INSTITUTO NACIONAL DE PESQUISAS DA AMAZÔNIA – INPA

Universidade Federal do Amazonas – UFAM

Programa Integrado de Pós-graduação em Biologia Tropical e Recursos Naturais

Mestrado em Agricultura no Trópico Úmido – ATU

ANÁLISE FILOGENÉTICA DE BACTÉRIAS RIZOSFÉRICAS DE DUAS ESPÉCIES FRUTÍFERAS DA AMAZÔNIA CENTRAL PELA CONSTRUÇÃO DE BIBLIOTECA GENÔMICA 16S rRNA

FABÍOLA DA SILVA RODRIGUES

Manaus - Amazonas
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Dissertação apresentada ao Programa Integrado de Pós-Graduação em Biologia Tropical e Recursos Naturais do convênio INPA/UFAM, como parte dos requisitos para obtenção do título de Mestre em CIÊNCIAS AGRÁRIAS, área de concentração em AGRICULTURA NO TRÓPICO ÚMIDO.

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Dedicatória

As pessoas mais importantes da minha vida...

Dedico minha conquista, aos meus amados pais,

Que sempre me mostraram a importância dos estudos,

O valor da honestidade e do caráter.

Por todo amor, carinho e apoio presentes em todos os momentos da minha vida.

Ao meu noivo **Ricardo**, *minha alma gêmea, por todo amor, paciência e companheirismo.*

Vocês são os maiores presentes que Deus poderia ter me dado!

Dedico.

AGRADECIMENTOS

Em primeiro lugar a Deus e Nossa Senhora, que me protegem todos os dias e guiam meus caminhos, por me darem toda força, perseverança e fé em todas as etapas desta pesquisa, em especial nas horas mais difíceis no laboratório, onde pensei jogar tudo para o alto.

Aos meus queridos pais, Francisco e Valdeci pelo estimulo constante e amor incondicional.

Ao meu noivo Ricardo por entender que domingo também é dia de laboratório, por todo amor, conforto e por compartilhar comigo todos os momentos sejam eles delicados e tristes ou felizes como a obtenção de um resultado positivo.

Ao meu orientador Luiz Antonio de Oliveira, pela liberdade com que me permitiu trabalhar, pela experiência passada, apoio e dedicação.

A minha co-orientadora Luciana Leomil, pela amizade, paciência, incentivo nas horas de desespero e por acreditar em meu trabalho quando nem eu mais acreditava.

Ao professor Spartaco por ter me recebido em seu laboratório de braços abertos e por todos os ensinamentos e dicas científicas.

A minha amiga Laura, por estar presente em várias fases da minha vida e pela amizade verdadeira.

Aos meus amigos do mestrado, grandes amigos, em especial Natasha, Grace, Marcos e Andrey, vocês sempre estarão em meu coração.

Ao Francisco Wesen e Manuelzinho, pela ajuda nas coletas de material no campo, meu agradecimento especial;

Ao Raimundo e Jonas pela grande contribuição nas análises químicas e físicas dos solos e momentos divertidíssimos no laboratório;

Aos amigos do laboratório de tecnologia de DNA da UFAM, Jonso, Dina, Gabi, Pessoa, Belle, Gisele, Diana e Lívio, que ao longo desse período sempre me ajudaram na execução do meu trabalho, e principalmente pelo convívio agradável;

Ao grupo Leomil, Mirna, Luna, Carolzinha, Ciça, meninas, nunca pensei que fosse fazer amizades para toda a vida no mestrado, muito abrigada por fazer até mesmo a bancada um lugar divertido, em especial Luna e Carolzinha, pela ajuda nas análises das seqüências.

Ao Instituto Nacional de Pesquisas da Amazônia, por ter me dado a oportunidade de fazer o mestrado.

A Fundação de Amparo a Pesquisa do Estado do Amazonas – FAPEAM – pela concessão da bolsa de mestrado e financiamento desta pesquisa.

Depois de algum tempo você aprende que...

... O tempo não é algo que possa voltar para trás. Portanto, plante seu jardim e decore sua alma, ao invés de esperar que

RESUMO

Os microrganismos apresentam grande diversidade fenotípicas e genéticas, desempenhando funções únicas e cruciais na manutenção dos mais variados ecossistemas. Devido a essa complexibilidade, métodos convencionais que usam meios de cultura seletivos são limitados, pois apenas uma pequena fração dos microrganismos pode ser cultivada. Técnicas moleculares vêm sendo aplicadas, com sucesso, para maximizar a caracterização de comunidades microbianas. Considerando a escassez de estudos relacionados à diversidade bacteriana dos solos da Amazônia Central, o presente trabalho teve como objetivo estimar e comparar a comunidade bacteriana do solo rizosférico de duas espécies frutíferas de grande importância regional, o cupuaçu (CUP) e o camu-camu (CAM), cultivadas em dois diferentes tipos de solos. Foram realizadas análises físico-químicas dos solos rizosféricos para determinar se há influência na composição das comunidades bacterianas encontradas no solo. O DNA genômico total das quatro amostras de solo rizosférico extraído foi purificado para remoção de ácidos húmicos e outros contaminantes para ser usado como molde em uma reação em cadeia de polimerase (PCR) utilizando "primers" específicos do gene 16S rRNA para o domínio bactéria. Os "amplicons" foram clonados em vetor TOPO TA e 1.536 clones foram selecionados. As seqüências foram comparadas em banco de dados públicos, como "GenBank" e RDP II. Quando analisadas em nível de espécie, a maior parte das seqüências encontram-se na condição de não conhecidas e ou não cultivadas. Ao comparar as seqüências por classes, dezesseis classes foram encontradas, sendo que, a predominância em todas as bibliotecas foi da classe *Acidobacteria*, correspondendo 41, 40 e 50% da constituição de CAM2, CUP1 e CUP2 respectivamente. O que sugere que o pH dos solos da Amazônia exerce função seletiva nas comunidades bacterianas neles encontradas.

Palavras-chave: diversidade bacteriana, 16S rRNA, solos rizosféricos, camu-camu, cupuaçu.

ABSTRACT

The microorganisms present great phenotypic and genetic diversity, performing unique and crucial functions in the maintenance of the most varied ecosystem. Due to this complexibility, conventional methods that use means of selective culture are limited, since only a small fraction of the microorganisms can be cultivated. Molecular techniques are being applied, successfully, to maximize the characterization of microbial communities. Considering the scarcity of studies related to the bacterial diversity of soils in central Amazon, the present study had the objective of estimating and comparing the bacterial community in rhizospheric soil of two fruit species of great regional importance, the cupuaçu (CUP) and the camu-camu (CAM), cultivated in two different types of soil. Physical and chemical analyses of the rhizospheric soil were made to determine if there is influence in the composition of the bacterial communities found in the soil. The total genomic DNA of the four extracted rhizospheric soil samples were purified to remove humic acids and other contaminations, in order to use it as a mold in a polymerase chain reaction (PCR) using specific primers of the 16S rRna gene to the bacteria domain. The amplicons were cloned in a vector TOPO TA and 1.536 clones were selected. The sequences were compared in public data banks, such as GenBank and RDP II. When analyzed on the species level, most of the sequences were found to be in the condition of unknown and/or non-cultivated. Comparing the sequences by classes, sixteen classes were found. Given these results, the predominance in all the libraries belonged to the acidbacteria, corresponding to 41, 40 and 50% of the CAM2, CUP1 e CUP 2 constitution, respectively, which suggests that the pH of the Amazon soils exerts selective function in the bacterial communities where it was found.

Keywords: bacterial diversity, 16S rRNA, rhizospheric soil, camu-camu, cupuaçu.

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1 INTRODUÇÃO

A Amazônia é detentora da maior biodiversidade do planeta. Estimativas mostram que nela encontram-se cerca de 16% das espécies vegetais conhecidas, de um total de 500.000, compreendendo assim, aproximadamente 75.000 espécies na região, podendo ser encontrado em um único hectare mais de 250 árvores com o diâmetro do caule superior a 10 cm (Oliveira, 2006). Sua fauna é representada por um número de 15.000 espécies documentadas, sendo que 25% das espécies de pássaros já catalogados residem na Amazônia (Prance, 1977). Embora a diversidade da fauna e flora tenham sido pesquisadas ao longo do tempo, a microbiota amazônica é praticamente desconhecida (Azevedo, 1998). A primeira descrição da diversidade microbiana em terras amazônicas utilizando ferramentas moleculares foi apresentada por Borneman & Triplett (1997), em um estudo realizado na Amazônia Oriental.

Os microrganismos apresentam uma imensa diversidade genética e desempenham funções únicas e cruciais na manutenção de ecossistemas, sendo, portanto, componentes fundamentais de cadeias alimentares e ciclos biogeoquímicos. No entanto, apesar de sua importância na manutenção da biosfera, estimativas recentes indicam que os microrganismos constituem quase que 90% das espécies da Terra, enquanto que somente 5% dessa totalidade foram caracterizados e descritos até o momento. Em relação às bactérias e fungos, o número decai ainda mais, pois apenas 1% são conhecidos (Canhos & Vazoller, 1999). Na Amazônia, essa condição é ainda mais crítica devida sua enorme extensão territorial e o delimitado recurso humano existente na região (Azevedo, 2006).

Devido à complexidade da população de microrganismos, métodos convencionais que usam meios de cultura seletivos são limitados, pois apenas uma pequena fração dos organismos pode ser estudada (Torsvik *et al.*, 1990). Técnicas modernas e mais eficientes no estudo da microbiota do solo, como o uso de ferramentas moleculares, vêm sendo aplicadas para maximizar a caracterização da diversidade microbiana. O uso de tais ferramentas é, portanto, imprescindível para

melhor compreender os processos de decomposição da matéria orgânica, reciclagem de nutrientes e as interações entre microrganismos e plantas.

Uma das ferramentas utilizadas é a pesquisa com o gene 16S rRNA, que revolucionou o campo da ecologia microbiana e, com seu uso, é possível investigar e determinar posições filogenéticas de comunidades de meio ambiente (Woese, 1990; Ludwig *et al*., 1997; Kuske *et al*., 1997).

Os ácidos ribonucléicos ribossomais (rRNA) são considerados os biopolímeros mais adequados para estudos de diversidade. Seus genes, os rRNAs, são universalmente distribuídos entre os diferentes grupos de seres vivos, sendo a molécula com maior grau de conservação existente (Reis Junior *et al*., 2002). Uma das vantagens de se usar informações sobre as seqüências do rRNA é sua disponibilização em bases de dados (RDP, Gen-Bank, EMBL), na maioria dos casos, acessíveis, gratuitamente, permitindo a comprovação de novas seqüências obtidas com as seqüências presentes nessas bases (Coutinho *et al*., 1999).

Considerando a escassez de estudos relacionados à diversidade de bactérias dos solos da Amazônia Central, o presente trabalho tem como objetivo, comparar e estimar a comunidade bacteriana do solo rizosférico de duas espécies frutíferas em dois diferentes tipos de solos, sendo uma propriedade onde se realiza tratos silviculturais, como adubação química, e outra sem que haja de forma efetiva a intervenção, ambas localizadas em uma comunidade rural do Estado do Amazonas.

2 OBJETIVOS

2.1 OBJETIVO GERAL

Analisar a diversidade filogenética de bactérias do solo rizosférico de duas espécies frutíferas nativas da Amazônia (camu-camu - *Myrciaria dubia* e cupuaçu - *Theobroma grandiflorum*) cultivadas em solos distintos pela técnica de seqüenciamento do gene 16S rRNA.

2.2 OBJETIVOS ESPECÍFICOS

- Determinar os teores de macro e micronutrientes no solo rizosférico das espécies estudadas;
- Isolar o DNA de comunidades bacterianas do solo rizosférico de duas espécies frutíferas encontradas em dois solos de propriedades rurais diferentes;
- Amplificar o gene 16S rRNA das bactérias do solo rizosférico das espécies frutíferas;
- Construir bibliotecas genômicas 16S rRNA dos quatro diferentes tipos de solos;
- Seqüenciar e identificar a comunidade bacteriana presente nas bibliotecas genômicas;
- Analisar filogeneticamente a estrutura das comunidades encontradas;
- Comparar a biodiversidade bacteriana presente nas rizosferas das espécies frutíferas cultivadas em diferentes solos.

3 REVISÃO DE LITERATURA

3.1 Solos de Terra Firme da Amazônia

A Amazônia caracteriza-se basicamente por apresentar solos de baixa fertilidade e acidez elevada. Cerca de 80% da floresta tropical úmida encontra-se localizada nos Latossolos e Argissolos em área de terra firme. Apesar da fragilidade desses solos, a floresta é mantida em equilíbrio por meio de uma ciclagem eficiente dos nutrientes medida por uma complexa rede de interações entre as plantas, os animais e os microrganismos (Alfaia *et al*., 2005).

Os solos amazônicos são resultados do intenso processo de lixiviação que vem ocorrendo há milhões de anos. O clima da região, quente e úmido, favorece os processos de intemperização das rochas e a lixiviação dos metais alcalinos e alcalinos terrosos; a exposição do solo por longo tempo à ação das chuvas abundantes e de temperaturas elevadas, aliada às grossas texturas do substrato geológico, permite fácil drenagem da água de percolação, tornando o intemperismo mais intenso (Schubart *et al*., 1984).

Diversos autores mostraram em seus trabalhos, que as principais carências dos solos amazônicos são químicas. Problemas como a elevada acidez, deficiência do solo em fósforo (P), baixa capacidade de troca catiônica, alto teor de alumínio trocável (Al^{+3}) e uma representativa deficiência de nitrogênio (N), potássio (K), Cálcio (Ca), magnésio (Mg), boro (B), cobre (Cu), zinco (Zn), podem ser tomados como os principais entraves edáficos para o cultivo na região (Hecht, 1985; Chauvel *et al*., 1987; Sanchez, 1987).

Aproximadamente 90% dos solos amazônicos são deficientes em nitrogênio e fósforo. Essa deficiência natural é ainda mais elevada devido às práticas agrícolas neles cultivadas (Nicholaides *et al*., 1983; EMBRAPA, 1990).

Apesar de todos os aspectos negativos conhecidos, a exuberância da floresta de terra firme é garantida por um mecanismo particular de disponibilidade e retenção

de nutrientes essenciais à sua manutenção, ao lado da existência das condições básicas de calor e umidade (Franken *et al*., 1985). A elevada eficiência na reciclagem de nutrientes observada nas florestas tropicais tem sido correlacionada com a sua alta diversidade biológica; e a reciclagem de nutrientes se contrapõe à lixiviação dos solos, pois representa um mecanismo de conservação de nutrientes no ecossistema, promovendo, ao mesmo tempo, a produtividade biológica e o bom estado nutricional das plantas (Schubart *et al*., 1984).

No sistema Amazônico, a dinâmica do aproveitamento dos nutrientes é mais intensa no período chuvoso, quando o aumento da umidade favorece as atividades da biota do solo no processo de mineralizar a matéria orgânica acumulada durante o período de baixa precipitação. A estrutura macroscópica da floresta de terra firme está caracterizada por um fluxo lento de entrada – saída, e um fluxo rápido de reciclagem (Walker & Franken, 1983).

Considerando que a ciclagem de nutrientes assegura a manutenção da floresta de terra firme, a remoção das árvores e a substituição de floresta por pastagens ou outras atividades agrícolas leva à diminuição de nutrientes do compartimento biomassa, transferindo-os temporariamente ao solo (Ferreira *et al*.,2006).

A fertilidade natural da maioria dos solos amazônicos diminui de forma acentuada quando é retirada sua cobertura vegetal e, portanto, torna-se necessário desenvolver sistemas agrícolas adequados que permitam melhorar sua recuperação, assim como desenvolver e utilizar tecnologias direcionadas aos fatores de produção (Pereira *et al*., 2000).

A solução para a atividade agrícola nos solos de terra firme da Amazônia seria, então, a implantação de técnicas específicas, como o manejo adequado do solo, o cultivo de espécies pioneiras, a utilização de plantas fixadoras de nitrogênio, o uso de fertilizantes artificiais, incluindo os macro e micronutrientes (Salati *et al*., 1998), além de associações simbióticas mutualísticas entre plantas e microrganismos benéficos do solo. A comunidade microbiana dos solos é a principal responsável pela decomposição dos resíduos orgânicos, pela ciclagem de nutrientes e pelo fluxo de energia dentro do solo, exercendo influência tanto na transformação da matéria orgânica, quanto na estocagem do carbono e nutrientes minerais (Jenkinson & Ladd, 1981; Oliveira & Oliveira, 2003).

Para que os sistemas produtivos dos agricultores regionais sejam bem sucedidos, faz-se necessário mesclar técnicas de cultivos tradicionais aliadas a técnicas de baixo uso de insumos agrícolas. Dentro desse contexto, a utilização de microrganismos benéficos do solo voltada para o melhor aproveitamento dos nutrientes minerais pelas plantas é uma alternativa desejável. Entre esses organismos, alguns que se associam às raízes das plantas, como os fungos micorrízicos arbusculares, bactérias do gênero *Rhizobium*, entre outros, as tornam menos dependentes de adubos químicos acarretando assim, uma economia destes insumos e ao mesmo tempo proporcionando uma maior produtividade dos solos (Oliveira & Oliveira, 2003).

3.2 Solo Rizosférico

O termo rizosfera foi utilizado pela primeira vez em 1904 pelo pesquisador alemão Hiltner, para definir a zona de influência direta da raiz, que se inicia na superfície das raízes, estendendo-se até 1 a 3 mm do solo adentro, podendo atingir 5 mm. Esta é a região de maior atividade física, química e, principalmente biológica, nela ocorre a maior parte das interações entre os microrganismos do solo e as plantas, tornando-se alvo de grande interesse agronômico, ecológico e biotecnológico (Siqueira & Franco, 1988; Siqueira *et al*., 1994).

A presença de raízes e as modificações físicas e químicas que elas promovem criam um ecossistema muito especializado, onde a população microbiana é altamente favorecida com a quantidade e qualidade das fontes de carbono presentes nos exsudatos radiculares, atingindo populações até 100 vezes superiores ao solo adjacente (Siqueira & Franco, 1988; Lynch, 1990; Schmalenberger & Tebbe, 2002). Em áreas fora da zona de influência das raízes, o solo pode ser considerado oligotrófico, ou relativamente pobre em fontes de carbono disponíveis (Rosado, 2000). Os exsudatos radiculares contêm uma miscelânea de compostos como açúcares, ácidos orgânicos, aminoácidos, peptídeos, nucleotídeos, vitaminas e outros compostos biologicamente ativos (Foster, 1986; Siqueira *et al*., 1994).

A rizosfera é um ambiente mutável, uma vez que a sua composição e sua estrutura são influenciadas durante o ciclo vegetativo. Suas dimensões também são determinadas pelo tipo, composição e umidade do solo. A vegetação acima do solo

pode modificar as características químicas do solo nas proximidades de suas raízes através dos fragmentos descascados da superfície das raízes e dos exsudatos radiculares solúveis, do consumo de O_2 e liberação de CO_2, da absorção seletiva de íons nutritivos, do consumo de H_2O, entre outros (Foster, 1986; Siqueira *et al*., 1994).

A composição da comunidade microbiana na rizosfera é determinada principalmente pela quantidade e qualidade das fontes de carbono presentes nos exsudatos radiculares (Lynch, 1990). Diversos componentes destes atuam como sinais moleculares que controlam as interações planta-microrganismos (Moreira & Siqueira, 2002). As raízes recebem entre 30 a 60% do C fotossintetizado, dos quais 10 a 20% são liberados por rizodeposição (Marschner, 1991). Esta disponibilidade de fontes de nutrientes e energia é atraente para bactérias e fungos no solo, estimulando uma variedade de interações (positivas, neutras ou negativas) com a planta (Andrew *et al*., 2003).

Assim, a rizosfera representa um sistema biológico de grande complexidade, tendo a necessidade de serem investigadas e conhecidas suas interações intimamente associadas entre os vegetais e os microrganismos (Pelczar *et al*., 1981).

3.3 Diversidade Microbiana dos Solos

Em microbiologia, o termo biodiversidade tem sido definido como o número de diferentes espécies em uma comunidade, para um ambiente específico. Do ponto de vista da ecologia molecular, biodiversidade pode ser definida como o número de seqüências de DNA divergentes presentes no DNA total extraído de uma comunidade, para um ambiente específico (Garbeva *et al.*, 2004).

Os microrganismos, de maneira geral, estão largamente distribuídos por todo o planeta, participando de quase todos os aspectos da existência humana com efeitos benéficos e nocivos (Pelczar *et al*., 1996). A diversidade da microbiota do solo é extremamente elevada. Por meio da análise da cinética de reassociação de DNA, tem sido estimado que em um grama de solo possa conter mais de 10.000 genomas diferentes (Torsvik *et al*., 1998). Esses organismos representam o repertório mais rico em diversidade química e molecular da natureza, constituindo a base de

processos ecológicos, como os ciclos biogeoquímicos e a cadeia trófica, além de manter relações vitais com organismos superiores (Hunter-Cevera, 1998).

Poucos ambientes fornecem tão grande variedade de microrganismos, como o solo. Bactérias, fungos, algas, protozoários e vírus formam a coleção microscópica que pode alcançar um total de bilhões de organismos por grama de solo. A diversidade de microrganismos é tão vasta quanto desconhecida. Um grama de solo pode conter 10 bilhões de microrganismos, representando milhares de espécies (Rosseló-Mora & Amann, 2001).

O número de espécies microbianas identificadas cresce a cada ano, sendo descritos mais de 47.000 fungos, 30.000 protozoários, 26.000 algas, 5.000 bactérias e 1.000 vírus. Esses números são, no entanto, pequenos diante do total de espécies, estimado em cerca de dois milhões (Wiilson, 1988; Rosselló-Mora & Amman, 2001). Isso significa que foram descobertas e nomeadas até o presente momento, menos de 0,1% e no máximo 10% das espécies microbianas (Trüper, 1992; Rosseló-Mora & Amman, 2001). Alguns autores, como Pace (1986); Torsvik & Øvreås (2002) associam esta realidade a razão de que, até pouco tempo atrás, os microrganismos tinham que ser cultivados para serem identificados, além deste fator limitante, o tamanho microscópico dos microrganismos, a freqüência de ocorrência faz populações, a sazonalidade, e em muitos casos, a dependência de hospedeiros e/ou substratos específicos para sua sobrevivência e multiplicação também podem ser consideradas relevantes limitações.

O estudo da diversidade microbiana nos solos é essencial para definir estratégias para preservação da biomassa e proporcionar parâmetros para desenvolver sistemas que indicam alterações ambientais, associadas geralmente, pela utilização não sustentável de solos agrícolas. Além destes fatores, a diversidade microbiana benéfica dos solos pode ser tomada como um suposto indicador da qualidade do solo.

O entendimento atual do conceito de qualidade do solo compreende o equilíbrio entre os condicionantes geológicos, hidrológicos, químicos, físicos e biológicos do solo (Bruggen & Semenov, 2000; Sposito & Zabel, 2003).

O conceito de qualidade do solo surgiu no final da década de 70, e durante os 10 anos seguintes esteve muito associado ao conceito de fertilidade. Acreditava-se, que um solo quimicamente rico era um solo com alta qualidade, isto porque tinha a

capacidade de promover a produção agrícola. Entretanto, a percepção de qualidade do solo evoluiu, principalmente nos últimos 10 anos. E em um entendimento mais amplo, percebe-se que não basta apenas o solo apresentar alta fertilidade, mas, também possuir boa estruturação e abrigar uma alta diversidade de microrganismos (Karlen *et al*., 2003; Zilli *et al*., 2003). Portanto, a diversidade microbiana tem figurado como importante indicador da qualidade do solo por estarem na base da cadeia trófica e intrinsecamente ligados aos diversos processos ecológicos do solo (Zilli, 2003).

3.4 Métodos Moleculares para Análise de Microrganismos

Pela complexidade da população de microrganismos, métodos convencionais que usam meios de culturas seletivos são limitados, pois uma pequena fração dos organismos pode ser isolada e assim estudada. Além disso, os microrganismos que conseguem crescer em meios artificiais não são necessariamente metabólica ou numericamente dominantes no meio natural de onde foram retirados (Muyzer & Ramsing, 1995).

A necessidade de métodos mais eficientes, capazes de caracterizar a diversidade de microrganismos é, portanto, imperativa para melhor compreender os processos de decomposição da matéria orgânica e reciclagem de nutrientes. A partir do início da década de 90, com o desenvolvimento dos métodos moleculares para a análise de microrganismos a partir de amostras de DNA ambiental (Ward *et al*., 1992), abriram-se novas perspectivas de pesquisa. A utilização de tais métodos tem resultado num melhor conhecimento da sucessão microbiana, dos diferentes níveis tróficos relacionados com a decomposição da matéria orgânica e a importância relativa de componentes nas suas múltiplas funções e nos seus *habitats* naturais (Peters *et al*., 2000).

Um grande avanço nos estudos de ecologia microbiana foi dado com o advento de técnicas moleculares, baseadas na análise do DNA de microrganismos retirado diretamente dos ambientes naturais, sem a necessidade de multiplicação prévia das células (Benlloch *et al*, 1995). O uso de ferramentas moleculares tem sido cada vez mais aplicado na área de agronomia/Ciência do solo. Somando aos métodos tradicionais, essas ferramentas têm permitido uma nova abordagem científica nos

estudos de microbiologia do solo, possibilitando assim um melhor entendimento dos mecanismos envolvidos (Xavier *et al*., 2004).

As técnicas moleculares mais bem sucedidas e amplamente utilizadas tem sido baseadas no uso do gene 16S do RNA ribossômico ou o gene 16S rRNA , no caso de procariotos e o 18S rRNA para o caso de eucariotos. A importância da utilização deste gene para a Ecologia Molecular foi revista por Macrae (2000) mostrando o histórico do desenvolvimento e a aplicação dos métodos baseados no 16S rRNA, que possibilitem a identificação do relacionamento filogenético entre todos os seres vivos por sua distribuição universal, conservação de sua estrutura e função, seu tamanho e a presença de seqüências divergentes. Os dados gerados possibilitam a caracterização da estrutura fundamental da microbiota presente em uma determinada amostra, permitindo a identificação de espécies predominantes, que podem ser utilizadas como indicadores de funcionalidade e equilíbrio. Segundo Schwieger & Tebbe (2000), métodos baseados na caracterização do DNA total extraído de uma comunidade microbiana são bastante confiáveis na identificação de bactérias isoladas, além de apresentarem resultados mais rapidamente do que os métodos fenotípicos convencionais.

O primeiro estudo a ser publicado sobre a diversidade bacteriana utilizando apenas ferramentas moleculares em solos da Amazônia, foi realizado por Borneman & Triplett (1997). Nesse estudo, foram obtidos 100 clones por meio da amplificação do gene 16S rRNA. O conceito de clonagem de DNA extraído diretamente do ambiente natural, independentemente do cultivo prévio, foi sugerido inicialmente por Pace *et al.* (1986), porém somente após cinco anos foi executado por Schimidt *et al* (1991). Em seu trabalho, foi realizado a partir da extração do DNA total da comunidade bacteriana, a construção de uma biblioteca de DNA em bacteriófago lambda, seleção por hibridação com uma seqüência especifica de 16S rRNA, determinação das seqüências dos clones contendo o gene e análise comparativa das seqüências encontradas.

Os métodos avançados de biologia molecular para seqüenciamento quando comparados com os tradicionais de cultivo de isolados em meios de cultura, mostram-se com larga vantagem, uma vez que grande parte das bactérias presentes em amostras ambientais não são cultiváveis ou são difíceis de cultivar (Rondon; Goodman; Haldesman, 1999). Em seus estudos sobre a diversidade genética de

organismos não cultiváveis de fontes termais, ambientes marinhos e ambientes terrestres, Hugenholtz *et al.* (1998) observaram que a maior parte das seqüências obtidas e analisadas pertencia a microrganismos que não apresentavam relação com microrganismos cultiváveis já seqüenciados e pertencentes a banco de dados públicos. Um outro exemplo é o trabalho publicado por Venter *et al.* (2004), onde foi constatado que das 1400 espécies de bactérias, reveladas a partir de amostras de DNA extraídas de Mar de Sargasso, aproximadamente 150 destas eram desconhecidas. Um estudo com grande impacto, quando analisado à ocorrência de seqüências desconhecidas, foi o realizado por Lambais *et al.* (2006) sobre a diversidade bacteriana na filosfera de árvores da Floresta Atlântica onde 97% do total de 428 genes 16S rRNA seqüenciados pertenciam às espécies desconhecidas.

Dentro desse contexto, vale ressaltar a importância do conhecimento da comunidade bacteriana presente em solos tropicais da Amazônia Central. O levantamento ecológico por meio de técnicas moleculares e a aplicação dessas comunidades são desconhecidos até o presente momento, estudos tímidos começam a ser efetuados.

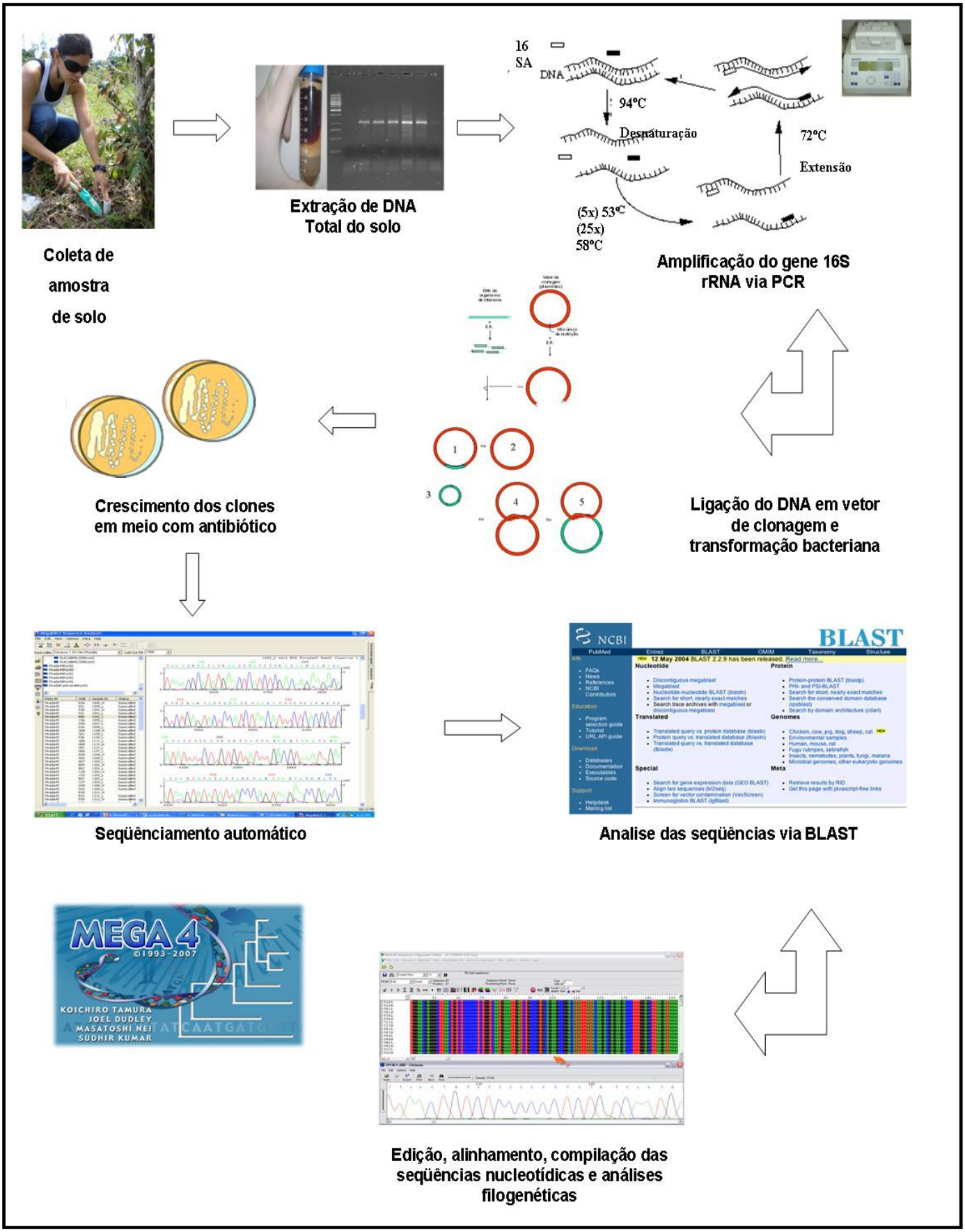

Figura 1 - Esquema ilustrativo para análise da diversidade bacteriana por meio da clonagem e seqüenciamento do gene 16S rRNA

3.5 ESPÉCIES FRUTÍFERAS DA AMAZÔNIA

Considera-se que há na Amazônia um dos maiores estoques de espécies frutíferas tropicais mundiais, a maioria delas com frutos comestíveis (Cavalcante, 1976; Calzavara, 1978; Clement, 1982).

O camu-camu e o cupuaçu são espécies nativas da Amazônia, e estão entre as dez frutas brasileiras que possuem um alto potencial econômico de comercialização, sendo com sua polpa ou outros produtos advindos de seus ricos frutos. Ao mesmo tempo, são pouco conhecidas pela população (Donadio, 1995; Ferreira & Gentil, 1997).

Desta forma, para proporcionar o aproveitamento do potencial econômico destas espécies e incorporá-las definitivamente à lista de produtos comerciais, torna-se necessário ampliar os estudos aplicados para melhor produção e aproveitamento, com tecnologias ecológicas, econômicas e sociais. A aplicação de tecnologia com baixo uso de insumos agrícolas como a utilização de microrganismos benéficos do solo voltada para o melhor aproveitamento dos nutrientes pelas plantas é uma alternativa desejável.

3.5.1 Camu-camu - *Myrciaria dubia (H.B.K.) McVaugh*

O camu-camu é uma espécie frutífera nativa das várzeas e cursos dos rios da Região Amazônica, onde se encontra amplamente distribuído. Esta distribuição geográfica estende-se desde a região central do Estado do Pará, passando pelo médio e alto Rio Amazonas até a parte ocidental do Peru e extremo setentrião brasileiro, no Estado de Roraima e através do Rio Casiquiare, e grande parte da alta e média Bacia do Orinoco. Ao sul, no Estado de Rondônia ocorrem às margens dos Rios Ji-Paraná e Candeias (Ribeiro *et al*., 2000).

No Brasil, a espécie apresenta as denominações mais comuns como araçá, araçazinho, araçá-d'água, araçá do igapó, caçari, sarão, araçá azedo, azedinho, socoró e murta (Ferreira, 1986; Cavalcante, 1991; Ribeiro *et al*., 2000), guayabito na Venezuela, guayabo na Colômbia (Clement, 1986) e rumberry nos Estados Unidos

(Cavalcante, 1991), porém, a maioria das referências adotou a denominação mais conhecida, que recebeu no Peru: camu-camu (Villachica, 1996).

O camu-camu é um arbusto que alcança uma altura de 3 a 6 metros, se ramifica desde a base formando vários ramos secundários que se ramificam na forma de um vaso aberto. O tronco e os ramos são glabros, cilíndricos, lisos, de coloração marrom claro ou avermelhada, cuja casca se desprende facilmente. Possui raízes profundas e muitos pêlos absorventes (Riva Ruiz, 1994; Villachica L., 1996).

Os frutos são do tipo baga esférica de superfície lisa e brilhante, coloração variando de vermelha a arroxeada, podendo ter de 2cm a 4cm de diâmetro, e uma a quatro sementes aplainadas e cobertas por uma lâmina com fibras brancas. A porção comestível tem rendimento médio de 60% do fruto (Ribeiro *et al*.,2000).

Em virtude da elevada acidez de sua polpa, dificilmente o fruto é consumido *in natura* na alimentação humana (Ferreira, 1986). Porém, por se tratar da maior fonte natural de vitamina C conhecida, os frutos apresentam alto potencial de aproveitamento pela indústria na obtenção de polpas congeladas, suco concentrado, suco liofilizado, néctar, sorvetes, geléia, licor e xaropes concentrados (Alvarado, 1969; Andrade, 1991; Suguino, 2002; Maques, 2005).

A exploração, geralmente, é efetuada em populações naturais distribuídas em rios amazônicos, cuja produção pode variar de 3 a 25 quilos de frutos frescos por planta. O rendimento dos frutos em pomares de implantados em condições de terra firme, no espaçamento de 3m x 3m pode ser obtido produções iniciais de até 6 quilos de frutos frescos por planta/safra, que corresponde a 6,7 toneladas de frutos frescos por hectare/safra (Ribeiro *et al*., 2002).

Dada a sua importância como fruto nativo e como rica fonte de vitamina C, o aproveitamento de pomares naturais merece redobrada atenção, pois esses locais se apresentam mais produtivos e com custos menores, considerando-se eficiente a sua exploração nestas condições. Essa atitude acarreta uma excessiva atividade exploratória destas populações silvestres e pode provocar um negativo impacto sobre a abundância de camu-camu e sobre toda a cadeia trófica que está baseada em seus frutos (Peters & Vasquez, 1987).

Pesquisas comprovam que o camu-camu tem em sua composição química, em 100 g de polpa, 93% de água, 24 calorias, 0,5 g de proteínas, 5,0 g de carboidratos,

0,4 g de fibras, 0,2 g de cinzas, 28,0 mg de cálcio, 15,0 mg de fósforo, 0,5 mg de ferro, 0,01 mg de tiamina, 0,04 mg de riboflavina, 0,061 mg de niacina e 2,780 mg de ácido ascórbico reduzido (Riva Ruiz, 1994; Ferreira & Gentil, 1997).

A polpa pode ser encontrada em países como Japão, França e Estados Unidos, nas formas liofilizadas e congeladas, para uso na agroindústria e indústria farmacêuticas, bem como transformadas nas formas de dropes e tabletes de vitamina "C" (Ribeiro *et al*., 2002).

3.5.2 Cupuaçu - *Theobroma grandiflorum* (Willdenow ex Sprengel)

O cupuaçu é uma fruteira arbórea nativa da Amazônia Brasileira, sua distribuição geográfica originalmente restringia-se às áreas de floresta nativa ao sul do rio Amazonas, oeste do rio Tapajós, incluindo o sul e sudeste do Estado do Pará e a região "pré-amazônica" do Estado do Maranhão. Trata-se de uma espécie pré-colombiana que, possivelmente, foi disseminada, de seu centro de origem, para todos os estados da região Norte, através da intensa movimentação das nações indígenas no interior da Amazônia (Calvazara *et al*., 1984; Clement, 1999; Cavalcante 1991).

Atualmente, o cupuaçu esta sendo cultivado, em pequena escala, em vários estados brasileiros, como Bahia, São Paulo e Paraná, mas também em outros paises como Guiana, Martinica, Equador, São Tomé, Trindad, Gana e Costa Rica estão dando início a seu cultivo (Venturieri & Aguiar, 1998).

O cupuaçuzeiro é uma árvore que, em condições naturais, é retilínea, podendo atingir mais de 30 m de altura e perímetro de tronco superior a 100 cm. Nas áreas cultivadas sua altura varia de 6 a 10 m, porém, parte dos agricultores efetua a poda após o segundo fluxo de lançamentos, para forçar a emissão de ramos secundários e, com isso reduzir a altura da planta. O tronco possui coloração acinzentada com manchas brancas (Prance & Silva, 1975; Calzavara *et al*., 1984; Cavalcante, 1991). O sistema radicular apresenta grande proporção de raízes finas que se encontram próximas à superfície (Haag, 1997).

Os frutos são do tipo baga drupácea oblonga, elipsóide ou oboval, com as extremidades obtusas ou arredondadas (Prance & Silva, 1975; Calzavara *et al*., 1984; Cavalcante, 1991). O endocarpo, parte comestível do fruto, tem coloração

branco-amarelada, recobre as sementes e de sabor ácido e odor agradável (Calzavara *et al*., 1984; Venturieri, 1993; Souza *et al*., 1996).

O consumo dos frutos dificilmente é *in natura*, em virtude da sua alta acidez. Grande parte dos frutos é beneficiado em forma de bombons, balas, biscoitos, sorvetes, doces, compotas, sucos e polpas congeladas. As sementes, que representam cerca de 15% do peso do fruto, possuem aproximadamente 60% do seu peso seco, constituídas de uma fina gordura, de fácil digestibilidade composta principalmente, por ácidos oléicos e esteárico (Vasconcelos *et al*., 1975), das quais podem ser obtido um produto muito similar ao chocolate oriundo do cacauzeiro (Souza *et al*., 1996).

A utilização de sementes de cupuaçu como sucedâneo para o cacau, ainda não se tornou realidade, em virtude dos baixos preços para aquisição do cacau e a carência de tecnologias apropriadas para disponibilizar ao mercado um produto de melhor qualidade. Essa utilização parece ter mais chances, em curto prazo, na indústria de cosméticos, onde alguns produtos estão sendo ofertados ao mercado (Alves, 2002).

A produção do cupuaçu tem início no terceiro ano de cultivo, contudo é bastante irregular, com grande variação entre plantas e sendo ainda bastante sensível a variações das condições climáticas (Locatelli *et al*., 2001; Reisdorff *et al*., 2002). Em média, a produção de cupuaçuzeiros nativos é de 25 frutos/pé (Homma *et al*., 2001). Em condições de cultivo a variação de produção entre as plantas é muito mais pronunciada, estima-se em média 12 frutos/pé, esta variação é acentuada devido à desuniformidade do material genético e as diversas formas de manejo (Calzavara *et al*., 1984).

Diversas pesquisas já foram realizadas sobre as características físicas e químicas do fruto do cupuaçu. O que se pode comprovar é que estas características são bastante variáveis. Venturieri (1993) e Carvalho *et al*. (1999) relatam estudos comparativos entre diferentes autores que realçam a diversidade dos resultados disponíveis, decorrentes de características intrínsecas dos materiais e da falta de padronização das metodologias de avaliação e análise.

4 MATERIAL E MÉTODOS

4.1 Localização e Área de Estudo

O estudo foi realizado na comunidade rural do Brasileirinho, situada na periferia de Manaus (AM) na Zona Leste da cidade, em uma área ànteriormente pertencente à SUFRAMA, na estrada do Puraquequara. As coordenadas geográficas da área são: 3° 01' 20" Latitude e 59º 53' 45" Longitude em uma altitude de 92 m acima do nível do mar. O clima é classificado como Afi, tropical úmido, de acordo com a classificação de Köppen. A umidade relativa do ar é bastante elevada em toda a região, em torno de 80%. O solo predominante na área é o latossolo amarelo de textura argilosa, distrófico. A comunidade destaca-se por apresentar em suas propriedades grande número de espécies frutíferas de importância econômica para a região, tais como araçá-boi, cupuaçu, graviola, maracujá, ingá, pitanga, camu-camu, siriguela, abacaxi, acerola, manga e laranja, além de espécies florestais como pau-rosa, cedro, mogno e jatobá.

Figura 2 - Imagem de Satélite mostrando a Cidade de Manaus, a Reserva Adolpho Ducke e a Comunidade do Brasileirinho

4.2 Coleta de Solos

A coleta das quatro amostras de solos (duas de solo rizosférico do camu-camu e duas do cupuaçu), sendo de áreas distintas (Propriedade 1 e Propriedade 2) foi realizada no mês de maio de 2007. Estas quatro amostras foram obtidas com auxílio de tubos PVC de 2,5 x 10 cm a partir da rizosfera das espécies adultas avaliadas. Em cada coleta foram retiradas três amostras de solo (0-10 cm de profundidade) em torno de cada planta, usando individualmente três tubos de PVC previamente esterilizados com álcool 70%. Após as coletas, as amostras foram devidamente acondicionadas em sacos de polietileno em caixas de isopor com gelo seco, para manter sua umidade durante o transporte (Anderson & Ingran, 1993) No laboratório, as amostras foram homogeneizadas e separadas em sub-amostras para extração de DNA e análises químicas. As sub-amostras de solo para extração de DNA foram armazenadas em temperatura de 2 a 4ºC até serem avaliadas. Para as análises químicas, estas foram secas ao ar e posteriormente peneiradas. Para a

denominação das amostras foram utilizadas as seguintes siglas: CUP1 (Cupuaçu da Propriedade 1), CUP2 (Cupuaçu da Propriedade 2), CAM1 (Camu-camu da Propriedade 1) e CAM2 (Camu-camu da Propriedade 2).

4.3 Análise do solo para Avaliar Teores de Macro e Micro Nutrientes

As determinações analíticas das amostras de solo foram efetuadas no Laboratório Temático de Análise de Plantas e Solos, localizado na coordenação de pesquisas em Ciências Agronômicas do Instituto Nacional de Pesquisas da Amazônia - INPA, pelos métodos estudados e descritos pela EMBRAPA (1999).

As amostras de solos foram secas ao ar e peneiradas, e em seguida, foram analisadas para nitrogênio (N), fósforo (P), cálcio (Ca), magnésio (Mg), cobre (Cu), zinco (Zn), ferro (Fe), manganês (Mn), alumínio (Al), acidez potencial ($H^+ + Al^{3+}$), pH e teor de matéria orgânica (M.O). O N foi determinado por digestão sulfúrica pelo método semi-micro Kjeldahl; O P foi extraído com solução extratora HCl 0,05 1N e H_2SO_4 0,025 1N (Mehlich 1). O P assimilável foi determinado por colorimetria com vanadato-molibdato de amônio; os elementos K, Ca, Mg, Zn, Fe, e Mn foram determinados por espectrofotometria de absorção atômica. O Al foi determinado por titulometria, a acidez potencial $H^+ + Al^{3+}$ foi medida por extração com solução tamponada de acetato de cálcio 1N pH 7.0. O pH foi medido em água destilada (1:2,5). E o C foi determinado por oxidação via úmida com dicromato de potássio em ácido sulfúrico.

4.4 Extração de DNA Genômico

Do material coletado, aproximadamente 25g de solo homogeneizado de cada solo foi transferido para um tubo de centrífuga de 50 mL para extração de DNA genômico, que ocorreu por lise direta, utilizando-se o método fenol/clorofórmio descrito a seguir. Foram adicionados 32,5 mL de Tampão Z (100 mM Tris-HCl, pH 8,0; 100 mM solução de Na_2HPO_4); 100 mM EDTA (ácido etileno diaminotetracético, pH 8,0; 1,5 M NaCl); 1% m/v CTAB (Brometo dicetil-trimetil-amônio) em cada tubo e acondicionado por 40 minutos a -80ºC para congelar e posteriormente para

descongelar foi colocado em água a 65ºC por 40 minutos. Esse processo foi repetido duas vezes. Foram adicionados 4,4 mL de SDS 20% (dodecil sulfato de sódio) e 2,25 mL de GITC (isotiocianato de guanidina - 5 M). Foram incubados a 65ºC por 2 horas, misturando eventualmente. Em seguida, as amostras foram centrifugadas por 1 hora a 5000 rpm a 10ºC. O sobrenadante foi transferido para um tudo de centrífuga limpo e adicionado 12,5 mL de clorofórmio:álcool isoamil (24:1) e foram gentilmente misturados por 10 minutos. As duas fases foram separadas por centrifugação a 5000 rpm a 10ºC por 1 hora. A fase aquosa foi transferida para um tubo limpo e nele foi adicionado isopropanol 70% e misturado por 5 minutos, sendo deixado à temperatura ambiente por 20 minutos. Com término do tempo estipulado, as amostras foram centrifugadas a 5000 rpm a 10ºC por 1 hora e 30 minutos. O sobrenadante foi retirado, assim como qualquer possível gota nas paredes do tubo. O *pellet* contendo DNA foi ressuspendido em quantidade mínima de 1 mL de $T_{10}E_{10}$ pH 8,0 (1 M Tris-HCl; 0,5 M EDTA) (e alicotado em microtubo de 2,0 mL). O DNA foi extraído com tampão Tris:fenol:clorofórmio (v/v) e centrifugado por 10 minutos em velocidade máxima à temperatura ambiente para separação da camada lipídica da protéica. A camada aquosa contendo DNA foi transferida para um tubo de centrifuga e repetiu-se a etapa anterior.

O DNA TOTAL extraído do solo foi analisado por eletroforese em gel de agarose normal a 1% com tampão TAE por 18 horas em câmera fria a 30 V. No dia seguinte, um filete do gel foi cortado e corado em solução de brometo de etídeo e visualizado em transluminador sob luz ultravioleta.

4.5 Purificação do DNA

Após o corte e coloração do filete de amostra, foi cortado na mesma altura o restante do gel não corado, equivalente ao DNA. Este foi mais uma vez cortado em pequenos pedaços de até 400 mg e acondicionados em microtubos de 2 mL. Em cada microtubo foi adicionado três vezes o volume da solução Ultra-Salt (NaI - 6 M) e aquecido em banho seco a 50ºC por 10 minutos até o gel derreter completamente. Após isso, foram adicionados 25 µL de resina deixando em descanso por 10 minutos para que o DNA fosse fixado à resina. Em seguida, as amostras foram centrifugadas a 13.400 rpm por 15 segundos. O pellet foi lavado com 1 mL da solução Ultra-Wash

pH 7,7 (50 mM Trs-HCl; 1 M NaCl; 10 mM EDTA; 50% de etanol absoluto) por 1 minuto, esse processo foi repetido por mais uma vez. Após essa etapa, o sobrenadante foi descartado e o microtubo foi centrifugado a seco por 15 segundos e os tubos foram invertidos e mantidos em cima da bancada por aproximadamente 1 hora para que todo etanol utilizado na reação fosse evaporado. O pellet foi ressuspendido com 45 µL água deionizada filtrada e autoclavada e deixado em descanso por 5 minutos. Em seguida, as amostras foram centrifugadas por 1 minuto e o sobrenadante transferido para um tubo novo e centrifugado mais uma vez por 2 minutos e 30 segundos. Como resultado final foi obtido o DNA das quatro amostras coletadas.

Para a quantificação do DNA extraído, uma alíquota de 5 µL de DNA adicionada de 2 µL de tampão de carregamento (0,025% de azul de bromofenol; 30% glicerol; tampão TBE 10X - Tris Borato EDTA) foi analisada por meio de eletroforese em gel de agarose 0,8% contendo brometo de etídio (0,5 µg/mL). Como padrão de tamanho de DNA foi utilizado o marcador molecular 1 kb plus DNA Ladder^{TM} (Invitrogen). A visualização do DNA foi realizada em transluminador sob luz ultravioleta.

4.6 Amplificação do Gene 16S rRNA pela PCR

O DNA total extraído e quantificado das amostras correspondente à comunidade bacteriana das quatro amostras de solo rizosférico foram amplificados pela PCR com oligonucleotídeos iniciadores específicos para o gene 16S rRNA bacteriano.

O protocolo da reação da PCR foi realizado como descrito em Crump *et al.* (1999) com modificações, e consistiu de um volume final de 25µL (2,5 mM $MgCl_2$, 2,5 mM DNTPs; 5 pMol/uL de cada “primer”, 5 U/uL de *Taq* DNA polimerase; tampão 10X). Foram usados os primers universal para bactérias: 530f (5’ - TGA CTG ACT GAG TGC CAG CMG CCG CGG - 3’) e o 1492r (5’ - TGA CTG ACT GAG AGC TCT ACC TTG TTA CGM YTT - 3’). O perfil térmico da PCR consistiu de um ciclo inicial de desnaturação a 94ºC por 1 min seguido por 30 ciclos como segue: desnaturação de fitas-molde a 94ºC por 30 s, pareamento dos “primers” a 50ºC por 30 s e extensão a 72ºC por 2 min e um ciclo final de extensão a 72ºC por 5 min. Em

seguida, a eletroforese em gel de agarose a 0,8% foi realizada para vizualizar o amplicon, que foi corado com brometo de etídio (0,5 µg/mL) e visualizado em transluminador com auxilio de luz ultravioleta.

4.7 Clonagem do Gene 16S rRNA

4.7.1 Purificação dos Produtos da PCR

Os produtos da PCR foram purificados utilizando-se o "KIT Wizard® SV Gel and PCR Clean-Up System" (Promega), conforme recomendações do fabricante. Esta purificação foi feita cortando-se do gel, e as bandas contendo o produto da PCR com auxílio de bisturi estéril. Em seguida, o cubo de gel contendo o amplicon foi transferido para microtubo previamente pesados. Foram adicionados 10 µL da solução de ligamento para cada 100mg da fatia de gel, em seguida foi vortexado e incubado em 60-65ºC até que a fatia do gel se mostrou completamente dissolvida. A mistura foi transferida para uma coluna SV contendo um tubo coletor e incubado à temperatura ambiente por um minuto e centrifugado por tempo igual a 14.000 rpm. O sobrenadante, material que passou pela coluna, foi descartado. Na mesma coluna foram adicionados 700 µL de solução de lavagem de membrana e centrifugado a 14.000 rpm por um minuto e o sobrenadante foi descartado. O processo foi repetido, porém com 500 µL de solução de lavagem e o tempo da ciclagem aumentou para cinco minutos. O tubo foi esvaziado e centrifugado juntamente com a coluna por um minuto com a tampa da centrifuga aberta para permitir a evaporação de qualquer resíduo de etanol. Cuidadosamente a minicoluna foi transferida para um microtubo novo onde foram adicionados 50 µL de água livre de nuclease e permaneceu por um minuto em temperatura ambiente e posteriormente centrifugado por um minuto a 14.000 rpm. Do material purificado, 5 µL foram quantificados em gel de agarose a 0,8% contendo marcador de peso molecular 1 Kb DNA Ladder (Fermentas). O gel foi visualizado em transluminador sob auxílio de luz ultravioleta sendo a imagem documentada.

4.7.2 Sistema de Ligação

Para que a ligação entre o vetor e os amplicons purificados do gene 16S rRNA ocorresse das quatro amostras, foi utilizado o "Kit TOPO TA Cloning" (Invitrogen), que foi constituído de: 4 µL do amplicon purificado; 1 µL da solução salina (3:1) e 1 µL do vetor pCR4-TOPO^{TM} (Figura 3), que tem como característica a exigência de um "overhang" adenosiva na extremidade 3' do inserto. É fornecido linearizado, dotado de uma enzima topoisomerase de *Vaccinia*, que vem ligando suas extremidades *overhang* timidinafosfato 5' (seqüência CCCTT). A própria enzima cria um ponto de ataque nucleofilico e realiza a ligação do DNA. O sistema de ligação permaneceu em temperatura ambiente por 30 minutos sendo armazenado a -20ºC.

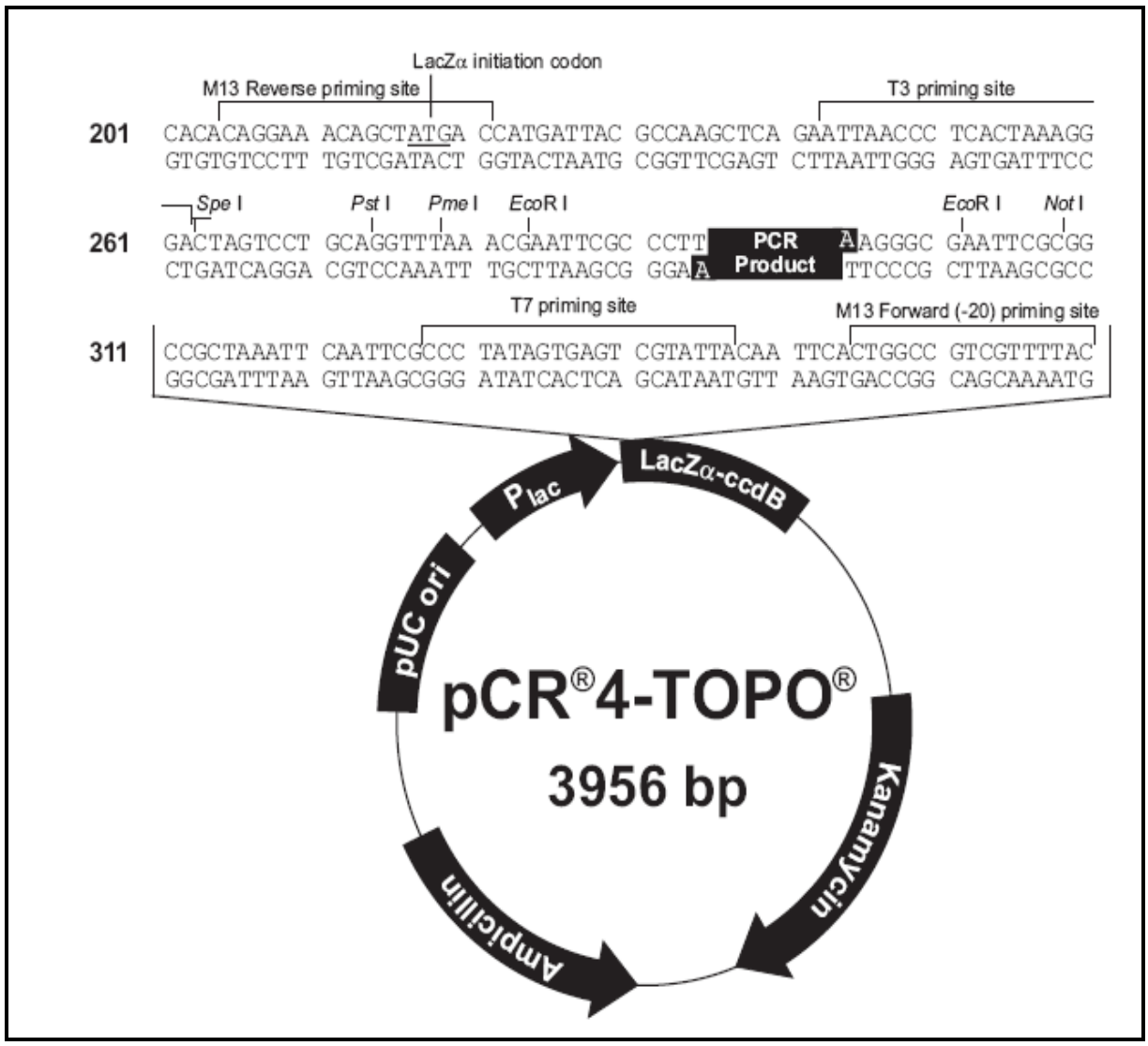

Figura 3 - Mapa do Vetor pCR®4-TOPO do Kit TOPO TA Cloning (Invitrogen)

4.7.3 Transformação por eletroporação

O processo de transformação foi realizado da seguinte forma: 2 µL do vetor contendo o inserto foram transformados em 50 µL de células competentes do "Kit TOPO TA Cloning" (Invitrogen) por meio de eletroporação utilizando eletroporador Eppendorf 2510 a 1.900V. Após o choque foi adicionado 1 mL de meio Super Optimal Catabolite (SOC) por uma hora em agitação no "shaker" a 180 rpm.

Após esse período, as células recuperadas em meio SOC foram semeadas em placas de Petri descartável contendo 50 mL de Ágar Luria-Bertani (LB) com ampicilina na concentração de 100 µg/mL. As placas já semeadas permaneceram na estufa a 37ºC por 18 horas, para que houvesse crescimento dos clones transformantes.

4.7.4 Seleção e estoque dos clones

Foram coletadas as colônias maiores e que se encontravam isoladas com auxilio de palitos estéreis e depositadas em microplacas de 96 poços, contendo 1 mL de meio CircleGrow (Bio 101 - catálogo nº. 3000-142), acrescido com ampicilina (100 µg/mL). As placas foram seladas e em cada poço foram feitos pequenos furos ao centro. Os clones foram incubados no "shaker" a 37ºC durante 22 horas a 320 rpm. Após o crescimento dos mesmos, 100 µL da suspensão das células foram transferidas para uma outra placa de 96 poços estéril, acrescidas com volume igual de glicerol a 50% e armazenada a -80ºC.

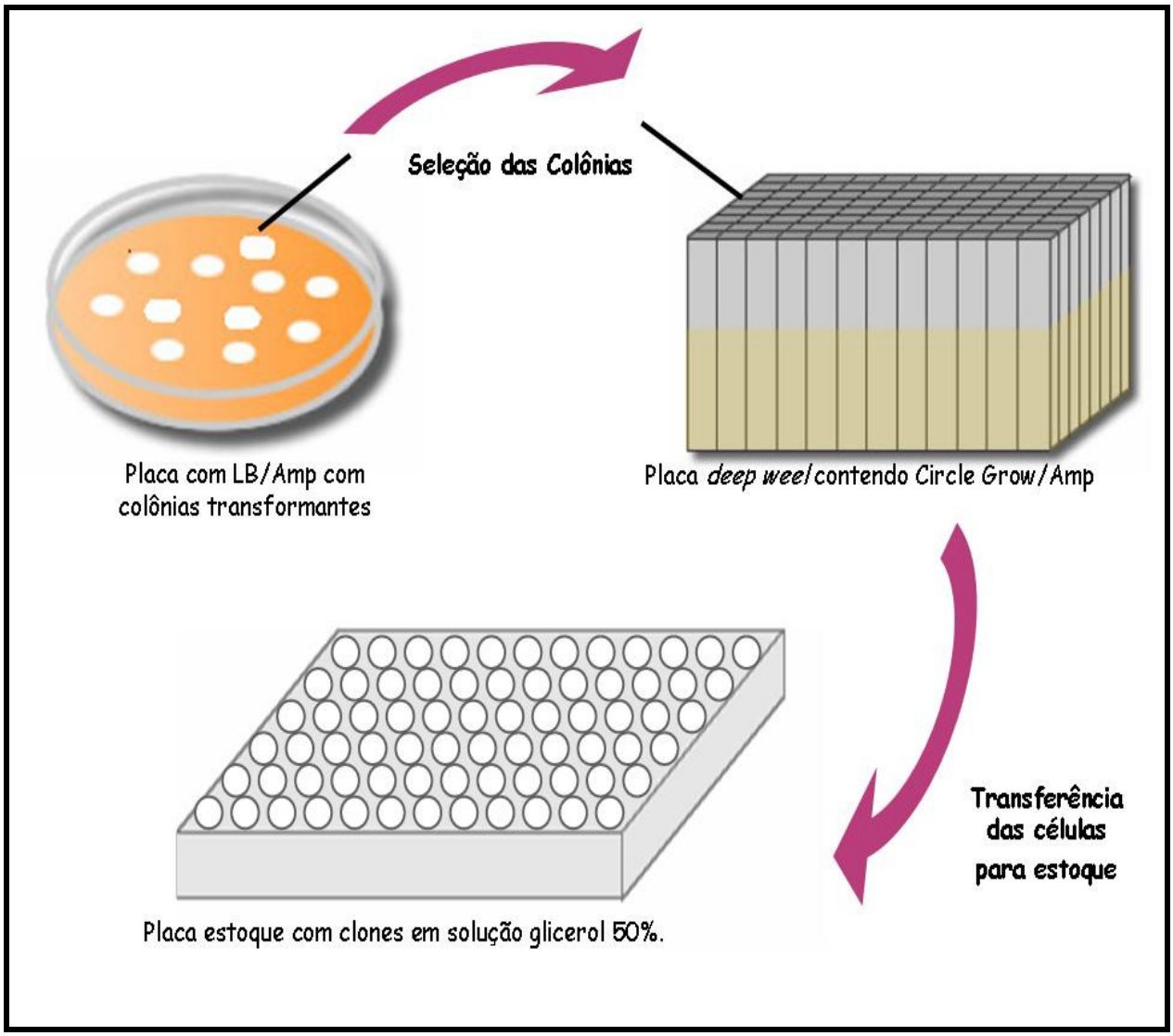

Figura 4 - Esquema ilustrativo da seleção de clones da biblioteca 16S rRNA

4.7.5 Extração e quantificação do DNA plasmidial

Após a estocagem dos clones, foi realizada a extração do DNA plasmidial das culturas, segundo protocolo de Birnboim *et al*. (1979) com modificações, em larga escala, 96 amostras por placa, como segue: as placas de 96 poços foram centrifugadas por 20ºC durante 6 min a 4.000 rpm para sedimentar as células, descartando o sobrenadante. O sedimento bacteriano foi ressuspendido em 240 µL de solução tampão GET - Glicose, EDTA, Tris (1M Tris-HCL, pH 8,0; 0,5M EDTA, pH 8,0 e 20% de glicose filtrada), centrifugado a 20ºC durante 6 min a 4.000 rpm. O sobrenadante foi descartado e a placa seca em papel absorvente. Adicionou-se 80

µL de solução tampão GET, e em seguida, as células foram ressuspendidas por agitação. Em uma microplaca de polipropileno de 250 µL de fundo em U (tipo Elisa) foi adicionado 1,5 µL de RNAse (10 mg/mL) em cada cavidade. Em seguida, foram transferidos 60 µL de cada suspensão de células para seus respectivos poços. Adicionou-se 80 µL de NaOH/SDS (NaOH 0,2 N; SDS 10%), o conteúdo foi homogeneizado por inversão, aproximadamente 30 vezes e em seguida mantido em temperatura ambiente por 10 min e em seguida centrifugado a 20ºC durante alguns segundos a 4.000 rpm. Foram adicionados 80 µL de acetato de potássio 3M gelado (60 mL de KOAc 5M; 11,5 mL de acido acético glacial em quantidade suficiente para 100 mL de água deionizada filtrada e autoclavada). Mais uma vez, o conteúdo foi homogeneizado por inversão, e a placa contendo os plasmídeos foi incubada por 10 min em temperatura ambiente e centrifugada por tempo igual a 20ºC a 4.000 rpm. O sobrenadante foi transferido para a microplaca com filtro (PVDF 0,2 µm - Millipore) e centrifugado a 20ºC durante 5 min a 4.000 rpm. Adicionou-se ao material filtrado 100 µL de isopropanol absoluto (Merck), a solução foi misturada por inversão, e o material foi centrifugado a 20ºC durante 45 min a 4.000 rpm. Depois de centrifugado, o sobrenadante foi descartado e o precipitado foi lavado com 200 µL de etanol 70% gelado (Merck), e posteriormente, foi centrifugado a 20ºC durante 5 min a 4.000 rpm. O sobrenadante foi descartado e dado um pulso de 900 rpm na placa invertida sobre papel absorvente. As amostras foram deixadas por 1 hora a temperatura ambiente para secagem, e ressuspendidas em 30 µL de água deionizada filtrada e autoclavada. A placa foi incubada por 18 horas a temperatura ambiente para solubilização do material e armazenada a -20ºC.

Para visualização e quantificação da extração do DNA plasmidial, uma alíquota de 5 µL adicionada de 2 µL de tampão de carregamento (0,025% de azul de bromofenol e 50% de glicose), foi aplicada em gel de agarose a 0,8%. O gel foi corado com brometo de etídeo (0,5 µg/mL) e as amostras foram visualizadas em transluminador com auxilio de luz ultravioleta.

4.7.6 Reação de seqüenciamento e precipitação

Foram seqüenciados 1.536 clones, sendo 384 clones pertencentes a cada biblioteca (CAM1, CAM2, CUP1 e CUP2). Todos os clones foram seqüenciados

utilizando o “primer” universal para bactérias 530f (5’ – TGA CTG ACT GAG TGC CAG CMG CCG CGG - 3’). As reações de seqüenciamento foram feitas pela PCR utilizando-se o “Kit” para seqüenciamento “DYEnamic ET Dye Terminator Cycle Sequencing Kit for MegaBACE” (Amershaw Bioscience) utilizando-se:

- 3,0 µL de água deionizada filtrada e autoclavada
- 2 µL de “DYEnamic ET”
- 1,0 µL de “primer” 530f a 5 pmol
- 4 µL de DNA

} Volume final 10 µL

A reação foi submetida a um termociclador seguindo o programa: 1 ciclo a 95ºC por 25 s, 30 ciclos de 95ºC por 15 s, 50ºC por 20 s e 60ºC por 1 h e 20 min. Após a reação, as amostras foram precipitadas para o seqüenciamento conforme instrução do fabricante. Adicionou-se em cada poço, 10 µL de acetato de amônia e 27,5 µL de etanol absoluto. O material foi homogeneizado em vórtex e incubado a temperatura ambiente por 10 min. Em seguida, as amostras foram centrifugadas a 4ºC durante 40 min a 4.000 rpm. O sobrenadante foi removido e em cada poço foi adicionado 120 µL de etanol 70% e vortexado por alguns segundos, e logo em seguida as placas contendo as amostras foram centrifugadas a 4ºC durante 10 min a 4000 rpm. O sobrenadante foi removido e a placa centrifugada a 700 rpm por alguns segundos invertida, sob papel absorvente. As amostras foram secas no fluxo por 30 min, até todo etanol ser evaporado, sendo ressuspendidas em 10 µL de tampão “loading buffer”, agitadas em vórtex e centrifugado a 4ºC a 700 rpm por alguns segundos. O seqüenciamento dos clones foi realizado no seqüenciador automático “MegaBace 1000” *(*Amersham BioSciences - Pharmacia).

4.7.7 Processamento e Análise das Seqüências

As seqüências de nucleotídeos geradas pelo seqüenciamento dos clones do gene 16S rRNA de bactéria foram analisadas por meio dos programas Phred/Phrap/Consed disponíveis no site de Bioinformática da Universidade Federal do Amazonas (UFAM), onde foram descartadas as seqüências com baixa qualidade (índice de qualidade <20) onde, ocorre apenas um erro em cada 100 pb lidos. As seqüências foram agrupadas em Unidades Taxonômicas Operacionais (UTO)

utilizando-se o programa CAP3. A seqüência consenso de cada UTO foi comparada com seqüências depositadas em banco de dados públicos (RDP Project e Programa de busca avançada “Basic local Alignment Search Tool” (BLAST) do “National Center for Biotechnology Information” (NCBI) para identificação das espécies procarióticas - bactérias. A análise filogenética foi realizada através do programa PHYLIP (www.rdp.msu.edu/html).

5 RESULTADOS E DISCUSSÃO

5.1 Análise Química e Física do Solo

Foram analisadas as amostras dos solos rizosféricos (Tabelas 1 e 2) das duas propriedades, prop. 1 e prop. 2, que possuem manejos diferentes com as duas espécies frutíferas selecionadas *Theobroma grandiflorum* (cupuaçu) *e Myrciaria dúbia* (Camu-camu), obtendo-se assim, quatro amostras distintas a serem estudadas:

1. CAM1: Camu-camu – Propriedade 1.
2. CAM2: Camu-camu – Propriedade 2
3. CUP1: Cupuaçu – Propriedade 1
4. CUP2: Cupuaçu – Propriedade 2

As características físicas e químicas dos solos, determinadas de acordo com a metodologia descrita no material e métodos, encontram-se nas Tabelas 1 e 2 apresentadas a seguir.

Tabela 1 - Características químicas das amostras de solo (análises realizadas no laboratório temático de solos e plantas - LTSP/INPA). Médias de 5 repetições.

Nr. Am LTSP	Identificação abrev	pH H2O	Ca++	Mg++	Al+H	K+	P	Fe	Zn	Mn	N	C	M.O
			.----------cmolc kg----------				mg/kg	--------mg/kg----------			----------g/kg----------		
1	CAM1	6,0	6,26	1,91	0,06	45	81,2	136	9,3	13,1	2,59	34,3	59,1
2	CUP1	5,0	2,52	0,56	0,78	48	9,4	176	3,3	9,3	2,68	36,0	61,9
3	CAM2	5,3	0,62	0,54	0,28	21	4,7	128	1,1	3,7	0,93	14,1	24,2
4	CUP2	5,2	0,09	0,06	0,38	7	2,6	65	0,6	2,2	0,67	8,4	14,4

Tabela 2 - Características físicas das amostras de solo (análises realizadas no LTSP/INPA). Médias de 5 repetições.

Nr. Am LTSP	Identificação abrev	%areia grossa	%areia fina	%argila	%silte
1	CAM1	14,0	4,3	62,1	19,6
2	CUP1	10,3	3,2	70,0	16,3
3	CAM2	66,6	15,3	12,1	5,5
4	CUP2	81,3	10,5	4,8	3,4

Pelos dados analisados, as características dos solos descritas nas Tabelas acima, constatam que em cada grupo amostral, os resultados obtidos apresentam diferenças significativas nas médias encontradas. Devido a esses resultados, os quatro tipos de solos rizosféricos encontrados são satisfatórios para o teste hipotético proposto neste trabalho, que visa essencialmente, verificar o impacto das diferenças encontradas nas características dos solos e a rizosfera de cada espécie na composição da comunidade bacteriana. Uma vez que, a biomassa, a atividade e a estrutura da comunidade microbiana são altamente influenciadas pelas características de seu habitat, neste caso, tipos diferentes de solos e raízes de diferentes plantas (Christensen, 1989). Além disso, cada planta libera exsudatos radiculares, complexos próprios que beneficiam determinados grupos microbianos, que são influenciados pelo estado nutricional das plantas, que por sua vez, é influenciada pela fertilidade do solo Diversos componentes dos exsudatos de plantas atuam como sinais moleculares que controlam as interações planta-microrganismos (Moreira & Siqueira, 2002).

Pequenas alterações na composição dessas substâncias podem alterar a diversidade de microrganismos e suas habilidades funcionais (Grayston & Campbell, 1996; Grayston *et al*, 1998). Os produtos excretados pelas raízes podem ser tão característicos, permitindo que uma determinada espécie de planta selecione microrganismos capazes de utilizar o composto orgânico excretado por ela (Duineveld *et al*., 1998).

5.2 Extração de DNA Genômico Total do Solo

A extração de DNA não foi tão prática e rápida quando comparada à extração com kits comerciais existentes, porém a retirada dos ácidos húmicos de forma mais completa mostrou-se satisfatória com o método utilizado. A co-extração de ácidos húmicos ficou evidente representado pela coloração marrom escuro na solução final (Figura 5).

Figura 5 - Extração de DNA total do solo CAM 2, após os ciclos de congelamento-descongelamento

Os ácidos húmicos têm propriedades físico-químicas similares aos dos ácidos nucléicos, fazendo com que haja competição na absorção por colunas de purificação. A não retirada por completo desses ácidos podem diminuir a eficiência de hibridização DNA/DNA, inibir atividades de endonucleases de restrição de enzimas *Taq* polimerase durante a PCR (Roose-Amsaleg, 2001). Consequentemente, as etapas de transformação genética por eletroporação, clonagem e seqüenciamento serão afetadas. Para que isso não acontecesse, foi realizada uma purificação das amostras de solo, em seguida à extração de DNA, para uma melhor retirada dos ácidos húmicos e outras impurezas pela corrida eletroforética em gel de agarose a 1,0% (dados não demonstrados).

O método de extração de DNA do solo foi considerado adequado e de qualidade, com rendimento satisfatório para obtenção de bibliotecas genômicas 16S rRNA.

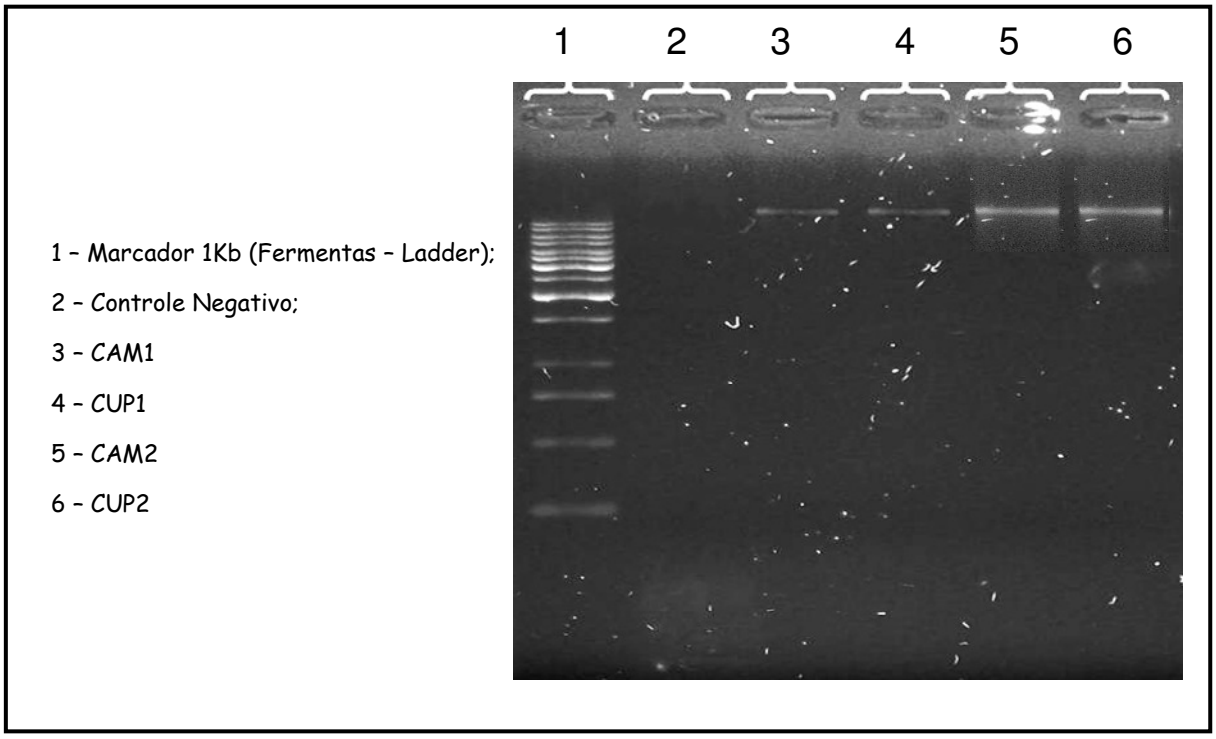

Figura 6 - Perfil eletroforético em gel de agarose a 0,8% contendo brometo de etídeo, constando o resultado da extração de DNA Total do solo das amostras devidamente identificadas

O alto teor de argila, silte e matéria orgânica podem ter influenciado na obtenção de um DNA de maior qualidade no caso das amostras CAM1 e CUP1, pertencentes à mesma propriedade, uma vez que, as células microbianas podem ligar-se fortemente a colóides do solo, principalmente àqueles ricos em matéria orgânica e argila, dificultando assim, a obtenção de DNA de alto peso molecular (Valadares-Inglis & Melo, 1998). CAM1 apresentou 62,10% de teor de argila, 19,63% de silte e 59,05% de M.O, CUP1 70,03% de argila, 16,25% de silte e 61,93% de M.O, evidenciando a diferença entre as amostras CAM2 e CUP2, que apresentaram respectivamente, 12,06% e 4,80% de argila, 5,54% e 3,38% de silte e 24,24% e 14,36% de M.O. Considerando que as argilas dos solos de terra firme da Amazônia possuem baixa CTC, o maior retentor de DNA seria a Matéria orgânica, pois apresenta alta retenção de cátions.

Esses dados evidenciam a dificuldade encontrada em se trabalhar com a amostra CAM1, em todas as etapas propostas no trabalho até o seqüênciamento. Além dos aspectos já conhecidos e descritos na literatura sobre os impactos negativos do alto teor de argila e a concentração em larga escala de ácidos húmicos na extração de DNA do solo, o alto teor de silte encontrado nesses solos

pode afetar também na obtenção de um DNA menos degradado, pois pela comunicação pessoal do Prof. Ricardo Krüger (2006), a silte atua não permitindo a liberação do DNA do solo.

5.3 Amplificação e Purificação do Gene 16S rRNA

Para a amplificação do gene de interesse foram utilizados oligonucleotídeos específicos para a região 16S rRNA do domínio bactéria r530 e f1492.

A amplificação pela PCR da região 16S rRNA demonstrou ser eficiente para avaliar a estrutura da comunidade microbiana presente na rizosfera do camu-camu e do cupuaçu das duas propriedades, gerando fragmentos de tamanho esperado, aproximadamente 1.100 pb (Figura 7).

Os amplicons foram purificados partir do corte do gel referente à região onde se encontrava o DNA de interesse, descartando, assim, as bandas inespecificas e moléculas quimeras formadas por seqüências de mais de uma bactéria, o que poderia induzir erros na comparação das seqüências obtidas com as seqüências depositadas em bancos de dados. As seqüências quimeras poderiam, erroneamente, ser identificadas como uma espécie nova ainda não catalogada, o que acarretaria em um erro muito grave, sugerindo a ocorrência de organismos inexistentes (Paabo *et al.*, 1992).

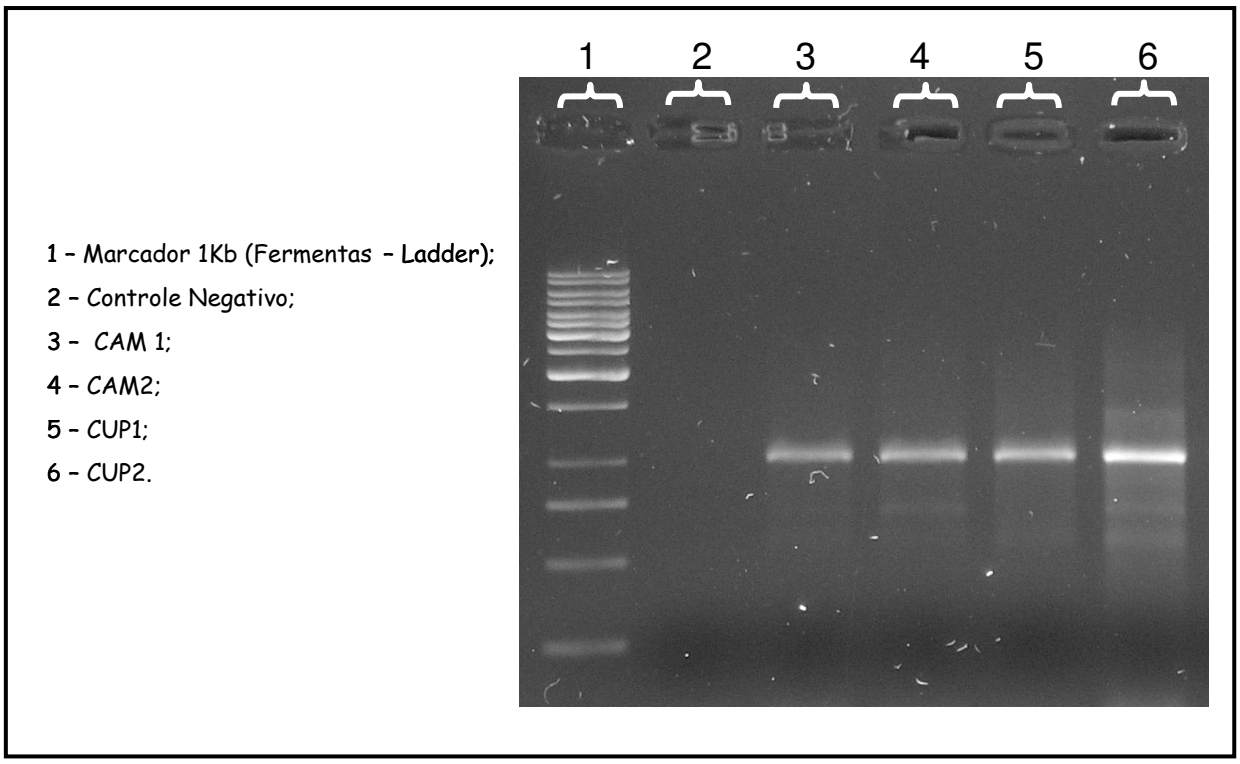

Figura 7 - Perfil eletroforético em gel de agarose a 0,8% contendo brometo de etídeo, constando o resultado da amplificação do DNA das quatro amostras devidamente identificadas utilizando "primers" para 16S rRNA

5.4 Construção da Biblioteca 16S rRNA

A partir dos produtos da PCR purificados, foram realizadas as ligações dos insertos em um vetor de clonagem. A ligação foi processada com o "Kit Topo TA cloning/Invitrogen Life Technologies". A transformação em *E. coli* da linhagem TOP10 eletrocompetente foi realizada em eletroporador Eppendorf 2.510 a 1.900v, que correspondeu a:

CAM1 – 1.840v por 2,8 milésimos de segundo;
CAM2 – 1.840v por 3,0 milésimos de segundo;
CUP1 – 1.900v por 4,6 milésimos de segundo;
CUP2 – 1.900v por 4,2 milésimos de segundo.

Após a eletroporação foram selecionados 1.536 clones transformantes, subdivididos em quatro bibliotecas. Os clones foram coletados com auxilio de palitos estéreis e transferidos para microplacas com 96 poços, contendo 1 mL de

meio CircleGrow, acrescido com ampicilina (100 µg/mL). Os clones foram incubados no "shaker" a 37ºC durante 22 horas a 320 rpm.

Foi criada uma nomenclatura para organizar e identificar cada biblioteca gênica. O critério de nomenclatura foi dado da seguinte forma: espécie frutífera de onde foram coletados os solos rizosféricos camu-camu (CAM) e cupuaçu (CUP); a propriedade onde se encontrava a amostra: Propriedade 1 e Propriedade 2; número da placa de 1 a 4; e o clone, esse foi ordenado de acordo com a placa de 96 poços, onde foram consideradas primeiro, as linhas A a H em seguida as colunas de 1 a 12. Exemplo, a amostra **CUP1P2F07** corresponde à rizosfera do **cupuaçu** coletado na propriedade **1**, placa **2**, linha **F**, coluna **07**.

5.5 Seqüenciamento e Análise dos Clones 16S rRNA

A extração do DNA plasmidial dos clones e a reação de seqüenciamento foram feitas em larga escala, 96 amostras por placa. Foram seqüenciados 1.536 clones, sendo 384 clones pertencentes a cada biblioteca (CAM1, CAM2, CUP1 e CUP2). Todos os clones foram seqüenciados utilizando o "primer" universal para bactérias 1492r.

Na análise das seqüências feitas pelos programas Phred/Phrap/Consed disponíveis no site de Bioinformática da Universidade Federal do Amazonas (UFAM), foram descartadas as seqüências com bases de baixa qualidade (< 20), onde encontra-se apenas um erro em cada 100 pb lidos. A biblioteca CAM1 não foi analisada, pois a mesma não apresentou condições para estudo, ou seja, não apresentou insertos nos vetores, sendo excluída das posteriores etapas. Obteve-se então, 255 clones de CAM2, 318 clones de CUP1 e 302 clones de CUP2 (Tabela 3).

Tabela 3 - Número total de clones seqüenciados e clones validos pertencentes às bibliotecas CAM1, CAM2, CUP1 e CUP2

Biblioteca	Clones seqüenciados	Clones válidos
CAM1	384	-
CAM2	384	256
CUP1	384	318
CUP2	384	302

As seqüências obtidas foram comparadas com outras depositadas no GenBank do NCBI, onde foi utilizada a ferramenta BLAST, visando a identificação das amostras encontradas. Para corroborar os resultados e obter dados mais completos, as seqüências foram analisadas no programa "Classifier" disponível no site "Ribosomal Database Project II" (RDP II). O programa apresenta os mais altos níveis taxonômicos e segue a proposta do manual de Bergey (Garrity *et al*., 2004).

Após a comparação, as seqüências foram identificadas de acordo com a classificação já existente no GenBank, onde o índice de similaridade apresentado em todas as seqüências comparadas variou entre 85 a 100% (Anexo 1). Não foram observadas seqüências ainda não cadastradas. Porém, em alguns casos a pontuação de confiabilidade se mostrou baixa, o que remete a idéia de serem seqüências de 16S rRNA não catalogadas no GenBank, a concluir que, a riqueza e a diversidade bacteriana presentes nos solos é pouco explorada, necessitando de estudos para detecção desses microrganismos.

5.6 Análise da Diversidade Microbiana nos Solos Estudados

Análises de clones de bibliotecas do gene 16S rRNA possibilitam a identificação das comunidades bacterianas mais abundantes no ambiente estudado e os possíveis responsáveis pelas principais atividades bioquímicas em seu ecossistema (Hungenholtz, *et al*., 1998).

Quando analisadas em nível de espécie, a maior parte das seqüências encontram-se na condição de não-conhecidas e ou não-cultivadas, denominadas pelo GenBank como "uncultured bacterium". Essas bactérias constituíram 90%

em CAM2, 85% em CUP1 e 92% em CUP2. Essa condição exigiu que informações adicionais sobre a taxonomia das espécies fossem necessárias para se observar a diferença existente entre a composição da comunidade bacteriana encontrada em cada biblioteca.

O domínio Bactéria é constituído, segundo Rape & Giovannoni (2003), por pelo menos 52 Filos bacterianos, sendo que apenas 24 são reconhecidos pelo Manual de Bergey. Jassen (2006) relata, com base nas seqüências do gene 16S rRNA, que bactérias do solo afiliam-se pelo menos em 32 Filos, muitos deles constituídos de poucas espécies (*Thermomicrobia, Chrysiogenetes, Fibrobacteres* e *Deferribacteres*), enquanto outros são constituídos de milhares de espécies (*Proteobacteria, Acidobacteria, Verrucomicrobia, Chloroflexi, Planctomycetes, Gemmanmonadetes, Actinobacteria* e *Firmicutes*), com cobertura de 92% da diversidade bacteriana

A classificação utilizada neste trabalho foi feita a partir de seqüências bacterianas depositados em banco de dados públicos, RPDII e BLAST, que utilizam como critério de classificação as semelhanças das seqüências de nucleotídeos no rRNA. As Classes são divididas em Ordens; e estas em Famílias; estas em Gêneros e; estes em Espécie, de acordo com o Manual de Bergey.

Alguns Filos possuem mais de uma Classe, como o Filo Proteobacteria, que é subdividido em cinco classes: *Alphaproteobacteria*; *Betaproteobacteria*; *Gammaproteobacteria*; *Deltaproteobacteria* e *Epsilonproteobacteria*, não fazendo parte da grande maioria dos filos onde são constituídos por uma única classe.

Dos 23 Filos bacterianos considerados pelo Manual de Bergey, 16 foram encontrados nesse trabalho, onde a Classe mais abundante em todas as bibliotecas foi a *Acidobacteria*, possuindo 106 clones em CAM2, 127 clones em CUP1 e 151 clones em CUP2; representando 41, 40 e 50% da constituição de cada biblioteca respectivamente. Outras Classes que se destacaram neste trabalho são as *Alphaproteobacteria*; *Betaproteobacteria*; *Deltaproteobacteria*; *Gammaproteobacteria*, todas pertencentes ao Filo *Proteobacteria* (Tabela 8). As *Proteobacterias* constituem o maior grupo taxonômico de bactérias, e o nome vem do grego mitológico *Proteu*, que podia assumir muitas formas. Dentro da Classe *Alphaproteobacteria*, encontram-se bactérias agrícolas importantes, capazes de induzir a fixação de nitrogênio na simbiose com plantas.

Tabela 4 - Classes encontradas nas bibliotecas construídas pela análise de seqüências 16S rRNA do RPD II com número de clones presentes e as respectivas percentagens

CLASSE	CLONES					
	CUP1		CUP2		CAM2	
	Número	(%)	Número	(%)	Número	(%)
Acidobacteria	127	40	151	50	106	41
Actinobacteria	13	4	12	4	27	11
Alphaproteobacteria	31	10	31	10	17	7
Anaerolineae	5	2	0	0	2	1
Bacilli	0	0	5	2	1	0
Betaproteobacteria	37	12	24	8	19	7
Clostridia	1	0	0	0	0	0
Cyanobacteria	1	0	1	0	0	0
Deltaproteobacteria	9	3	3	1	10	4
Flavobacteria	0	0	1	0	0	0
Gammaproteobacteria	21	7	17	6	2	1
Gemmatimonadetes	1	0	3	1	1	0
Não classificada	53	16	36	12	50	20
Planctomycetacia	2	1	7	2	0	0
Sphingobacteria	4	1	3	1	4	2
Verrucomicrobiae	13	4	8	3	10	4
TOTAL DE CLONES	**318**		**302**		**149**	

As classes *Actinobacteria*, *Gemmatimonadetes*, *Sphingobacteria* e *Verrucomicrobiae* fazem-se presentes em todas as bibliotecas. Porém, a classe *Bacilli* só foi encontrada em amostras provenientes da comunidade 2, tendo maior abundância em CUP2. Essa classe pode ser encontrada muito comumente em solos e muitas de suas espécies produzem antibióticos (Tortora *et al*., 2005).

A classe *Clostridia* teve apenas um representante, uma bactéria não conhecida e ou não cultivada, que foi encontrada por Nelson *et al*. (2003) no trato intestinal de herbívoros que se encontravam em um habitat inexplorável.

Uma outra classe que apresentou um único representante foi a *Flavobacteria*. Seqüências dessas bactérias foram encontradas em répteis (Bernadet *et al*., 2005; Xie *et al*., 2007). Hyman *et al*. (2005) identificaram a

presença dessa bactéria no epitélio vaginal de seres humanos. Não foram encontrados trabalhos onde se relata a presença de seqüências similares em solos.

A classe *Anaerolineae* foi representada por sete clones pertencentes às bibliotecas CUP1 e CAM2. Essa classe está inserida no Filo *Chloroflexi*, facilmente encontrado em solos e formam um grupo complexo de bactérias recentemente reclassificadas em cinco classes, sendo detectada neste estudo, somente a *Anaerolineae*. Kim *et al.* (2007) relataram a existência de seqüências similares em seu trabalho sobre a diversidade bacteriana em solos de Terra Preta de Índio da Amazônia Ocidental.

Apenas nas bibliotecas construídas a partir do solo rizosférico do cupuaçu (CUP1 e CUP2) apresentaram em sua constituição, bactérias da Classe *Cyanobacteria*, possuindo um clone em cada biblioteca, e bactérias da Classe *Planctomycetacia*, que apresentaram em CUP1, dois clones e CUP2, sete clones.

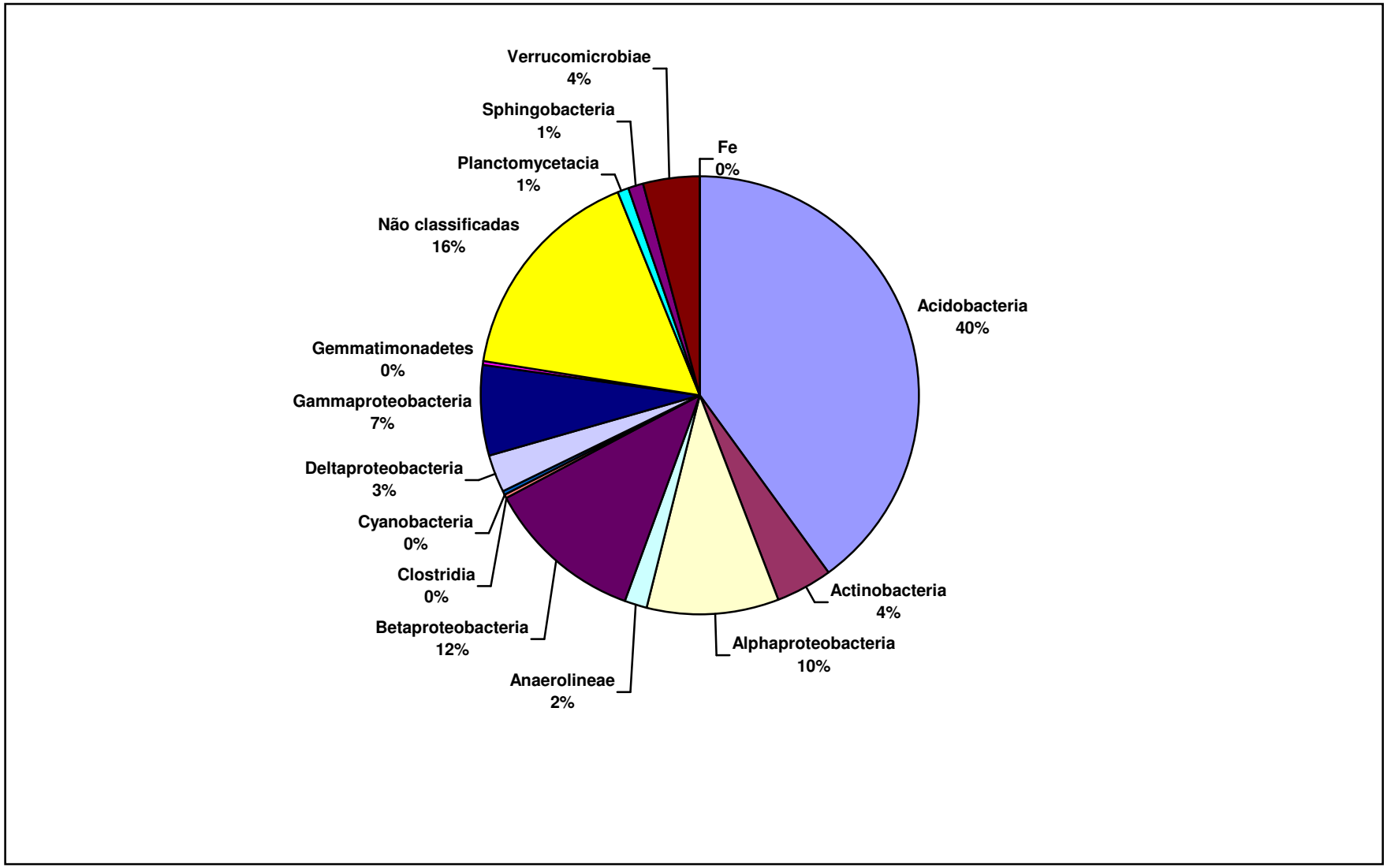

Figura 8 - Diversidade bacteriana de CUP1 de acordo com suas classes

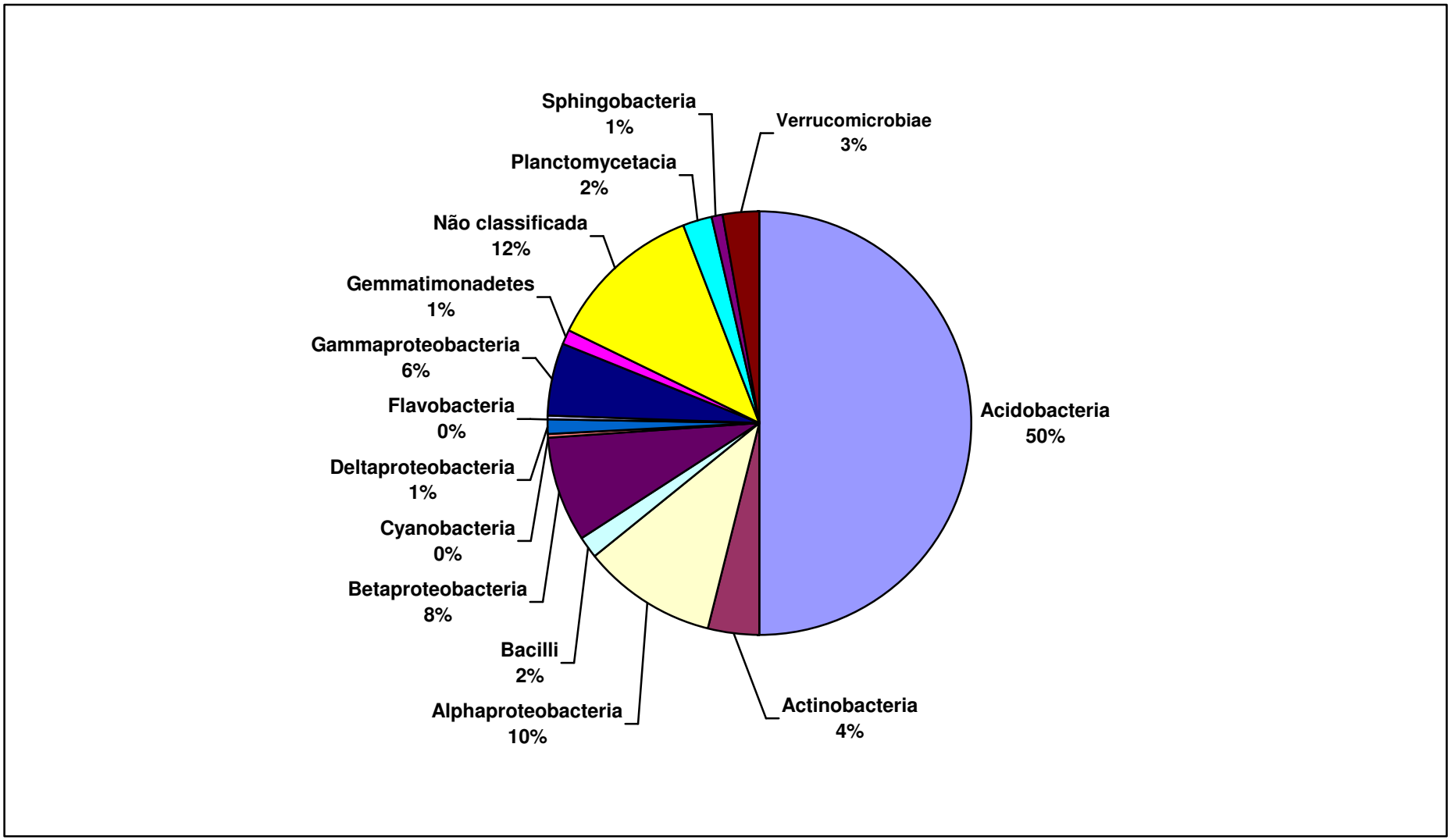

Figura 9 - Diversidade bacteriana de CUP2 de acordo com suasclasses

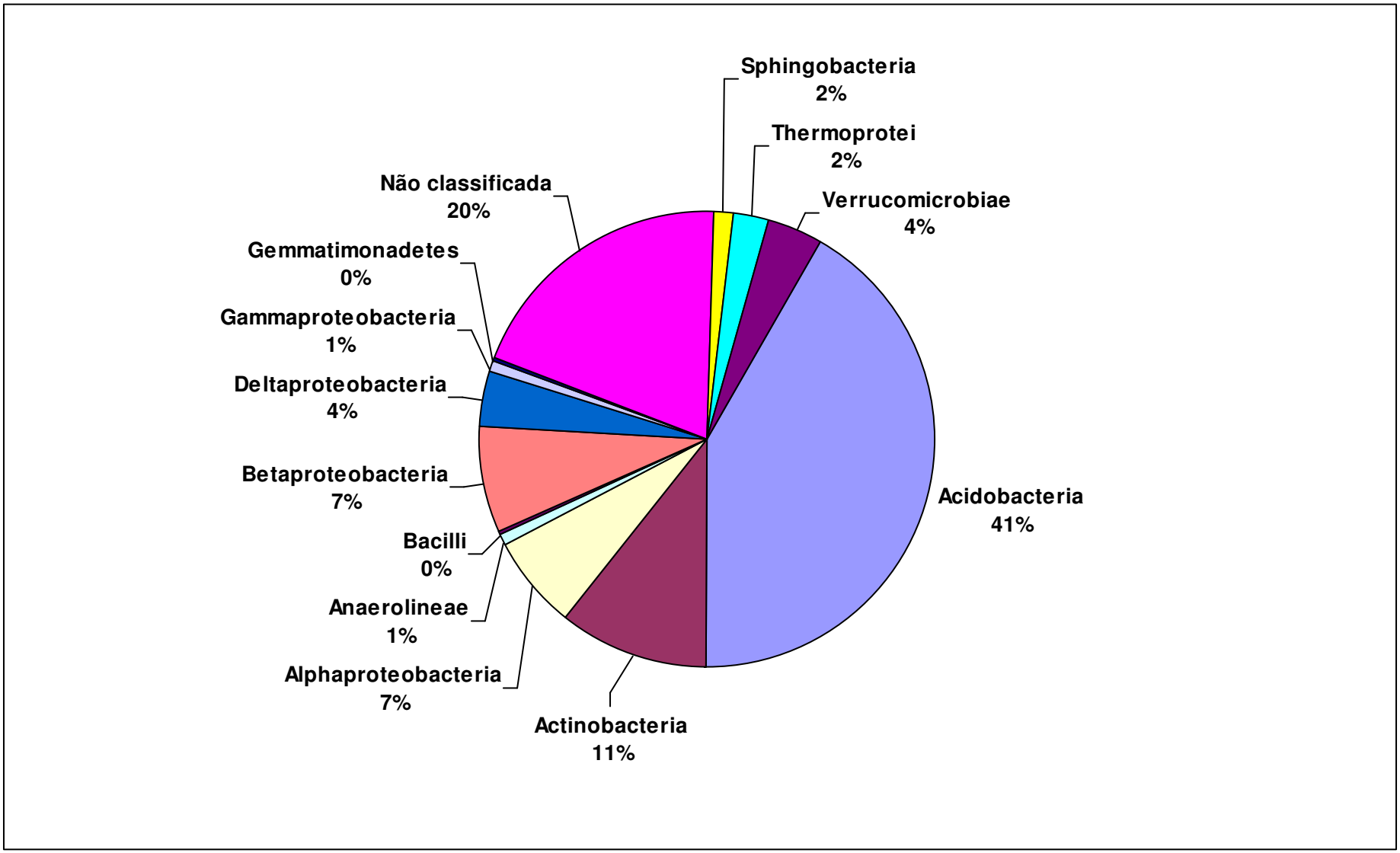

Figura 10 - Diversidade bacteriana de CAM2 de acordo com suas classes

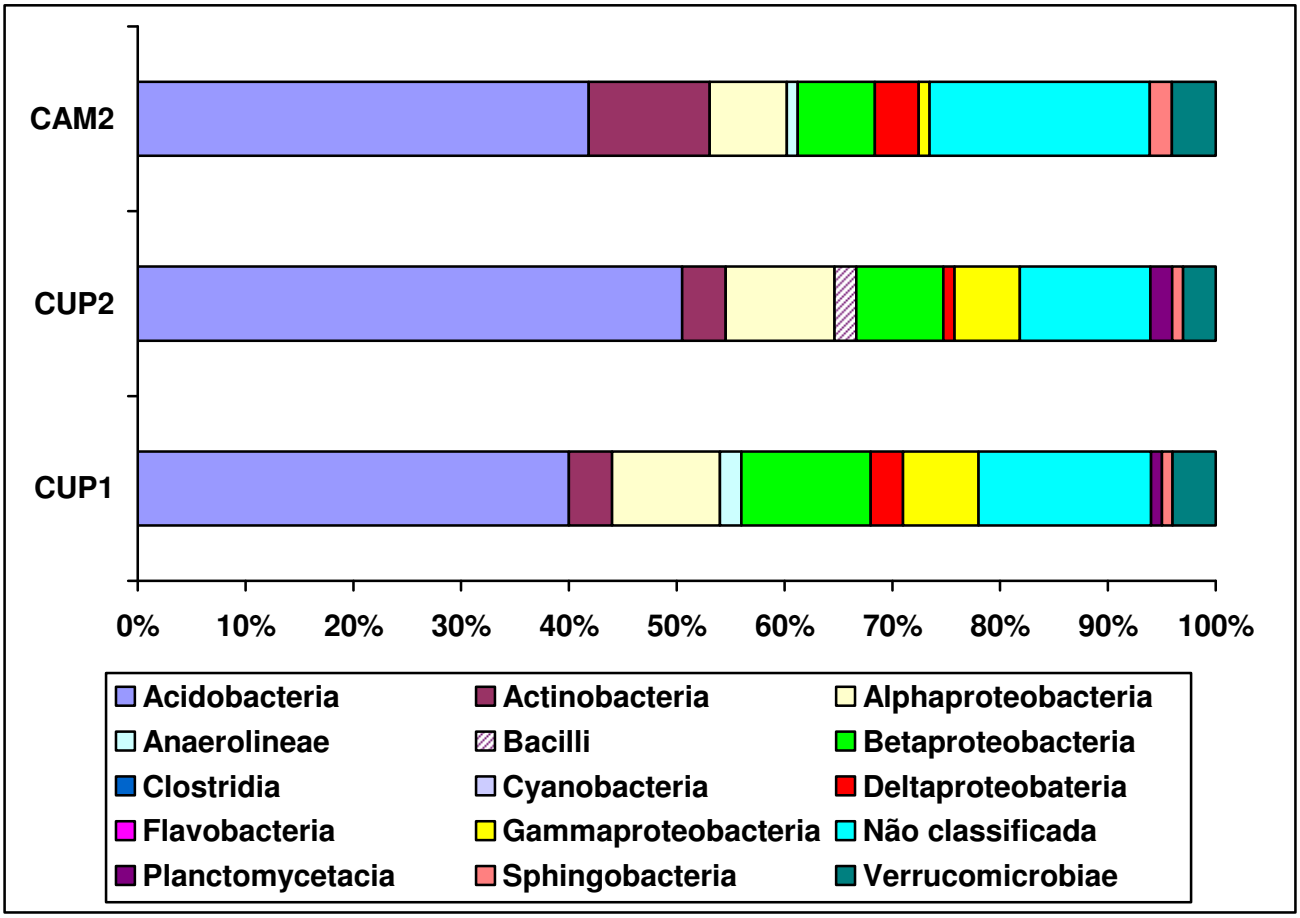

Figura 11 - Ocorrência relativa de seqüências de 16S rRNA das classes bacterianas das bibliotecas CUP1, CUP2 e CAM2.

Analisando as seqüências do gene 16S rRNA verificou-se que as comunidades bacterianas encontradas no solo rizosférico de CUP1, CUP2 e CAM2 foram diferentes entre si, (Figura 11) sugerindo que as comunidades presentes nesses ambientes possuem participações nos processos biogeoquímicos diferenciados. Dentro deste contexto, faz-se necessário conhecer os processos associados a cada táxon. A seguir são descritas algumas características dos táxons encontrados nas bibliotecas CUP1, CUP2 e CAM2.

Acidobacteria - Divisão largamente encontrada em análises de amostras ambientais marinhas, terrestres, animais, aerosóis e fontes termais, sendo formado por bactérias generalistas, capazes de adaptar-se aos mais diversos ambientes (Borneman *et al.*, 1996; Hackl *et al.*, 2004; Kim *et al.*, 2007). O Filo apresenta oito

subdivisões (Hugenholtz *et al*., 1998), porém apenas três gêneros foram formalmente descritos dentro do filo (Garrity; Bell; Lilburn, 2004).

Esta Classe é um exemplo do grande número de bactérias que só passou a ser conhecida com o advento de técnicas moleculares utilizando a análise de seqüência de rRNA (Barns *et al*., 1999). Provavelmente, bactérias desta Classe possuem importância ecológica significativa, pois são encontradas em abundância nos mais diversos tipos de ecossistemas, em especial em solos (Hugenholtz *et al.,*1998; Dumbar *et al*., 2002).

Com base nas análises do gene 16S rRNA, Hirashi *et al.* (1995) propuseram que esse agrupamento fosse denominado *Acidobacteria,* pois a maioria de suas espécies são ácido-tolerantes (Hirashi *et al*., 1995; Garrity & Holt, 2001). Essa maior adaptabilidade em condições de meio ácido justifica a ampla distribuição de *Acidobacteria* encontradas nestes solos, onde esteve presente 40% em CUP1, 50% em CUP2 e 41% em CAM2. O solo de CUP2 é, dentre os três, o mais ácido, o que comprova uma relação com o pH acido do solo e a ocorrência de comunidades bacterianas do filo *Acidobacteria*.

A predominância do Filo *Acidobacteria* em solos com o pH ácido justifica o trabalho realizado por Kim *et al.* (2007), onde observaram a predominância do Filo *Acidobacteria* em 50% das seqüências de amostras de solo da Floresta Amazônica, enquanto que em solos de Terra Preta de Índio foram encontrados 30% das seqüências pertencentes a esse Filo. Faoro (2006), em estudos sobre a avaliação da diversidade microbiana em solos da Floresta Atlântica Paranaense, comparou as seqüências de 754 clones do gene 16S rRNA e observou, também, a predominância do Filo *Acidobacteria*, com freqüência de 49% do total das seqüências analisadas.

Proteobacteria - Esse Filo representa o maior e mais diverso grupo de bactérias cultivadas, alocadas em cinco subdivisões: *Alphaproteobacteria, Betaproteobacteria, Deltaproteobacteria, Gammaproteobacteria* e *Epsilonproteobacteria*, esse último não encontrado neste trabalho. Este Filo compõe em média 39% das comunidades bacterianas de solo. A grande ocorrência de *Proteobacteria* se dá, geralmente, em solos cultivados (Nusslein & Tiedje, 1999) e contaminados por metais pesados (Dandaa *et al*., 2001), que podem apresentar pH mais elevado em relação ao solo de floresta.

Neste estudo, o Filo *Proteobacteria* foi o segundo mais abundantes entre os Filos, constituindo 32% em CUP1, 25% em CUP2 e 19% em CAM2. Das cinco Classes inseridas dentro do Filo, a que apresentou maior abundância entre as três bibliotecas construídas foi a Classe *Alphaproteobacteria*, tendo maior amplitude em CUP1 e CUP2 do que em CAM2, 10%, 10% e 7%, respectivamente.

Smit *et al.* (2001) propuseram em seu trabalho, uma relação entre a abundância dos Filos *Acidobacteria* e *Proteobacteria* e as condições de fertilidade do solo, sugerindo que a razão entre *Proteobacteria* e *Acidobacteria* pode ser usada como um indicativo da condição nutricional do solo. Nas análises realizadas por eles, encontraram para os solos com alto teor de nutrientes, uma seleção positiva de bactérias das divisões *Alpha* e *Betaproteobacteria*, indicativo de seleção de bactérias com alta taxa de crescimento. Esses autores descreveram para solos com baixo teor de nutrientes e alto teor de substratos recalcitrantes, uma maior concentração de *Acidobacteria*, as quais possuem baixo potencial de crescimento e alta capacidade de competição por substrato, ou seja, solos pobres em nutrientes. Portanto, as bibliotecas que compõem este trabalho apresentaram valores baixos dessa relação, onde foram encontrados menores valores para essa razão que são observados em solos oligotróficos; já nos intermediários, em solos agrícolas com baixo aporte de M.O; e nos altos, em solos agrícolas com alto aporte de M.O.

→ A classe *Alphaproteobacteria* compreende a maioria das bactérias púrpuras, não-sulfurosas e organismos não-fotossintéticos com metabolismo diverso. Segundo Canhos *et al*. (1997), as variações dentro da classe são geralmente correlacionadas com propriedades fenotípicas, destacando-se:

- Os grupos das nitrificantes (*Nitrobacter* sp.) e desnitrificante (*Rhodopseudomonas* sp.);
- Organismos com capacidade de fixação de nitrogênio (Gêneros *Bradyrhizobium, Rhizobium* e outros);
- Parasitas intracelulares de células eucarióticas (Gêneros *Bartonella e Rochalimae*);
- Organismos formadores de prosteca (*Caulobacter* e *Prosthecomicrobium*).

Detectadas nas três bibliotecas, os gêneros *Bradyrhizobium* e *Rhizobium* foram os que apresentaram maior freqüência dentro de *Alphaproteobacteria*. Grupos de bactérias pertencentes a esses gêneros estão diretamente envolvidos no ciclo do N,

sendo bactérias fixadoras simbiônticas, nodulantes extremamente heterogêneas. A manutenção da sustentabilidade de ecossistemas florestais pode ser relacionada à fixação de nitrogênio realizada por bactérias diazotróficas (Franco & Faria, 1997; Zahran, 2001).

Kolb *et al*. (2005) realizaram estudos dos genes que codificam para a subunidade alpha da enzima particulada metano mono-oxigenase (pMMO) relacionada estruturalmente e evolucionariamente à enzima nitrificadora de amônia mono-oxigenase (AMO), com genes que codificam partículas metano monoxigenase (pmoA) em solos florestais, indicando a presença de matanotróficos putativos de *Alphaproteobacteria*. O *pmo*A é um gene codificante para as partículas de metano oxigenase, a qual é uma enzima chave para o primeiro passo de uma oxidação aeróbica de metano ($CH_4 = 2H^+ + O_2 \rightarrow C_3OH_3 + H_2O$) (Inagaki *et al*., 2004).

→ A segunda classe, pertencente ao Filo *Proteobacteria*, mais abundante nas três bibliotecas foi a *Betaproteobacteria,* tendo representantes em todas as bibliotecas, correspondendo a 12% em CUP1, 8% em CUP2 e 7% em CAM2. Das seis Ordens pertencentes à Classe *Betaproteobacteria,* somente uma foi encontrada nas bibliotecas, a Ordem *Burkholderiales* com as famílias *Burkholderiaceae*, *Oxalobacteraceae*, *Alcaligenaceae* e *Comamonadaceae*.

Espécies pertencentes à Ordem *Burkolderiales* são habitantes comuns da rizosfera, caracterizadas pela sua versatilidade nutricional. Como atributos benéficos de alguns membros pertencentes a este grupo incluem: fixação de nitrogênio, promoção de crescimento entre as plantas e controle biológico de doenças, por produzir antibióticos (Parke & Gurian-Sherman, 2001). O fato referente à produção de antibióticos torna essas bactérias importantes componentes econômicos a serem explorados, podendo reduzir ou eliminar o uso de pesticidas na agricultura, o que acarretaria benefícios não meramente econômicos, como também, benefícios ecológicos inestimáveis. Clones dessas bactérias com atividade antimicrobiana foram identificados em solos e, zonas de inibição de crescimento foram observadas quando esses clones foram cultivados em placas contendo outras bactérias, fungos e leveduras (Cain *et al*., 2000).

→ A classe *Deltaproteobacteria* foi a de menor freqüência dentro do Filo *Proteobacteria* presente nas três bibliotecas; apresentando 9 (3%) clones em CUP1, 3 (1%) clones em CUP2, e 10 (4%) clones em CAM2.

Membros da classe *Deltaproteobacteria* estão envolvidos em processos de redução dissimilatória do sulfato, redução de ferro, metabolismo fermentativo, comportamento predatório e desenvolvimento de ciclos de vida (Cummings *et al*., 2003; Rendulic *et al*., 2004). A grande diversidade metabólica dos membros pertencentes a essa classe deixa aberto o potencial para muitos papéis ecológicos que podem exercer no solo. A classe é subdividida em sete ordens, porém, somente a ordem *Myxococcales* foi detectada, esta se fez presente em todas as bibliotecas, tendo representantes das famílias *Myxococcaceae*, *Bdellovibrionales* e *Cystobacteriaceae*. Segundo Garrity & Holt (2001), a taxonomia dessa classe é muito dinâmica e está suscetível a reclassificações constantes.

→ As bactérias da classe *Gammaproteobacteria* são distintivas, pois incluem algumas bactérias que são predadoras de outras bactérias. Os membros desse grupo são importantes contribuintes do ciclo do enxofre (Tortora *et al*., 2005). A classe está subdividida em nove Ordens, desta totalidade três foram explícitas na biblioteca CUP1, as Ordens *Xanthomonadales*, *Oceanospirales* e *Enterobacteriales*.

Actinobacteria – Membros da classe foram encontrados nas três bibliotecas analisadas, sendo mais predominante na biblioteca CAM2 com 11% e em CUP1 e CUP2 com predominância igual, 4%. As *Actinobacteria* estão distribuídas em ecossistemas aquáticos e terrestres (Chun *et al*., 2000). Espécies pertencentes a essa classe apresentam papel importante na decomposição da matéria orgânica e formação de húmos (Goodfellow & Williams, 1983). Portanto, são fundamentais para o melhoramento do solo, o que explicaria sua predominância em CAM2. Algumas bactérias dessa classe estão envolvidas na oxidação de formas reduzidas de Fe. Tais bactérias utilizam Fe^{+3} como aceptor de elétrons na decomposição de compostos orgânicos, podendo indicar ambientes redutores ou problemas de drenagem no solo.

Outras bactérias presentes a essa classe possuem potencial econômico inestimável, pois possuem importante papel na produção de antibióticos e metabólicos secundários. Isso sugere que as bactérias presentes no solo de CAM2 podem aplicar aos outros microrganismos presentes no mesmo habitat, uma pressão seletiva, ou seja, os microrganismos que compõem essa Microbiota são mais resistentes e por isso, há um prevalência destes no seu habitat. CAM2 foi a biblioteca

que apresentou menor diversidade de classes em relação às bibliotecas CUP1 e CUP2, onde a ocorrência de bactérias pertencentes a essa classe foi menos abrangente. Esse fato pode estar associado a uma resposta a condições de estresse, já que bactérias do Filo *Actinobacteria* desenvolvem importante papel no solo ocupando nichos antes ocupados por bactérias menos tolerantes a estresses (Rondon *et al*., 2000; Silveira *et al*., 2006).

Ao comparar e estimar a diversidade bacteriana de comunidades simpátricas em solos de duas áreas, uma floresta nativa e outra de arboreto de eucalipto adjacente, Silveira *et al*. (2006) encontraram um predomínio do Flo *Actinobacteria* no solo sob monocultivo de eucalipto, quando comparado à floresta nativa. Os autores associaram a maior abundância do Filo na área de monocultivo a uma instabilidade do sistema, o qual seleciona, por meio dos exsudatos radiculares, grupos dominantes como os dos actinomicetos, capazes de produzir esporos que são importantes estruturas de resistência para microrganismos expostos a distúrbios aplicados ao meio ambiente.

Verrucomicrobia - Compõem em média 7% das comunidades bacterianas dos solos, sendo a amplitude dessa cobertura entre 0 e 21% (Janssen, 2006). Essa classe, da mesma forma que as demais, tem freqüentemente sido encontrada em amostras de solo de diferentes áreas (Dunbar *et al*., 1999; Sessitsch *et al*., 2001).

Organismos do Filo *Verrucomicrobia* são bactérias Gram-negativas sensíveis à penicilina, sendo que algumas são capazes de produzir cápsulas de peptidioglicano (Hedlund; *et al*., 1997).

Embora muitos estudos evidenciem a presença de membros do Filo *Verrucomicrobia* em inúmeros ambientes como o solo, pouco se sabe sobre a função desses organismos nos diferentes ambientes encontrados e os fatores externos que possam estar diretamente associados à sua presença.

Lindström *et al.* (2004), ao analisarem os fatores que afetam a composição do Filo *Verrucomicrobia* em diferentes profundidades e diferentes concentrações de fósforo (P) em um lago na Suécia, verificaram que quanto maior a disponibilidade deste nutriente, maior era o crescimento da população de bactérias pertencentes a este Filo. Esse resultado fortalece o encontrado no presente estudo, onde a Classe *Verrucomicrobia* esteve presente em todas as bibliotecas, sendo mais abundante em

CUP1 com treze clones (4% da biblioteca), tendo em vista que as análises do solo (Tabela 1) mostraram ser CUP1 a amostra com maior teor de P.

Geralmente, o Filo *Verrucomicrobia* é pouco encontrado nos estudos com bibliotecas genômicas de solo. Corroborando com estes dados, Faoro (2006) encontrou em solos da Floresta Atlântica Paranaense, 1% de bactérias pertencentes a esse Filo, bem como Kim *et al* (2007), em seu estudo com solos de Terra Preta de Índio e Floresta nativa da Amazônia Ocidental.

Firmicutes - o Filo é dividido em três classes, *Bacilli, Clostridia* e *Mollicutes*. Dentre elas foram encontradas no presente estudo, as classes *Bacilli* e *Clostridia*, comuns em comunidades bacterianas de solos (Garrity *et al*., 2004).

As bactérias pertencentes ao Filo *Firmicutes* são Gram-positivas, aeróbicas e anaeróbicas e com baixo teor de guanina e citosina (G+C) no DNA (Garrity *et al*., 2004). Os organismos que se encaixam nesse Filo apresentam metabolismo caracterizado por homo e heterofermentação e respiração.

Apenas uma seqüência pertencente à classe *Clostridia* foi encontrada, a amostra CUP1P1A10. Seqüências similares foram descritas por Nelson *et al*. (2003), que foram encontradas em trato intestinal de herbívoros em habitat inexplorável.

A classe *Bacilli* foi encontrada em CUP2 e CAM2, pertencentes à mesma propriedade, porém com maior abundância em CUP2, onde apresentou cinco clones que correspondem a 2% da totalidade da amostra.

Bactérias das Classes *Clostridia* e *Bacilli* são formadoras de esporos e frequentemente encontrados em ambientes instáveis que estejam passando por transições, utilizando como estratégia de sobrevivência, um crescimento rápido quando há disponibilidade de nutrientes em quantidades necessárias (Canhos *et al*., 1997). Alguns membros do gênero *Bacillus* e *Clostridium* são fixadores de nitrogênio, podendo contribuir para a nutrição de algumas espécies de plantas (Kuhner & Matthies, 2000).

Pereira *et al.* (2006), estudando a relação entre solo sob cultivo de tomate, feijão e milho com solo de floresta nativa, descreveram abundância significativa do Filo *Firmicutes*. Corroborando com estes dados, Silveira *et al*. (2006), em monocultivo de eucalipto no Estado de São Paulo, encontraram resultados similares. Segundo estes autores, a ocorrência deste Filo nestes solos pode estar associada a uma seleção

pelas plantas e ou, pelo rápido crescimento em solos, onde há disponibilidade de nutrientes, o que geralmente ocorre em sistemas agrícolas ou solos de florestas plantadas.

Porém, nos resultados obtidos no presente estudo, houve uma baixa prevalência das bactérias pertencentes a este Filo, e isso também foi observado por Faoro (2006), o qual realizou a pesquisa em solo da Floresta Atlântica Paranaense. Um outro trabalho que corrobora com nossos resultados foi o de Kim *et al.* (2007), que não encontraram nenhuma seqüência desse Filo nas bibliotecas de Terra Preta de Índio e Floresta nativa da Amazônia Ocidental.

5.7 Análise Filogenética

A análise filogenética foi realizada a partir das árvores inferidas pelo programa Mega 4.0. O resultado obtido a partir da diversidade bacteriana das três bibliotecas indicou um alto índice de seqüências não-classificadas e ou não-cultivadas, sendo necessário, então, aproximar as seqüências de 16S rRNA não-conhecidas e ou não-cultivadas aos agrupamentos genéticos dos grupos classificados. Tais filogramas não tinham como objetivo realizar a classificação filogenética e evolutiva das bactérias, mas apenas auxiliar o agrupamento das seqüências não-classificadas e ou não-cultivadas em relação às Classes que se aproximam filogeneticamente. Entretanto, esse tipo de informação não é suficiente para descrever uma nova espécie, sendo necessários mais estudos da fisiologia e morfologia pelos métodos clássicos de cultivo dependente (Garrity *et al*., 2001).

Esses dados deram condições para comparar as árvores filogenéticas, podendo ser observada as diferenças existentes entre as bibliotecas CUP1, CUP2 e CAM2. Todas as bibliotecas apresentaram dois grandes clusters. Os Filos acidobacteria e proteobacteria com as Classes *alphaproteobacteria*, *betaproteobacteria*, *deltaproteobacteria* e *gammaproteobacteria*.

Grande parte das seqüências não-classificadas e ou não-cultivadas foram agrupadas no cluster *Acidobacteria*. As arvores filogenéticas encontram-se em anexo, pois as mesmas apresentam muitos cladogramas que não pode ser colocada em uma única página.

CONCLUSÕES

● A extração do DNA do solo pelo método fenol/clorofórmio com posterior etapa de purificação permitiu separar o DNA da microbiota do solo dos ácidos húmicos e outros contaminantes que prejudicariam o andamento do trabalho;

● A amplificação pela PCR da região 16S rRNA do domínio Bactéria foi eficiente para avaliar a estrutura da comunidade bacteriana presente na rizosfera do camu-camu e do cupuaçu das duas propriedades, gerando fragmentos de tamanho esperado, aproximadamente 1.100 pb;

● Foram construídas três bibliotecas genômicas, as quais puderam ser analisadas, como CUP1, CUP2 e CAM2;

• Houve uma prevalência de bactérias das Classes: Acidobacteria, Betaproteobacteria e Alphaproteobacteria em todas as bibliotecas;

• Em relação aos solos rizosféricos das duas espécies frutíferas, a biblioteca de cupuaçu mostrou maior diversidade bacteriana, quando comparada com a de camu-camu;

• Houve relação intrínseca dos macro e micronutrientes com a comunidade bacteriana encontrada;

• Existe influência das raízes das espécies frutíferas estudadas na seleção de bactérias nos solos analisados;

• São necessárias mais pesquisas para entender melhor a influência da rizosfera das plantas e do grau de fertilidade do solo na diversidade da microbiota do solo;

• Informações relacionadas com a biodiversidade da microbiota do solo, como as obtidas no presente trabalho, podem servir como ferramenta para um melhor manejo dos solos usados em sistemas produtivos da Amazônia, pois ao estipular a

comunidade bacteriana de interesse, pode-se adequar o meio para que a mesma se desenvolva.

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ANEXOS.

ANEXO 1 CARACTERÍSTICAS QUÍMICAS DAS AMOSTRAS DE SOLO (ANÁLISES REALIZADAS NO LABORATÓRIO TEMÁTICO DE SOLOS E PLANTAS - LTSP/INPA)

Nr. Am LTSP	Identificação abrev	Profund. cm	pH H2O	Ca++	Mg++	Al+H	K+	P	Fe	Zn	Mn	N	C	M.O
				.----------cmolc kg----------				mg/kg	--------mg/kg----------			----------g/kg----------		
1	CAM1 r1	0-10	5,66	5,38	1,74	0,00	28,00	46,61	147	8,4	12,4	2,28	27,57	47,44
2	CAM1 r2	0-10	5,80	5,63	1,37	0,00	44,50	98,88	153	5,1	11,9	2,41	30,64	52,71
3	CAM1 r3	0-10	5,36	4,07	0,99	0,28	50,00	40,00	174	5,4	9,7	2,78	40,21	69,18
4	CAM1 r4	0-10	6,82	6,34	2,96	0,00	43,00	49,35	131	18,2	9,6	1,95	25,28	43,48
5	CAM1 r5	0-10	6,54	9,87	2,47	0,00	59,00	170,92	75	9,5	24,2	3,53	47,88	82,35
6	CUP1 r1	0-10	4,91	4,88	1,15	0,09	38,00	14,06	124	4,0	14,8	2,37	30,64	52,71
7	CUP1 r2	0-10	4,90	1,76	0,35	1,20	55,00	10,54	201	4,7	8,3	2,93	42,13	72,47
8	CUP1 r3	0-10	5,00	3,07	0,53	0,60	70,50	8,19	182	3,5	12,3	2,98	42,13	72,47
9	CUP1 r4	0-10	4,95	2,42	0,58	0,74	40,00	6,88	197	3,2	7,4	2,60	30,64	52,71
10	CUP1 r5	0-10	4,71	0,48	0,19	1,29	38,50	7,46	179	1,1	4,5	2,50	34,47	59,29
11	CAM2 r1	0-10	5,16	0,54	0,54	0,37	16,50	4,99	125	1,1	3,0	1,11	19,91	34,26
12	CAM2 r2	0-10	5,06	0,38	0,48	0,41	16,00	3,95	124	1,1	3,2	0,91	15,70	27,01
13	CAM2 r3	0-10	5,33	0,67	0,61	0,14	28,00	2,94	118	1,2	4,7	0,76	11,87	20,42
14	CAM2 r4	0-10	5,12	0,65	0,72	0,41	28,50	6,52	174	1,3	3,0	1,06	17,61	30,31
15	CAM2 r5	0-10	5,66	0,88	0,33	0,05	15,00	4,87	99	0,9	4,5	0,83	5,36	9,22
16	CUP2 r1	0-10	5,08	0,14	0,07	0,46	7,50	2,94	66	0,7	2,0	0,67	11,11	19,11
17	CUP2 r2	0-10	4,93	0,06	0,06	0,69	8,00	3,13	73	0,7	1,8	0,60	9,19	15,81
18	CUP2 r3	0-10	5,31	0,12	0,09	0,18	7,00	2,67	62	0,7	2,7	1,02	7,28	12,52
19	CUP2 r4	0-10	5,16	0,07	0,07	0,32	7,00	2,18	71	0,6	2,1	0,6104	7,28	12,52
20	CUP2 r5	0-10	5,33	0,09	0,01	0,23	7,00	1,94	54	0,4	2,3	0,44	6,89	11,86

r: repetição de amostras

ANEXO 2 CARACTERÍSTICAS FISÍCAS DAS AMOSTRAS DE SOLO (ANÁLISES REALIZADAS NO LABORATÓRIO TEMÁTICO DE SOLOS E PLANTAS - LTSP/INPA)

Nr. Am LTSP	Identificação abrev	Profund. cm	**%areia grossa**	**%areia fina**	**%argila**	**%silte**
1	CAM1 r1	0-10	10,75	3,97	67	18,28
2	CAM1 r2	0-10	12,28	2,89	66	18,83
3	CAM1 r3	0-10	11,07	3,79	68,5	16,64
4	CAM1 r4	0-10	13	4,52	63,5	18,98
5	CAM1 r5	0-10	22,66	6,44	45,5	25,4
6	CUP1 r1	0-10	10,73	2,57	69,5	17,2
7	CUP1 r2	0-10	9,66	3,69	69,5	17,15
8	CUP1 r3	0-10	10,42	4,34	67,5	17,74
9	CUP1 r4	0-10	10,41	2,63	73,5	13,46
10	CUP1 r5	0-10	10,1	2,68	71,5	15,72
11	CAM2 r1	0-10	67,9	15,27	11,5	5,33
12	CAM2 r2	0-10	65,16	16,95	12,5	5,39
13	CAM2 r3	0-10	66,27	15,89	12,5	5,34
14	CAM2 r4	0-10	64,28	13,09	16	6,63
15	CAM2 r5	0-10	69,28	15,21	10,5	5,01
16	CUP2 r1	0-10	83,16	9,02	5	2,82
17	CUP2 r2	0-10	78,3	10,25	5,5	5,95
18	CUP2 r3	0-10	78,18	13,2	5,5	3,12
19	CUP2 r4	0-10	83,46	9,17	5,5	1,87
20	CUP2 r5	0-10	83,33	11,02	2,5	3,15

r: repetição de amostras

ANEXO 3 - RESULTADO DAS COMPARAÇÕES DAS SEQÜÊNCIAS DO GENE 16S rRNA OBTIDAS EM AMOSTRAS DE CUP1 COM AMOSTRAS DEPOSITADAS EM BANDO DE DADOS PÚBLICOS (BLAST E RDPII)

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP1P1A01	DQ351927	562	Uncultured bacterium	100	Betaproteobacteria
CUP1P1A02	DQ004761	710	Uncultured bacterium	100	Acidobacteria
CUP1P1A03	EF516672	741	Uncultured bacterium	97	Betaproteobacteria
CUP1P1A04	DQ450782	441	Uncultured Verrucomicrobia bacterium	97	Verrucomicrobiae
CUP1P1A05	-	-	-	-	-
CUP1P1A06	-	-	-	-	-
CUP1P1A07	-	-	-	-	-
CUP1P1A08	AY963359	737	Uncultured bacterium	97	Acidobacteria
CUP1P1A09	-	-	-	-	-
CUP1P1A10	AY854284	758	Uncultured bacterium	88	Clostridia
CUP1P1A11	AY917633	472	Uncultured bacterium	94	Deltaproteobacteria
CUP1P1A12	CP000360	737	Acidobacteria bacterium		Acidobacteria
CUP1P1B01	-	-	-	-	-
CUP1P1B02	DQ404800	714	Uncultured bacterium	98	Acidobacteria
CUP1P1B03	AY963476	712	Uncultured bacterium	98	Alphaproteobacteria
CUP1P1B04	-	-	-	-	-
CUP1P1B05	-	-	-	-	-
CUP1P1B06	-	-	-	-	-
CUP1P1B07	AM420143	651	Uncultured Propionibacterium sp.	99	Actinobacteria
CUP1P1B08	AM162481	696	Uncultured bacterium	96	Anaerolineae
CUP1P1B09	AF465652	658	Uncultured gamma proteobacterium	98	Gammaproteobacteria
CUP1P1B10	DQ984545	684	Uncultured bacterium	98	Alphaproteobacteria
CUP1P1B11	-	-	-	-	-
CUP1P1B12	UEU68649	728	Unidentified eubacterium from the Amazon	95	Acidobacteria
CUP1P1C01	EU160160	690	Uncultured bacterium	96	Alphaproteobacteria
CUP1P1C02	DQ004761	717	Uncultured bacterium	97	Acidobacteria
CUP1P1C03	EF516253	690	Uncultured bacterium	95	Planctomycetacia
CUP1P1C04	DQ984550	635	Uncultured bacterium	99	Acidobacteria
CUP1P1C05	EF142019	526	Uncultured delta proteobacterium	99	Deltaproteobacteria
CUP1P1C06	EU335380	201	Uncultured bacterium	96	Não Classificada
CUP1P1C07	-	-	-	-	-
CUP1P1C08	AB299588	617	Burkholderia sp.	99	Betaproteobacteria
CUP1P1C09	DQ404617	608	Uncultured bacterium	94	Acidobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP1P1C10	AY326553	600	Uncultured soil bacterium	99	Acidobacteria
CUP1P1C11	EF516751	313	Uncultured bacterium	97	Deltaproteobacteria
CUP1P1C12	AJ292600	633	Uncultured eubacterium	98	Alphaproteobacteria
CUP1P1D01	AF465655	685	Uncultured alpha proteobacterium	97	Alphaproteobacteria
CUP1P1D02	CP000360	753	Acidobacteria bacterium	98	Acidobacteria
CUP1P1D03	EU180537	265	Beta proteobacterium	98	Betaproteobacteria
CUP1P1D04	-	-	-	-	-
CUP1P1D05	-	-	-	-	
CUP1P1D06	AY917478	651	Uncultured bacterium	96	Acidobacteria
CUP1P1D07	-	-	-	-	-
CUP1P1D08	DQ646315	632	Uncultured Myxococcales bacterium	96	Deltaproteobacteria
CUP1P1D09	EU359996	630	Uncultured bacterium	97	Acidobacteria
CUP1P1D10	-	-	-	-	-
CUP1P1D11	-	-	-	-	-
CUP1P1D12	AY326547	747	Uncultured soil bacterium	98	Acidobacteria
CUP1P1E01	EF516796	729	Uncultured bacterium	99	Acidobacteria
CUP1P1E02	DQ381722	705	Burkholderia sp.	99	Betaproteobacteria
CUP1P1E03	-	-	-	-	-
CUP1P1E04	DQ139450	607	Uncultured Acidobacteria bacterium	96	Acidobacteria
CUP1P1E05	AB266607	712	Burkholderia sp.	99	Betaproteobacteria
CUP1P1E06	-	-	-	-	-
CUP1P1E07	AB108482	834	Propionibacterium acnes	99	Actinobacteria
CUP1P1E08	AF234690	687	Uncultured sludge bacterium	94	Anaerolineae
CUP1P1E09	AM162481	494	Uncultured bacterium	97	Anaerolineae
CUP1P1E10	EF516639	680	Uncultured bacterium	96	Verrucomicrobiae
CUP1P1E11	DQ676430	500	Uncultured beta proteobacterium	96	Betaproteobacteria
CUP1P1E12	EU399922	365	Burkholderia sp.	97	Betaproteobacteria
CUP1P1F01	AY178108	576	Burkholderia sp.	98	Betaproteobacteria
CUP1P1F02	-	-	-	-	-
CUP1P1F03	EF173336	707	Uncultured beta proteobacterium	95	Betaproteobacteria
CUP1P1F04	DQ837260	632	Uncultured Acidobacteria bacterium	98	Acidobacteria
CUP1P1F05	EF516647	638	Uncultured bacterium	97	Acidobacteria
CUP1P1F06	EU044462	675	Uncultured bacterium	96	Não Classificada
CUP1P1F07	-	-	-	-	-
CUP1P1F08	AY963499	672	Uncultured bacterium	97	Não classificada
CUP1P1F09	UEU68600	462	Unidentified eubacterium from the Amazon	93	Não classificada
CUP1P1F10	-	-	-	-	-
CUP1P1F11	AY326563	844	Uncultured soil bacterium	97	Acidobacteria
CUP1P1F12	AY395368	599	Uncultured alpha proteobacterium	97	Alphaproteobacteria
CUP1P1G01	AY673350	715	Acidobacteria bacterium	98	Acidobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP1P1G02	AY963487	641	Uncultured bacterium	99	Acidobacteria
CUP1P1G03	DQ223214	668	Uncultured proteobacterium	96	Gammaproteobacteria
CUP1P1G04	AY587230	624	Acidobacteriaceae bacterium	96	Acidobacteria
CUP1P1G05	DQ839350	670	Uncultured anthomonadaceae bacterium	97	Gammaproteobacteria
CUP1P1G06	-	-	-	-	-
CUP1P1G07	-	-	-	-	-
CUP1P1G08	AY963453	593	Uncultured bacterium	98	Não classificada
CUP1P1G09	EF221578	667	Uncultured Bacteroidetes bacterium	97	Não classificada
CUP1P1G10	UEU68612	219	Unidentified eubacterium from the Amazon	99	Acido bacteria
CUP1P1G11	DQ451498	639	Uncultured bacterium	97	Acidobacteria
CUP1P1G12	-	-	-	-	-
CUP1P1H01	AY673350	764	Acidobacteria bacterium	98	Acidobacteria
CUP1P1H02	AB179518	718	Uncultured bacterium	96	Não classificada
CUP1P1H03	DQ676430	700	Uncultured beta proteobacterium	97	Betaproteobacteria
CUP1P1H04	EF516438	669	Uncultured bacterium	99	Acidobacteria
CUP1P1H05	-	-	-	-	-
CUP1P1H06	-	-	-	-	-
CUP1P1H07	UEU68606	659	Unidentified eubacterium from the Amazon	95	Não classificada
CUP1P1H08	AY917683	731	Uncultured bacterium	95	Não classificada
CUP1P1H09	AY326525	668	Uncultured soil bacterium	99	Verrucomicrobiae
CUP1P1H10	EU137517	435	Uncultured bacterium	97	Actinobacteria
CUP1P1H11	EF516488	731	Uncultured bacterium	98	Acidobacteria
CUP1P1H12	-	-	-	-	-
CUP1P2A01	EF515937	712	Uncultured bacterium	98	Gamaproteobacteria
CUP1P2A02	-	-	-	-	-
CUP1P2A03	-	-	-	-	-
CUP1P2A04	EF540415	692	Uncultured soil bacterium	96	Betaproteobacteria
CUP1P2A05	DQ984596	465	Uncultured bacterium	97	Alphaproteobacteria
CUP1P2A06	EU403036	646	Uncultured bacterium	98	Acidobacteria
CUP1P2A07	AY917683	694	Uncultured bacterium	95	Não classificada
CUP1P2A08	DQ906778	738	Uncultured bacterium	98	Deltaproteobacteria
CUP1P2A09	AY238506	647	Burkholderia sp.	99	Betaproteobacteria
CUP1P2A10	-	-	-	-	-
CUP1P2A11	-	-	-	-	-
CUP1P2A12	EF492947	756	Uncultured bacterium	97	Acidobacteria
CUP1P2B01	DQ984553	743	Uncultured bacterium	97	Acidobacteria
CUP1P2B02	DQ520829	796	Oxalobacteraceae bacterium	98	Betaproteobacteria
CUP1P2B03	DQ906058	646	Uncultured bacterium	97	Acidobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP1P2B04	EF516608	711	Uncultured bacterium	98	Acidobacteria
CUP1P2B05	CP000151	725	Burkholderia sp.	99	Betaproteobacteria
CUP1P2B06	EF667415	543	Uncultured bacterium	97	Acidobacteria
CUP1P2B07	EF516077	639	Uncultured bacterium	99	Acidobacteria
CUP1P2B08	DQ303278	653	Uncultured bacterium	96	Actinobacteria
CUP1P2B09	AY963385	650	Uncultured bacterium	98	Verrucomicrobiae
CUP1P2B10	EU344930	611	Uncultured Planctomyces sp.	99	Planctomycetacia
CUP1P2B11	EU335378	619	Uncultured bacterium	92	Não classificada
CUP1P2B12	AY913242	789	Uncultured forest soil bacterium	97	Acidobacteria
CUP1P2C01	EF516527	742	Uncultured bacterium	96	Não classificada
CUP1P2C02	EU335407	758	Uncultured bacterium	98	Acidobacteria
CUP1P2C03	AM902627	746	Uncultured Acidobacteria	96	Acidobacteria
CUP1P2C04	U68606	552	Unidentified eubacterium	96	Não classificada
CUP1P2C05	EF516825	683	Uncultured bacterium	98	Acidobacteria
CUP1P2C06	DQ791291	724	Uncultured bacterium	97	Acidobacteria
CUP1P2C07	EF515937	652	Uncultured bacterium	98	Gamaproteobacteria
CUP1P2C08	AB297963	819	Goodfellowia coeruleoviolacea	96	Actinobacteria
CUP1P2C09	EF494274	602	Uncultured bacterium	97	Gamaproteobacteria
CUP1P2C10	EU360046	610	Uncultured bacterium	98	Acidobacteria
CUP1P2C11	AY444980	700	Uncultured bacterium	98	Alphaproteobacteria
CUP1P2C12	EF635247	764	Serratia sp.	99	Gammaproteobacteria
CUP1P2D01	EF516757	725	Uncultured bacterium	98	Acidobacteria
CUP1P2D02	AY963487	716	Uncultured bacterium	99	Acidobacteria
CUP1P2D03	EU051336	768	Uncultured soil bacterium	97	Acidobacteria
CUP1P2D04	DQ984550	732	Uncultured bacterium	98	Acidobacteria
CUP1P2D05	-	-	-	-	-
CUP1P2D06	AB238786	689	Uncultured bacterium	96	Não classificada
CUP1P2D07	AY963453	651	Uncultured bacterium	97	Betaproteobacteria
CUP1P2D08	AB238786	687	Uncultured bacterium	96	Não classificada
CUP1P2D09	EF516981	597	Uncultured bacterium	98	Acidobacteria
CUP1P2D10	AM162456	702	Uncultured bacterium	97	Verrucomicrobiae
CUP1P2D11	-	-	-	-	-
CUP1P2D12	EU133559	754	Uncultured bacterium	95	Não classificada
CUP1P2E01	-	-	-	-	-
CUP1P2E02	EF516899	749	Uncultured bacterium	98	Acidobacteria
CUP1P2E03	AY963453	765	Uncultured bacterium	98	Betaproteobacteria
CUP1P2E04	AY673350	652	Acidobacteria bacterium	98	Acidobacteria
CUP1P2E05	AY945875	698	Uncultured bacterium	99	Não classificada
CUP1P2E06	DQ984550	600	Uncultured bacterium	99	Acidobacteria
CUP1P2E07	EF079087	718	Ideonella sp.	98	Betaproteobacteria
CUP1P2E08	EF516026	308	Uncultured bacterium	100	Acidobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP1P2E09	DQ404800	572	Uncultured bacterium	98	Não classificada
CUP1P2E10	DQ302437	665	Uncultured bacterium	90	Não classificada
CUP1P2E11	EF018987	655	Uncultured Rhodospirillaceae	95	Alphaproteobacteria
CUP1P2E12	DQ451521	696	Uncultured bacterium	98	Alphaproteobacteria
CUP1P2F01	EF516026	728	Uncultured bacterium	99	Acidobacteria
CUP1P2F02	EF516796	760	Uncultured bacterium	99	Acidobacteria
CUP1P2F03	EF516748	723	Uncultured bacterium	99	Acidobacteria
CUP1P2F04	EF516572	657	Uncultured bacterium	93	Anaerolineae
CUP1P2F05	AB299596	717	Burkholderia sp.	98	Betaproteobacteria
CUP1P2F06	DQ984127	708	Dyella japonica	99	Gammaproteobacteria
CUP1P2F07	AB238786	649	Uncultured bacterium	95	Não classificada
CUP1P2F08	EF51665	741	Uncultured bacterium	97	Acidobacteria
CUP1P2F09	EF516651	694	Uncultured bacterium	94	Não classificada
CUP1P2F10	CP000360	692	Acidobacteria bacterium	99	Acidobacteria
CUP1P2F11	EF515962	782	Uncultured bacterium	95	Não classificada
CUP1P2F12	EF516608	555	Uncultured bacterium	98	Acidobacteria
CUP1P2G01	DQ984550	757	Uncultured bacterium	99	Acidobacteria
CUP1P2G02	AY917683	714	Uncultured bacterium	95	Não classificada
CUP1P2G03	EF516603	719	Uncultured bacterium	98	Gammaproteobacteria
CUP1P2G04	AY326614	655	Uncultured soil bacterium	99	Alphaproteobacteria
CUP1P2G05	AM939778	642	Dyella marensis	99	Gammaproteobacteria
CUP1P2G06	AJ519377	597	Uncultured Holophaga	96	Acidobacteria
CUP1P2G07	AY221070	759	Uncultured bacterium	86	Não classificada
CUP1P2G08	AY963385	668	Uncultured bacterium	97	Verrucomicrobiae
CUP1P2G09	AY917478	630	Uncultured bacterium	96	Não classificada
CUP1P2G10	EU359927	622	Uncultured actinobacterium	98	Actinobacteria
CUP1P2G11	DQ083115	774	Uncultured bacterium	96	Acidobacteria
CUP1P2G12	AF465651	789	Uncultured Verrucomicrobia	96	Verrucomicrobiae
CUP1P2H01	AY917683	802	Uncultured bacterium	95	Não classificada
CUP1P2H02	DQ854740	704	Burkholderia sp.	99	Betaproteobacteria
CUP1P2H03	AY917933	719	Uncultured bacterium	95	Alphaproteobacteria
CUP1P2H04	AB266607	695	Burkholderia sp.	99	Betaproteobacteria
CUP1P2H05	EF516796	712	Uncultured bacterium	99	Acidobacteria
CUP1P2H06	-	-	-	-	-
CUP1P2H07	EF495209	679	Burkholderia sp.	95	Betaproteobacteria
CUP1P2H08	EF516738	755	Uncultured bacterium	98	Alphaproteobacteria
CUP1P2H09	AY963499	713	Uncultured bacterium	98	Não classificada
CUP1P2H10	EF219663	598	Uncultured actinobacterium	98	Acidobacteria
CUP1P2H11	AY963418	669	Uncultured bacterium	97	Acidobacteria
CUP1P2H12	DQ302728	722	Bdellovibrio sp	96	Deltaproteobacteria
CUP1P3A01	EF516825	699	Uncultured bacterium	99	Acidobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP1P3A02	DQ084325	604	Uncultured bacterium	100	Não classificada
CUP1P3A03	DQ298005	616	Uncultured soil bacterium	100	Não classificada
CUP1P3A04	EU359935	651	Uncultured Bradyrhizobium sp.	99	Alphaproteobacteria
CUP1P3A05	EF492955	237	Uncultured bacterium	99	Não classificada
CUP1P3A06	EF516796	645	Uncultured bacterium	98	Acidobacteria
CUP1P3A07	DQ451501	597	Uncultured bacterium	98	Não classificada
CUP1P3A08	EU335368	592	Uncultured bacterium	99	Não classificada
CUP1P3A09	EU423305	595	Mucilaginibacter sp.	99	Sphingobacteria
CUP1P3A10	EF516679	695	Uncultured bacterium	97	Não classificada
CUP1P3A11	-	-	-	-	-
CUP1P3A12	AY326567	550	Uncultured soil bacterium	99	Não classificada
CUP1P3B01	EU223949	714	Uncultured bacterium	97	Actinobacteria
CUP1P3B02	DQ984573	660	Uncultured bacterium	99	Acidobacteria
CUP1P3B03	UEU68649	673	Unidentified eubacterium from the Amazon	98	Acidobacteria
CUP1P3B04	-	-	-	-	-
CUP1P3B05	EU360040	631	Uncultured bacterium	99	Sphingobacteria
CUP1P3B06	-	-	-	-	-
CUP1P3B07	DQ839350	618	Uncultured Xanthomonadaceae bacterium	98	Gammaproteobacteria
CUP1P3B08	EU335264	664	Uncultured bacterium	99	Gemmatimonadetes
CUP1P3B09	AY917380	645	Uncultured bacterium	99	Não classificada
CUP1P3B10	AY691397	721	Burkholderia sp.	98	Betaproteobacteria
CUP1P3B11	EF221371	555	Uncultured Verrucomicrobia bacterium	100	Verrucomicrobiae
CUP1P3B12	EF492949	758	Uncultured bacterium	99	Acidobacteria
CUP1P3C01	EF516026	664	Uncultured bacterium	99	Acidobacteria
CUP1P3C02	DQ984564	725	Uncultured bacterium	99	Acidobacteria
CUP1P3C03	DQ004761	637	Uncultured bacterium	99	Acidobacteria
CUP1P3C04	DQ984550	612	Uncultured bacterium	99	Acidobacteria
CUP1P3C05	EF141943	680	Uncultured alpha proteobacterium	99	Alphaproteobacteria
CUP1P3C06	AY963489	606	Uncultured bacterium	98	Alphaproteobacteria
CUP1P3C07	AY211073	742	Uncultured Verrucomicrobia bacterium	99	Verrucomicrobiae
CUP1P3C08	EF516588	726	Uncultured bacterium	100	Betaproteobacteria
CUP1P3C09	EF221554	572	Uncultured gamma proteobacterium	100	Gammaproteobacteria
CUP1P3C10	-	-	-	-	-
CUP1P3C11	-	-	-	-	-
CUP1P3C12	EF516796	596	Uncultured bacterium	98	Acidobacteria
CUP1P3D01	DQ984550	647	Uncultured bacterium	100	Acidobacteria
CUP1P3D02	-	-	-	-	-
CUP1P3D03	AY942992	631	Uncultured Acidobacteria bacterium	100	Acidobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP1P3D04	AY913378	614	Uncultured forest soil bacterium	97	Alphaproteobacteria
CUP1P3D05	EF516248	625	Uncultured bacterium	97	Não classificada
CUP1P3D06	DQ815195	631	Uncultured bacterium	98	Não classificada
CUP1P3D07	-	-	-	-	-
CUP1P3D08	UEU68606	733	Unidentified eubacterium from the Amazon	100	Não classificada
CUP1P3D09	AB426557	454	Nevskia sp.	98	Gammaproteobacteria
CUP1P3D10	AF465652	757	Uncultured gamma proteobacterium	99	Gammaproteobacteria
CUP1P3D11	AY963328	713	Uncultured bacterium	99	Gammaproteobacteria
CUP1P3D12	EF516608	725	Uncultured bacterium	99	Acidobacteria
CUP1P3E01	AM162420	721	Uncultured bacterium	100	Acidobacteria
CUP1P3E02	DQ298003	763	Uncultured soil bacterium	99	Acidobacteria
CUP1P3E03	DQ378171	667	Uncultured soil bacterium	99	Alphaproteobacteria
CUP1P3E04	EF606234	575	Uncultured bacterium	98	Não classificada
CUP1P3E05	EU359989	657	Uncultured bacterium	98	Acidobacteria
CUP1P3E06	AB184645	570	Streptomyces chrysomallus subsp. fumigatus	98	Actinobacteria
CUP1P3E07	AY395441	642	Uncultured Acidobacteriales bacterium	99	Acidobacteria
CUP1P3E08	AY913376	622	Uncultured forest soil bacterium	99	Alphaproteobacteria
CUP1P3E09	AY326562	640	Uncultured soil bacterium	97	Acidobacteria
CUP1P3E10	-	-	-	-	-
CUP1P3E11	EF032755	669	Uncultured Acidobacteria bacterium	98	Acidobacteria
CUP1P3E12	EF540415	587	Uncultured soil bacterium	99	Betaproteobacteria
CUP1P3F01	AY326552	611	Uncultured soil bacterium	98	Acidobacteria
CUP1P3F02	DQ984550	645	Uncultured bacterium	98	Acidobacteria
CUP1P3F03	AY963498	692	Uncultured bacterium	98	Acidobacteria
CUP1P3F04	-	-	-	-	-
CUP1P3F05	-	-	-	-	-
CUP1P3F06	-	-	-	-	-
CUP1P3F07	EF221207	348	Uncultured beta proteobacterium	99	Betaproteobacteria
CUP1P3F08	EF220672	620	Uncultured alpha proteobacterium	99	Alphaproteobacteria
CUP1P3F09	EU360040	674	Uncultured bacterium	99	Sphingobacteria
CUP1P3F10	DQ984550	733	Uncultured bacterium	99	Acidobacteria
CUP1P3F11	AB299597	681	Burkholderia sp.	100	Betaproteobacteria
CUP1P3F12	AJ785292	614	Bradyrhizobium genosp.	98	Alphaproteobacteria
CUP1P3G01	-	-	-	-	-
CUP1P3G02	EF516796	690	Uncultured bacterium	99	Acidobacteria
CUP1P3G03	AB179518	646	Uncultured bacterium	100	Acidobacteria
CUP1P3G04	AY963486	628	Uncultured bacterium	100	Não classificada
CUP1P3G05	AY963486	700	Uncultured bacterium	100	Não classificada
CUP1P3G06	AY673350	641	Acidobacteria bacterium	99	Acidobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP1P3G07	-	-	-	-	-
CUP1P3G08	EF220587	523	Uncultured actinobacterium	100	Actinobacteria
CUP1P3G09	DQ404819	644	Uncultured bacterium	99	Não classificada
CUP1P3G10	DQ984559	698	Acidobacteria bacterium	99	Acidobacteria
CUP1P3G11	AB288596	648	Uncultured Acidobacteria bacterium	97	Acidobacteria
CUP1P3G12	EU335315	666	Uncultured bacterium	98	Acidobacteria
CUP1P3H01	AY395372	702	Uncultured delta proteobacterium	96	Deltaproteobacteria
CUP1P3H02	EF429297	725	Leptolyngbya badia	98	Cyanobacteria
CUP1P3H03	EF019854	583	Uncultured acetobacteraceae bacterium	97	Alphaproteobacteria
CUP1P3H04	-	-	-	-	-
CUP1P3H05	EF516825	669	Uncultured bacterium	98	Acidobacteria
CUP1P3H06	EF516825		Uncultured bacterium	98	Acidobacteria
CUP1P3H07	-	-	-	-	-
CUP1P3H08	-	-	-	-	-
CUP1P3H09	EF612398		Uncultured alpha proteobacterium	97	Alphaproteobacteria
CUP1P3H10	DQ984566		Uncultured bacterium	99	Acidobacteria
CUP1P3H11	EU447185		Burkholderia sp.	98	Betaproteobacteria
CUP1P3H12	-	-	-	-	-
CUP1P4A01	DQ906065	723	Uncultured bacterium	97	Acidobacteria
CUP1P4A02	DQ468069	669	Uncultured bacterium	92	Não classificada
CUP1P4A03	AF498703	670	Bacterium Ellin321	99	Betaproteobacteria
CUP1P4A04	AY963324	734	Uncultured bacterium	96	Acidobacteria
CUP1P4A05	EF516825	692	Uncultured bacterium	99	Acidobacteria
CUP1P4A06	AY694646	617	Uncultured Acidobacteria bacterium	96	Acidobacteria
CUP1P4A07	EF516233	697	Uncultured bacterium	97	Acidobacteria
CUP1P4A08	U81738	752	Unidentified eubacterium	88	Verrucomicrobiae
CUP1P4A09	AY917540	742	Uncultured bacterium	96	Acidobacteria
CUP1P4A10	Y12596	656	Uncultured bacterium	96	Alphaproteobacteria
CUP1P4A11	EF516950	664	Uncultured bacterium	99	Acidobacteria
CUP1P4A12	DQ004825	709	Uncultured bacterium	89	Anaerolineae
CUP1P4B01	EF516094	751	Uncultured bacterium	98	Acidobacteria
CUP1P4B02	AY917678	731	Uncultured bacterium	98	Alphaproteobacteria
CUP1P4B03	AB254785	684	Uncultured bacterium	95	Não classificada
CUP1P4B04	-	-	-	-	-
CUP1P4B05	DQ222225	767	Bradyrhizobium sp.	100	Alphaproteobacteria
CUP1P4B06	DQ451462	669	Uncultured bacterium	100	Gammapoteobacteria
CUP1P4B07	DQ125900	599	Uncultured bacterium	99	Acidobacteria
CUP1P4B08	EF516751	703	Uncultured bacterium	95	Deltaproteobacteria
CUP1P4B09	AY963343	802	Uncultured bacterium	97	Verrucomicrobiae
CUP1P4B10	AY040362	776	Burkholderia terricola	98	Betaproteobacteria
CUP1P4B11	EF516498	680	Uncultured bacterium	97	Sphingobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP1P4B12	EF032776	781	Uncultured bacterium	92	Não classificada
CUP1P4C01	EF516796	684	Uncultured bacterium	99	Acidobacteria
CUP1P4C02	EF584756	715	Duganella nigrescens	97	Betaproteobacteria
CUP1P4C03	AB110498	655	Dyella japonica	99	Gammaproteobacteria
CUP1P4C04	AJ292588	706	Unidentified eubacterium	99	Acidobacteria
CUP1P4C05	AY917362	704	Uncultured bacterium	99	Não classificada
CUP1P4C06	AB245367	712	Dyella ginsengisoli	98	Gammaproteobacteria
CUP1P4C07	DQ499302	777	Uncultured bacterium	99	Betaproteobacteria
CUP1P4C08	DQ404794	731	Uncultured bacterium	92	Não classificada
CUP1P4C09	EF516343	553	Uncultured bacterium	97	Acidobacteria
CUP1P4C10	EF516296	703	Uncultured bacterium	96	Acidobacteria
CUP1P4C11	AY963457	665	Uncultured bacterium	99	Acidobacteria
CUP1P4C12	DQ004764	649	Uncultured bacterium	99	Acidobacteria
CUP1P4D01	-	-	-	-	-
CUP1P4D02	AY917358	703	Uncultured bacterium	93	Acidobacteria
CUP1P4D03	AM284972	642	Burkholderia nodosa	99	Betaproteobacteria
CUP1P4D04	AY963452	623	Uncultured bacterium	99	Acidobacteria
CUP1P4D05	-	-	-	-	-
CUP1P4D06	EF516448	694	Uncultured bacterium	97	Acidobacteria
CUP1P4D07	AJ292594	560	Uncultured eubacterium	99	Alphaproteobacteria
CUP1P4D08	AY389140	714	Amycolatopsis fastidiosa	96	Actinobacteria
CUP1P4D09	EF515877	648	Uncultured bacterium	97	Acidobacteria
CUP1P4D10	EF516950	769	Uncultured bacterium	99	Acidobacteria
CUP1P4D11	EF139182	685	Burkholderia tropica	98	Betaproteobacteria
CUP1P4D12	AY913242	761	Uncultured forest soil bacterium	98	Acidobacteria
CUP1P4E01	EF516257	606	Uncultured bacterium	97	Actinobacteria
CUP1P4E02	AY326552	783	Uncultured soil bacterium	98	Acidobacteria
CUP1P4E03	-	-	-	-	-
CUP1P4E04	EF516115	562	Uncultured bacterium	99	Acidobacteria
CUP1P4E05	AM162464	705	Uncultured bacterium	95	Verrucomicrobiae
CUP1P4E06	AY963324	607	Uncultured bacterium	95	Acidobacteria
CUP1P4E07	-	-	-	-	-
CUP1P4E08	-	-	-	-	-
CUP1P4E09	EF516438	637	Uncultured bacterium	99	Acidobacteria
CUP1P4E10	EU160255	713	Uncultured bacterium	98	Acidobacteria
CUP1P4E11	EF219663	729	Uncultured actinobacterium	98	Actinobacteria
CUP1P4E12	EF516077	679	Uncultured bacterium	99	
CUP1P4F01	DQ129651	628	Uncultured bacterium	98	Não classificada
CUP1P4F02	EF516477	723	Uncultured bacterium	98	Deltaproteobacteria
CUP1P4F03	-	-	-	-	-
CUP1P4F04	AM939778	353	Dyella marensis	97	Gammaproteobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP1P4F05	EF516847	666	Uncultured bacterium	95	Não classificada
CUP1P4F06	EF492949	647	Uncultured bacterium	97	Acidobacteria
CUP1P4F07	-	-	-	-	-
CUP1P4F08	EF21977	595	Unidentified bacterium	94	Não classificada
CUP1P4F09	AJ318174	615	Uncultured alpha proteobacterium	94	Alphaproteobacteria
CUP1P4F10	DQ004761	767	Uncultured bacterium	98	Acidobacteria
CUP1P4F11	EF221371	712	Uncultured Verrucomicrobia bacterium	98	Verrucomicrobiae
CUP1P4F12	-	-	-	-	-
CUP1P4G01	AY662029	687	Uncultured bacterium	94	Alphaproteobacteria
CUP1P4G02	AF465655	709	Uncultured alpha proteobacterium	97	Alphaproteobacteria
CUP1P4G03	-	-	-	-	-
CUP1P4G04	-	-	-	-	-
CUP1P4G05	EF219638	744	Unidentified bacterium	94	Não classificada
CUP1P4G06	EU151834	661	Uncultured soil bacterium	98	Alphaproteobacteria
CUP1P4G07	-	-	-	-	-
CUP1P4G08	AY917552	664	Uncultured bacterium	91	Acidobacteria
CUP1P4G09	AY963452	600	Uncultured bacterium	96	Acidobacteria
CUP1P4G10	EF516825	697	Uncultured bacterium	99	Acidobacteria
CUP1P4G11	DQ451498	761	Uncultured bacterium	97	Acidobacteria
CUP1P4G12	DQ347894	692	Uncultured bacterium	97	Actinobacteria
CUP1P4H01	EU044264	744	Uncultured bacterium	95	Não classificada
CUP1P4H02	DQ984612	737	Uncultured bacterium	98	Gammaproteobacteria
CUP1P4H03	DQ906852	625	Uncultured bacterium	99	Betaproteobacteria
CUP1P4H04	AJ292626	643	Uncultured eubacterium	99	Betaproteobacteria
CUP1P4H05	DQ984550	493	Uncultured bacterium	98	Acidobacteria
CUP1P4H06	-	-	-	-	-
CUP1P4H07	DQ521504	776	Uncultured bacterium	86	Não classificada
CUP1P4H08	EF516825	749	Uncultured bacterium	99	Acidobacteria
CUP1P4H09	-	-	-	-	-
CUP1P4H10	DQ984542	620	Uncultured bacterium	99	Gammaproteobacteria
CUP1P4H11	AY963453	635	Uncultured bacterium	99	Betaproteobacteria
CUP1P4H12	DQ984573	304	Uncultured bacterium	98	Acidobacteria

ANEXO 4 - RESULTADO DAS COMPARAÇÕES DAS SEQÜÊNCIAS DO GENE 16S rRNA OBTIDAS EM AMOSTRAS DE CUP2 COM AMOSTRAS DEPOSITADAS EM BANDO DE DADOS PÚBLICOS (BLAST E RDPII)

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP2P1A01	DQ451521	712	Uncultured bacterium	97	Alphaproteobacteria
CUP2P1A02	AB238771	603	Uncultured bacterium	98	Acidobacteria
CUP2P1A03	AY234420	613	Bacterium Ellin5003	98	Alphaproteobacteria
CUP2P1A04	AP009373	692	Draba nemorosa	99	Cyanobacteria
CUP2P1A05	DQ004761	753	Uncultured bacterium	97	Acidobacteria
CUP2P1A06	AY694659	673	Uncultured Acidobacteria bacterium	95	Acidobacteria
CUP2P1A07	AY866407	582	Alcaligenes faecalis	99	Betaproteobacteria
CUP2P1A08	AJ582045	638	Uncultured Acidobacteria bacterium	97	Acidobacteria
CUP2P1A09	EF516358	663	Uncultured bacterium	98	Verrucomicrobiae
CUP2P1A10	AY917583	658	Uncultured bacterium	97	Actinobacteria
CUP2P1A11	AY963326	579	Uncultured bacterium	97	Acidobacteria
CUP2P1A12	EF018156	607	Uncultured bacterium	98	Verrucomicrobiae
CUP2P1B01	AM162409	706	Uncultured bacterium	98	Acidobacteria
CUP2P1B02	EF516891	626	Uncultured bacterium	97	Betaproteobacteria
CUP2P1B03	EF516748	721	Uncultured bacterium	93	Acidobacteria
CUP2P1B04	AY694659	668	Uncultured Acidobacteria bacterium	98	Acidobacteria
CUP2P1B05	AY963512	643	Uncultured bacterium	99	Acidobacteria
CUP2P1B06	DQ004775	544	Uncultured bacterium	96	Acidobacteria
CUP2P1B07	AY326523	677	Uncultured soil bacterium	98	Verrucomicrobiae
CUP2P1B08	AY917830	614	Uncultured bacterium	93	Não classificada
CUP2P1B09	AB238771	667	Uncultured bacterium	98	Acidobacteria
CUP2P1B10	EF516661	693	Uncultured bacterium	96	Acidobacteria
CUP2P1B11	-	-	-	-	-
CUP2P1B12	EF516921	727	Uncultured bacterium	95	Não classificada
CUP2P1C01	AY326562	712	Uncultured soil bacterium	99	Acidobacteria
CUP2P1C02	-	-	-	-	-
CUP2P1C03	-	-	-	-	-
CUP2P1C04	AY963499	608	Uncultured bacterium	98	Não classificada
CUP2P1C05	DQ451514	739	Uncultured bacterium	97	Actinobacteria
CUP2P1C06	-	-	-	-	-
CUP2P1C07	AB238768	661	Uncultured bacterium	95	Acidobacteria
CUP2P1C08	AY963390	680	Uncultured bacterium	97	Acidobacteria
CUP2P1C09	AY963504	569	Uncultured bacterium	97	Gammaproteobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP2P1C10	DQ451522	365	Uncultured bacterium	99	Alphaproteobacteria
CUP2P1C11	AB238771	667	Uncultured bacterium	98	Acidobacteria
CUP2P1C12	EF516796	667	Uncultured bacterium	99	Acidobacteria
CUP2P1D01	AY913252	641	Uncultured forest soil bacterium	93	Gemmatimonadetes
CUP2P1D02	AY963512	685	Uncultured bacterium	97	Acidobacteria
CUP2P1D03	AY963361	738	Uncultured bacterium	98	Alphaproteobacteria
CUP2P1D04	EF516296	584	Uncultured bacterium	98	Acidobacteria
CUP2P1D05	AY326573	663	Uncultured soil bacterium	97	Acidobacteria
CUP2P1D06	AB021423	669	Burkholderia caryophylli	97	Betaproteobacteria
CUP2P1D07	DQ125691	590	Uncultured bacterium	95	Alphaproteobacteria
CUP2P1D08	AB238771	493	Uncultured bacterium	99	Acidobacteria
CUP2P1D09	AY963452	621	Uncultured bacterium	97	Acidobacteria
CUP2P1D10	AB021423	646	Burkholderia caryophylli	99	Betaproteobacteria
CUP2P1D11	AY963500	729	Uncultured bacterium	96	Acidobacteria
CUP2P1D12	-	-	-	-	-
CUP2P1E01	AM489641	424	Uncultured Caulobacter sp.	88	Alphaproteobacteria
CUP2P1E02	AB240329	731	Uncultured bacterium	89	Alphaproteobacteria
CUP2P1E03	EF516709	638	Uncultured bacterium	93	Betaproteobacteria
CUP2P1E04	AY724094	520	Uncultured bacterium	91	Não classificada
CUP2P1E05	DQ004821	656	Uncultured bacterium	91	Acidobacteria
CUP2P1E06	AY326587	654	Uncultured soil bacterium	89	Gammaproteobacteria
CUP2P1E07	EF516233	709	Uncultured bacterium	91	Acidobacteria
CUP2P1E08	DQ453803	656	Uncultured bacterium	93	Alphaproteobacteria
CUP2P1E09	AY917446	660	Uncultured bacterium	93	Acidobacteria
CUP2P1E10	AY917472	464	Uncultured bacterium	93	Planctomycetacia
CUP2P1E11	AY326587	590	Uncultured bacterium	93	Gammaproteobacteria
CUP2P1E12	AY326559	666	Uncultured bacterium	93	Acidobacteria
CUP2P1F01	AY326549	603	Uncultured bacterium	90	Acidobacteria
CUP2P1F02	AY917421	673	Uncultured bacterium	93	Alphaproteobacteria
CUP2P1F03	DQ404617	574	Uncultured bacterium	88	Acidobacteria
CUP2P1F04	AY963457	702	Uncultured bacterium	93	Acidobacteria
CUP2P1F05	AY694655	673	Uncultured bacterium	91	Acidobacteria
CUP2P1F06	-	-	-	-	-
CUP2P1F07	AY326554	744	Uncultured soil bacterium	92	Acidobacteria
CUP2P1F08	AJ390478	599	Uncultured soil bacterium	90	Planctomycetacia
CUP2P1F09	AY963509	748	Uncultured bacterium	92	Acidobacteria
CUP2P1F10	AY326587	681	Uncultured soil bacterium	92	Gammaproteobacteria
CUP2P1F11	AY917478	627	Uncultured bacterium	90	Acidobacteria
CUP2P1F12	DQ451512	390	Uncultured bacterium	92	Alphaproteobacteria
CUP2P1G01	AY326573	674	Uncultured soil bacterium	93	Acidobacteria
CUP2P1G02	EF516570	741	Uncultured bacterium	90	Acidobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP2P1G03	AY963390	701	Uncultured bacterium	90	Acidobacteria
CUP2P1G04	AY963504	618	Uncultured bacterium	92	Gammaproteobacteria
CUP2P1G05	AB238779	683	Uncultured bacterium	91	Acidobacteria
CUP2P1G06	AY963480	686	Uncultured bacterium	87	Não classificada
CUP2P1G07	AY963504	665	Uncultured bacterium	93	Gammaproteobacteria
CUP2P1G08	EF032756	659	Uncultured Acidobacteria bacterium	92	Acidobacteria
CUP2P1G09	EF032753	691	Uncultured Acidobacteria bacterium	93	Acidobacteria
CUP2P1G10	AB278570	665	Chitinophaga terrae	91	Sphingobacteria
CUP2P1G11	AB238779	537	Uncultured bacterium	93	Acidobacteria
CUP2P1G12	AB238771	669	Uncultured bacterium	93	Acidobacteria
CUP2P1H01	EF516796	707	Uncultured bacterium	93	Acidobacteria
CUP2P1H02	AB238771	708	Uncultured bacterium	92	Acidobacteria
CUP2P1H03	AY963457	742	Uncultured bacterium	92	Acidobacteria
CUP2P1H04	AY963311	540	Uncultured bacterium	93	Acidobacteria
CUP2P1H05	AB161266	698	Uncultured bacterium	92	Acidobacteria
CUP2P1H06	-	-	-	-	-
CUP2P1H07	-	-	-	-	-
CUP2P1H08	EF516689	560	Uncultured bacterium	89	Acidobacteria
CUP2P1H09	EF516796	594	Uncultured bacterium	93	Acidobacteria
CUP2P1H10	AY326626	674	Uncultured soil bacterium	93	Actinobacteria
CUP2P1H11	AY234747	662	Bacterium Ellin6095	91	Betaproteobacteria
CUP2P1H12	DQ791301	598	Uncultured bacterium	90	Não classificada
CUP2P2A01	AY963453	681	Uncultured bacterium	99%	Betaproteobacteria
CUP2P2A02	EF515945	545	Uncultured bacterium	99%	Acidobacteria
CUP2P2A03	DQ768111	702	Cystobacter miniatus	97%	Deltaproteobacteria
CUP2P2A04	EF516255	475	Uncultured bacterium	97%	Planctomycetacia
CUP2P2A05	AY326564	561	Uncultured bacterium	99%	Acidobacteria
CUP2P2A06	EU403011	508	Uncultured bacterium	94%	Acidobacteria
CUP2P2A07	EU360070	446	Uncultured bacterium		Não classificada
CUP2P2A08	-	-	-	-	-
CUP2P2A09	-	-	-	-	-
CUP2P2A10	-	-	-	-	-
CUP2P2A11	-	-	-	-	-
CUP2P2A12	EF492912	573	Uncultured bacterium	97%	Acidobacteria
CUP2P2B01	AB111107	710	Proteobacterium	96%	Alphaproteobacteria
CUP2P2B02	EU335407	706	Uncultured bacterium	99%	Acidobacteria
CUP2P2B03	-	-	-	-	-
CUP2P2B04	-	-	-	-	-
CUP2P2B05	AY673403	670	Chloroflexi bacterium	90%	Não classificada
CUP2P2B06	DQ984562	675	Uncultured bacterium	99%	Alphaproteobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP2P2B07	DQ837260	466	Uncultured Acidobacteria	94%	Acidobacteria
CUP2P2B08	EU385703	669	Uncultured bacterium	89%	Não classificada
CUP2P2B09	-	-	-	-	-
CUP2P2B10	DQ984567	573	Uncultured bacterium	98%	Gammaproteobacteria
CUP2P2B11	-	-	-	-	-
CUP2P2B12	AY963452	621	Uncultured bacterium	99%	Acidobacteria
CUP2P2C01	-	-	-	-	-
CUP2P2C02	AY395343	368	Uncultured Gemmatimonadetes	98%	Gemmatimonadetes
CUP2P2C03	-	-	-	-	-
CUP2P2C04	-	-	-	-	-
CUP2P2C05	AY326559	678	Uncultured soil bacterium	99%	Acidobacteria
CUP2P2C06	DQ984567	613	Uncultured bacterium	98%	Gammaproteobacteria
CUP2P2C07	-	-	-	-	-
CUP2P2C08	-	-	-	-	-
CUP2P2C09	AY326529	431	Uncultured soil bacterium	93%	Não classificada
CUP2P2C10	-	-	-	-	-
CUP2P2C11	EF606669		Unidentified bacterium	97%	Acidobacteria
CUP2P2C12	-	-	-	-	-
CUP2P2D01	-	-	-	-	-
CUP2P2D02	AB262730	333	Uncultured bacterium	97%	Planctomycetacia
CUP2P2D03	DQ004761	487	Uncultured bacterium	97%	Acidobacteria
CUP2P2D04	-	-	-	-	-
CUP2P2D05	-	-	-	-	-
CUP2P2D06	AY913371	550	Uncultured forest soil	98%	Acidobacteria
CUP2P2D07	AY963453	529	Uncultured bacterium	99%	Betaproteobacteria
CUP2P2D08	-	-	-	-	-
CUP2P2D09	AY963480	410	Uncultured bacterium	97%	Acidobacteria
CUP2P2D10	-	-	-	-	-
CUP2P2D11	-	-	-	-	-
CUP2P2D12	-	-	-	-	-
CUP2P2E01	-	-	-	-	-
CUP2P2E02	AF465655	710	Uncultured alpha proteobacterium	96%	Alphaproteobacteria
CUP2P2E03	-	-	-	-	-
CUP2P2E04	-	-	-	-	-
CUP2P2E05	-	-	-	-	-
CUP2P2E06	AY326548	594	Uncultured soil bacterium	98%	Acidobacteria
CUP2P2E07	-	-	-	-	-
CUP2P2E08	-	-	-	-	-
CUP2P2E09	-	-	-	-	-
CUP2P2E10	-	-	-	-	-

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP2P2E11	-	-	-	-	-
CUP2P2E12	EU359998	588	Uncultured bacterium	96%	Gemmatimonadetes
CUP2P2F01	-	-	-	-	-
CUP2P2F02	EU359996	735	Uncultured bacterium	97%	Acidobacteria
CUP2P2F03	AY917478	598	Uncultured bacterium	96%	Não classificada
CUP2P2F04	-	-	-	-	-
CUP2P2F05	AY963453	531	Uncultured bacterium	99%	Betaproteobacteria
CUP2P2F06	EF221257	319	Uncultured actinobacterium	93%	Actinobacteria
CUP2P2F07	-	-	-	-	-
CUP2P2F08	-	-	-	-	-
CUP2P2F09	-	-	-	-	-
CUP2P2F10	-	-	-	-	-
CUP2P2F11	-	-	-	-	-
CUP2P2F12	-	-	-	-	-
CUP2P2G01	-	-	-	-	-
CUP2P2G02	AB262725	402	Uncultured bacterium	99%	Acidobacteria
CUP2P2G03	EU341264	419	Uncultured Delftia	99%	Betaproteobacteria
CUP2P2G04	-	-	-	-	-
CUP2P2G05	-	-	-	-	-
CUP2P2G06	EF688384	602	Uncultured soil bacterium	97%	Acidobacteria
CUP2P2G07	-	-	-	-	-
CUP2P2G08	-	-	-	-	-
CUP2P2G09	AY963326	377	Uncultured bacterium	98%	Acidobacteria
CUP2P2G10	-	-	-	-	-
CUP2P2G11	-	-	-	-	-
CUP2P2G12	-	-	-	-	-
CUP2P2H01	-	-	-	-	-
CUP2P2H02	AY425788	690	Uncultured bacterium	96%	Gammaproteobacteria
CUP2P2H03	-	-	-	-	-
CUP2P2H04	EU335401	439	Uncultured bacterium	97%	Não classificada
CUP2P2H05	DQ984564	738	Uncultured bacterium	98%	Acidobacteria
CUP2P2H06	AY963326	362	Uncultured bacterium	97%	Acidobacteria
CUP2P2H07	EF221336	721	Uncultured actinobacterium	94%	Acidobacteria
CUP2P2H08	-	-	-	-	-
CUP2P2H09	-	-	-	-	-
CUP2P2H10	-	-	-	-	-
CUP2P2H11	AY100619	651	Uncultured bacterium	96%	Deltaproteobacteria
CUP2P2H12	-	-	-	-	-
CUP2P3A01	-	-	-	-	-
CUP2P3A02	AY963504	717	Uncultured bacterium	96	Gammaproteobacteria
CUP2P3A03	EF221528	513	Uncultured actinobacterium	97	Actinobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP2P3A04	-	-	-	-	-
CUP2P3A05	AY963500	723	Uncultured bacterium	98	Acidobacteria
CUP2P3A06	EF516340	626	Uncultured bacterium	94	Sphingobacteria
CUP2P3A07	EF516889	587	Uncultured bacterium	98	Verrucomicrobiae
CUP2P3A08	DQ451514	746	Uncultured bacterium	98	Actinobacteria
CUP2P3A09	EF515968	739	Uncultured bacterium	97	Acidobacteria
CUP2P3A10	AY326559	740	Uncultured soil bacterium	98	Acidobacteria
CUP2P3A11	EF516257	684	Uncultured bacterium	97	Actinobacteria
CUP2P3A12	-	-	-	-	-
CUP2P3B01	AY917446	605	Uncultured bacterium	94	Não classificada
CUP2P3B02	CP000115	592	Nitrobacter winogradskyi	88	Alphaproteobacteria
CUP2P3B03	EF516084	294	Uncultured bacterium	95	Não classificada
CUP2P3B04	EU335425	412	Uncultured bacterium	93	Não classificada
CUP2P3B05	AY326547	728	Uncultured soil bacterium	98	Acidobacteria
CUP2P3B06	DQ451521	475	Uncultured bacterium	99	Alphaproteobacteria
CUP2P3B07	AY326559	625	Uncultured soil bacterium	98	Acidobacteria
CUP2P3B08	DQ512800	696	Inquilinus sp.	90	Alphaproteobacteria
CUP2P3B09	DQ829635	653	Uncultured Acidobacteria bacterium	98	Acidobacteria
CUP2P3B10	AY963449	270	Uncultured bacterium	96	Betaproteobacteria
CUP2P3B11	-	-	-	-	-
CUP2P3B12	AY326523	748	Uncultured soil bacterium	98	Verrucomicrobiae
CUP2P3C01	AY913231	532	Uncultured forest soil bacterium	98	Acidobacteria
CUP2P3C02	-	-	-	-	-
CUP2P3C03	EF220981	235	Uncultured actinobacterium	93	Acidobacteria
CUP2P3C04	EU335317	417	Uncultured bacterium	97	Não classificada
CUP2P3C05	AY963504	503	Uncultured bacterium	95	Gammaproteobacteria
CUP2P3C06	EU335407	740	Uncultured bacterium	99	Acidobacteria
CUP2P3C07	DQ984573	679	Uncultured bacterium	92	Acidobacteria
CUP2P3C08	AY326589	696	Uncultured soil bacterium	98	Gammaproteobacteria
CUP2P3C09	DQ351909	638	Uncultured bacterium	95	Bacilli
CUP2P3C10	EU360092	304	Uncultured bacterium	99	Acidobacteria
CUP2P3C11	DQ129097	552	Uncultured soil bacterium	98	Deltaproteobacteria
CUP2P3C12	AY326574.1	593	Uncultured soil bacterium	97	Acidobacteria
CUP2P3D01	DQ984542	785	Uncultured bacterium	98	Gammaproteobacteria
CUP2P3D02	EU403021	344	Uncultured bacterium	96	Acidobacteria
CUP2P3D03	-	-	-	-	-
CUP2P3D04	EU160156	230	Uncultured bacterium	96	Não classificada
CUP2P3D05	EU403016	657	Uncultured bacterium	96	Acidobacteria
CUP2P3D06	EU335339	666	Uncultured bacterium	96	Acidobacteria
CUP2P3D07	-	-	-	-	-
CUP2P3D08	DQ001691	747	Uncultured bacterium	95	Não classificada

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP2P3D09	AY963495	516	Uncultured bacterium	96	Não classificada
CUP2P3D10	EU335340	268	Uncultured bacterium	95	Verrucomicrobiae
CUP2P3D11	EF516614	764	Uncultured bacterium	96	Acidobacteria
CUP2P3D12	AY694646	578	Uncultured Acidobacteria	97	Acidobacteria
CUP2P3E01	-	-	-	-	-
CUP2P3E02	AY963453	618	Uncultured bacterium	99	Betaproteobacteria
CUP2P3E03	-	-	-	-	-
CUP2P3E04	AY234477	564	Uncultured bacterium	97	Alphaproteobacteria
CUP2P3E05	DQ336984	667	Uncultured bacterium	98	Alphaproteobacteria
CUP2P3E06	DQ404617	609	Uncultured bacterium	94	Acidobacteria
CUP2P3E07	AY963487	738	Uncultured bacterium	99	Acidobacteria
CUP2P3E08	EF032755	743	Uncultured Acidobacteria bacterium	94	Acidobacteria
CUP2P3E09	AY963496	510	Uncultured bacterium	97	Acidobacteria
CUP2P3E10	AY963453	642	Uncultured bacterium	99	Betaproteobacteria
CUP2P3E11	AJ582045	509	Uncultured Acidobacteria bacterium	97	Acidobacteria
CUP2P3E12	AY913232	587	Uncultured forest soil bacterium	97	Acidobacteria
CUP2P3F01	AY917292	464	Uncultured bacterium	96	Acidobacteria
CUP2P3F02	AY395352	737	Uncultured alpha proteobacterium	97	Alphaproteobacteria
CUP2P3F03	AY694659	748	Uncultured Acidobacteria bacterium	96	Acidobacteria
CUP2P3F04	AY963472	702	Uncultured bacterium	94	Não classificada
CUP2P3F05	AY963495	759	Uncultured bacterium	98	Não classificada
CUP2P3F06	AY963503	740	Uncultured bacterium	97	Acidobacteria
CUP2P3F07	DQ004813	608	Uncultured bacterium	97	Acidobacteria
CUP2P3F08	DQ004775	830	Uncultured bacterium	97	Acidobacteria
CUP2P3F09	AB179518	468	Uncultured bacterium	97	Não classificada
CUP2P3F10	AJ863290	623	Uncultured bacterium	96	Não classificada
CUP2P3F11	AY963328	387	Uncultured bacterium	97	Gammaproteobacteria
CUP2P3F12	AY917446	590	Uncultured bacterium	99	Acidobacteria
CUP2P3G01	AY326559	689	Uncultured soil bacterium	99	Acidobacteria
CUP2P3G02	AB245375	730	Bacillales bacterium Gsoil 1105	96	Bacilli
CUP2P3G03	DQ004779	500	Uncultured bacterium	98	Acidobacteria
CUP2P3G04	DQ084283	563	Uncultured bacterium	96	Acidobacteria
CUP2P3G05	AY963457	762	Uncultured bacterium	99	Acidobacteria
CUP2P3G06	AB286283	736	Uncultured beta proteobacterium	94	Betaproteobacteria
CUP2P3G07	DQ395983	690	Uncultured organism	98	Verrucomicrobiae
CUP2P3G08	AY302124	722	Uncultured bacterium	88	Sphingobacteria
CUP2P3G09	DQ004756	692	Uncultured bacterium	96	Planctomycetacia
CUP2P3G10	AY963453	726	Uncultured bacterium	98	Betaproteobacteria
CUP2P3G11	DQ356901	726	Delftia tsuruhatensis	99	Betaproteobacteria
CUP2P3G12	AY326554	680	Uncultured soil bacterium	98	Acidobacteria
CUP2P3H01	-	-	-	-	-

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP2P3H02	AY391686	701	Uncultured soil bacterium	97	Acidobacteria
CUP2P3H03	AY326590	388	Uncultured soil bacterium	99	Gammaproteobacteria
CUP2P3H04	AY943019	705	Uncultured Acidobacteria bacterium	97	Acidobacteria
CUP2P3H05	DQ451522	689	Uncultured bacterium	99	Alphaproteobacteria
CUP2P3H06	AY100610	468	Uncultured bacterium	94	Betaproteobacteria
CUP2P3H07	DQ468065	697	Uncultured bacterium	96	Não classificada
CUP2P3H08	AJ582045	713	Uncultured Acidobacteria bacterium	99	Acidobacteria
CUP2P3H09	DQ337549	443	Caulobacter sp.	96	Alphaproteobacteria
CUP2P3H10	EF032755	708	Uncultured Acidobacteria	94	Acidobacteria
CUP2P3H11	AY963328	819	Uncultured bacterium	97	Gammaproteobacteria
CUP2P3H12	AY917713	699	Uncultured bacterium	97	Actinobacteria
CUP2P4A01	DQ004818	762	Uncultured bacterium	98	Acidobacteria
CUP2P4A02	DQ984550	758	Uncultured bacterium	99	Acidobacteria
CUP2P4A03	EU335407	551	Uncultured bacterium	98	Acidobacteria
CUP2P4A04	EU335368	690	Uncultured bacterium	97	Não classificada
CUP2P4A05	EU335189	829	Uncultured bacterium	97	Acidobacteria
CUP2P4A06	-	-	-	-	-
CUP2P4A07	EF492953	350	Uncultured bacterium	88	Não classificada
CUP2P4A08	AY963436	751	Uncultured bacterium	95	Acidobacteria
CUP2P4A09	EU044304	708	Uncultured planctomycete	96	Planctomycetacia
CUP2P4A10	EF492915	432	Uncultured bacterium	94	Não classificada
CUP2P4A11	AM749759	636	Uncultured Acidimicrobiaceae bacterium	97	Actinobacteria
CUP2P4A12	-	-	-	-	-
CUP2P4B01	DQ469200	688	Uncultured bacterium	96	Alphaproteobacteria
CUP2P4B02	AB262724	770	Uncultured bacterium	98	Acidobacteria
CUP2P4B03	AY326552	312	Uncultured soil bacterium	94	Acidobacteria
CUP2P4B04	-	-	-	-	-
CUP2P4B05	DQ984565	486	Uncultured bacterium	94	Acidobacteria
CUP2P4B06	DQ453803	804	Uncultured bacterium	98	Alphaproteobacteria
CUP2P4B07	EF516748	340	Uncultured bacterium	97	Acidobacteria
CUP2P4B08	EF492956	757	Uncultured bacterium	95	Acidobacteria
CUP2P4B09	AY963478	705	Uncultured bacterium	97	Acidobacteria
CUP2P4B10	-	-	-	-	-
CUP2P4B11	EF219804	274	Uncultured alpha proteobacterium	98	Alphaproteobacteria
CUP2P4B12	EF492956	765	Uncultured bacterium	94	Acidobacteria
CUP2P4C01	AY963453	665	Uncultured bacterium	99	Betaproteobacteria
CUP2P4C02	EF516796	742	Uncultured bacterium	99	Acidobacteria
CUP2P4C03	-	-	-	-	-
CUP2P4C04	EU359928	626	Uncultured actinobacterium	98	Actinobacteria
CUP2P4C05	EF516090	825	Uncultured bacterium	98	Betaproteobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP2P4C06	EF516001	328	Uncultured bacterium	99	Acidobacteria
CUP2P4C07	AY846228	287	Uncultured soil bacterium	98	Não classificada
CUP2P4C08	AY963455	770	Uncultured bacterium	98	Acidobacteria
CUP2P4C09	AY661975	306	Uncultured bacterium	97	Não classificada
CUP2P4C10	EU335343	744	Uncultured bacterium	98	Gammaproteobacteria
CUP2P4C11	AJ582045	637	Uncultured Acidobacteria bacterium	98	Acidobacteria
CUP2P4C12	AY234590	649	Bacterium Ellin	98	Acidobacteria
CUP2P4D01	EF032776	680	Uncultured candidate	92	Não classificada
CUP2P4D02	AY468482	737	Elizabethkingia meningoseptica	100	Flavobacteria
CUP2P4D03	DQ451499	607	Uncultured bacterium	97	Acidobacteria
CUP2P4D04	AB245375	776	Bacillales bacterium Gsoil 1105	97	Bacilli
CUP2P4D05	EU360076	545	Uncultured bacterium	97	Acidobacteria
CUP2P4D06	EU360033	793	Uncultured bacterium	95	Acidobacteria
CUP2P4D07	AY963480	779	Uncultured bacterium	96	Acidobacteria
CUP2P4D08	DQ451521	756	Uncultured bacterium	98	Alphaproteobacteria
CUP2P4D09	EF032762	482	Uncultured Termite group 1 bacterium	95	Não classificada
CUP2P4D10	EF516796	313	Uncultured bacterium	99	Acidobacteria
CUP2P4D11	AY963452	703	Uncultured bacterium	98	Acidobacteria
CUP2P4D12	DQ984565	775	Uncultured bacterium	98	Acidobacteria
CUP2P4E01	-	-	-	-	-
CUP2P4E02	DQ004797	446	Uncultured bacterium	98	Acidobacteria
CUP2P4E03	AB179498	398	Uncultured bacterium	97	Alphaproteobacteria
CUP2P4E04	DQ004815	534	Uncultured bacterium	97	
CUP2P4E05	-	-	-	-	-
CUP2P4E06	AB238771	468	Uncultured bacterium	97	Acidobacteria
CUP2P4E07	EF516796	689	Uncultured bacterium	99	Acidobacteria
CUP2P4E08	AY963499	437	Uncultured bacterium	98	Não classificada
CUP2P4E09	AB075070	338	Uncultured bacterium	97	Betaproteobacteria
CUP2P4E10	DQ451512	698	Uncultured bacterium	97	Alphaproteobacteria
CUP2P4E11	DQ833485	807	Uncultured bacterium	95	Acidobacteria
CUP2P4E12	-	-	-	-	-
CUP2P4F01	DQ451522	734	Uncultured bacterium	97	Alphaproteobacteria
CUP2P4F02	AY963480	727	Uncultured bacterium	96	Acidobacteria
CUP2P4F03	AY963480	601	Uncultured bacterium	97	Acidobacteria
CUP2P4F04	AY917364	708	Uncultured bacterium	94	Planctomycetacia
CUP2P4F05	EF516965	658	Uncultured bacterium	99	Acidobacteria
CUP2P4F06	EF516587	685	Uncultured bacterium	97	Actinobacteria
CUP2P4F07	AF530465	818	Bradyrhizobium japonicum	98	Alphaproteobacteria
CUP2P4F08	DQ129211	340	Uncultured soil bacterium	92	Não classificada
CUP2P4F09	DQ648966	747	Uncultured alpha proteobacterium	96	Alphaproteobacteria
CUP2P4F10	AJ582045	255	Uncultured Acidobacteria bacterium	98	Acidobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CUP2P4F11	AY234590	731	Bacterium Ellin5239	98	Acidobacteria
CUP2P4F12	-	-	-	-	-
CUP2P4G01	EF019841	652	Uncultured bacterium	97	Acidobacteria
CUP2P4G02	EF139182	652	Burkholderia tropica	98	Betaproteobacteria
CUP2P4G03	AY395433	721	Uncultured Rubrobacteridae bacterium	96	Actinobacteria
CUP2P4G04	DQ468069	635	Uncultured bacterium	92	Não classificada
CUP2P4G05	DQ297977	755	Uncultured soil bacterium	96	Betaproteobacteria
CUP2P4G06	DQ004761	783	Uncultured bacterium	97	Acidobacteria
CUP2P4G07	EF516331	676	Uncultured bacterium	97	Acidobacteria
CUP2P4G08	AB089840	759	Alicyclobacillus pomorum	98	Bacilli
CUP2P4G09	AB089840	754	Alicyclobacillus pomorum	98	Bacilli
CUP2P4G10	AY734385	269	Uncultured Acidobacteria bacterium	95	Acidobacteria
CUP2P4G11	EF516825	547	Uncultured bacterium	97	Acidobacteria
CUP2P4G12	AY963453	673	Uncultured bacterium	99	Betaproteobacteria
CUP2P4H01	EF516262	692	Uncultured bacterium	96	Verrucomicrobiae
CUP2P4H02	DQ083115	537	Uncultured bacterium	97	Acidobacteria
CUP2P4H03	AY326552	646	Uncultured soil bacterium	96	Acidobacteria
CUP2P4H04	DQ316230	689	Burkholderia sp.	99	Betaproteobacteria
CUP2P4H05	DQ453803	715	Uncultured bacterium	99	Alphaproteobacteria
CUP2P4H06	-	-	-	-	-
CUP2P4H07	AY326554	737	Uncultured soil bacterium	98	Acidobacteria
CUP2P4H08	AY326552	685	Uncultured soil bacterium	97	Acidobacteria
CUP2P4H09	EF516526	737	Uncultured bacterium	97	Não classificada
CUP2P4H10	AY963480	656	Uncultured bacterium	96	Acidobacteria
CUP2P4H11	DQ004779	769	Uncultured bacterium	98	Acidobacteria
CUP2P4H12	AY963480	643	Uncultured bacterium	94	Não classificada

ANEXO 5 - RESULTADO DAS COMPARAÇÕES DAS SEQÜÊNCIAS DO GENE 16S rRNA OBTIDAS EM AMOSTRAS DE CAM2 COM AMOSTRAS DEPOSITADAS EM BANDO DE DADOS PÚBLICOS (BLAST E RDPII

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CAM2P1A01	EU529843	405	Bradyrhizobium sp. JS 15-10	99	Alphaproteobacteria
CAM2P1A02	-	-	-	-	-
CAM2P1A03	AY913231	670	Uncultured forest soil bacterium	97	Acidobacteria
CAM2P1A04	EF492955	616	Uncultured bacterium	95	Acidobacteria
CAM2P1A05	DQ984564	581	Uncultured bacterium	98	Acidobacteria
CAM2P1A06	EU360032	488	Uncultured bacterium	99	Actinobacteria
CAM2P1A07	-	-	-	-	-
CAM2P1A08	AB294330	577	Uncultured bacterium	98	Betaproteobacteria
CAM2P1A09	EU133377	532	Uncultured bacterium	97	Alphaproteobacteria
CAM2P1A10	-	-	-	-	-
CAM2P1A11	-	-	-	-	-
CAM2P1A12	-	-	-	-	-
CAM2P1B01	EF492947	625	Uncultured bacterium	98	Acidobacteria
CAM2P1B02	ATURRNAII	628	Agrobacterium rhizogenes	98	Alphaproteobacteria
CAM2P1B03	AF523892	653	Uncultured bacterium	98	Acidobacteria
CAM2P1B04	EF516257	498	Uncultured bacterium	97	Actinobacteria
CAM2P1B05	AY922136	646	Uncultured Acidobacteria bacterium	98	Acidobacteria
CAM2P1B06	-	-	-	-	-
CAM2P1B07	-	-	-	-	-
CAM2P1B08	EU135200	549	Uncultured bacterium	98	Não classificada
CAM2P1B09	EU135570	298	Uncultured bacterium	95	Não classificada
CAM2P1B10	DQ984573	660	Uncultured bacterium	97	Acidobacteria
CAM2P1B11	-	-	-	-	-
CAM2P1B12	AY963512	425	Uncultured bacterium	99	Acidobacteria
CAM2P1C01	-	-	-	-	-
CAM2P1C02	EU299240	311	Uncultured beta proteobacterium	96	Betaproteobacteria
CAM2P1C03	EU335407	652	Uncultured bacterium	98	Acidobacteria
CAM2P1C04	-	-	-	-	-
CAM2P1C05	-	-	-	-	-
CAM2P1C06	AY921789	498	Uncultured beta proteobacteria	98	Betaproteobacteria
CAM2P1C07	-	-	-	-	-
CAM2P1C08	AY913275	528	Uncultured forest soil bacterium	98	Acidobacteria
CAM2P1C09	-	-	-	-	-
CAM2P1C10	AY387341	405	Uncultured bacterium	97	Acidobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CAM2P1C11	EF020241	462	Uncultured bacterium	96	Não classificada
CAM2P1C12	DQ822374	540	Uncultured bacterium	99	Betaproteobacteria
CAM2P1D01	AY425789	610	Uncultured bacterium	94	Não classificada
CAM2P1D02	DQ791257	572	Uncultured bacterium	97	Acidobacteria
CAM2P1D03	EU399718	729	Mesorhizobium sp. CCBAU 25282	99	Alphaproteobacteria
CAM2P1D04	-	-	-	-	-
CAM2P1D05	AY830804	618	Uncultured Myxococcales bacterium	98	Deltaproteobacteria
CAM2P1D06	AY278106	576	Uncultured crenarchaeote	97	Thermoprotei
CAM2P1D07	-	-	-	-	-
CAM2P1D08	EU335299	560	Uncultured bacterium	97	Acidobacteria
CAM2P1D09	-	-	-	-	-
CAM2P1D10	AY714237	569	Burkholderia sp. HSL-4	99	Betaproteobacteria
CAM2P1D11	AM412133	440	Aquabacterium sp. P-113	97	Betaproteobacteria
CAM2P1D12	-	-	-	-	-
CAM2P1E01	EU359918	415	Uncultured Acidobacteria bacterium	95	Acidobacteria
CAM2P1E02	AY963509	648	Uncultured bacterium	98	
CAM2P1E03	-	-	-	-	-
CAM2P1E04	-	-	-	-	-
CAM2P1E05	AJ536875	672	Uncultured Holophaga sp.	99	Acidobacteria
CAM2P1E06	DQ984552	502	Uncultured bacterium	95	Acidobacteria
CAM2P1E07	-	-	-	-	-
CAM2P1E08	-	-	-	-	-
CAM2P1E09	-	-	-	-	-
CAM2P1E10	AJ295657	517	Uncultured bacterium KF/GS-JG36-31	97	Acidobacteria
CAM2P1E11	-	-	-	-	-
CAM2P1E12	-	-	-	-	-
CAM2P1F01	-	-	-	-	-
CAM2P1F02	DQ822329	397	Uncultured bacterium	98	Betaproteobacteria
CAM2P1F03	-	-	-	-	-
CAM2P1F04	EF443867	342	Uncultured bacterium	98	Gammaproteobacteria
CAM2P1F05	DQ125843	624	Uncultured bacterium	97	Alphaproteobacteria
CAM2P1F06	DQ984570	365	Uncultured bacterium	99	Verrucomicrobiae
CAM2P1F07	-	-	-	-	-
CAM2P1F08	AJ536875	446	Uncultured Holophaga sp.	97	Acidobacteria
CAM2P1F09	-	-	-	-	-
CAM2P1F10	DQ984541	623	Uncultured bacterium	99	Sphingobacteria
CAM2P1F11	EF594055	556	Uncultured bacterium	97	Anaerolineae
CAM2P1F12	EF516026	518	Uncultured bacterium	99	Acidobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CAM2P1G01	AY963491	359	Uncultured bacterium	99	Acidobacteria
CAM2P1G02	-	-	-	-	-
CAM2P1G03	DQ278848	636	Uncultured bacterium	96	Betaproteobacteria
CAM2P1G04	-	-	-	-	-
CAM2P1G05	DQ278848	484	Uncultured bacterium	96	Acidobacteria
CAM2P1G06	EF019618	505	Uncultured proteobacterium	98	Alphaproteobacteria
CAM2P1G07	DQ984564	397	Uncultured bacterium	97	Acidobacteria
CAM2P1G08	-	-	-	-	-
CAM2P1G09	DQ984564	481	Uncultured bacterium	98	Acidobacteria
CAM2P1G10	AY963484	724	Uncultured bacterium	99	Acidobacteria
CAM2P1G11	-	-	-	-	-
CAM2P1G12	AY913618	470	Uncultured forest soil bacterium	96	Não classificfada
CAM2P1H01	DQ278842	641	Uncultured bacterium	97	Betaproteobacteria
CAM2P1H02	-	-	-	-	-
CAM2P1H03	DQ083321	613	Uncultured bacterium	99	Acidobacteria
CAM2P1H04	AY963500	538	Uncultured bacterium	98	Acidobacteria
CAM2P1H05	DQ451522	664	Uncultured bacterium	99	Alphaproteobacteria
CAM2P1H06	EF516358	621	Uncultured bacterium	98	Verrucomicrobiae
CAM2P1H07	-	-	-	-	-
CAM2P1H08	EU134563	669	Uncultured bacterium	94	Deltaproteobacteria
CAM2P1H09	EU135535	658	Uncultured bacterium	99	Verrucomicrobiae
CAM2P1H10	EF516257	617	Uncultured bacterium	95	Actinobacteria
CAM2P1H11	EU133710	385	Uncultured bacterium	98	Sphingobacteria
CAM2P1H12	-	-	-	-	-
CAM2P2A01	EF516787	405	Uncultured bacterium	99	Alphaproteobacteria
CAM2P2A02	-	-	-	-	-
CAM2P2A03	AY913231	670	Uncultured forest soil bacterium	97	Acidobacteria
CAM2P2A04	EF516877	616	Uncultured bacterium	95	Acidobacteria
CAM2P2A05	EF516094	581	Uncultured bacterium	98	Acidobacteria
CAM2P2A06	AB238767	488	Uncultured bacterium	99	Actinobacteria
CAM2P2A07	-	-	-	-	-
CAM2P2A08	AB294330	577	Uncultured bacterium	98	Betaproteobacteria
CAM2P2A09	DQ125843	532	Uncultured bacterium	97	Alphaproteobacteria
CAM2P2A10	-	-	-	-	-
CAM2P2A11	-	-	-	-	-
CAM2P2A12	-	-	-	-	-
CAM2P2B01	AY326563	625	Uncultured soil bacterium	98	Acidobacteria
CAM2P2B02	ATURRNAII	628	Agrobacterium rhizogenes (Sphingomonas rosa)	98	Alphaproteobacteria
CAM2P2B03	AF523892	653	Uncultured bacterium	98	Acidobacteria
CAM2P2B04	EF516257	498	Uncultured bacterium	97	Actinobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CAM2P2B05	AY922136	646	Uncultured Acidobacteria bacterium	98	Acidobacteria
CAM2P2B06	-	-	-	-	-
CAM2P2B07	-	-	-	-	-
CAM2P2B08	EF019842	549	Uncultured bacterium	88	Não classificada
CAM2P2B09	DQ067002	298	Uncultured bacterium	93	Não classificada
CAM2P2B10	AY963311	660	Uncultured bacterium	96	Acidobacteria
CAM2P2B11	-	-	-	-	-
CAM2P2B12	AY963512	425	Uncultured bacterium	99	Acidobacteria
CAM2P2C01	-	-	-	-	-
CAM2P2C02	EF516351	311	Uncultured bacterium	96	Betaproteobacteria
CAM2P2C03	AY326554	652	Uncultured soil bacterium	97	Acidobacteria
CAM2P2C04	-	-	-	-	-
CAM2P2C05	-	-	-	-	-
CAM2P2C06	AY921789	498	Uncultured beta proteobacterium	98	Betaproteobacteria
CAM2P2C07	-	-	-	-	-
CAM2P2C08	AY913275	528	Uncultured forest soil bacterium	98	Acidobacteria
CAM2P2C09	-	-	-	-	-
CAM2P2C10	AY387341	405	Uncultured bacterium	97	Acidobacteria
CAM2P2C11	EF020241	462	Uncultured bacterium	96	Não classificada
CAM2P2C12	DQ822374	540	Uncultured bacterium	99	Betaproteobacteria
CAM2P2D01	AY425789	610	Uncultured bacterium	94	Não classificada
CAM2P2D02	DQ791257	572	Uncultured bacterium	97	Acidobacteria
CAM2P2D03	EF213644	729	Mesorhizobium sp. WSM3875	99	Alphaproteobacteria
CAM2P2D04	-	-	-	-	-
CAM2P2D05	AY830804	618	Uncultured Myxococcales bacterium	98	Deltaproteobacteria
CAM2P2D06	AY278106	576	Uncultured crenarchaeote	97	Thermoprotei
CAM2P2D07	-	-	-	-	-
CAM2P2D08	EF516438	560	Uncultured bacterium	97	Acidobacteria
CAM2P2D09	-	-	-	-	-
CAM2P2D10	DQ665824	569	Burkholderia sp. NGR195A	99	Betaproteobacteria
CAM2P2D11	AB161309	440	Uncultured bacterium	97	Betaproteobacteria
CAM2P2D12	-	-	-	-	-
CAM2P2E01	EU359918	415	Uncultured acidobacteria bacterium	95	Acidobacteria
CAM2P2E02	AY963509	648	Uncultured bacterium	98	Acidobacteria
CAM2P2E03	-	-	-	-	-
CAM2P2E04	-	-	-	-	-
CAM2P2E05	AJ536875	672	Uncultured Holophaga sp.	99	Acidobacteria
CAM2P2E06	DQ984552	502	Uncultured bacterium	95	Acidobacteria
CAM2P2E07	-	-	-	-	-

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CAM2P2E08	-	-	-	-	-
CAM2P2E09	-	-	-	-	-
CAM2P2E10	AJ295657	517	Uncultured bacterium KF/GS-JG36	97	Acidobacteria
CAM2P2E11	-	-	-	-	-
CAM2P2E12	-	-	-	-	-
CAM2P2F01	-	-	-	-	-
CAM2P2F02	DQ822329	397	Uncultured bacterium	98	Betaproteobacteria
CAM2P2F03	-	-	-	-	-
CAM2P2F04	EF443867	342	Uncultured bacterium	98	Gammaproteobacteria
CAM2P2F05	DQ125843	624	Uncultured bacterium	97	Alphaproteobacteria
CAM2P2F06	DQ984570	365	Uncultured bacterium	99	Verrucomicrobiae
CAM2P2F07	-	-	-	-	-
CAM2P2F08	AJ536875	446	Uncultured Holophaga sp.	97	Acidobacteria
CAM2P2F09	-	-	-	-	-
CAM2P2F10	DQ984541	623	Uncultured bacterium	99	Sphingobacteria
CAM2P2F11	EF594055	556	Uncultured bacterium	97	Anaerolineae
CAM2P2F12	EF516026	518	Uncultured bacterium	99	Acidobacteria
CAM2P2G01	AY963491	359	Uncultured bacterium	99	Acidobacteria
CAM2P2G02	-	-	-	-	-
CAM2P2G03	DQ278848	636	Uncultured bacterium	96	Betaproteobacteria
CAM2P2G04	-	-	-	-	-
CAM2P2G05	AY387347	484	Uncultured bacterium	98	Acidobacteria
CAM2P2G06	EF019618	505	Uncultured proteobacterium	98	Alphaproteobacteria
CAM2P2G07	DQ984564	397	Uncultured bacterium	97	Acidobacteria
CAM2P2G08	-	-	-	-	-
CAM2P2G09	DQ984564	481	Uncultured bacterium	98	Acidobacteria
CAM2P2G10	AY963484	724	Uncultured bacterium	99	Acidobacteria
CAM2P2G11	-	-	-	-	-
CAM2P2G12	AY913618	470	Uncultured forest soil bacterium	96	Não classificada
CAM2P2H01	DQ278842	641	Uncultured bacterium	97	Betaproteobacteria
CAM2P2H02	-	-	-	-	-
CAM2P2H03	DQ083321	613	Uncultured bacterium	99	Acidobacteria
CAM2P2H04	AY963500	538	Uncultured bacterium	98	Acidobacteria
CAM2P2H05	DQ451522	664	Uncultured bacterium	99	Alphaproteobacteria
CAM2P2H06	EF516358	621	Uncultured bacterium	98	Verrucomicrobiae
CAM2P2H07	-	-	-	-	-
CAM2P2H08	EU134563	669	Uncultured bacterium	94	Deltaproteobacteria
CAM2P2H09	EU135535	658	Uncultured bacterium	99	Verrucomicrobiae
CAM2P2H10	EF516257	617	Uncultured bacterium	95	Actinobacteria
CAM2P2H11	EU133710	385	Uncultured bacterium	98	Sphingobacteria
CAM2P2H12	-	-	-	-	-

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CAM2P3A01	-	-	-	-	-
CAM2P3A02	EF516257	687	Uncultured Rubrobacteridae	96	Actinobacteria
CAM2P3A03	AY395403	640	Uncultured Rubrobacteridae bacterium	97	Actinobacteria
CAM2P3A04	U68606	623	Unidentified eubacterium from the Amazon	97	unclassified_Bacteria
CAM2P3A05	EF516610	568	Uncultured bacterium	99	Acidobacteria
CAM2P3A06	AY326540	451	Uncultured soil bacterium	97	unclassified_Bacteria
CAM2P3A07	AY326540	483	Uncultured soil bacterium	96	unclassified_Bacteria
CAM2P3A08	-	-	-	-	-
CAM2P3A09	EF516610	430	Uncultured bacterium	98	Acidobacteria
CAM2P3A10	AY395403	522	Uncultured Rubrobacteridae	97	unclassified_Bacteria
CAM2P3A11	EF142009	553	Uncultured Acidobacteria bacterium	96	unclassified_Bacteria
CAM2P3A12	-	-	-	-	-
CAM2P3B01	U68606	637	Unidentified eubacterium	97	unclassified_Bacteria
CAM2P3B02	EF688355	620	Uncultured soil bacterium	97	unclassified_Bacteria
CAM2P3B03	AY395403	679	Uncultured Rubrobacteridae	97	Actinobacteria
CAM2P3B04	U68606	498	Unidentified eubacterium	95	unclassified_Bacteria
CAM2P3B05	AY326540	566	Uncultured soil bacterium	96	unclassified_Bacteria
CAM2P3B06	-	-	-	-	-
CAM2P3B07	U68606	411	Unidentified eubacterium from the Amazon	97	unclassified_Bacteria
CAM2P3B08	EF688355	549	Uncultured soil bacterium	97	unclassified_Bacteria
CAM2P3B09	-	-	-	-	-
CAM2P3B10	AY234751	518	Bacterium Ellin6099	98	Acidobacteria
CAM2P3B11	AY395403	659	Uncultured Rubrobacteridae	95	Actinobacteria
CAM2P3B12	U68606	624	Unidentified eubacterium	96	unclassified_Bacteria
CAM2P3C01	EF516610	711	Uncultured bacterium	99	Acidobacteria
CAM2P3C02	EF220615	432	unclassified_Rubrobacteraceae	97	Actinobacteria
CAM2P3C03	-	-	-	-	-
CAM2P3C04	DQ984629	325	Uncultured bacterium	98	Acidobacteria
CAM2P3C05	AY234751	599	Bacterium Ellin6099	97	Acidobacteria
CAM2P3C06	U68606	325	Unidentified eubacterium from the Amazon	97	unclassified_Bacteria
CAM2P3C07	DQ451480	461	Uncultured bacterium	97	Deltaproteobacteria
CAM2P3C08	-	-	-	-	-
CAM2P3C09	-	-	-	-	-
CAM2P3C10	AY326540	566	Uncultured soil bacterium	97	Uncultured bacterium
CAM2P3C11	-	-	-	-	-
CAM2P3C12	EF516610	587	Uncultured bacterium	99	Acidobacteria
CAM2P3D01	EF516610	603	Uncultured bacterium	98	Acidobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CAM2P3D02	EF516610	641	Uncultured bacterium	98	Acidobacteria
CAM2P3D03	DQ984629	345	Uncultured bacterium	99	Acidobacteria
CAM2P3D04	DQ984629	338	Uncultured bacterium	95	unclassified_Bacteria
CAM2P3D05	-	-	-	-	-
CAM2P3D06	AY395403	437	Uncultured Rubrobacteridae	93	Actinobacteria
CAM2P3D07	-	-	-	-	-
CAM2P3D08	DQ984629	419	Uncultured bacterium	98	Acidobacteria
CAM2P3D09	-	-	-	-	-
CAM2P3D10	DQ984629	305	Uncultured bacterium	94	unclassified_Bacteria
CAM2P3D11	U68606	449	Unidentified eubacterium from the Amazon	96	unclassified_Bacteria
CAM2P3D12	AY395403	623	Uncultured Rubrobacteridae	97	Actinobacteria
CAM2P3E01	EF516610	710	Uncultured bacterium	98	Acidobacteria
CAM2P3E02	AY326540	467	Uncultured soil bacterium	96	unclassified_Bacteria
CAM2P3E03	EF220655	359	Uncultured actinobacterium	95	unclassified_Bacteria
CAM2P3E04	DQ984629	302	Uncultured bacterium	96	Acidobacteria
CAM2P3E05	-	-	-	-	-
CAM2P3E06	EF220615	455	Uncultured actinobacterium	94	Actinobacteria
CAM2P3E07	-	-	-	-	-
CAM2P3E08	-	-	-	-	-
CAM2P3E09	-	-	-	-	-
CAM2P3E10	-	-	-	-	-
CAM2P3E11	-	-	-	-	-
CAM2P3E12	-	-	-	-	-
CAM2P3F01	EF516610	640	Uncultured bacterium	97	Acidobacteria
CAM2P3F02	-	-	-	-	-
CAM2P3F03	U68606	597	Unidentified eubacterium from the Amazon	97	unclassified_Bacteria
CAM2P3F04	AY326540	562	Uncultured soil bacterium	96	unclassified_Bacteria
CAM2P3F05	-	-	-	-	-
CAM2P3F06	-	-	-	-	-
CAM2P3F07	-	-	-	-	-
CAM2P3F08	-	-	-	-	-
CAM2P3F09	EF516610	602	Uncultured bacterium	97	Acidobacteria
CAM2P3F10	EF516610	600	Uncultured bacterium	98	Acidobacteria
CAM2P3F11	U68606	519	Unidentified eubacterium from the Amazon	98	unclassified_Bacteria
CAM2P3F12	EF688355	361	Uncultured soil bacterium	95	unclassified_Bacteria
CAM2P3G01	-	-	-	-	-
CAM2P3G02	EF220615	511	Uncultured actinobacterium	98	Actinobacteria
CAM2P3G03	U68606	506	Eubacterium from the Amazon	98	unclassified_Bacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CAM2P3G04	-	-	-	-	-
CAM2P3G05	-	-	-	-	-
CAM2P3G06	AY326540	416	Uncultured soil bacterium	96	unclassified_Bacteria
CAM2P3G07	EF220615	516	Uncultured actinobacterium	95	Actinobacteria
CAM2P3G08	-	-	-	-	-
CAM2P3G09	AY326540	575	Uncultured soil bacterium	95	unclassified_Bacteria
CAM2P3G10	U68606	594	Unidentified eubacterium from the Amazon	96	unclassified_Bacteria
CAM2P3G11	EF516610	427	Uncultured bacterium	97	Acidobacteria
CAM2P3G12	AY395403	580	Uncultured Rubrobacteridae bacterium	98	Actinobacteria
CAM2P3H01	U68606	733	Unidentified eubacterium from the Amazon	96	unclassified_Bacteria
CAM2P3H02	U68606	637	Unidentified eubacterium from the Amazon	975	unclassified_Bacteria
CAM2P3H03	EF688355	451	Uncultured soil bacterium	98	unclassified_Bacteria
CAM2P3H04	-	-	-	-	-
CAM2P3H05	EF516610	569	Uncultured bacterium	98	Acidobacteria
CAM2P3H06	-	-	-	-	-
CAM2P3H07	EF516257	598	Uncultured bacterium	97	Actinobacteria
CAM2P3H08		583	Unidentified eubacterium from the Amazon	96	unclassified_Bacteria
CAM2P3H09	U68606	594	Bacterium Ellin6099	98	Acidobacteria
CAM2P3H10	AY395403	566	Uncultured Rubrobacteridae	97	Actinobacteria
CAM2P3H11	EF516610	525	Uncultured bacterium	99	Acidobacteria
CAM2P3H12	-	-	-	-	-
CAM2P4A01	-	-	-	-	-
CAM2P4A02	EF516257	632	Uncultured bacterium	97	Actinobacteria
CAM2P4A03	-	-	-	-	-
CAM2P4A04	AY234751	677	Bacterium Ellin	98	Acidobacteria
CAM2P4A05	AY697655	339	Uncultured Acidobacteria bacterium	96	Não classificada
CAM2P4A06	EF516257	702	Uncultured bacterium	98	Actinobacteria
CAM2P4A07	EF688355	673	Uncultured soil bacterium	98	Não classificada
CAM2P4A08	U68606	733	Unidentified eubacterium	97	Acidobacteria
CAM2P4A09	AY234751	681	Bacterium Ellin	99	Acidobacteria
CAM2P4A10	AY326540	708	Uncultured soil bacterium	97	Acidobacteria
CAM2P4A11	U68606	616	Unidentified eubacterium	97	Não classificada
CAM2P4A12	EF516547	672	Uncultured bacterium	98	Acidobacteria
CAM2P4B01	-	-	-	-	-
CAM2P4B02	-	-	-	-	-
CAM2P4B03	AY234751	707	Bacterium Ellin	98	Acidobacteria

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CAM2P4B04	-	-	-	-	-
CAM2P4B05	EF516257	685	Uncultured bacterium	99	Actinobacteria
CAM2P4B06	EF516257	471	Uncultured bacterium	98	Actinobacteria
CAM2P4B07	-	-	-	-	-
CAM2P4B08	EF516257	450	Uncultured bacterium	99	Actinobacteria
CAM2P4B09	U68606	772	Unidentified eubacterium	96	Acidobacteria
CAM2P4B10	EF516926	776	Uncultured bacterium	96	Acidobacteria
CAM2P4B11	-	-	-	-	-
CAM2P4B12	-	-	-	-	-
CAM2P4C01	EF516257	742	Uncultured bacterium	96	Actinobacteria
CAM2P4C02	DQ829635	651	Uncultured Acidobacteria bacterium	97	Acidobacteria
CAM2P4C03	-	-	-	-	-
CAM2P4C04	EF516610	489	Uncultured bacterium	99	Acidobacteria
CAM2P4C05	-	-	-	-	-
CAM2P4C06	U68606	637	Unidentified eubacterium	97	Não classificada
CAM2P4C07	DQ395983	613	Uncultured organism clone	97	Verrucomicrobiae
CAM2P4C08	AY278106	709	Uncultured crenarchaeote	99	Thermoprotei
CAM2P4C09	AY234751	696	Bacterium Ellin	98	Acidobacteria
CAM2P4C10	-	-	-	-	-
CAM2P4C11	-	-	-	-	-
CAM2P4C12	AY234751	623	Bacterium Ellin	99	Acidobacteria
CAM2P4D01	EF516358	707	Uncultured bacterium	98	Verrucomicrobiae
CAM2P4D02	-	-	-	-	-
CAM2P4D03	-	-	-	-	-
CAM2P4D04	AY234751	683	Bacterium Ellin	98	Acidobacteria
CAM2P4D05	-	-	-	-	-
CAM2P4D06	AY234751	708	Bacterium Ellin	98	Acidobacteria
CAM2P4D07	EU335246	375	Uncultured bacterium	92	Deltaproteobacteria
CAM2P4D08	-	-	-	-	-
CAM2P4D09	AY234751	721	Bacterium Ellin	98	Acidobacteria
CAM2P4D10	EU223942	745	Uncultured Acidobacterium	95	Acidobacteria
CAM2P4D11	AY234751	670	Bacterium Ellin	99	Acidobacteria
CAM2P4D12	DQ451518	577	Uncultured bacterium	98	Deltaproteobacteria
CAM2P4E01	DQ139447	775	Uncultured Acidobacteria bacterium	96	Acidobacteria
CAM2P4E02	AY326540	684	Uncultured soil bacterium	97	Acidobacteria
CAM2P4E03	AY234751	661	Bacterium Ellin	99	Acidobacteria
CAM2P4E04	AY395441	523	Uncultured Acidobacteriales bacterium	98	Acidobacteria
CAM2P4E05	DQ451522	655	Uncultured bacterium	99	Alphaproteobacteria
CAM2P4E06	-	-	-	-	-
CAM2P4E07	-	-	-	-	-

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CAM2P4E08	AY522866	519	Uncultured crenarchaeote	97	Thermoprotei
CAM2P4E09	DQ004809	671	Uncultured bacterium	98	Deltaproteobacteria
CAM2P4E10	AY395424	656	Uncultured Xiphinematobacteriaceae	95	Verrucomicrobiae
CAM2P4E11	DQ659426	642	Uncultured organism	100	unclassified_Bacteria
CAM2P4E12	EU151834	579	Uncultured soil bacterium	99	
CAM2P4F01	EF688379	624	Uncultured soil bacterium	97	Acidobacteria
CAM2P4F02	AJ617864	747	Bacillales bacterium	98	Bacilli
CAM2P4F03	DQ659426	655	Uncultured organism	100	unclassified_Bacteria
CAM2P4F04	AJ009449	573	uncultured bacterium	96	Deltaproteobacteria
CAM2P4F05	DQ451485	614	Uncultured bacterium	97	Acidobacteria
CAM2P4F06	-	-	-	-	-
CAM2P4F07	-	-	-	-	-
CAM2P4F08	AM168186	611	Unidentified soil bacteria	98	Acidobacteria
CAM2P4F09	AY532573	715	Uncultured bacterium	95	Deltaproteobacteria
CAM2P4F10	EF492965	711	Uncultured bacterium	97	Acidobacteria
CAM2P4F11	AY395403	647	Uncultured Rubrobacteridae	97	Actinobacteria
CAM2P4F12	AY234751	515	Bacterium Ellin6099	99	Acidobacteria
CAM2P4G01	EF688384	732	Uncultured soil bacterium	97	Acidobacteria
CAM2P4G02	AY234719	760	Bacterium Ellin6067	97	Betaproteobacteria
CAM2P4G03	EF632934	694	Uncultured bacterium	97	Gemmatimonadetes
CAM2P4G04	-	-	-	-	-
CAM2P4G05	AY587230	714	Acidobacteriaceae bacterium	98	Acidobacteria
CAM2P4G06	AY493930	470	Uncultured soil bacterium	95	Não classificada
CAM2P4G07	EF492949	465	Uncultured bacterium	94	Não classificada
CAM2P4G08	-	-	-	-	-
CAM2P4G09	-	-	-	-	-
CAM2P4G10	-	-	-	-	-
CAM2P4G11	U68606	629	Unidentified eubacterium from the Amazon	98	unclassified_Bacteria
CAM2P4G12	AY278106	688	Uncultured crenarchaeote	99	Thermoprotei
CAM2P4H01	AY963457	737	Uncultured bacterium	98	Acidobacteria
CAM2P4H02	AY917404	710	Uncultured bacterium	96	Alphaproteobacteria
CAM2P4H03	AF200699	733	Uncultured Acidobacterium	98	Acidobacteria
CAM2P4H04	EF220672	701	Uncultured alpha proteobacterium	99	Alphaproteobacteria
CAM2P4H05	AY963503	656	Uncultured bacterium	98	Acidobacteria
CAM2P4H06	-	-	-	-	-
CAM2P4H07	U68606	718	Unidentified eubacterium from the Amazon	97	Acidobacteria
CAM2P4H08	-	-	-	-	-
CAM2P4H09	AY395403	694	Uncultured Rubrobacteridae bacterium	97	Actinobacteria
CAM2P4H10	AY278106	713	Uncultured crenarchaeote	98	Thermoprotei

Clone	Nº. acesso no GenBank	Tamanho (pb)	Classificação no GenBank	Similaridade (%)	Classe RDPII
CAM2P4H11	DQ395983	813	Uncultured organism	97	Verrucomicrobiae
CAM2P4H12	EF999349	603	uncultured bacterium	98	Acidobacteria

ANEXO 6 – ÁRVORE FILOGENÉTICA EXIBINDO OS CLONES PERTENCENTES À AMOSTRA CUP1 OBTIDOS COM SEQÜÊNCIAS DO GENE 16S rRNA

(Em dobradura. Manuseie com cuidado)

ANEXO 7 – ÁRVORE FILOGENÉTICA EXIBINDO OS CLONES PERTENCENTES À AMOSTRA CUP2 OBTIDOS COM SEQÜÊNCIAS DO GENE 16S rRNA

(**Em dobradura. Manuseie com cuidado**)

ANEXO 8 – ÁRVORE FILOGENÉTICA EXIBINDO OS CLONES PERTENCENTES À AMOSTRA CAM2 OBTIDOS COM SEQÜÊNCIAS DO GENE 16S rRNA

(**Em dobradura. Manuseie com cuidado**)

ANEXO 9 – SEQÜÊNCIAS DOS CLONES OBTIDOS A PARTIR DA BIBLIOTECA CUP1 E SUA CLASSIFICAÇÃO (BLAST E RDPII)

>CUP1P1A01 Uncultured bacterium (Betaproteobacteria)
TGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGACATGCTGATCCGCGATTACTAGCGATTCCGACTTCAT
GAAGTCGAGTTGCAGACTTCAATCCGGACTACGACGCGCTTTCTGGGATTGGCTCCCCATCACTGGTTGGCAACCCTCTGCACGCGCCATTGTATGACGTTGTAGCCC
TACCTATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCCCATTAGAGTGCTCAACTGAATGTAGCAACTAATGGCAAGGGTTG
CGCTCGTTGCGGGACTTAACCCA
ACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCAGGTTCCCTTTCGGGCACCACTGCATTTCTGCAGCGTTCCTGGCATGTCAAAGGTAGGTAAGG
TCTCTCGCGTCGCATCGAATTAAACCACATCATCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTCCAATCTTGCGACCGTACTCCCCAGGCGGACG

>CUP1P1A02 Uncultured bacterium (Acidobacteria)
TGGGCGTCTGCTCCTGCGGTTAGCGTGACGACTTCTAGTACAACTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGGT
ACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGT
GCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGAACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCT
TGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACTTGTCCCTTGCG
GGAAGGTCGTATTTCTACAACTTGTCAAGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGG
GCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTCATTCAGC

>CUP1P1A03 Uncultured bacterium (Betaproteobacteria)
GGTTAGGCAACCTGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGACATGCTGATCCGCGATTACTAGCGAT
TCCGACTTCATGAAGTCGAGTTGCAGACTTCAATCCGGACTACGACGCGCTTTCTGGGATTGGCTCCCCATCACTGGTTGGCAACCCTCTGTACGCGCCATTGTATGAC
GTGTGTAGCCCTACCTATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCCCATTAGAGTGCTCAACTGAATGTAGCAACTAAT
GGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCAGGTTCCCTTTCGGGCACCGCTGCATTTC
TGCAGCGTTCCTGGCATGTCAAAGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAAACCACATCATCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAA
TCTTGCGACCGTACTCCCCAGGCGGACGACTTCACGCGTTAGCTGCGTTACTAAAGGATTTAACTCCTCCAACAACTAGTCGTCATCGTTTAGGGCGTGGACTTACCAG
GGTATCTAATCCTGTTAGCTCCCCAAGCTTTCGTGCATGAGCGTCAGTGTTGGCCCAGGAGGCTGCCTTCGCCATCGGTGTTCCTCC

>CUP1P1A04 Uncultured Verrucomicrobia bacterium (Verrucomicrobiae)
GATGTGACGGGCGGTGTTACAGCCCGGGAACGTATTCACGGGCCGTACTGATGCGCCATTACTAGCGATTCCAGCTTCATGCCGTCGAGTTGCAGACGAAATCTGAACT
GGGCCCGGTTTTGGGGGATTTGCTCCAGCTTACGCTCTTGCTTCCCTTTGTACCGGGCATTGTAGTACGTGTGCAGCCCTGGCCGTAAGGGCCATACTGACTTGACGTC
ATCCCCACCTTCCTCCTCGTTGAAGCGAGGCAGTCTGTCCAGAGTGCTCCCAATTAAGGGGTGGCAACAGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACA
TCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAGCTTCCCTTGCGGGATCGTCAGACTTTCATCCTTCTACTACTTGCATGTCAAGGCCAGGTAAGGTT
CTTCG

>CUP1P1A08 Uncultured bacterium (Acidobacteria)
GCCTCCCTTGCGGGTTAGCCTGCAGACTTCTAGTACAATTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTCACGGCAGCGTGCTGATCTGCC
ATTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTAGCGACGCTTTGTACCGT
CCATTGTAGCACGTGTGTAGCCCTAGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTTCCCAACTGAAT
GATGGCAACACAGGACAAGAGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCCTTGCGGGGT
AGCGATGTTTCCACCGCCGTTAACCAGCCGTTCGAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTC
CTTTGAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACGGATCAACTGAATGACCCANACCAAATATGCATCGTTAAGGGCGT
GGACTACCAGGGTATCTAATCCTGTTTGCTACCCACGCTTTCGTGTCTCAGCGTCAGTTACGGTCCAGAAAGCCGTCTACACC

>CUP1P1A10 Uncultured bacterium (Clostridia)
TTATCTTACTTTGGGTACTCCCTCCTTGCGGTTGGGTCATACACTTTGGGTACTATAAACTCCCGTGGTGTGACGGGCGGTGTGTACAAGGCCCGAGAACGTATTCACC
GCGGCATTCTGATCCGCGATTACTAGCGATTCCAACTTCATGTAGTCGAGTTGCAGACTACAATCCGAACTTAGACGCAATTTTTGTGCTTTGCTTACTGCCACCAGCT
CGCTTCACTTTGTTTACGCCATTGTAGCACGTGTGTAGCCCAAGACATAAAGGGCATGATGATTTGACGTCGCCCCCACCTTCCTCCGTGTTATCCACGGCTGTCCCTC
TAGTGTGCCCACCTCAACGTGCTGGCTACTAAAGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGGGCTGACGACAACCATGCACCACCTGT
ATCCATCGCCCCGAAGGGAAAAGGTATCTCTACCTCTGTCGCTGGTATGTCAAGCCTTGGTAAGGTTCTTCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGT
GCGGGCCCCCGTCAATTTCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGTGGAATACTTATTGCGTTTGCTTCGGCAACCAGGATTGCTCCCAGACACCTAGTAT
TCATCGTTTACGGCGTGGACTACCAGGATATCTAATCCTGTTTGCTCCCCCACGCTTTCGTGTCTCAGCGTCAATTATTGCCCAGTAAACCGCCTTCGCCACTG

>CUP1P1A11 Uncultured bacterium (Deltaproteobacteria)
TCCTTGCGGTTGGCGCAGGCACTTCTGGAGCAAACGACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCCCTGCCTGCTGATCAGGGATTAC
TAGCGATTCCAACTTCAAAGAGTCGAGTTGCAGACTCTTATCTGTACTGAGGCTACTTTTTTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCTTTGTAGTAGCCATT
GTAGCACGTGTGTAGCCCTGGACATAAGGGCCATGATGACTTGACGTCGTCCCCACCTTCCTCCGATTTGAATATCGGCGGTCTCACTAGAGTCCCCGGCCGAACCGCT
GGTAACTAGTGATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTAACCGCGCGTTCTCCGAAGAGCACC
CCGATATTTCTACCAGGTTCGCGTGTTTTCTAGCCC

>CUP1P1A12 Acidobacteria bacterium (Acidobacteria)
GGACGGTGTTCCTTGCGGTCAGCGCACCGGCTTCTAGTACAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATC
TGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGATGACTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTA
TCACCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCGCCAGAGTGCCCAACT
AAATGATGGCAACTGGCAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTACGCAGCAGTCCCTTGCG
GGAAGATGATATTTCTACCACTGTCCACTGCGCCTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTTCGGCACGGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTAG
GGCTAGGACTACCAGCGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTGTGGTCCAGTGAGCCG

>CUP1P1B02 Uncultured bacterium (Acidobacteria)
CACCGACTTCTAGTACACCCACTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCAGCTTC
ATGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGGTAGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCATTGTAGCACGTGTGTAGC
CCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTGTCCGGGGCGGTTTCGCTAGAGTGCTCGCCATAACGCGTTAGCAACTAACGATAAG
GGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCCTTGCGGGCGCCGATGTTTCCACCGGATTC
CACTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGAC
CGTACTCCCCAGGCGGAACACTTAACGCGTTAGCTCCGGCACGGCGGGATTGGGTACCCGCCACACCAAGTGTTCATCGTTTAGGGCTAGGACTACCAGGGTATCTAAT
CCTGTTTGCTCCCCTAGCTTTCGCGCATCAGCGTCAGTTGTGGTCCAGTGCGCCGGTTTC

>CUP1P1B03 Uncultured bacterium (Alphaproteobacteria)

GGTTAGCGCACCGTCTTCAGGTAAAGCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCGTGCTGATCTGCGATTACTAGCGAT
TCCAACTTCATGTGCTCGAGTTGCAGAGCACAATCCGAACTGAGACGGCTTTTTGAGATTTGCGCAGGATTGCTCCATTGCATCCCACTGTCGCCGCCATTGTAGCACG
TGTGTAGCCCAGCCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCCCCTTAGAGTGCCCAACTGAATGATGGCAACTAA
GGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCACGCCCCTTGCGGGGAGGATCCCATCTC
TGGAAACCGTCGTGGCATGTCAAGGGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTA
ATCTTGCGACCGTACTCCCCAGGCGGGATGCTTAATGCGTAAGCTGCGCCACTGAAGGGTGAACCCAACAACGGCTAGCATCCATAGTTTACGGCGTGGACTACCAGGG
TATCTAATCCTGTTTGCTCCCCAAGCTTTCGCACCTCAACGTCAGTACCGGGCCAGTG

>CUP1P1B07 Uncultured Propionibacterium sp.(Actinobacteria)
TATCACAGTCCACCTTCGAGGTCCCCCACAACGGTTAGGCCACCGGCTTCGGGTGTACCAACTTTCATGACTTGACGGGCGGGTGTACAAGCCCCGGGAACGTATTCAC
CGCAGCGTTGCTGATCTGCGATTACTAGCGACTCCGACTTCATGAGGTCGAGTTGCAGACCCCAATCCGAACTGAGACCGGCTTTCCGAGATTCGCTCACCCTCACAGG
CTCGCCACTCTCTGTACCAGCCATTGTAGCATGCGTGAAGCCCTGGACATAAGGGGCATGATGACTTGACGTCATCCCCACCTTCCTCCGAGTTGACCCCGGCGGTCTC
CACTGAGTCCCCACCATAACGTGCTGGCAACAGTGAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCT
GTGAACCGACCCCAAAAGAGGCACACCCATCTCTGAGCACTCCCGATCCATGTCAAACCCAGGTAAGGTTCTACGCGTTGCATCGAATTAATCCGCATGCTCCGCCGCT
TGTGCGGGGCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGTACTTAAAGCGTTAGCTACGGCACGGAACCCGTGGAATGGACCCC

>CUP1P1B08 Uncultured bacterium(Anaerolineae)
GTCCAGTCACACCACACCTTCGACGGCGTCTCCTTGCGGTTAGACTACCGGCTTCAGGTGTTACCAGCTCCCATGACGTGACGGGCGGTGTGTACAAGGCCCGAGAACG
TATTCAACGCATTATAGCTGACGCGCGTTTACTAGCAACTCCGACTTCACGCAGGCGAGTTGCAGCCTGCGATCTGAACTGAGGACGGTTTTGGGGATTGGCTCTACCT
CGCGGCTTAGCGACCCATTGTACCGCCCATTGTAGCGTGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGCTTAATACCGGC
GGTCCCGTATGACACATGTAACATACAGCGAGGGTTGCGCTCGTTAGCGGACTTAACCGAACATCTCACGACACGAGCTGACGACAGCCATGCAACACCTGTGCAAGCT
CCCTTGCGGGTCGGTCACCTTTCAGATCTCTACCACTTGCATGTCAAGCCCAGGTAAGGTTCTTCGTGTGGCATCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGC
CCCCGTCAATTCCTTTGAGCTTTAATCTTGCGATCGCAGTCCCCAGGCGGTGAACTTATCGCGTTAGCTGCGGCACTGATGGGGTTTATCCACCAACGCCAAGTTCACA
TCGTTTACCAGCTAGGATTACCGGGGTCTCTAATCCCGTTTA

>CUP1P1B09 Uncultured gamma proteobacterium (Gammaproteobacteria)
GTAGGCGCCCTCCTTGCGGTCAGGCTACCTGCTTCTGGTGCAGTCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGCATTCACCGCAGCAATGCTG
ATCTGCGATTACTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTTCTGGGATTGGCTTCCGCTCGCGCGTTGGCTTCCCTCT
GTATCTACCATTGTAGCACGTGTGTAGCCCTGGTCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCGCCGGCGGTCTCCTTAGAGTGCCCA
ACTTAATGATGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTGGGTTCCTT
GCGGCACCCCCATATCTCTACAGGGCTCCCAGGATGTCAAGACCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTC
AATTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGAGGACTTAGCGCGTTAGCTACGACACTGCGAGGCTTACCCTCTCAACGTCTAGTCCTCATCGTTTA
TGGC

>CUP1P1B10 Uncultured bacterium (Alphaproteobacteria)
CCAGTCGTGACCTACGTGGCCGGCTGCTCCTTGCGGTTAGCACGCCGTCTTCGGGTAAAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTAT
TCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAACTTCATGCACTCGAGTTGCAGAGTGCAATCCGAACTGAGACGGCTTTTCGAGATTTGCTCAGGGTCGCC
CTTCGCATCCCGTTGTCCCGCCATTGTAGCACGTGTGTAGCCCAGCCTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCAGTCCC
CCTGGAGTGCCCAACTGAATGATGGCAACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGT
GTTCCCGGCCCCGAAGGGAAGATCGCATCTCTGCGATCCGTCCAGGACATGTCAAAAGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTT
GTGCGGGCCCCCGTCAATTCCTTCGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGGATGCTTAAAGCGTTAGCTGCGCCACTGAAGAGCAAGCTCCCCAACGGCTA
GCATCCATCGTTTACAGCGTGGACTACCAG

>CUP1P1B12 Unidentified eubacterium from the Amazon(Acidobacteria)
ATACTTAGGCGCTACCTCCCTTGCGGGTAGCGCAGCGATTCTAGTACAGCCAGTTTCGTGATGTAGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATGCT
GATCCGCGATTACTAGCGATTCCAACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGACTTTCTCCGATTAGCTCCCCCTCGCGGGCTTGCAACGGTT
TGTATCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCCCCAGAGTGCCA
GCTTAACCTGATGGCAACAGAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACAGATGTCCT
TGCGGAAACCGACTTTCACCGGCGTTCATCTGCATTTCGAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTC
AATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGCCAAACCAAGCATTCATCGTTT
AGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCGCCTCAGCGTCAATATCGGTCCA

>CUP1P1C01 Uncultured bacterium (Alphaproteobacteria)
GACCTACCGTGGCCGGCTGCTCCTTGCGGTTAGCGCACCGTCTTCAGGTAGAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGC
AGCCTGCTGTTCTGCGATTACTAGCGATTCCACCTTCATGCACTCGAGTTGCAGAGTGCAATCTGAACTGGGACGGTTTTTGGAGATTAGCATACTCTCGCGAGTTAGC
TGCTCACTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGGGTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTGTCGCCGGCGGTCCCTCTAG
AGTGCCCAACTTAATGATGGCAACTAAAGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTG
AGCCCTTGCGGGAAACTCCCTTTCAGGAGCGGTCTCAGGATGTCAAACCCTGGTAAGGTTCTGCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCC
CCCGTCAATTTCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGAACGCTTAATGCGTTAGCTGCGCCACTGAGCAGCAAGCTGCCCAACGGCTAGCGTTCATA
GTTTACGGCGTGGACTACCAGGGTATCTAATCCTGT

>CUP1P1C02 Uncultured bacterium(Acidobacteria)
GGTTAGCGTGACGACTTCTAGTACAACTCACTTTCGTGATGTGACAGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGA
TTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACA
CGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTAC
GTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACTTGTCCCTTGCGGGAAGATCGTATTTCT
ACAACTTGTCAAGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GTCTTGCGACCGCACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGG
TATCTAATCCTGTTTGCTCCCCTTAGCTTTCGTCATTCAGCGTCAGTTATGGTCCAGCGCGCC

>CUP1P1C03 Uncultured bacterium (Planctomycetacia)
TCTTCGGCGCTGCCGTGAGGCTCCGGCGACTTCGGATGCCCCCCGCTTTGGTGGCTGACGGGCGGTGTGTACAAGGCTCAGGAACACATTCACCGCGGCAGTGCTGATC
CGCGATTACTAGCGATTCCGGCTTCATGCGGGCGGGTTGCAGCCCGCAATCCGAACTGGGGGACGGTTTTTGCGATTGGCGGGCGCTTACGCGTTTGCGTCGCTTTGTC
CGGCCCATTGTAGCACGTGTGCAGCCCTGGGCATAAGGGCCATGAGGACTTGACGTCGTCCCCGCCTTCCTCCGGCTTGACGCCGGCGGTCTGGCCAGAGTCCCCACCT
TTACGTGTTGGCAACTGGCCACAGGGGTTTCGCTCGTTACGGGACTTAACCCAACATCTCACGACATGAGCTGACGACAGCCATGCAGCACCTGTGCACGTTGTACCTT
GCGGCCTTACCGACGTTTCCGCCGGCTAATCCGTGCATGTCAAGCCCAGGATAAGGTTTTGCGCGTAGCCTCGAATTAAGCCACATGCTCCACCGCTTGTGTGAGCCCC
CGTCAATTCCTTTGAGTTTCAGCCTTGCGACCATACTCCCCAGGCGGGGCACTTCACGCTTTCGCTACGGCAGGGGGCCCATCGGCGAGCCCCCTACCCAGTGCCCATC
GTTTACGGCCAGGACTACCGGGGTATCTAATCCCGT

>CUP1P1C04 Uncultured bacterium (Acidobacteria)
GGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCCGCGATTACTAGCGAT
TCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGACCCGATGGCAACT
AGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCTTTTAAGGGGAAGGGATGTTT
CCACCCCGGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGGTACACCAAGCAATTCATC

>CUP1P1C05 Uncultured delta proteobacterium (Deltaproteobacteria)
GGTACAGCGGGCTTCCATGGTGTGACGGGCGGTGTGTACAATGCCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCACCTTCATGGAGTCG
AGTTGCAGACTCCAATCCGAACTGAGAGCGGCTTTTTGGGATTGGCTCCCCCTCGCGGGTTTGCTGCCCTTTGTACCGCCCATTGTAGCACGTGTGTAGCCCCGGACAT
AAGGGCCATGAGGACTTGACGTCATCCCCGNCTTCCTCCCGTTTGACACGGGCAGTCCCTCTAGAGTGCCCAACTAAATGATGGCAACTAGAGGCAAGGGTTGCGCTCG
TTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGAACCAGAGGTCCCCGAAGGGAAGACCTTATTTCTAAGGGTGTCCTCTGTTG
TCTAGCCCGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTA

>CUP1P1C08 Burkholderia sp. (Betaproteobacteria)
ACCACTCCCATGGTGTGACGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCAGCTTCACGCAGTCGAGTTGCAG
ACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCTCTGTTCCGACCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCA
TGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCCGGAGTGCTATTGCGTAGCAACTGGGGACAAGGGTTGCGCTCGTTGCGGGACTTAA
CCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGACGGCTCCCTTTCGGGCACCCCCGGCTCTCACCGAGGTTCCGTCCATGTCAAGGGTAGGT
AAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGTCAAC
TTCACGCGTTAGCTACGTTACCAAGCCAATGAAGGCCCGACAACCAGTTGACATCGTTTAGGGCGTGGACTA

>CUP1P1C09 Uncultured bacterium (Acidobacteria)
GCCGCTGCCTCCTTGCGGTTAGCATGCAGACTTCCAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCATCGTTCTGAT
ACGCCATTACTAGCGATTCCAGCTTCACGCAGGCGAGTTGCAGCCTGCGATCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTCTGCAGCGCAGTGT
ACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTGCTATCT
TACGATGTGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCCTTGC
GGAGTAACCGTGTTTCCACGATCGTTAGCCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTC
AATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGCATACTTAACGCGTTAGCTC

>CUP1P1C10 Uncultured soil bacterium (Acidobacteria)
GCGTCTGCTCCTTGCGGTTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGC
CCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTG
CGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGG
AAGGCCGTATTTCTACAGCTGGTCAGAAGCATTTCGAGCCTAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGTCTTGCGAACGTACTCCCCAGGTGCAGGACTTAACGCGTT

>CUP1P1C11 Uncultured bacterium (Deltaproteobacteria)
GGTTGGCTCAGGCACTTCTGGAGCAATGACTCCCATGGTGTGACGGCGGTGTGTACATGCCCGGGAACGTATTCACCCCTGCCTGCTGATCAGGGATTACTAGCGATTC
CGACTTCAAAGAGTCGAGTTGCAGACTCTTATCTGTACTGAGGTCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCTTTGTACCGACCATTGTAGCACGT
GTGTAGCCCTGGACATAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGATTTGAATATCGGCGGTCTCACTAGAGTCCCCGGCATGA

>CUP1P1C12 Uncultured eubacterium (Alphaproteobacteria)
CTTCGGGTGAATCCAATCCCATGGTGTAGGCGGTGTGTACAAGGCCTGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCGCCTTCATGCACTCG
AGTTGCAGAGTGCAATCCGAACTGAGACGGCTTTTGGAGATTAGCTCACCCTCGCGGGATTGCTGCCCACTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCATAAAGGCCATGAG
AGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCGGTTCCTTTAGAGTACCCAACTGAATGATGGTAACTAAAGGCGAGGGTTGCGCTCGT
TGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCAGTCCCCGAAGGGAAGAAATCCATCTCTGGAAATCGTCCGGACATG
TCAAACGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCAGGCCCCCGTCAATTCATTTGAGTTTTAACCTTGCGGCCGTACTCCC
CAGGCGGATAACTTAATGCGTTAGCTGCGCCACCAAAGCTCTAAGAGCCCTGACAGCTAGTTATCATCGTTTACGGCGTGGACTACCA

>CUP1P1D01 Uncultured alpha proteobacterium Alphaproteobacteria)
CTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAGCTTCATGCTCTCGAGTTGCAGAGA
ACAATCCGAACTGAGACGGCTTTTCGAGATTGGCTCGGGGTCGCCCCTCAGCCTCCCTCTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCATAAAGGCCATGAG
GACTTGACGTCATCCCCGCCTTCCTCCGGCTTGTCACCGGCAGTTCCTTCAGAGTGCCCGGCTTGACCCGATGGCAACTGAAGGTGAGGGTTGCGCTCGTTGCGGGACT
TAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGCCAGCCGAACTGAAGAAGCCGATCTCTCGGCCCCATACGGGACATGTCAAGGG
CTGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGAGCCCCCGTCAATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGG
TGCGCTTAACGCGTTAGCTGCGACACCGGAAGACTAGGTCTCCCAACGTCTAGCGCACATCGTTTACAGCGTGGACTACCAGTGTATCTAATCCTGTTTGCTCCCCACG
CTTTCGCGCCTCAGCGTCAGTTACGGTCCAG

>CUP1P1D02 Acidobacteria bacterium (Acidobacteria)
GGTCAGCGCACCGGCTTCTAGTACAGCCCACTTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCGAT
TCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGATGACTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTATCACCCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTAATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCGCCAGAGTGCCCAACTAAATGATGGCAACTGG
CAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTACGCAGCAGTCCCTTGCGGGAAGATGATATTTCT
ACCACTGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
CCTTGCGACCGCACTCCCCAGGCGGATTGCTTATCGCGTTAGCTTCGGCACGGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTAGGGCTAGGACTACCAGG
GGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTGTGGTCCAGTGAGCCGCTTTCGCCACAGGTGTTCCTCCCGATATCTACG

>CUP1P1D03 Beta proteobacterium(Betaproteobacteria)
GTTAGGCTAACTACTTCTGGCAGAACCCGCTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCGGCAAGCTGATCCGCGATTACTAGCGATT
CCGACTTCACGCAGTTGAGTTGCAGACTGCGATCCGGACTACGACCGGTTTTCTTGGGATTGGCTCCCCCTCGCGGGTTGGCAGCCCTCTGTACCGGCCATTGTATGAC
GTGTGTAGCCCTACCCATAAGGGCCATGATGACCTGACGTCATCCCC

>CUP1P1D06 Uncultured bacterium (Acidobacteria)
GGTTAGCGCACCGGCTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGNTTCACCGCGGCGTGCTGATCCGCGATTACTAGCGAT
TCCAGCTTCATGTAGTCGAGTTGCAGACTACAATCCGAACTGGGGCCGGCTTTTTCCGATTAGCTCCCCCTCATGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCAGTTTCGCTAGAGTGCCCGGCTTGACCCGTTGGCAACT
AGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTCCCTTGCGGGAAAGGGATGTTT
CCACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTATCGCGTTAACTGCGGCACGATCGGATTGGATACCGATCACACCAAGCATTCATCGTTTAAGGCTAGGACTA

>CUP1P1D08 Uncultured Myxococcales bacterium(Deltaproteobacteria)
CGGGTTGGCGCATCCACTTCTGGAGCAATCGACTCCCANTGGTGTGACGGACGGTGTGTACAAGGCCCGGGAACTTTTCACCCCTGCCTGCTGATCAGGAATTACTAGC
GATTCCGACTTCAAAGAGTCGAGTTGCAGACTCTTATCCGTACTGAGGCTGGTTTTTTGGGATTGGCTTCCCCTCGCGGGTTCGCGACCCTTTGTACCGGCCATTGTAG
CACGTGTGTAGCCCTGGACATAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGATTTGAATATCGGCAGTCTCGTTAGAGTGCCCGACTTGACTCGCTGGC
AACTAACGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTCCCTTGCGGGAAAGGCACCCCG
ATCTTTCGACCAGATTCCTGCATTTTCTAGCCCAGGTAAGGTTCTGCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGA
GTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGTGCTTAATGCGTTAGCTGCGGCACCGCAGGGGTCAAAGCCCGCGACACCTAGC

>CUP1P1D09 Uncultured bacterium (Acidobacteria)

GGTTAGCCCACCGGCTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCCGCGATTACTAGCGAT
TCCAGCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGACCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCGCCAGAGTGCCCAACTGAATGATGGCAACTGG
CAATAAGGGTTGCCCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACCGCAGCCCCTGCGGGAAGGGATGTTTCCAC
CCCAGTCCACTGCATTTCCAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTC
TTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTACGGCACGTCGGGATTGGGTACCCGACACACCAAGCAATCATC

>CUP1P1D12 Uncultured soil bacterium (Acidobacteria)
AATGGGGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATTCACGGCAGCGTGCTGATCTGCCATTACTAGCGATTCCAGC
TTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTCTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCTTTGTACCGTCCATTGTAGCACGTGTGT
AGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTTCCGCCTTTCGGCATGGCAACACAGGACAA
GGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCCTTGCGGGGTAGCGATGTTTCCACCGCC
GGTAACCAGCCGTTCGNAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTT
GCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACGGACAGAATGAACTGCCCACACCAAATATGCATCGTTTAGGGCGTGGACTACCAGCGTATCT
AATCCTGTTTGCTACCCACGCTTTCGTGTCTCAGCGTCAGTTACGGTCCAGAGAGCCGTCTACACCGCCGGTGTTCCTCCTGATATCTACGCA

>CUP1P1E01 Uncultured bacterium (Acidobacteria)
GGTTAGCGTGACGACTTCTAGTACAGCTCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAATGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGAT
TCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTACCCTGCATTGTAACAC
GTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACG
TGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCTA
CAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
TCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACTTCCGAACGGAAGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGGT
ATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAACGGTCCAGCGCGCCGCTTTCGCCACGGG

>CUP1P1E02 Burkholderia sp. (Betaproteobacteria)
GTCATGAATCCTGCCGTGGTGACGTCCTCCTTGCGGTTAGACTAGCCACTTCTGGCAAAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTAT
CACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCAGCTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCG
GCTTGGCAACCCTCTGTTCCGACCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTC
TCCCTGGAGTGCTCTTGCGTAGCAACTAGGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTT
ACGGCTCCCTTTCGGGCACCCCCACCTCTCAGCAGGGTTCCGTACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTG
CGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCTGGCGGTCAACTTCACGCGTTAGCTACGTTACCAAGCCAATGAAGGCCCGACAACCAGTT
GACATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCC

>CUP1P1E04 Uncultured Acidobacteria bacterium (Acidobacteria)
ATACTTAGGCGCCTGTCTCCCTTGCGGGTTACGCAGCGACTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGG
CATGCTGATCCGCGATTACTAGCGATTCCAACTTCATGCCGGCGAGTTGCAGCCGACAATCCGAACTGAGACCGACTTTCTCCGATTAGCTCCCCCTTGCGGGCTTGCA
ACGGTTTGTATCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCCTCAGA
GTGCCCAGCGTAACCTGATGGCAACAGAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACAG
GCGTCCTTGCGGAAACCGGCTTTCACCGGCGGTCACCTGCATTTCGAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGC
CCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAGTGCTTAATGC

>CUP1P1E05 Burkholderia sp. (Betaproteobacteria)
ATCCACGTGGTAGCGCCTCTTGCGGTTAGGCTACTACTTCTGGTGAAACCCACTCCCATGGTGTGAGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGC
TGATCCGCGATTACTAGCGATTCCAGCTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCT
CTGTTCCGACCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTTAGAGTGCT
CTTGCGTAGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCGCCGGTTCTCTTTC
GAGCACTCCCGCCTCTCAGCAGGATTCCGACCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCA
ATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACTAAGGAAATGAATCCCCAACAACTAGTTGACATCGTTTAGG
GCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCATGAGCGT

>CUP1P1E07 Propionibacterium acnes (Actinobacteria)
TATCACACTCCACCTTCGACGGCTCCCCCACAACGGTTAGGCCACCGGCTTCGGGTGTACCAACTTTCATGACTTGACGGGCGGTGTGTACAAGCCCCGGGAACGTATT
CACCGCAGCGTTGCTGATCTGCGATTACTAGCGACTCCGACTTCATGAGGTCGAGTTGCAGACCCCAATCCGAACTGAGACCGGCTTTCCGAGATTCGCTCACCCTCAC
AGGCTCGCCACTCTCTGTACCAGCCATTGTAGCATGCGTGAAGCCCTGGACATAAGGGGCATGATGACTTGACGTCATCCCCACCTTCCTCCGAGTTGACCCCGGCGGT
CTCCACTGAGTCCCCACCATAACGTGCTGGCAACAGTGAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCA
CCTGTGAACCGACCCCAAAAGAGGCACACCCATCTCTGAGCGCTCCCGATCCATGTCAAACCCAGGTAAGGTTCTACGCGTTGCATCGAATTAATCCGCATGCTCCGCC
GCTTGTGCGGGGCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGTACTTAAAGCGTTAGCTACGGCACGGAACCCGTGGAATGGACCCC
ACACCTAGTACCCACCGTTTACAGCGTGGACTACCAGGGTATCTAAGCCTGTTCGCTCCCCACGCTTTCGCTCCTCAGCGTCAGGAAAGGCCCAGAGAACCGCCTTCGC
CACTGGTGTTCCTCCTGATATCTGCGCATTCCACCGCTCCACCAGGAATTCCATTCTCCCCTACCTTCCTC

>CUP1P1E08 Uncultured sludge bacterium (Anaerolineae)
CTTCGACGGCGGCGTCCTTGCGGTTAGCCCACCGGCTTCAGGTGTTGCCAGCTCCCATGACGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAGTATA
GCTGTCCTGCGGTTACTAGCAACTCCGACTTCAGGCAGGCGGGTTGCAGCCTGCCATCCGAACTGAGACCAGCTTTGGTGGATTGGCTCCGCCTCACGGCTTGGCGACC
CATTGTGCTGGCCATTGTAGCGTGTGTGTCGCCCAGNGTATAAAGGACATGCTGACTTGACGTCATCCCCACCTTCCTCCGGCTTAATACCGGCAGTCGCGCCAGACAC
TTGTAACTGGCGCTAGGGGTTGCGCTCGTCAGTGGACTTAACCAAACACCTCACGGCACGAGCTGACGACAGCCATGCATCACCTGTGACCGCTCCCCGAAGGGTCGTT
CCGCTTTCGCTTCACTACTACGGTCATGTCAATCCCTGGTAAGGTTCTTCGCGTAGCCTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGTCCCCGTCAATTCCTT
TGAGTTTTAACCTTGCGGCCGTAGTCCCCAGGCGGTGGACTTATTGCGTTGGCTGCGGCACTGGCGGGGTTTAGACCGCCAAAACCTAGTCCACATCGTTTATAGCTAG
GACTACCGGGGTTTCTAATCCCGTTCGCTCCCC

>CUP1P1E09 Uncultured bacterium (Anaerolineae)
TGTTACCAGCTCCCATGACGTGAGGGCGGTGTGTACAAGGCCCGAGAACGTATCAACGCACTATAGCTGACGCGCGTTTACTAGCAACTCCGACTTCACGCAGGCGAGT
TGCAGCCTGCGATCTGAACTGAGGACGGTTTTGGGGATTGGCTCTACCTCGCGGCTTAGCGACCCATTGTACCGCCCAATTGGTAGCGTGTGTGTAGCCCTGGACATAA
AGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGCTTAATACCGGCGGTCCCGTATGACACATGTAACATACAGCGAGGGTTGCGCTCGTTAGCGGACTTAACC
GAACATCTCACGACACGAGCTGACGACAGCCATGCAACACCTGTGCAAGCTCCCTTGCGGGTCGGTCACCTTTCAGATCTCTACCACTTGCATGTCAAGCCCAGGTAAG
GTTCTTCGTGTGGCATCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGCCCCCGTC

>CUP1P1E10 Uncultured bacterium (Verrucomicrobiae)
ATCACATCCATACTTCGGCACTGCCTCCTTGCGGTTGGCACGGCGACTTCGGGTACAAACGGCTTCATGATGTGACGGGCGGTGTGTACAAGGCCTGGGAACGTATTCA
CGGCGCCGTAGCTGATGCGCCATTACTAGCGATTCCAACTTCATGTCGTCGAGTTGCAGACGACAATCTGAACTGGGCCCGGTTTTTTGGGATTTGCTCCACCTTACGG
TCTTGCTTCCCATTGTGCCGGGCATTGTAGTACGTGTGCAGCCCTGGCCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCGTTTAAGCGAGGCAGTC
TGTCCAGAGTGCTCCAGCCTCTCGGCCGGGTGGCAACAGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCA
GCACCTGTGCAAGCTGGTATTGCTACCTCGTCAGGCTTTCACCCTCCTACTACTTGCATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTGAGCCACATACT
CCACCGCTTGTGCAGGCCCCCGTCAATTTCTCTGAGTTTTAATCTTGCGACCGTACTTCCCAGGCGGCATGCTTAACGCGTTGGCTCCGCCACAAAAGGGGTCGATTCC
TTTTACAGCAAGCATGCACCGTTTAC

>CUP1P1E11 Uncultured beta proteobacterium (Betaproteobacteria)
GGTTAGGCGACGGCTTCTGGTGAACCCACTCCCATGGTGTGACGGCGGTGTGTCAAGACCCGGGAACGTATTCACCGCGACATGCTGATCCGCGATTACTAGCGATTCC
GACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACGCGCTTTAAGGGATTGGCTCTACCTCGCGGCTTAGCAGCCCTCTGTACGCGCCATTGTATTACGTG
TGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCCCAACTGAATGTAGCAACTAATGAC
AAGGGTTGCGCTCGTTGCAGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCCCTTTCGGGCACCCCCGGCTCTCACC
AGGCTTCCGGACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATAAT

>CUP1P1E12 Burkholderia sp. (Betaproteobacteria)
GGTTAGACTACCACTTCTGGCAAAACCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCC
AGCTTCACGCAGTCGAGTTGCAGACTGGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACTCGCGGCTGGCAACCCTCTGTTCCGACCATTGTATGACGTGTGA
AGCCCTACCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTGGAGTGCTCTTGCGTAGCAACTAGGGACAAGGGTTG
CGCTCGTTGCGGGACTTAACCCAACATCTCACGACACG

>CUP1P1F01 Uncultured bacterium (Betaproteobacteria)
GGTTAGACTAGCCACTTCTGGTAAAACCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGCCGATCCGCGATTACTAGCGAT
TCCAGCTTCACGCACCCGAGTTGCAGAGTGCGATCCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCTCTGTTCCGACCATTGTATGACG
TGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTGGAGTGCTCTTGCGTAGCAACTAGGGACAA
GGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTATGGCTCCCTTTCGGGCCACTCCCGCCTCTCAGCA
GGATTCCATACATGTCAAGGGTAGGTAAGGTTTCTCGCGTTGCATCGAATTAAATCCACATCATCCACCGGTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTCATCT
TGCGACCGTACTCCCCAGGCGGTCCACTTCA

>CUP1P1F03 Uncultured beta proteobacterium (Betaproteobacteria)
GTGGCATCGCCCTCCTTGCGGTTAGGCTAACTGCTTCTGGTGAAACCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGACATGCTG
ATCCGCGATTACTAGCGATTCCGACTTCATGTAGTCGAGTTGCAGACTACAATCCGGACTACGACGCGCTTTCTGGGATTGGCTCCCCCTCGCGGGTTGGCAACCCTCT
GTACGCGCCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCCCATTAGAGTGCCCA
ACTGAATGTAGCAACTAATGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCAGGTTCTCTT
TCGAGCACATCCATGTCTCCACGGACTTCCTGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGCCCCCGT
CAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTGCGTTACTAAGGGAGGTAAGTCCCCCAACAACTAGTTGACATCGTT
TAAGGCGTGGACTACCAGCGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTG

>CUP1P1F04 Uncultured Acidobacteria bacterium(Acidobacteria)
ACATACTTAGCCCTGCCTCCCTTGCGGGTTGGCGCGGCGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGG
CATGCTGATCCGCGATTACTAGCGATTCCAACTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCACTCTCGCGAGTTTGCG
ACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGA
GTGCCCGGCATTACCCGATGGCAACAGGAAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACAG
ATGCCCTTGCGGGAGTCGGCTTTCGCCGATGGTCATCTGCACTTCGAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGC
CCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTACGGCACGGCAGGGATCG

>CUP1P1F05 Uncultured bacterium (Acidobacteria)
CGGTTGAATCACCGGCTCTAGTACAAATGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCTGCTTGCTGATCAGCGATTACTAGCGAT
TCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGAACGGTTTTTTGAGATTGGCTCCCCCTCGCGGGTTTGCGACTCATTGTGCCGCCCATTGTAGTAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTTTCACCGGCAGTCCCATTAGAGTGCTCAACTTGACTTGGTGGCAACT
AATGGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTAATGTCCCTTGCGGGAAAAGGATGTTT
CCACCCCTGTCACTAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGCCTTGCGACCGTACTCCCCAGGCGGGATACTTAATGCGTTAGCTTCGCCACGACTGGATTCAATCCCAGTTACAGCAAGTATCCATCGTTT

>CUP1P1F06 Uncultured bacterium (Não classificada)
TTTGGCGGATCCCCCTTGCGGGTTAAGCTCCGACTTCTGTTGCAGCGGGCTTTCGTGGTGTGGCGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCTGCCTGCT
GATCAGCGATTACTAGCGATTCCGCCTTCATGTGGGCGAGTTGCAGCCCACAATCTGAACTGGGGCCGGCTTTGGGGTTTGGCTCCACCTTACGGTATTGCTTCCCATT
GTACCGGCCATTGTAACACGTGTGTGGCCCTGGACATAAGGGCCATGAGGATTTGACGTCGTCCCCACCTTCCTCCTTCTTATCGAAGGCAGTTTCCAAAGAGTGCATC
CCTTGCGGGATTAGCAACATTGGATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAACCATGCAGCACCTCTGCTGGCTTCCT
TGCGGATCAGCCTCTGTTTCCAGAGACTTACTACCAGTAGTTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGTTCCACCGCTTGTGCGGGCCC
CCGTCAATTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGCTCATTTAATGCGTTAGCTGCGACGCGGAAGGGGTCGATACCTCCCAGATCTAATGAGCAT
CGTTTAGGGCTAGGACTACCA

>CUP1P1F08 Uncultured bacterium (Não classificada)
TCCGTCCTCACGGGTCGGCAGCGACTTCGGGAGCCCAGACTCGGGTGATGTAGGGCGGTGAGTGCAGGCCCGGGAACGTATTCAACGCAGTGTGCTGACCTGCGTTTAC
TAGCAACTCCGACTTCATGCTGGCGAGTTGCAGCCAACAATCCGAACTGAGACCGGTTTTAAGGGATTGCCTTCACGTCGCCGTGTCGGAACCCGTTGTGCCGGCCATT
GTAGCGTGTGTGTAGCCCTGGACATAAAGGGCATGCGGACTTGACGTCATCCCCACCTTCCTCCGGGTTTCGCCCGGCAGTCTCCCTAGAAAATTCAACTAAGGACAAG
GGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCACCACCTGTGCAGAGACCTCTTGCGAGGGGCGCTGACTTTCACCAGCG
TTTCCTCTACATGTCAAGCCCAGGTAAGGTTCTTCGCGTTGCCTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGCCCCCGCCTATTCCTTTGAGTTTTAACCTTG
CGGCCGTAGTCCCCAGGCGGCGAACTTAATGCGTTGGCTGCGGCACTGATCGGGTCAATCCGACCAACACCTAGTTCGCAACGTTTAGGGCGTGGACTACCCGGGTATC
TAATCCGGTTCGCTCCCC

>CUP1P1F09 Unidentified eubacterium from the Amazon (Não classificada)
TCAGGTATTGGCGACTTCATGGTTTGACGGGCGGTGTGTACAGACCGGGAACGTATTCACGGTAGTGTGCTGACCTACCGTTACTAGCGATTCCAGCTTCATGCAGGCG
AGTTTCAGCCTGCAATCCGAACTGAGACCGGTTTTGATGGGGTTTGCTCCGTCTCGCGACTTGGCAGCCCTTTGTACCGGCCATTGTAGCGTGTTTGTAGCCCAGGATG
TAAGGGCAATACTGACCTGACATCATCCCCCCCTCCCTCCCCGTTACCGGGGCAGTCTAGCTAGAGAAATTCAACTAACTATAAGGGTTGCGCTCGTTGATGGACTTAA
CCGAACATCTCACGACACGAGCTGACGACGGCCATGCAGCACCTGTCACTGCGGCCCGAAGGCACTCTCTCCTTTCGGAGAAATTAGCAGGATGTCAAACCCTGGTAAG
GTTCTTCGGTTATCATCGAATTAAAC

>CUP1P1F11 Uncultured soil bacterium (Acidobacteria)
GCACACCTGCTTCTATTGGTCCACTTCGTGATGTGAGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCGTCTGATCTGCGATTACTACGATTCCAGCTTCATG
GAGTCGGGTTGCAGACTCCAATCCGAACTGAGCACGGCTTTTTGCGATTAGCTCCCCCTCGCGGGTTGCGACGCTTTGTACCGCGCATTGTAGCACGTGTGTAGCCCTG
GACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCCCGGCTTGACCCGATGGCAACTGACGATAAGGGTT
GCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGTCCTTGCGGAAAGGGATGTTTCCACCCCGGTCCACT
GCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTA
CTCCCCAGGCGGGATGCTTAACGCGTTAGCTGCGGCACGATGGGATTGGGTACCCATCACACCAAGCATCCATAGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTG
TTTGCTCCCCTAGCTTTTGCGCCTCAGCGTCAGTTGTGGTCCAGTGCGCCGCTTTCGCCACAGGTGTTCCTCCCGATATCTACGCATTTCACCGTTAAACCGGGAATTC
CACGCACCTCTCCCAAACTCCAGCACGGCAGTTTCGCCTGCAAGCTCCCAGTTGAGCCAGGAGATTCACAGGTGACTTACC

>CUP1P1F12 Uncultured alpha proteobacterium (Alphaproteobacteria)
GGTTAGCGGTACCGTCTTAAGGTAATCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCGA
TTCCAGCTTCATGGGCTCGAGTTGCAGAGCCCAATCCGAACTGAGACGGCTTTTTGAGATTTGCGCAGGATTGCTCCATTGCATCCCATTGTCACCGCCATTGTAGCAC
GTGTGTAGCCCAGCCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCCCCTTAGAGTGCCCAACTGAATGATGGCAACTA
AGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGAACTGAAGGGATCGATC

TCTCGTTCCCGCGACCGGGATGTCAAGGGCTGGTAAGGTTCTTCGCGTTGCTTCGAATTGAGCCACATGCTCCCACGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTT
TTAATCTTGCGACCGTACTCCCCAGGCGGGATGCTCAAAGCGTTAGCTGCGCCA

>CUP1P1G01 Acidobacteria bacterium (Acidobacteria)
GGTCAGCGTGACGACTTCTAGTACAACTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGA
TTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACA
CGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCCCTTACGGGTGGCAACTAC
GTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCTTGTCCCTTGCGGGAAGGCCATATTTCT
ACAGCTTGTCAAAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCATAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTGGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGG
TATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAGTGGTCCAGCGCGC

>CUP1P1G02 Uncultured bacterium (Acidobacteria)
ACAGCTCACTTTCGTGATGTGAGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTG
CAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTACCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGG
CCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGG
GACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCAGAAGCATTTCGAG
CCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGT
GCAGGACTTAACGCGTTAGCCCCGGGACGACTTCCGAACGGAAGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCT

>CUP1P1G03 Uncultured proteobacterium (Gammaproteobacteria)
GGACGGCGTCCTCCTTGCGGTTAGACTACCGGCTTCTGGTGCAGCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGTGGCATTGCT
GATCCACGATTACTAGCGATTCCAACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTGCGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTCGCGACCCTC
TGTACCGACCATTGTAGTACGTGTGTAGCCCTGGTCATAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCTCAACTA
AACTTAATGATGGCAACTAGGGACGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTCAGTTCCC
GAAGGCACTCCCGCATCTCTGCAGGATTCCGAGGATGTCAAGACCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATACTCCACCGGTTGTGCGGGCCCCCGT
CAATTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGAGAACTTAGCGCGTTAGCTACGTCACTGGAAAGCAAACCTCTCCAACGACTAGTTCTCATCGTTT
ACAGCGTGGACTAC

>CUP1P1G04 Acidobacteriaceae bacterium (Acidobacteria)
GCGGCTGCTCCCTTGCGGTTAGCTCACCGACTTCTAGTGCAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATCACCGCAGCATTCTGATCT
GCGATTACTAGCGATTCCAGCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGGCCGGCTTTATCCGATTGGCTCCCCCTCACGGGTTCGCGACGGTTCGTAC
CGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCTCAACTA
AATGGTAGCAACTGGAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGAGGCCTATTGCTA
GGCGCCGATATTTCTACCGAATTCCTCTACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTTCGGCACGACGGGATTGGGT

>CUP1P1G05 Uncultured Xanthomonadaceae bacterium(Gammaproteobacteria)
CCGTGGTAGCGTCCCCTTGCGGTTAGACTACCTACTTCTGGAGCAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGACAATGC
TGATTCGCGATTACTAGCGATTCCGACTTCACGGAGTCGAGTTGCAGACTCCGATCCGGACTGAGAGAGGTTTTCTGGGATTGGCTTCACCTCGCGGCTTCGCAACCCT
CTGTACCTCCCATTGTAGTACGTGTGTAGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTAGAGTTCC
CACCATAACGTGCTGGCAACTAGGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGATT
CCCGAAGGCACCCTCGCATCTCTGCAAGGTTCCGGACATGTCAAGGCCAGGTAAGGTTCTGCGCGTCGCATCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCC
CGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGGCGAACTTAACGCGTTAGCTTCGACACTGAGTGCCAAGTTGCACCCAACGTCCAGTTCGCATC
GTTTAGGGCGTGGACT

>CUP1P1G08 Uncultured bacterium (Não classificada)
CCTGCGGTTAGGCAACGGTTCTGGTGAACCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGTGGCATGCTGATCCACGATTACTAGC
GATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCATTGTAT
GACGTGTGAGGCCCTANCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCACTAAAGTGCCCTTTCGTAGCAACTAGTG
ACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCCGGCTCCCTTTCGGGCACTCCCACATCTCT
GCGGGATTCCGGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAAT
CTTGCGAACGTACTCCCCAGGCGGTCGACTTCACGCGTTAGCTGCGTT

>CUP1P1G09 Uncultured Bacteroidetes bacterium (Não classificada)
TACACCCGGCTTCCATGGCTTGACGGGCGGTGTGTACAAGGTCCGGGAACGTATTCACCGTATCATTGCTGATATACGATTACTAGCGATTCCAGCTTCATGCAGTCGA
GTTGCAGACTGCAATCTGAACTGAGAAAAGGTTTTTGGGATTAGCTTCACGTCGCCGTGTTGCTGCCCTTTGTCCTTCCCATTGTAGCACGTGTGTAGCCCTGGGCATA
AAGGCCATGATGACTTGACATCATCCCCTCCTTCCTCGCGTCTTACGACGGCAGTTTCACTAGAGTTCCCAGCATTACCTGATGGCAACTAGTGATGGGGGTTGCGCTC
GTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTTACTGGCGGTGTATTGCTACAAAAAGAGCTTTCACCCTCGGTCCACCAGCA
TTCTAGCCCAGGTAAGGTTCCTCGCGTATCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGACCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGTCGTACTTC
CCAGGTGGGATACTTAATGCTTTCGCTCAGACACCAACAGTGTATCGCTGATGTCGAGTATCCATCGTTTAGGGCGTGGACTACCAGCGTATCTAATCCTGTTTTGATC
CCCAAGCTTTCGT

>CUP1P1G10 Unidentified eubacterium from the Amazon(Acidobacteria)
GTTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGCGGTGTGTACAATGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGATT
CCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACG
T

>CUP1P1G11 Uncultured bacterium (Acidobacteria)
CATACCTTGGGCCGCTGCTCCCTTGCGGGTCAGCCTGCAGACTTCTAGTACAATCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGC
AGCGTGCTGATCTGCCATTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTCG
CTGCGCTCTGTACCGCCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGC
GAGTTCCGCCTTGCGGCATGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTG
GACCCCCTTGCGGGGTAGAGATGTTTCCACCTCCGTTGACCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCCCCACCGGTTGTGC
GGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACGGACCGACTGAACG

>CUP1P1H01 Acidobacteria bacterium (Acidobacteria)
ATGAGTCATACTTGGGCGTCTGCCTCCTGCGGTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACG
GCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTT
GGCAACGGTTTGTGCCCTGCATCGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACG
TAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTATACT
CCTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTG
CGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTC
CTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAATGGTCCAGCGCGCCGCTTTCGCCACGGGTGTT
C

>CUP1P1H02 Uncultured bacterium (Não classificada)
GGTTAGCCTGTAGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGCCATCGTTCTGATACGGCATTACTAGCGAT
CCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTTTGGGATTGGCTCCCCCTCGCGGGTTGGCGACCCTTTGTGCCGTCCATTGTAGCACG
TGTGTAGCCCTAGACATAAAGGCCATGAGGACTTGACGCCATCCCCACCTTCCTCCAGGTTATCCCTGGCGGTCTCCTGCGAGTTCCACCGATTAAAGTATGGCAACAC
AGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTCCGGTCCCTTGCGGGAAGTCCTCGTTTC
TGAGGATTATCCAAAGCCGTTCGAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACAGATCAAATGAATGACCCAAACCAAATATGCATCGTATAGGGCGTGGACTACCAGG
GTATCTAATCCTGTATGCTAACCAAGCTTTCGTGTTTCAGCGTCAGTTACGGTCCAGAAAGCCG

>CUP1P1H03 Uncultured beta proteobacterium(Betaproteobacteria)
GGTCGGCGCCTCCTTGCGGTTAGGCGACCGGCTTCTGGTGAAGCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGACATGCTGA
TCCGCGATTACTAGCGATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACGCGCTTTAAGGGATTGGCTCTACCTCGCGGCTTAGCAGCCCTCTG
TACGCGCCATTGTATTACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCCCAA
CTGAATGTAGCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCCCTTT
CGGGCACACCCAGCTCTCACCAGGCTTCCGGACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATAATCCACCGCTTGTGCGGGTCCCCGTC
AATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTCGACTTCACGCGTTAGCTTCGTTACTGAGAGTGTCAAACTCCCAACAACCAGTCGACATCGTTTA
GGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTT

>CUP1P1H04 Uncultured bacterium (Acidobacteria)
TGGGCGCCTGCCTCCTTGCGGTTGGCACAGCGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTGCT
GATCCGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGATGGCTTTTTCCGATTAGCCCCCCCTCGCGGGTTTGCGACGGTT
TGTACCACCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCGCCAGAGTGCCC
AACTGAATGATGGCAACTGGCAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGCAGCCCTT
GCGGGAAGGGATGTTTCCACCCCGGTCCACTACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTC
AATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATCGCTTAACGCGTTAGCTCCGGCACGATAGGATTGGGTACCTATCACACCAAGCGATCATCGCTT
AGGGCTAGGACTACC

>CUP1P1H07 Unidentified eubacterium from the Amazon (Não classificada)
GACATACTTAAGCGCCTATGCCCCCTGCGGGTTCACACAGCGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCG
CGGCATGCTGATCCGCGATTACTAGCGATTCCAACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTCTGCGATTAGCTCACTCTCGCGAGTTC
GCGACGCTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCC
AGAGTGCCCGGCATTACCCGATGGCAACAGGAAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATG
CAAATGTCCTTGCGGAAGTCGACTTTCGCCGATGGTCATCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCG
GGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAACTTCGGCACGGCAGGGATCGATACCCGGCAAACCAAGCA
TTCAT

>CUP1P1H08 Uncultured bacterium (Não classificada)
CAGCGGCTTCAGGGTGCCGACTTCGTGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGTGGTGTGCTGACCCACGGTTACTAGCAACTCCGCCTTCAG
GCAGGCGAGTTGCAGCCTGCCATCCGAACTGAGACCGCCTTTTGGGATTGGCTCCCCGTCGCCGGTTCGCTTCCTACTGTCGCGGCCATTGTAGCGTGTGTGTCGCCCA
GGACGTCGGGGCCGTGCTGACTTGACGTCATCCCCACCTTCCTCCACGTTACTCGTGGCAGTCTGGTCGGACACTTATAACCGACCACAGGGGTTGCGCTCGTTGCGGG
ACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGCGCCTGTCCCGAAGGAAGCCTCGTCTCCGAGGTGCTCAGGCGCATGTCAAGCCCTG
GTAAGGTTCTTCGCGTCGCTTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGACC
ACTTATTGCGTTTGCGTCGGCACGCAGCGGGTCGATACGCCGCACACCTAGTGGTCATCGTTTACGGCCAGGACTACCGGGGTATCTAATCCCGTTCGCTCCCCTGGCT
TTCGCCCCTCAGCGTCAGGTGCCTCCCAGGACACTGCCTTCGCCTTTGGTGTTCCTCCGGATCTCTACGCATTTCAC

>CUP1P1H09 Uncultured soil bacterium (Verrucomicrobiae)
ATACTTCGGCACTGCTTCCTTGCGGTTAGCACGGCAATTCGGGTACAAACGGCTTCATGATGTGACGGGCGGTGTGTACAAGGCCTGGGAACGTATTCACGGCGCCGTA
GCTGATGCGCCATTACTAGCGATTCCAACTTCATGCCGTCGAGTTGCAGACGACAATCTGAACTGGGGCTGGTTTTAGGGGATTTGCTCCACCTGACGGTCTCGCTTCC
CTTTGTGCCAGCCATTGTAGTACGTGTGCAGCCCTGGCCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCGTTTAAGCGAGGCAGTCTGTCCAGAGT
GCTCCAGCCTCTCGGCCGGGTGGCAACAGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGT
ACGCTGGTATTGCTACCTCGTCAGGCTTTCACCCTTCTACTACGTACATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTGAGCCACATACTCCACCGCTTG
TGCAGGCCCCCGTCAATTTCTTTGAGTTTTAATCTTGCGACCGTACTTCCCAGGCGGCACGTTTAACGCGTTGGCTACGCCACAAAAGGGGTCGATTCCTTTTACAGCA
AACGTGCACCGTTT

>CUP1P1H10 Uncultured bacterium (Actinobacteria)
CCACTTCGACGGTCCCCACACGGTTAGGCCCGGCTTCGGGTGTACCAACTTCATGACTTGACGCGGTGTGTACAAGCCCCGGGAACGTATCACCGCAGCGTTGCTGATC
TGCGATTACTAGCGACTCCGACTTCATGAGGTCGAGTTGCAGACCCCAATCCGAACTGAGACCGGCTTTCCGAGATTCGCTCACCCTCACAGGCTCGCCACTCTCTGTA
CCAGCCATTGTAGCATGCGTGAAGCCCTGGACATAAGGGGCATGATGACTTGACGTCATCCCCACCTTCCTCCGAGTTGACCCCGGCGGTCTCCACTGAGTCCCCACCA
TAACGTGCTGGCAACAGTGAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGAACCGACCCCAA

>CUP1P1H11 Uncultured bacterium (Acidobacteria)
ACGGCTATCTCCTTGCGGTTGAATTGCCGGCTTCTAGTACAACGGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCTGCTTGCTGAT
CAGCGATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGAATGGTTTTTTGAGATTGGCTCCCCCTCGCGGGTTTGCGACTCATTGT
GCCATCCATTGTAGTACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTTTCACCGGCAGTCCCTTTAGAGTGCTCAGC
ATAACCTGGTGGCAACTAAAGGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTAGTGTCCCTT
GCGGGAAAAGCGACTTTCGCCACCTGCCACTAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGT
CAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATACTTAATGCGTTAGCTTCGGCACGACTGGATTCAATCCCAGTCACACCAAGTATCCATCGTT
TAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTTCTGTCCAGG

>CUP1P2A01 Uncultured bacterium (Gammaproteobacteria)
CTACCTACTTCTGGAGCAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGACAATGCTGATTCGCGATTACTAGCGATTCCGAC
TTCGCGGAGTCGAGTTGCAGACTCCGATCCGGACTGAGAGAGGTTTTCTGGGATTGGCTTCACCTCGCGGCTTCGCAACCCTCTGTACCTCCCATTGTAGTACGTGTGT
AGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTTAGAGTTCCCACCATTACGTGCTGGCAACTAAGGAC
AAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGATTCCCGAAGGCACTCCCGCATCTCTGCAG
GATTCCGGACATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTG
CGACCGTACTCCCCAGGCGGCGAACTTAACGCGTTAGCTTCGACACTGAGAGCCAAGTTGCTCCCAACGTCCAGTTCGCATCGTTTAGGGCGTGGACTACCAGGGTATC
TAATCCTGTTTGCTCCCCACGCTTTCGTGCTTGAGTGTCAATGCTGGTCCAGGTAGCC

>CUP1P2A04 Uncultured soil bacterium (Betaproteobacteria)
GTCGGCGCCATCCTTGCGGTTAAGCGACCGGCTTCTGGTGAAAACCCACTCCCATGGTTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCGACATGCTGATC
CGCGATTACTAGCGATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACGCGCTTTAAGGGATTGGCTCCAGGTCGCCCCTTGGCTACCCTCTGTA
CGCGCCATTGTATTACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCCCATTAGAGTGCCCCCTT
ACGGGTGGCAACTAATGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCTCTTTCG
AGCACACCCGCCTTTCAGCAGGCTCCCGGACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATAATCCACCGCTTGTGCGGGTCCCCGTCAA
TTCCTTTGAGTTTTAACCTTGCGGCCGTGCTCCCCAGGCGGTCGACTTCACGCGTTAGCTTCGTTACTGAGAGTGTCAAACCCCCAACAACCAGTCGACATCGTTTAGG
GCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCC

>CUP1P2A05 Uncultured bacterium (Alphaproteobacteria)
CTGACTTACGTGGTAGGCTGCTCCTTGCGGTTAGCGCACCTGCTTCGGGTAAAACCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGTG
GCATGCTGATCCACGATTACTAGCGATTCCACCTTCATGCACTCGAGTTGCAGAGTGCAATCTGAACTGAGACGGCTTTTTGGGATTTGCTCCACCTTGCGGTCTTGCA
CCCCACTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCATAAGGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCGGCTTGTCACCGGCAGTTTCGTCAAA
GTGCCCAACTAAATGATGGCAACTGACGATGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGGGA
GCCAGCCGAACTGAAGGACACCGTCTCTG

>CUP1P2A06 Uncultured bacterium (Acidobacteria)
AAGGTGCTCCTGCGGTTAGCACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGC
GATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCG
ACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGA
CCCGATGGCGACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTTCTTGCGAA
AAGGGATGTTTCCACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTC
CTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTTCGGCACGGCAGGATTGGGTACCTGCTACACCAAGCAATCATCG

>CUP1P2A07 Uncultured bacterium (Não classificada)
GTTGCCGACTTTCGTGGTGTGACGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGTGGTGTGCTGACCCACGGTTACTAGCAACTCAGCCTTCAGGCAGGCGAGTT
GCAGCCTGCCATCCGAACTGAGACCGCCTTTTGGGATTGGCTCCCCGTCGCCGGTTCGCTTCCTACTGTCGCGGCCATTGTAGCGTGTGTGTCGCCCAGGACGTCGGGG
CCGTGCTGACTTGACGTCATCCCCACCTTCCTCCACGTTACTCGTGGCAGTCTGGTCGGACACTTATAACCGACCACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAA
CACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGCGCCTGTCCCGAAGGAAGCCTCGTCTCCGAGGTGCTCAGGCGCATGTCAAGCCCTGGTAAGGTTCTT
CGCGTCGCTTCGAGTTAGACCACACGCTCCGCTGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGACCACTTATTGCGT
TTGCGTCGGCACGCAGCGGGTCGATACGCCGCACACCTAGTGGTCATCGTTTACGGCCAGGACTACCGGGGTATCTAATCCCGTTCGCTCCCCTGGCTTTCGCCCCTCA
GCGTCAGGTGCCTCCCAGGACACTGCCTTCGCCTTTGGTG

>CUP1P2A08 Uncultured bacterium (Deltaproteobacteria)
TGGAGCAACTGACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACCCCTGCCTGCTGATCAGGGATTACTAGCGATTCCGACTTCATGAAGTCGA
GTTGCAGACTTCAATCTGAACTGAGGCCGGTTTTTTGGGATTGGCGTACCCTCGCGGGTTAGCAACCCTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGGCATA
AGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTAACACCGGCAGTCTCGTTAGAGTGCCCGGCCGAACCGCTGGCAACTAACGACAAGGGTTGCGCTCG
TTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGGACACCCGATTCCCTTGCGGGCACCCCTCCATCTCTGGAAGGTTCCGGGGG
GTTCCAACCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTC
CCCAGGCGGAGTGCTTAACGCGTTAGCTACGACGCCTCCGGGGTCAATACCAGAAACATCTAGCACTCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGTTT
GCTCCCCACGCTTTCGCACCTCAGCGTCAGTATCTACCCAGGTCGCCGCCTTCGCCACCGGTGTTCCTCCCGATATCTACGAAT

>CUP1P2A09 Burkholderia sp (Betaproteobacteria)
CGTGGTGACCGTCTCCTTGCGGTTAGACTAGCCACTTCTGGTAAACCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGCTG
ATCCGCGATTACTAGCGATTCCAGCTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCTCT
GTTCCGACCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTGGAGTGCTCT
TGCGTAGCAACCAGGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTACGGCTCCCTTTCGG
GCACCTCCACCTCTCAGCAGGGTTCCGTACATGTCAAGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGA
TCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACCAAGCCAATGAAGGCCCGATAACCAGTTGACATCGT

>CUP1P2A12 Uncultured bacterium (Acidobacteria)
CCCCTTGCGGTTGGCTCACCGACTTCTAGTACGGCCCACTTTCGTGATGNACGGGCGGTGTGTACAAGGCCCGGGAACGTTTCACCGCAGCGTCCTGATCTGCGATTAC
TAGCGATTCCAGCTTCATGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGACCATT
GTAGCACGTGTGTGGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCGCTAGAGTGCCCGGCATTACCCGAT
GGCAACTAGCGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGTCCTTGCGGAAAGGGA
TGTTTCCACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGA
GTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATGCTTAACGCGTTAGCTGCGGCACGACCGGATTGGGTACCGATCACACCAAGCATCCATAGTTTAGGGCTAGGAC
TACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTGTGGTCCAGTGCGCCGCTTTCGCCACAGGTGTTCCCTCCCGATATCT

>CUP1P2B01 Uncultured bacterium (Acidobacteria)
CACCGGCTTCTAGTATCACCCACTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAGCTT
CATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAG
CCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCCTTGTCAGAGGCGGTTTCGCCAGAGTTCTCAGCTTGACCTGTCAGTAACTGGCGATAA
GGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTACGCAGCAGCCCTTGCGGGCTCCAGTGTTTCCACCGGATT
CCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGA
CCGTACTCCCCAGGCGGATTGCTTAACGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTCTAGGGCTAGGACTACCAGGGTATCTAA
TCCTGTTTGCTCCCCTAGCTTTCGCGCATCAGCGTCAGTTATGGTCCAGTGCGCCGCTTTCGCCACAGGTGTTCCTCCCGATATCTACG

>CUP1P2B02 Oxalobacteraceae bacterium (Betaproteobacteria)
TAGCGCCCCCTTACGGTTAAGCTACCTACTTCTGGTAAAACCCGCTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGCTGATCC
GCGATTACTAGCGATTCCAACTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGATGCACTTTCTGGGATTAGCTCCCCCTCGCGGGTTGGCGGCCCTCTGTAT
GCACCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCTCTTGCG
TAGCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCAGGCTCTCTTTCGAGCAC
TCCTCAATCTCTCGAGGATTCCTGACATGTCAAGGGTGGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCT
TTGATTTTAATCTTGCGACCGTACTCCCCAGGCGGTCTACTTCACGCGTTAGCTGCGTTACCAAGTCAATTAAGACCCGACAACTAGTAGACATCGTTTAGGGCGTGGA
CTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCATGAGCGTCAATCTTGACCCAGGGGGCTGCCTTCGCCATCGGTGTTCCTCCACATCTCTACGCATT
TCACTGCTACACGTGGAATTCTAACCCCCTCT

>CUP1P2B03 Uncultured bacterium (Acidobacteria)
CACCGGCTTCTAGTGCAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATTCTGATCCGCGATTACTAGCGATTCCAGCTT
CATACAGTCGAGTTGCAGACTGTAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGACCATTGTAGCACGTGTGTAG
CCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTCCGCCAGAGTGCCCAACTAAATGATGGCAACTGGAGGTAAGG
GTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATACAGGTCCCTTGCGGGACGCCGATGTTTCCACCGGATT
CCTGTACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGA
CCGTACTCCCCAGGCGGACTGCTTATCGCGTTAGCTTCGACACGGCGGGATTGGGTACCCGCCACATCAAGCAGTCATGGTTTAGGGCTAGGACTACCAGG

>CUP1P2B04 Uncultured bacterium (Acidobacteria)
GGCGCTCCCTCCCTTGCGGGTTGGTATGGCGACTTCTAGTACAACCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGCTGA
TCCGCGATTACTAGCGATTCCAACTTCATGCCGGCGAGTTGCAGCCGACAATCCGAACTGAGACAGACTTATCCGATTAGCTCCACCTTACGGTCTCGCGACGGTTTG
TATCTGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTGCAGAGTGCCCAC
CATAACGTGATTGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAGCCCAACGTCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTT
GCGGAAGCTCACTTTCGTGAGTGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGCCACACCAAGCATTCATCGTTTA
GGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCTCCTCAG

>CUP1P2B05 Burkholderia sp. (Betaproteobacteria)
CTAGCCACTTCTGGTAAAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCAGCT
TCATGCACTCGAGTTGCAGAGTGCAATCCGGACTACGATCGGTTTTCTGGGATTAGCTCCCCCTCGCGGGTTGGCAACCCTCTGTTCCGACCATTGTATGACGTGTGAA
GCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTTAGAGTGCTCTTGCGTAGCAACTAAGGACAAGGGTTG
CGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCGCCGGTTCTCTTTCGAGCACTTCCACCTCTCAGCGGAATTCC
GACCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCG
TACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACTAAGGAAATGAATCCCCAACAACTAGTTGACATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTG
TTTGCTCCCCATGCTTTCGTGCATGAGCGTCAGTATTGGCCCAGGGGGCTGCCTTCGCCATCGGTATTCCT

>CUP1P2B06 Uncultured bacterium (Acidobacteria)
GCCTTCCCCTCGCGGGTTCGGGACGCTTTGTACCGTCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGCT
TATCGCTGGCGGTCTCCTGCGAGTTCCGCCTTTCGGCATGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACA
GCCATTCAGCACCTCGACTGGACCCCCTTGCGGGGTAAAGATGTTTCCACCTCCGTTGACCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACC
ACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACGGATCAACT
GAATGACCCATACCAAATATGCATCGTTTAGGGCGTGGACTACCAGCGTATCTAATCCTGTTTGCTACCCACGCTTTCGTGTCTCAGCGTCAGTTACGGTCCAGAAA

>CUP1P2B07 Uncultured bacterium (Acidobacteria)
CTTCTAGCACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGC
AGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTG
GACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCCTTGCGGAGTGGCAACTACGTGCAGGGGTTG
CGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTTGTCAG
AAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCG
TACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGAACACCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCA

>CUP1P2B08 Uncultured bacterium (Actinobacteria)
GTGACGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATCACCGCGGCGTTGCTGATCCGCGATTACTAGCGACTCCGGCTTCACGGGGCCGGGTTGCAGACCCCGATC
CGAACTGAGACCGGCTTTCCGGGATTCGCTCACCCTCACAGGCTCGCAGCCCTCTGTACCGGCCATTGTAGCATGTTTGCAGCCCAAGACATAAGGGGCATGATGACTT
GACGTCATCCCCACCTTCCTCCGAGTTGACCCCGGCAGTCTCCCATGAGTCCCCAACTGAATGCTGGCAACATGGGACGAGGGTTGCGCTCGTTGCGGGACTTAACCCA
ACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGACCGGCCCCGAAGGACCCCATGTCTCCATGAGTTTTCCGGCCATGTCAAACCTTGGTAAGGTTCTT
CGCGTTGCGTCGAATTAAGCAACATGCTCCGCCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGCGCTTAATGCGC
TAGCTGCGGCACAGAGCCCGTGGAAGGACCCCANACCTAGCGCCCAACGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGTTCGCTCCCCCAGCTTTCGCTCCTC

>CUP1P2B09 Uncultured bacterium (Verrucomicrobiae)
AGGGGCGACTTCGGGTACAAACGGCTTTCATGATGTGACGGGCGGTGTGTACAAGGCCTGGGAACGTATTCACGGCGCCGTAGCTGATGCGCCATTACTAGCGATTCCA
GCTTCATGCCGTCGAGTTGCAGACGACAATCTGAACTGGGCCCGGTTTTAGGGGATTTGCTCCACCTTACGGTCTCGCTTCCCTCTGTGCCGGGCATTGTAGTACGTGT
GCAGCCCTGGTCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCGTTGAAGCGAGGCAGTCTGTCCAGAGTGCTCCAGCCTCTCGGCCGGGTGGCAAC
AGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCCCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAGCTCCCCTTGCGGGGTCGTCCCACT
TTCATGGTTCTACCACTTGCGTGTCAAGACCAGGTAAGGTTCTTCGCGTCGCATCGAATTAAGCCACATACTCCACCGCTTGTGCAGGCCCCCGTCAATTTCTTTGAGT
TTTAATCTTGCGACCGTACTTCCCAGGCGGCTTATTTAACGCGTTTGCTACGCCACAAAAGGGGTCGATTCCTTTTACAGCAAATAAGCACCGTTTACAGCTAGG

>CUP1P2B10 Uncultured Planctomyces sp. (Planctomycetacia)
GGCGACTTGGGATGCTCCCCGCTTTCGTGGCTTGACGGGCGGTGTGTACAAGGCTCAGGAACACATTCACCGCAGCATAGCTGATCTGCGATTACTAGCGATTCCGGCT
TCATGCAGGCGAATTGCAGCCTGCAATCTGAACTGGGGGGCGGTTTTTGAGATTTGCTCCCGCTCGCGCGTTCGCGTCCCTTTGTCCGACCCATTGTAGCACGTGTGCA
GCCCTAGGCATAAAGGCCGTGATGACTTGACGTCGTCCCCGCCTTCCTCCGGTTTAACACCGGCGGTCTCTCTAGGGTCCCCAACTGAATGCTGGCAACTAGAGACAGG
GGTTTCGCTCGTTGAAGGACTAAACCCGACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGATCGTTCCACCCGAAGGCGTCATTCCGCTTTCACGGAA
CTAATCCGACCATGTCAAGCCTAGGATAAGGTTCTTCGCGTTGCCTCGAATTGAGCCACATGCTCCACCGCTTGTGTGAGCCCCCGTCAATTCCTTTGAGTTTCAGCCT
TGCGACCATACTCCCCAGGCGGAGCACTTAACACTTTCGCTCCGTTAGGAAGGGCCTACGCCCCTC

>CUP1P2B11 Uncultured bacterium (Não classificada)
TGTTGCCGACTTTCGTGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGTGGTATGCTGACCCACGGTTACTAGCAACTCCTCCTTCATGCAGGCGGGT
TGCAGCCTGCAATCTGAACTGAGGCCGACTTTGCTGGGATTGGCTCCCCCTCGCGGGTTGGCGACCCGTTGTCTCGGCCATTGTAGCGTGTGTGTCGCCCAGGATATCA
GGGCCGTGCTGACTTGACGTCATCCCCACCTTCCTCCACGTTACACGTGGCAGTCTCGCCGGACACTTCAACCGGCGACAGGGAGTAGCGCTCGTTGCGGGACTTAACC
CAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGCGCGCCTCCCTTGCGGGCCCGCCCATCGCTGGACGCTCAGCGCGCATGTCCAACCCTGGTAAGG
TGCTTCGCGTCGCATCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGTCCCCGTCAATTCCTTATGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGACCACTTA
CTGGGTTGCCTCCGGCACGCAACGGGTCGATACGTCGCACACCTAGTGGTCATCGTTTACGGCTAGGACTACCG

>CUP1P2B12 Uncultured forest soil bacterium (Acidobacteria)
GGTTGGCTCACCTGCTTCTAGTGCAACCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTTCTGATCTGCGATTACTAGCGAT
TCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCCCGTTATCCGAGGCGGTCTCACCAGAGTGCTCAACTAAATGGTAGCAACTGG
TAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGCAGCCTATTGCTAGGAAGGATCATTTCT
ACTCCGGTCCACTACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
CCTTGCGACCGTACTCCCCAGGCGGATCGCTTAACGCGTTAGCTTCGGCACGGCGGGATTGGGTACCCGTCACACCAAGCGATCATCGTTTAGGGCTAGGACTACCAGG
GTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTGCATCAGCGTCAGTTGTGGTCCAGTGAGCCGCTTTCGCCACAGGTGTTCCTTCCGATATCTACGCATTTCACCGCT
ACACCGGAAATCCACTCACCTCTCCC

>CUP1P2C01 Uncultured bacterium (Não classificada)
GCCCTCCTTGCGGTTAGGCTACTTGCTTCTGGTGCAATCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGACCCGGGAACGTATTCACCGCAGCAATGCTGATCTGC
GATTACTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGACAGGCTTTATGGGATTGGCTCCGCCTCGCGGCTTAGCGACCCTTTGTACCT
GCCATTGTAGCACGTGTGTAGCCCTGGCCATAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTTCCCAACTAAA
TGATGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTAGGTTCCCGAAGGCA
CCAAGCCATCTCTGGCAAGTTCCTAGGATGCCAAGACCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCC
TTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGACAACTTAACGCGTTAGCTGCGACACCGAGAGGCAGACCCTCCCAACATCTAGTTGTCATCGTTTATGGCGT
GGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCACATGAACGTCAGTATTGGACCAGGAAGTCGCTTTCGCCACTGG

>CUP1P2C02 Uncultured bacterium (Acidobacteria)
CTCACTTCGTGATGTGAGGGCGGTGTGTCAGGCCCGGGAAGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGC
AATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTACCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGG
ACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAAC
CCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACCTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCAGGTGCGCTTCGAGCCCAGGTA
AGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACT
TAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGT
TCCTCAGCGTCAGTAGTGGTCCAGCGCGCCGCTTTCGCCACGGGTGTTCCTGCAGATATCTACGCATTTCACCGCTACACCTGCAATTCCACGCGCCTCTCCCA

>CUP1P2C03 Uncultured Acidobacteria (Acidobacteria)

GGACGCCTGCCTCCTTGCGGTTAGCTCAACGTCTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAGCATGCTG
ATCTGCGATTACTAGCGATTCCAACTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGAACGGTTTTTTCCGATTAGCTCCATCTCGCGACTTTGCAGCGGTTT
GTACCGTCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTTCCGTGCGAGTTCTCA
ACTTAATGTTAGCAACACACGGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCGTGCAGCACCTCGCAGGCAGGAGCCG
GTTATCCGGATCGCCGTGTCTCCACGACTTATCCACCGCATTCTAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCC
CCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGCTGACTTAACGCGTTAGCTCCGGCACCCCCGGACTTAAAACCGGGAACACCAAGTCAGCAT
CGTTTAAGGCTAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTAGCTTTCGCGCATCAGCGTCAGTGTTGGCCCAGCGATCCGCCTTC

>CUP1P2C04 Unidentified eubacterium (Não classificada)
GGTTACACAGCGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGATT
CCGACTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCGGCCATTGTAGCACG
TGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTCAGAGTGCCCAGCTTTACCTGATGGCAACAG
AGAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCGGGAATCGACTTTCGCC
GAGTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTAGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCCAAATTCCTTTGAGTTTCAG
CCTTGCG

>CUP1P2C05 Uncultured bacterium (Acidobacteria)
GGCGTCTGCCTCCTGGCGGTTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGA
TACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTG
TGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCCGTTTATCCGGAGCAGTCCACGTAGAGTTCCCTC
TTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTTACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGC
GGGAAGGCCGTATTTCTACAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGCTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTC
AATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGATACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAG
GGCTAGGACTACCAGGGTATCTAATCCTG

>CUP1P2C06 Uncultured bacterium (Acidobacteria)
GCCTCCCCGAAGGGTTAGCCCTGTCGCTTCTAGTACAACCACTTCGTGATGTGACGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGCGGCATGCTGATCCGCGAT
TACTAGCGATTCCAGCTTCACGGAGTCGAGTTGCAGACTCCGATCCGAACTGAGACAGGCTTTTTCCGATTGGCTCCCTCTTGCGAGTTTGCGGCGGTTTGTACCTGCC
ATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGTTTTATCAACGGCAGTCTCAGTAGAGTGCCCGGCATAACCC
GCTGGCAACTACTGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGCATCCTGCCTGGTTTTACCC
AGGAGACCCCATCTCTGGGGCTGTCAGGAGCATTCTAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAAT
TCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGGGATACTTAATGCGTTAGCGCCGGCACCCGAGGACTATGTAACCTCGGACACCAAGTATCCATCGTTTAA
GGCCAGGACTACCGGGGTATCTAATCCCGTTCGCTCCCCTGGCTTTCGCGCATCAGCGTCAGTGTCGGCC

>CUP1P2C07 Uncultured bacterium (Gammaproteobacteria)
GGTTAGACTACCTACTTCTGGAGCAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGACAATGCTGATTCGCGATTACTAGCGA
TTCCGACTTCACGGAGTCGAGTTGCAGACTCCGATCCGGACTGAGAGAGGTTTTCTGGGATTGGCTTCACCTCGCGGCTTCGCAACCCTCTGTACCTCCCATTGTAGTA
CGTGTGTAGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTTAGAGTTCCCACCATTACGTGCTGGCAAC
TAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGATTCCCGAAGGCACTCCCGCATC
TCTGCAGGATTCCGGACATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGTCTTGCGACCGTACTCCCCAGGCGGCGAACTTAACGCGTTAGCTTCGACACTGAGAGCCAAGTTGCTCCCAACGTCCAGTTCGCATCGTTTAGGGCGTGGACTAC

>CUP1P2C08 Goodfellowia coeruleoviolacea (Actinobacteria)
ACTCATCCCACAAGGGGTAGGCATGGGCTTCGGGTGTACCGACTTCGTGACGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCGTTGCTGATCTGCG
ATTACTAGCGACTCCGACTTCACGGGGTCGAGTTGCAGACCCCGATCCGAACTGAGACCGGCTTTATGAGATTCGCTCCACCTCACGGCTTCGCAGCCCTCTGTACCGG
CCATTGTAGCATGTGTGAAGCCCTGGACATAAGGGGCATGATGACTTGACCTCATCCCCACCTTCCTCCGAGTTGACCCCGGCAGTCTCCCATGAGTCCCCGGCATTAC
CCGCTGGCAACATGGAACGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTACACAGACCTTACGGAAC
CAACATCTCTGCTGGCGTCCTGTGCATGTCAAACCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAATCCACATGCTCCGCCGCTTGTGCGGGCCCCCGTCAATTCCTT
TGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGCGCTTAATGCGTTAGCTACGGCACGGAAACCGTGGAATGGTCCCCACACCTAGCGCCCAACGTTTACGGCGT
GGACTACCAGGGTATCTAATCCTGTTCGCTCCCCACGCTTTCGCTCCTCAGCGTCAGTAACGGCCCAGATACCCGCCTTCGCCACCGGTGTTCCTCCTGATATCTGCGC
ATTTCACCGCTACACCAGGAATTCCAGTCTCCCCTGGCGAACTCAAGTCTGCCCGT

>CUP1P2C09 Uncultured bacterium(Gammaproteobacteria)
CGGTCAGGCTACTGCTTCTGGTGCAATCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGGACGTATTCACCGCAGCAATGCTGATCTGCGATTACTAGCG
ATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGGTTTTCTGGGATTGGCTCCCACTCACGTGTTGGCTTCCCTCTGTACCTACCATTGTAGC
ACGTGTGTAGCCCTGGTCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGCCCAACTAAATGATGGCAACT
AAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAAATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTGGGCTCCTTGCGGGACCCCTAAATCT
CTTCAGGGTTCCCAGGATGTCAAGACCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCA
ACCTTGCGGCCGTACTCCCCAGGCGGAGAACTTAGCGCGTTAGCTGCGACACTTGGA

>CUP1P2C10 Uncultured bacterium (Acidobacteria)
GGTTGGCTCACCGGCTTCTAGTGCAACCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCATTCTGATCCGCGATTACTAGCGAT
TCCAGCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTCTCGCCAGAGTGCCCAACTGAATGATGGCAACTGG
TAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGCAGCCCCATTGCTGGGAAGGGATATTTCT
ACCCCGGTCCACTACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
CCTTGCGACCGTACTCCCCAGGCGGATCGCTTAACGCGTTAGCTTCGGCACGGCGGGATTGGGTA

>CUP1P2C11 Uncultured bacterium (Alphaproteobacteria)
ATCTTCGGGTAAACAACTCCCATGGCTGACGGGCGGTGTGTACAAGGCCCGGGAATGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCACCTTCATGCA
CTCGAGTTGCAGAGTGCAATCCGAACTGGGACGGCTTTTTGGGATCGGCTCCGGGTCGCCCCTTCGCATCCCACTGTCACCGCCACTGTAGCACGTGTGTAGCCCAGCC
CGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTGTCACCGGCAGTTTCTCCAAAGTGCCCAGCTTAACCTGATGGCAACTGGAGACGAGGGTTGC
GCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCGGAGTCCGGCCGAACCGAAGGGACCGTCTCTGGTCCCGGCGAC
TCCCATGTCAAGGGCTGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGCCG
TACTCCCCAGGCGGGGTGCTTAACGCGTTAGCTACGACACTGACGAGCAAGCTCGCCAACGTCTAGCACCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTG
TTTGCTCCCCAAGCTTTCGCGTCTTAGCGTCAGAAACCGTCCAGAT

>CUP1P2C12 Serratia sp. (Gammaproteobacteria)
CCGAAGGTTAGCTACCTACTTCTTTTGCAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGTAGCATTCTGATCCACGATTACTA
GCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGACGTACTTTATGAGGTCCGCTTGCTCTCGCGAGGTCGCTTCTCTTTGTATACGCCATTGT
AGCACGTGTGTAGCCCTACTCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCAGTTTATCACTGGCAGTCTCCTTTGAGTTCCCGGCCGAACCGCTGGC
AACAAAGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATTTCACAACACGAGCTGACGACAGCCATGCAGCACCTGTCTCAGAGTTCCCGAAGGCACCAAAGC
ATCTCTGCTAAGTTCTCTGGATGTCAAGAGTAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCATTTGAGT
TTTAACCTTGCGGCCGTACTCCCCAGGCGGTCTATTTAACGCGTTAGCTCCGGAAGCCACGCCTCAAGGGCACAACCTCCAAATAGACATCGTTTACGGCGTGGACTAC
CAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCACCTGAGCGTCAGTCTTCGTCCAGTGGGCCGCCTTCGCCACCGGTATTCCTCCAGATCTCTACGCATTTCAC
C

>CUP1P2D01 Uncultured bacterium (Acidobacteria)
TGTGGCGACTTCTAGTACAACCGGCTTCGTGATGTGACTGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAAC
TTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGACTTTCTCCGATTAGCTCCCCCTTGCGGGCTCGCGACGGTTTGTATCGGCCATTGTAGCACGTGTGT
AGCCCCAGACATAAAGGCCATGCTGACTTGGCGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTTTGCAGAGTGCCCACCATAACGTGATGGCAACAGCAAAC
AAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGGCCCCTTTCGGGACTGG
TCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCG
ACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGCCACACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGGGTATCTA
ATCCCGTTTGCTCCCCTGGCTTTCGCTCCTCAGCGTCAGTGTTGGTCCAGGATGCCGCCTTCGCCACCGGT

>CUP1P2D02 Uncultured bacterium (Acidobacteria)
ACTTCTAGTACAGCTCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCA
GTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAATTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTACCCTGCATTGTAACACGTGTGTAGCCCTGG
ACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGC
TCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCAGAAG
CATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTAC
TCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACTTCCGAACGGAAGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTT
GCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAACGGTCCAGCGCGCCGCTTTCGCCACGGGT

>CUP1P2D03 Uncultured soil bacterium (Acidobacteria)
GGCGCTGCCTCCCATGCGGGTTAGCGCTGCGACTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGCTGA
TCCGCGATTACTAGCGATTCCAACTTCATGCAGGCGAGTTGCAGCCCGCAATCCGAACTGAGACCGATTTTCTCCGATTAGCCCCACCTTGCGGTATCGCGACGGTTTG
TATCGGCCATTGTAGCACGTGTGTGGCCCCAGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTCAGAGTGCCCAC
CATAACGTGCTGGCAACAGAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACAAGTGTCCTT
GCGGAAGCCGACTTTCGCCGGATGTCACTCGCCGTTCGAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAGTGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGCCANACCAAGCACTCATCGTTTA
GGGCTAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAATGCCGGTCCAGGATGCCGCCTTCGCCACCGGTGTTCCTCCAGATAT
CTACG

>CUP1P2D04 Uncultured bacterium (Acidobacteria)
GTGCTCCTGCGGTTAGCACACCTGCTTCTATACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCCGCGATTA
CTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCACTCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCAT
TGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGACCCGA
TGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCTTTTAAGGGGAAG
GGATGTCTCCACCCCAGTCTCCAGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTT
TGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGATACCTGCTACACCAAGCAATCATCGTTTAGGGCTAG
GACTNACCAGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTATGGTCCAGTGCGCCGGTTT

>CUP1P2D06 Uncultured bacterium (Não classificada)
GGTTCGAATGACGACTTCTAGTACAAACCATTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCCGCGATTACTAGCGATT
CCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGAGCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTGGCGACGCTTTGTACCGCCCATTGTAGCACG
TGTGTTGCCCTGGGCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTCCCTTAGGGTGCTTCCCTTGCGGGCGAGCAACTAA
GGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATCCAGCCGTCCCTTGCGGGAAGATCTCATCTCT
GAGACTGTCAACTAGATTTCGAGTCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
CCTTGCGACCGTACTCCCCAGGCGGAGCACTTAATGCGTTAGCTTCGGCACTGCCCGGTGAAGGGCAACACCCAGTGCTCATCGTTTAGGGCTAGGACTACCAGGGGTA
TCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTC

>CUP1P2D07 Uncultured bacterium (Betaproteobacteria)
GCTTCTGGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGTGACATGCTGATCCACGATTACTAGCGATTCCGACTCCATGC
AGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCATTGTATGACGTGTGAGGCCCTA
CCCATAAGGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGGCAGTCTCACTAAAGTGCCCTTTCGTAGCAACTAGTGACAAGGGTTGCGCT
CGTTGCGGGACTTAACCCAAAACCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCCGGCTCCCTTTCGGGCACTCCCACATCTCTGCGGGATTCCGGGC
ATGTCAAGGGTAGGTAAGGTTAATCGCGTTGCATCGAATTAATCCACATCATCCAGCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTGAATCTTGCGACCGTACT
CCCCAGGCGGTCGACTTCACGCGTTAGCTGCGTTACCGAGAAAATGAATTCCCGACAACTAGTCGACATCGTTTAGGGCGTGGACTAACAAGGTATCTAATCCTGT

>CUP1P2D08 Uncultured bacterium (Não classificada)
GGGAACGTATCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAGCTTCATGCCCTCGAGTTGCAGAGGACAATCCGAACTGAGACGGCTTTTTGAGATTGGCCA
AGGCTTGCGCCTTCGCATCCCACTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCATAAAGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCGGCTTGTCA
CCGGCAGTTCCTTCAGAGTGCCCAGCATAACCTGATGGCAACTGAAGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCC
ATGCAGCACCTGTGCACCGGCCAGCCGAACTGAAGGAGCCGATCTCTCGGCCCCATACCGGGCATGTCAAGAGCTGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCA
CATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTCGCTTATCGCGTTAGCTGCGACACCGAAAGGCTA
AGCCTTCCAACGTCTAGCGCACATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCATGCTTTCGCGCCTCAGCGTCAGTTACGGTCCAGAGAGC
CGCCTTCGCCACCGGTGTTCTTCCCAATATCTA

>CUP1P2D09 Uncultured bacterium (Acidobacteria)
GGTCAGCGTGACGACTTCTAGTACAATCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGAT
TCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACAC
GTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCCCTTACGGGTGGCAACTACG
TGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCTTGTCCCTTGCGGGAGGGCCGTATTTCTA
CAGCTTGTCAAAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
TCTTGCGACCGTACGCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACG

>CUP1P2D10 Uncultured bacterium (Verrucomicrobiae)
GGTTGGCACGGCGACTTCGGGTACAAGCGGCTTCATGATGTGACGGGCGGTGTGTACAAGGCCTGGGAACGTATTCACGGCGCCGTAGCTGATGCGCCATTACTAGCGA
TTCCAGCTTCATGCCGTCGAGTTGCAGACGACAATCTGAACTGGGCCCGGTTTTTGGGGATTTGCTCCATCTTGCGATCTTGCTTCCCTTTGTGCCAGGCATTGTAGTA
CGTGTGCAGCCCTGGCCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCATTTAGATGAGGCAGTCTGTCCAGAGTGCTTCAAACTCTCGTTTGAGTG
GCAACAGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGCAAGCTTTCCTTGCGGAATCGTC
CCACTTTCATGGTTCTACTACTTGCATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAGCCACATACTCCACCGCTTGTGCAGGCCCCCGTCAATTTCTT
TGAGTTTTAATCTTGCGACCGTACTTCCCAGGCGGCATATTTATCGCGTAAGCTTCGCCACAAAAGGGGTCGATTCCTTTTACAGCAAATATGCACCGTTTACAGCTAG
GACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTGCCT

>CUP1P2D12 Uncultured bacterium (Não classificada)
GAGACGGTTACGGCAGAACCGGCTCCATGGTGTGACGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGCGCCGCGATGATGCGCGATTACTAGCGATTCCAGCTTC
ATGTACTCGAGTTGCAGAGTACAATCCGAACTGAGGCGTCTTTTTTGCGATTGGCTTGCCCTTGCGGGTTCGCAGCGCATTGTCAACGCCATTGTAACACGTGTGTAGCC
CAGGATGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCAGTTTCCTCAGAGTTCTCAGCATTACCTGTTAGCAACAGAGGACGAGG
GTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGACTGAGGACAGCCATGCAGCACCTGTGCTCCTCCCACCCGAAGTGAAGGACTCTATTTCTAGGGTCC

ATAGAGGGCATGTCAAATCCTGGTAAGGTTCTTCGCGTTGCCTCGAATTAAACCACATGTTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGC
GACCGTACTCCCCAGGCGGGATGCTTAACGCGTTAGCTACGCCACCGAGGGGGAACCCCCCGACGGCTAGCATCCATCGTTTACAGCGTGGACTACCGGGGTATCTAAT
CCTGTTTGATCCCCACGCTTTCGCGCCTCAGCGTCAGTTGTCGTCCAGATAGCCGCCTTCGCCACCGGTGTTCCTCCTAATATCTACGTATTTCACCAC

>CUP1P2E02 Uncultured bacterium (Acidobacteria)
CGCGGATTCTATACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGGCGTTCTGATCCGCCATTACTAGCGATTCCAGCTTCA
TGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTTTGGGATTGGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGTCCATTGTAGCACGTGTGTAGCC
CTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGGTTATCCCTGGCGGTCTCCTGCGAGTTCCACCTTTCGGTATGGCAACACAGGACAAGGGT
TGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACTACGGTCCCTTGCGGGAAGGCCTGCTTTCACAGACTGGTC
CATAGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGAC
TGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACAGACCAAATGAATGGCCCACACCAAATATGCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCC
TGTTTGCTACCCACGCTTTCGTGCATCAGCGTCAGTTACGGTCCAGAAAGCCGTTTACACCACCGGTGTTCCTCCTGATATCTACGCATTTCACC

>CUP1P2E03 Uncultured bacterium (Betaproteobacteria)
CCCCCTTGCGGTTAGGCAAACGGCTTCTGGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGTGACATGCTGATCCACGATTA
CTAGCGATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCAT
TGTACGACGTGTGAGGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCACTAGAGTGCCCTTTCGTAGCAAC
TAGTGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCCGGCTCCCTTTCGGGCACTCCCACA
TCTCTGCGGGATTCCGGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTT
TTAATCTTGCGACCGTACTCCCCAGGCGGTCGACTTCACGCGTTAGCTGCGTTACCGAGAAAATGAATTCCCGACAACTAGTCGACATCGTTTAGGGCGTGGACTACCA
GGGTATCTAATCCTGTTTGCTCCCCNAGCTTTCGTACATGAGCGTCAGTCTCATCCCAGGGGGCTACCTTCGCCATCGGTGTTCCTCCACATCTCTAAGCATTTCACTG
CT

>CUP1P2E04 Acidobacteria bacterium (Acidobacteria)
CTCCTTGCGGCAGCGTGACGACTTCTAGTACAACTCACTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTAC
TAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATT
GTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCCCTTACGGGTGGC
AACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCGACTCTACTCCCTTGCGGGATAACGACGTTTCCACCGT
ATTTCTACAGCTTGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGA
GTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAGCGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGAC

>CUP1P2E05 Uncultured bacterium (Não classificada)
CTGGGGACTTCTAGTGCAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGNGAACGTATTCACGGTATCATTCTGATATACCATTACTAGCGATTCCAG
CTTCACGCAGGCGAGTTGCAGCCTGCGATCCGAACTGAGAACGGTTTTATGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCTTTGTACCGCCCATTGTAGCACGTGTG
TAGCCCTGGACATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCAACTTATCGCTGACGGTCTCCTGAGAGTGCCCAACTGAACGATGGCAACACAGGACA
AGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTCTACTCCCTTGCGGGATAACGACGTTTCCACCGT
CGTTGAAAAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTT
GCGACCGTACTCCCCAGGCGGCGGACTTAACGCGTTAGCTCCGGCACAGACAGACTGAACTGCCTACACCAAGTCCGCATCGTTCAGGGCGTGGACTACCAGGGTATCT
AATCCTGTTTGCTACCCACGCTTTCGTAACTCAGCGTCAGTAAT

>CUP1P2E06 Uncultured bacterium (Acidobacteria)
CGGTTAGCACACTGCTTCTATACGGCCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCCGCGATTACTAGCGATTCC
AGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCATTGTAGCACGTG
TGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCCCTTTCGTAGCAACTAATGAC
AAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACGGCCATGCAGCACCTGTGTCCAGGTTCTCTTTCGAGCACTCCCACATCTCTGC
AGGATTCCTGGCATGTCAAGGGTAGGTAAGGTTTATCGCGTTGCATCGAATTAAACCAGATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAACCT
TGCGGCCGTAATCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACTGAGAAGGAACCTTCCCAACAACCAGTTGACATCGTTTAGGGCGTGGACTACCAGAGTATC
TAATCCTGTTTGCTCCCCAGGCTTTCGTGCATGAGCGTCAGTGCAGGCCCAGGGGATTGCCTTC

>CUP1P2E08 Uncultured bacterium (Acidobacteria)
CGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTC
TCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGAC
GACAGCCATGCAGCGCCTATACTGCTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCAGCAGCATTTCGAGCCCAGGTAAGGTTC

>CUP1P2E09 Uncultured bacterium (Não classificada)
ACCCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCTAGCTTCATGGAGTCGGGTTGCA
GACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCC
ATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTGTCCGGGGCGGTTTCGCTAGAGTGCCCGCCATAACGCGTTAGCAACTAACGATAAGGGTTGCGCTCGTTGCG
GGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCCTTGCGGGCGCCGATGTTTCCACCGGATTCCACTGCATTTCGAGCC
CAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGG
AACACTTTACGCGTTAGCTCCGGCACG

>CUP1P2E10 Uncultured bacterium (Não classificada)
ATCATGTTTACACCAGTACAATGTGTTATCAATTCAAAATACTACTGACGACACTTCAACCAAATAATAATCCCAGGNCGTGACGGGCAGTGTGTGCAAAATCCAAAAA
CCTATTCACCGTATCTCGCTGCTACACGATTACTAGCGATTCCGCCTTCATATTTTCAACTTGCATAAACTAATCGGAACTACGACAAACTTTAAATATTTTTTCAACT
TTGCAGTTTCACTTTCCTTTGCGTATACCATTGTAACATATAAAACACCCAATCCATAAAGGCCGTAAAGATCAGTCCTAAACCCTTTCACTCGCTATTAACGAGAATC
CCTAATTTTAAGTTAATTTATTAAAAAGTCACGTCTAATAAATTATACCGCACAAATCAGAATTGGCGTTCTGCCCGTTACTGGAATTAACCAAACATCTCACAACACG
AGCTGATGACGACCATGCAACACCTGGGCAAACACCCTAGTAATACACTGTTACACAATATATCACACATCTACGAATATCACGGTAAACGTTATCCTATCTGCTAGCT
AGAATCGGTAAGATCAGCGGGTGCTTTCGCATTACTTTACATGTTCCACCGCTTGTTTGGACTCCCGCCAATTCCTTTGAGTTTAAACCTTGCGATTGTACTCTCCAGG
CGGAATATTTA

>CUP1P2E11 Uncultured Rhodospirillaceae (Alphaproteobacteria)
CCAGAGTGCCCAGCTTAACCTGATGGCAACTGAAGATGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTG
TGTGGACGCCAGCCGAACTGAAGAATGAGATCTCTCCCACCCATACGTCCCATGTCAAGAGCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCG
CTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTGTGCTTAATGCGTTAGCGGCGACACCGAAAGACTAGGTCTCCCGACG
TCTAGCACACATCGTTTACAGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCGCCTCAGCGTCAGTATCGGTCCAGAGAGCCGCCTTCGCCAC
TGGTGTTCTTCCCAATATCTACGAATTTCACCTTCTACACTGGGAATTCCACTCTCCTCTCCCGATCTCAAGCCATCCAGTCCCAAATGCTGTTCCCAGGTTAAGCCCG

GGGCTTTCACATCTGACTTGAATGGCCGCCTGCGCGCCCTTTACGCCCAGTAATTCCGAACAACGCTTGCCCCCTTCGTATTACCGCGGCGGCTGGCACTCAGTCAGTC
A

>CUP1P2E12 Uncultured bacterium (Alphaproteobacteria)
TAAAGCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCGATTCCAACTTCATGTGCTCGAG
TTGCAGAGCACAATCCGAACTGAGACGGCTTTTTGAGATTTGCGCAGGATCGCTCCATTGCATCCCACTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCGTAAG
GGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCCCCTTAGAGTGCCCAACTGAATGATGGCAACTAAGGGCGAGGGTTGCGCTCGTT
GCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGAACTGAAGGGATCGATCTCTCGTTCCCGCGACCGGGAT
GTCAAGGGCTGGTAAGGTTCTTCGCGTTGCTTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCC
CCAGGCGGGATGCTTAAAGCGTTAGCTGCGCCACTGACGAGCAAGCTCGCCAACGGCTAGCATCCATCGTTTACAGCGTGGACTACCAGGGTATCTAATCCTGTTTGCT
CCCCACGCTTTCGCACCTCAGCGTCAGTACCGGGCCAGTGAG

>CUP1P2F01 Uncultured bacterium (Acidobacteria)
GCGTCTGCTCCTTGCGGTTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGC
CCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTG
CGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTGCTGTCCCTTGCGGG
AAGGCCGTATTTCTACAGCTGGTCAGCAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGC
TAGAACTACCAGCGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAATGGTCCAGCGCG

>CUP1P2F02 Uncultured bacterium (Acidobacteria)
GCGTCTGCTCCTTGCGGTTAGCGCGAGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGC
CCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTG
CGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGG
AAGGCCGTATTTCTACAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACTTCCGAACGGAAGGCACCCCAAGTCCTGATCGTTTAGGGC
TAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAACTTTCGTTCCTCAGCGTCAGTAACGGTCCAGCGCGCCGCTTTCGCCACGGGTGTTCCTGCAGATATC

>CUP1P2F03 Uncultured bacterium (Acidobacteria)
GAATCACCGGCTTCTAGTACAACGGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCTGCTTGCTGATCAGCGATTACTAGCGATTCCA
GCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGAGTGGTTTTTTGAGATTGGCTCCCCCTCGCGGGTTTGCGACTCTTTGTGCCACCCATTGTAGTACGTGT
GTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTTTCACCGGCAGTCCCTTTAGAGTGCCCAGCTTGACCTGTTGGCAACTAAAG
GCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTAGTGTCCCTTGCGGGAAAAGGATGTTTCCAC
CCCTGTCACCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCC
TTGCGACCGTACTCCCCAGGCGGGATACTTAATGCGTTAGCTTCGCCACGACTGGATTCAATCCCAGTCACAGCAAGTATCCATCGTTTAGGGCTAGGACTACCAGGGT
ATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGACTCTGTCCAGATAGCCGCCTTGG

>CUP1P2F04 Uncultured bacterium (Anaerolineae)
GCAGTGGCATCCTGCGGTTTGCTCGCTGACTTCAGGCGTGACCAGCTCCCATGACGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGTATGGCTGACC
TGCGGTTACTAGCAACTCCGACTTCATGAGGGCGGGTTGCAGCCCTCAATCCGAACTGAGACCGGCTTTGTTTGGATTGGCTCCGCCTTGCGGCTTGGCGACCCATTGT
ACCGGCCATTGTAGCGTGTGTGTAGCCCTGGATATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCCGCTTGTCACGGGCAGTCGGTTCAGACACGTATAA
CTGAACCCGGGGGTTGCGCTCGTTACAGGACTTAACCTAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTACGGCCTCCTTGCGGTCGCTCCCCTTTC
GGTTCGCTACTAGCCGTATGTCAAACCCAGGTAAGGTTCTTCGTGTAGCCTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTT
AACCTTGCGGTCGTACTTCCCAGGTGGTCGACTTATCGCGTTGGCTGCGGCACCGACGGGGTTGAGACCGCCGACGCCTAGTCGACATCGTTTACGGCATGGACTACCG
GGG

>CUP1P2F05 Burkholderia sp. (Betaproteobacteria)
CTACGTGGTGACGTCTCCTTGCGGTTAGACTAGCCACTTCTGGTAAACCCATCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGC
TGATCCGCGATTACTAGCGATTCCAGCTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCT
CTGTTCCGACCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTGGAGTGCT
CTTGCGTAGCAACTAGGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGATGGCTCCCTTTC
GGGCACCCCCAGCTCTCACCGGGGTTCCATCCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCA
ATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACCAAGCCAATGAAGGCCCGACAACCAGTTGACATCGTTTAGG
GCGTGGACTACCAGCGTATCTAATCCTGTTTGCTCCCCAAGCTTTCGTGCATGAGCGTCAGTA

>CUP1P2F06 Dyella japonica (Gammaproteobacteria)
TCCGTGGTCGCGTCCCCTTGCGGTTAGACTACGGCTTCTGGAGCAACTCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCATAG
CTGATCTGCGATTACTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTGGGATCGGCTTTCTGGGATTGGCTCCACCTCGCGGTATTGCAACCC
TCTGTACCGACCATTGTAGTACGTGTGTAGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTTAGAGTTC
CCACCATTACGTGCTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCTGAT
TCCCGAAGGCACTCCCGCATCTCTGCAGGATTCCAGACATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCC
CCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGGCGAACTTAACGCGTTAGCTTCGACACTGATCTCCGAGTTGAGACCAACATCCAGTTCGCAT
CGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGGTCCCCAAGCTTTC

>CUP1P2F07 Uncultured bacterium (Não classificada)
GGTTCGAATGACGACTTCTAGTACAAACCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTCACCGCGGCGTACTGATCCGCGATTACTAGCGAT
TCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGAGCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTGGCTACGCTTCGTACCGCCCATTGTAGCAC
GTGTGTTGCCCTGGGCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTCCCTTAGGGTGCTTCCCTTGCGGGCGAGCAACTA
AGGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATCCAGCCGTCCCTTGCGGGAAGATCTCATCTC
TGAGACTGTCAACTAGATCTCGAGTCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GCCTTGCGAACGTACTCCCCAGGCGGAGCACTTAATGCGTTAGCTTCGGCACTGCCCGGTGAAGGGCAAAACCCAGTGCTCATCGTTTAGGGCTAGGACTACCA

>CUP1P2F08 Uncultured bacterium (Acidobacteria)
GGCGGTGCTCCCTTTCGGTCAGCGCACGACTTCTATGCAACCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCATTCTGATCCGC
GATTACTAGCGATTCCAGCTTCATGTAGTCGAGTTGCAGACTACAATCCGAACTGAGGACGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCG
GCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGTCAGAGTGCTCAACTAAA
TGGTAGCAACTGAAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACTACGGCCCCTTGCGGGG
AAGGAATATTTCTACTCCGGTCCATAGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTC
CTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGACTGCTTAACGCGTTAGCTACGGCACGGCGGGATTGGGTACCCGTCACACCAAGCAGTCATCGTTTAGGGC
TAGGACTACCAGGGTATCTAATCCTGTATGCTCCCCTAGCTTTCGTGCATCAGCGTCAGTTATGGTCCAGTGAACCGCTTTCGCCAC

>CUP1P2F09 Uncultured bacterium (Não classificada)
TACTTAGACGGTCCCTCTCTTGCGAGTTAGGCCACGGCTTCGGGTGCAGACAATTCAGGTGACTTGACTGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGTT
TAGCTGACCTGCGGTTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGGACGGATTTTTGCGATTGCCTCCCCCTCACGGGATCGGGA

CGCTCTGTCGCCGTCCATTGTAGCATGTGTGAAGCCCCAGGCGTAAGGGCCATGCCGACTTGACGTCATCCCCACCTTCCTCCCGCTTGCACGGGCAGTTCCGTAAGAG
TTCCCGACTTTACGCTGGCAACATACGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAACACCTGTCTTCGGG
CTTGCTTGCGCAAGGGGACTGCTTTCACAGCCTTTCCCTCGATGTCAAGCCTGGGTAAGGTTCTTCGGTTAGTGACGAATTAATCCACATGCTCCACCGCTTGTGCGGG
CCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGAGTGCTTACTGCGTTGGCGACGGCACCCGGGGGGTCGATACCCCGAACACCTAGCACT
CATCGTTTACGGCGTGGACTACCGGGGTATCTAATCCCGT

>CUP1P2F10 Acidobacteria bacterium (Acidobacteria)
GGTCAGCGCACCGGCTTCTAGTACAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGNGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCGA
TTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGATGACTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTATCACCCATTGTAGCA
CGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCGCCAGAGTGCCCAACTAAATGATGGCAACTG
GCAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTACGCAGCAGTCCCCTTGCGGGAAAGCGATATTTC
TACCGCAGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTTCGGCACAACAGGATTGGGTACCTGTTACACCAAGCAATCATCGTTTAGGGCTAGGACTACCAG
GGTATCTAATCCTGTTTGCTCCCCCTAGCTTTCGCGCC

>CUP1P2F11 Uncultured bacterium (Não classificada)
GACGGCTGGCTCCTTGCGGCTACCCCACCGGCTTCGGGTGCAGACAACTCAGGTGACGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCAACGCAGTTTCGCTG
ACCTGCGTTTACCAGCGATTCCGGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGATTTCTGAGATTGCCTCCACCTCACGGTCTCGGATCCCTCT
GTGCACCGTCCATTGTAGCATGTTTGTAGCCCAGGATGTAAGGGCCATGCTGACTTGACGTCGTCCTCACCTTCCTCCGAGTTACCCCGGCAGTTTCCCAAGAGTTCCC
GTCTTCACGCGCTGGCAACATGGGATGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGCGTGTCC
CCTTGCGGGGAAGGCTACTTTCATAGCATAGCACGCCATGTCAAACCCTGGTAAGGTTCTACGGTTAGTGACGTATTAAGCAACATGCTCCACCGCTTGTGCGGGCCCC
CGTCAATTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGGATACTTACTGCGTTAGCGGCGGCACCGGGGGGGGTCGATACCCCCGACACCTAGTATCCATC
GTTTAGGGCTGGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCCAGCTTTCGCGCCTCAGCGTCAAGTGTGCCCCAGGAGACCGCCTTCGCCACTGGTGTTCCTACC
GATATCTACGCATTTCACC

>CUP1P2F12 Uncultured bacterium (Acidobacteria)
TAACTTCATGCCGGCGATTGCAGCGACAATCCGAACTGAACAGACTTATCCGATAGCTCCACCTTACGGTCTCGCGACGGTTTGTATCTGCCATTGTAGCACGTGTGTA
GCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCTGGCAGTCTCTGCAGAGTTGCCCACCATAACGTGATGGCAACAGCAGA
CAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGCTCACTTTCGTGAGTG
GTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGC
GACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGGCACACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGGGTATCT
AATCCCGTTT

>CUP1P2G01 Uncultured bacterium (Acidobacteria)
GGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTAACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTACTAGCGA
TTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCATTGTAGCA
CGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGACCCGATGGCAAC
TAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCTTTTAAGGGGAAGGGATGTT
TCCACCCCAGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
CAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGATACCTGCTACACCAAGCAATCATCGTTTAGGGCTAGGACTACC
AGNGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTATGGTCCAGTGCGCCGCTTTCGCCACAGGTGTTCCTCCCGATATCTACGCAT

>CUP1P2G02 Uncultured bacterium (Não classificada)
GCTCAGGGTTGCGACTTCGTGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGTGGTGTGCTGACCCACGGTTACTAGCAACTCAGCCTTCAGGCAGGC
GAGTTGCAGCCTGCCATCCGAACTGAGACCGCCTTTTGGGATTGGCTCCCCGTCGCCGGTTCGCTTCCTACTGTCGCGGCCATTGTAGCGTGTGTGTCGCCCAAGACGT
CGGGGCCGTGCTGACTTGACGTCATCCCCACCTTCCTCCACGTTACTCGTGGCAGTCTGGTCGGACACTTATAACCGACCACAGGGGTTGCGCTCGTTGCGGGACTTAA
CCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGCGCCTGTCCCGAAGGAAGCCTCGTCTCCGAGGTGCTCAGGCGCATGTCAAGCCCTGGTAAGG
TTCTTCGCGTCGCTTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTAATCTTGCGACCGTACTCCCCAGGCGGACCACTTAT
TGCGTTTGCGTCGGCACGCAGCGGGTCGATACGCCGCACACCTAGTGGTCATCGTTTACGGCCAGGACTACCGGGGTATCTAATCCCGTTCGTTCCCCTGGCTTTCGCC
CCTCAGCGTCAGGTGCCTCCCAGGACACTGCCTTCGCCTTTGGTGTTCCTCCGGATCTCT

>CUP1P2G03 Uncultured bacterium (Gammaproteobacteria)
GGTTAGACTACCCGCTTCTGGAGCAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGACAATGCTGATTCGCGATTACTAGCGA
TTCCGACTTCACGGAGTCGAGTTGCAGACTCCGATCCGGACTGAGAGAGATTTTCTGGGATTGGCTTCACCTCGCGGCTTCGCAACCCTCTGTATCTCCCATTGTAGTA
CGTGTGTAGCCCTGGTCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTAGAGTTCCCACCATTACGTGCTGGCAAC
TAGGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGATTCCCGAAGGCACTCCCGCATC
TCTGCAGGATTCCGGACATGTCAAGACCAGGTAAGGCTCTGCGCGTTGCATCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGTCTTGCGACCGTACTCCCCAGGCGGCGAACTTAACGCGTTAGCTTCGACACTGAGTGGCTAAGTCCACCCAACGTCCAGTTCGCATCGTTTAGGGCGTGGACTACCA
GGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCCTCAGCGTCAGTGCTGGTCCAGATGGCC

>CUP1P2G04 Uncultured soil bacterium(Alphaproteobacteria)
GGGCGGTACCCCTTGCGGTTGGCGCACCGACTTAAGGCCAAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTAGCTGA
TCCGGATTACTAGCGATTCCACTTCATGCACTCGAGTTGCAGAGTGCAATCTGAACTGAGACGGCTTTTCGGGATCGGCTCGGCCTCGCGACCTGGCATCCCGCTGTCA
CCGCCATTGTAGCACGTGTGTAGCCCAGGACATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTGTCACCGGCAGTTCCTTCAGAGTGCCCACCCA
AACGTGCTGGCAACTGAAGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCGGGAGGCCCTTGC
GGGAACACTCATCTCTGAGTGCGTCCTCCCCATGTCAAGCCCTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGTGTGCTTATCGCGTTAGCTACGACACTGAAGGGCTAGGCCCCCCAACATCCAGCACACATCGTTTACA
G

>CUP1P2G05 Dyella marensis (Gammaproteobacteria)
CAAGGCCCGGGAACGTATTCACCGCAGCATAGCTGATCTGCGATTACTAGCGATTCCGACTTCATGAAGTCGAGTTGCAGACTTCGATCCGGACTGGGATCGGCTTTCT
GGGATTGGCTCCACCTCGCGGTCTTGCAACCCTCTGTACCGACCATTGTAGTACGTGTGTAGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCT
CCGGTTTGTCACCGGCAGTCTCCTTAGAGTCCCCACCTTTACGTGCTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGC
TGACGACAGCCATGCAGCACCTGTGTTCTGATTCCCGAAGGCACTCCCGCATCTCTGCAGGATTCCAGACATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAAT
TAAACCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGGCGAACTTAACGCGTTAGCTTCGACACTGA
TCTCCGAGTTGAGACCAACATCCAGTTCGCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCAAGCTTTCGTGCCTCAGCG

>CUP1P2G06 Uncultured Holophaga (Acidobacteria)
TCTGATACGCCATTACTACGATCGGCTTCATGCAGTCGAGTTGCAGATGCAATCCGAACTGAGCGCGGTTTTCCGATTAGCTCCCCCTCACGGGTTCGCGACGGTTTGT
ATCGCGCATTGTAACACGTGTGTAGCCCTGGACAATAAAGGCCGTGCTGACTTTGACGTCATCCCCACCTTCCTCTCCGGNTTATCCGGAGCAGTCCTCTTAGAGTTCC
CCCTTGCGGGTGGCAACTAAGAGTAGGGGTCGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACCGGTGTCTCT
TGCGAGAAGGCGATGTTTCCACCGCTGGTCACCGGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCC
GTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGCAGGACTTAACGCGTTAGCTCCGGGACGACCCGCCAACGCGGGCCATCCCAAGTCCTGATGGTT
TAGGGCTAGGACTACCAGNGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGT

>CUP1P2G07 Uncultured bacterium (Não classificada)

AGGTGTCACGGCTTCCATGGTGTGACGGGCGGTGTGTACAAGACCGGGAACGTATCACCGCAGTGTGCTGACCTGCGATTACTAGCAACTCCACCTTCATGGCGGCGGG
TTGCAGCCGCCAATCTGAACTGGGGCNGCTTTGCTGGGATGGCTAGGCGTGTCCGCTTGCTGCCCGTTGTACCAGCCATTGTAGCGTGTGTGTAGCCCGGGACGTAAGG
GCCGTGCTGACTTGACGTCTCCCCACCTTCCTCCGCGTGCGCGCGGCAGTCTCGCTGGAAAAATACAACCAGCGACAGGGGTTGCGCTCGTTAGGGGACTTAACCCAAC
ACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGCCAGCGTCCCTTGCGGGTACGAGCATCTCTGCCCGGTGCGCTGGCATGTCAAACCCCGGTAAGGTTCT
TCGCGTTGCATCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGTCTACTTATGCGT
TAGCTGCGACAGAGACAGGGTCGAAACTGCCTCTATCTAGTAGACATCGTTTACAGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCAGGCTTTCGCGCCTGA
GCGTCAGCAGTCGGCCAGGGCATTGCCTTCGCCATTGGTGTACTTCCGGATCTCTACGCATTTCACCGTTCCACCCGGAGTTCCATGCCCCTCTCCGACGCTCAA

>CUP1P2G08 Uncultured bacterium (Verrucomicrobiae)
CATACTTCGGCACTTTAAGGGGCGACTTCGGGTAAAACGGCTTCATGATGTGACGGGCGGTGTTACAATGCCTGGGAACGTATTCACGGCGCCGTAGCTGATGCGCCAT
TACTAGCGATTCCAGCTTCATGCTGTCGAGTTGCAGACAACAATCTGAACTGGGCCCGGTTTTTGGGGATTTGCTCCACCTTACGGTCTCGCTTCCCTCTGTGCCGGGC
ATTGTAGTACGTGTGCAGCCCTGGTCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCGTTGAAGCGAGGCAGTCTGTCCAAAGTGCTCCAGCCTCTC
GGCCGGGTGGCAACAGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGAAACGAACTGACGAAAGCCATGCAGCACCTGTGCAAGCTCCCCTTTG
CGGGGTCGTCCCACTTTCATGGTTCTACCACTTGCATGTCAAGACCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAGCCACATACTCCACCGCTTGTGCAGGCCCCCG
TCAATTTCTTTGAGTTTTAATCTTGCGACCGTACTTCCCAGGCGGCGTATTTAATGCGTTTGCTACGCCACAAAAGGGGTCGATTCCTTTTACAGCAAATACGCACCGT
TTACGGCTAGGACT

>CUP1P2G09 Uncultured bacterium (Não classificada)
GCACCGGCTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGCGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAGCT
TCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGGGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCCACGGTTTGTACCGGCCATTGTAGCACGTGTGTA
GCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCAGTTTCGCTAGAGTGCCCGGCTTGACCCGTTGGCAACTAGGGATA
AGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTCTCTTGCGAGAAAGGGATGTTTCCACCCC
GGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTCTCAGCCTTG
CGACCGTACTCCCCAGGCGGAATGCTTATCGCGTTAACTTGCGGCACGATCGGAATTGGATACCGATCACACCAAGCATTCATCG

>CUP1P2G10 Uncultured actinobacterium (Actinobacteria)
TTCGACGGCTCCTTCCTTGCGGTTAGGCCACCGGCTTCGGGTGTTACCAACTTTCGTGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCCCGGCGTAGC
TGATCCGGGATTACTAGCGACTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGACCGGCTTTTTGGGATTCGCTCCTCCTCGCGGATTAGCAGCCCT
TTGTACCGGCCATTGTAGCATGTTAGCAGCCCTACGCGTAAGGGGCATGCAGACTTGACGTCATCCCCACCTTCCTCCGAGTTGACCCCGGCAGTCTCCTACGAGTCCC
CGGCATTACCCGCTGGCAACATAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTATCGCAGGCCC
TTTCGGACACCGTGTCTCCACGGCTTTTCCTGCGTAGTTCAACGTAGGTAAGGTTCTTCGCGTTGCATCGAATTAAGCAACATGCTCCGCCGCTTGTGCGGGCCCCCGT
CAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCTACGGCACAGAGAGC

>CUP1P2G11 Uncultured bacterium (Acidobacteria)
ATACTTAGGCACTGCCCCCTGCGGGTAGCGCAGTGACTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGT
GCTGATCCGCGATTACTAGCGATTCCAACTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCCCTCTTGCGAGATCGCGACG
GTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCCGCAGAGTG
CCCACCATAACGTGATGGCAACAGCGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACATCGG
CCCTTGCGGGAGCCTGCTTTCGCAGGATGTCCAATGCCGTTCGAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCC
CGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGNCANACCAAGCATTCATC
GTTTAGGGCTAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTAGCTTTCGCCGTTCAGCGTCAATGTCGGTCCAGGATGCCGCCTTCGCCACCGGTATTCCTCCA
GATATCTACGC

>CUP1P2G12 Uncultured Verrucomicrobia (Verrucomicrobiae)
CATACTTCGGCACTGTCTCCTTGCGGTTACACATTGACTTCGGGTACAACCGGCTTCATGATGTGACGGGCGGTGTGTACAAGGCCTGGGAACGTATTCACGGCGCCGT
AGCTGATGCGCCATTACTAGCGATTCCAGCTTCATGCCGTCGAGTTGCAGACGACAATCTGAGCTGGGCCCGGTTTTTGGGGATTTGCTCCACCTTGCGGTCTCGCTTC
CCCTTGTACCGGGCATTGTAGTACGTGTGCAGCCCTGGCCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCGTTTAAGCGAGGCAGTCTGTCCAGAG
TGCTTCGAACTCTCGTTCAAGTGGCAACAGGACATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTG
CAAGCTGGTATTGCTACCTCGTCCCACTTTCATGGTTCTACTACTTGCATGTCGAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAGCCACATACTCCACCGCTT
GTGCAGGCCCCCGTCAATTTCTTTGAGTTTTAATCTTGCGACCGTACTTCCCAGGCGGCATATTTAACGCGTTGGCTACGCCACAAAAGGGGTCGATTCCTTTTACAGC
AAATATGCACCGTTTACGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTGCCTCAGTGTCAGAAGTTGTCCAGAGACTCGCCTTCGCCACTG
GTGTTCCCCTTGATATCTACGCATTT

>CUP1P2H01 Uncultured bacterium (Não classificada)
CGACGCCTGCCTCTCTTGCGAGTTAGCCCAGCGGCTTCAGGGGTTGCCGACTTTCGTGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCNGTGGTGTG
CTGACCCACGGTTACTAGCAACTCCGCCTTCAGGCAGGCGAGTTGCAGCCTGCCATCCGAACTGAGACCGCCTTCTGGGATTGGCTCCCCGTCGCCGGTTCGCTTCCTA
CTGTCGCGGCCATTGTAGCGTGTGTGTCGCCCAGGACGTCGGGGCCGTGCTGACTTGACGTCATCCCCACCTTCCTCCACGTTACTCGTGGCAGTCTGGTCGGACACTT
ATAACCGACCACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGCGCCTGTCCCGAAGGAAGCCTCG
TCTCCGAGGTGCTCAGGCGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTCGCTTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGTCCCCGTCAATTCCTCTGAGT
TTTAATCTTGCGACCGTACTCCCCAGGCGGACCACTTATTGCGTTTGCGTCGGCACGCAGCGGGTCGATACGCCGCACACCTAGTGGTCATCGTTTACGGCCAGGACTA
CCGGGGTATCTAATCCCGTTCGCTCCCCTGGCTTTCGCCCCTCAGCGTCAGGTGCCTCCCAGGACACTGCCTTCGCCTTTGGTGTTCCTCCGGATCTCTACGCATTTCA
CCGGTCCACCCGGATTCCATGTCCTCTGAGGCCTCCAGT

>CUP1P2H02. Burkholderia sp. (Betaproteobacteria)
GGTTAGACTAGCCACTTCTGGTAAAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTACTCACCGCGGCATGCTGATCCGCGATTACTAGCGA
TTCCAGCTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCTCTGTTCCGACCATTGTATGA
CGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTAGAGTGCTCTTGCGTAGCAACTAGGGAC
AAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTACGGCTCCCTTTCGGGCACTCCCACCTCTCAGC
AGGATTCCGTACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCT
TGCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACCAAGTCAATGAAGACCCGACAACTAGTTGACATCGTTTAGGGCGTGGACTACCAGGGTATC
TAATCCTGTTTGCTCCCCATGCTTTCGTGCATGAGCGTCAGTATTGGCCC

>CUP1P2H03 Uncultured bacterium (Alphaproteobacteria)
GTCGGTAGCTCTCTTGCGAGTTACCCCACCGGCTTCGGGTAAAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCATGCTG
ATCCGCGATTACTAGCGATTCCGACTTCATGCTCTCGAGTTGCAGAGAGCAATCCGAACTGAGACGGCTTTTCGAGATTGGCTTGGCATCACTGCCTCGCGTCCCTCTG
TCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCATAAGGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCGGCTTGTCACCGGCAGTTTCCGCAGAGTGCCCAG
CTCAACATGCTGGCAACTGCGGATGGGGGTTGCGCTCGTTGCGGGACTTAACCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGCCAGC
CGAACTGAAGAAGTGGGTCTCCCCACCCCATACGGGACATGTCAAGGGCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCC
CTGTCAATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTGTGCTTACCGCGTTAGCTGCGACACCGAAAAGCTAGGCTCCCCAACGTCTAGCACACATC
GTTTACAGCGTGGACTACAGGGTATCTAATCCTGTTTGTCCCCAAGCTTTCGCGCCTCAGCGTCA

>CUP1P2H04 Burkholderia sp. (Betaproteobacteria)
ACTTCTGGTGAAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCAGCTTCACGC
AGTCGAGTTGCAGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCTCTGTTCCGACCATTGTATGACGTGTGAAGCCCTA
CCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTTAGAGTGCTCTTGCGTAGCAACTAAGGACAAGGGTTGCGCTCG
TTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCGCCGGTTCTCTTTCGAGCACTCCCGCCTCTCAGCAGGATTCCGACCAT

GTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCC
CCAGGCGGTCAACTTCACGCGTTAGCTACGTTACTAAGGAAATGAATCCCCAACAACTAGTTGACATCGTTTAGGGCGTGGACTACCAGNGTATCTAATCCTGTTTGCT
CCCCACGCTTTCGTGCATGAGCGTCAGTGTTGGCCCAGGAG

>CUP1P2H05 Uncultured bacterium (Acidobacteria)
GGTTAGCGTGACGACTTCTAGTACAGTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATT
CCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTACCCTGCATTGTAACACG
TGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCCTGCGAGTGGCAACTACGT
GCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACTACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCTAC
AGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTCTCAGT
CTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACTTCCGAACGGAAGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGGTA
TCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCCGTAACGGTCCAGCGCG

>CUP1P2H07 Burkholderia sp. (Betaproteobacteria)
CACTCCCATGGTGTGACGCGGTGTGTACAAGACCCGGGAACGTATCACCGGGATGCTGATCCGGATTACTACGATTCCAGCTTCACGCAGTCGAGTTGCAACTGCGATC
CGGACTACGATCGGTTCTGGGATTGGCTCACTCGCGGTTGGACCTCTGTCCGACGTTGTATGACGTGTGAACCCTACCATAAGGGCCATGAGACTTGACGTCATCCCCA
CTTCCTCCGGTTTGTCACCGGCAGTCTCCTTAAGTGCTCTTGCGTACAACTAAGGACAAGGTGCGCTCGTTGCGGGACTTACCCAACATCTCACGAACGAGCTGACGAC
AGCCATGCAGCACCTGTGCGTCGGTTCTCTTTCGAGCACTCCCGCCTCTCAGCAGGATTCCGACCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATC
CACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACTAAGGAAA
TGAATCCCCAAGAACTAGTTGACATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGGTCCCCAAGCTTTCGTGCATGAGCGTCAGTGTTGGCCCAGGAGG
CTGCCTTCGCCATCGGTATTCCTCC

>CUP1P2H08 Uncultured bacterium (Alphaproteobacteria)
TTCGGGTAAACAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCACTC
GAGTTGCAGAGTGCAATCCGAACTGAGACGACTTTTAGGGATTGGCTCCCCTTCGCAGGTTCGCAACCCTCTGTAGTCGCCATTGTAGCACGTGTGTAGCCCACCCCGT
AAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTACCACCGGCGGTCCCATTAGAGTGCCCAACTAAATGATGGCAACTAATGGCGAGGGTTGCGCTCG
TTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCCTGCCCCCGAAGGGGAAACTGCATCTCTGCAGCGATCAGGGCATGT
CAAAAGGTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTCGAGTTTTAATCTTGCGACCGTACTCCCC
AGGCGGAGTGCTTAATGCGTTAGCTGCGTCACCGACATGCATGCATGCCGACAACTAGCACTCATCGTTTACGGCGTGGACTACCAGNGTATCTAATCCTGTTTGCTCC
CCACGCTTTCGCGCCTCAGCGTCAGTATCGGGCCAGTGAGTCGCCTTCGCCACTGGTGTTCCGCCGAATATCTACGAATTTCACCTCTACACTCGGCATTC

>CUP1P2H09 Uncultured bacterium (Não classificada)
CCTTCGGCGCCTCCGTCCCTCACGGGTTCGGCCAGCGACTTCGGGAGCACAGATTCAAGTGATGTGACGGGCGGTGAGTGCAAGGCCCGGGAAACGTATTCACCGCAGT
GTGCTGACCTGCGGTTACTAGCAACTCCGACTTCATGCTGGCGAGTTGCAGCCAACAATCCGAACTGAGACCGGCTTTAAGGGATTGCCTTCACGTCGCCGTGTTGGAA
CCCGTTGTACCGGCCATTGTAGCGTGTGTGTAGCCCTGGACATAAGGGCATGCGGACTTGACGTCATCCCCACCTTCCTCCGGGTTTCGCCCGGCAGTCTCCATAGAAA
ATTCAACTAAGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCACCACCTGTGTAGAAACCTCTTGCGAGGGGC
GCTGGCTTTCACCAGCGTTTCTTCTACATGTCAAGCCCAGGTAAGGTTCTTCGCGTTGCCTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGCCCCCGCCTATTCC
TTTGAGTTTTAACCTTGCGGCCGTAGTCCCCAGGCGGCGAACTTAATGCGTTAGCTGCGGCACTGATCGGGTCAATCCGACCAACACCTAGTTCGCAACGTTTAGGGCG
TGGACTACCCGGGTATCTAATCCGGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGT

>CUP1P2H10 Uncultured actinobacterium (Acidobacteria)
AGCGCCTGCTCCTTAGGTTGGCACGGCGATTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGCCGTTCTGATGC
GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTGCGATTAGCTCCCCCTCGCGGGTTCGCGACGCTTTGTGG
CGCGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACCTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTCGTAGAGTTCCCCCTTG
CGGGTGGCAACTACGAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACACAGGTCCCTTGCGGG
AAGTCCCTATTTCTAGGGAGGGTCCTGTGCGGTTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGCAGGACTTAACGCG

>CUP1P2H11 Uncultured bacterium (Acidobacteria)
GGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGCCGTGCTGATGCGCCATTACTAGCGATTCCGGCTTCATGCAGCCGAGTTGCAGACTGCAATCCGAACTGAGC
GCGATTTTTTGCGATTAGCTCCCCCTCGCGGGTTCGCAGCGCTTTGTGTCGCGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCC
CCACCTTCCTCTCCGTTATCCGGAGCAGTCCCCTTAGAGTTCCCCCTTGCGGGTGGCAACTAAGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGG
CACGAGCTGACGACAGCCATGCAGCACCTCCGTACCTGTCCCTTGCGGGAAGTGCCTGCTTTCGCAGACTGGTCAGGCACGCTTCGAGCCCAGGTAAGGTTCTTCGCGT
TGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGGCCGTACTCCCCAGGCGCAGGACTTCACACGTTAGCT
CCGACACGGGCTCCGAACGGGACCCACGCCAAGTCCTGATGGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTCTCTCAGCGTCAG
TTGCGGTCCAGTGAG

>CUP1P2H12 Bdellovibrio sp. (Deltaproteobacteria)
TGCCTCCTTGCGGTTAGCGCAGCGACTTCTGGTACAACCAACTTTCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATTCTGATCCGCGA
TTACTAGCGATTCCAACTTCATGGTCTCGAGTTGCAGAGACCAATCTGAACTTAGATAGCTTTTCTCCGATTAGCTCCATCTCGCGACTTCGCTTCAGTTTGTGACTAC
CATTGTAGCACGCGTGTAGCCCTAGGCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTAACACCGGCAGTCCATCTAGAGTGCCCAACTGAATG
CTGGCAACTAAATGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTACCGACTCTTGCGAGCTAC
GGCGTTTCCGCCAATATTCCAGTACATGTCAAGCCTAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTTCTT
TGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGGATACTTAACGCGCTAGCTTCGTCACTGAAGGGGTCAATACCTCCAACAACAAGTATCCATCGTTTATGGTGCG
GACTACCAGGGTATCTAATCCTGTTTGATCCCCGGACTTTCGGGTCTGAGTGTCCGTGTCTAGCCAGA

>CUP1P3A01 Uncultured bacterium (Betaproteobacteria)
GCTCCTTGCGGTTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATT
ACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCA
TTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTG
GCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCC
GTATTTCTACAGCTGGTCAGAAGCATTTCGAGCCCAAGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGAC
TACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTC

>CUP1P3A02 Uncultured bacterium (Não classificada)
GCTCAGCCGCTCTAGCACAGCCACTTCGTGATGTAGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCACCTTC
ATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGACAGGCTTTTTGCGATTGGCTCCCCCTCGCGGGCTTGCTGCGCTTTGTGCCTGCCATTGTAGCACGTGTGTAGC
CCTGGACATAAAGGCCATGGTGACTTGACGTCGTCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCCCACTAGAGTGCCCAACTCAATGCTGGCAACTAGTGGTAAGGG
TTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCGTCCTACCTCCCCCGAAGGGAAGCCTCATCTCTGAGGCGGCAAG
GTAGGATTTAACCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGT
ACTCCCCAGGCGGGATACTTAACGCGTTAGCTCCGGCACGCGGGGACTTAGAGAACCCC

>CUP1P3A03 Uncultured soil bacterium (Não classificada)
TTCAGGTACTCCCAACTTCCATGGCTTGACGGGCGGTGTACAAGGCCCGGGAACGTATTCACCGCATCATGGCTGATATGCGATTACTAGCGAATCCAGCTTCATGAG
GTCGAGTTGCAGACCTCAATCCGAACTGAGACCGGTTTTAAAGATTAGCATCATGTTACCATGTAGCTGCCCTCTGTACCGGCCATTGTAGCACGTGTGTAGCCCAGGA

CGTAAGGGCCGTGATGACTTGACGTCATCCCCACCTTCCTCACCGCTTGCGCGGGCAGTCTCATTAGAGTCCCCAGCTTAACCTGTTGGCAACTAATGATAGGGGTTGC
GCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTAGTTTCAGGTCATTGCTGACTGACATATTTCTACATCATTCCTTAAC
TTTCAAGCCCTGGTAAGGTTCCTCGCGTATCATCGAATTAAGCCACATGCTCCTCCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGTCGTACTC
CCCAGGTGGATTACTTAATGCTTTCGCTCAGACGCGTACGGCGTATTGCACACATCGAGTAATCATCGTTT

>CUP1P3A04 Uncultured Bradyrhizobium sp.(Alphaproteobacteria)
ACCAGTCGCTGACCTACGTGGCGGTGCTCCTTGCGGTTAGCGCACCGTCTTTATGTAAAACAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATC
ACCGTGGCGTGCTGATCCACGATTACTAGCGATTCCAACTTCATGGGCTCGAGTTGCAGAGCCCAATCCGAACTGAGACGGCTTTTTGAGATTTGCCAGTGCTTGCGCC
TTCGCATCCCATTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCT
CCTTAGAGTGCTCAACTGAATGGTAGCAACTAAGGACGGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTG
TGTTCCGGGCTCCGAAGAGAAGGTCACGTCTCTGCGACCGGTCCCGGACATGTCAAGGGCTGGTAAGGTTCTGCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCT
TGTGCGGGCCCCCGTCAATTCCTTTGAGTNTTAATCTTGCGAACGTACTCCCCAGGCGGAATGCTTAAAGCGTTAGCTGCGCCACTAGTGAGTAAACCCACTAACG

>CUP1P3A05 Uncultured bacterium (Não classificada)
ATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAA
CTGAGGCCGGTTTCTTGCGATTGGCTCCCCCTCACGGGTTGGCAACCGCGTCTGTACCGACCATTGTATCACGTGTGAAGCCCTGGCCATAAGGGCCATGAGGACTTGA
CGTCATCCCCACCTTCCTC

>CUP1P3A06 Uncultured bacterium (Acidobacteria)
GGCGTCTGCTCCTTGCGGTAGCGTGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTAC
CCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTG
CGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGG
AAGGCCGTATTTCTACAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCCCCGGGACGACTTCCGAACGGAAGGCACCCCAAGTCCTGATC

>CUP1P3A07 Uncultured bacterium (Não classificada)
TGCGGACTTCTAGTAAACCACTTCGTGATGTAGGCGGTGTGTACAAGGCCCGGGAACGTATCACGCTGGCGTTCTGATCCAGCATTACTAGCGATTCCAGCTTCATGCA
GGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTTTGGGATTGGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGTCCATTGTAGCACGTGTGTAGCCCTGG
ACATAAAGGCCATGAGGATTTGACGTCATCCCCACCTTCCTCTAGGTTATCCCTGGCGGTCTCCTGCGAGTTCCTCCTTGCGGAATGGCAACACAGGACAAGGGTTGCG
CTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACTGCAGTCCCTTGCGGGAAGGCCGGCTTTAACCAGCTGGTCCACA
GCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACTGTA
CTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACAGACCAAATGAATG

>CUP1P3A08 Uncultured bacterium (Não classificada)
ACTTCGGGAGCACCAGACTCGGGTGATGTGACGGGCGGTGAGTGCAAGGCCCGGGAACGTATTCAACGCAGTGTGCTGACCTGCGTTTACTAGCAACTCCGACTTCGTG
CTGGCGAGTTGCGGCCAACAATCCGAACTGAGACCGGTTTTAAGGGATTGCCTTCACGTCGCCGTGTCGGAACCCGTTGTACCGGCCATTGTAGCGTGTGTGTAGCCCT
GGACATAAAGGGCATGCGGACTTGACGTCATCCCCACCTTCCTCCGGGTTTCGCCCGGCAGTCTCCCTAGATGATTCAACTAAGGACAGGGGTTGCGCTCGTTGCGGGA
CTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCACCACCTGTGTAGAGACCTCTTGCGAGGGGCGCTGACTTTCACCAGCGTTTCCTCTACATGTCAAGC
CCAGGTAAGGTTCTTCGCGTCGCCTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGCCCCCGCCTATTCCTTTGAGTTTAACCTTGCGGCCGTAGTCCCCAGGCG
GCGAACTTAATGCGTTAGCTGCGGCACTGATCGGGTCAATCCGACCA

>CUP1P3A09 Mucilaginibacter sp. (Sphingobacteria)
GCTTCAGGCACCCCCAGCTTCCATGGCTTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCATTGCTGATCTGCGATTACTAGCGAATCCAACTTCACG
GGGTCGAGTTGCAGACCCCGATCCGAACTGTGAATGGCTTTTTGAGATTGGCTTCTTGTTACCAAGTCGCTGCCCTCTGTACCATCCATTGTAGCACGTGTGTAGCCCC
GGACGTAAGGGCCATGATGACTTGACGTCGTCCCCTCCTTCCTCTCTACTTGCGTAGGCAGTCTGTTTAGAGTCCCCACCTTTACATGCTGGCAACTAAACATAGGGGT
TGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTAGTTTCGTGTCCCGAAGGACTAGAGCGTCTCTGCTCTATTCACT
AACTTTCAAGCCCGGGTAAGGTTCCTCGCGTATCATCGAATTAAACCACATGCTCCTCCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCACCCTTGCGGGCGTA
CTCCCCAGGTGGAACACTTAACGCTTTCGCTTAGACGCTGACCGTATATC

>CUP1P3A10 Uncultured bacterium (Não classificada)
CTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCTGGGAACGTATTCACCGCGTCGTGCTGATACGCGATTACTAGCGATTCCAACTCCATGGAGT
CGAGTTGCAGACTCCAATCCGAACTGAGAACGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCAGCGGTCTGTACCGTCCATTGTAGCACGTGTGTAGCCCTGGAC
ATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTTCCACTAGAGTCCCCAACTAAATGCTGGCAACTAGTGGTAAGGGTTGCGCT
CGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTCCCAGCCGCCTATTGCTAGGGGGATGTATCTCTACACCTTGCAACTGGG
ATTTAACCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCAGGTCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCC
CCAGGCGGGATACTTAACGCGTTAGCTCCGGCACGCCGGGACTATAAAACCCGACACACCAAGTATCCATCGTTTAGGGCTAGGACTACCAGCGTATCTAATCCTGTTT
GCTCCCCTAACTTTCGCGCATCAGCGTCAGTATCAGCCCAG

>CUP1P3A12 Uncultured soil bacterium (Não classificada)
GGTGTCCTGCGGTACTTACGGTTCTATACAGTCCACTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCACGTGCTGATCTGCGATTACTAGCG
ATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGACCATTGTAGC
ACGTGTGTAGCCCTGGACATAAAGACCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCGTTGGAGTGCCCAGCTTGACCTGATGGCAA
CTAAAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTTCTTGCGAAAAGGGATATTT
CTACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGCCT

>CUP1P3B01 Uncultured bacterium (Actinobacteria)
GGGTTAGGCCACGGCTTCGGGTGTTGCTCACTCCCGTGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCAATGCTGATCCGCGATTACTAGCA
ACTCCGCCTTCATGCAGGCGAGTTTCAGCCTGCAATCCGAACCGAGACGCGCTTTAAGGGATTCGCTCCACCTCGCGGTATCGCAACCCTCTGTACGCGCCAATGTAGC
ACGTGTGTAGCCCTGGACATAAGGGGCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCGCATGAGTCCCCAACTAAATGCTGGCAACA
TGCGACGGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGAAAGTGCCCCGAAGGGAAGATGTGTTTCC
ACACCGGTCACTCACATGTCAAGCCCAGGTAAGGTTCTTCGCGTCGCGTCGAATTAAACCACATGCTCTGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAG
CCTTGCGGCCGTACTCCCCAGGCGGGCAACTTAATGCGTTAGCTTCGGCACAGGGGGAGTCGAAACCCCCCAAACCTAGTTGCCATCGTTTACAGCGTGGACCACCAGG
GTATCTAATCCTGTTTGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTAACGTCCCAGCGAG

>CUP1P3B02 Uncultured bacterium (Acidobacteria)
TGCCTCCTTGCGGTTAGCGTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCC
ATTACTATCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTCCGATTAGCTCCCCCTCACGGGTTGGCAACGGTTTGTAACGC
GCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCCTCTCTTGCGA
GTAGTAACTGTGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCGGTCCCTTGCGGGAAG
GCCGTATTTCTACAGCTGGTCCGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCC
TTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACGCCCGAACGGACGCCACCCCAAGTCCTGATCGTTTAGGGCTAG
GACTAC

>CUP1P3B03 Unidentified eubacterium from the Amazon(Acidobacteria)

CATACTTAGGCGCCTGTCTCCCTTGCGGGTTACGCAGCGACTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGG
CATGCTGATCCGCGATTACTAGCGATTCCAACTTCATGCCGGCGAGTTGCAGCCGACAATCCGAACTGAGACCGACTTTCTCCGATTAGCTCCCCCTTGCGGGCTTGCA
ACGGTTTGTATCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCCTCAGA
GTGCCCAGCGTAACCTGATGGCAACAGAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACAG
GCGTCCTTGCGGAAACCGGCTTTCACCGGCGGTCACCTGCATTTCGAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGC
CCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAGTGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGGCAGACCAAGCACTC
ATCGTTTAGGGCCAGGACT

>CUP1P3B05 Uncultured bacterium (Sphingobacteria)
TACACCCGGCTCCATGGCTTGACGGGCGGTGTGTACAAGGTCCGGGAACGTATTCACCGTATCATTGCTGATATACGATTACTAGCGATTCCAGCTTCATGCAGTCGAG
TTGCAGACTGCAATCTGAACTGAGAAAGAGTTTTGGGGATTAGCTTCACATCACTGTGTCGCTGCCCTTTGTCTCCCCCATTGTAGCACGTGTGTAGCCCTGGGCATAA
AGGCCATGATGACTTGACATCATCCCCTCCTTCCTCGCGTCTTACGACGGCAGTTTCACTAGAGTTCCCAGCTTTACCTGATGGCAACTAGTGATGGGGGTTGCGCTCG
TTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTTACAGGAGACGTATTGCTACGAAACCAGCTTTCACCGGCAGTCCTCCTGCAT
TCTAGCCCAGGTAAGGTTCCTCGCGTATCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGACCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGTCGTACTTCC
CAGGTGGGATACTTAATGCTTTCGCTCAGACACCAACCGTGTATCGCTGATGTCGAGTATCCATCGTTTAGGGCGTGGACTACCAG

>CUP1P3B07 Uncultured Xanthomonadaceae bacterium (Gammaproteobacteria)
CAGTCATTGACACTCCGTGGTAAGCGTCCCCCTTGCGGTTAGACTACCTACTTCTGGAGCAACCAACTCCCATGGTGTGACGCGGTGTGTACAAGGCCCGGGAACGTAT
TCACCGCGACAATGCTGATTCGCGATTACTAGCGATTCCGACTTCACGGAGTCGAGTTGCAGACTCCGATCCGGACTGAGAGAGGTTTTCTGGGATTGGCTTCACCTCG
CGGCTTCGCAACCCTCTGTACCTCCCATTGTAGTACGTGTGTAGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGGCACCGGCAGTCTTCCCAGAGTCCCCGCCATA
GTCTCCTTAGAGTTCCCACCATTACGTGCTGGCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAG
CACCTGTGTTCCGATTCCCGAAGGCACTCCCGCATCTCTGCAGGATTCCGGACATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATACTCCAC
CGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGAACGTACTCCCCAGGCGGCGAACTTAAC

>CUP1P3B08 Uncultured bacterium (Gemmatimonadetes)
GTTGGTCCCTTGCGGGTTCCGACACGGACTTCGGGCGCTCACAGCTTCCATGGCGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGTGGCGTAGCTGATCCA
CGATTACTAGCGATTCCAGCTTCATGGAGGCGAGTTGCAGCCTCCAATCCGCACTGAGGTCGGCTTTCGGGGATTGGCTCACCTTCGCAGGCTCGCAACCCTCTGTACC
GGCCATTGTAGCACGTGTGTAGCCCTAGACGTAAGGACCATGATGACTTGACGTCGTCCCCACCTTCCTCCGGTTTGGCACCGGCAGTCTTCCCAGAGTCCCCGCCATA
ACGCGCTGGCAACTGGGAACGGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCTGGTGTCCCGAAGG
AGGCCCCTGGTTTCTCAAGGGTTTCACCAGCATGTCAAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCCTTTGAGTTTCAGCCTTGCGGCCGTACTCCCCAGGCGGGGTACTTAATGCGTTAGCGCCGGCACTCAGGGGGTCGCTCCCCCAAGCACCTAGTAACCATCGTTTAC
GGCGTGGACT

>CUP1P3B09 Uncultured bacterium (Não classificada)
GGGCGGCTTCAGGGTTGCGACTTTCGTGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGCATTCACCGTGGTGTGCTGACCCACGGTTACTAGCAACTCCGGCTTC
AGGCAGGCGGGTTGCAGCCTGCCATCCGAACTGAGACTGGATTTGGCGGATTAGCTCCCCCTCGCGGGTTGGCGAACCGATTGTGCCAGCCATTGTAGCGTGTGTGTGG
CCTAGGACGTCAGGGCCGTGCTGACTTGACGTCATCACCACCTTCCTCCACGTTGCTCGCGGCAGTCTGGTCGGACACCCATAACCGACCACAGGGGTTGCGCTCGTTG
CGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGTCCGTACCCTTGCGGACCTCGTGTCTCCACGAGTTTTACGGACATGTCAAGC
CCTGGTAAGGTGCTTCGCGTCGCATCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCG
GACCATTTCGTGCGTTAGCGCCGGCACGCAGGGGGTCGATACCCCACGCGCCTGATGGTCATCGTTTACGGCCAGGACTACCGGGGTATCTAATCCCGTT

>CUP1P3B10 Burkholderia sp.(Betaproteobacteria)
TACGTGGTGACGTCCTCCTGCGGTTAGACTAGCCACTTCTGGTAAAACCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGC
TGATCCGCAGATTACTAGCTGATTCCATGCTTCACGCCAGTCGAGTTGCAGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAA
CCCTCTGTTCCGACCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTAGAG
TGCTCTTGCGTAGCAACTAGGGACAATGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCACGCAGCACCTGTGTTACGGCTCCC
TTTCGGGCACTCCCACCTCTCAGCAGGATTCCGTACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCC
GTCAATTCCCTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGTCAACTTCGCGCGTTAGCTACGTTACCAAGTCAATGAAGACCCGACAACTAGTTGACATCGTT
TAGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCATGAGCGTCAGTA

>CUP1P3B11 Uncultured Verrucomicrobia bacterium (Verrucomicrobiae)
ATCACACCATACTTCGGCGCTGCCTCCCTGCGGTTAGCACGGCGACTTCGGGTACAAGCGGCTTTCATGATGTGACGGGCGGTGTGTACAAGGCCTGGGAACGTATTCA
CGGCACCGTAGCTGATGTGCCATTACTAGCGATTCCGGCTTCATGCCGTCGAGTTGCAGACGACAATCTGAACTGGGCCTGATTTTCGGGGATTTGCTCCACCTGACGG
TCTTGCTTCCCTTTGTATCAGGCATTGTAGTACGTGTGCAGCCCTGGCCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCATTTAGATGAGGCAGTC
TGTCCAGAGTGCTCCAAACTCTCGTTTGGGTGGCAACAGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCA
GCACCTGTGCAAGCTTTCCTTGCGGAATCGTCCCACTTTCATGGTTCTACTACTTGCATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAGCCACATACT
CCACCGCTTG

>CUP1P3B12 Uncultured bacterium (Acidobacteria)
GGTTGGCTCACCGGCTTCTAGTGCAACCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTACTAGCGAT
TCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGGCCGGCTTTCTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGATTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTCTGCCAGAGTGCCCAACTAAATGGTGGCAACTGGA
AGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACATCGGCCCCTTGCGGGGAAGGGATATTTCTA
CCCCGGTCCAATGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGC
CTTGCGACCGTACTCCCCAGGCGGACTGCTTAACGCGTTAGCTACGGCACGGCGGGATTGGGTACCCGTCACACCAAGCAGTCATCGTTTAGGGCTAGGACTACCAGGG
TATCTAATCCTGTTTGCTCCCCTAGCTTTCGTGCATCAGCGTCAGTTGTGGTCCATTGAGCCGCTTTCGCCACAGGTGTTCCTCCCGATATCTACGCATTTCA

>CUP1P3C01 Uncultured bacterium (Acidobacteria)
GGTTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGA
TTCCGGCTCCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACA
CGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTAC
GTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTGCTGTCCCTTGCGGGAAGGCCGTATTTCT
ACAGCTGGTCAGCAGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGG
TATCTAATCC

>CUP1P3C02 Uncultured bacterium (Acidobacteria)
ACGGTATCCCCTTGCGGTTAATTACCGGCTTCTAGTACAACTGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCTGCTTGCTGATCA
GCGATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGAACGGTTTTTTGAGATTAGCTCCCCCTCGCGGGTTCGCAACTCATTGTAC
CGCCCATTGTAGTACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTTTCACCGGCAGTCCCTTTAGAGTGCTCAGCTT
AACCTGGTGGCAACTAAAGGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTAGTGTCCCTTGC
GGGAAAAGCGACTTTCGCCACCTGTCACTAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATACTTAATGCGTTAGCTTCGGCACGACTGGATTCAATCCCAGTCACACCAAGTATCCATCGTTTA
GGGCTAGGACTACCAGGGTATCTAATCCTGTGTGCTCCCCTAGCTTTCGTGCCTCAGCGTCAGTTTCTGTC

>CUP1P3C03 Uncultured bacterium (Acidobacteria)

GGTTAGCGTGACGACTTCTAGTACAACTCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGAT
TCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACAC
GTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACG
TGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACTTGTCCCTTGCGGGAAGGCCGTATTTCTA
CAGCTTGTCAAGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
TCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGG

>CUP1P3C04 Uncultured bacterium (Acidobacteria)
GTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTACTAGCGAT
TCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGACCCGATGGCAACT
AGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCTTTTAAGGGGAAGGGATGTTT
CCACCCCGGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGCCTTGCGACCGTACTCCCCAGGTGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTA

>CUP1P3C05 Uncultured alpha proteobacterium (Alphaproteobacteria)
AGTCGCTGACTTACGTGGCCGGCTGCTCCTTGCGGTTAGCGCACCGTCTTCGGGTAAAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATC
ACCGCAGCGTGCTGATCTGCGATTACTAGCGATTCCGACTTCATGGGGTCGAGTTGCAGACCCCAATCCGAACTGAGACGGCTTTTTGTGATTAGCTCCCCATTGCTGG
GTGGCTGCCCACTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCAGTCCC
ACTAAAGTGCCCAACTAAATGATGGCAACTAATGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGT
TCTCCGACCTATTGCTAGGAGGAATCCATTTCTGGAAACCGCCCGGAGAATGTCAAGGACTGGTAAGGTACTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCT
TGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGGATGCTTAATGCGTTAGCTGCGCCATCAACAAGCATGCTTGCTGACGGCT
AACATCCATCGTTTAAGGCGTGGACT

>CUP1P3C06 Uncultured bacterium(Alphaproteobacteria)
CGGTTGGCACACCGTCTTCAGGTAAAACCAACTCCCATGGTGTGACGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGCGCTGATCCGCGATTACTAGCGATT
CCAGCTTCATGCTCTCGAGTTGCAGAGAACAATCCGAACTGAGACGGCTTTTCGAGATTGGCGCAGGATCGCTCCCTTGCCGCCCTCTGTCACCGCCATTGTAGCACGT
GTGTAGCCCAGCCCATAAAGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCGGCTTGTCACCGGCAGTTCCTTCAGAGTGCCCGGCTTAACCCGATGGCAACTGA
AGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGCCAGCCGAACTGAAGAAGCCGATCT
CTCGGCCCCATACGGGACATGTCAAGGGCTGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
TAACCTTGCGGCCGTACTCCCCAGGCGGTGCGCTTAACGCGTTTGCTGCGACACCGGAAAG

>CUP1P3C07 Uncultured Verrucomicrobia bacterium (Verrucomicrobiae)
CACTTTTAGGGGCGGTTCGGGTGCAACCGGCTTCATGATGCGACGGGCGGTGTGTACAAGGCCTGGGAACGTATTCACGGCGCCGTAGCTGATGCGCCATTACTAGCGA
TTCCAGCTTCATGCCGTCGAGTTGCAGACGACAATCTGAACTGGGCCCGGTTTTGGGGGATTTGCTCCAGCTTACGCTCTTGCTTCCCTTTGTACCGGGCATTGTAGTA
CGTGTGCAGCCCTGGCCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCGTTGAAGCGAGGCAGTCTGTCCAGAGTGCTCCCAATTAAGGGGTGGCAA
CAGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAGCTTCCCTTGCGGGATCGTCAGAC
TTTCATCCTTCTACTACTTGCATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTGAGCCACATACTCCACCGCTTGTGCAGGCCCCCGTCAATTTCTTTGAG
TTTTAACCTTGCGGCCGTACTTCCCAGGCGGCGCGTTTAACGTGTTAACTTCGCCGCGAGCGGGGTCGATTCCACTCACAGCAAACGCGCACCGTTTAGGGCCAGGACT
ACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGTGCCTCAGCGTCAGGAAATGTCCAGAGACTCGCCTTCGCCACTGGTGTTC

>CUP1P3C08 Uncultured bacterium (Betaproteobacteria)
CCTCCTTGCGGTTAGGCGACGGCTTCTGGTGAAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGACATGCTGATCCGCGATT
ACTAGCGATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACGCGCTTTAAGGGATCGGCTCTACCTCGCGGCTTAGCAGCCCTCTGTACGCGCCA
TTGTATTACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCCCAACTGAATGTA
GCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCCCTTTCGGGCACAC
CCAGCTCTCACCAGGCTTCCGGACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATAATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTT
GAGTTTTAACCTTGCGGCCGTACTCCCAGGCGGTCGACTTCACGCGTTAGCTTCGTTACTGAGAGTGTCAAACTCCCAACAACCAGTCGACATCGTTTAGGGCGTGGA
CTACCAGGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCATGAGCGTCCGTGTCAGCCCAGAGACCT

>CUP1P3C09 Uncultured gamma proteobacterium (Gammaproteobacteria)
TCCTTGCGGTTAGGCTACTGCTTCTGGTGCAATCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGCAGCAATGCTGATCTGCGATTAC
TAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGGTTTTCTTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCCTCTGTACCTACCAA
TGTAGCACGTGTGTAGCCCTGGTCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGCCCAACTGAATGATG
GCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCAGGTTCCCGAAGGCACTCCC
GCATCTCTGCAGGATTCCTGGGATGTCAAGACCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGA
GTTTCAACCTTGCGGGCGTAATCCCCA

>CUP1P3C12 Uncultured bacterium (Acidobacteria)
GGTTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGAT
TCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACAC
GTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACG
TGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTGCTGTCCCTTGCGGGAAGGCCGTATTTCTA
CAGCTGGTCAGCAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
TCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGAC

>CUP1P3D01 Uncultured bacterium (Acidobacteria)
AGGCTGCTCCTTGCGGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCCG
CGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACC
GACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTG
ACCCGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCTTTTAAG
GGGAAGGGATGTTTCCACCCCGGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCAT

>CUP1P3D03 Uncultured Acidobacteria bacterium (Acidobacteria)
GGGTTAGCTCGGCGACTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGCTGATCCGCGATTACTAGCGA
TTCCAACTTCATGCCGGCGAGTTGCAGCCGACAATCCGAACTGAGACAGGCTTTCTCCGATTAGCTCCACCTTGCGGTCTCCACCCTGCGGTTCGCTCCGTCATTGTAGCA
CGTGTGTGGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTTCAGAGTGCCCAGCTTGACCTGATGGCAAC
AGAAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGATAGCTGCCCTTGCGGGAGCCTACTTTCG
TAGGATGTCAGCTACCGTTCGAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
CCCTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGGGCAACAAGCATTCATC

>CUP1P3D04 Uncultured forest soil bacterium (Alphaproteobacteria)
GGGTTAGCGCAGCGCCTTCGGGTAATGCCAACTCCCATGGTGTGAGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCCTGCTGTTCTGCGATTACTAGCGAT
CCACCTTCATGCACCCGAGTTGCAGAGTGCAATCTGAACTGGGACGGTTTTTTGGGATTCGCATCCACTCGCGTGGTCGCTGCCCACTGTCACCGCCATTGTAGCACGT
GTGTAGCCCAGGCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTGTCGCCGGCGGTCCCTTTAGAGTGCCCAACTAAATGATGGCAACTAAAG

GCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGCGCCCCTTGCGGGGACCACCCATCTCTGG
GCTTAGCACGGGATGTCAAGGCCTGGTAAGGTTCTGCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAACCT
TGCGGCCGTACTCCCCAGGCGGGATGCTTAATGCGTTAGCTGCGCCACTGATAAGCATGCTTACCAACG

>CUP1P3D05 Uncultured bacterium (Não classificada)
GGGTTAGCGCGACGACTTTTAGTACAGCCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGA
TTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGGGACTGATTTTTGGGGATTAGCTCCACCTCGCGGCTTTGCGACCCTTTGTATCAGCCATTGTAGCA
CGTGTGTAGCCCGGGGCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTCCAGAGTGCCCAGCTTTACCTGCTGGCAAC
AGGAGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACACGAGTCCCGAAGGAACACTGTATCTC
TACAGCTGTCCCGTGCAGTTCAAACCCCGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GCCTTGCGACCGTACTCCCCAGGCGGAGTGCTTAATGCGTTAGCTTCGGCACAGAAGGGTTTATACCTTCTACACCCAGC

>CUP1P3D06 Uncultured bacterium (Não classificada)
ATACTTCATATCGCCTCCCTATAAGGGTAGCTAAAATAATTCTGGTATGAACAACTTCGTGGTGTGGCGGGCGGTGTGTACAAGGTCCGAGAACGTATCACCGCGCCGT
TCTGATGCGCGATTACTAGCGATTTCAACTTCATGGAGCCGGGTTGCAGGCTCCAATCTGAACTTAGACTGGCTTTTTGAGATTTGCTTCCCCTCGCGGGTTTGCTGCT
CTTTGTACCAGCCATTGTAACACGTGTGTAGCCCTAGACATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTACTAGTTTCCTAGTCAGTCCCGCCAGAGTGC
CCCCAAAAATGAGGTAGCAACTGACGGCAAGGGTTGCGCTCGTTAGAGGACTTAACCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTATTTGT
TCGAGCAAGCTCGAAAGACCGTATTTCTACAGCTGTCAAATACATGTCAAGCCTAGGTAAGGTTCCTCGCGTAGTGTCGAATTAAACCACATGTTCCACCGCTTGTGCG
GACCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTTCTCAGGCGGATCACTTAACGCGTTAGCTACGACACGAATTTT
>CUP1P3D08 Unidentified eubacterium from the Amazon (Não classificada)
GCGCTATGTCCCTTGCGGGTTCACACAGCGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGAATTCACCGCGGCATGCTGA
TCCGCGATTACTAGCGATTCCAACTTCATGCTGGCGAGTTGCAGCCAACAATCCGAACTGAGACCGACTTTATGCGATTAGCTCACTCTCGCGAGTTCGCGACGCTTTG
TATCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTGCCCGG
CATTACCCGATGGCAACAGGAAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCTGTCCTT
GCGGAAATCGACTTTCGCCGACGTTCGTCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGCTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAACTTCGGCACGGCAGGGATCGATACCCGGCAAACCAAGCATTCATCGTTTA
GGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGTTTCTCAGTGTCAGATGCCGTCCAGAACGC

>CUP1P3D09 Nevskia sp. (Gammaproteobacteria)
TCCTTGCGGTTAGACTACCGGCTTCTGGTGCAGCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGACAAGTGCTGATCCGCGATTA
CTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATCGGCTTTCTGGGATTAGCTCCCCCTCGCGGGTTGGCAACCCTCTGTACCGACCAT
TGTAGTACGTGTGTAGCCCTGGTCATAAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGCCCAGCCGAACTGCT
GGCAACTAAGGACAAGGGTTGCGTTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCGAGTTCCCGAAGGCACCCC
CGCATCTCTGCAGGGTCC

>CUP1P3D10 Uncultured gamma proteobacterium (Gammaproteobacteria)
GGTCAGGCTACTGCTTCTGGTGCAGTCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGCATTCACCGCAGCAATGCTGATCTGCGATTACTAGCGA
TTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTTCTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCCTCTGTATCTACCATTGTAGCA
CGTGTGTAGCCCTGGTCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTCAGAGTGCCCAACTTAATGATGGCAACTA
AGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTGGGTTCCTTGCGGCACCCCCATATCTC
TACAGGGTTCCCAGGATGTCAAGACCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAA
CCTTGCGGCCGTACTCCCCAGGCGGAGGACTTAGCGCGTTAGCTACGACACTGCGAGGCTTACCCTCTCAACGTCTAGTCCTCATCGTTTATGGCGTGGACTACCAGGG
TATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCCTGAACGTCGGTGCTGGACCAGGAAGCCGCTTTCGCCACTGGTGTTCCTTCCGATATCTACGCATTTCA

>CUP1P3D11 Uncultured bacterium (Gammaproteobacteria)
GGTCAGGCTACTGCTTCTGGTGCAGTAAACTTCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCAGCAATGCTGATCTGCGATTACTAGCGAT
TCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGACAGATTTTCTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCCTCTGTTTCTGCCATTGTAGCAC
GTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGCCCAACTGAATGATGGCAACTAA
GGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCACGGTTCCTTGCGGCACTCCCGCATCTCT
GCAGGATTCCGTGGATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAAC
CTTGCGGCCGTACTCCCCAGGCGGAGGACTTAGCGCGTTAGCTACGACACTGCGAGGCTTACCCTCTCAACGTCTAGTCCTCATCGTTTATGGCATGGACTACCAGGGT
ATCTAATCCTGTTTGCTCCCCATGCTTTCGTACCTGAACGTCGGTGCTGGACCAGGAAG

>CUP1P3D12 Uncultured bacterium (Acidobacteria)
ACGACATACTTAGGCGCTCCTCCCTTGCGGGTTGGTATGGCGACTTCTAGTACAACCGGCTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCG
CGGCGTGCTGATCCGCGATTACTAGCGATTCTAACTTCATGCCGGCGAGTTGCAGCCGACAATCCGAACTGAGACAGACTTTATCCGATTAGCTCCACCTTACGGTCTC
GCGACGGTTTGTATCTGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTGC
AGAGTGCCCACCATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTA
CGAGTGTCCTTGCGGAAGCTCACTTTCGTGAGTGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCG
GGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGCCATACCAAGCA
TTCATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCTCCTCAGTGT

>CUP1P3E01 Uncultured bacterium (Acidobacteria)
TCCTTGCGGTTAGCGCGCGGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGGCGTTCTGATCCGCCATTA
CTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTTTGGGATTGGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGTCCAT
TGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTTCAGGTTATCCCTGGCGGTCTCCTGCGAGTTCCCACCTTTCTGTATG
GCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACTACGGTCCCTTGCGGGAAGGCC
TGCTTTCACAGACTGGTCCGTAGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACAGACCAAATGAATGGCCCACACCAAATATGCATCGTTTAGGGCGTGGAC
TACCAGCGTATCTAATCCTGTTTGCTACCCACGCTTTCGTGCATCAGCGTCAGTTACGGTCCAGAAA

>CUP1P3E02 Uncultured soil bacterium (Acidobacteria)
GCTCCTTGCGGTTGGCGCGCGGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTCACGGCGGCGTTCTGATCCGCCATT
ACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTGGCAGCGCTTTGTACCGTCCA
TTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGGTTATCCCTGGCGGTCTCCTGCGAGTTCCCAACTAAATGAT
GGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGGCACGAGCTGACGACAGCCATGCAGTACCTATACTGTGATCCCTTGCGGGAAGGC
CTGCTTTCACAGACTGGCCACAGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACGGACCAACTGAATGGCCCACACCAAATATGCATCGTTTAGGGCGTGGAC
TACCAGGGTATCTAATCCTGTTTGCTACCCACGCTTTCGTGCATCAGCGTCAGTAATGGTCCAGAAAGCCGTTTACACCACCGGTGTTCCTCCTGATATCTACGCATTT

>CUP1P3E03 Uncultured soil bacterium (Alphaproteobacteria)
GTGGACGGTACCCCCTTGCGGGTTGGCGCACCGGCTTAAGGCCAAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATNCACCGCGGCGTGC
TGATCCGCGATTACTAGCGATTCCACCTTCATGCACCCGAGTTGCAGAGTGCAATCTGAACTGAGACGGCTTTTGGGGATCGGCTCGGCCTTGCGACCTGGCATCCCGC
TGTCACCGCCATTGTAGCACGTGTGTAGCCCAGGACATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTGTCACCGGCAGTTCCTTCAGAGTGCCC
AGCCAAACCTGCTGGCAACTGAAGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCGGGAGGTC
CTTGCGGAAAGGTCCATCTCTGGACCGGTCCTCCCCATGTCAAGCCCTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCC

GTCAATTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGTGCGCTTATCGCGTTAGCTACGACACTGAGTGACTATGTCACCCAACATCCAGCGCACATCGT
TTACGGCGTGGAC

>CUP1P3E04 Uncultured bacterium (Não classificada)
ACAACTTTGGCGGATCCCCCCTTGCGGGTTAGAGCTCCGACTTCTGTTGCAGCGGGCTTTCGTGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCT
GCCTGCTGATCAGCGATTACTAGCGATTCCGCCTTCATGTGGGCGAGTTGCAGCCCACAATCTGAACTGGGGCCGGCTTTGGGGTTTGGCTCCACCTTACGGTATTGCT
TCCCATTGTACCGGCCATTGTAACACGTGTGGCCCTGGACATAAGGGCCATGAGGATTTGACGTCGTCCCCACCTTCCTCCTTCTTATCGAAGGCAGTTTCCAAAGA
GTGCATCCCTTGCGGGATTAGCAACATTGGATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAACCATGCAGCACCTCTGCTG
GCTTCCTTGCGGATCAGCCTCTGTTTCCAGAGACTTACTACCAGTAAGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGTTCCACCGCTTGT
GCGGGCCCCCGTCAATTCCTTTGAGTTTCA

>CUP1P3E05 Uncultured bacterium (Acidobacteria)
TCCTTGCGGTTAGCACACCAGCTTCTAGTACGGCCCACTTTCGTGATGTGACGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTACT
AGCGATTCCAGCTTCATGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGCGCGGCTTTTTGCGATTAGCTCCCCCTCACGGGTTTGCGACGCTTTGTACCGCGCATTG
TAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCAGCTTGACCTGATG
GCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGCCTTTTAAGGGGCGCCG
ATGTTTCCACCGGATTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTG
AGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGGTACACCAAGCAATCATCGTTTAGGGCTAGGA
CTA

>CUP1P3E06 Streptomyces chrysomallus subsp. fumigatus (Actinobacteria)
TCCCCTTACGGGTTAGGCCACGGCTTCGGGTGCTACCGACTTTCGTGACGTACGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCATGCTGATCTGCGATTA
CTAGCAACTCCAACTTCATGGGGTCGAGTTGCAGACCCCAATCCGAACTGAGGCCGGCTTTTTGGGATTCGCTCCGCCTCACGGCATCGCAGCCCTTTGTACCGACCAT
TGTAGCACGTGTGCAGCCCAAGACATAAGGGGCATGATGATTTGACGTCGTCCCCACCTTCCTCCGAGTTGACCCCGGCAGTCTCCTGTGAGTCCCCATCACCCCGAAA
GGCATGCTGGCAACACAGAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAACCATGCACCACCTGTATACCGACCACAAGG
GGGCACCCATCTCTGGATGTTTCCGGCATATGTCAAGCCTTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAGCCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATT
CCTTTGAGTTTTAGCCTTGCGGCCG

>CUP1P3E07 Uncultured Acidobacteriales bacterium (Acidobacteria)
CCCCTTGCGGTTAGCACACCAGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATT
ACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCA
TTGTAGCACGTGTGTGGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGACCCG
ATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTCTCTTGCGAGAAA
GGGATATTTCTACCCCAGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCT
TTGAGTTTCAGCCTTGCGAACGTACTCCCCAGGCGGATAGCTTATCGCGTTAACTGCGGCACAGCAGGATTGGGTACCTGGTACACCAAGCTATCAT

>CUP1P3E08 Uncultured forest soil bacterium (Alphaproteobacteria)
TCGGTGCTCCCGAAGGTTAGCTCACGCTTAGGTAAAACTAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCTGCGGCATGCTGATCCGC
GATTACTAGCGATTCCGACTTCATGCTCCCGAGTTGCAGAGAGCAATCCGAACTGAGACGGCTTTTTGAGATTAGCTTGGCATCGCTGCCTCGCCGCCCTCTGTCACCG
CCATTGTAGCACGTGTGTAGCCCAGCCCATAAGGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCGGCTTGTCACCGGCAGTTTCCTCAGAGTGCCCGGCATAAC
CCGATGGCAACTGAGGATGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACTGCCATGCAGCACCTGTGTCCCCGCCAGCCGAACT
GAAGGACCTGATCTCTCAGGCCCATACGAGGCATGTCAAGAGCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTGTGCTTACCGCGTTAGCTGCGACACCGAAGAGCT

>CUP1P3E09 Uncultured soil bacterium (Acidobacteria)
CTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCGATTCCAGCTTCATGG
AGTCGAGTTGCAGACTCCAATCCGGACTGGGATTGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCAACCATTGTAGCACGTGTGTAGCCCTG
GACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCGCCGAGAGTGCCCAACTAAATGATGGCAACTGGCAATAAGGGTTGC
GCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTACGCAGCGGTCCCTTGCGGGAAAGCGATATTTCTACCGCGGTCCACT
GCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCTGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTA
CTCCCCAGGCGGATCGCTTAACGCGTTAGCTCCGGCACGACAGGATTGGGTACCTGTCACACCAAGCGATCATCGTTTAGGGCTAGGACTACCAG

>CUP1P3E11 Uncultured Acidobacteria bacterium (Acidobacteria)
GCCTCCTGCGGTTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTGCAAGGCCCGGGAACGTATCACGGCATCGTTCTGATACGCCATT
ACTAGCGATTCCAGCTTCACGCAGGCGAGTTGCAGCCTGCGATCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCATTGTACCGGCCA
TTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGGGAAAGTTGGACTTGACATCATCCCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTGCTATC
TTTCGATGTGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCCTTG
CGGAGTAACCGTGTTTCCACGATCGTTAGCCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGT
CAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGCATACTTAACGCGTTAGCTCCGGCACGAACCAAATGAATGGCTCACACCAAGTATGCATCGTTTA
GGGCGTGGACTACCA

>CUP1P3E12 Uncultured soil bacterium (Betaproteobacteria)
TTCTGGTGAAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGACATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCA
GTCGAGTTGCAGACTGCAATCCGGACTACGACGCGCTTTAAGGGATTGGCTCCAGGTCGCCCCTTGGCTACCCTCTGTACGCGCCATTGTATTACGTGTGAAGCCCTAC
CCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCCCATTAGAGTGCCCCCTTACGGGTGGCAACTAATGGCAAGGGTTGCGC
TCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCTCTTTCGAGCACACCCGCCTTTCAGCAGGCTCCCGGA
CATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATAATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAACCTTGCGGCCGTAC
TCCCCAGGCGGTCGACTTCACGCGTTAGCTTCGTTACTGAGA

>CUP1P3F01 Uncultured soil bacterium (Acidobacteria)
GCGTCTGCTCCTTGCGGTTGGCACGACGACTTCTAGTACAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTGCGATTAGCTCCCCCTCACGGGTTCGCGACGCTCTGTGG
CGCGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACCTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTCGTAGAGTTCCCCCTTG
CGGGTAGCAACTACGAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACACAGGTCCCTTGCGGG
AAGACCCGATTTCTCAGGCTGGTCCTGTGCGGTTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGCCTTGCTGACGTACTCCCCAGGCGCAGGACTTAACGCGTTAGCTCCGGGAC

>CUP1P3F02 Uncultured bacterium (Acidobacteria)
GTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTACTAGCGAT
TCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGACCCGATGGCAACT
AGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCTTTTAAGGGGAAGGGATGTTT
CCACCCCGGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGCCTTGCGAACGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAAATCATCGTTTAGGGCT

>CUP1P3F03 Uncultured bacterium (Acidobacteria)

GAAGGTGCTCCTGCGGTTAGACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCCGCG
ATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGA
CCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGAC
CCGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTTCTTGCGAAA
AGGGATGTTTCCACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCC
TTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGGTAAACCAAAGCAATCATCGTTTAGGGC
TAGGACTACCAGGGTATCTAATCCCTGTTTGCTCCCCT

>CUP1P3F07 Uncultured beta proteobacterium (Betaproteobacteria)
CCCCCCTGCGGTTAGGCTAACTACTTCTGGCAAACCGCTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCGGCAAGCTGATCCGCGATTAC
TAGCGATTCCGACTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGACCGGTTTTCTGGGATTGGCTCCCCCTCGCGGGTTGGCAGCCCTCTGTACCGGCCATT
GTATGACGTGTGTAGCCCTACCCATAAGGGCCATGAGGACCTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCCCTTTCGTAGCAACT
AATGACAAGGGTTGCGCTCGT

>CUP1P3F08 Uncultured alpha proteobacterium (Alphaproteobacteria)
CTCCTTGCGGTTAGCGCGCCGTCTTCGGGTAAAACAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGCTGATCCGCGATTAC
TAGCGATTCCAACTTCATGCACTCGAGTTGCAGAGTGCAATCCGAACTGAGACGGTTTTTCGAGATTTGCTAGGGGTCGCCCCTTCGCCTCCCGTTGTCACCGCCATTG
TAGCACGTGTGTAGCCCAGCCTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCAGTCCCCCTGGAGTGCCCAACTGAATGATGGC
AACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGGCCCCGAAGGGAAGATCGC
ATCTCTGCAATCCGTCCAGGACATGTCAAAAGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGA
GTTTTAATCTTGCGACCGTACTCCCCAGGCGGGATGCTTAAAGCGTTAGCTGCGCCACTGAAGAGCAAGCTCCCC

>CUP1P3F09 Uncultured bacterium (Sphingobacteria)
ATGGCTTGACGGGCGGTGTGTACAAGGTCCGGGAACGTATTCACCGTATCATTGCTGATATACGATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAA
TCTGAACTGAGAAAGAGTTTTGGGGATTAGCTTCACATCACTGTGTCGCTGCCCTTTGTCTCTCCCATTGTAGCACGTGTGTAGCCCTGGGCATAAAGGCCATGATGAC
TTGACATCATCCCCTCCTTCCTCGCGTCTTACGACGGCAGTTTCACTAGAGTTCCCAGCTTTACCTGATGGCAACTAGTGATGGGGGTTGCGCTCGTTGCGGGACTTAA
CCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTTACAGACAGTGTATTGCTACAAAATGAGCTTTCACCCACGGTCTCTCTGCATTCTAGCCCAGGTA
AGGTTCCTCGCGTATCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGACCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGTCGTACTTCCCAGGTGGGATACT
TAATGCTTTCGCTCAGACACCAACAGTGTATCGCTGATGTCGAGTATCCATCGTTTAGGGCGTGGACTACCAGCGTATCTAATCCTGTTTGATCCCCAAGCTTTTCGTG
CCTCAGTGTCAATAATAGTG

>CUP1P3F10 Uncultured bacterium (Acidobacteria)
GGTTAGCACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTACTAGCGAT
TCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGACCCGATGGCAACT
AGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCTTTAAGGGGAAGGGATGTTT
CCACCCCGGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTAGGGCTAGGACTACCA
GCGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTATGGTCCAGTGCGCCGCTTTCGCCACAGG

>CUP1P3F11 Burkholderia sp. (Betaproteobacteria)
TCCTCCTTGCGGTTAGACTAGCCACTTCTGGCAAAACCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGAT
TACTAGCGATTCCAGCTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCTCTGTTCCGACC
ATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCCGGAGTGCTCTTGCGTAGCA
ACTGGGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGACGGCTCCCTTTCGGGCACTTCCA
CCTCTCAGCAGAATTCCGTCCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAG
TTTTAATCTTGCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACCAAGCCAATGAAGGCCCGACAACCAGTTGACATCGTTTAGGGCGTGGACTAC
CAGGGTATCTAATCCTGTTTGCTCCCC

>CUP1P3F12 Bradyrhizobium genosp. (Alphaproteobacteria)
GGCTGCCCCTTTCGGTTAGCGCACCGTCTTCAGGTAAAGCCAACTCCCATGGTGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATCACCGTGGCGTGCTGATCCACG
ATTACTAGCGATTCCAACTTCATGGGCTCGAGTTGCAGAGCCCAATCCGAACTGAGACGGCTTTTTGAGATTTGCCAGGNCTTACGCCTTCGCATCCCATTGTCACCGC
CATTGTAGCACGTGTGTAGCCCAGCCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCTCCTTAGAGTGCTCAACTAAAT
GGTAGCAACTAAGGACGGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGAACTGA
AGAACACCGTCTCTGGTGTCCGCGACCGGGATGTCAAGGGCTGGTAAGGTTCTGCGCGTTGCGTCGAATTAAACCACATGCTCCAACGGTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTTAATCTTGCGAACGTACTCCCCAGGCGGAATGCTTAAAGCGTTAGCTGGGCCACTAA

>CUP1P3G02 Uncultured bacterium (Acidobacteria)
GGTTAGCGTGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGA
TTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTACCCTGCATTGTAACA
CGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTAC
GTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCT
ACAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGGGTTTCA
GTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACTTCCGAACGGAAGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGG
TATCTAATCCTGTTTGCTCCCCTAGCTCTCGTTCCT

>CUP1P3G03 Uncultured bacterium (Acidobacteria)
TGCCTCCCTTGCGGGTTAGCCTGTAGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGCCATCATTCTGATACGG
CATTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTTGGGGATTGGCTCCCCCTTGCGGGTTGGCAGCCCTTTGTACCG
TCCATTGTAGCACGTGTGTAGCCCTAGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGGTTATCCCTGGCGGTCTCCTGCGAGTTCCACCGATAA
AGGTATGGCAACACAGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTCCGGTCCCTTGCGG
GAAGTCCTCATTTCTGAAGATTGTCCAAAGCCGTTCGAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCCTTTGAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACGGATCAAATGAATGACCCAAACCAAATATGCATC

>CUP1P3G04 Uncultured bacterium (Não classificada)
CGACTTCGGGAGCACAGACTCGGGTGATGTGACGGGCGGTGAGTGCAAGGCCCGGGAACGTATTCACCGCAGTGTGCTGACCTGCGGTTACTAGCAACTCCGACTTCAT
GCTGGCGAGTTGCAGCCAACAATCCGAACTGAGACCGGCTTTTAGGGATTGCCTTCACGTTGCCGTGTCGGAACCCGTTGTACCGGCCACTGTAGCGTGTGTGTTGCCC
TGGACATAAAGGGCATGCGGACTTGACGTCATCCCCACCTTCCTCCGGGTTTCGCCCGGCAGTCTCCCTAGAAGATTCAACTAAGGACAGGGGTTGCGCTCGTTGCGGG
ACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCACCACCTGTGTAGAAACCTCTTGCGAGGGGCGCTGACTTTCACCAGCGTTTCTTCTACATGTCAAG
CCCAGGTAAGGTTCTTCGCGTCGCCTCGAATTAAACCACAACGCTCCGCTGCTTGTGCGGGCCCCCGGCTATTCCTTTGAGTTTTAACCTTG

>CUP1P3G05 Uncultured bacterium (Não classificada)
TTCGGCGCTCCGTCCCTCACGGGTTCGGCCAGCGACTTCGGGAGCACCAGACTCGGGTGATGTGACGGGCGGTGAGTGCAAGGCCCGGGAACGTATTCACCGCAGTGTG
CTGACCTGCGGTTACTAGCAACTCCGACTTCATGCTGGCGAGTTGCAGCCAACAATCCGAACTGAGACCGGCTTTTAGGGATTGCCTTCACGTTGCCGTGTCGGAACCC
GTTGTACCGGCCATTGTAGCGTGTGTGTTGCCCTGGACATAAAGGGCATGCGGACTTGACGTCATCCCCACCTTCCTCCGGGTTTCGCCCGGCAGTCTCCCTAGAAGAT
TCAACTAAGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCACCACCTGTGTAGAAACCTCTTGCGAGGGGCGC

TGACTTTCACCAGCGTTTCTTCTACATGTCAAGCCCAGGTAAGGTTCTTCGCGTCGCCTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGCCCCCGCCTATTCCTT
TGAGTTTTAACCTTGCGGCCGTAGTCCCCAGGCGGTGAACTTAATGCGTTAGCTGCGGCACTGATCGGGTCAATCCGACCAANACCTAGTTCACAACGTTTAGGGCGTG
GACTACCCGGGTATCTAATCCGGTTCGCTCCCCAAGCTTTCGCGTC

>CUP1P3G06 Acidobacteria bacterium (Acidobacteria)
GCTCCTTGCGGTTAGCGTGACGACTTCTAGTACAACTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCAT
TACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGC
ATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGT
GGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACTTGTCCCTTGCGGGAAGGT
CGTATTTCTACAACTTGTCAAGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTT
TGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCG

>CUP1P3G08 Uncultured actinobacterium (Actinobacteria)
TGCTTCTAGTGCAACCACTTTCGTGATGTGACGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCATTCTGATCTGCGATTACTAGCGATTCCAGCTTCATAGAG
TCGAGTTGCAGACTCTAATCCGAACTGAGGCGGCTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACAGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACA
TAAAGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCCCGTTATCCGAGGCGGTCTCACCAGAGTGCCCAACTAAATGATGGCAACTGGTAATAAGGGTTGCGCTC
GTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGCAGCCTATTGCTAGGAAGGAATATTTCTACTCCGGTCCACTACAT
CTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGT

>CUP1P3G09 Uncultured bacterium (Não classificada)
GCCGACTTCAGTGCGTGACCAGCTCCCATGACGCGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCACTCTGCTGACGCGCGGTTACTAGCAACTCCGACTT
CATGTGGGCGAGTTGCAGCCCACAATCTGAACTGAGGCCGGCCTTGATTGGATTAGCTCCGCCTTGCGGCTTGGCTGCCCATTGTACCGACCATTGTAGCGTGTGTGTC
GCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCCGCTTGTCACGGGCAGTCGCGGTAGACAGTCTAACTACCGCCGAGGGTTGCGCTCGTTT
CAGGACTTAACCCTACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGACGCCTCCTTGCGGTCGGACGTGTTTCCACGCCCTACTAGCGCCATGTCCAG
TCCAGGTAAGGTGCTTCGTGTAACCTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGACCGTACTCCCCAGGC
GGGATGCTTACCAGTTTCCCTCCGACACAGAGCGGACTTAACCGCCCCAGGCCTCGCATCCATCGTTTACGGCATGGACTACCGGGGTTTCTAATCCCG

>CUP1P3G10 Acidobacteria bacterium (Acidobacteria)
GCCCTGCGGTTGGCTCACCGGCTCTAGTGCAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTAC
TAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGGCCGGCTTTCTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGGCCATT
GTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTCTGCCAGAGTGCCCAACTAAATGGTGG
CAACTGGAAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACTACGGCCCCTTGCGGGGAAGGGA
TGTTTCCACCCCGGTCCATAGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGA
GTTTCAGCCTTGCGACCGTACTCCCCAGGCGGACTGCTTAACGCGTTAGCTACGGCACGGCGGGGATTGGGTACCCGTCACACCAAGCAGTCATCGTTTAGGGCTAGGAC
TACCAGCGTATCTAATCCTGTTTGCGCCCCTAGCTTTCGTGCAT

>CUP1P3G11 Uncultured Acidobacteria bacterium (Acidobacteria)
ATGGATCATACTTGGGCCGCTGCCCCCTTGCGGGTCAGCCTGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTC
ACGGCAGCGTGCTGATCTGCCATTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCCCTCGCGG
GTTAGCGGCGCATTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCGCCAGAGTGCTCGGCGGTCT
CCTGCGAGTTCCGCCTTTCGGCATGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTC
GACTGGACCCCCTTGCGGGGTAAAGATGTTTCCACCTCCGTTGACCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCT
TGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCACATTTAACGCGTTAGCTCCGGCACAGATCAACTGAATGACCC

>CUP1P3G12 Uncultured bacterium (Acidobacteria)
CGGCTGCTTCCTTGCGGTTAGCCCACCGGCTTCTAGTACAGCCCACTTTCGTGATGTGACGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCCGC
GATTACTAGCGATTCCAGCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCG
GCCATTGTAGCACGTGTGTGGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCGCCAGAGTGCTCGGCATAA
CCCGGTAGCAACTGGCAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATAGAGCAGCCCTTGCGGG
AAGGGATGTTTCCACCCCGGTCCACTCCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTC
CTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACATCGGGATTGGGTACCCGACACACCAAGCAATCATCGTTTAGGGC
TAGGACTACCAG

>CUP1P3H01 Uncultured delta proteobacterium (Deltaproteobacteria)
ATCACGACTTCCGGTACAGCGGGCTTCCATGGTGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCACCT
TCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGAGCGGCTTTTTGGGATTGGCTCCCCCTCGCGGGTTTGCAACCCTTTGTACCGCCCATTGTAGCACGTGTGTA
GCCCCGGATATAAGGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCCGTTTGACACGGGCAGTCCCTCTAGAGTGCCCAACTAAATGATGGCAACTAGAGGCAAG
GGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGAACCAGAGGTCCCCGAAGGGAAGACCTTATTTCTAAGGTT
GTCCTCTGTTGTCTAACCCGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAACCTTGCG
GCCGTAGTCCCCAGGCGGGGCACTTAATGCGTTAGCTGCGGCACCGCAGGGGTCAATACCCACGAAACCTAGTGCCCATCGTTTACAGCGTGGACTACCAGGGTATCTA
ATCCTGTTTGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTATCCGT
CC

>CUP1P3H02 Leptolyngbya badia(Cyanobacteria)
TGCTTCGGGCCTCCTCCAGAATGGTTGGAGTACGACTTCGGGCGTGGCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCCGTATGCT
GACCGGCGATTACTAGCGATTCCGCCTTCATGCAGGCGAGTTGCAGCCTGCAATCTGAACTGAGCCACGGTTTATGGGATTAGCGCACCATCGCTGGCTGGCAACCCTT
TGTCCGTAGCATTGTAGTACGTGTGTAGCCCAGGACGTATGGGGCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTGCCC
AACTCAATGCTGGCAACTAAAGACGAGGGTTGCGCTCGTTGCGGGACTTAACCTAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGTTCCGCGCTCCC
GAAGGCACCCCTCCCTTTCAAGAAGGTTCGCGACATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGT
CAATTCCTTTGAGTTTCACTCTTGCGAGCGTACTCCCCAGGCGGGGTACTTAACGCGTTAGCTCCGGCACTGACCGGGTCGATACGGTCAACGCCTAGTACCCATCGTT
TACGGCTAGGACTACAGGGGTATCTAATCCCTTTCGGTCCCCTAGCTTTCGTCCCTCAGTGTCAGTTATGA

>CUP1P3H03 Uncultured acetobacteraceae bacterium (Alphaproteobacteria)
GTGTGTACAAGGCCCTGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCGCCTTCATGCACCCGAGTTGCAGAGTGCAATCTGAACTGAGACGGC
TTTTGGGGATCGGCTCGGCCTTGCGACCTGGCATCCCGCTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGGACATAAGGGCCATGAGGACTTGACGTCATCCCCACC
TTCCTCCGGCTTGTCACCGGCAGTTCCTTCAGAGTGCCCAGCCAAACCCGATGGCAACTGAATGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACA
CGAGCTGACGACAGCCATGCAGCACCTGTGTGGGAGGCCCTTGCGGGAACAGCCATTTCTGGCCGCGTCCTCCCCATGTCAAGCCCTGGTAAGGTTCTGCGCGTTGCTT
CGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTCAACCTTGCGGCCGTACTCCCCAGGCGGTGCGCTTATCGCGTAAGCTACGACA
CTGAATGACTATGTCACCCAAAATCCAGCGCACATCGT

>CUP1P3H05 Uncultured bacterium (Acidobacteria)
GGTTTGCGCGGCGACTTCTAGTACAACTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGAT
TCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTCTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACAC
GTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACG
TGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTCTA
CAGCTTGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG

TCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGACCGTTTAGGGCTAGGACTACCAGGGT
ATCTAATCCTGTTTG

>CUP1P3H06 Uncultured bacterium (Acidobacteria)
ATACTTGGGCGTTGCTCCTTGCGGTTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGA
TCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCACGGGTTGGCAACG
GTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTT
CCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCC
CTTGCGGGAAGGCCGTATTTCTACAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCC
CCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCG
TATAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTTGTGGTCCAGCGCGCCGCTTTCGCCACGGGTGTTCCTGCAG
ATATCTACG

>CUP1P3H09 Uncultured alpha proteobacterium (Alphaproteobacteria)
GGTTAGCGCACCACCTTCGGGTGAAACAACTCCCATGGTGTACGGGCGGTGTGTACAAGGCCTGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGATTC
CGCCTTCATGCTCTCGAGTTGCAGAGAACAATCCGAACTGAGACGGCTTTTGGAGATTAGCTCACCCTCGCGGGTTTGCAGCCCTCTGTCACCGCCATTGTAGCACGTG
TGTAGCCCAGCGCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCAGTTTCTTTACAGTGCCCAACTAAATGGTAGCAACTAAAGA
CGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCAGGTCCCGTAAGGGAAGGAATCCATCTCTGG
AAACCGTCCTGGCATGTCAAACGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCAGGCCCCCGTCAATTTCTTTGAGTTTTAACC
TTGCGGCCGTACTCCCCAGGCGGATGACTTAACGCGTTAGCTGCGCCACCGGAACTCCAAGAGCCCCGACAGCCAGTCATCATCGTTT

>CUP1P3H10 Uncultured bacterium (Acidobacteria)
CGCTTGCACCCTTGCGGTTTGCGCGGCGACTTCTAGTACAACTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATA
CGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTCTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTG
CCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGT

>CUP1P3H11 Burkholderia sp. (Betaproteobacteria)
TATCGCCTCCTTGCGGTTAGGTACTACTTCTGGCAAAACCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTTTCACCGCGGCATGCTGATCCGCGA
TTACTAGCGATTCCAGCTTCACGTAGTCGAGTTGCAGACTACGATCCGGACTACGATGCGTTTTCTGGGATTGGCTCCCCCTCGCGGGTTGGCAACCCTCTGTACGCAC
CATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCTAGAGTGCTCTTGCGTAGC
AACTAAAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCCGTGTCCACTTTCCCTTTCGGGCACCTGA
TGCATCTCTGCTTCGTTAGTGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTG
AGTTTTAATCTTGCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTGCGTT

>CUP1P4A01 Uncultured bacterium (Acidobacteria)
TCCTTGCGGTTAGCGCACCGGCTCTAGTGCAACCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTACT
AGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGGCCATTG
TAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCACCAGAGTGCCCAACTAAATGATGGC
AACTGGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACAGCAGCCCCTTGCGGGGAAGGAAT
GTTTCCACTCCGGTCCACTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAG
TTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACGGCGGGATTGGGTACCCGTCACACCAAGCAATCATCGTTTAGGGCTGGGACT
ACCAGGGTATCTAATCCTGTTTGCTCCCCCAGCTTTCGTGCATCAGCGTCAGTTATGGTCCAGTGAGCC

>CUP1P4A02 Uncultured bacterium (Não classificada)
CCAGTCACGACCACCTCGACATCTGCCCTGACGGTTGGCCAACGGCTTCAGGTGTTCCGGCTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACC
GTGGTGTGCTGACCCACGGTTGCTAGCAACTCCGGCTTCAGGCAGGCGAGTTGCAGCCTGCCATCCGAACTGTGACCGGCTTTAGGGGATTGGCTCCACCTCGCGGCTT
GGCAACCCGTTGTACCGGCCATTGTAGCGTGTGTGTCGCCCTGGACGTAAGGGCCGTGCTGACTTGATGTCATCCCCACCTTCCTCCGCGTTGCGCGCGGCAGTCGGGC
CCGAAAAGTACAACGGACCCCAGGGGTTGCGCTCGTTAGGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGGAACCGCCGGACGA
ACCGGACACGGCATAACCCGTGGTGCAGTCCCATGTCAAACCCAGGTAAGGTTCTTCGCGTCGCATCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTCCACTCATCACGTTAGCTGCGGCACCGAAGGGGTCGATACCTCCAGCACCTGGTGGACATCGTTTA
CAGCTGGGACTACCA

>CUP1P4A03 Bacterium Ellin321 (Betaproteobacteria)
GGTTAGGCTAACTACTTCTGGCAGAACCCGCTCCCATGGTGTACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCGGCAAGCTGATCCGCGATTACTAGCGATT
CCGACTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGACCGGTTTTCTGGGATTGGCTCCCCCTCGCGGGTTGGCAGCCCTCTGTACCGGCCATTGTATGACG
TGTGTAGCCCTACCCATAAGGGCCATGAGGACCTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCCCTTTCGTAGCAACTAATGACAA
GGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACGGCCATGCAGCACCTGTGTTCTAGTTCTCTTTCGAGCACTTTCACATCTCTGCAA
AATTCTAGACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAAACCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAACCTTG
CGGCCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACTGAGAAGGAACCTTCCCAACAACCAGTTGACATCGTTTAGGGCGTGGACTACCAGGGTATCTA
ATCCTGTTTGCTCCCC

>CUP1P4A04 Uncultured bacterium (Acidobacteria)
TCATACTGGGCGCTATCTTCCTTGCGGTAGAATGACGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCACGTCA
TTCTGATACGTGATTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGGTTTTTTCCGATTGGCTCCCTCTCGCGAGTTCGCGAC
GGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGGCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTCCCTTAGGGT
GCTTCCTTGCGGCTAGCAACTAAGGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATTCTGCTGTC
CCTTGCGGGAAAATCTCATCTCTGAGACGGTCAACAAAATTTCGAGTCCAGGTAAGGTGCTTCGCGTTGCGTCGAATTAAGCCACATGCTCCACCGCTTGTGCGGGCCC
CCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATACTTAATGCGTTAGCTTCGGCACAGCCCCGTGAGGGGCTACACCCAGTATTCATCGTT
TAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCGGTTATGGTCCAGATAG

>CUP1P4A05 Uncultured bacterium (Acidobacteria)
TTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTGCAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAG
TCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGA
CATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCT
CGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCAGAAGC
ATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACT
CCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTG
CTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAGTGGTCC

>CUP1P4A06 Uncultured Acidobacteria bacterium (Acidobacteria)
GACTTCTAGTACGGCCACTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTTCTGATCTGCGATTACTAGCGATTCCAGCTTCATGG
AGTCGGGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGACCATTGTAGCACGTGTGTGGCCCTG
GACATAAAGGCCATGAGGACTTGACGTCATCCCCAACTTCCTCCTCGTTATCCGAGGCAGTTTCGCTAGAGTGCCCGGCATTACCCGATGGCAACTAGCGATAAGGGTT
GCGCTCGTTGCGGGACTTAACCCATCATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGTCCTTGCGGAAAGGGATGTTTCCACCCCGGTCCACT
GCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGNTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTA
CTCCCCAGGCGGGATGCTTAACGCGTTAGCTGCGGCACGAACGGATTGGGTACCCGATCACACCAAGCATCC

>CUP1P4A07 Uncultured bacterium (Acidobacteria)
TCCCTTGCGGGTTGGTATGGCGACTTCTAGTACAACCGGCTTCGTGATGTGAGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGCTGATCCGCGATTACT
AGCGATTCCAACTTCAAGCAGGCGAGTTGCAGCCTGCTATCCGAACTGAGACCGACTTTCTCCGATTAGCTCCCCCTTGCGGGCTCGCGACGGTTTGTATCGGCCATTG
TAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTTTGCAGAGTGCCCAGCATTACCTGATG
GCAACAGCAAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGTCAAC
TTTCGTCGATGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGT
TTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGACAGGGATCGATACCCGTCACACCAAGCATTCATCGTTTAGGGCCAGGACTA
CCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCTCCTC

>CUP1P4A08 Unidentified eubacterium (Verrucomicrobiae)
GGTTGGCGCACATACTTCGGGTAAAACCGGCTTCATGACGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCAAGGTGCCGTTGCTGATACACCTTTACTAGCGAT
TCCGGCTTCATGGAGTCGAGTTGCAGACTCCAATCTGAACTGGGCCTGGTTTTGGGGATTTGCTCCACCTCGCGGTATTGCGTCCTTTTGTACCAGGCATTGTAGCACG
TGTGCAGCCCTGGGTGTAAGGGCCATACTGACTTGACGTCGTCCCCACCTTCCCACCTCTACAAAGAGGTTTGTCTCCCTAGAGTCCCCGGCATTACCCGCTGGCAACT
AAGGACGAGGGTTGCGCTTGTTGCCGGACTTAACCGAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAATTGTGTATTGCTACACTCACCGGCT
TTCACCGGCTTAGAGATGCATGTCAAACCCAGGTAAGGTTCTTCGCGTTGCATCGAATTGAGCCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTTCTTTGAGTT
TTAGTCTTGCGACCGTAGTCCTCAGGCGGTGCACTTAACGCGTTAGCTCGAGCCCTGAGAGGGTCGAATCCCCCAAAGCCTAGTGCACAACGTTTACAGTATGGACTAC
AGGGGTATCTAATCCCTTTTGCTCCCCGTACTTTCGAGCCTGAGTGTCAGGATTTGTCCAGCGGGCTGCCTTCGCCGTCGGTGTTCCTCCAGATAT
CT

>CUP1P4A09 Uncultured bacterium (Acidobacteria)
GGTTGGCCTGCGCGCTTCTAGTACAACCCACTTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCATCGTTCTGATATGCCATTACTAGCGAT
TCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTTTGCGATTTGCTCCCCCTCACGGGTTCGCTGCGCTTTGTACCGCCCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGAGAGTGCTTCCTTGCGGAGTGGCAACACA
GGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACTACTGTCCCTTGCGGGAACCCCAATCTTTC
GACCAGGCGTCAGCAGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGCCTTGCGAACGTACTCCCCAGGCGGNATACTTAACGCGTTAGCTCCGGCACCGGCCAACTGAATGGCCGACACCAAGTATGCATCGTTTAGGGCGTGGACTACCAGG
GTATCTAATCCTGTTTGCTACCCACGCTTTCGTGTCTCAGCGTCAGCCATGGTCCAGAAAGCCGTCTACACCACCGGTGTTCCTCCTG

>CUP1P4A10 Uncultured bacterium (Alphaproteobacteria)
GGTCGCTGCTCCTTGCGGTTGGCGCAGCGCCTTCGGGTAAAACAATCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTGCTGATCC
GCGATTACTAGCGATTCCAGCTTCATGCCCTCGAGTTGCAGAGGACAATCCGAACTGAGACGGCTTTTTGAGATTGGCCAAGACTTGCGTCTTCGCATCCCACTGTCAC
CGCCATTGTAGCACGTGTGTAGCCCAGCCCATAAAGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCGGCTTGTCACCGGCAGTTCCTTTAGAGTGCCCAGCATA
ACCTGATGGCAACTAAAGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCACCGGCCAGCCGAA
CTGAAGAAACAGATTTCTCCATTCCATACCGGGCATGTCAAGAGCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGT
CAATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTGCGCTTATCGCGTTAGCTGCGACACCGAGAAGCTAAGCTTCCCAACGTCTAGCGCACATCGTTT
AC

>CUP1P4A11 Uncultured bacterium (Acidobacteria)
AAGGCTGCTCCTTGCGGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCC
GCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTAC
CGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAAAGTGCCCGGCTT
GACCCGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCTTTTAA
GGGGAAGGGATGTTTCCACCCCAGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTA
GGGCTAGGAC

>CUP1P4A12 Uncultured bacterium (Anaerolineae)
GGCGGCTGCCCCTTGCGGTTGGCTGACCGACTTCAGGCGTGACCAGCTCCCATGACGGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCACTATGCTGACG
CGCGGTTACTAGCAACTCCGACTTCATGCGGGCGAGTTTCAGCCCACAATCTGAACTGAGGCCGGCTTTGATTGGATTGGCTCCGTCTTGCGACTTGGCTACCTATTGT
ACCGACCATTGTAGCGTGTGTGTAGCCCTGGATATACAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCCGCTTGTCACGGGCAGTTGCGTTAGACTATCTAAC
TAACGCCGAGGGTTGCGCTCGTTTCAGGACTTAACCCTACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCAGTGCGACCCATTCCGGACTGGTTTCCCAATC
TTGCGAATCGCATGTCAAACCCAGGTAAGGTTCTTCGTGTAGCCTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTT
GCGACCGTACTCCCCAGGCGGGATGCTTACCGGTTTCCCTCCGACACGGAACGGACTTCTCCGNCCCACGCCTCGCATCCATCGTTTACGGCATGGACTACCGGGGTTT
CTAATCCCGTTCGGTCCCCATGCTGTCGTGTCTCAGCGTCAGTAATGCGCCAGGA

>CUP1P4B01 Uncultured bacterium (Acidobacteria)
TATCTCCTGCGGTTAATTGCGGCTTCTAGTACAACTGGCTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCTGCTTGCTGATCAGCGATTA
CTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGAGCGGTTTTTTGAGATTGGCTCCCCCTCGCGGGTTTGCAACTCATTGTGCCGCCCAT
TGTAGTACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTTTCACCGGCAGTCCCTTTAGAGTGCTCAGCATAACCTGG
TGGCAACTAAAGGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTAGTGTCCCTTGCGGGAAAA
GCGACTTTCGCCACCTGTCACTAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTT
TGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATACTTAATGCGTTAGCTTCGGCACGACCGGATTCAATCCCGGTCACACCGAGTATCCATCGTTTAGGGCTAG
GACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTGCCTCAGCGTCAGTTTCTGTCCAGGTAGCCGGCTTCGCCACCGGTGTTCCTCCT

>CUP1P4B02 Uncultured bacterium (Alphaproteobacteria)
GGCCGGCTGCCCCTTGCGGTTGGCGCACCGTCTTAAGGTAAATCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCGTGCTGAT
CTGCGATTACTAGCGATTCCAACTTCATGTGCTCGAGTTGCAGAGCACAATCCGAACTGAGACGGCTTTTTGAGATTTGCGCAGGATTTCTCCATTGCGTCCCATTGTC
ACCGCCATTGTAGCACGTGTGTAGCCCAACCTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCCCCTTAGAGTGCCCAAC
TAAATGATGGCAACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGA
ACTGAAAGGCTCCATCTCTGGTGCCCGCGACCGGGATGTCAAAGGTTGGTAAGGTTCTGCGCGTTGCTTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCG
TCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGGATGCTTAATGCGTTAGCTGCGCCACTGACGAGTAAACCCGACAACGGCTAGCATCCATCGTTT
ACGGCGTGGACTACCAGGGTATCTTAATCCTGTTTGCTCCCCACGCTTTCGCACCTCAGCGTCAGTACCGGGCCAGT

>CUP1P4B03 Uncultured bacterium (Não classificada)
GGGCGCTATCTTCCTTGCGGTTAGAATGACGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGNTTCT
GATCCGCGATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGGGACCGGTTTTTTGCGATTTGGCTCCCCCTCGCGGGTTCGCGACGCTT
TGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGGCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTCCCTTCGGGTGCTT
CCCTTGCGGGTTAGCAACAAAGGGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATCCAGCCGTCCC
TTGCGGGAAAGCCTCATCTCTGAGACGGTCAGCTAGATTTCGAGTCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCC
GTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAGCACTTAATGCGTTAGCTTCGGCACAACCCCGTGAAGGGCTACACCCAGTGCTCATCGTTTA
AGGGCCGGGACTACCAGGGTATCTAATCCT

>CUP1P4B05 Bradyrhizobium sp.(Alphaproteobacteria)
CAGTCGTCGACTACGTGGCGGTGCCCTTCGGTTACGCACGTCTTCAGGTAAAACAACTCCCATGGTGTAGGGCGGTGTGTACAATGCCGGGAACGTATCACCGTGGCGT
GCTGATCCACGATTACTAGCGATTCCAACTTCATGGGCTCGAGTTGCAGAGCCCAATCCGAACTGAGACGGCTTTTTGAGATTTGCGAAGGGTTGCCCCTTAGCGTCCC

ATTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCTCCTTAGAGTG
CTCAACTAAATGGTAGCAACTAAGGACGGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCC
AGCCGAACTGAAGAACTCCGTCTCTGGAGTCCGCGACCGGGATGTCAAGGGCTGGTAAGGTTCTGCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGG
CCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGAATGCTTAAAGCGTTAGCTGCGCCACTAGTGAGTAAACCCACTAACGGCTGGCATTCA
TCGTTTACGGCGTGGACTNACCAGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCCTCAGCGTCAGTATCGGGCCAGTGAGCCGCCTTCGCCACTGGTGTTCTTG
CGAA

>CUP1P4B06 Uncultured gamma proteobacterium (Gammaproteobacteria)
CGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCATAGCTGATCTGCGATTACTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTGGGAT
CGGCTTTCTGGGATTGGCTCCACCTCGCGGTATTGCAACCCTCTGTACCGACCATTGTAGTACGTGTGTAGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCC
CACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTTAGAGTTCCCACCATTACGTGCTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAC
GACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCTGATTCCCGAAGGCACTCCCGCATCTCTGCAGGATTCCAGACATGTCAAGGCCAGGTAAGGTTCTTCGCGTT
GCATCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGGCGAACTTAACGCGTTAGCTT
CGACACTGATCTCCGAGTTGAGACCAACATCCAGTTCGCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCCTCAGCGTCA
GTGTTGATCCAGATG

>CUP1P4B07 Uncultured bacterium (Acidobacteria)
CGGGTAGTGTGGCGATTCTAGTAAACCGGCTTTCGTGAGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCC
AACTTCAAGCAGGCGAGTTGCAGCCTGCTATCCGAACTGAGAACGGCTTTCTCCGATTAGCTCCACCTTGCGGTATCGCGACGGTTTGTACCGGCCATTGTAGCACGTG
TGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTTCAGAGTGCCCAGCATAACCTGATGGCAACAGAA
GACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACAAGTGTCCTTGCGGAAGCTCCCTTTCGGGAG
TGGTCACTCGCAGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTT
GCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGG

>CUP1P4B08 Uncultured bacterium (Deltaproteobacteria)
TCCTGCGGTTGGCGCAGCACTTCTGGAGCAACGATCCCATGGTTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCTGCCTGCTGATCAGCGATTACTAGCG
ATTCCGACTTCAAAGAGTCGAGTTGCAGACTCTTATCTGTACTGAGGTTGCTTTTTTGCGATTGGCTTCCCCTCGCGGGTTTGCGGCGCTTTGTAGCAACCATTGTAGC
ACGTGTGTAGCCCTGGACATAAGGGCCATGATGACTTGACGTCGTCCCCACCTTCCTCCGATTTGAATATCGGCGGTCTCACTAGAGTCCCCGGCCGAACCGCTGGTAA
CTAGTGATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTAACCATGCGCTCTCCGAAGAGCACCCCGAT
ATTTCTACCAGGCTCGCACGTTTTCTAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGT
TTTAGCCTTGCGGCCGTACTTCCCAGGCGGGGTGCTTAATGCGTTGGCTACGGCACCACAGGAGTCAAAGCCCGTGACACCTAGCACCCATCGTTTACGGCGTGGACTA
CCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGTCTCAGCGTC

>CUP1P4B09 Uncultured bacterium (Verrucomicrobiae)
ACCATACTTCGGCGCCTGTCCTTGCGGTTAGCACGGCGACTTCGGGTACAAGCGGCTTTCATGATGTGACGGGCGGTGTGTACAAGGCCTGGGAACGTATTCACGGCAC
CGTAGCTGATGTGCCATTACTAGCGATTCCGGCTTCATGCCGTCGAGTTGCAGACGACAATCTGAACTGGGCCCGGTTTTCGGGGATTTGCTCCACCTGACGGTCTTGC
TTCCCTTTGTACCGGGCATTGTAGTACGTGTGCAGCCCTGGCCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCATTTAGATGAGGCAGTCTGTCCA
GAGTGCTCCGAACTCTCGTTTGGGTGGCAACAGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGATAGCCATGCAGCACCT
GTGCAAGCTCCCCTTGCGGGGTCGTCCCACTTTCATGGTTCTACCACTTGCATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAGCCACATACTCCACCG
CTTGTGCAGGCCCCCGTCAATTTCTTTGAGTTTTAATCTTGCGACCGTACTTCCCAGGCGGCATATTTAACGCGTTGGCTACGCCACAAAAGGGGTCGATTCCTTTTAC
AGCAAATATGCACCGTTTACGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTGCCTCAGTGTCAGGAGTCGTCCAGGGACTCGCCTTCGCCA
CTGGTGTTCCTCTCGATATCTACGCATTTCACTGCTACA

>CUP1P4B10 Burkholderia terricola (Betaproteobacteria)
TCCTCCTTGCGGTTAGACTAGCCACTTCTGGTAAAACCCACTCCCATGGTGTACGGGCGGTGTGTACAAGACACGGGAACGTATTCACCGCGGCATGCTGATCCGCGAT
TACTAGCGATTCCAGCTTCACGCACTCGAGTTGCAGAGTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCGACCCTCTGTTCCGACC
ATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTGGAGTGCTCTTGCGTAGCA
ACTAGGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTACGGCTCCCTTTCGGGCACTCCCA
CCTCTCAGCAGGATTCCGTACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAG
TTTTAATCTTGCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACCAAGCCAATGAAGGCCCGACAACCAGTTGACATCGTTTAGGGCGTGGACTAC
CAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCATGAGCGTCAGTATTGGCCCAGGGGGCTGGCTTCGGCATCGGGATTCCTCCACATCTCTACGCATTTCAC
TGGTACACGTGGA

>CUP1P4B11 Uncultured bacterium (Sphingobacteria)
TACACCCAGCTTCCATGGCTTGACGGGCGTGTGTACAAGGTCCGGGAACGTTTCACCGTATCATTGCTGATATACGATTACTAGCGATTCCAGCTTCATGAGGTCGAGT
TGCAGACCTCAATTCGAACTGAGACAGGTTTTTTGAGATTAGCATCCTGTTACCAGGTAGCAACCCTTTGTACCTGCCATTGTAGCACGCGTGTAGCCCTGGGCATAAA
GGCCATGATGACTTGACATCATCCCCTCCTTCCTCGCGCCTTACGGCGGCAGTTTCACTAGAGTTCCCAGCATTACCTGATGGCAACTAGTGATAGGGGTTGCGCTCGT
TGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTTACAAATTGTGTATTGCTACAAAGTGAGCTTTCACCCACGGTCAAAATGCATT
CTAGCCCAGGTAAGGTTCCTCGCGTATCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGACCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGTCGTACTTCCC
AGGTGGATTACTTAATGCTTTCGCTCAGACACCAACAGTATATCGCTGATGTCGAGTAATCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGATCCCC
ACGCTTTCGTGCCTCAGCGTCAATCA

>CUP1P4B12 Uncultured bacterium (Não classificada)
GCGGCTGGCTCCTTGCGGTTACCCCACCGACTTCGGGTGCAGACAACTCAGGTGACGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGTTTAGCTGA
CCTGCGGTTACTAGCGATTCCGGCTTCACGCAGGCGAGTTGCAGCCTGCGATCCGAACTGAGAACGGATTTTTGGGATCGGCTCCACCTTACGGTCTTGCACCCCTTTG
TGTACCGTCCATTGTAGCATGTTTGTAGCCCAGGATGTAAGGGCCATGCTGACTTGACGTCGTCCTCACCTTCCTCCCGCTTACACGGGCAGTTTCCCAAGAGTTCCCG
GCTTTACCCGATGGCAACATGGGATGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAACACCTGTCTCGACGTCCT
TTTAAGGGGGACGATGCTTTCACACCGGTGCGTCGGATGTCAAACCCTGGTAAGGTTCTACGGTTAGTGACGTATTAAACAACATGCTCCACCGCTTGTGCGGGCCCCC
GTCAATTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGGATACTTACTGCGTTAGCTGCGGCACCAGGGGGGTCGATACCCCTGACACCTAGTATCCATCG
TTTAGGGCTGGGACTACCGGGGTATCTAATCCCGTTCGCTCCCCCAGCTTTCGCGCATCAGCGTCAAGAATGCCCCAAGAAGCCGCCTTCGCCACTGGTGTTCCTACAG
ATATCTACGCATTTCACC

>CUP1P4C01 Uncultured bacterium (Acidobacteria)
TCCTTGCGGTTAGCGTGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTA
CTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTACCCTGCAT
TGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGG
CAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCG
TATTTCTACAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTG
AGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACTTCCGAACGGAAGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACT
ACCAGGGTATCTAATCCTGTTTGCTCCCCT

>CUP1P4C02 Duganella nigrescens (Betaproteobacteria)
TCTACGTGGTAGCGCCTCCTTGCGGTAGCTACTACTTCTGGTAAAACCGCTCCCATGGTGTAGGGCGGTGTGTACAAGACCGGGAACGTATCACCGCGACATGCTGATC
CGCGATTACTAGCGATTCCAACTTCATGTAGTCGAGTTGCAGACTACAATCCGGACTACGATACACTTTCTGGGATTAGCTCCCCCTCGCGGGTTGGCGGCCCTCTGTA
TGTACCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCTCTTGC
GTAGCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGCAGGTTCTCTTTCGAGCA

CTCCCAGATCTCTCCGGGATTCCTGCCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCC
TTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGTCTACTTCACGCGTTAGCTGCGTTACTAAGTCAATTAAGACCCAACAACTAGTAGACATCGTTTAGGGCGTG
GACTACCAGCGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCATGAACGTCAGTTTTG

>CUP1P4C03 Dyella japonica (Gammaproteobacteria)
GGTTAGACTAACGGCTTCTGGAGCAACTCACTCCCATGGTGTGACGGGCGGTGCGTACAAGGCCCGGGAACGTATTCACCGCAGCATAGCTGATCTGCGATTACTAGCG
ATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTGGGATCGGCTTTCTGGGATTGGCTCCACCTCGCGGTATTGCAACCCTCTGTACCGACCATTGTAGT
ACGTGTGTAGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTTAAAGTTCCCACCATTACGTGCTGGCAA
CTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCTGATTCCCGAAGGCACTCCCGCAT
CTCTGCAGGATTCCAGACATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
CAGTCTTGCGACCGTACTCCCCAGGCGGCGAACTTAACGCGTTAGCTTCGACACTGATCTCCGAGTTGAGACCAACATCCAGTTCGCATCGTTTAGGGCGTGGACTACC
A

>CUP1P4C04 Unidentified eubacterium (Acidobacteria)
GGGAACGTATCACCGCAGCGTGCTGATCTGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGATGACTTTTTCCGATTAGCT
CCCCCTCGCGGGTTTGCGACGGTTTGTATCACCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATC
CGGGGCGGTTTCGCCAGAGTGCCCAACTAAATGATGGCAACTGGCAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGATGACAGCCA
TGCAGCACCTACGCAGCAGTCCCTTGCGGGAAGATGATATTTCTACCACTGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATG
CTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTTCGGCACGGCAGGATTGGGTA
CCTGCTACACCAAGCAGTCATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTGAGGTCCAGTGAGCCGC
TTTCGCCACAGGTGTTCCTCCCGATATCTACGCATTTCACCGCTACACCGGG

>CUP1P4C05 Uncultured bacterium (Não classificada)
TTGCCGACTTTCGTGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGCATTCACCGTGGTGTGCTGACCCACGGTTACTAGCAACTCCAGCTTCAGGCAGGCGGGTT
GCAGCCTGCCATCCGAACTGAGACTGGATTTAGCGGATTAGCTCCCCCTCGCGGGTTGGCCACCGATTGTGCCAGCCATTGTAGCGTGTGTGTCGCCCAGGACGTAAGG
GCCGTGCTGACTTGACGTCATCCCCACCTTCCTCCACGTTGATCGCGGCAGTCTGGTCGGACACCTGTAACCGACCACAGGGGTTGCGCTCGTTGCGGGACTTAACCCA
ACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGCCACTACCCTTGCGGACCTCCGATCTCTCGGAGTTTTAGTGGCATGTCAAGCCCTGGTAAGGTGCT
TCGCGTCGCATCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGGCCGTACTCCCCAGGCGGGATACTTACTGTG
TTAACTACGGCACATATGGAGTCGATACCACATACACCTAGTATCCATCGTTTACGGCTAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTAGCTTTCGCTCCTC
AGCGTCAGAACAACCCCAGGTGATCGCCTTCGCCACTGGTGTTCCTCCCG

>CUP1P4C06 Dyella ginsengisoli (Gammaproteobacteria)
TGGTCGTCGTCCCCCTGCGGTTAGACTAACGGCTTCTGGAGCAATCACTCCCATGTGTGACGGGCGGGTGTACAAGGCCCGGGAACGTATCACCGCAGCATAGCTGATC
TGCGATTACTAGCGACTCCGACTTCACGAAGTCGAGTTGCAGACTTCGATCCGGACTGGGATCGGCTTTCTGGGATTGGCTCCACCTCGCGGTATTGCAACCCTCTGTA
CCGACCATTGTAGTACGTGTGTAGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTTAGAGTTCCCACCA
TTACGTGCTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCTGATTCCCGA
AGGCACTCCCGCATCTCTGCAGGATTCCAGACATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGGCGAACTTAACGCGTTAGCTTCGACACTGATCTCCGAGTTGAGACCAACATCCAGTTCGCATCGTTTA
GGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCAAGCTTTCGTGCCTCAGC

>CUP1P4C07 Uncultured bacterium (Betaproteobacteria)
GGTAGGCGCCCTCCTTGCGGTTAGGAACCTGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGACATGCTGA
TCCGCGATTACTAGCGATTCCGACTTCATGAAGTCGAGTTGCAGACTTCAATCCGGACTACGACGCGCTTTCTGGGATTGGCTCCCCCTCGCGGGTTGGCAACCCTCTG
TACGCGCCATTGTATGACGTGTGTGGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCCCATTAGAGTGCTCAA
CTGAATGTGGCAACTAATGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTGAGGTTCCCTTT
CGGGCACCGCCGCATCTCTGCAGCGTTCCTCACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCGTCGAATTAAACCACATCATCCACCGCTTGTGCGGGCCCCCGTC
AATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGATGACTTCGCGCGTTAGCTGCGTTACTAAAGGATTTAACTCCTCCAACAACTAGTCATCATCGTTT
AGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCATGAGCGTCAGTGTTGGCCCAGGAGGCTGGCTTCGCCATCGGTGTTCCTCCACATC
TCTACGCATTTCAC

>CUP1P4C08 Uncultured bacterium (Não classificada)
GGCGGTGCTCTCTTGCGAGTTAGCGCACCGATTCTAGTACACCCACTTTCGTGATTACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGCTGATCCGC
GATTACTAGCGATTCCAGCTTCATGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGGCCGACTTTCTCCGGTTGCCTCCCCCTCGCGGGTTCGGATCGGTTTGTATCG
GCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCCTTGTCGGAGGCAGTTTCGCCAGAGTAGCTCGGCATA
ACCCGGTGGCAACTGGCAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGTGGCGGTCCTTGCGG
AAAGGGATGTTTCCACCCCGGCCCACCACGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATT
CCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAACACTTAACGCGTTAGCTCCGGCACGGCGGGATTGGGTACCCGCCACACCAAGTGTTCATCGTTTAGGG
CTAGGACTACCAGCGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTGTGGTCCAGTGCGCC

>CUP1P4C09 Uncultured bacterium (Acidobacteria)
TCCTTGCGGTCAGGCGGCGACTTCTAGTACAGTCACTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGC
GATTCCGGCTTCATGCAGTCGAGTTGCAGACTGAATCCGATTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTACCCTGCATTGTAACA
CGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCAACTTCCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCCTCTCTTGCGAGTAGTAACTGT
GTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAANAACTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTAGTGTCCCTTGCGGGAAGGCCATATTTCT
ACAGCTGGTCACTAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GTCTTGCG

>CUP1P4C10 Uncultured bacterium (Acidobacteria)
TGACTGTACTGGAAGGTGCTCCTTGCGGAGCACACCTGCTTCTATACGGCCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTT
CTGATCCGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGG
TTTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCATTATCTGAGGCAGTTTCACTAAAGTGC
CCGGCTTGACCCGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGT
CTCTTGCGAGACGCCGATGTTTCCACCGGATTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCC
CCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATC
ATCGTTTAGGGCTAGGACTACCAACGTATCTAATCCCTGTTTGTTCCCC

>CUP1P4C11 Uncultured bacterium (Acidobacteria)
AAGGCTGCTCCTTGCGGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCC
GCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTAC
CGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTT
GACCCGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCTTTTAA
GGGGAAGGGATGTTTCCACCCCGGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTA
GGGCTAGGACT

>CUP1P4C12 Uncultured bacterium (Acidobacteria)

GGTCGAATCACCGGCTTCTAGTACAACTGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTAACCGCTGCTTGCTGATCAGCGATTACTAGCGA
TTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGAACGGTTTTTTGAGATTGGCTCCCCCTCGCGGGTTTGCAACTCATTGTGCCGTCCATTGTAGTA
CGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCGGTTTTTCACCGGCAGTCCCTTTAGAGTGCTCAGCTTGACCTGGTGGCAAC
TAAAGGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTAGTGTCCCTTGCGGGAAAAGAGACTT
TCGCCCCCTGTCACTAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
CAGCCTTGCGACCGTACTCCCCAGGCGGGATACTTAATGCGTTAGCTTCGGCACGACCGGATTCAATCCCGGTCACACCAAGTATCCATCGTTTAGGGCTAGGA

>CUP1P4D02 Uncultured Acidobacteria (Acidobacteria)
GGTTAGCCCAGCGGCTTCAGGTGTTGCCGACTTTCGTGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGTAGTATGCTGACCCACGGTTACTAGCAAC
TCCGACTTCAGGCAGGCGGGTTGCAGCCTACCATCCGAACTGAGAACGCCTTTGCTGGGATCCGCTCCCCCTCGCGGGTTGGCCTCCCGTTGTCGCGTCCATTGTAGCG
TGTGTGTCGCCCAGGATGTAAGGGCCGTGCTGACTTGACGTCATCCCCGCCTTCCTCCCCGTTGATCGAGGCAGTCTCGTCGGAGAGTTTCAACCGACGACAGGGGTTG
CGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGCCGGCGTCCCTTGCGGGCACGACCATCTCTGGCCGGTGCACCG
GCATGTCAAACCCTGGTAAGGTTCTGCGCGTCGCGTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTA
CTCCCCAGGCGGACCACTTACTGCGTTGGCTGCGGCACGGAAGGGGTCGATACCTCCCACACCTAGTGGTCATCGTTTACGGCTAGGACTACCGGGGTATCTAATCCCG
TTCGCACCCCTAGCTTTCGCCCCTGAGCGTCAGGTACCAGCCAGGAGAC

>CUP1P4D03 Burkholderia nodosa (Betaproteobacteria)
GGTTAGACTAGCCACTTCTGGCAAAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGA
TTCCAGCTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCTCTGTTCCGACCATTGTATGA
CGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGATGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTGGAGTGCTCTTGCGTAGCAACTAGGGAC
AAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTACGGCTCCCTTTCGGGCACATCCACCTCTCAGC
GGACTTCCGTACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCT
TGCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACCAAGCCAATGAAGGCCCGACAACCAGTTGACATCGTTCAGGGCGTGGAC

>CUP1P4D04 Uncultured bacterium (Acidobacteria)
CGCTGCCTCCTTGCGGTCAGCCTGCAGACTTCTAGTACAATCCACTTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCAGCGTGCTGATCTG
CCATTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGCTTGCAGCGCTTTGTACC
GGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTTCCGCCTTTC
GGCATGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCCTTGCGGG
GTAGCGATGTTTCCACCGCCGGTAACCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACGGATCAACTGAA

>CUP1P4D06 Uncultured bacterium (Acidobacteria)
GGGTTGATATGGCGACTTCTAGTACAACCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGA
TTCCAACTTCAAGCAGGCGAGTTGCAGCCTGCTATCCGAACTGAGACAGACTTTCTCCGATTAGCTCCACCTTGCGGTCTCGCGACGGTTTGTATCTGCCATTGTAGCG
CGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTTCAGAGTGCCCAGCCTAACCTGATGGCAAC
AGAAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGACTCCTTTCG
GAGTTTGCCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGGTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
CCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGNCANACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGG
GTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCTCCTCAG

>CUP1P4D07 Uncultured eubacterium (Alphaproteobacteria)
AACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCACCTTCATGCACTCGAGTTGCAGAGT
GCAATCTGAACTGAGACGGTTTTTTGGGATTTGCTCCACCTCGCGGTATTGCACCCCACTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCATAAGGGCCATGAG
GACTTGACGTCATCCCCGCCTTCCTCCGGCTTGTCACCGGCAGTTTCGTCAGAGTGCCCAACTAAATGATGGCAACTGACAATGGGGGTTGCGCTCGTTGCGGGACTTA
ACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGGGAGCCAGCCGAACTGAAGGCGTTCATCTCTGAACACCAAACTCCCCATGTCAAGAGCT
GGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGTG
TGCTTAAAGCGTTAG

>CUP1P4D08 Amycolatopsis fastidiosa (Actinobacteria)
CCATCGCAGTCCACCTTCGACCATCCCCCCCATAATGGGTTGGGCCATGGGCTTCGGGTGTACCGACTTTCGTGACGTGACGGGCGGTGTGTACAAGGCCCGGGAACGT
ATCACCGCAGCGTTGCTGATCTGCGATTACTAGCGACTCCGACTTCACGGGGTCGAGTTGCAGACCCCGATCCGAACTGAGACCGGCTTTAAGGGATTCGCTCCACCTC
ACGGTCTCGCCACCCTCTGTACCGGCCATTGTAGCATGTGTGAAGCCCTGGACATAAGGGGCATGATGACTTGACGTCATCCCCACCTTCCTCCGAGTTGACCCCGGCA
GTCTCCCATGAGTCCCCACCTTCACGTGCTGGCAACATGGAACGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACGGCCATGCAC
CACCTGTACACCCACCACAAGGGGGCCTACGTCTCTGCAGGTTTCGAGTGCATGTCAAGCCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAATCCACATGCTCCGCCG
CTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGCGCTTAATGCGTTAGCTACGGCACGGAGAACGTGGAATGCTCCCCA
NACCTAGCGCCCAACGTTTACAGCGTGGACTACCAGGGTATCTAATTCTGTTCGCTCCCC

>CUP1P4D09 Uncultured bacterium (Acidobacteria)
GGTCAGCGCACCGGCTTCTAGTACAGCCCACTTTCGTGGTTGCGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCGTGCTGATCTGCGATTACTAGCGATTC
CAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTGGGATTGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCAACCATTGTAGGCACGT
GTGTGGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCGCCAGAGTGCCCAACTAAATGATGGCAACTGGCA
ATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTACGCAGCAGCCCCTTGCGGAGAAAGAGTATTTCTAC
TCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCC
TTGCGACCGTACTCCCCAGGCGGATCGCTTAACGCGTTAGCTCCGGCACGACAGGATTGGGTACCTGTCACACCAAGCGATCATCGTTCAGGGCTAGGACTAC

>CUP1P4D10 Uncultured bacterium (Acidobacteria)
CTCCTTGCGGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCCGCGATTA
CTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCAT
TGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGACCCGA
TGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATTTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCTTTTAAGGGGAAG
GGATGTTTCCACCCCAGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTT
TGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTAGGGCTAG
GACTACCAGNGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTATGGTCCAGTGCGCCGCTTTCGCCACAGGTGTTCCTCCCGATATCTACGCA
TTTCAC

>CUP1P4D11 Burkholderia tropica (Betaproteobacteria)
TCTGGCAAAACCACTCCCATGGTGTAGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCAGCTTCACGCAGTCGA
GTTGCAGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCTCTGTTCCGACCATTGTATGACGTGTGAAGCCCTACCCATA
AGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTGGAGTGCTCTTGCGTAGCAACTAGGGACAAGGGTTGCGCTCGTTGCGG
GACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTACGGCTCCCTTTCGGGCACCCCCACCTCTCAGCAGGGTTCCGTACATGTCAAG
GGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGCCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGC
GGTCAACTTCACGCGTTAGCTACGTTACCAAGTCAATGAAGACCCGACAACCAGTTGACATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCAC
GCTTTCGTGCATGAGCGTCAGTATTGACCCA

>CUP1P4D12 Uncultured forest soil bacterium (Acidobacteria)

CGGTTAGCTCACCTGCTTCTAGTGCAACCCACTTTCGTGATGTANGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATTCTGATCCGCGATTACTAGCGAT
TCCAGCTTCATAGAGTCGAGTTGCAGACTCTAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCCCGTTATCCGAGGCGGTCTCACCAGAGTGCTCAACTAAATGGTAGCAACTGG
TAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGCGGTCTATTGCTAGACGCCGATGTTTCC
ACCGGATTCCACTACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
CCTTGCGACCGTACTCCCCAGGCGGATCGCTTAACGCGTTAGCTTCGGCACGGCGGGATTGGGTACCCGTCACACCAAGCGATCATCGTTTAGGGCTAGGACTACCAGG
GTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTGCATCAGCGTCAGTTGTGGTCCAGTGAGCCGCTTTCGCCACAGGTGTTCCTTCCGATATCTACGCATTTCACCG

>CUP1P4E01 Uncultured bacterium (Actinobacteria)
TTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCATGCACCACTGTGCACTAGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCAGT
GCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTA
CTCCCCAGGCGGGGAACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGACACCCGCCACACCTAGTTCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTG
TTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAATTC
CACTCTCCTCTTCCGGACTCTAGCCGTACGGTTTCAACCGACGTCTCGAGGTTGAGCCTCGAGTTTTCACAGCTGACCTGTGCGGCCGCCTACACGCTCTTTACGCCCA
ATAAATCCGGACAACGCTTGCCCCCTACGTATTACCGCGGCTGCTGGCACTCAGTCAGTCA

>CUP1P4E02 Uncultured soil bacterium (Acidobacteria)
CATACTTGGGCGTCTGCTCCTTGCGGTTGGCACGACGACTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTC
GATCTGATACGCCATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTGCGATTAGCTCCCCCTCACGGGTTCGCGA
CGCTCTGTGGCGCGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACCTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTCGTAGAG
TTCCCCCTTGCGGGTAGCAACTACGAGTAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACACAGGTC
CCTTGCGGGAAGACCCGATTTCTCAGGCTGGTCCTGTGCGGTTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCC
CCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGCAGGACTTAACGCGTTAGCTCCGGGACTTGCCCCGTACAGGGCAAACCCCAAGTCCTGATG
GTTTAGGGCTAGGACTACCCAGGGTATCTAATCCTGTTTGCTCCCCTAACTTTCGTCCCTCAGCGTCAGTTGCGATCCAGCGAGCCGCTTTCGCCTCGGATGTCCCTGC
GGATATCTACGCATTTCAC

>CUP1P4E04 Uncultured bacterium (Acidobacteria)
GGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCCGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGT
CGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCC
CACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCCCAACTGAATGATGGCAACTGACAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGA
CACGAGCTGACGACAGCCATGCAGCACCTATATAGCATCCCTTGCGGGAAGGGATGTTTCCACCCCGGTCCACTACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCG
TCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTTCGG
CACGTTGGGATTGGGTA

>CUP1P4E05 Uncultured bacterium (Verrucomicrobiae)
TTCGACACTTTTAGGGGCGGCTTCGGGTGCAACCGGCTTTCATGATGTGACGGGCGGTGTGTACAAGGCCTGGGAACGTATTCACGGCGCCGTAGCTGATGCGCCATT
ACTAGCGATTCCAGCTTCATGCCGTCGAGTTGCAGACGACAATCTGAACTGGGCCCGGTTTTGGGGGATTTGCTCCAGCTTACGCTCTTGCTTCCCTTTGTACCGGGCA
TTGTAGTACGTGTGCAGCCCTGGCCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCGTTGAAGCGAGGCAGTCTGTCCAGAGTGCTCCCAATTAAGG
GGTGGCAACAGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAGCTTCCCTTGCGGGAT
CGTCAGACTTTCATCCTTCTACTACTTGCATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTGAGCCACATACTCCACCGCTTGTGCAGGCCCCCGTCAATT
TCTTTGAGTTTTAACCTTGCGGCCGTACTTCCCAGGCGGCGCGTTTAACGTGTTAACTTCGCCACGAGCGGGGTCGATTCCATTCACAGCAAACGCGCACCGTTTAGGG
CCAGGACTACCGGGGTATCTAATCCCGTATGCTCCCCTGGCTTTCGTGCCT

>CUP1P4E06 Uncultured bacterium (Acidobacteria)
TCTTCCTTGCGGTTAGAATTACGACTTCTAGTACAAACCACTTTCGTGATGTGACGGGCGGGGTGTACAAGGCCCGGGAACGTATTCACCACGTCGTTCTGATACGTGA
TTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGGTTTTTTCCGATTGGCTCCCCCTCGCGGGTTAGCAACGGTTTGTACCGGC
CATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCCCGTTATCCGAGGCAGTTCCCTTAGGGTGCTTCCTTGCGGC
TAGCAACTAAGGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACAGCCGTCCCTTGCGGGAAAG
CCTCATCTCTGAAGCCGGCGACTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGGATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTT
TGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAACACTTAATGCGTTAGCTTCGGCACA

>CUP1P4E09 Uncultured bacterium (Acidobacteria)
ACTTCTAGTACAACCCACCTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAGCTTCATGG
AGTCGAGTTGCAGACTCCAATCCGAACTGAGGATGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCACCCATTGTAGCACGTGTGTAGCCCTG
GACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCGCCAGAGTGCCCAACTGAATGATGGCAACTGGCAATAAGGGTTGC
GCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGCAGCCCTTGCGGGAAGGGATGTTTCCACCCCGGCCCACTAC
ATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACT
CCCCAGGCGGATCGCTTAACGCGTTAGCTCCGGCACGATAGGATTGGGTACCTATCACACCAAGCGATCATCGTTTAGGGCTAGGACTACCA

>CUP1P4E10 Uncultured bacterium (Acidobacteria)
GGTTAGTGTGGCGACTTCTAGTACAACCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTGCTGATCCGCGATTACTAGCGA
TTCCAACTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCCACCTTACGGTATCGCGACGGTTTGTACCGGCCATTGTAGCA
CGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTTCAGAGTGCCCACCATAACGTGATGGCAAC
AGAAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGACTCCTTTCG
GAGTGTGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
CCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATAACCGNCACACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGG
GTATCTAATCCCGTTTGCTCCCCTGTGCTTCGCTCATCAGCGTCAGTATCGGTCCAGGA

>CUP1P4E11 Uncultured actinobacterium (Actinobacteria)
GAGCGCCTGCCTCCTTGCGGTTGGCACGGCGATTTCTAGTACAGCCCACTTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGCCGTTCTGAT
GCGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTGCGATTAGCTCCCCCTCGCGGGTTCGCGACGCTTTGT
GGCGCGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACCTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTCGTAGAGTTCCCCCT
TGCGGGTGGCAACTACGAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACACAGGTCCCTTGCG
GGAAGTCCCTATTTCTAGGGAGGGTCCTGTGCGGTTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGCAGGACTTAACGCGTTAGCTACGGGACTTGCCCCGTACAGGGCAAACCCCAAGTCCTGATGGTTAAGG
GCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTTCGTCCCTCAGCGTCAGTTGTGATCCAGCG

>CUP1P4E12 Uncultured bacterium (Acidobacteria)
GTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATC
CGAACTGAGCAGAGTTTCTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTG
ACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAAC
ACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTTGTCAGAAGCATTTCGAGCCCAGGTAAGGTT
CCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACG
CGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTC
AGCGTCAGTAGTGGTCCAGCGCGCC

>CUP1P4F01 Uncultured bacterium (Não classificada)
ACACCCAGCTTCCATGGCTTGACGGGCGGTGTGTGCAAGGTCCGGGAACGTATTCACCGTATCATTGCTGATATACGATTACTAGCGATTCCAGCTTCATGGAGTCGAG
TTGCAGACTCCAATCTGAACTGAGAGGCGTTTTTTGGGATTGGCTCCTTATCGCTAAGTGGCAGCCCGTTTGTACGCCCCATTGTAGCACGTGTGCAGCCCTGGGCATAA
AGGCCATGATGACTTGACATCATCCCCTCCTTCCTCGCGTCTTACGACGGCAGTTTCAGTAGAGTTCCCAGCGTTACCTGATGGCAACTACTGATGGGGGTTGCGCTCG
TTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTTACTAAGTGTGTATTGCTACAAAAAGAGCTTTCACCCTCGGTCACTTAGCAT
TCTAGCCCAGGTAAGGTTCCTCGCGTATCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGACCCCCGCCAATTCCTTTGAGTTTCAACCTTGCGGTCGTACTTCC
CAGGTGGGATACTTAATGCTTTCGCTCAGACACACACAGTGTATCGCGTATGTCGAGTATCCATCGTTTAGGGCGTGGACTAC

>CUP1P4F02 Uncultured bacterium (Deltaproteobacteria)
ACTGCCTCCTTGCGGTTAGCGCGGCCGTTTCTTGGAGCAACTGACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCCCTACCTGCTGATTA
GGGATTACTAGCGATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCTGAACTGAGGCCGGTTTTTTCCGATTGGCTCCCCCTCGCGGGTTAGCAACGGTTTGTAC
CGGCCATTGTAGCACGTGTGTAGCCCTGGGCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTAACACCGGCAGTCTCGTTAGAGTGCTCAGCCG
AACTGTTAGCAACTAACGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGGACACTCGGTTCTCTTG
CGAGCACATCCACATCTCTGCGGACTTCCGAGGGGTTCCAACCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTC
AATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGTGCTTAACGCGTTAGCTACGACGCCTCCGGGGTCAATACCAGAAACATCTAGCACCCATCGTTT
ACGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCAGGCTTTCGCGCCTCAGCGTCAGTATCC

>CUP1P4F04 Dyella marensis (Gammaproteobacteria)
CGTAAGGGCATGATGACTTGACGTATCCCACTTCCTCCGGTTGTCACCGGAGTCTCCTTAAGTTCCACATTACTGCTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCG
GGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCTGATTCCCGAAGGCACTCCCGCATCTCTGCAGGATTCCAGACATGTCAAGG
CCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCG
GCGAACTTAACGCGTTAGCTTCGACA

>CUP1P4F05 Uncultured bacterium (Não classificada)
GCGGCTGCGTCCTTGCGGTTCGCGCACCGACTTCTAGTACAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCGTTCTGATC
TGCGGTTACTAGCGATTCCAGCTTCATGGAGTCGGGTTGCAGGCTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCTTCGCAGGTTTGCGACGGTTTGTA
CCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCCGTTATCCGGCGCAGTTTCGCTAGAGTGCCCGGCA
TAACCCGATGGCAACTAGAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGCCCGTGA
GGGCGGGGATGTTTCCACCCCATTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATGCTTAACGCGTTAGCTACGGCACGATCGGATTGGGTACCGATCACACCAAGCATCCATGGTTTAG
GGCTAGGACTAC

>CUP1P4F06 Uncultured bacterium (Acidobacteria)
CCCTTACGGTTGGCGTACCGACTTCTAGTGCAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCCGCGATTAC
TAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGGCCATT
GTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTCTGCCAGAGTGCCCAACTAAATGATGG
CAACTGGAAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACATCGGCCCCTTGCGGGGAAGGGA
TATTTCTACCCCGGTCCAATGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGA
GTTTCAGCCTTGCGACCGTACTCCCCAGGCGGACTGCTTAACGCGTTAGCTACGGCACGGCGGGATTGGGTACCCGTCACACCAAGCAGTCATCGTTTAAGG

>CUP1P4F08 Unidentified bacterium (Não classificada)
GGTGTGTACAAGGCCCGGGAACGTATCACGCTATCATCTGATATAGCATTACTAGCGATTCCGCTCTGCAGGCGATTGCAGCTAATCCGAACTGAGGACGGTTTGGCGA
TTACTCCCCCTTGCGGGTTGGACGCTTTGTACCGCCATTGTACCGTGTGTGGCCTGACATAAAGGCATGATGACTTGACGTCATCCCCACTTCCTCCAGCTTATCGCTG
GCGGCTCCTGAAGTGGCCTTGCGGCATGCCAAACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACC
TCGACTCCAGTCCCTTGCGGGAAAACCGTGTTTCCACAGTCTGTCCGAAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCG
CTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGCATACTTAACGCGTTAGCTCCGGCACGAACCGAATGAACGGCTCACAC
CAAGTATGCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGTTT

>CUP1P4F09 Uncultured alpha proteobacterium (Alphaproteobacteria)
CTCCTTGCGGTTAGCGCACCGGCTTCGGGTAAAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGTGGCGTGCTGATCCACGATTA
CTAGCGATTCCGACTTCATGCACTCGAGTTGCAGAGTGCAGTCCGAACTGAGACGGCTTTTTGAGATTAGCTCAGCCTCGCGGCTTTGCTGCCCATTGTCACCGCCATT
GTAGCACGTGTGTGGCCCAACCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTGTCACCGGCAGTTTCTTCAGAGTGCCCAGCCGAACTGATG
GCAACTGAAGATGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCAGGTCTATTGCTAGAAGGAA
CCCGTTTCTGGGAACCGTCCTGGCATGTCAAGGGTTTGTAAGGTTCTTCGCGTTGCTTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGAGTGCTTAATGCGTTAGCTGCGTCACTGAGGTGCAA

>CUP1P4F10 Uncultured bacterium (Acidobacteria)
GCTTCCTTGCGGTCAGCGCGGCGACTTCTAGTACAACTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCA
TTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTCTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTG
CATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAG
TGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACTTGTCCCTTGCGGGAAGG
CCGTATTTCTACAGCTTGTCAAGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCT
TTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGG
ACTACCAGCGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTCATTCAGCGTCAGTTGTGGTCCAGCGCGCCGCTTTCGCCACGGGTGTTCCTGCAGATATCTACGCAT
TTCA

>CUP1P4F11 Uncultured Verrucomicrobia bacterium (Verrucomicrobiae)
GACGGCGACTTCGCGTACAAGCGGCTTCATGATGTACGGGCGGTGTGTACAAGGCCTGGGAACGTATTCACGGCACCGTAGCTGATGTGCCATTACTAGCGATTCCGGC
TTCATGCCGTCGAGTTGCAGACGACAATCTGAACTGGGCCCGATTTTAGGGGATTTGCTCCACCTGACGGTCTTGCTTCCCTTTGTATCGGGCATTGTAGTACGTGTGC
AGCCCTGGCCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCATTTAGATGAGGCAGTCTGTCCAGAGTGCTTCAAACTCTCGTTTGAGTGGCAACAG
GACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAGCTTCCCTTGCGGGCTCGTCCCACTTT
CATGGTTCTACTACTTGCATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAGCCACATACTCCACCGCTTGTGCAGGCCCCCGTCAATTTCTTTGAGTTT
TAATCTTGCGACCGCACTTCCCAGGCGGCATATTTAACGCGTTAGCTGCGCCACAAAAGGGGTCGATTCCTTTTACAGCAAATATGCACCGTTTACGGCTAGGACTACC
AGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTGCCTCAGTGTCAGGAATCGTCC

>CUP1P4G01 Uncultured bacterium (Alphaproteobacteria)
AACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGTAGCATGCTGATCTACGATTACTAGCGATTCCAATTTCATGTACTCGAGTTGCAGA
GTACAATCCAAACTGAGACGGCTTTTTGAGATTAGCTAGCCCTTGCGGGATCGCGACTCATTGTCACCGCCATTGTAACACGTGTGTAGCCCAGGATGTAAGGGCCGTG
AGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCAGTTTCCTCAGAGTGCTCAGCATTACCTGGTAGCAACAGAGGACGAGGGTTGCGCTCGTTGCGGGA
CTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCCCCACCCGAAGTGAAGGACTCCTTTTCGGGAGTCCAAAAGGGACATGTCGAA
TCCTGGTAAGGTTCTTCGCATTGCCTCGAATTAAACCACATGTTCCACCGCTTGTGCGGGTCCCCGTCAATTTCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGC
GGGGTGCTTAACGCGTTAGCTGCGCTACTCAGGGGTAACCCCCGAACAGCTAGCACCCATCGTTTACAGCACGGACTACCAGGGTATCTAATCCTGTTTGATCCCCGTG
CTTTCGCGCCTCAGCGTCAGTTGTCGTCCAGAT

>CUP1P4G02 Uncultured alpha proteobacterium (Alphaproteobacteria)

GGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGCGCTGATCCGCGATTACTAGCGATTCCAGCTTCATGCTCTCGAGTTGCAGAGAACAATCCGAACTGAGAC
GGCTTTTCGAGATTGGCTCGGGGTCGCCCCTCCGCCTCCCTCTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCATAAAGGCCATGAGGACTTGACGTCATCCCC
GCCTTCCTCCGGCTTGTCACCGGCAGTTCCTTCAGAGTGCCCGGCTTCACCCGATGGCAACTGAAGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACG
ACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGCCAGCCGAACTGAAGAAGCCGATCTCTCGGCCCCATACGGGACATGTCAAGGGCTGGTAAGGTTCTTCGC
GTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTGCGCTTAACGCGTTAG
CTGCGACACCGGCAGACTAGGTCCGCCAACGTCTAGCGCACATCGTTTACAGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCGCCTCAGCGT
CAGTTACGGTCCAGAGAGCCGCCTTCGCCACCGGTGTTCTTCCCAATATCTACGA

>CUP1P4G05 Unidentified bacterium (Não Classificada)
CGACACTGCCCCCTTACGGTTGGCCGGGCGGCTTCAGGTGTTGCCCGCTTTCGTGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACATATCACCGCGGTGTGCTGAC
CCACGGTTACTAGCAACTCCGCCTTCACGCAGGCGAGTTGCAGCCTGCGATCTGAACTGAGACCGGCTTTGACTGGATTAGCTCCGGCTCGCGCCCTCGCTTCCCGTTG
TACCGGCCATTGTAGCGTGTGTGTAGCCCGGGACGTAAGGGCCATGCTGACTTGACGTCATCCCCGCCTTCCTCCGGTTTGCTTCCGGCAGTCGCGCCAGACAGCCTAA
CTGGCGCCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAACACCTGCACAGGTGCTCCGAAGAGCCAGACCATCT
CTGGCCTGTTCACCTGCATGTCAAGCCCCGGTAAGGTTCTACGCGTTGCGTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTT
AGCCTTGCGGCCGTACTCCCCAGGCGGGCGACTTATCGCGTGTGCTCCGGCACGGAAGGGGTCGATACCTCCCACACCTAGTCGCCATCGTTTAGGGCCAGGACTACCG
GAGTATCTAATTCCGTTCGCTCCCCTGGCTTTCGCGCCTCAGCGTCAGGGTCGGCCCAGCCGGCCGCCTTCGCCACTGGTGTTCTGCCCG

>CUP1P4G06 Uncultured soil bacterium (Alphaproteobacteria)
GCTGCTCCCTTGCGGGTTAGCGCACCGTCTTCGGGTGAAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAGGCCTGGGAACGTATCACCGCGGCGTGCTGATCCGC
GATTACTAGCGATTCCGCCTTCATGCTCTCGAGTTGCAGAGAACAATCCGAACTGAGACGGCTTTTTGGGATTTGCTCACCCTCGCGGGTTTGCTGCCCGTTGTCACCG
CCATTGTAGCACGTGTGTAGCCCAGCGCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCAGTTTCTTTAGAGTGCCCAACTAAAT
GGTAGCAACTAAAGACGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCAGGTCCCGTAAGGGAA
GGAATCCATCTCTGGAAACCGTCCTGGCATGTCAAACGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCAGGCCCCCGTCAATTT
CTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGAGGACTTAACGCGTTAGCTGCGCCACCGGAACGCCAAGCGCCCCGACAGCTAGTCCTCATCGTTTACGGCG
TGGACTA

>CUP1P4G08 Uncultured bacterium (Acidobacteria)
ACGGCTGCTCCCTTGCGGTTAGCGCACCGGCTTCTAGTACAGCCCACTTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATC
CGCGATTACTAGCGATTCCAGCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCTTCGCAGGTTTGCGACGGTTTGTA
CCGACCATTGTAGCACGTGTGTGGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCGCCAGAGTGCCCAACT
AAATGATGGCAACTGGCAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCACCCCTTGCGG
GAAGAGATGTTTCCACCTCGGTGCACTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATT
CCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGGATTGCTTAACGCGTTAGCTGCGGCACATTGGGATTGGGTACCCAATACACCAAGCAATCATCGCTTAGGG
CTAGGACTAC

>CUP1P4G09 Uncultured bacterium (Acidobacteria)
CAAGGCCCGGGAACGTATTCACGGCAGCGTGCTGATCTGCCATTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTTTG
CGATTGGTCCCCCTCGCGGGCTTGCAGCGCTTTGTACCGTCCATTTGTAGCACGTGTGTNCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACTTCCTCCA
GCTTATCGCTGGCGGTCTCCTGCGATCCGCTTTCGGCATGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCAAATTCACGAACGAGCTGACGAAGCATG
CAGCACTCGATGGACCCCTTGCGGGGTACGATGTTCCACCGCCGTTAACCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCAC
CGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACGGATCAACTGAATGACCCAC
ACCAAATATGCATCGTTTAGGGCGTGGACTACCAGCGTATCTAATCCTGTTTGCT

>CUP1P4G10 Uncultured bacterium (Acidobacteria)
AAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTCTCC
GATTAGCTCCCCCTCACGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCT
CCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACG
ACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGA
ACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACC
CGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGNGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTTGTGGTCCAGCG
CGCCGCTTTCGCCACGGGTGTTCCTGCAGATATCTACGCATTT

>CUP1P4G11 Uncultured bacterium (Acidobacteria)
CTCCCTTGCGGGTCAGCCTGCAGACTTCTAGTACAATTCACTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCAGCGTGCTGATCTGCCAT
TACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTTTGCGATTGCCTTCCCCTCGCGGGTTCGGGACGCTTTGTACCGTCC
ATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTTCCGCCTTTCGGCA
TGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCCTTGCGGGGTAA
AGATGTTTCCACCTCCGTTGACCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCT
TTGAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACGGATCAACTGAATGACCCAAACCAAATATGCATCGTTTAGGGCGTGG
ACTACCAGGGTATCTAATCCTGTTTGCTACCCACGCTTTCGTGTCTCAGCGTCAGTTACGGTCCAGAAAGCCGTCTACACCACCGGTGTTCCTCCTGATATCTACGC

>CUP1P4G12 Uncultured bacterium (Actinobacteria)
TAGGCCACCGGCTTCGGGTGTTGCTCGCTTTCGTGGTGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATTGCTAGATCCGCGATACTAGCAACTCC
ACCTTCATGGAGGCGAGTTCAGCCTCCAATCCGAACCGAGGCGCACTTTATGGGATTTGCTCCACCTCACGGTATTGCTGCCCTTTGTATGCGCCAATGTAGCACGTGT
GTAGCCCTGGACATAAGGGGCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTATGAGTTCCCAACTGAATGCTGGCAACATAGGAC
GGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGATGGTGTCCCGAAGGAAAACCGTGTTTCCACGGCG
GTCACCAACATGTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGC
GGCCGTACTCCCCAGGCGGGGTACTTAGTGCGTTAGCGACGGCACGGGAGGAGTCGACACCTCCCACACCTAGTACCCATCGTTTACGGCGTGGACTACCCGGGGTATC
TAATCCTGTTCGCTCCCCAAGCTTTCGCGCCTCAGTGT

>CUP1P4H01 Uncultured bacterium (Não classificada)
TAGATCACCGATTTCTGTTGCAGCGGGCTTTCGTGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCCTGCTGATCTGCGATTACTAGCGATTCC
GCCTTCACGTGGGCGAGTTGCAGCCCACGATCTGAACTGGGGCCGGCTTTCAGGGTTTGGCTCCACCTTACGGTATTGCTTCCCGTTGTACCGACCATTGTAGCACGTG
TGTAGCCCTGGACATAAGGGCCATGAGGATTTGACGTCGTCCCCACCTTCCTCCTTCTTATCGAAGGCAGTTTTCGAAGAGTGCTCCCCTTGCGGGGGTGGCAACATCG
AATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAACCATGCAGCACCTCTGCTGGCTTCCTTGCGGATCAGCCCTTTTTTCAA
AGGACTTACTACCAGTAGTTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTCGTGCGGGCCCCCATCAATTCCTTTGAGTTTCA
ACCTTGCGGCCGTACTCCCCAGGCGGCTCATTTAATGCGTTAGCTCGGCGCGGAAGGGGTCGATACCTCCCAAACCTAATGAGCATCGTTTATGGCTAGGACTACCAG
GGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCAGATCAGAGTCAGTGACGGTCCAGTAGCCTGGTTTCGGCATAAGGTATTCCTCCCG

>CUP1P4H02 Uncultured bacterium(Gammaproteobacteria)
CTGGTGCAATCACTTCCATGGTGTGAGGGCGGTGTGTACAAGACCCTGGAACGTATTCACCGCGACGTTGCTGATTCGCGATTACTAGCGATTCCGACTTCACGGAGTC
GAGTTGCAGACTCCGATCCGGACTACGACTGGCTTTCTGGGATTGGCTCCCCCTCGCGGGTTGGCAGCCCTCTGTACCAGCCATTGTAGCACGTGTGTAGCCCTGGTCA
TAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCCTAGAGTTCCCAACTAAATGATGGCAACTAGGGACAAGGGTTGCGCTC
GTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTCGGCTCCCGAAGGCACCCCCGCATCGCTGCAGGGTTCCGAGGATG
TCAAGACCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCC

CAGGCGGAGAACTTAGCGCGTTAGCTACGACACCGAGAGGCTAATCCCTCCCGACATCTAGTTCTCATCGTTTACGGCGTGGACTACCAGCGTATCTAATCCTGTTTGC
TCCCCACGCTGTCGCACCTGAGTGTCAGTATTGGGCCAGGTAGCCGCCTTCGCCACTGATGTTCCTCCCGATATCTACGCATT

>CUP1P4H03 Uncultured bacterium (Betaproteobacteria)
ACTTCTGGCAGAACCCGCTCCATGGTGTGAGGGCGGTGTGTACAAGATTCGGGAACGTATTCACCGCGACATGCTGACCCGCGATTACTAGCGATTCCGACTTCACGCA
GTCGAGTTGCAGACTACGATCCGGACTACGACTGGTTTTATGGGATTAGCTCCCCCTCGCGGGTTGGCAACCCTCTGTACCAGCCATTGTATGACGTGTGTAGCCCTAC
CCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCCCTTTCGTAGCAACTAATGACAAGGGTTGCGCTCGT
TGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCTGGCTCTCTTTCGAGCACTCCCACATCTCTGCGGGATTCCAGACATG
TCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAAACCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCC
CAGGCGGTCAACTTCACGCGTTAGCTTCGTTACTGATCCAGTGAAGGACCAACAACCAGTTGACATCGTTTAGGGCGTGG

>CUP1P4H04 Uncultured eubacterium (Betaproteobacteria)
GGTTAGGCTAACTACTTCTGGCAGAACCCGCTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCGGCAAGCTGATCCGCGATTACTAGCGAT
TCCGACTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGACCGGTTTTCTGGGATTGGCTCCCCCTCGCGGGTTGGCAGCCCTCTGTACCGGCCATTGTATGAC
GTGTGTAGCCCTACCCATAAGGGCCGTGAGGACCTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCCCTTTCGTAGCAACTAATGACA
AGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACGGCCATGCAGCACCTGTGTTCAAGTTCTCTTTCGAGCACTTCCACATCTCTGCG
AAATTCTTGACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAAACCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAACCTT
GCGGCCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACTGAGAAGGAACCTTCCCAAAAACCAGTTGACATCGTTTAGGGCGTGGACTA

>CUP1P4H05 Uncultured bacterium (Acidobacteria)
AAGGCTGCTCCTTGCGGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCG
CGATTACTAGCGATTCCAGCTTCATGGGGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACC
GACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTG
ACCCGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTAACGACAGCCATGCAGCACCTATGCAGCAGCCTTTTAAG
GGGAAGGGATGTTTCCACCCCGGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCG

>CUP1P4H07 Uncultured bacterium (Não classificada)
GGACTTACTTAGTTAATCTTCAAGCAAAACTGACTCTCTGCATGTGACGGGCGGTGTGTACAAGGCTAATTGACATATTCACCGCAACGTTCTGATTTGCGATTACTAG
TGATTCCAACTTCATATAAGCGAGTTTCAGCTTATAATCCGAACTGGGAAAATTTTTGAAGATTAACGAAAAGGTATAACTTTTTGTAACTTTTTGTAACTTTCATTGT
AGCACATGTGTAGCCCAATCCATTAGGGTCACACTGACTTGACTTAGTTCTCACCTTCCTTCAACTTATCGTTGACAGTATCTTTAAAGCTTATTTTCAAAATTTTAGA
CTATTTCAAAAATCAGTAAAACACTATATAAAGACAAGAGTTACGCCCGTTTAGGGAATTAACCAAACATCTCACGACACGAGCTGACGACAGCCGTGCAGCACCTGTA
AAAGTTATTTGTATAGTTATATTTGCCTAAAAGTGCAAAACATACGAAAACTATTATTCAAGGATTGGTAAGGTTTTGCGCGGATTATCGCATTAAACCACATGCTCCA
CCACTAGTATTAGCCCCCGTCAATTCCTTTGAGTTCCAACCTTGCGATCGTACTTCTCAGGCGGAGTGCTTATAGCGTTAGCTTAAAAATCTAAATAAGTATTTGATAA
CAGTATGTATTTTGAATACTACGTAACTTACATTAAATCACAGCACTCATAGTTTACAGTATGGACTACCGGGGTATCTAATCCTGTTTGCTACCCATACTTTCGTCCT
CAACGTCAGTTTT

>CUP1P4H08 Uncultured bacterium (Acidobacteria)
GGTTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCCGGCGTCGATCTGATACGCCATTACTAGCGATT
CCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACG
TGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGT
GCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCTAC
AGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGT
CTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGCGTA
TCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAATGGTCCAGCGCGCCGGTTTCGCCACGGGTGTTCCTGCAGATATCTACGC

>CUP1P4H10 Uncultured bacterium (Gammaproteobacteria)
TAGGCGCCCCCTTGCGGTCAGGCTACTGCTTCTGGTGCAGTAAACTTCCATGGTGTACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAGCAATGCTGATCT
GCGATTACTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTTCTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCCTCTGTAT
CTACCATTGTAGCACGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGTGTGCCCAACTG
AATGCTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGGCGACAGCCATGCAGCACCTGTCTCCAGGCTCCTTGCGG
CACCCCTAAATCTCTTCAGGGTTCCTGGGATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATT
CCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGAGAACTTAGCGCGTTAGCTACGACACTGCAGGGCTT

>CUP1P4H11 Uncultured bacterium (Betaproteobacteria)
CCCCCTTGCGGTTAGGCAACGGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGTGACATGCTGATCCACGATTA
CTAGCGATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCAT
TGTATGACGTGTGAGGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCACTAGAGTGCCCTTTCGTAGCAAC
TAGTGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCCGGCTCCCTTTCGGGCACTCCCACA
TCTCTGCGGGATTCCGGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTT
TTAATCTTGCGACCGTACTCCCCAGGCGGTCGACTTCACGCGTTAGCTGCGTTACCGAGAAAATGAATTCCCGACAACTAGTCGACATCG

>CUP1P4H12 Uncultured bacterium (Acidobacteria)
TGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAAACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCGGTCCCTTGCGGGAAGGCCGTATTTCT
ACAGCTGGTCCGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACGCCCGAACGGGCGAAAACCCAAGTCCTGATC

ANEXO 10 – SEQÜÊNCIAS DOS CLONES OBTIDOS A PARTIR DA BIBLIOTECA CUP2 E SUA CLASSIFICAÇÃO (BLAST E RDPII)

>CUP2P1A01 Uncultured bacterium (Alphaproteobacteria)
CGGTGCTCCTTGCGGTTAGCGCACGTCTTCAGGTAAAGCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGC
GATTACTAGCGATTCCGACTTCATGTGCTCGAGTTGCAGAGCACAATCCGAACTGAGACGGCTTTTTGAGATTTGCGCAGGATCACTCCATTGCATCCCATTGTCACCG
CCATTGTAGCACGTGTGTAGCCCAGCCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCCCCTTAGAGTGCCCAACTGAA
TGATGGCAACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGAACTG
AAGGGATCGATCTCTCGTTCCCGCGACCGGGATGTCAAGGGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGGATGCTTAAAGCGTTAGCTGCGCCACTGACGTGCAAGCTCGCCAACGGCTAGCATCCATCGTTTACGG
CGTGGACTACCAGTGTATCTAATCCTGTTTGCTCCCCAAGCTTTCGCACATCAGCGTC

>CUP2P1A02 Uncultured bacterium (Acidobacteria)
AGACTTCTAGTACAATTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCAT
GCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTACCCTGCATTATAACACGTGTGTAGCCC
TGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCCTCTCTTGCGAGTAGTAACTGTGTGCAGGGGTTG
CGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTAGTGTTCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCCG
AAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCG
TACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACGCCCGAACGGGCGCC

>CUP2P1A03 Bacterium Ellin5003 (Alphaproteobacteria)
ATCTTCGGGTAGAACAACTCCCATGGCGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCACCTTCATGC
ACTCGAGTTGCAGAGTGCAACCCGAACTGGGACGGCTTTTTGGGATCGGCTCCGGCTCGCGCCTTCGCATCCCACTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGC
CCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTGTCACCGGCAGTTTCTCCAAAGTGCCCAGCTTAACCTGATGGCAACTGGAGACGAGGGTTG
CGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTGACTCCGGCCGAACCGAAGGGAGCGTCTCTGCTCCCGGCGA
GTCACATGTCAAGGGCTGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGCC
GTACTCCCCAGGCGGGGTGCTTAACGCGTTAGCTGCGACACTGACGAGCAAGCTCGCCAACGTCTAGC

>CUP2P1A04 Draba nemorosa (Cyanobacteria)
CCCCCTCCTTGCGGTTAGGTAACGACTTCGGGCATGGCCAGCTCCCATAGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGAATCACCGCCGTATGGCTGACCGGCG
ATTACTAGCGATTCCGGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGGACGGGTTTTTGGAGTTAGCTCACCCTCGCGGGATCGCGACCCTTTGTCCCGG
CCATTGTAGCCCGTGTGTCGCCCAGGGCATAAGGGGCATGATGACTTGACGTCATCCTCACCTTCCTCCGGCTTATCACCGGCAGTCTGTTCAGGGTTCCAAACTCAAC
GGTGGCAACTAAACACGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTTACGGCACGAGCTGACGACAGCCATGCACCACCTGTGTCCGCGTTCCCGAAGGCAC
CCCTCTCTTTCAAGAGGATTCGCGGCATGTCAAGCCCCGGTAAGGTTCTTCGCTTTGCATCGAATTAAACCACATGCTCCACCGCTTGTTCGGGCCCCCGTCAATTCCT
TTGAGTTTCATTCTTGCGAACGTACTCCCCAGGCGGGATACTTAACGCGTTAGCTACAGCACTGCACGGGTCGATACGCACAGCGCCTAGTATCCATCGTTTACGGCTA
GGACTACTGGCGTATCTAATCCCATTTGCTCCCCTAGC

>CUP2P1A05 Uncultured bacterium (Acidobacteria)
TACTTGGGCGCTTGCTTCCTTGCGGTCAGCGCGGCGACTTCTAGTACAACTCACTTTCGTGATGNACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGAT
CTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTCTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGG
TTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTC
CCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACCTGTCCC
TTGCGGGAAGGCCGTATTTCTACAGCTTGTCAAGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCC
CGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGGCACCCAAGTCCTGATCGT
TTAGGGCTAGGACTACCAGGGTATCTAATCCTGTNTGCTCCCCTAGCTTTCGTCATTCAGCGTCAGTTGTGGTCCAGCGCGCCGCTTTCGCCACGGGTG

>CUP2P1A06 Uncultured Acidobacteria bacterium (Acidobacteria)
TACTTGGGCCGCTGCTCCCCTTGCGGGTTAGCGTGCAGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGCTAT
CGTTCTGATATAGCATTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTAAGGACGGTTTTTGGCGATTAGCTCCCCCTCGCGGGTTGGCA
GCGCTTTGTACCGCCCATTGTAGCACGTGTGTGGCCCTGGACATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGAGA
GTTGCGCCTTGCGGCATGCCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTCCA
NCCCCTTGCGGAGTAGCGATGTTTCCACCGCCGTTGAGAAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGG
GCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGAACGTACTCCCCAGGCGGCATACTTAACGCGTTAGCTCCGGCACGAAACGAATGAACGGGTCACACCAAGTATGC
ATCGTTTAGGGCGTGGACT

>CUP2P1A07 Alcaligenes faecalis (Betaproteobacteria)
CTACGTGGTATCGCCCCCTTGCGGTTAGGCTAACTACTTCTGGTAAAACCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGACATG
CTGATCCGCGATTACTAGCGATTCCGACTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGATCGGGTTTCTGGGATTGGCTCCCCCTCGCGGGTTGGCGANCC
TCTGTCCCGACCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGC
CCTTTCGTAGCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCTCTTG
CGAGCACTTGCCAAATCTCTTCGGCATTCCAGACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGT
CAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCC

>CUP2P1A08 Uncultured Acidobacteria bacterium (Acidobacteria)
GGTTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTCACGGCGTCGATCTGATACGCCATTACTAGCGAT
CCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTCCGATTAGCTCCCTCTCGCGAGTTGGCAACGGTTTGTAACGCGCATTGTAACAC
GTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCCTTGCGGAGTGGCAACTA
CGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACCTGTCCCTTGCGGGAAGGCCGTGTTTC
CACAGCTGGTCAGGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAG

>CUP2P1A09 Uncultured bacterium (Verrucomicrobiae)
TCGGGTACAAACGGCTTTCATTGATGTGACGGGCGGTGTTACAATGCCCGGGAACGTATCACGGCGCCGTAGCTGATGCGCCATTACTAGCAATTCCGGCTTCATGGAG
GCGAATTGCAGCCTCCAATCCGAACTGGGCCCAGTTTTAAGTGATTTCCTCCACCTCGCGGTATCGGATCGTTCTGTACTGGGCATTGTAGTACGTGTGCAGCCCAGGC
CGTAAGGGCCATACTGACTTGACGTCGTCCCCACCTTCCTCCTCGTTTAAGCGAGGCAGTCTGAACAGAGTGCTGGAACCTCTCGGTTCCGTGGCAACAGTTCACAGGG
GTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAATTGTCTCTTTCGAGACTCGCTGGCTTTCACCAACT
TAGAGATGCATGTCAAGGCCTGGTAAGGTTTTTCGCGTTGCATCGAATTGAGCCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTTCCTTGAGTTTTAATCTTGC
GACCGTACTCCCCAGGCGGCACGTTTAACGCGTTGGCTCCGGCGCAGAAGGGGTCGAATCCTCCCANACCAAACGTGCACCGTTTACTGCCAGGACTACCGGGGTATCT
AATCCCGTT

>CUP2P1A10 Uncultured bacterium (Actinobacteria)

GGCTTCGGGTGTTACAACTTTCGTGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCCCGGCGTGGCTGATCCGGGATTACTAGCGACTCCGACTTCATG
GAGTCGAGTTGCAGACTCCAATCCGAACTGAGACCGGCTTTTTGGGATTCGCTCCTCCTCGCGGATTAGCAGCCCTTTGTACCGGCCATTGTAGCATGTTAGCAGCCCT
ACGCGTAAGGGGCATGCAGACTTGACATCATCCCCACCTTCCTCCGAGTTGACCCCGGCAGTCTCCTACGAGTCCCCGGCTTACCCGCTGGCAACATAGGACAAGGGT
TGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTATCGCAGGCCCTTTCGGACACCGTGTCTCCACGGCTTTTCCTGC
GTAGTTCAACGTAGGTAAGGTTCTTCGCGTTGCATCGAATTAAGCAACATGCTCCGCCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTAC
TCCCCAGGCGGGGCACTTAATGCGTTAGCTACGGCACAGAGAGCGTTGAAACTCCCCACACCTAGTGCCCAACGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGT
TTGC

>CUP2P1A11 Uncultured bacterium (Actinobacteria)
GGTTAGCACAGCGACTTCTAGTACAACCCACTTTCGTGATGNACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGTTCTGATACGCCATTACTAGCGAT
TCCGGCTTCATGCAGTCGGGTTGCAGACTGCAATCCGAACTGAGCGCGGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTCGCGACGGTTTGTACCGCGCATTGTAACAC
GTGTGTAGCCCTGGACATAAAGGCCGTGCTGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTTCTCTTAGAGTTCCCCCTTGCGGGTGGCAACTAAG
AGTAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACCAGTGTCCCTTGCGGGAAGGCGATGTTTCCA
CCGCTGGTCACTGGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
CCTTGCGACCGTACTCCCCAGGCGCAGGACTTAA

>CUP2P1A12 Uncultured bacterium (Verrucomicrobiae)
GGGAACGTATCACGGCGTCGTAGCTGATACGCCATTACTAGCGATTCCGGCTTCATGAAGTCGAGTTGCAGACTTCAATCTGAACTGGGCCCAGTTTTAGTGATTTCCT
CCACCTCGCGGTTTAGGATCGTTCTGTGCTGGGCATTGTAGTACGTGTGCAGCCCAGGCCGTAGGGGCCATACTGACTTGACGTCGTCCCCACCTTCCTCCCCGTTAGA
GCGGGGCAGTCTGAACAGAGTGCTCGGAGCTCACGCTCCGGTGGCAACAGTTCACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACG
ACAGCCATGCAGCACCTGTGCAAATTGTCCCTTTCGGGACTCGCTGGCTTTCACCAACTTAGAGATGCATGTCAAGGCCTGGTAACGTTCTTCGCGTTGCATCGAATTG
AGCCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTTCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGCACGTTTAACGCGTTAGCTCCGGCGCAGAAG
GGGTCGAATCCTCCCACAGCAAACGTGCACCGTTTACTGTCAGGACTACCGGGGTATCTAAT

>CUP2P1B01 Uncultured bacterium (Acidobacteria)
CCCTTGCGGTTGGCTCACGGCTTCTAGTGCAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCATTCTGATCCGCGATTAC
TAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGGCCATT
GTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGTCAGAGTGCTCAACTAAATGGTAG
CAACTGAAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATTACGGCCCATTGCTGGGAAGGGA
TATTTCTACCCCGGTCCATAACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGA
GTTTCAGCCTTGCGACCGTACTCCCCAGGCGGACTGCTTAACGCGTTGGCTACGGCACGGCGGGATTGGGTACCCGTCACACCAAGCAGTCATCGTTTAGGGCTAGGAC
TACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTGCATCAGCGTCA

>CUP2P1B02 Uncultured bacterium (Betaproteobacteria)
GGTCGGGCCTCCTTGCGGTTAGGCGACGGCTTCTGGTGAAACCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGACATGCTGATCC
GCGATTACTAGCGATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACGCGCTTTAAGGGATTGGCTCTACCTCGCGGCTTAGCAGCCCTCTGTAC
GCGCCATTGTATTACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCCCAACTG
AATGTAGCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCCCTTTCGG
GCACCCCCAGCTCTCACCAGGCTTCCGGACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATAATCCACCGCTTGTGCGGGTCCCCGTCAAT
TCCTTTGAGTTTAACCTTGCGGCCGTACTCCCCAGGCGGTCGACTTCACGCGTTAGCTTCGTTACTGAGAGTGTCAAACT

>CUP2P1B03 Uncultured bacterium (Acidobacteria)
GGCACTGCCCCCCTTGCGGGTTAGCTCAGTGACTTCTAGTACAGCCAGCTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGA
TACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCACGGGTTGGCAACGGTTTG
TGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTTTCACCGGCAGTCCCTTTAGAGTGCCCAG
CTTGACCTGTTGGCAACTAAAGGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGTGTCCCT
TGCGGGAAAAGGATGTTTCCACCCCTGTCACCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATACTCCANCGCTTGTGCGGGCCCCCG
TCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATACTTAACGCGTTAGCTGCGGCACGACCGGATTGGGTACCGATCACACCAAGCATCCATAGT
TTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGT

>CUP2P1B04 Uncultured Acidobacteria bacterium (Acidobacteria)
GGGTTAGCATGCAGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGCTATCGTTCTGATATAGCATTACTAGCG
ATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGGACGGTTTTTGGCGATTAGCTCCCCCTCGCGGGTTGGCAGCGCTTTGTACCGCCCATTGTAGC
ACGTGTGTGGCCCTGGACATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCAACTTATCGCTGGCGGTCTCCTGAGAGTTGCGCCTTGCGGCATGCCAACA
CAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTCCAGTCCCTTGCGGGAAAACCTTGTTT
CCAAGGTCTGTCCGAAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
CAGCCTTGCGACCGTACTCCCCAGGCGGCATACTTAACGCGTTAGCTCCGGCACGAACCGAATGAACGGCTCACACCAAGTATGCATCGTTTAGGGCGTGGACTAACAG
GGTATCTAATCCTG

>CUP2P1B05 Uncultured bacterium (Acidobacteria)
GACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCGATTCCAGCTTCAT
GGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGACCATTGTAGCACGTGTGTAGCCC
TGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCACTAGAGTGCCCGACTTGACTCGCTGGCAACTAGGGATAAGGG
TTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTCTCTTGCGAGAAAGGGATATTTCTACCCCGGTC
CACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGAC
CGTACTCCCCAGGCGGATTGCTTAACGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTAGGGCTAGGACTACCA

>CUP2P1B06 Uncultured bacterium (Acidobacteria)
AGCGCGGGACTCTATACAACTCACTTTCGTGATGTGACGGGCGGGTGTACAAGGTCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCT
TCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTCTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTA
GCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAGGG
GTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCATACCTGTACCTTGCGGGAAGGCCGTATTTCTACAGCTTG
TCAAGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTACCGTCGAATTGAACCACATGTTCCATCGCTTGCTGCGCGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTG

>CUP2P1B07 Uncultured soil bacterium (Verrucomicrobiae)
ATCCCAGTTACGTCATACTTAGGGCCTGCTCCTTGCGGTTAGCACAGACACTTCGGGTACAAGCGACTCCCATGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGT
ATTCACGGCGCCGTAGCTGATGCGCCATTACTAGCGATTCCGGCTTCATGTAGGCGAGTTGCAGCCTACAATCCGAACTGGGCCCAGTTTTCAGGGTTGCCCACCTC
GCGGATTCGGATCATTCTGTACTGGGCATTGTAGTACGTGTGCAGCCCTGGCCGTAAGGGCCATCCTGACTTGACGTCATCCCCACCTTCCTCCCCGTTTCACAGGGCA
GTCTGAACAGAGTGCACTCTTGCGAGTTTGCAACAGTTCACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCA
CCTGTGCAAAGCGCGTATTGCTACGCTGGCCGGCTTTCACCGGCGACACAATGCATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAGCCACATACTCCA
CCGCTTGTGCGGGCCCCCGTCAATTTCTTTGAGTTTTAATCTTGCGACCGTACTCCTCAGGCGGCACGTTTAACGCGTTAGCTCCGGCACGCACGGGGTCGAATCCGCG
CACACCAAACGTGCACCGTTTAC

>CUP2P1B08 Uncultured bacterium(Não classificada)
CTTACGGTTACACGGGCGGCTTCGGGTGCACTAAACTCAGGTGACGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCAACGCAGCGTAGCTGATCTGCGTTTAC
TAGCGATTCCGACTTCATGAAGGCGAGTTGCAGCCTTCAATCCGAACTGACCGCCGATTTAAGAGATTGGCTTACCCTCGCGAGTTCGCTGCTCGTTGTTCGGCGGATT

GTAGCACGTGTGTAGCCCGGGACGTAAGGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGCTTCTCACCGGCGGTCTCGTGTGAGAGATCTTGTGGACCAACA
CACGACGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTCTGGAAGTAGGGTTGCCCCTAAGCCGTATT
TCTACGGTTGTCCTCCGATGTCAAGCCCCGGTAAGGTTCTTCGCGTTGCTTCGAATTAAACCACATGTTCCACCGCTTGTGCGGGACCCCGTCAATTCCTTTGAGTTTC
AGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTG

>CUP2P1B09 Uncultured bacterium (Acidobacteria)
TCTAGTACAACCATTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCG
AGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACAT
AAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCCTCTCTTGCGAGTAGTAACTGTGTGCAGGGGTTGCGCTCGT
TGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGTCATGCAGCGCCTATACTGGTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCACCAGCATT
TCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCC
CAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTC
CCCCTAACTTTCG

>CUP2P1B10 Uncultured bacterium (Acidobacteria)
GGTTAGCTCACCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCGA
TTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGACCATTGTAGCA
CGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCACTAGAGTGCCCGACTTGACTCGCTGGCAAC
TAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGCCTTTTAAGGGGCGCCGATGTT
TCCACCGGATTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
CAGCCTTGCGACCGTACTCCCCAGGCGGGATGCTTATCACGTTAGCTTCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCATCCATCGTTTAGGGCTAGGACTACC
AGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCC

>CUP2P1B12 Uncultured bacterium (Não classificada)
ACCTCGACGCTGCCTCCTCTCTTCCGAAGACAATAGGTTAGCCCAGCGGCTTCAGGTGTTGCCGACTTTCGTGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTA
TTCACCGTGGTGTGCCGACCCACGGTTACTAGCAACTCCGGCTTCAGGCAGGCGGGTTGCAGCCTGCCATCCGAACTGAGAATGAGTTTGCCAGGATTTGCTCCCCCTC
GCGGGTTCGCTTCCCATTGTCTCACCCATTGTAGCGTGTGTGTCGCCCAGGACGTAAGGGCCGTGCTGACTTGACGTCATCCCCACCCTCCTCCTCGTTTAGCGTGGCA
GTCTCGCCGGACAGCCTAACCGGCGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGTGCCCGCC
ACCGAAGTGGACACCTGTCTCCAGGTGGTGCAGGCACATGTCAAACCCTGGTAAGGTTCTTCGCGTCGCATCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGTCCC
CGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGACCACTTAATGGGTTCCCTTTGGCACAGAAGGGGTCGATACCTCCCACACCTGGTGGTCATC
GTTTACGGCCAGGACTACCGGGGTATCTAATCCCGTTCGCTCCCCTGGCCTTCGCACCTCAGCGTCAGGTTCA

>CUP2P1C01 Uncultured soil bacterium (Acidobacteria)
GGCTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCGATTCCAGCTTCAT
GGAGTCGAGTTGCAGACTCCAATCCGGACTGGGATTGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCAACCATTGTAGCACGTGTGTAGCCC
TGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCGCCAGAGTGCCCAACTAAATGATGGCAACTGGCAATAAGGGTT
GCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTACGCAGCGGTCCCTTGCGGGAAAGCGATATTTCTACCGCGGTCCA
CTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCG
TACTCCCCAGGCGGATCGCTTAACGCGTTAGCTCCGGCACGACAGGATTGGGTACCTGTCACACCAAGCGATCATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCC
TGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTGTGGTCCAGTGAGCCGCTTTC

>CUP2P1C04 Uncultured bacterium (Não classificada)
CCCCTCACGCGCACTCCTTCGGCGCCTCCGTCCCTCACGGGTTCGGCCAGCGACTTCGGGAGCACCAGACTCGGGTGATGTGACGGGCGGTGAGTGCAAGGCCCGGGAA
CGTATCAACGCAGTGTGCTGACCTGCGTTTACTAGCAACTCCGACTTCATGCTGGCGAGTTGCAGCCAACAATCCGAACTGAGACCGGTTTTAAGGGATTGCCTTCACG
TCGCCGTGTCGGAACCCGTTGTGCCGGCCATTGTAGCGTGTGTGTAGCCCTGGACATAAAGGGCATGCGGACTTGACGTCATCCCCACCTTCCTCCGGGTTTCGCCCGG
CAGTCTCCCTAGAAAATTCAACTAAGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCACCACCTGTGTAGAAA
CCTCTTGCGAGGGGCGCTGACTTTCACCAGCGTTTCTTCTACATGTCAAGCCCAGGTAAGGTTCTTCGCGTCGCCTCGAATTAAACCACACGCTCCGCTGCTTGTGCGG
GCCCCCGCCTATTCCTTTGAGTTTTAACCTTGCGGCCGTAGTCCCCAGGCGGCGAACTTAATG

>CUP2P1C05 Uncultured bacterium (Actinobacteria)
TCACGATCCACTTCGACGGTCCCTCCTAAAGGTTGGGCCACGGCTTCGGGTGTTACCGACTTTCGTGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCC
CGGCGTTGCTGATCCGGGATTACTAGCGACTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGACCGGCTTTAGGGATTGGCTCCTCCTCGCGGATTA
GCAGCCCGTTGTACCGGCCATTGTAGCATGTGTGCAGCCCTGGACGTAAGGGGCATGATGACTTGACTTCGACCCCACCTTCCTCCGAGTTGACCCCGGCAGTCTCCCA
CGAGTCCCCGGCATTACCCGCTGGCAACATAGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTG
TAAGGCCCCGAAGGACACCGTATCTCTACGGCTTTTCCCTACATGTCAAACCCAGGTAAGGTTCTTCGCGTTGCCTCGAATTAAGCCACATGCTCCGCCGCTTGTGCGG
GCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGNCGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCTACGGCACGGAAACCGTTGAATAGTTCCCACACCTAGTG
CCCAACGTTTACGGCGTGGACTANCAGGGTATCTAATCCTGTTCGCTCCCCACGCTTTCGCTCCTCAGCGTCAATAACGGGCCAG

>CUP2P1C07 Uncultured bacterium (Acidobacteria)
ATGAGCATACTTGGACGGCTGCCTCTCTTGCGAGTTACACACCGGCTTCTAGTGCAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCA
CCGCAGCATTCTGATCTGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTCTCCGATTACCTCTCCCTCGCGGG
TTCGGGACGGTTTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTC
ACTAGAGTGCCCGGCTTGACCCGATGGCAACTAGGGATGAGGGTTGCGCCCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCT
ATACAGCAGTCTCTTGCGAGAAAAGGATGTTTCCACCCCGGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCT
TGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACGACGGGATTGGGTACCCGCCACAC
CAAGCAA

>CUP2P1C08 Uncultured bacterium (Acidobacteria)
GGGCGGTGTCCTGCGGTTAGCCCACGACTTCTAGTGCAACCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCATTCTGATCCGC
GATTACTAGCGATTCCAGCTTCATGTAGTCGAGTTGCAGACTACAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCG
ACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTCTGCCAGAGTGCCCAACTAAA
TGATGGCAACTGGAAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATTACGGTCCCTTGCGGGA
AAGCGATATTTCTACCGCGGTCCATAACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTC
CTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGACTGCTTAACGCGTTAGCTACGGCACGGCGGGATTGGGTACCCGTCACACCAAGCAGTCATCGTTTAGGGC
TAGGACTACCAGGGTATCTAATCCTG

>CUP2P1C09 Uncultured bacterium (Gammaproteobacteria)
GTGGTAGGCGCCCCCCTTGCGGTCAGGCTACTGCTTCTGGTGCAGTAACTTCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAGCAATGCT
GATCTGCGATTACTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGACAGATTTTCTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCCTC
TGTATCTGCCATTGTAGCACGTGTGTTGCCCTGGCCATAAAGGGCATGATGACTTGACGTCATCCCCAACTTTCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGCCA
ACTGAATGGTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCAGGCTCCTT
ACGGCACCCCTGAATCTCTTCAGGGTTCCTGGGATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAAGCACATGCTCCACCGCTTGTGCGGGTCCCCGTC
AATTCCTTTGAGTTTCAACCTTGC

>CUP2P1C10 Uncultured bacterium (Alphaproteobacteria)

GATTACTAGCGATTCCAACTTCATGTGCTCGAGTTGCAGAGCACAATCCGAACTGAGACGGCTTTTTGAGATTTGCGCAGGGTTTCCCCATTGCGTCCCATTGTCACCG
CCATTGTAGCACGTGTGTAGCCCAGCCTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCCCCTTAGAGTGCCCAACTAAA
TGATGGCAACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGAACT
GAAGGGGCTCCATCCTCTGGTGCCCGCGACCGGGATGT

>CUP2P1C11 Uncultured bacterium (Acidobacteria)
CAATCATGAGTCATACTTGGGCGCTTGCTCCCTTGCGGTTAGCACGGCGACTTCTAGTACAACTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGT
ATCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCG
CGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAG
TCCACACAGAGTCCTCTCTTGCGAGTAGTAACTGTGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCC
TATACTCGTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCACGAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCG
CTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCAACC
CAAGTCCTGATCG

>CUP2P1C12 Uncultured bacterium (Acidobacteria)
GGCGTCTGCCTCCTTGCGGCTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGAT
ACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGT
GCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCT
TGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCG
GGAAGGCCGTATTTCTACAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGCTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACTTCCGAACGGAAGCCACCCCAAGTCCTGATCGTTTAGG
GCTAGGACTACCA

>CUP2P1D01 Uncultured forest soil bacterium (Gemmatimonadetes)
GACACCGACTTCGGGCGCTCATCGCTTCCATGGCGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGTGGCGTGGCTGATCCACGATTACTAGCGATTCCA
GCTTCATGCCGCCGGGTTGCAGGCGACAATCCGCACTGAGGACAGCTTTTGGGATTGGCTTGGCATTGCTACCTCGCAGCCCTCTGTACTGTCCATTGTAGCACGTGTG
TAGCCCTAGACGTAAGGACCATGATGACTTGACTTCGACCCCACCTTCCTCCGGTTTGGCACCGGCAGTCCCCCCAGAGTCCCCGGCCGGCTTACGCCGCCGCTGGCAA
CAGGGGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCACGTGCCCCGAAGGGACCCCTCCATC
TCTGGAGAGAATCACGTGCATGTCAAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTT
TCAGCCTTGCGGCCGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCGACGGCACTCGAAGGGTCGCTCCTCCGAGCACCTAGTGCCCATCGTTTA

>CUP2P1D02 Uncultured bacterium (Acidobacteria)
GCGGCTGCTCCTTGCGGTTAGCTTACCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAAGCCCGGGAACGTATTCACCGCAGCGTGCTGATC
TGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCGCAGGTTTGCGACGGTTTGTA
CCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCACTAGAGTGCCCGACT
TGACTCGCTGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAGCCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTCTCTTG
CGAGAAAGGGATATTTCTACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTC
AATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTAACGCGTTAGCTGCGGCACAGCCGGATTGGGTACCGGCTACACCAAGCAATCATCGTTT
AGGGCTAGGACTACCAGGGTATCTAATCCTG

>CUP2P1D03 Uncultured bacterium (Alphaproteobacteria)
GGCGGCTGCTCCTTGCGGTTAGCGCACCGTCTTCAGGTAAAGCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGAT
CTGCGATTACTAGCGATTCCAACTTCATGTGCTCGAGTTGCAGAGCACAATCCGAACTGAGACGGCTTTTTGAGATTTGCGCAGGATTGCTCCATTGCATCCCACTGTC
ACCGCCATTGTAGCACGTGTGTAGCCCAGCCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCCCCTTAGAGTGCCCAAC
TAAATGATGGCAACTAAGGGCGAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGA
ACTGAAGGGATCCATCTCTGGTTCCCGCGACCGGGATGTCAAGGGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCG
TCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGGATGCTTAATGCGTTAGCTGCGCCACTGACGGGTAAACCCGCCAACGGCTAGCATCCATCGTTT
ACGGCGTGGACTGCCAGNGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCACCTCAGCGTCAGTACCGGGCCAGTGAGCCGCC

>CUP2P1D04 Uncultured bacterium (Acidobacteria)
GGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGCACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTACTAGCGA
TTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTCGTACCGACCATTGTAGCA
CGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGACCCGATGGCAAC
TAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTTCTTGCGAAAAGGGATGTTTC
CAACCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTACA
GCCTTGCGACCGTACTCCCCAGGCGGATAGCTTATCGCG

>CUP2P1D05 Uncultured soil bacterium (Acidobacteria)
GAATTACACCTTGGGCGGCTGCTCCCTTGCGGTTAGCGCACCGACTTCTAGTGCAACCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACC
GCAGCATGCTGATCTGCGATTACTAGCGATTCCAGCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCCCGCGGGTT
TGCAGCGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGC
CAGAGTGCTCAACTAAATGGTAGCAACTGGAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATAT
ACAGGCCCATTGCTGGGCGCCCCTATTTCTAGGAGATTCCTGTACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTG
CGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCCTTAACGCGTTAGCTGCGGCACGACAGGATTGGGTACCTGTCACACCAA
GCAATCATC

>CUP2P1D06 Burkholderia caryophylli (Betaproteobacteria)
CAGTCATGATCTACGTGGTGACGTCCTCCTTGCGGTTAGACTACCATTCTGGTAAACCACTCCCATGGTGTACGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGC
GGCATGCTGATCCGCGATTACTAGCGATTCCAGCTTCATGCACTCGAGTTGCAGAGTGCAATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCCCCTCGCGGGTTGG
TGACCCTCTGTTCCGACCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTTA
GAGTGCCCTTGCGTAGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGACGGTT
CTCTTTCGAGCACTCCCACCTCTCAGCGGGATTCCGTCCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTC
CCCGTCAATTCCTTTGAGTTTAATCTTGCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACTAAGGAAATGAATCCCCAACAACTAGTTGACATC
GTTTAGGGCGTGGACTACCAGGGTATCTAATCCTG

>CUP2P1D07 Uncultured bacterium (Alphaproteobacteria)
TCCTTGCGGTTAGCGCACCGTCTTCGGGTAATGCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCCTGCTGTTCTGCGATTA
CTAGCGATTCCACCTTCATGCACCCGAGTTGCAGAGTGCAATCTGAACTGGGACGGCTTTTTGCGATTAGCTCACCCTCGCGGGCTTGGCTGCGCATTGTCACCGCCAT
TGTAGCACGTGTGTAGCCCAGGGTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTGCCGCCGGCGGTCCCTCTAGAGTGCCCAACTGAATGATG
GCAACTAAAGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCACGCCCCTTGCGGGGACCGC
CTGTTTCCAGGCGTAGCGTGGGATGTCAAACCCTGGTAAGGTTCTGCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGA
GTTTCAACCTTGCGGCCGTACTCCCCATGCGGAACGCTTAATGCG

>CUP2P1D08 Uncultured bacterium (Acidobacteria)
CGCTGCCTCCTTGCGGTTAGCGTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGC

CCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCAACTTCCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCCTCTCTTG
CGAGTAGTAACTGTGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTAGTGTCCCTTGCGGG
AAGGCCGTATTTCTACAGCTGGTCACTAGCATTTCGAGCCCAGGTAAGGTTCCTCGC

>CUP2P1D09 Uncultured bacterium (Acidobacteria)
GCCTACAGACTTCTAGTACAATCCACTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCAGCGTGCTGATCTGCCATTACTAGCGATTCCAGC
TTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGGTTTTTTGCGATTGCCTCCGCCTCGCGCCTTCGGGACGCTTTGTACCGGCCATTGTAGCACGTGTGT
AGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCCTCCTCCAACTTATCGCTGGCGGTCTCCTGCGAGTTCCACCTTTCGGTATGGCAACACAGGACAA
GGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCCTTGCGGGGTAGCGATGTTTCCACCGCC
GTTGACCAGCCGTTCGAGCCCAGGTAACGTTCTTCGCGTTGCCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTT
GCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACGGATCAACTGAATGACCCACACCAAATAT

>CUP2P1D10 Burkholderia caryophylli (Betaproteobacteria)
GGTTAGACTAGCCACTTCTGGTAAAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGAT
TCCAGCTTCATGCACTCGAGTTGCAGAGTGCAATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCCCCTCGCGGGTTGGCGACCCTCTGTTCCGACCATTGTATGAC
GTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTTAGAGTGCCCTTGCGTAGCAACTAAGGACA
AGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGACGGTTCTCTTTCGAGCACTCCCACCTCTCAGCG
GGATTCCATCCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTCGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTT
GCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACTAAGGAAA
TGAATCCCCAACAACTAGTTGACATCGTTTAGGGCGTGGACTACCA

>CUP2P1D11 Uncultured bacterium (Acidobacteria)
CTATACTTGGGCGGCTGCCCCTTGCGGTTGGCTCACGACTTCTAGTACAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGC
GTTCTGATCTGCGATTACTAGCGATTCCAGCTTCATGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGA
CGGTTTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCCGTTATCCGGCGCAGTTTCGCTAGAG
TGCCCGGCTTGACCCGATGGCAACTAGAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGC
AGTCCTTGCGGAAAGGGATGTTTCCACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGC
CCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATGCTTAACGCGTTAGCTGCGGCACGACCGGATGGGTACCGATCACACCAAGCATCCA
TAGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAACGTCAGTTGTG

>CUP2P1E01 Uncultured Caulobacter sp. (Alphaproteobacteria)
CTTCGGGTAAGCATCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTACTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCTCTC
GAGTTGCAGAGAGCAATCCGAACTGAGACGACTTTTAGGGATTGCCTCCCCCTCGCGGGTTAGGAACCCTCTGTAGTCGCCATTGTAGCACGTGTGTAGCCCACCCTGT
AAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTACCACCGGCGGTCCCTTTAGAGTGCTCAGCCAAACCTGGTAGCAACTAAAGGCGAGGGTTGCGCT
CGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCTAGTCCCCGAAGGGAAAACCGGATCTCTCCGG

>CUP2P1E02 Uncultured bacterium (Alphaproteobacteria)
CCAGTCGCTGACCTACTGTGGTCGGTGCTCCCTTGCGGGTTACGCACGCCTTCAGGTAAAGCCAACTCCCATGGTTGACGGGCGGTGTGTACAAGGCCCGGGAACGTAT
CACCGCAGCGTGCTGATCTGCGATTACTAGCGATTCCGACTTCATGTGCTCGAGTTGCAGAGCACAATCCGAACTGAGACGGCTTTTGGAGATTTGCTCAGGGTTACCC
CTTTGCTTCCCACTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGCGGCTTATCACCGGCAGTC
CCCTTAGAGGGCCCAACTGAATGATGGCAACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCT
GTCTCCGGTCCAGCCGAACTGAAGGAGTCCATCTCTGGTCCCCGCGACCGGGATGTCAAGGGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTGAACCACATGCTCCACC
GCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGGGGGCTTAATGCGTTAGCTGCGCCACTGACGAGCATGCTCGCCAACG
GCTAGCCCCCATCGTTTACGGCGTGGACTACCAGNGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCACATCAGCG

>CUP2P1E03 Uncultured bacterium (Betaproteobacteria)
TGTGTACAAGGCCCGGGAACGTATCACCGCGACATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGACGCGCT
TTCTGGGATTGGCTCCCCCTCGCGGGTTGGCAACCCTCTGTACGCGCCATTGTATGACGTGTGTAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCT
TCCTCCGGTTTGTCACCGGCAGTCCCATTAGAGTGCTCAACTGAATGTAGCAACTAATGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAG
CTGACGACAGCCATGCAGCACCTGTGTCTAGGTTCCCTTTCGGGCACCGCTGCATCTCTGCAGCGTTCCTAGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCG
AATTAAACCACATCATCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGATGACTTCACGCGTTAGCTGCGTTAC
TAAAGGATTAACTCCTCCAACAACTAGTCATCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCA

>CUP2P1E04 Uncultured bacterium (Não classificada)
CTTACGGTTGCACGGGCGGCTTCGGGTACACTAAACTCAGGTGACGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCGTAGCTGATCTGCGGTTACT
AGCGATTCCGACTTCATGAAGGCGAGTTGCAGCCTTCAATCCGGACTGAGAAACGGTTTGTGAGATTAGCTTGCCCTCGCGGGTTCGCAACTCGTTGTCCGTTCCATTG
TAGCACGTGTGTAGCCCGGGACGTAAGGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGCTTGTCACCGGCGGTCCCGCGTGAGAGATCTTTTGGACCAACAC
ACGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTCTCTGCGTTCCATTGCTGGAAAACCTAGTCT
CCTAGGATAGCGCAGGATGTCAAGCCCCGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGG

>CUP2P1E05 Uncultured bacterium (Acidobacteria)
TCATACTTGGGCGCTGCCTCCCTGCGGTCAGCGCGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTC
GATCTGATACGCCATTACTAGCGATTCCGGCTCCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAA
CGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAG
TTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACCGGT
CCCTTGCGGGAAGGCCGTGTTTCCACAGCTTGTCCAGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGC
CCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACGCACGAACGTGCGGCACCCCAAGTCCTGAT
CG

>CUP2P1E06 Uncultured soil bacterium (Gammaproteobacteria)
GGTCAGGCTACTGCTTCTGGTGCAGTAGACTTCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCAGCAATGCTGATCTGCGATTACTAGCGAT
TCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTTCTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCCTCTGTTTCTACCATTGTAGCAC
GTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTTTGCAGAGTGCCCAACTGAATGCTGGCAACTAA
GGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCAGGCTCCTTGCGGCACCCCCGAATCTCT
TCAGGGTTCCTGGGATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAAC
CTTGCGGCCGTAACTCCCC

>CUP2P1E07 Uncultured bacterium (Acidobacteria)
GGGTTGGTGCAGCGACTTCTAGTACAACCGGCTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTGCTGATCCGCGATTACTAGCGA
TTCCAACTTCAAGCAGGCGAGTTGCAGCCTGCTATCCGAACTGAGACCGACTTCCTCCGATTAGCTCCCCCTTGCGGGCTCGCGACGGTTTGTATCAGCCATTGTAGCA
CGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTTTGCAGAGTGCCCACCATTACGTGATGGCAAC
AGCAAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGTCAACTTTCG
TCGATGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
CCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGACAGGGATCGATACCCGTCACACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGG
GTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCTCCTCAGCGTCAGTAGTAGTCC

>CUP2P1E08 Uncultured bacterium (Alphaproteobacteria)
GGTTAGCGCGCCGTCTTCGGGTAAAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATTCACCGCGGCGTGCTGATCCGCGATTACTAGCGAT
TCCAACTTCATGCGCTCGAGTTGCAGAGCGCAATCCGAACTGAGACGGCTTTTCGAGATTTGCTAAGGGTCGCCCCTTCGCCTCCCGCTGTCACCGCCATTGTAGCACG
TGTGTAGCCCAGCCTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCAGTCCCCCTGGAGTGCCCAACTGAATGATGGCAACTAAG
GGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCGCGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGGCCCCGAAGGGAAGATCGCATTTCTG
CAATCCGTCCAGGACATGTCAAAAGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAA
TCTTGCGACCGTACTCCCCAGGCGGGATGCTTAAAGCGTTAGCTGCGCCACTGAAGAGCAAGCTCCCCAACGGCTAGCATCCATCGTCTACAGCGTGGACTACCAGGGT
AT

>CUP2P1E09 Uncultured bacterium (Acidobacteria)
CGACATACTTAGCGCCTCTCCCCCTGCGGGTTGATGTAGCGACTTCTAGTACAACCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGC
GGCGTGCTGATCCGCGATTACTAGCGATTCCAACTTCAAGCAGGCGAGTTGCAGCCTGCTATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCCACCTTGCGGTTTTG
CGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTGCA
GAGTGCCCAGCTTAACCTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTAC
GAGTGTCCTTGCGGAAGACCACTTTCGTAGTTTGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGG
GCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGCCACACCAAGCAT
TCATCG

>CUP2P1E10 Uncultured bacterium (Planctomycetacia)
CATCTTCGGCGCTGCCTTGCGGCTCCGACGACTTCGGATGCCCCCCGCTTTGGTGGCTTGACGGGCGGTGTGTACAAGGCTCAGGAACACATTCACCGCCGCAGTGCTG
ATCGGCGATTACTAGCGATTCCGGCTTCATGCGGGCGGGTTGCAGCCCGCAATCCGAACTGAGGGACGATTTTTGCGATTGGCGCGGTCTTGCGACCTGGCAACGCTCT
GTCCATCCCATTGTAGCACGTGTGCAGCCCTGGGCATAAGGGCCATGATGACTTGACGTCGTCCCCGCCTTCCTCCGGCTTAACGCCGGCGGTCTGATCAGAGTCCCCG
CCTTTACGCGCTGGCAACTGACCACAGGGGTTTCGCTCGTTACGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGCATGTTCCAC
CTTTCGGCGTCACCGGCGTTTCCGTCGG

>CUP2P1E11 Uncultured bacterium (Gammaproteobacteria)
GTCATCGACACACGTGGTAGGCGCCCCCCTTGCGGTCAGGCTACCTGCTTCTGGTGCAGTAGACTTCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATT
CACCGCAGCAATGCTGATCTGCGATTACTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTTCTGGGATTGGCTCCCGCTCGC
GCGTTGGCTTCCCTCTGTATCTACCATTGTAGCACGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGT
CTCCTTAGAGTGCCCAACTGAATGCTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACC
TGTCTCCAGGTTCCTTGCGGCACCCCCGAATCTCTTCAGGGTTCCTGGGATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCT
TGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGCCG

>CUP2P1E12 Uncultured bacterium (Acidobacteria)
ACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCGTGCTGATCTGCGGTTACTAGCGATTCCAGCTTCATGGAGTCGAGTT
GCAGACTCCAATCCGGACTGGGATTGGCTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCAACCATTGTAGCACGTGTGTGGCCCTGGACATAAAG
GCCATGAGGACTTGACGTCATCTCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCCCAACTAAATGATGGCAACTGACAATAAGGGTTGCGCTCGTTGC
GGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGTAGCGGTCCCTTGCGGGAAAGAGATATTTCTACCTCGGTCCACTACGCTTCGA
GCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGG
CGGATCGCTTAACGCGTTAGCTCCGGCACGACAGGATTGGGTACCTGTCACACCAAGCGATCATAGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCC
CTAGCTTTCGTG

>CUP2P1F01 Uncultured bacterium (Acidobacteria)
CTTGCGGTCAGCCTGCGGACTTCTAGTACAACCCACTTTCGTGATTAACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACGGCAGCGTGCTGATCTGCCATTACTA
GCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGGTTTTTTGCGATTGCCTCCACCTCGCGGCTTGGGAACGCATTGTACCGGCCATTGT
AGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTGCGCCTTGCGGCTAGCAAC
ACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGGCTCCACTCCCTTGCGGGATAGCGGTGTT
TCCACCGCCGGTAAGAAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTT
TCAGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAACTCCGGCACAGA

>CUP2P1F02 Uncultured bacterium (Alphaproteobacteria)
CAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCGATTCCAACTTCATGTGCTCGAGTTGCAGA
GCACAATCCGAACTGAGACGGCTTTTTGAGATTTGCGAAGGATTACTCCTTTGCGTCCCTCTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCTGTAAGGGCCATG
AGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCAGTCCCCTTAGAGTGCCCAACTAAATGATGGCAACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACT
TAACCCAACACCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGAACTGAAGAGCTCCATCTCTGGTGCTCGCGACCGGGATGTCAAAGG
CTGGTAAGGTTCTTCGCGTTGCTTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGG
GATGCTTAATGCGTTAGCTGCGCCACTGAAGGGTAAACCCAACAACGGCTAGCATCCATCGTTTATGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGC
TTTCGCACCTCAGCGTCAG

>CUP2P1F03 Uncultured bacterium (Acidobacteria)
CTCCTTGCGGTTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCATCGTTCTGATACGCCATTA
CTAGCGATTCCAGCTTCGCGCAGGCGAGTTGCAGCCTGCGATCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCATTGTACCGGCCAT
TGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTGCTATCTTTCGATGTG
GCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACCGGACCCCCTTGCGGAGTAACC
GTGTTTCCACGATCGTTAGCCGGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTCAGCCTTGCGACCGTACTCCCCA

>CUP2P1F04 Uncultured bacterium (Acidobacteria)
CTTGGAAGGCTGCTCCTTGCGGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTC
TGATCCGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGT
TTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCC
CGGCTTGACCCGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACGCGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCC
TTTTAAGGGGAAGGGATGTTTCCACCCCGGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCC
CCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATGGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCCATCAT
CGTTTAGGGCTAGGACTACCAGCGGTATCTAATCCTGTTTGCTCCCCT

>CUP2P1F05 Uncultured bacterium (Acidobacteria)
TTGCGGTTCGCGCGGCGACTTCTAGTACAACTCACTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGC
GATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAA
CACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCTCTCTTGCGAGTAGCAACT
ACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGTCCGTATTT
CTACAGATTGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTCGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
CAGCCTTGCGACCGTACTCCCCAGGCGGGATACTTAATGCGTTAGCTTCGGCACGACCGGATTCAATCCCGGTCACACCAAGTATCCATCGTTTAGGGCTAGGACTACC
AGGGTATCTAATCCTGTTT

>CUP2P1F07 Uncultured soil bacterium (Acidobacteria)

ACTTGGGCGCTGCTCCTTGCGGTCAGCTTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATC
TGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGCTTTTTCCGATTAGCTCCCCCCCGCGGGTTGGCAACGGT
TTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCC
CTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACCTGTCCCT
TGCGGGAAGGCCGTGTTTCCACAGCTGGTCAGGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCC
GTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTT
TAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAGTGGTCCAGCGCGCCGCTTTCGC

>CUP2P1F08 Uncultured soil bacterium (Planctomycetacia)
CCATCGCGGAGTATCTTAACGCTTTGCTCCTTGCGGTTACTACAGCGTATGGATGCCCCCCATTCGTGGCTTGACGGGCGGTGTGTACAAGGCTCAGGAACACATTCAC
CGCGGTATGCTGACCCGCGATTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGGCGCGTTTTTTGGGAGTTGCTTGCTCTCGCGAGT
TCGCTTCCCTTTGTGCGCGCCATTGTATGACGTGTGCAGCCCTAGTCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTAACGCCGGCGGTCTCG
CTAGAGTCCCCGACTTTACTCGCTGGCAACTAGCGACAAGGGTTTCGCTCGTTAAGGGACTTAACCCGACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTG
TGCACGTTCCAACCTTGCGGCTGTGGCCCTACTTTCATAGGGTTAATCCGTGCATGTCAAGACTAGGATAAGGTTCTTCGCGTAGCCTCGAATTAAGCCACATCATCCA
CCGCTTGTGTGAGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCATACT

>CUP2P1F09 Uncultured bacterium (Acidobacteria)
TGCACCAATCATGAGTCATACTTGGGCGCTTGCACCCTTGCGGTTTGCGCGGCGACTTCTAGTACAACTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGG
AACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTCCCCGATTAGCTCC
CCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCCG
GAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGC
AGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTTGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTT
CCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTG
GCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGGTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAGTGGTC

>CUP2P1F10 Uncultured soil bacterium (Gammaproteobacteria)
GGTCAGGCTACTGCTTCTGGTGCAGTAGACTTCCATGGTGTGACGGGCGGTGTGTACAAGACCGGGAACGTATCACCGCAGCAATGCTGATCTGCGATTACTAGCGATT
CCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTTCTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCCTCTGTATCTACCATTGTAGCACG
TGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGCCCAACTAAATGCTGGCAACTAAG
GACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCAGGCTCCTTGCGGCACCCCCAAATCTCTT
CGGGGTTCCTGGGATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAACC
TTGCGGCCGTACTCCCCAGGCGGAGAACTTAGCGCGTTAGCTACGACACTGCGAGGCTTACCCTCTCAACGTCTAGTTCTCATCGTTTATGGCGTGGACTACCAGGGTA
TCTAATCCTGTTTGCTCCCCACGCTTT

>CUP2P1F11 Uncultured bacterium (Acidobacteria)
GGTTAGCGCACCGGCTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTCACCGCGGCGTGCTGATCCGCGATTACTAGCGAT
TCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGGGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCAGTTTCGCTAGAGTGCCCGGCTTGACCCGTTGGCAACT
AGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTCTCTTGCGAGAAAGGGATGTTT
CCACCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTATCGCGTTAACTGCGGCACGATCGGATTGGATACCGATCACACCAAGC

>CUP2P1F12 Uncultured bacterium (Alphaproteobacteria)
CTCCCATGGTGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCTCTCGAGTTGCAGAGAG
CAATCCGAACTGAGACGGCTTTTTGAGATTGGCGCCGGGTCGCCCCGTTGCCGCCCGCTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCGTAAGGGCCATGAGG
ACTTGACGTCATCCCCGCCTTCCTCCGGCTTGTCACCGGCAGTTTCTGCAAAGTGCCCGGCTTGCCCGATGGCAACTGCAGATGGGGGTTGCGCTCGTTGCGGGACTTA
ACCCAACATTTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCCGGCCAGCCAAA

>CUP2P1G01 Uncultured soil bacterium (Acidobacteria)
CACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCATGCTGATCTGCGATTACTAGCGATTCCAGCTTCATGAAGTCGAGTTGCAGA
CTTCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCAGCGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCAT
GAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCTCAACTAAATGGTAGCAACTGGAGATAAGGGTCGCGCTCGTTGCGGGAC
TTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGCAGCCCATTGCTGGGAAGGGATATTTCTACCCCGGTCCACTACATTTCGAGCCCA
GGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGGCCGTACTCCCCAGGCGGAT
TGCTTAACGCGTTAGCTGCGGCACGACAGGATTGGGTACCTGTCACACCAAGCAATCATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGC
TTTCGCGCCTCAGCGTCAGT

>CUP2P1G02 Uncultured bacterium (Acidobacteria)
ATACTTAGGCGCGCTCTCCCTTGCGGGTTGATGAGGCGACTTCTAGTACAACCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGG
CGTGCTGATCCGCGATTACTAGCGATTCCAACTTCAAGCAGGCGAGTTGCAGCCTGCTATCCGAACTGAGACCGATTTTCTCCGATTAGCTCCCCCTTACGGGCTCGCG
ACGGTTTGTATCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTTTGCAGA
GTGCCCAGCATTACCTGATGGCAACAGCAAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGA
GTGTCCTTGCGGAAGGCAACTTTCGTCGCTGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGC
CCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGCTACACCAAGCATTC
ATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCTCACTCAGCGTCAGAATGGGTCCAGGATG

>CUP2P1G03 Uncultured bacterium (Acidobacteria)
ACGGCTGCCCCTTGCGGTTGGCTCACCGGCTTCTAGTGCAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATC
CGCGATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGGCCGGCTTTCTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTA
CCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTCTGCCAGAGTGCCCAACT
AAATGGTGGCAACTGGAAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACATCGGCCCCTTGCG
GGGAAGGGATATTTCTACCCCGGTCCAATGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCCTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGACTGCTTAACGCGTTAGCTACGGCACGGCGGGATTGGGTACCCGTCACACCAAGCAGTCATCGTTTAG
GGCTAGGACTACCCAGGTATCTAATCCTGTTTGCTCCCCTAGCTTTC

>CUP2P1G04 Uncultured bacterium (Gammaproteobacteria)
CTTGCGGTCAGGCTACTGCTTCTGGTGCAGTAGACTTCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCAGCAATGCTGATCTGCGATTACTA
GCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTTCCGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCCTCTGTATCTACCATTGT
AGCACGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGCCCAACTAAATGCTGGCA
ACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCAGGCTCCTTGCGGCACCCCCGAA
TCTCTTCAGGGTTCCTGGGATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGCGCGGGTCCCCGTCAATTCCTTTGAGTT
TCAACCTTGCGGCCGTACTCCCCAGGCGGAGAACTTAGCGCGTTAGCTACGACACTGCGAGGCTTACCTCTCA

>CUP2P1G05 Uncultured bacterium (Acidobacteria)
ACTTTCGTGATTGGCGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTG
CAATCCGAACTGAGCGCGCTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTAACGCGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCG

GACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCCTCTCTTGCGAGTAATAACTGTGTGCAGGGGTTGCGCTCGTTGCGGGACTTAA
CCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCGGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCCGAAGCATTTCGAGCCCAGGT
AAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGAC
TTAACGCGTTAGCTCCGGGACGACGCCCGAACGGGCGACACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCG
TTCCTCAGCGTCAGTTATGGTCCAGCGCG

>CUP2P1G06 Uncultured bacterium (Não classificada)
CTTGGGCGGCTGCGTCCTTGCGGTTCGCGCACCGACTTCTAGTACAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTT
CTGATCTGCGATTACTAGCGATTCCAGCTTCATGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCTTCGCAGGTTTGCGACGG
TTTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCCGTTATCCGGCGCAGTTTCGCTAGAGTGC
CCGGCATAACCCGATGGCAACTAGAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGGGC
CCTTGCGGGCGGGGATGTTTCCACCCCTTTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCC
CGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGGATGCTTAATGCGTTAGCTGCGCCACTGAAGGGTAAACCCAACAACGGCTAGTATCCATCGT
TTATGGCGTGGACTACCGGGGTATCTAATCCT

>CUP2P1G07 Uncultured bacterium (Gammaproteobacteria)
GTGGTAGGCGCCCTCCTTGCGGTCAGGCTACCTGCTTCTGGTGCAGTAAACTTCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAGCAATG
CTGATCTGCGATTACTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTTCTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCC
TCTGTATCTACCATTGTAGCACGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGC
CCAACTAAATGCTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCAGGCTC
CTTGCGGCACCCCTAAATCTCTTCAGGGTTCCTGGGATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGACTTAAACCACATGCTCCACCGCTTGTGCGGGTCCCC
GTCAATTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGAGAACTTAGCGCGTTAGCTACGACACTGCGAGGCTTACCCTCTCAACGTCTAGTTCTCATCGT
TTATGGCGTGG

>CUP2P1G08 Uncultured Acidobacteria bacterium (Acidobacteria)
GCGCTTGCGTCCTTGCGGTTCGCGCGGCGACTTCTAGTACAGCTCACTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATA
CGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTCTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTG
CCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACACTGAGTCCTCTCTT
GCGAGTAGTAACAGTGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTGGTGTCCCTTGCGG
GAAGGCCGTATTTCTACAGCTGGTCACCAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTTGAAGCACATGTTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGTCTTGCG

>CUP2P1G09 Uncultured Acidobacteria bacterium (Acidobacteria)
CATACCTTGGGCGCTTGCGTCCTTGCGGTTCGCGCGGCGACTTCTAGTACAACTCACCTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGT
CGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCA
ACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGA
GTTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTCGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTG
TCCCTTGTGGGAAGGCCATATTTCTACAGCTTGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGG
CCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCANCCCAAGTCCTGA
TGGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTG

>CUP2P1G10 Chitinophaga terrae (Sphingobacteria)
CCCGACTTTCATGGCTTGACGGGCGGGTGTACAAGGTCCGGGAACGTATCACCGTATCATTGCTGATATACGATTACTAGCGATTCCAGCTTCATGAGGTCGAGTTGCA
GACCTCAATCCGAACTGAGATAGAGTTTTTGAGATTAGCAGCTTGTTACCAAGTAGCAGCCCTTTGTCTCTACCATTGTAGCACGTGTGTAGCCCTGGGCATAAAGGCC
ATGATGACTTGACATCATCCCCTCCTTCCTCGCGTCTTACGACGGCAGTTTCACTAGAGTTCCCACCATTACGTGCTGGCAACTAGTGATAGGGGTTGCGCTCGTTGCG
GGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTTACAGACTGTGTATTGCTACAAAATGAGCTTTCACCCACGGTCAATCTGCATTCTAG
CCCAGGTAAGGTTCCTCGCGTATCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGACCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGTCGTACTTCCCAGGT
GGGATACTTAATGCTTTCGCTCAGACACTTACAATGTATCGCAAATGTCGAGTATCCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGATCCCCACGC
TTTCGTGCCTC

>CUP2P1G11 Uncultured bacterium (Acidobacteria)
GGTTAGCGCGGGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGAT
TCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACAC
GTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCCTCTCTTGCGAGTAGTAACTGTG
TGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCATGTCCCTTGCGGGAAGGCCGTATTTCTA
CAGCTGGTCATAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTG

>CUP2P1G12 Uncultured bacterium (Acidobacteria)
CTCCTTGCGGTTAGCGTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATT
ACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCA
TTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCGCACAGAGTCCTCTCTTGCGAGTA
GTAACTGTGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTAGTGTCCCTTGCGGGAAGGCC
GTATTTCTACAGCTGGTCACTAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGAC
TACCAGGGTATCTAA

>CUP2P1H01 Uncultured bacterium (Acidobacteria)
ACAGCTCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTT
GCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAG
GCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCG
GGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCAGAAGCATTTCGA
GCCCAGGTAAGGTTCCTCGCGTAGCGTCGAGTTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGG
TGCAGGACTTAACGCGTTAGCTCCGGGACGAGTCCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGNGTATCTAATCCTGTTTGCTCCCCT
AGCTTTCGTTCCTCAGCGTCAGTAACGGTCCAGCGCGCCGCTTTCGCCACGGG

>CUP2P1H02 Uncultured bacterium (Acidobacteria)
ACCAATCATGAGTCATACCTTGGGCGCTTGCTCCCTTGCGGTTAGCACGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAA
CGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCC
CTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGA
GCAGTCCACACAGAGTCCTCTCTTGCGAGTAGTAACTGTGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAG
CGCCTATACTCGTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCACGAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCC
ACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGC
ACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTT

>CUP2P1H03 Uncultured bacterium (Acidobacteria)

TGAGCTGTACCTTGGAAGGCTGCTCCTTGCGGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCAC
CGCGGCGTTCTGATCCGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGT
TTGCGACGGTTTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGCCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCA
CTAGAGTGCCCGGCTTGACCCGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTA
TGCAGCAGCCTTTTAAGGGGAAGGGATGTTTCCACCCCGGTCTCCTGCGTTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTT
GTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACC
AAGCAATCATCGTCTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAACTTTCGCGCCTCAGCGTCAGTTATGGTCC

>CUP2P1H04 Uncultured bacterium (Acidobacteria)
GCGCTGCTCCTTGCGGTTAGCGTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACG
CCATTACTAGCGATTCCGGCTTCATGCGGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCC
CTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCCTCTCTTGC
GAGTAGTAACTGTGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCATGTCCCTTGCGGGA
AGGCCGTATTTCTACAGCTGGTCATAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGT

>CUP2P1H05 Uncultured bacterium (Acidobacteria)
TGATCTATACTTGGGCGGTACTCCCCTTGCGGGTCAGCGCACCGACTTCTAGTACAGACCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCA
CCGCAGCGTGCTGATCTGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGATGGCTTTTTCCGATTAGCTCCCCCTCACGGG
TTTGCGACGGTTTGTACCACCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTC
TCTAGAGTGCCCACCATTACGTGATGGCAACTAGTGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCT
ACGCAGCAGCCCTTGCGGGAAGGGATGTTTCCACCCCGATCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTG
TGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATGCTTAACGCGTTAGCTCCGACACGGTGGGATTGGGTACCCACCACATCA
AGCATCCATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCT

>CUP2P1H08 Uncultured bacterium (Acidobacteria)
TCCTTGCGGTTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCATCGTTCTGATACGCCATTAC
TAGCGATTCCAGCTTCACGCAGGCGAGTTGCAGCCTGCGATCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCATTGTACCGGCCATT
GTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTGCTATCTTTCGATGTGG
CAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACCGGACCCCCTTGCGGAGTAACCG
TGTTTCCACGATCGTTAGCCGGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTG
AGTTTCAGCCTTGCG

>CUP2P1H09 Uncultured bacterium (Acidobacteria)
AGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCG
AGTTGCATGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACA
TAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCG
TTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCAGAAGCAT
TTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCC
CCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACTTCCGAACGGAA

>CUP2P1H10 Uncultured soil bacterium (Actinobacteria)
ACCACCTTCGACGGCTCCCTCCCTTACGGGTTAGGCCACGGCTTCGGGTGTTGCCGACTTTCGTGACGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCG
ACGTTGCTGATTCGCGATTACTAGCGACTCCGACTTCATGGGGTCGAGTTGCAGACCCCAATCCGAACTGAGACCGGCTTTTTGGGATTCGCTCCACCTTGCGGTCTCG
CAACCCTTTGTACCGGCCATTGTAGCATGTTTGCAGCCCAAGACATAAGGGGCATGAGGACTTGACGTCATCCCCACCTTCCTCCGAGTTGACCCCGGCAGTCTCCTAT
GAGTCCCCGGCATTATCCGCTGGCAACATAGGACGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGC
AGGACCCTTACGGACACCGTATCTCTACGGCTTTTCCCTGCATGTCAAACCTTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAGCAACATGCTCCGCCGCTTGTGCGGG
CCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGCGCTTAATGCGTTAGCTGCGGCACGGAATCCGTGGAAGGATCCCACACCTAGCGCC
CAACGTTTACGGCGTGGACT

>CUP2P1H11 Bacterium Ellin6095 (Betaproteobacteria)
ACGTGGTAGCGGCCCCTTGCGGTTAGCCTACTACTTCTGGTGCACCCACTCCCATGGTGTACGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGCGACATGCTGAT
CCGCGATTACTAGCGATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCTGGGATGGCTCCCCCTCCGCGGGTTGGGCAACCCTCTG
TACNCGGCCATTGTATGGCGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTAGAGTGCCCT
TGCGTAGCAACTAGGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCCCTTTCGG
GCACCCCCACCTCTCAGCAGGGTTCCAGACATGTCAAGGGTAGGTAAGGTTGTTCGCGTCGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAAT
TCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTCGACTTCACGCGTTAGCTACGGTACCAAGGAATCGCTTCCCCAACACCCAGTTGACATCGTTTAGGGC
GTGGACTA

>CUP2P1H12 Uncultured bacterium (Não classificada)
GACTTCGGGAGCACCAGACTCGGGTGGTGTGACGGGCGGTGAGTGCAAGGCCCGGGAACGTATCACCGCCGTGTGCTGACCGGCGGTTACTAGCAACTCCGACTTCATG
CAGGCGGGTTGCAGCCTGCAACCCGAACTGAGACCGGTTTAAGGGATTACCTTCACGTCGCCGCGTCGGAGCCCGTTGTACCGGCCATTGTAGCGTGTGTGTAGCCCT
GAACATAAAGGGCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGGTTTCGCCCGGCAGTCTCCCTAGAACATTCAACTAAGGACAGGGGTTGCGCTCGTTGCGGGA
CTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCACCACCTGTGCAACGGCCCATTGCTGAGAGACCTGGCTTTCACCAGGCTTTCCGAAACATGTCAAGC
CCAGGTAAGGTTCTTCGCGTAGCCTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGCCCCCGCCTATTCCTTTGAGTTTTAACCTTGCGGCCGTACTTCCCAGGCG
GCGAACTTAATGCGTTAGCTGCGGCACTGACGAGGTCAATCTCGCCAACACCT

>CUP2P2A01 Uncultured bacterium (Betaproteobacteria)
GGTTAGGCAAACGGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGTGACATGCTGATCCACGATTATTAGCGA
TTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCATTGTATGA
CGTGTGAGGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCACTAGAGTGCCCTTTCGTAGCAACTAGTGAC
AAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCCGGCTCCCTTTCGGGCACTCCCACATCTCTGC
GGGATTCCGGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCT
TGCGACCGTACTCCCCAGGCGGTCGACTTCACGCGTTAGCTGCGTTACCGAGAAAATGAATTCCCGACAACTAGTCGACATCGTTTAGGGCGTGGACTACCAGGGTATC
TAATCCTGTTTGCTCCCCACGCTTTCG

>CUP2P2A02 Uncultured bacterium (Acidobacteria)
GCCTCCTTGCGGTTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCATCGTTCTGATACGCCA
TTACTAGCGATTCCAGCTTCACGCAGGCGAGTTGCAGCCTGCGATCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCATTGTACCGGC
CATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTGCTATCTTTCGAT
GTGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCCTTGCGGAGTA
ACCGTGTTTCCACGATCGTTAGCCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCC

>CUP2P2A03 Cystobacter miniatus (Deltaproteobacteria)
GGCGGTACTCCTTGCGGTATACGCCGACTTCTGGAGCAACTGACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGTAGCGTGCTGATCTA
CGATTACTAGCGATTCCGCCTTCATGGAGTCGAGTTGCAGACTCCAATCTGAACTGAGACCGGCTTTATGCGATTGGCTCCCTCTCGCGAGTTGGCAGCGCTTTGTACC
GGCCATTGTAGCACGTGTGTAGCCCTGGTCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTAACACCGGCAGTCCCTCTAGAGATCCACTTGCG

TGGCAACTAAAGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTCGGCTCCCTTGCGGGCAC
CCCGCCATCTCTGGCGGCTTCCGAGGATGTCAAGACCAGGTAAGGTTCTGCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCT
TTGAGTTTTAGCCTTGCGGCCGTACTTCCCAGGCGGAGAACTTAATGCGTTAGCTACGGCACCGCGGGGGTCAACACCCACGACACCTAGTTCTCATCGCTTACAGCGT
GGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCGTCT

>CUP2P2A04 Uncultured bacterium (Planctomycetacia)
GGCTCCGGCGACTTCGGATGCCCCCCGCTTTGGTGGCTTGACGGGCGGTGTGTACAAGGCTCAGGAACACATTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTC
CGGCTTCATGCGGGCGGGTTGCAGCCCGCAATCCGAACTGGGGGGCGGTTTTTGCGATTAGCTCGGCCTTGCGGCCTGGCGACGCTCTGTCCGCCCCATTGTAGTACGT
GTGCAGCCCCAGGCATAAGGGCCATGAGGACTTGACGTCATCCCCGCCTTCNNCTCCGGCTTTCACGCCNCGGCGGTCTGGGTCTAGAGTTCCCNGCCATGACGCGCTG
GCAACTAGACACAGGGGTTTCGCTCGTTAGGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGCACGTTGTACCTTGCGGCCTCGC
CGACGTTCCCGCCGGCTAATCCGTGCATGTCAAGCCTGG

>CUP2P2A05 Uncultured soil bacterium (Acidobacteria)
GGGTTACACGACGACTTCTAGTATCACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTTCTGATCTGCGATTACTAGCGA
TTCCAGCTTCATGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGACCATTGTAGCA
CGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCTAGAGTGCCCAGCTTGACCTGATGGCAAC
TAACGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTCCTTGCGGAAAGGGATGTTTC
CACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GCCTTGCGACCGTACT

>CUP2P2A06 Uncultured bacterium (Acidobacteria)
GGTTACGTGCGACTTCTATAAGCTCACTTGATGTGACGGGCGGTGTACAAGGCCCGGGAATTCCGGCGTCATCTGATACGCCATTACTACGACCGGCTTCATGCAGTCG
AGTTGCAACTGCAATCCGAACTGAGCAGAGTTTTTCCGATTACTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTACCCTGGACATAAAG
GCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCCTCTCTTGCGAGTAGTAACTGTGTGCAGGGGTTGCGCTCGTTGCG
GGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCGGCCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCCGAAGCATTCGAG
CCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATT

>CUP2P2A07 Uncultured bacterium (Não classificada)
GGTTAGCGCACCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCAGTGTGTACAAGTGCCCGGGTAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGC
GATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCGCAGGTTTGCGACGGTTTGTACCGAGCATTGTAG
CACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCATCTTCCTCCCCGTTATCCGGGGCGGTTTCACTACAGTGCCCTACTTGACTCGCTGGCA
ACTAAGGATAAAGGTTGCGCTCGTTGCTGGACTTAACCCAACATCTTATGACAAGAGCTGATGACAGCCATGCTGCAGCTCCGCAGCAGTCTCTTGCGAGAAAGGGGTA
TTTCTATCCC

>CUP2P2A12 Uncultured bacterium (Acidobacteria)
GCGGCTGCTCCTTGCGGTTAGCTTACCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATC
TGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTA
CCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCACTAGAGTGCCCGGCT
TGACCCGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTCCTTGC
GGAAAGGGATATTTCTACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCCTTTGAGTTTCAGCCTTGCGACCGT

>CUP2P2B01 Proteobacterium (Alphaproteobacteria)
GTCGGCTGCTCCTTGCGGTTAGCTCACCGGCTTCGGGTAAAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGTGGCATGCTGATC
CACGATTACTAGCGATTCCGACTTCATGCACTCGAGTTGCAGAGTGCAATCCGAACTGAGACGGCTTTTTGAGATTAGCTTGCCCTCGCGGGCTCGCGACCCATTGTCA
CCGCCATTGTAGCACGTGTGTAGCCCAACCTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTGTCACCGGCAGTTTCTTCAGAGTGCCCAGCCG
AACTGATGGCAACTGAAGATGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGGGAGCCACCCGAA
GTGAAGGTCGCCGTCTCTGGCAACCATACTCCCCATGTCAAAGGTTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGT
CAATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGAGTGCTTAATGCGTTAGCTGCGTCACTGAGGTGCATGCACCCCAACAACTAGCACTCATCGTTTA
CGGCGTGGACTACCAGTGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCACATGA

>CUP2P2B02 Uncultured bacterium (Acidobacteria)
GCGCCTGCCTCCTTGCGGTCAGCTTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATA
CGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTG
CCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTT
GCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACCTGTCCCTTGCGG
GAAGGCCGTGTTTCCACAGCTGGTCAGGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGG
CTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTC

>CUP2P2B05 Chloroflexi bacterium (Não classificada)
CCACCTCGACGGCTGCCCCCGGCCCGGAGGCCGGGTTGGCCCGCCGGCTTCAGGTGTCGCGGCTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTC
ACCGCGGTGTGCTGACCCGCGGTTACTAGCAACTCCGGCTTCACGCAGGCGGGTTGCAGCCTGCGATCCGAACTGGGGCCGGCTTTGGGGATTGGCTCCGCCTCGCGGC
GTCGCGGCCCGCTGCCCCGGCCATTGTAGCGTGTGTGTCGCCCCGGGCGTAGGGGCCGTGCTGACTTGACGTCGTCCCCACCTTCCTCCGCGTTGCGCGCGGCAGTCGG
GCCGGACACTCCTGCAACCGGCCCCGGGGGTTGCGCTCGTTAGGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGCATACGTCCC
TCGCGGGCACGGGGCGTTACCCCCGGTGCGTATGCATGTCAAGCCCGGGTAAGGTTCTGCGCGTCGCGTCGAATTGAACCACACGCTCCGCTGCTTGTGCGGGCCCCCG
TCAATTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGTCCACTCACCACGTTGGCTGCGGCACCGAGGGGGTCGATACCCCCGGCACCCGGTGGACATCGT
TTACGGCGCGGACTAC

>CUP2P2B06 Uncultured bacterium (Alphaproteobacteria)
CTTGCGGTTAGCGCACCGTCTTCAGGTAAAGCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACT
AGCGATTCCAACTTCATGTGCTCGAGTCGCAGAGCACAATCCGAACTGAGACGGCTTTTTGAGATTTGCGCAGGGTCTCCCCATTGCGTCCCATTGTCACCGCCATTGT
AGCACGTGTGTGGCCCAGCCTGTAAGGGCCATGGGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCCCCTTAGAGTGCCCAACTAAATGATGGC
AACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGAACTGAAGGGCT
CCATCTCTGGTGCCCGCGACCGGGATGTCAAAGGCTGGTAAGGTTCTTCGCGTTGCTTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTTGATCTTGCGACCGTACTCCCCAGGCGGGATGCTTAATGCGTTAGCTGCGCCACTGACGAGTAAACCCGACAACGGCTAGCATCCATCGTTTACGGCGTGGAC
TACCAGGGTATCTAATCCTGT

>CUP2P2B07 Uncultured Acidobacteria (Acidobacteria)
TGACATACTTAGCGCCTATGCCCCTGCGGGTCACACAGCGATTTCTAGTACAGCCAGCTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGG
CATGCTGATCCGCGATTACTAGCGATTCCAACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTCTGCGATTAGCTCACTCTCGCGAGTTCGCG
ACGCTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGA
GTGCCCGGCATTACCCGATGGCAACAGGAAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAA
ATGTCCTTGCGGAAGTCGACTTTCGCCGAT

>CUP2P2B09 Uncultured bacterium (Não classificada)

TAGGTATTCGCCCCCGATAAAGGTTGGCAAAAATAACTTCGGGTACAAACAGCTTTCGTGGTGTGACGGGCAGTGTGTACAAGGTCCGTGAACGTATCACCGCGCCGTT
ACTTATACGCGATTACTAGCGATTTCAACTTCACGGGGTCGAGTTGCAGACCCCAATCCGAACTTAGACCGACTTTATAGGATTAGCTTACCTTCGCAGGCTTGCAACC
TTTTGTATCGGCCATTGTAACACGTGTGTAGCCCTAGGCATAAAGGCCATGATGACTTGACGTTGTCCCCACCTTCCTCCTGGTTTCCCAGGCAGTCCCATCAGAGTGC
CTTATTAAAATAAGTAGCAACTGACAGCAAGGGTTGCGCTCGTTAGAGGACTTAACCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAATTGT
CTGAACCGAAGCTCAAAAAGCCGTATTTCTACGGATGTCAAAAGCATGTCAAGCCTAGGTAAGGTTCCTCGCGTAGTGTCGAATTAAACCACATGTTCCACCGCTTGTT
CGAACCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTTCCCAGGCGAATCACTTAACGCGTTAGCTTCGACACCAATCCGGCAGAGCCAGACTGACGTCTA
GTGATTATCGCTTAC

>CUP2P2B10 Uncultured bacterium (Gammaproteobacteria)
AGGCTACTGCTTCTGGTGCAGTAAACTTCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAGCAATGCTGATCTGCGATTACTAGCGATTCC
GACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTTCTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCCCTCTGTATCTACCATTGTAGCACGTG
TGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGCCCAACTGAATGCTGGCAACTAAGGA
CAAGGGTTGCGCTCGTTGCGGGACTTAACCCATCATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCAGGCTCTTTGCGGCACCCCCGAATCTCTCCG
GGGTTCCTGGGATGTCAAGGCCAGGTAGGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAACCTT
GCGGCCGTACTCCCCAGGCGGAGAACTT

>CUP2P2B12 Uncultured bacterium (Acidobacteria)
GCCGCTGCCTCCTTGCGGTCAGCCTGCAGACTTCTAGTACAATCCACTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCAGCGTGCTGATC
TGCCATTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGCTTGTAGCGCTTTGTA
CCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTTCCGCCTT
TCGGCATGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGGCTGGACCCCCTTGCG
GGGTAGCGATGTTTCCACCGCCGTTAACCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACGGATCAAC

>CUP2P2C02 Uncultured Gemmatimonadetes (Gemmatimonadetes)
GGGTTCCGACACGGACTTCGGGCGCTCACAGCTTCCATGGCGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATTCACCGCGGCGTAGCTGATCCGCGATTACTAGCG
ATTCCAGCTTCATGGAGGCGGGTTGCAGCCTCCAATCCGCACTGAGGCCGGCTTTCGGGGGTTGGCTCCAGGTTGCCCTGTCGCAGCCCGCTGTACCGGCCATTGTAGC
ACGTGTGTAGCCCTGGACGTAAGGACCATGATGACTTGACGTCGTCCCCACCTTCCTCCGGTTTGGCACCGGCAGTCCCCCGAGAGTCCTCAGCTTTACCTGTGAGCAA
CACGGGGCGGGAGTTGCGCTCGTTGCGGGACTTAACCCAAC

>CUP2P2C05 Uncultured soil bacterium (Acidobacteria)
TGCGGGTCAGCGCACCGGCTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCAGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTA
GCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTGGGATTGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCAACCATTGT
AGCACGTGTGTGGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCCCAACTAAATGATGGCA
ACTGACAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGTAGCGGTCCCTTGCGGGAAAGAGATA
TTTCTACCTCGGTCCACTACGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGT
TTCAGCCTTGCGACCGTACTCCCCAGGCGGATCGCTTAACGCGTTAGCTCCGGCACGACAGGATTGGGTACCTGTCACACCAAGCGATCATAGTTTAGGGCTAGGACTA
CCAGGGTATCTAATCCTGTTTGCT

>CUP2P2C06 Uncultured bacterium (Gammaproteobacteria)
TAGGCGCCCCCTTGCGGTCAGGCTACCTGCTTCTGGTGCAGTAAACTTCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAGCAATGCTGAT
CTGCGATTACTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGACAGATTTTCTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCCTCTGT
ATCTGCCATTGTAGCACGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGCCCAAC
TGGATGATGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCAGGTTCCTTGC
GGCACCCCCGAATCTCTTCAGGGTTCCTGGGATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAA
TTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGAGGACTTAGCGCGTTAGCTACGACACT

>CUP2P2C09 Uncultured soil bacterium (Não classificada)
GGGCGGCTTCGGGTACACTAATCGTGACGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATTCACCGCAGCGTACTGATCTACGGTTACTACGATTCCGATCTGAAGG
CGATGCAGCTTCAATCCGAACTGAGAAATGGTTTGTGAGATTAGCNTTGCCCTCGCGGGTTCGCAACTCGTTGTCCATTCCATTGTAGCCGTGTGTGCCCGGGACGTAG
GGCCATGCTGACTTGACGTCTCCCCACTTCCTCCGGCTTGTCCCGGCGGTCCCGCGTGAGAGATCTTGCGACCAACACGCGGCGAGGGTTGCGCTCGTTGCGGGACTTA
ACCCAACACCTCACGGCACGAGCTGACGACGCCATGCAGCACTGTCTCTGCGTCCGGTTGCCCGGAAACTTAGTCTCCTAAGTGTGCGCAGGATGTCAAGCCCC

>CUP2P2C11 Unidentified bacterium (Acidobacteria)
TCCTTGCGGTTGGCGCGGCGACTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGTTCTGATACGCCATTA
CTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCATGGTTTTTTACGATTAGCTCCCCCTCGCGGGTTCGCGACGGTTTGTACCATGCAT
TGTAACACGTGTGTAGCCCTGGACATAAAGGCCGTGCTGACTTGACGTCATCCCCACCTTCCTCTCCGTTGTCCGGAGCAGTCTTCTTAGAGTTCCCCCTTGCGGGTGG
CAACTAAGAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACTACTGTCCCTTGCGGGAAGACGA
TATTTCTACCGTTGGTCAGTAGCAGTTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACC

>CUP2P2D02 Uncultured bacterium (Planctomycetacia)
GTTCATCTTCGGCGCTGCTCGCGGTCCGACGACTTCGGATGCCCCCCGCTTTGGTGGCTTGACGGGCGGTGTGTACAAGGCTCAGGAACACATTCACCGCGGCAGTGCT
GATCCGCGATTACTAGCGATTCCGGCTTCATGCGGGCGAGTTGCAGCCCGCAATCCGAACTGAGGGGCGATTTTTGCGATTAGCTCGACCTTGCGGCCTGGCAACGCTT
TGTCCGCCCCATTGTAGCACGTGTGCAGCCCTGGGCATAAGGGCCATGATGACTTGACGTCGTCCCCGCCTTCCTCCGGCTTGACGCCGGCGGTCTGATCAGAGTCCCC
GCCTTG

>CUP2P2D03 Uncultured bacterium (Acidobacteria)
GGTCAGCTTGGCGATTCTATACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATTC
CGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGT
GTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCCCTTGCGGGTGGCAACTACGTG
CAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACTTGTCCCTTGCGGGAAGGCCGTATTTCTACA
GCTTGTCAAGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAA

>CUP2P2D06 Uncultured forest soil (Acidobacteria)
TCCTTGCGGTTGGCTCGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCTATTA
CTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCACGGTTTTATCCGATTAGCTCCCCCTCGCGGGTTCGCAACAGTTTGTACCGTGCAT
TGTAACACGTGTGTAGCCCTGGACATAAAGGCCGTGCTGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTAGTAGAGTTCTCCCTTGCGGGTAG
CAACTACTAGTAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACTACGGTCCCTTGCGGGAAGACGA
TATTTCTACCGTTGGTCCGTAGCGGTTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTG
AGTTT

>CUP2P2D07 Uncultured bacterium (Betaproteobacteria)
ACGTGGTCGCGCCCCCCTTGCGGTTAGGCAAACGGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGTGACATG
CTGATCCACGATTACTAGCGATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCC
TTTGTACCGGCCATTGTATGACGTGTGAGGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCATCCGGTTTGTCACCGGCAGTCTCACTAGAGTGC

CCTTTCGTAGCAACTAGTGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCCGGCTCCCTTT
CGGGCACTCCCACATCTCTGCGGGATTCCGGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCT

>CUP2P2D09 Uncultured bacterium (Acidobacteria)
TCATGACTATACTTGGACGGCTGCTCCCTTGCGGTTAGCTTACCGGCTTCTAGTACAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTC
GCCGCAGCGTGCTGATCTGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGG
GTTTGCGACGGTTTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTT
CGTTAGAGTGCCCAGCTTGACCTGATGGCAACTAAAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACA

>CUP2P2E02 Uncultured alpha proteobacterium (Alphaproteobacteria)
GCTCCTTGCGGTTGGACACCGTCTTCAGGTAAAACCAACTCCCATGGTGTACGGGCGGTGTGTACAAGGCCCGGGAACGTTTCACCGCGGCGTGCTGATCCGCGATTAC
TAGCGATTCCAGCTTCATGCTCTCGAGTTGCAGAGAACAATCCGAACTGAGACGGCTTTTCGAGATTGGCTTGGGGTCGCCCCGTCGCCTCCCTCTGTCACCGCCATTG
CAGCACGTGTGTAGCCCAGCCCATAAAGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCGGCTTGTCACCGGCAGTTCCTTCAGAGTGCCCGGCTCGACCCGATG
GCAACTGAAGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGCCAGCCGAACTGAAGAG
GCCGATCTCTCGGCCCCATACGGGACATGTCAAGGGCTGGTAAGGTTCTTCGCGTTGCGTCGAACTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCT
TTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTCGCTTAACGCGTTAGCTGCGACACCGGAGGACTAGGTCCCCCAACGTCTAGCGCACATCGTTTACAGCGTG
GACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCGCCTCAGCGTCAG

>CUP2P2E06 Uncultured soil bacterium (Acidobacteria)
CCCCTTGCGGGTCGGCCTGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCAGCGTGCTGATCTGCCAT
TACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAGCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTCGCGGCGCATTGTACCGCCC
ATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCANCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTTCCGCCTTTCGGCA
TGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGAACACGAACTTGACGACAGGCATGCAGCACCTCGACTGGATCCCCTTGCGGGGT
AGCGATGTTTCCACCGCCGTTAACCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTC
CTTTGAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCACATTTAACG

>CUP2P2E12 Uncultured bacterium (Gemmatimonadetes)
CACGACGCTCGCCTTCGGCGGCTTGGTCCCTTGCGGGTTCCGACACGACTTCGGGCGCTCATCGCTTCCATGGCGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTAT
TCACCGTGGCGTGGCTGATCCACGATTACTAGCGATTCCAGCTTCATGCCGCCGGGTTGCAGGCGACAATCCGCACTGAGGACAGCTTTTGGGATTGGCTTGGCATTGC
TACCTCGCAGCCCTCTGTACTGTCCATTGTAGCACGTGTGTAGCCCTAGACGTAAGGACCATGATGACTTGACTTCGACCCCACCTTCCTCCGGTTTGGCACCGGCAGT
CCCCCCAGAGTCCCCGGCCGGCTTACGCCGCCGCTGGCAACAGGGGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCA
TGCAGCACCTGTGCACGTGCCCCGAAGGGACCCCTCCATCTCTGGAGAGAATCACGTGCATGTCAAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATG
CTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA

>CUP2P2F02 Uncultured bacterium (Acidobacteria)
TTGGACGGCTGCTTCCTTGCGGTTAGCCCACCGGCTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTC
TGATCCGCGATTACTAGCGATTCCAGCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGGTCAGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGT
TTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCC
CAGCATAACCTGATGGCAACTGACAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGCAGCC
CTTGCGGGAAGGGATGTTTCCACCCCAGTCCACTACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCC
GTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTTCGGCACGTTGGGATTGGGTACCCAACACACCAAGCAATCATCG
TTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTGTGGTCCAGTGA

>CUP2P2F03 Uncultured bacterium (Não classificada)
GGGCGGTGTGTACAGCCCGGGAACGTATCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAGCTTCATGTAGTCGAGTTGCAGACTACAATCCGAACTGGGGCC
GGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCC
ACCTTCCTCCCCGTTATCCGGGGCAGTTTCGCTAGAGTGCCCGGCTTGACCCGTTGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACG
ACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTCCCTTGCGGGAAAGGGATGTTTCCACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTT
GCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTATCGCGTTAACTG
CGGCACGATCGGATTGGATACCGATCACACCAAGCATTCATCGTTTAAGGCTA

>CUP2P2F05 Uncultured bacterium (Betaproteobacteria)
GGTTAGGCAAACGGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGTGACATGCTGATCCACGATTACTAGCGA
TTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCATTGTATGA
CGTGTGAGGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCACTAGAGTGCCCTTTCGTAGCAACTAGTGAC
AAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCCGGCTCCCTTTCGGGCACTCCCACATCTCTGC
GGGATTCCGGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCT

>CUP2P2F06 Uncultured actinobacterium (Actinobacteria)
CCAATGTACACGTGTGTACCTGACATAAGGCATGATGACTTGACGTCATCCCCACTTCCTCCGGTTTGTCACCGGCAGTCTCGCATGATCCCCAATAAATGCTGGCAAC
ATGCGACGGGGGTTGCGCTCGTTGCGGGACTTAACCCANNACATTCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGAATCTGCTCCGAAGAAGAGNNNCCG
TGTTTCCACGGTTGTCAGGAACATGTCAAGCCCAGGTAAGGTTCTTCGCGTCGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGTCCCCGTCAATT

>CUP2P2G02 Uncultured bacterium (Acidobacteria)
GGTTCGCGCGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGA
TTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACA
CGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCCTCTCTTGCGAGTAGTAACTGT
GTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCT

>CUP2P2G03 Uncultured Delftia (Betaproteobacteria)
CGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCGACTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGACT
GGTTTTATGGGATTAGCTCCCCCTCGCGGGTTGGCAACCCTCTGTACCAGCCATTGTATGACGTGTGTAGCCCCACCTATAAGGGCCATGAGGACTTGACGTCATCCCC
ACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCCCAACTGAATGTAGCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACA
CGAGCTGACGACAGCCATGCAGCACCTGTGTGCAGGTTCTCTTCCGAGCACGAATCCATCTCTGGAAACTTCCTGCCATGTCAAAGGTGGGT

>CUP2P2G06 Uncultured soil bacterium (Acidobacteria)
ATGGTACTTCTATACACCGGCTTTCGTGATGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGGTGCTGATCCGCGATTACTAGCGATTCCAACTTCAAG
CAGGCGAGTTGCAGCCTGCTATCCGAACTGAGACGGCTTTCTCCGATTAGCTCCAGCTTGCGCTTTTGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCA
GACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTGCAGAGTGCCCACCATAACGTGATGGCAACAGCAGACAAGGGTT
GCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCAACGAGTGTCCTTGCGGAAGCGCCCTTTCGGGCGTTGTCATTCG
CTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTAC
TCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGACAGGGATCGATACCCGTC

>CUP2P2G09 Uncultured bacterium (Acidobacteria)
CTTGCGGTTACGCAGCGACTTCTAGTACAGCCCACTTTCGTGTTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGTCCTGATACGCCATTACTA
GCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGGTTTTATCCGATTAGCTCCCCCTCACGGGTTCGCGACGGTTTGTACCGCGCATTGT

AACACGTGTGTAGCCCTGGACATAAGGGCCGTGCTGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTCTTAGAGTTCCCCCTTGCGGGTGGCAA
CTAAGAGTAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGG

>CUP2P2H02 Uncultured bacterium (Gammaproteobacteria)
TACCTACTTCTGGTACAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGACATTCTGATTCGCGATTACTAGCGATTCCGACT
TCATGGAGTCGAGTTGCGGACTCCAATCCGGACTACGGGACGCTTTCCGGGATCCGCTCCCTCCCGCGAGTTGGCTTCCCTCTGTACGCCCCATTGTAGCACGTGTGTA
GCCCTACCCATAAAGGCCATGATGACTTGACGTCGTCCCCGCCTTCCTCCGGTTCTTCACCAGCAGTCTCCTTAGAGTCCCCACCATTACATGTTGGCAACTAAGGATA
AGGGTTGCGCTCGTTACGGGACTTAACCCAACATCTCACAACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTAGGTTCCTTTCGGCACTTCCACATCTCTGCAGA
ATTCCTAGGATGTCAAGGGTAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAACCTTGC
GGTCGTACTCCCCAGGCGGAAGACTTATCGCGTTAGCTTCGATACTAATCAGTCATGCTGACCAACATCTAGTCTTCATCGTTTACAGCGTGGACTACCAGGGTATCTA
ATCCTGTTTGCTCCCCACGCTCTCGCGCCTCAGCGT

>CUP2P2H04 Uncultured bacterium (Não classificada)
ACTTAGGCGGCTGCTCCTTGCGGTTGGCACACCGACTTCGGGTACTACCAACTTTCGTGGCTTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCTGCCTG
CTGATCAGCGATTACTACGATTCCGACTTCATGCANGTCGAGTTGCAGACTGCAATCCGANTGAGACCGGTTTTTTGGGAATTACCTCCACCTCGCGGTATCGGAACCC
TCTGTNACCGGCCATTGTNNAGCACGTGTGTAGCCCCAGACGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCCTTAGAG
TGCTCGGCATTACCCGTTAGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCACC
AGC

>CUP2P2H05 Uncultured bacterium (Acidobacteria)
CACACTCATACTTGGACGGTATCCCCTTGCGGTTAATTACCGGCTTCTAGTACAACTGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCG
CTGCTTGCTGATCAGCGATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGAACGGTTTTTTGAGATTAGCTCCCCCTCGCGGGTTT
GCAACTCATTGTACCGCCCATTGTAGTACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTTTCACCGGCAGTCCCTTT
AGAGTGCTCAGCTTAACCTGGTGGCAACTAAAGGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGA
CTAGTGTCCCTTGCGGGAAAAGCGACTTTCGCCACCTGTCACTAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATACTCCACCGCTTGT
GCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATACTTAATGCGTTAGCTTCGGCACGACTGGATTCAATCCCAGTCACACCAA
GTATCCATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTGCCTCAGCGTCAGTTTCTGT

>CUP2P2H06 Uncultured bacterium (Acidobacteria)
GGTTAGCACAGCGACTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGTTCTGATACGCCATTACTAGCGA
TTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCATGGTTTTTTCCGATTAGCTCCCCCTCACGGGTTCGCGACGGTTTGTACCATGCATTGTAACA
CGTGTGTAGCCCTGGACATAAAGGCCGTGCTGACTTGACGTCATCCCCAACTTCCTCCCCGTTATCCGGAGCAGTCCTCTTAGAGTTCCCCCTTGCGGGTGGCAAATAA
GAGTAAGGGTTGCGCTCGTTGCGGGACTTAAACCA

>CUP2P2H07 Uncultured actinobacterium (Acidobacteria)
GGGCGCTGCCTCCTTGCGGTTAGCACGGCGACTTCTAGTACAACTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGTTCTGA
TACGCCATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTGCGATTAGCTCCCCCTTGCGGGTTTGCAACGCTCTG
TAGCGCGCATTGTAACACGTGTGTAGCCCTGGGCATAAAGGCCATGCTGACTTGACCTCATCCCCGCCTTCCTCTCCGTTATCCGGAGCAGTCCTCCTAGAGTTCTCCC
TTGCGGGTAGCAACTAAGAGTAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACACCAGTTTCTTGC
GAAAAGTCCCTGTTTCCAGGGATGGTCCGGTGCACTTCAAGTCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTC
AATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGCGGGACTTAACGCGTTAGCTACGGCACGTATCCCGTACAGGATACACGCCCAGTCCTGATGGTTTAG
GGCTAGGACTACCANGGTATCTAATCCAGTTTGCTCCCCTAGCTTTCGTCCCTCAGCGTCAGTTGTG

>CUP2P2H11 Uncultured bacterium (Deltaproteobacteria)
GGGACTGCTCCCTTGCGGGTTAGCACATCCACTTCTGGAGCAATCGACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCCCTGCCTGCTGA
TCAGGGATTACTAGCGATTCCAACTTCAAAGAGTCGAGTTGCAGACTCTTATCTGTACTGAGGCCGGTTTTTTGCGATTGGCACCCTCTTGCGAGTTCGCGACGCTTTG
TACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGATTTGAATATCGGCAGTCTCGCTAGAGTGCCCA
ACTGAATGATGGCAACTAGCGATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTAACTACAGGTTCTCC
GAAGAGCACCCCGACCTTTCGACCAGGTTCCTGCATTTTCTAGCCCAGGTAAGGTTCTGCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCG
TCAATTCCTTTGAGTTTTAGTCTTGCGACCGTACTCCCCAGGCGGGGTGCTTAATGCGTTGGCTACGGCACCGCAGGGGTCAAAGCCCGCGACACCTAGCACCCAT

>CUP2P3A02 Uncultured bacterium (Gammaproteobacteria)
GGTCAGGCTACCTGCTTCTGGTGCAGTAAACTTCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAGCAATGCTGATCTGCGATTACTAGCG
ATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGTCAGATTTTCTGGGATTGGCTCCCGCCCGCGCGTTGGCTTCCCTCTGTATCTGCCATTGTAGC
ACGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGCCCAACTGAATGATGGCAACT
AAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCACGGTTCCTTGCGGCACTCCCGCATCT
CTGCAGGATTCCGTGGATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCA
ACCTTGCGGCCGTACTCCCCAGGCGGAGGACTTAGCGCGTTAGCTACGACACTGCGAGGCCTAACCTCTCAACGTCTAGTCCTCATCGTTTATGGCATGGACTACCAGG
CTATCTAATCCTGTTTGCTCCCCATGCTTTCGTACCTGAACGTCGGTGCTGGACCAGGAAGCC

>CUP2P3A03 Uncultured actinobacterium (Actinobacteria)
ACGGCTCGGGTGTGCGACTTCGTGGTGTGCGGGCGGTGTGTACAAGCCCGGGAACGTATCACCCCGGCGTTGCTGATCCGGGATACTAGCGACTCCGACTTCACGCAGT
CGAGTTGCAGACTGCGATCCGAACTGAGACCGGCTTTTTGGGATTCGCTCATCCTNCGCGGAATAGCAGCCCTTTGTACCGGCCATTGTAGCATGTGTGCAGCCCTGGA
CGTAAGGGGCATGATGACTTGACGTCATCCCCACCTTCCTCCGAGTTGACCCCGGCAGTCTCCTACGAGTCCCCGGCGTTACCCGCTGGCAACATAGGACAAGGGTTGC
GCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTATCGCAGGCCCTTGCGGACACCGCATCTCTGCGGCTTTTCCTGCGTA
GTTCAACCCAGGTAAGGTTCTTCGCGTTGCCTCGAATTAAGCCACATGCTCCGCCGCTTGTGCGGGCCCCCGTCAAT

>CUP2P3A05 Uncultured bacterium (Acidobacteria)
GGTTAGCTTACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCGAT
TCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCACTAGAGTGCCCGGCTTGACCCGATGGCAACT
AGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAACAGTCCTTGCGGAAAGGGATATTTCT
ACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCANCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
CCTTGCGACCGTACTCCCCAGGCGGGATGCTTATCGCGTTAGCTTCGGCACGGCGGGATTGGGTACCCGANACACCAAGCATCCATCGTTTAGGGCTAGGACTACCAGC
GTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCATCAGCGTCAGTTGTGGTCCAGTGCGCCGCTTTC

>CUP2P3A06 Uncultured bacterium (Sphingobacteria)
GACACTCCTTACGGTATCGTCTTAGGTACACCAACTTCCATGGCTGACGGGCGGTGTGTGCAAGGTCCGGGAACGTATTCACCGTGGCATTGCTGATCCACGATTACTA
GCGATTCCAGCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACGTTTTTTGTGGGATTTGCTCACCATCGCTGGTTGGCTGCCCTTTGTAAACGCCATTGT
AGCACGTGTGTAGCCCTGGGCATAAAGGCCATGATGATTTGACGTCATCCCCTCCTTCCTCTCTGCTTACGCAGGCAGTCTCTTTAGAGTCCCCGGCATTACCCGCTGG
CAACTAAAGATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAACCATGCAGCACCTTGTAATCTGCGTATTGCTACAAAGACC
CCTTTCAGGATCGGTCAAATCACATTCTAGCCCAGGTAAGGTTCCTCGCGTATCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGACCCCCGCCAATTCCTTTGA
GTTTCAACCTTGCGGTCGTACTTCCCAGGTGGTAAACTTAACGCTTTTGCTTGGACACTAACTGTGTATCGCTAATGTCGA

>CUP2P3A07 Uncultured bacterium (Verrucomicrobiae)

CATGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGCCGTACTGATGCGCCATTACTAGCGATTCCGGCTTCATGGAGGCGAATTGCAGCTCCAATC
CGAACTGGGCCCAGTTTTGAGAGATTTCCTCCACCTCGCGGTATCGGATCGTTCTGTACTGGGCATTGTAGTACGTGTGCAGCCCAGGCCGTAAGGGCCATACTGACTT
GACGTCGTCCCCACCTTCCTCCTCGTTTAAGCGAGGCAGTCTGAACAGAGTGCTGGAACCTCTCGGTTCCGTGGCAACAGTTCACAGGGGTTGCGCTCGTTGCGGGACT
TAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAATTGTCTCTTTCGAGACTCGCTGGCTCTCACCAACTTAGAGATGCATGTCAAGGCC
TGGTAAGGTTCTTCGCGTTGCATCGAATTGAGCCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTTCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGC
ACGTTTAACGCGTTGGCTCCGGCGCAGAAGGGGTCGAATCCT

>CUP2P3A08 Uncultured bacterium (Actinobacteria)
GGCTTCGGGTGTGACCGACTTTCGTGGTGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATCACCCCGGCGTTGCTGATCCGGGATTACTAGCGACTCCGACTTCATG
GAGTCGAGTTGCAGACTCCAATCCGAACTGAGACCGGCTTTAGGGATTGGCTCCTCCTCGCGGAATAGCAGCCCGTTGTACCGGCCATTGTAGCATGTGTGCAGCCCTG
GACGTAAGGGGCATGATGACTTGACTTCGAACCCACCTTCCTCCGAGTTGACCCCGGGCAGTCTCCTACGAGTCCCCGCCATTACGCGCTGGCAATATAGGATAAGGGTT
GCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGTAAGGCCCCGAAGGACACCGTATCTCTACGGCTTTTCCCTAC
ATGTCAAACCCAGGTAAGGTTCTTCGCGTTGCCTCGAATTAAGCCACATGCTCCGCCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACT
CCCCAGGCGGGGCACTTAATGCGTTAGCTGCGGCACGGAAACCGTTGAATAGTTCCCACACCTAGTGCCCAACGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGT
TCGCTCCCCACGCTTTCGCTCCTCAGCGTCAATGTCGGCCCAGACCACCGCCTTCGCTGCTGGTGTTCCTCCTGATATCTGCGCATTTCACC

>CUP2P3A09 Uncultured bacterium (Acidobacteria)
CGACATACTTAGCGCTCTCTCCTGCGGGTTGATATGGGATTCTATAACGGCTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGGTGCTGA
TCCGGATTACTAGCGATTCCAACTTCAAGCAGGCGAGTTGCAGCCTGCTATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCCACCTTGCGGTATCGCGACGGTTTGT
ACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTTCAGAGTGCCCAGC
TTAACCTGATGGCAACAGAAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTG
CGGAAGCTCCCTTTCGGGAGTGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGNCACACCAAGCATTCATCGTTTAG
GGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCTCCTCAGCGTCAGTGTCGGTCCAGGATGCCGGCTTC

>CUP2P3A10 Uncultured soil bacterium (Acidobacteria)
GGGTCAGCGCACCGGCTTCTAGTACAGCCCACCTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCG
ATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTGGGATTGGCTTTTTCCGATTGGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCAACCATTGTAGC
ACGTGTGTGGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCCCAACTGAATGATGGCAACT
GACAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGTAGCAGTCCCTTGCGGGAAAGGGATATTT
CTACCCCGGTCCACTACGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGCCTTGCGACCGTACTCCCCAGGCGGATCGCTTAACGCGTTAGCTCCGGCACGACGGGATTGGGTACCTGTCACACCAAGCGATCATCGGTTAAGGCTAGGACTACCA
GCGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTGCATCAGCGTCAGTAATGGTCCAGTGAGCCGCTTTCGCCACAGGTGTTCCT

>CUP2P3A11 Uncultured bacterium (Actinobacteria)
TTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACATTAGCCCCGAAGGGGGACCATATTTCTACGGTTTTCTA
ATGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCG
TACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCC
TGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAAT
TCCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCAACCGACGTCTCGAGGTTGAGCCTCGAGTTTTCACAGCTGACCTGTATGGCCGCCTACACGCTCTTTACGCC
CAATAAATCCGGACAACGCTTGCCCCCTACGTATTTCCGCGGCTGCTGGCACTCAGTCAGTCA

>CUP2P3B01 Uncultured bacterium (Não classificada)
CATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAG
CCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGTCAGAGTGCTCAACTAAATGGTAGCAACTGAAGATAAGG
GTTGCGCTCGTTGCGGGACTTAACCCAACATCCCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGACCACTTTCGTAGTTTGTCAC
TCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCG
TACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGCCACACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCC
CGTTTGCTCCCCTGGCTTTCGCTCCTCAGCGTCAGAATTGGTCCAGGATGCCGCCTTCGC

>CUP2P3B02 Nitrobacter winogradskyi (Alphaproteobacteria)
TAGCATCGGTCGCAAATCGTTTGCTGCGGCAGTCAAGCCGCTGGAATTGACCGACACATCACTCCGCACATCTGCCGGCACACAGCTGCGACGTGGGCGATGCAGGCGG
GCGCGAACATCTGGGATGCTGCCAACTGGCTCGGGATGAGCGCCGAGGTTTTGGAGCGGGTATATGGCCACCATCATCCGGATTTCCAGGCTGATGTTGCCGAGAGAGT
ATCGGGACAGAAACGGGACAGAAATACCGTGAACAAACGCGGATTGACGGCTTAGAAGATGACGAAAACCCTCGAACTTTCAGGAGATACGAGGTGAAACAACACGTTC
GGGACGCAGGGGTCGCAGTTCAAATCCTGCCGCTCCGACCATTCCTTCAAGTACTTATAATTACGATGTCTTTTCAGCGCAGCGAAAGGCGCAATGAAGAGCCGCTGCG
TCGCCGTTAACTACACTATTGTCGACGGTGCAACCAAAAGTGGCTTGCTATATGAGGCCATTTTCCGGCAGCTCTCGGATCATCGATAGCATTCCGATCGCGGCATTGC
GCCATTGGGCCATCGCAAATTCGAGGGCGCCTATGACGGCGCTACGA

>CUP2P3B03 Uncultured bacterium (Não classificada)
CAATCCGAACTGAGGCCGGCTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGACATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCATGAGGAC
TTGAACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCTAGAAGTGCCCAGCTTGACCTGATGGCAACTAAACGAATAAGGGTTGCGCTCGTTGCGGGAC
TTAACCCNAACATTCTCACGACACGAGCTGACGACAGCCATGCAGCACCCTCCCGCAGCAGTCCTTGCGGAAAGGG

>CUP2P3B04 Uncultured bacterium (Não classificada)
GGCGGTGCTCCCTTACGGTTAGCGCACGACTTCTATACAGTCATTCGGATTAGGGCGGTGTGTACAAGCCCGGGAACGTATCACCGCAGCGTGCTGATCTGCGATTACT
AGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGGATTAGCTCCCCCTCGCAGGTTTGCGACGGTTTGTACCGACATTG
TACACGTGTGTACCCTGGACATAAAGGCCATGAGACTTGACGTCATCCCCANCTTCCTCCCCGTTATCCGGGGCGGTTTCACTAGAGTGCCCGACTTGACTCGCTGGCA
ACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCA

>CUP2P3B05 Uncultured soil bacterium (Acidobacteria)
CCCCTTGCGGGTCAGCTGCAGACTTCTAGTACAATCCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCAGCGTGCTGATCTGCCATTA
CTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGATTGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTTGCGGCGCTTTGTACCAACCAT
TGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTTCCGCCTTTCGGCATG
GCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCCTTGCGGGGTAGCG
ATGTTTCCACCGCCGTTAACCAGCCGTTCGAGCCCAGGCAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACGGACAGAATGAACTGGCCACACCAAATATGCATCGTTTAGGGCGTGGAC
TACCAGGGTATCTAATCCTGTTTGCTAACCACGCTTTCGTGATTCAGCGTCAGTTACGGTCCAGAAAGCCGTCT

>CUP2P3B06 Uncultured bacterium (Alphaproteobacteria)
TAAAGCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCGATTCCAACTTCATGTGCTCGAGT
TGCAGAGCACAATCCGAACTGAGACGGCTTTTTGAGATTTGCGCAGGATCGCTCCATTGCATCCCATTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCGTAAGG
GCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCCCCTTAGAGTGCCCAACTAAATGATGGCAACTAAGGGCGAGGGTTGCGCTCGTTG
CGGGACTTAANCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGAACTGAAGGGATCGATCTCTCGTTCCCGCGACCGGGATG
CCAAGGGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTGA

>CUP2P3B07 Uncultured soil bacterium (Acidobacteria)

GACGGTGCTCCCTTGCGGGTCAGCGCACCGGCTTCTATACAGCCCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATC
TGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTGGGATTGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTA
CCAACCATTGTAGCACGTGTGTGGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCCCAACT
GAATGATGGCAACTGACAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTACGTAGCAGTCCCTGGCG
GGAAAAAGATATTTCTACCTCGGTCCACTACGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCANCGCTTGTGCGGGCCCCCGTCAA
TTCCTTTGAGTTTCAGCCTTGCGAACGTACTCCCCAAGCGGATCGCTTAACGCGTTAACTCCGGCACGACAGGATTGGGT

>CUP2P3B08 Inquilinus sp. (Alphaproteobacteria)
ACACCGTCTTCGGGTAAGCATCCCATGGTGTGACGGGCGGTGTGTCATGCCCGGGAACGTATTCACCGCAGCCTGCTGTTCTGCGATTACTAGCGATTCCACCTTCATG
CACCCGAGTTGCAGAGTGCAATCTGAACTGGGACGGTTTTTGGGGATTAGCATCCACTCGCGTGGTCGCTGCCCACTGTCACCGCCATTGTAGCACGTGTGTAGCCCAG
GCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCGCCGGCGGTCCCTTTAGAGTGCCCAACTTAATGATGGCAACTAAAGGCGAGGGTTGC
GCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGGACGCCAGCCGAACTGAAGACCTCGATCTCTCGGGGTCAAAC
GTCCCATGTTAAGAGCTGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTAACCTTGCGGCC
GTACTCCCCAGGCGGTGCGCTTATCGCGTTAGCTGCGACACCGAGAAACTAAGTTTCCCAACGTCTAGCGCACATCGTTTACGGCGTGGACTACCAGGGTATCTAATCC
TGTTTGCTCCCCACGCTTTCGCGCCTCAGCGTCCAGTATCGG

>CUP2P3B09 Uncultured Acidobacteria bacterium (Acidobacteria)
GGTTAGCTCACCGACTTCTAGTGCAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCATTCTGATCCGCGATTACTAGCGA
TTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCA
CGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCAACTTCCTCCCCGTTATCCGAGGCGGTTTCACCAGAGTGCCCAACTAAATGATGGCAACTG
GGGATAAGGGTTGCGCTCGTTGCGGGACTTAANCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACAGCAGCCCCTTGCGGGGAAGGAATATTTC
TACTCCGGTCCACTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAGTTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GCCTTGCGACCGTACTCCCCAGGCGGACTGCTTAACGCGTTAGCTACGGCACGGCGGGATTGGGTACCCGTCACACCAAGCAGTCATCGTTTAGGGCTAGGACTACCA

>CUP2P3B10 Uncultured bacterium (Betaproteobacteria)
GAAGTCACGTGGTCGCGCCCCTTGCGGTTAGGCAAACGGCTTCTGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCGGGAACGTATCACGTGACATGC
TGATCACGATTACTAGCGATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTT
TGTACCGGCCATTGTATGACGTGTGAGGCCCTACCCATAAGGGCCATGAGGA

>CUP2P3B12 Uncultured soil bacterium (Verrucomicrobiae)
ACACTTCGGGTACAGCGATCCCATGATTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGCGCCGTAGCTGATGCGCCATTACTAGCGATTCCGGCTTCATGTA
GGCGAGTTGCAGCCTACAATCCGAACTGGGCCCAGTTTTCAGGATTTCCTCCACCTCGCGGATTCGGATCATTCTGTACTGGGCATTGTAGTACGTGTGCAGCCCTGGC
CGTAAGGGCCATCCTGACTTGACGTCATCCCCACCTTCCTCCCCGTTTCACAGGGCAGTCTGAACAGAGTGCACTCTTGCGAGTTTGCAACAGTTCACAGGGGTTGCGC
TCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAAGCGCGTATTGCTACGCTGGCCGGCTTTCACCGGCGACACAAT
GCATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAGCCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTTCTTTGAGTTTTAATCTTGCGACCGTA
CTCCTCAGGCGGCACGTTTAACGCGTTAGCTCCGGCACGCACGGGGTCGAATCCGCGCACACCAAACGTGCACCGTTTACTGCTAGGACTACCGGGGTATCTAATCCCG
TTTGCTCCCCTAACCTTCGCGCCTCAGCGTCAGGAGCTGTCCAGAGATCCGCCTTCGCCACCGGTCTTCCTCACGATATCTACGCATTTCACTG

>CUP2P3C01 Uncultured forest soil bacterium (Acidobacteria)
TTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTC
CCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACCTGTCCC
TTGCGGGAAGGCCGTGTTTCCACAGCTGGTCAGGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCC
CGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGT
TTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAGTGGTCCAGCGCGCCGCTTTCGCCACGG

>CUP2P3C03 Uncultured actinobacterium (Acidobacteria)
GATTAGCTCCCCCTCGCGGGTCGGAACTCTGTACATGCATGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACCTCATCCCCACTTCCTCTCCGTTA
TCCGGAGCAGTCCTCGTAAGTCTCCCTTGCGGGTAGCAACTACGAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCCAACACCTCACGGCACGAGCCCGACGACAGCC
ATGCAGCGCCTATACTC

>CUP2P3C04 Uncultured bacterium (Não classificada)
GAGAACGTATCACCGGGATGGCTGATCCGGATTACTAGCGATCCACTTCACGGAGTCGAGTTGCAGACTCCGATCCGAACTGAGGACGGTTTTGGGATTAGCTTGCTCT
CGCGAGTTGCAACCCTTTGTACCGCCCATTGTAGCAGCTTGTACCCTGGGCATAAGGGCCATGATGACTTGACGTCATCCCCAACTTCCTCCCGGTTGACCGGGCAGTC
TCCCTAGAGTGCTCAGCTTTATCTGGTAGCACTAAGGAAAGGGGTTGTGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAACACN
CTGAACCGGCAGTCCCCGAAGGGAAGACTACTTTCATAGGCTGTCCACCCGTTGTCTAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAAT

>CUP2P3C05 Uncultured bacterium (Gammaproteobacteria)
TCTTGTGGTCAGGCTACTGCTTCTGGTGCAGTAAACTTCCATGGTGTGACGGGCGGTGTGTAAAGACCGGGAACGTATCACCGCAGCAACGCTGATCTGCGATTACTAG
CGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTCTGGGATGGTCCCGCTCGCGCGTGGTTCCCTCTGTATCTACCATTGTACCGTG
TGTCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACTTCCTCCGGTTTGTCACGGCGGTCTCCTTAGAGTGCCCAACTAAATGCTGGCAACTAAGGACAAG
GGTTGCGCTCGTTGCGGGACTTAACCAAATCTCACGAACGACTGACGACAGCCATGCAGCACCTGTCTCCAGGCTCCTTGCGGCACCCCTAAATCTCTTCAGGGTTCCT
GGGATGTAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGC

>CUP2P3C06 Uncultured bacterium (Acidobacteria)
TGCTCCTTGCGGTCAGCTTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCA
TTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTG
CATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAG
TGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACCTGTCCCTTGCGGGAAGG
CCGTGTTTCCACAGCTGGTCAGGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCT
TTGAGTTCCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGG
ACTACCAGNGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAGTGGTCCAGCGCGCCGCTTTCGCCACGGG

>CUP2P3C07 Uncultured bacterium (Acidobacteria)
GGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAG
CAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATC
CCCACCTTCCTCTCCGTTATCCGGTGCAGTCCACACAGAGTCCTCTCTTGCGAGTAGTAACTGTGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACG
GCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCGGTCCCTTACGGGAAGGCCGTATTTCTACAGCTGGTCCGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGT
AGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCT
CCGGGACGACGCCCGAACGGGCGCCAACCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAAGGTATCTAATCCTGTTTGCTCCCCTAACTTTCGTTCCTCAGCGTCAG
TTGTGGTCCAGCGCGCCGCTTTCGC

>CUP2P3C08 Uncultured soil bacterium (Gammaproteobacteria)
TGAACACTCCGTGGTCGTCGCCCCCTTGCGGTTAGGCTAACGGTTCTGGAGCAATCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGC
AGCATAGCTGATCTGCGATTACTAGCGATTCCGACTTCATGAAGTCGAGTTGCAGACTTCAATCCGGACTGGGATCGGCTTTCTGGGATTGGCTCCACCTCGCGGTCTC
GCAACCCTCTGTACCGACCATTGTAGTACGTGTGTAGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTT
AGAGTTCCCACCATTACGTGCTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGT

TCTGGTTCCCGAAGGCATTTCCGCATCTCTGCAGAATTCCAGACATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATACTCCACCGCTTGTGC
GGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGGCGAACTTAACGCGTTAGCTTCGACACTGATCTCCGAGTTGAGACCAACATCCAGT
TCGCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTG

>CUP2P3C09 Uncultured bacterium (Bacilli)
AGTCATCGACCCACTTAGGCGGCTGGCTCCATAAAGGTTACCTCACCGACTTCGGGTGTTGCAACTCCCATGGTGTGACGGGCGGTGTNTACAAGGCCCGGGAACGAAT
TCACCGCGGCATGCTGATCCGCGATTACTAGCAATTCCGGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTACGAACGGCTTTATGAGATTAGCTCCACCTCAC
GGTCTCGCATCCCTTTGTACCGCCCATTGTAGCACGTGTGTAGCCCAGGACATAAGGGGCATGATGATTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGT
CCATTGTGAGTGCTCAACTAAATGGTAGCAACACAATGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAACCATGCACCAAC
TGTCACCGCTGCCCCGAAGGGAAGGCTTATCTCTAAACCGGTCAGCGGGATGTCAAGTCCTAGTAAGGTTCTTCGCGTTGCTTCGAATTAAACCACATGCTCCACTGCT
TGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGAACGTAATCCCCAAGCGGAGTGCTTAATGCGTTAGCTTCGGCACTGAGGGTG

>CUP2P3C10 Uncultured bacterium (Acidobacteria)
ACGGCTGCTCCCTTGCGGGTCAGCGCACCGGCTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGA
TCTGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTGGGATTGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTG
TACCAACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGG

>CUP2P3C11 Uncultured soil bacterium (Deltaproteobacteria)
GTGTGTCAGGCCCGGGAACGTATCCCGCGGCATGCTGATCCGGATTACTAGCGATCCGCCTTATGGAGTCGAATTGCAGACTCCAATCCGAACTGAGACCGGCTTTTTG
GGATTGCTCCACCTCGCGGATTCGCAGCCCTTTGTGCCGGCCATTGTAGCACGTGAGTGGCCCTGGGCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTC
CGGCTTAACACCGGCAGTCCCACTAGAGTGCCCAGCATGATCTGATGGCAACTAATGGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGACACGAGCT
GACGACAGCCATGCAGCACCTGTCTTGGAGCTCCCGAAGGCACCCTCCTGTTTCCAGGAGGTTCTCCAGATGTCAAGCCCAGGTAAGGTTCTTCGCGTTGCTTCGAATT
GAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGTCTTGCGACCGTACTCCCCAGGCGGGGTGCTTAACGCGTTAGCTGCGGCACCACG
GGGGCCA

>CUP2P3C12 Uncultured soil bacterium (Acidobacteria)
ATTCCAGCTTCATTGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGGCCATTGTAG
CACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCTAGAGTGCCCGGCTTGACCCGATGGCA
ACTAACGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGTCCTTGCGGAAAGGGATGTT
TCCACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
CAGCCTTGCGACCGTACTCCCCAGGCGGGATGCTTAACGCGTTAGCTGCGGCACGATGGGATTGGGTACCCATCACACCAAGCATCCATGGTTTAGGGCTAGGACTACC
AGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCA

>CUP2P3D01 Uncultured bacterium (Gammaproteobacteria)
GGTGTGACGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGCAGCAATGCTGATCTGCGATTACTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCC
GGACTACGACAGATTTTCTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCCTCTGTATCTGCCATTGTAGCACGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTG
ACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGCCCAACTGAATGGTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAA
CATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCAGGCTCCTTACGGCACCCCTAAATCTCTTCAGGGTTCCTGGGATGTCAAGACCAGGTAAGGTTC
TTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGAGAACTTAGCGC
GTTAGCTACGACACTGCGAGGCTTACCCTCTCAACGTCTAGTTCTCATCGTTTATGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCCTG
AACGTCGGTGCTGGACCAGGAAGCCGCTTTCGCCACTGGTGTTCCTTCCGATATCTACGCATTTCACCGCTACACCGGAAATTCCGCTTCCCTCTTCCGCACCCTAGCA
GAGCAGTCTCGAATGCAATTCC

>CUP2P3D02 Uncultured bacterium (Acidobacteria)
GGCGGCTGCGTCTTGCGGTCGCGCACGACTTCTAGTACAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTTCTGATCT
GCGATTACTAGCGATTCCAGCTTCATGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTAC
CGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCCGTTATCCGGCGCAGTTTCGCTAGAGTGCCCGGCTT
GACCCGATGGCAACTAG

>CUP2P3D04 Uncultured bacterium (Não classificada)
GTCTCCTGCGAGTTCCTCCTTGCGGAATGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCA
CCTCGACCGGACCTCCTTGCGGAGTAGCGATGTTTCCACCGCCGTTAACCGGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCCCCAC
CGCTTGTGCGGG

>CUP2P3D05 Uncultured bacterium (Acidobacteria)
ACGGCTGCGCCCTTGCGGTTCGCTCACCGGCTTCTAGTGCAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTTCTGAT
CTGCGATTACTAGCGATTCCAGCTTCATGGAGTCAGGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCTTCGCAGGTTTGCGACGGTTTGT
ACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCCGTTATCCGGCGCAGTTTCGCTAGAGTGCCCGGC
ATAACCCGATGGCAACTAGAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGCCCTTG
CGGGCGCCGATGTTTCCACCGGATTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCANCCCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATGCTTATCGCGTTAGCTTCGGCACAGTGGGATTGGGTACCCACTACACCAAGCATCCATGGTTTA
GGG

>CUP2P3D06 Uncultured bacterium (Acidobacteria)
GACTTCTAGTACAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTTCTGATCTGCGATTACTAGCGATTCCAGCTTCAT
GGAGTCGGGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCTTCGCAGGTTTGCGACGGTTTGTACCGACCATTGTAGCACGTGTGTAGCCC
TGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCCGTTATCCGGCGCAGTTTCGCTAGAGTGCCCGGCATAACCCGATGGCAACTAGAGATAAGGG
TTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGCCCTTGCGGGCGGGGATGTTTCCACCCCTTTCCA
CTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCG
TACTCCCCAGGCGGGATGCTTAACGCGTTAGCTGCGGCACAGCCGGATTGGGTACCGGCTACACCAAGCATCCATGGTTTAGGGCTAGGACTACCAGGGTATCTAATCC
TGTTTGCTCCCC

>CUP2P3D08 Uncultured bacterium (Não classificada)
CAGTCACAGTCATACATGAACGGTACTCCCTTGCGGGTTGGCGCACCGGCTTCCGGTACAACGGGCTTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTA
TTCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGAGCGGTTTTTTGGGATTGGCTTACTCTCG
CGAGCTCGCATCCCTTTGTACCGCCCATTGTAGCACGTGTGTAGCCCTGGACATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTAACGCCGGCAG
TCTCCTTAGAGTGCCACGGCATGACCCGGGGGCAACTAAGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAG
CACCTGAACCGGCAGTCCCCGAAGGGAAAGCCCCATCTCTGGGGCGGTCCGCCGTTGTCTAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCA
CCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAACCTTGCGGCCGTAATCCCCAGGCGGGGGACTTAATGCGTTAGCGGCGGCACGGGAGGGTCAATACCCCCC
AAACCTAGTCCCCATCGTTTACAGCGTGGACTACCAGGGTATCTAATCCTGTTTGATCCCCACGCTTTCGCGCCTCAGCGTCAGTATCCGTCC

>CUP2P3D09 Uncultured bacterium (Não classificada)
CTTGGGCGTGCCCCTTGCGGTCGGGCGCAGATTCTATACAATCCATTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGAGCGTGCTGATCTGCAT
TACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTCTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCTTTGTACCGTCC
ATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTTCCCAACTAAATGA

TGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCCTTGCGGGGTAG
CGATGTTTCCAACGCCGGTAACCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCC

>CUP2P3D10 Uncultured bacterium (Verrucomicrobiae)
ATACTTCGGCGCTTTGAGGGGCGATCGGGTACAAACGGTTCATGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGCCGTAGCTGATGCGCCATTAC
TAGCGATTCCGGCTTCATGAAGGCGAATTGCAGCCTTCAATCCGAACTGGGCCCAGTTTGATAGATTTCCTCCACCTCGCGGTCTCGGATCGTCTGTACTGGGCATTGT
AGTACGTGTGCAGCCAGCCGTAAGGGCCATACTGACTTGACGTCATCCCC

>CUP2P3D11 Uncultured bacterium (Acidobacteria)
GTCCACTTCGTGATGTACGGGCGGTGTGTACAAGCCCGGGAACGTATCACCGAGCGTCTGATCTGCGATTATACGATCCAGCTTCATGGGAGTCGGGTTGCAGACTCCA
ATCCGAACTGAGCAGCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGTGCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGA
CTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCTAGAGTGCCCCGGCTTGACCCGATGGCAACTAACGATAAGGGTTGCGCTCGTTGCGGGACTTA
ACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGCCCTTGCGGGCTGAGATGTTTCCACCTCATTCCACTGCGCTTCGAGCCCAGGTAA
GGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATGCTT
ATCGCGTTAGCTGCGCCACGGCGGGATTGGGTACCCGCCACAGCAAGCATCCATAGTTTAGGGCTAGGACTACCAGNGTATCTAATCCTGTTTGCTCCCCTAGCTTTCG
CGCATCAGCGTCAGTTGTGG

>CUP2P3D12 Uncultured Acidobacteria (Acidobacteria)
GGGAACGTATTCACCGCAGCGTTCTGATCTGCGATTACTAGCGATTCCAGCTTCATGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGC
TCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCATTGTAGCACGTGTGTGGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTAT
CCGAGGCAGTTTCGCTAGAGTGCCCGGCATAACCCGGTGGCAACTAGCGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAG
CCATGCAGCACCTCCGCAGCGGTCCTTGCGGAAAGGGATGTTTCCACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACAT
GCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATGCTTAACGCGTTAGCTGCGGCACGACCGGATTGGGT
ACCGATCACACCAAGCATCCATAGTTTAGGGCT

>CUP2P3E02 Uncultured bacterium (Betaproteobacteria)
CCCCTTGCGGTTAGGCAAACGGCTTCTGGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGTGACATGCTGATCCACGATTA
CTAGCGATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCAT
TGTATGACGTGTGAGGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCACTAGAGTGCCCTTTCGTAGCAAC
TAGTGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCCGGCTCCCTTTCGGGCACTCCCACA
TCTCTGCGGGATTCCGGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCAAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTT
TTAATCTTGCGACCGTACTCCCCAGGCGGTCGACTTCACGCGTTAGCTGCGTTACCGAGAAAATGAATTCCCG

>CUP2P3E04 Uncultured bacterium (Alphaproteobacteria)
TTCGGGTAAAGCCAATCCCATGGTGTGACGGGCGGTGTGTACAGCCGGGAACGTATTCACCGGGCATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCACTCGA
GTTGCAGAGTGCAATCCGAACTGAGACGACTTTTGGGGATTGGCTCGCCATCACTGGGTTGCAGCCCTCTGTAGTCGCCATTGTAGCACGTGTGTAGCCCACCCTGTAA
GGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTACCACCGGCGGTCCCATTAGAGTGCCCAACTAAATGATGGCAACTAATGGCGAGGGTTGCGCTCGTT
GCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCTAGTCCCCGAAGGGAAAACCGGATCTCTCCGGCGGTCCAGGCATGTCA
AAAGGTGGTAAGGTTCTGCGCGTCGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGAACGTACTCCCCAG
GCGGAGTGCTTAATGCGTT

>CUP2P3E05 Uncultured bacterium (Alphaproteobacteria)
TCGGGTAAACAATCCATGGTGTGACGGCGGTGTGTCAAGGCCCGGGAACGATCACCGCGGATGCTGATCCGCGATTACTAGCGATTCCAACTTCATGCCCTCGAGTTGC
AGAGGACAATCCGAACTGAGACGACTTTTAAGGATTAACCCTCTGTAGTCGCCATTGTAGCACGTGTGTAGCCCACCCTGTAAGGGCCATGAGGACTTGACGTCATCCC
CACCTTCCTCCGGCTTAGCACCGGCAGTCCCATTAGAGTTCCCAACTGAATGATGGCAACTAATGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGA
CACGAGCTGACGACAGCCATGCAGCACCTGTGTCCCAGTCCCCGAAGGGAAAGCCACATCTCTGTGGCGGTCCGGGCATGTCAAAAGGTGGTAAGGTTCTGCGCGTTGC
TTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGATTGCTTAATGCGTTAGCTGCG
TCACCGAAATGCATGCATCCCGACAACTAGCAATCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGAGCCTCAGCGTCAGTAA
TGAGCCAGTGTGT

>CUP2P3E06 Uncultured bacterium (Acidobacteria)
GGTTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATTTACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCATCGTTCTGATACGCCATTACTAGCGAT
TCCAGCTTCACGCAGGCGAGTTGCAGCCTGCGATCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCATTGTACCGGCCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTGCTATCTTTCGATGTGGCAACACA
GGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCCTTGCGGAGTAACCGTGTTTCC
ACGATCGTTAGCCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GCCTTGCGACCGTACTCCCCAGGCGGCATACTTAACGCGTTAGCTCCGGCACGAACCAAATGAA

>CUP2P3E07 Uncultured bacterium (Acidobacteria)
GCGTCTGCTCCTTGCGGTTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATA
CGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTA
CCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTT
GCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGG
GAAGGCCGTATTTCTACAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACTTCCGAACGGAAGCCANCCCAAGTCCTGATCGTTTAGGG
CTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAACGGTCCAGCGCGCCGCTTTCG

>CUP2P3E08 Uncultured Acidobacteria bacterium (Acidobacteria)
GGTTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGCGTACAAGGCCCGGGAACGTATTCACGGCATCGTTCTGATACGCCATTACTAGCGG
TTCCAGCTTCACGCAGGCGAGTTGCAGCCTGCGATCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCATTGTACCGGCCATTGTAGCA
CGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTGCTATCTTTCGATGTGGCAACAC
AGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGGCCCCCTTGCGGAGTAACCGTGTTTC
CACGATCGTTAGCCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTCGAGTTTC
AGCCTTGCGACCGTACTCCCCAGGCGGCATACTTAACGCGTTAGCTCCGGCACGAACCAAATGAATGGCTCACACCAAGTATGCATCGTTTAGGGCGTGGACTACCAGN
GTATCTAATCCTGTTTGCTACCCACGCTTTCGTGTCTCAGCGTCAGGGATGGTCCAGAAAGCTGTCTACACCACAGGTGTTCCTCCCGG

>CUP2P3E09 Uncultured bacterium (Acidobacteria)
GGCGGTGCTCCCTGCGGTTAGCGCACCGACTTCTAGTGCAACCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCATGCTGATCTG
CGATTACTAGCGATTCCAGCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCAGCGGTTTGTACC
GGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCAACTTCCTCCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCTCAACTAA
ATGGTAGCAACTGGAGATAAGGGTTGCGCTCGTTGCGGGACTTAANCCAACATCTCACGACACGAGCTGACGACAGGCATGCAGCACCTATATAGCGGGCCATTGCTGG
GAAGGGATATTTCTAACCCGGTCCACTACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACC

>CUP2P3E10 Uncultured bacterium (Betaproteobacteria)
GGTTAGGCAAACGGCTTCTGGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGTGACATGCTGATCCACGATTACTGGCGAT
TCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCATTGTATGAC

GTGTGAGGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCACTAGAGTGCCCTTTCGTAGCAACTAGTGACA
AGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCCGGCTCCCTTTCGGGCACTCCCACATCTCTGCG
GGATTCCGGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTT
GCGACCGTACTCCCCAGGCGGTCGACTTCACGCGTTAGCTGCGTTACCGAGAAAATGAATTCCCGACAACTAGTCGACATCGTTTAGGGCGTGGACT

>CUP2P3E11 Uncultured Acidobacteria bacterium (Acidobacteria)
TGGGCGCTGCTCCTTGCGGTCAGCTTGGCGACTTCTATACAGCTCACTTCGTGATGTGACGGGCGGTGTGTACAAGNCCGGGAACGTATTCACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTCCGATTAGCTCCCTCTCGCGAGTTGGCAACGGTTTGTAA
CGCGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTG
CGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGG
AAGGCCGTATTTCTACAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAA

>CUP2P3E12 Uncultured forest soil bacterium (Acidobacteria)
CTTCTAGTACAACCACTTCGTGATGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATTCACGGCGTCGTTCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGT
CGAGTTGCAGACTGCAATCCGAACTGAGCATGGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTCGCGACGGTTTGTACCATGCATTGTAACACGTGTGTAGCCCTGGAC
ATAAAGGCCGTGCTGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTCTTAGAGTTCCCCCTTGCGGGTGGCAACTAAGAGTAGGGGTTGCGCTC
GTTGCGGGACTTAACCCAACACCTCACGGCACGAGCCGACGACAGCCATGCAGCACCTCTACCGGTGTCCCTTGCGGGAAGGCGGTGTTTCCACCGCTGGTCACCGGCA
CTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTC
CCCAGGCGCAGGACTTAACGCGTTAGCTCCGGGACGACCC

>CUP2P3F01 Uncultured bacterium (Acidobacteria)
CTTTCGTGATGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATCACGGCATCATTCTGATACGCCATTACTAGCGCTTCCAGCTTCATGCAGGCGAGTTGCAGCCTGC
AATCCGAACTGAGAACGGTTTTTTGCGATTAGCTCCCCCTCGCGGGTTTGCAGCGCTTTGTACCGCCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGATG
ACTTGACATCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTCCTACCTTTCGGTTTAGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAA
CCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACTCCGGTCCCTTGCGGGAAGTCCGTGTTTCCACGAATGGTCCGAAGCCGTTCGAGCCCAGGT
AAGGTTCTTCGCGTTGCGTCGAATTGAA

>CUP2P3F02 Uncultured alpha proteobacterium (Alphaproteobacteria)
TTACGTGGTCGGTACTCCCTTGCGGGTTAAGCACCGGCTTCGGGTAAACAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATGC
TGATCCGCGATTACTAGCGATTCCGACTTCATGCTCCCGAGTTGCAGAGAGCAATCCGAACTGAGACGGCTTTTCGAGATTAGCTCAGGCTCGCACCCATGCCGCCCTC
TGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCATAAGGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCGGCTTGTCACCGGCAGTTTCTGCAGAGTGCCC
AGCTCAACCTGATGGCAACTGCAGATGGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGCCA
GCCGAACTGAAGGACCGGATCTCTCCGGACCACACGGGACATGTCAAGGGCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGC
CCCCGTCAATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTGTGCTTACCGCGTTAGCTGCGACACCGAAGAGCTAGGCTCCCCAACGTCTAGCACACA
TCGTTTACAGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCGCCTCAGCGTCAGATCCGGTCCAGAG

>CUP2P3F03 Uncultured Acidobacteria bacterium (Acidobacteria)
GGGTCAGCATGCGGACTTCTAGTACACCCACTTTCGTGATTACGGGCGGTGTGTCAAGCCCGGGAACGTATCACGCTATCGTTCTGATATAGCATTACTAGCGATTCCA
GCTTCATGCAGGCGAATTGCAGCCTGCAATCCGAACTGAGGACGGTTTTTGGCGATTAGCTCCCCCTCGCGGGTTGGCAGCGCTTTGTACCGCCCATTGTAGCACGTGT
GTGGCCCTGGACATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCAACTTATCGCTGGCGGTCTCCTGAGAGTGGCGCCTTGCGGCATGCCAACACAGGAC
AAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTCCAGTCCCTTGCGGGAAAACCCTGTTTCCAGGA
TCTGTCCGAAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCT
TGCGACCGTACTCCCCAGGCGGCATACTTAACGCGTTAGCTCCGGCACGAACCGAATGAACGGCTCACACCAAGTATGCATCGTTTAGGGCGTGGACTACCAGGGTATC
TAATCCTGTTTGCTACCCACGCTTTCGTGTCTCAGCGTCAGTGATGGTCCAGAAAGCCGTCTACACCGCAGGTGTTCCTCCTGATATCTACGCA

>CUP2P3F04 Uncultured bacterium (Não classificada)
TCCCCTTGCGGTTGGAATTACGACTTCTAGTACAAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGTCGTTCTGATACGCGAT
TACTAGCGATTCCGCCTTCACGTGGGCGAGTTGCAGCCCACGATCTGAACTGAGGCCGGCTTTCAGGGTTTGGCTCCACCTTACGGTATTGCTTCCCGTTGTACCGACC
ATTGTAGCACGTGTGTAGCCCTGGGCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCATTATCTGAGGCGGTTCTCCTAGGGTGCTTCCCTTGCGGG
CGAGCAACTAGGCGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATCCAGCCGTCCCTTGCGGGAAA
ACCTCATCTCCGAGGCGGTCGACCAGATTTCGAGTCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCT
TTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAGCACTTAATGCGTTAGCTTCGACACAGCCCGGTGAAGGGCTACATCCAGTGCTCAACGTTTAGGGCCAGGAC
TACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGC

>CUP2P3F05 Uncultured bacterium (Não classificada)
CCCCTTGCGGTCGGCGCGCAACTTCTAGTACAATCCACTTTCGTGATGTAACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCAGCGTGCTGATCTGCCATTA
CTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTCTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCTTTGTACCGTCCAT
TGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTTCCCAACTGAATGATG
GCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCCTTGCGGGGTAGCG
ATGTTTCCACCGCCGGTAACCAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTCAGCCTTGCGACTGTACTCCCCAGGCGGCATATTTAACGCGTTAGCTCCGGCACGGATCAACTGAATGACCCACACCAAATATGCATCGTTTAGGGCGTGGAC
TACCAGGGTATCTAATCCTGTTTGCTACCCACGCTTTCGTGTTTCAGCGTCAGTTACGGTCCAGAGAGCCGTCTACACCGCCGGTGTCCTCCTGATATCTACGCA

>CUP2P3F06 Uncultured bacterium (Acidobacteria)
ACTTGGGCGGCTGCTCCTTGCGGTCAGCACACCGACTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTT
CTGATCCGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGG
TTTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGC
CCGGCATGACCCGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGC
CTTTTAAGGGGCGCCGATGTTTCCACCGGATTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCC
CCCGTCAATCCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGGTACACCAAGCAATCA
TCGTTTAGGGCTAGGACTACCAGCGTATCTAATCCTGGTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTATGGTCCAGTGCGC

>CUP2P3F07 Uncultured bacterium (Acidobacteria)
GGCGCTGCTCCTTGCGGTTGGCTTGGCGACTTCTATACAATCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGTTCTGATACG
CCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCATGGTTTTTTCCGGTTAGCTCCCCCTCACGGGATCGCGACAGTCTGTACC
ATGCATTGTAACACGTGTGTAGCCCTAGACATAAAGGCCATGCTGACTTGACCTCATCCCCGCCTTCCTCTCCGTTATCCGGAGCAGTCCCCTTAGAGTTCTCCCTTGC
GGGTAGCAACTAAGGGTAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACACCGGCCTTTTCGGGAA
AGCTATTTCTAGCTCTGTCCAGTGCAGTTCAAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTT
TGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGCAGAACTTAACGCGTTAGCTCCGGGACGC

>CUP2P3F08 Uncultured bacterium (Acidobacteria)
GCTTCCTTGCGGTCAGCGCGGCGATTCTATACAGCTCACTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACT
AGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTCTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTG
TAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCA
ACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACCTGTCCCTTGCGGGAAGGCCGTA
TTTCTACAGCTTGTCAAGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAG

TTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTAC
CAGNGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTCATTCAGCGTCAGTTGTGGTCCAGCGCGCCGCTTTCGCCACGGGTGTTCCTGCAGATATCTACGCATTTCAC
CGNTACACCTGCAATTCCACGCGCCTCTCCCACACTCAAGCACAGCAGTTTCGGAAGCAGTCTCTGA

>CUP2P3F09 Uncultured bacterium (Não classificada)
GATACGGCATTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTTTGGGATTGGCTCCCCCTCGCGGGTTGGCGACCCAT
TGTACCGTCCATTGTAGCACGTGTGTAGCCCTAGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGGTTATCCCTGGCGGTCTCCTGCGAGTTCCA
CCGTTTAAAGTATGGCAACACAGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTCCGGTCC
CTTGCGGGAAGTCCCCGTTTCTGGGGATTGTCCAAAGCCGTTCGAGCCTAGGTAAGGTTCTTCGCGTGGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCC
CCGTCAATTCCTTTGAGTTTCAGCCTTGCGAC

>CUP2P3F10 Uncultured bacterium (Não classificada)
GCGGAGGCCCCTTACGGTTAGCTGACGTCTTCTGGTTGAGTCAGTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTGCTGATCCGC
GATTACTAGCGATTCCAACTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGATCGGCTTTTTGAGATTAGCTCCCCCTCGCGGGTTCGCGTCCCTCTGTACCG
ACCATTGTATCACGTGTGTCGCCCTGGATATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGTGTTAACCACGGCAGTCTCCTTAGAGAGCCCAACTGAA
TGCTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATGTCCCCACACGGGCTGACGACAGCCATGCAGCACCTGTCTCTCGGTCGTATTGCTAC
GAAAGCCGTATCTCTACGGATGTCCGAGGATGTCAAATCCAGGTAAGGTTCTTCGCGTTGCTTCGAATTAAACCACATGATCCACCGCTTGTGCGGGCCCCCGTCAATT
CCTTTGAGTTTTAGTCTTGCGACCGTACTTCCCAGGCGGGGTACTTATTGCGTTAGCGCCGGTTCAGCGGGGGTCAAG

>CUP2P3F11 Uncultured bacterium (Gammaproteobacteria)
ACACACGTGGTAGCGCCCCTTGCGGTCAGGCTACTGCTTCTGGTGCAGTAACTTCCATGGTGTGACGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGCAGCAATG
CTGATCTGCGATTACTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGACAGATTTTCTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCC
TCTGTATCTGCCATTGTAGCACGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCAACTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGC
CCAACTGAATGATGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACA

>CUP2P3F12 Uncultured bacterium (Acidobacteria)
AGTACAACCGGCTTCGTGATGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATTCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAACTTCAAGCAGGCGAG
TTGCAGCCTGCTATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCCACCTTACGGTTTTGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAA
AGGCCATGCTGACTTGACGTCATCCCCAACTTCCTCCGGTTTATCACCGGCAGTCTCTGCAGAGTGCCCAGCTTAACCTGATGGCAACAGCAGACAAGGGTTGCGCTCG
TTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGTCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGACCACTTTCGTAGTTTGTCACTCGCTGTTCA
AGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAG
GCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATAC

>CUP2P3G01 Uncultured soil bacterium (Acidobacteria)
CACCGGCTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCGTGCTGATCTGCGATTACTAGCGATTCCAGCTT
CATGGAGTCGAGTTGCAGACTCCAATCCGGACTGGGATTGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCAACCATTGTAGCACGTGTGTGG
CCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCCCAACTGAATGATGGCAACTGACAATAAGG
GTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGTAGCAGTCCCTTGCGGGAAAGGGATATTTCTACCCCGGT
CCACTACGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGA
CCGTACTCCCCAGGCGGATCGCTTAACGCGTTAGCTCCGGCACGACAGGATTGGGTACCTGTCACACCAAGCGATCATCGTTTAGGGCTAGGACTACCAGGGTATCTAA
TCCTGTTTGCTCCCCTAGCTTTCGTGCATCAGCGT

>CUP2P3G02 Bacillales bacterium Gsoil 1105 (Bacilli)
TTAGGCGGTGGCTCCGTAAAGGTTACCTCACCGACTTCGGGTGTTGCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGAATTCACCGCGGCATGCT
GATCCGCGATTACTAGCAATTCCGGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTACGAACGGCTTTATGAGATTCGCTCCACCTCACGGTCTCGCATCCCTT
TGTACCGCCCATTGTAGCACGTGTGTAGCCCAGGACATAAGGGGCATGATGATTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCCATTGTGAGTGCCC
AACCAAATGATGGCAACACAATGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAACCATGCACCACCTGTCACCGCTGCCCC
GAAGGGAAGGCTTATCTCTAAGCCGGTCAGCGGGATGTCAAGTCCTGGTAAGGTTCTTCGCGTTGCTTCGAATTAAACCACATGCTCCACTGCTTGTGCGGGCCCCGT
CAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGGAGTGCTTAATGCGTTAGCTTCGGCACTGAGGGTGGTACCCCCCAANACCCAGCACTCATCGTTTA
CGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCGCCTCAGCGTCAGAAATCGGCCAGCA

>CUP2P3G03 Uncultured bacterium (Acidobacteria)
GGTTGGCACGGCGATTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTCAAGGCCCGGGAGCGTATCACGGCGCCGTTCTGATGCGCCATTACTAGCGATT
CCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTGCGATTAGCTCCCCCTCACGGGTTCGCGACGCTTTGTGGCGCGCATTGTAACACG
TGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACCTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTCGTAGAGTTCCCCCTTGCGGGTGGCAACTACGA
GTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACACAGGTCCCTTGCGGGAAGTCCCTATTTCTAA
GGAGGGTCCTGTGCGGTTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATG

>CUP2P3G04 Uncultured bacterium (Acidobacteria)
GGGCGCTGCCTCCTTGCGGTTGGCGCGGCGACTTCTAGTACAACCACTTTCGTGATGTGACGGGCGGTGTGTACAAGNCCGGGAACGTATTCACCGCGGCGTGCTGATC
CGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAANACTGAGGGATGGGCTTTTTCNCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTT
TGTACCATCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCAGTTTCGCCAGAGTGCCC
AACTAAATGATGGCAACTGGCAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACAGCGGCCCTT
GCGGGAAGGGATGTNTCCACCCCGGTCCACTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCANCGCTTGTGCGGGCCCCCGTC
AATTCCTTTTGAGTTTCA

>CUP2P3G05 Uncultured bacterium (Acidobacteria)
CTCCTTGCGGTTAGCACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTA
CTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCAT
TGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGACCCGA
TGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCTTTTAAGGGGAAG
GGATGTTTCCACCCCGGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTT
TGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTAGGGCTAG
GACTACCAGGATATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTATGGTCCAGTGCGCCGCTTTCGCCACAGGTGTTCCTCCCGATATCTACGC

>CUP2P3G06 Uncultured beta proteobacterium (Betaproteobacteria)
ACCAGTCATGAAGCTCACGTGGTAGGCGCCTCCTTGCGGTTAGGCGACTGCTTCTGGTGGACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTA
TTCACCGCGACATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGTAGTCGAGTTGCAGACTACAATCCGGACTACGACCGGCTTTCTGGGATTGGCTCCCCCTCG
CGGGTCGGCAACCCTCTGTACCGGCCATTGTATGACGTGTGAGGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAG
TCCCATAGAGTGCCCAACTAAATGTAGCAACTAATGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCT
GTGTCCAGGCTCCCTTTCGGGCACCCTCGAATCTCTCCGAGGTTCCTGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCAC
TTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGCGAACTTCACGCGTTAGCTGCGTCACTGAGAGATTTCTCCCCCAACGAC
TAGTTCGCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCCTGAGTGTCAGTGC

>CUP2P3G07 Uncultured organism (Verrucomicrobiae)

GGCGCCTTTAAGGGGCGATTCGGGTACAAACGGCTTCATGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGCCGTAGCTGATGCGCCATTACTAGC
GATTCCGGCTTCATGGAGGCGAATTGCAGCCTCCAATCCGAACTGGGCCCAGTTTTAAATGATTTCCTCCACCTCGCGGTATTGGATCGTTCTGTACTGGGCATTGTAG
TACGTGTGCAGCCCAGGCCGTAAGGGCCATACTGACTTGACGTCGTCCCCACCTTCCTCCTCGTTTAGGCGAGGCAGCCTGAACAGAGTGCTGGAACCTCTCGGTTCCG
TGGCAACAGTTCACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAATTGTCTCTTTCGAGACT
CGCTGGCTTTCACCAACTTAGAGATGCATGTCAAGGCCTGGTAAGGTTCTTCGCGTTGCATCGAATTGAGCCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTTC
TTCGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGCACGTTTAACGCGTTGGCTCCGGCGCAGAAGGGGTCGAATCCTCCCANACCAAACGTGCACCGTTTACTGCC
AGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCT

>CUP2P3G08 Uncultured bacterium (Sphingobacteria)
GACACTCCTTACGGTTATCGTCTTATTGTACACCCAACTTCCATGGCTTGACGGGCGGTGTGTGCAAGGTCCGGGAACGTATCACCGTGGCATTGCTGATCCACGATTA
CTAGCGATTCCAGCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACGTTTTTTGTGGGATTTGCTCACCATCGCTGGTTGGCTGCCCTTTGTAAACGCCAT
TGTAGCACGTGTGTAGCCCTGGGCATAAAGGCCATGATGATTTGACGTCATCCCCTCCTTCCTCTCTGCTTACGCAGGCAGTCTCTTTAGAGTCCCCGGCATTANCCGC
TGGCAACTAAAGATAGGGGTTGCGCTCGTTGCGGGACTTAAACCAACACCTCACGGCACGAGCTGACGACAACCATGCAGCACCTTGTAATCTGTGTATTGCTACAAAG
ACCCCTTTCAGGATCGGTCAAATCACATTCTAGCCCAGGTAAGGTTCCTCGCGTATCATCGAATTAAAGCACATGCTCCACCGCTTGTGCGGACCCCCGGCAATTCCTT
TGAGTTTCAACCTTGCGGTCGTACTTCCCAAGTGGTAAACTTAACGCTTTTGCTTGGACACTAACTGTGTATCGCTAATGTCGAGTTTACATCGTTTAGGGCGTGGACT
ACCAGGGTATCTAATCCTGTTTGATCCCCACGCTTTCGTGCCTCAGTGTCAATACACGCCTGGTGAAC

>CUP2P3G09 Uncultured bacterium (Planctomycetacia)
CGGTTGGGTAGGCGGCTTCGGGCATCCCGGCTCTCGTGGCTTGACGGGCGGTGTGTACAAGGCTCAGGAACATATCACCGCTGCGTAGCTGATCAGCGGTTACTAGCGA
TTCCAGCTTCATGAAGGCGAATTGCAGCCTTCAATCCGAACTGGGACAGGCTTTTTGCGATTTGCTCCACCTCTCGGCTTCGCTTCGCTCTGTACCTGCCATTGTGGCA
CGTTTGTAGCCCTGGGCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTAACACCGGCAGTCTCCCTAGAGTCCTCGGCTTTATCCGTTAGTAAC
TAGGAACAGGGGTTTCGCTCGTTATGGGACTTAACCCGACATCTCACGACACGAGCTGATGACAGCCATGCAACACCTGTGCTGGCTCTCCCAGAGGGAGTCGTTACCC
TTTCAGGCTTCTACCACCAGCATGTCAAGCCCAGGTAAGGTTCTGCGCGTTGCTTCGAATTGAACAACATGCTCCACCGCTTGTGTGAGCCCCCGTCAATTCCTTTGAG
TTTCAGCCTTGCGACTGTACTTCCCAGGCGGGGTACTTAATATATTCACTCCAGCAGAGAGACGTTTGAAATCCCCCTAACTAGTACCCATCGTTTACGGCCAGGACTA
CCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGC

>CUP2P3G10 Uncultured bacterium (Betaproteobacteria)
TCTGGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGTGACATGCTGATCCACGATTACTAGCGATTCCGACTTCATGCAGTC
GAGTTGCAGACTGCAATCCGGACTACGACCGGCTTCCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCATTGTATGACGTGTGAGGCCCTACCCA
TAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCACTAGAGTGCCCTTTCGTAGCAACTAGTGACAAGGGTTGCGCTCGTTGC
GGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCGGCACCTGTGCCCCGGCTCCCTTTCGGGCACTCCCACATCTCTGCGGGATTCCGGGCATGTCA
AGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAG
GCGGTCGACTTCACGCGTTAGCTGCGTTACCGAGAAAATGAATTCCCGACAACTAGTCGACATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCC
ACGCTTTCGTACATGAGCGTCAGTCTCATCCCAGGGGGCTGGCTTCGCCATCCGGTGTTCCTCCAAATCTCT

>CUP2P3G11 Delftia tsuruhatensis (Betaproteobacteria)
GTGGTAGCGCCTCCTTGCGGTTAGGCTACCTACTTCTGGCGAGACCCGCTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGCTG
ATCCGCGATTACTAGCGATTCCGACTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGACTGGTTTTATGGGATTAGCTCCCCCTCGCGGGTTGGCAACCCTCT
GTACCAGCCATTGTATGACGTGTGTAGCCCCACCTATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCCCA
ACTGAATGTAGCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAGCCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGCAGGTTCTCTT
TCGAGCACGAATCCATCTCTGGAAACTTCCTGCCATGTCAAAGGTGGGTAAGGTTTTTCGCGTTGCATCGAATTAAACCACATCATCCACCGCTTGTGCGGGTCCCCGT
CAATTCCTTTGAGTTTCAACCTTGCGGCCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTTCGTTACTGAGAAAACTAATTCCCAACAACCAGTTGACATCGTTTA
GGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCATGAGCGTCAGTACAGGCCC

>CUP2P3G12 Uncultured soil bacterium (Acidobacteria)
GCGCCTGCCTCCTTGCGGTCAGCTTGGCGACTTCTAGTACAGCTCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATA
CGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTG
CCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTT
GCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACCTGTCCCTTGCGG
GAAGGCCGTGTTTCCACAGCTGGTCAGGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGG
CTAGGACTACCAGGGTATCTAATCCT

>CUP2P3H02 Uncultured soil bacterium (Acidobacteria)
CACCGCTGCTTGCTGATCAGCGATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGAGCGGTTTTTTGAGATTGGCTCCCCCTCGCG
GGTTTGCAACTCATTGTGCCGCCCATTGTAGTACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTTTCACCGGCAGTC
CCTTTAGAGTGCTCAGCTTAACCTGGTGGCAACTAAAGGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCAC
CTCGACTAGTGTCCCTTACGGGAAAAGCGACTTTCGCCACCTGTCACTAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATACTCCACCG
CTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATACTTAATGCGTTAGCTTCGGCACGACCGGATTCAATCCCGGTCAC
ACCAAGTATCCATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTGCCTCAGCGTCAGTTTCTGTCCAGGTAGCCGCCTTCGCCA
CCGGTGTTCCTCCTGATATCTACGCATTTCACCGCTACACCAGGAAT

>CUP2P3H03 Uncultured soil bacterium (Gammaproteobacteria)
GCCTCCTTGCGGTTAGGCTAACGGCTTCTGGAGCAACTCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACCGCAGCATAGCTGATCTGCGAT
TACTAGCGATTCCGACTTCACGAAGTCGAGTTGCAGACTTCGATCCGGACTGGGATCGGCTTTCTGGGATTGGCTCCACCTCGCGGTATTGCAACCCTCTGTACCGACC
ATTGTAGTACGTGTGTAGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCTTAGAGTTCCCACCATTACGT
GCTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAC

>CUP2P3H04 Uncultured Acidobacteria bacterium (Acidobacteria)
CTAGTACAACCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAACTTCACGCAGGC
GAGTTGCAGCCTACGATCCGAACTGAGACCGACTTTCTCCGATTAGCTCCACCTTACGGTTTTGCAACGGTTTGTATCGGCCATTGTAGCACGTGTGTAGCCCCAGACA
TAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTGCAGAGTGCCCACCATAACGTGATGGCAACAGCAGACAAGGGTTGCGC
TCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGCTCCCTTTCGGAAGTGGTCACTCGCTCT
TCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCC
CAGGCGGAATGCTTAATGCGTTAGCTTCGGCATGACAGGGATCGATACCCGTCACACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGC
TCCCCTGGCTTTCGCTCCTCAGCGTCAGTGTTGGTCCAGGATGCCGCCTTC

>CUP2P3H05 Uncultured bacterium (Alphaproteobacteria)
GTCTTCAGGTAAAGCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCGATTCCAACTTCATG
TGCTCGAGTTGCAGAGCACAATCCGAACTGAGACGGCTTTTTGAGATTTGCGCAGGGTTTCCCCATTGCGTCCCATTGTCACCGCCATTGTAGCACGTGTGTAGCCCAG
CCTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCCCCTTAGAGTGCCCAACTAAATGATGGCAACTAAGGGCGAGGGTTG
CGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGAACTGAAAGGCTCCATCTCTGGTGCCCGCG
ACCGGGATGTCAAAGGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGAC
CGTACTCCCCAGGCGGGATGCTTAATGCGTTAGCTGCGCCACTGACGAGTAAACCCGACAACGGCTAGCATCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCC
TGTTTGCTCCCCACGCTTTCGCACCTCAGCGTCAG

>CUP2P3H06 Uncultured bacterium (Betaproteobacteria)
CTTCTGGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGACATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGTA
GTCGAGTTGCAGACTACAATCCGGACTACGACCGGCTTCTGGGATTGGTCCCCCTCGCGGGTTGGCAACCCTCTGTACCGGCATTGTATGACGTGTGAGGCCCTACCCA
TAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCCCACNTAGAGTGGCCCAACTAAATGTAGCAACTAGTGGCAAGGGTTGCGCT
CCNGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCAGGCTCCCTTTCGGGCACCCTCGAATCTCTCCGAGGTTCCTG
ACATGTCAAGGGTAGGTAAGGTTTTTCGCGTT

>CUP2P3H07 Uncultured bacterium (Não classificada)
TCGGGTACACTAAACTCAGGTGACGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTAGCTGATCTGCGGTTACTAGCGATTCTGACTTCATGGA
GGCGAGTTGCAGCCTCCAATCCGAACTGAGGAATGGTTTAAGAGATTAGCTTGCCCTCGCGGGTTCGCGACTCGCTGTCCATCCCATTGTAGCACGTGTGTAGCCCTGG
ACGTAAGGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGCTTGTCACCGGCGGTCTCGTGTGAGAGATCTTGTGGACCAACACACGACAAGGGTTGCGCTCGT
TGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTCACTCTGTCCGGTTGCCCGGAAACCTAGTCTCCTAGATGGTCAGAGGATGT
CAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCC
AGGCGGGACACTTATTGTGTTAACTGCGGCACAGATGGAGTCGATACCANCTACACCTAGTGTCCATCGTTTACGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCT
CCCCTGGCTTTCGCTCCTCAGCGTCAGGTCAGTCCCAGATGAT

>CUP2P3H08 Uncultured Acidobacteria bacterium (Acidobacteria)
TCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGT
CGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTCCGATTAGCTCCCTCTCGCGAGTTGGCAACGGTTTGTAACGCGCATTGTAACACGTGTGTAGCCCTGGAC
ATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTC
GTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCAGAAGCA
TTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTC
CCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGC
TCCCCTAGCTTTCGTTCCTCAGCGTCAGTAGTGGTCCAGCGCGCCGCTTTCGCCACGGG

>CUP2P3H09 Caulobacter sp. (Alphaproteobacteria)
CCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCTCTCGAGTTGCAGAGAGCAATCCGAACTGAGACGACTTTTAGGGATTA
GCTCCCCCTCGCGGGTTTGCAGCCCTCTGTAGTCGCCATTGTAGCACGTGTGTAGCCCACCCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTT
ACCACCGGCGGTCCCTTTAGAGTGCCCAGCCAAACCTGCTGGCAACTAAAGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGAC
AGCCATGCAGCACCTGTGTCCCAGTCCCCGAAGGGAAAAGTGCATCTCTGCACCGGTCCGGGCATGTCAAAAGGTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCA
CATGCTC

>CUP2P3H10 Uncultured Acidobacteria (Acidobacteria)
GCCTCCTTGCGGTTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATGNACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCATCGTTCTGATACGCCAT
TACTAGCGATTCCAGCTTCACGCAGGCGAGTTGCAGCCTGCGATCCGAACTGAGACCGGCTTTTTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCATTGTACCGGCC
ATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGCCCAACTGAATGCTGGCAACTAAGG
ACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCAGGCTCCTTGCGGCACCCCCGAATCTCTTC
AGGGTTCCTGGGATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAACCT
TGCGGCCGTACTCCCCAGGCGGAGAACTTAGCGCGTTAGCTACGACACTGGGAGGCTTACCCTCTCAAGCTCTAGTTCTCATCGTTTATGGCGTGGACTACCAGGGTAT
CTAATCCTGTTTGCTCCCCACGCTTTCGTGCCTGAACGTCGGTGCTGGACCAGGAAGCCGCTTTCGCCACTGGTGTTCCTTCCGGTATCTACGCATTTCACCGCTACAC
CGGAAATTCCCGCTTCCCTCTTCCGCACCCTAGCTATGCAGTCTCGAATGCAATTC

>CUP2P3H12 Uncultured bacterium (Actinobacteria)
CGGCTTCGGGTGTTACGACTTTCGTGGTGTGACGGGCGGTGTGTCAAGGCCCGGGAACGTATCACCCCGGCGTTGCTGATCCGGGATTACTAGCGACTCCGACTTCACG
CAGTCGAGTTGCAGACTGCGATCCGAACTGAGACCGGCTTTTTGGGATTCGCTCATCCTCGCGGAATAGCAGCCCTTTGTACCGGCCATTGTAGCATGTGTGCAGCTCT
GGGCATAAGGGGCATGATGACTTGACGTCATCCCCACCTTCCTCCGAGTTGACCCCGGCAGTCTCCTACGAGTCCCCGGCATTACCCGCTGGCAACATAGGACAAGGGT
TGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTATCGCAGACCCTTACGGACACCGTATCTCTACGGCTTTTCCTGC
GTAGTTCAAACCAGGTAAGGTTCTTCGCGTTGCCTCGAATTAAGCCACATGCTCCGCCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTAC
TCCCCAGGCGGGGCACTTAATGCGTTAGCTACGGCACGGAACCCGTTGATCAGGTCCCAAACCTAGTGCCCAACGTTTACGGCGTGGACTACCAGGGTATCTAATCCTG
TTCGCTCCCCACGCTTTCGCTCCTCAGCGTCAAGTGCCGGCCCAG

>CUP2P4A01 Uncultured bacterium (Acidobacteria)
TCCTTGCGGTTAGCACAGCGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGTTCTGATACGCCATTA
CTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCATGGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTCGCGACGGTTTGTACCATGCAT
TGTAACACGTGTGTAGCCCTGGACATAAAGGCCGTGCTGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTCTTAGAGTTCCCCCTTGCGGGGTGG
CAACTAAGAGTAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACCGGTGTCCCTTGCGGGAAGGCGG
TGTTTCCACCGCTGGTCACCGGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTG
AGTTTCAGCCTTGCGACCGTACTCCCCAGGCGCAGGACTTAACGCGTTAGCTCCGGGACGACCCGCCAACGCGGGCCANCCCAAGTCCTGATGGTTTAGGGCTAGGACT
ACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTTGCGGTCCAGCGAGCCGCCTTCGCCACGGGTGTTCCTGCAGATATCTACGCATTT

>CUP2P4A02 Uncultured bacterium (Acidobacteria)
GGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTACTAGCGA
TTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCATTGTAGCG
CGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGACCCGATGGCAAC
TAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCTTTTAAGGGGAAGGGATGTT
TCCACCCCGGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
CAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTAGGGCTAGGACTACC
AGNGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCATCAGCGTCAGTTATGGTCCAGTGCGCCGGTTTCGCCACAGGTGTTCCTCCCGATATCTACGCATT

>CUP2P4A03 Uncultured bacterium (Acidobacteria)
GGTTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGAT
TCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACAC
GTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTACG
TGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACCTGTCCCTTGCGGGAAGGCCGTGTTTCCA
CAGCTAGTCAGGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
TCTTG
C

>CUP2P4A04 Uncultured bacterium (Não classificada)
CTCACGGGCATCCTTCGGCGCCTCCGTCCCTTACGGGTTCGGCCAGCGACTTCGGGAGCACCAGACTCGGGTGATGTGACGGGCGGTGAGTGCAGGCCCGGGAACGTAT
CACCGCAGTGTGCTGACCTGCGGTTACTAGCAACTCCGACTTCATGCAGGCGGGTTGCAGCCTGCAATCCGAACTGAGACCGGCTTTCAGGGATTGCCTTCACGTCGCC
GTGTTGGAACCCGTTGTACCGGCCATTGTAGCGTGTGTGTAGCCCTGGATATAAAGGGCATGCGGACTTGACGTCATCCCCACCTTCCTCCGGGTTTCGCCCGGCAGTC
TCCCTAGAAGATTCAACTAAGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCACCACCTGTGTAGAGACCTCT
TGCGAGGGGCGCTGGCTTTCACCAACGTTTCCTCTACATGTCAAACCCAGGTAAGGTTCTTCGCGTCGCCTCGAATTAAACCACACGCTCCGCTGCTTGTGCGGGCCCC
CGCCTATTCCTTTGAGTTTTAACCTTGCGGCCGTAGTCCCCAGGCGGCGAACTTAATGCGTTAGCTGCGGCACTGATCGGGTCAATCCGACCAAGACCTAGTTCGCAAC
GTTTAGGGCGTGGACTACCCGGGTATCTAATCCGGT

>CUP2A05. Uncultured bacterium (Acidobacteria)
ACCATCACGACATACTTAGGCGCTCCCTCCCTGCGGGTGGTATGGCGACTCTAGTACAACCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATT
CACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAACTTCACGCAGGCGAGTTGCAGCCTACGATCCGAACTGAGACCGACTTTCTCCGATTAGCTCCACCTTACG
GTTTTGCAACGGTTTGTATCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTC
TCTGCAGAGTGCCCACCATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCAC
CTCTACGAGTGTCCTTGCGGAAGCTCCCTTTCGGAAGTGGTCACTCGCTCTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTT
GTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGACAGGGATCGATACCCGTCACACC
AAGCATTCATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCTCCTCAGCGTCAGTGTTGGTCCAGGATGCCGCCTTCGCCACCG
GTGTTCCTCCAGATATCTACGCATTTCACCGTTACACCTGGAATTCCGCATCCCTCTCCCAAACTC

>CUP2P4A07 Uncultured bacterium (Não classificada)
TAGGCGCCCCCCTTGCGGTCAGGCTACTGCTTCTGGTGCAGTAGACTTCCATGGTGTGACGGGCGGTGTTGTACAAGACCCGGGAACGTATTCACCGCAGCAATGCTGA
TACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCTGACTGCTGTCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGTGGACGGTTTG
TGTCCCTGTGTTGTGACACGTGTGTATCCCTGTACATATAGGCCATGCGGACTTGACGTCATCCCCAACTTCCTCTCCGGTATCCGGAACAGTCCAAACAGAGTCCTCT
CTTGCGAGTAGTAACTGTGTGCA

>CUP2P4A08 Uncultured bacterium (Acidobacteria)
GCGCTTGCTTCCTTGCGGTCAGCGCGGCGACTTCTAGTACAACTCACTTTCGTGATGNACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATA
CGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTCTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTG
CCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCACTAGAGTGCCCGACT
TGACTCGCTGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTCTCTTG
CGAGAAAGGGATATTTCTACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTC
AATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTAACGCGTTAGCTGCGGCACAGCCGGATTGGGTACCGGCTACACCAAGCAATCATCGTTT
AGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTGTGGTCCAGTGCGCCGCTTTCGCCACAGGTG

>CUP2P4A09 Uncultured planctomycete (Planctomycetacia)
CTCCCTTTCGTGGCTTGACGGGCGGTGTGTACAGTCAGGAACACATTCACCGCAGTGTTGCTGACCTGCGATTACTAGCGATTCCAACTTCATGCAGGCGAGTTGCAGC
CTGCAATCTGAACTGGGGCACCTTTTTTGGGATTAGCTCCCTCTCGCGAGTTTGCGTCCCTCTGTAGGTGCCATTGTAGCACGTGTGCAGCCCTGGGCATAAAGGCCAT
GAGGACTTGACGTCATCCCCGCCTTCCTCCGGTTTAACACCGGCAGTCTCTCCAGAGTCCCCGGCATGACCCGCTGGCAACTGGAGACAAGGGTTTCGCTCGTTATGGG
ACTTAACCCGACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTAGTAGGTTCCGGACTGGATACCGTTGGCCTTACGTTTCCGCAGGCTACTTCCTACCG
CTTTCGCACATGTCAAGCCCAGGATAAGGTTCTTCGCGTAGCCTCGAATTAAGCCACATGCTCCACCGCTTGTGTGAGCCCCGTCAATTCCTTTGAGTTTCAGCCTTG
CGACCATACTCCCCAGGCGGGGTACTTAACACTTTTGCTTCGGCTGTGAACCCATGTCAAGTCCACAANCTAGTACCCATCGTTTAGGGCCAGGACTACCGGGGTATCT
AATCCCGTTTGCTCCCCTGGCTTTCGCGCCTCAGCGTCAGAAGAGGTCCAGCAG

>CUP2P4A10 Uncultured bacterium (Não classificada)
CCACCGGCTCTAGTATGGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTTCTGATCTGCGATTACTAGCGATTCCAGCT
TCATGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGCGCGGCTTTTTGCGATTAGCTCCCCCTCACGGGTTTGCGACGCTTTGTACCGCGCATTGTAGCACGTGTGTA
GCCCTGGACATAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTTCCGAGGCGGTTTCGCTAGAGTGCCCGGCTTGCCCGGTGGCAACTAACGATAAGG
GTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGAAGACTGACACGCATGCAGACCTCCGCAGCGGCCCTTGCGGGCGGGGATGTTCCACCCCATTCCACTGC

>CUP2P4A11 Uncultured Acidimicrobiaceae bacterium (Actinobacteria)
CTCCACAAGGTTGGGCCACGGCTTCGGGTGTTGCCGACTTTCGTGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCCCGGCGTTGCTGATCCGGGATTA
CTAGCGACTCCGACTTCACGCAGTCGAGTTGCAGACTGCGATCCGAACTGAGACCGGCTTTAGGGATTGGCTCCTCCTCGCGGAATAGCAGCCCGTTGTACCGGCCATT
GTAGCATGTGTGCAGCCCTAGGCGTAAGGGGCATGATGACTTGACGTCGTCCCCACCTTCCTCCGAGTTGACCCCGGCAGTCTCCTACGAGTCCCCGGCATTACCCGCT
GGCAACATAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGTAAGGCCCCGAAGGACACCGTA
TCTCTACGGCTTTTCCCTACATGTCAAACCTAGGTAAGGTTCTTCGCGTTGCCTCGAATTAAGCCACATGCTCCGCCGCTTGTGCGGGCCCCCGTCACTTCCTTTGAGT
TTCAGCCTTGCGGCCGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCTGCGGCACGGAACCCGTTGAATAGGCCCCACACCTAGTGCCCA

>CUP2P4B01 Uncultured bacterium (Alphaproteobacteria)
AACTCCCATGGTGTGCGGGCGGTGTGTACAGGCCCGGGAACGTATCCCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCACCTTCATGCACCCGAGTTGCAGAGTGC
AATCTGAACTGAGACGGCTTTTCGGGATCGGCTCGGCCTCGCGACCTGGCATTCCCGCTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGGACATAAGGGCCATGAGG
ACTTGACGTCATCCCCACCTTCCTCCGGCTTGTCACCGGCAGTTCCTTCAGAGTGCCCGGCTGAAACCGATGGCAACTGAAGGCGAGGGTTGCGCTCGTTGCGGGACTT
AACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCGGGAGGTCCCTTGCGGGAAATGCCCGTTTCCGGACACGGCCTCCCCATGTCAAGCCCTG
GTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAACCCTGCGGCCGTACTCCCCAGGCGGTGC
GCTTACCGCGTTAGCTACGACACTGAGCGGCTATGCCGCCCAACATCCAGCGCACATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTT
TCGCGCCTCAGCGTCAGTAAAGGACCAGGTCGCC

>CUP2P4B02 Uncultured bacterium (Acidobacteria)
GCGCTGCCCCCTTGCGGTTAGCGTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGC
CCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCCTCTCTTG
CGAGTAGTAACTGTGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTAGTGTCCCTTGCGGG
AAGGCCGTATTTCTACAGCTGGTCACTAGCATTTCGAGCCCAGGTAAGGTTCCCCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGCTTAGGGC
TAGGACTACCAGNGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAGTGATCCAGCTCGCCGCTTTCGCCACGGGTGTTCCTGCAGATATCTAC
GCATTTC

>CUP2P4B03 Uncultured soil bacterium (Acidobacteria)
TGCTCTTGCGGTCAGCACGACGACTTCTAGTACAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGTCGATCTGATACGCCATTA
CTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTGCAATCCGAACTGAGGGCGGTTTTTTGCGATTAGCTCCCCCTCACGGGTTCGCGACGGTCTGTGCCGCGCAT
TGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCTTCGTTATCCGGGGCAGTCCTCCTAGAGTG

>CUP2P4B05 Uncultured bacterium (Acidobacteria)
GCGCTGGCTCCTTAGGTTGGTCGGGATTCTATACAGCTCACTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTA
CTAGCGATTCCAGCTTCATGCAGCCGAGTTGCAGACTGAATCCGAACTGAGCGCGGTTTGTCCGATTAGCTCCCCCTCGCGGGTTCGCAACAGTCTGTGCCGCGCATTG
TAACACGTGTGTAGCCCTGGACATAAAGGCGTGCTGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTATAAGTCTCCCTTGCGGGTAGCAACTA

CAGTAGGGTGCGCTCGTGCGGGACTTAACCAAACTCACGGACGAGCTGACGACAGCCATGCAGCACCTCTACTACGGTCCCTTGCGGGAAGACGATGTTTCCCCGTTGG
TCCGTAGCGGTTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGA

>CUP2P4B06 Uncultured bacterium (Alphaproteobacteria)
GACCTACGTGGCGGTGCTCCTGCGGTTAGCGCGCCGCTTCGGGTAAACAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGCT
GATCCGCGATTACTAGCGATTCCAACTTCATGCGCTCGAGTTGCAGAGCGCAATCCGAACTGAGACGGCTTTTCGAGATTTGCTAAGGGTCGCCCCTTCGCCTCCCGCT
GTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCAGTCCCCCTGGAGTGCCCA
ACTGAATGATGGCAACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGGCCCCG
AAGGGAAGATCGCATTTCTGCAATCCGTCCAGGACATGTCAAAAGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCG
TCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGGATGCTTAAAGCGTTAGCGGCGCCACTGAAGAGCAAGCTCCCCAACGGCTAGCATCCATCGTTT
ACAGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTTCCGGGCCAGTGAGCCGCCTTCGCCACTGGTGTTCTTGCGAATA
TCTACGAATTTCACCTCTACACTCGCAATTCCACTCACCTC

>CUP2P4B07 Uncultured bacterium (Acidobacteria)
CGGTTGAATCACCGGCTTCTATACAACGGGCTTCGTGATGTGACGGGCGGTGTGTACAATGGCCCGGGAACGTTCACCGCTGCTTGCTGATCAGCGATTACTAGCGATT
CCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGAGTGGTTTTTTGAGATTGGCTCCCCCTCGCGGGTTTGCGATCTTTGTGCCACCCATTGTAGTACGT
GTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTTTCACCGGCAGTCCCTTTAGAGTGCCCAGCTTGACCTGTTGGCAACTAA
AGGCAGGGGTTGC

>CUP2P4B08 Uncultured bacterium (Acidobacteria)
GATTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCATCGTTCTGATACGCCATTACTAGCGA
TTCCAGCTTCACGCAGGCGAGTTGCAGCCTGCGATCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCATTGTACCGGCCATTGTAGCA
CGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTGCTATCTTTCGATGTGGCAACAC
AGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCCTTGCGGAGTAACCGTGTTTC
CACGATCGTTAGCCAGCCGTTCGAGCCCAGGTAAGGTCCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGCCTTGCGACCGTACTCCCCAGGCGGCATACTTAACGCGTTAGCTCCGGCACGAACCAAATGAATGGCTCACACCAAGTATGCATCGTTTAGGGCGTGGACTACCAGG
GTATCTAATCCTGTTTGCTACCCACGCTTTCGTGTCTCAGCGTCAGGGATGGTCCAGAAAGCTGTCTACACCACAGGTGTTCCTCCCGATATCTACGCATTTC

>CUP2P4B09 Uncultured bacterium (Acidobacteria)
TCATGATGATACTTGGGCGGTGCTCCTTGCGGTTAGCGCACCGACTTCTAGTACACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCG
CGGCGTGCTGATCCGCGATTACTAGCGATTCCAGCTTCATGAAGTCGAGTTGCAGACTTCAATTCGGACTGAGACCGGCTTTTTCCGGTTAGCTCCCCCTCGCGGGTTT
GCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCAGTTTCGCC
AGAGTGCCCAACTAAATGATGGCAACTGGCAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCA
GCACCCCTTGCGGGAAGGGATATTTCTACCCCGGTGCACTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGG
GCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTTCGGCACGACGGGATTGGGTACCCGACACACCAAGCAA
TCATCGTTTAGGGCTAGGACTACCAAGGTATCTAATCCTGTTTGCTCCCCT

>CUP2P4B11 Uncultured alpha proteobacterium (Alphaproteobacteria)
GCTCCTTGCGGTTAGCGCGCCGTCTCGGGTAAAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTGCTTGATCCGCGAT
TACTAGCGATTCCAACTTCATGCGCTCGAGTTGCAGAGCGCAATCCGAACTGAGACGGTTTTTCGAGACTTGCTAAGGGTCGCCCCTTCGCCTCCCGCTGTCACCGCCA
TTGTAGCACGTGTGTAGCCCAGCCTGTAAGGGCCATGAGGACTTGACGTCATCCCC

>CUP2P4B12 Uncultured bacterium (Acidobacteria)
TCCTTGCGGTTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCATCGTTCTGATACGCCATTA
CTAGCGATTCCAGCTTCACGCAGGCGAGTTGCAGCCTGCGATCCGAACTGAGACCGGCTTTTTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCATTGTACCGGCCAT
TGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTGCTATCTTTCGATGTG
GCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACCGGACCCCCTTGCGGAGTAACC
GTGTTTCCGCGATCGTTAGCCGGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGCATACTTAACGCGTTAGCTCCGGCACGAACCAAATGAATGGCTCACACCAAGTATGCATCGTTTAGGGCGTGGAC
TACCAGNGTATCTAATCCTGTTTGCTACCCACGCTTTCGTGTCTCAGCGTCAGGGATGGTCCAGAAAGCTGTCTACACCACAGGTGTTCCTCCCGGTATCTACGCATTT
CA

>CUP2P4C01 Uncultured bacterium (Betaproteobacteria)
GGTTAGGCAAACGGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGTGACATGCTGATCCACGATTACTAGCGAT
TCCGACTTCATGCAGTCGGGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCCAGGATTGGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCATTGTATGAC
GTGTGAGGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCACTAGAGTGCCCTTTCGTAGCAACTAGTGACA
AGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCCGGCTCCCTTTCGGGCACTCCCACATCTCTGCA
GGATTCCGGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTT
GCGACCGTACTCCCCAGGCGGTCGACTTCACGCGTTAGCTGCGTTACCGAGAAAATGAATTCCCGACAACTAGTCGACATCGTTTAGGGCGTGGACTACCAGGGTATCT
AATCCTGTTTG

>CUP2P4C02 Uncultured bacterium (Acidobacteria)
GGCGTCTGCTCCTTGCGGTCAGCGTGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTCAAGGCCCGGGAACGTATCACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGC
CCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTG
CGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGG
AAGGCCGTATTTCTACAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACTTCCGAACGGAAGGCACCCCAAGTCCTGATCGTTTAGGGC
TAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAACGGTCCAGCGCGCCGCTTTCGCCACG

>CUP2P4C04 Uncultured actinobacterium (Actinobacteria)
TTCGACGGCTCCCTCCCTTGTGGGTTAGGCCACGGCTTCGGGTGTTGCTCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCAGTG
CTGATCCGCGATTACTAGCAACTCCGCCTTCATGCAGGTGGGTTTCTGGGATTGGCTCCACCTCGCGGTTTGGCAACCCTCTGTACCGGCCATTGTATCGCAACCC
TTTGTACGCGCCAATGTAGCACGTGTGTAGCCCTGGACATAAGGGGCATGATGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCGGTCTCGCATGAGTCC
CCAACTAAATGCTGGCAACATGCGACGGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGATCCTGCCC
CGAAGGGAGACCGTGTTTCCACGGCTGTCAGGAACATGTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCG
TCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCGTCGGCACGGAGGGAGTC

>CUP2P4C05 Uncultured bacterium (Betaproteobacteria)
TACCTACTTCTGGTGCACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGACATGCTGATCCGCGATTACTAGCAATTCCGACTT
CATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCTGGGATTGGCTCCACCTCGCGGTTTGGCAACCCTCTGTACCGGCCATTGTATGACGTGTGAGG
CCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTAGAGTGCCCTTGCGTAGCAACTAGGGACAAGGGTTGC
GCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTACGGCTCCCTTTCGGGCACACCCGCCTCTCAGCGGGCTTCCG
TACATGTCAAGGGTAGGTAAGGTTATTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTTAATTCCTTTGAGTTTTAATCTTGCGACCGT
ACTCCCCAGGCGGACAACTTCACGCGTTAGCTGCGGTACTGAGAAATCGCTTCCCCAACACCTAGTTGTCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGT

TTGCTCCCCACGCTTTCGTGCCTGAGCGTCAATCTCAGCCCAGGGGGCTGCCTTCGCCATCGGTGTTCCGCCACATCTCTACGCATTTCACTGCTACACGTGGCATTCC
ACCCCCCTCTGCCGGATTCAAGTCCCATAGTTTCCACTGCAGTTCCCAAGTTAAGCTCGGGG

>CUP2P4C06 Uncultured bacterium (Acidobacteria)
GCGTCTGCCTCCTTGCGGTCAGCGTGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATA
CGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTCTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTG
CCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTT
G

>CUP2P4C07 Uncultured soil bacterium (Não classificada)
ACCGCGGCGTCTGATCCGCGATTACTAGCGATTCCAGCTTCATGCAGTCGGGTTGCAGACTGCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGG
TTTGCGACGGTTTGTACCGGCCATCGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTCT
GCCAGAGTGCCCAACTAAATGGTGGCAACTGGAAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAC

>CUP2P4C08 Uncultured bacterium (Acidobacteria)
GCGCTGCCTCCTTGCGGTCAGCGCGGCGACTTCTAGTACAACTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGC
CCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTG
CGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTGGTGTCCCTTGCGGG
AAGGCCGTATTTCTACAGCTGGTCACCAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGC
TAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAGTGGTCTAGCGCGACGCTTTCGCCACGGGTGTTCCTGCAGATATCTAC
GCATTTC

>CUP2P4C09 Uncultured bacterium (Não classificada)
TACTTCGGCTGCTACACAGGACTTCGGGTACTCCCAACTCTCATCGCTTGACGGGCGGTGTGTACAAGCCGGGAACGTATTCACGGCAGCGTGCTGATCTGCCATTACT
AGCGATTCCGGCTTCATGGAGTCGAATTGCAGACTCCAATCTGAACTGAGGATGGTTTTTAGAGATTAGCTCCCCCTCGCGGGTTGGCGACCCTCTGTTCCACCCATTG
TAACACGTGTGTCGCCCAGAGCATAAAGGCCGTACTGACTTGACGTCATCTCCACCTTCCTCCTGGTTATCCCAGGCAGTCTCCTTAA

>CUP2P4C10 Uncultured bacterium (Gammaproteobacteria)
GTCAGGCTACTGCTTCTGGTGCAGTAGACTTCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCGGCAATGCTGATCTGCGATTACTAGCGATT
CCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTTCTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCCTCTGTATCTACCATTGTAGCACG
TGTGTAGCCCTGGTCATAAAGGCCATGATGACTTGACGTCATCCCCATCTTCCTCCGGTTTGTCACCGGCGGTCTCCTTAGAGTGCCCAATTGAATGCTGGCAACTAAG
GACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTGGGCTCCTTGCGGCACCCCTAAATCTCTT
CAGGGTTCCCAGGATGTCAAGACCAGGTAAGGTGCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGGTTGTGCGGGTCCCCCGTCAATTCCTTTGAGTTTCAAC
CTTGCGGCCGTACTCCCCAGGCGGAGAACTTAGCGCGTTAGCTACGACACTGCGAGGCTTACCCTCTCAACGTCTAGTTCTCATCGTTTATGGCGTGGACTACCAGGGT
ATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCCTGAACGTCGGTGCTGGACCAGGAAGCCGCTTTCGCCACTGGTGTTCCTTCCGATAT

>CUP2P4C11 Uncultured Acidobacteria bacterium (Acidobacteria)
CTCCTTGCGGTTAGCTTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTAC
TAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTAACGCGCATT
GTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGC
AACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGT
ATTTCTACAGCTGGTCAGAAGCATTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGA
GTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGGACCCAAGTCCTGATCG

>CUP2P4C12 Bacterium Ellin5239 (Acidobacteria)
GGTTGGCTCACCGACTTCTAGTGCAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATTCTGATCCGCGATTACTAGCGAT
CCAGCTTCATGTAGTCGAGTTGCAGACTACAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCACG
TGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCACCAGAGTGCCCAACTTAATGATGGCAACTGGG
GATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGCGGCCCCTTGCGGGGAAGGAATATTTCTA
CTCCGGTCCACTACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGC
CTTGCGACCGTACTCCCCAGGCGGACTGCTTAACGCGTTAGCTACGGCACGGCGGGATTGGGTACCCGTCACACCAAGCAGTCATCGTTTAGGGCTAGGACTAC

>CUP2P4D01 Uncultured candidate (Não classificada)
TTCGGGTGCAGACAACTCAAGTGACGTGACGGCGGTGTGTACAGGCCCGGGAACGTATCACCGCCGTTTAGCTGACCGGCGGTTACTAGCGATTCCGGCTTCACGCAGG
CGAGTTGAGCCTGCGATCCGAACTGAGAACGGATTTCTCGGATTGCCTCCCTCTCACGAGATCGGTCCCGTTTGTCTACCGTCCATTGTACCATGTTTGTAGCCCAGGA
TGTAAGGGCCATGCTGACTTGACGTCATCCTCACCTTCCTCCGAGTTACCCCGGCAGTTTCCCCAGAGTGCCCAGCCTTACCTGCTGGCAACAGGGGATGAGGGTTGCG
CTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAACACCTGTCTCGCCGCCCTCTTGCGAGGGACACGCCTTTCAGCGTGGTGCGGCG
GATGTCAAACCCTGGTAAGGTTCTACGGTTAGTGACGTATTAAACAACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGCCGTAC
TCCCCAGGCGGGATACTTACTGCGTTAGCGGCGGCACCCGAGGGGTCGATACCCCGGACACCTAGTATCCATCGTTTAGGGCTGGGACTACCGGGGTATCTAATCCCGT
TCGCTCCCCCAGCTTTCGCGCCTCAG

>CUP2P4D02 Elizabethkingia meningoseptica (Flavobacteria)
CGGTCACCGACTTCAGGTACCCCCAGCTTCCATGGCTTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGCCATGGCTGATGCGCGATTACTAGCGATTC
CAGCTTCATAGAGTCGAGTTGCAGACTCCAATCCGAACTGAGACCGGCTTTCGAGATTTGCATCCTATCACTAGGTAGCTGCCCTCTGTACCGGCCATTGTAGCACGTG
TGTGGCCCAAGACGTAAGGGCCGTGATGATTTGACGTCATCCCCACCTTCCTCTCTACTTGCGTAGGCAGTCTCACTAGAGTCCTCAACTTAATGTTAGCAACTAGTGA
CAGGGGTTGCGCTCGTTGCAGGACTTAACCTAACACCTCACGGCACGAGCTGACGACAACCATGCAGCACCTTGAAAAATGTCCGAAGAAGGATCTATTTCTAAATCTG
TCATTTCCCATTTAAGTCTTGGTAAGGTTCCTCGCGTATCATCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCATTCTTGCG
AACGTACTCCCCAGGTGGATTACTTATCACTTTCGCTTAGTCTCTGAATCCTAAAACCCAAAAACGAGTAATCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCC
TGTTCGCTCCCCACGCTTTCGTCCATCAGCGTCAGTTAAGACTTAGTGACCTGCCTTCGCAATTGGTGTTCTAAGTAATATCT

>CUP2P4D03 Uncultured bacterium (Acidobacteria)
TGTTTGATTAGGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATTCACGGCATCATTCTGATACGCCATTACTAGCGATT
CCAGCTTCACGCAGGCGAGTGCAGCCTGCGATCCGAACTGAGAACGGTTTTTTGCGATTAGCTCCCCCTCGCGGGTTTGCAGCGNCTTTGTACCGCCCATTGTAGCACG
TGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCAACTTATCGCTGGCGGTCTCCTGCGAGTGCTTCCGTTTAACGGGAGTGGCAAC
ACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTTCAAGTCCCTTGCGGGAAAACCATATT
TCTACAGTCGATCTTAAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTT
TCAGCCTTGCGACCGTACTCCCCAGGCGGCATACTTAACGCGTTAGCTCCGGCACGAACGAA

>CUP2P4D04 Bacillales bacterium Gsoil 1105 (Bacilli)
TCGACCACCTTAGGCGGCTGGCTCCATAAAGGTACCTCACCGACTTCGGGTGTTGCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGAATCACCGC
GGCATGCTGATCCGCGATTACTAGCAATTCCGGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTACGAACGGCTTTATGAGATTAGCTCCACCTCACGGTCTCG
CATCCCTTTGTACCGCCCATTGTAGCACGTGTGTAGCCCAGGACATAAGGGGCATGATGATTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCCATTGT
GAGTGCTCAACTAAATGGTAGCAACACAATGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAACCATGCACCACCTGTCACC
GCTGCCCCGAAGGGAAGGCTTATCTCTAAGCCGGTCAGCGGGATGTCAAGTCCTGGTAAGGTTCTTCGCGTTGCTTCGAATTAAACCACATGCTCCACTGCTTGTGCGG

GCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGGAGTGCTTAATGCGTTAGCTTCGGCACTGAGGGTGGTACCCCCCAACACCTAGCACTC
ATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCGCCTCAGCGTCAGAAATCGGCCAGCAAGGCGCCTTCGCCACAGGTGTTCCT
CCACATCTCTACG

>CUP2P4D05 Uncultured bacterium (Acidobacteria)
CGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTG
GCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGAGCAGTCCACAC
AGAGTCCTCTCTTGCGAGTAGTAACTGTGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTC
ATGTCCCTTGCGGGAAGGCCGTATTTCTACAGCTGGTCATAAGCATTTCGAGCCCAGGTACAGGTTCCCTCGCCGTAGCCGTCCGAATTGAACCACATGTTCCACCGCT
TGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCACGTCCTTGGCGACCCGTACCTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACGCCCGAACGGGCGGCA

>CUP2P4D06 Uncultured bacterium (Acidobacteria)
TGAGCATACTTGGACGGCTGCTCTCTTGCGAGTTAGCACACCGGCTTCTAGTGCAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCAC
CGCAGCATTCTGATCTGCGATTACTAGCGATTCCAGCTTCATGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTCTCCGATTACCTCTCCCTCGCGGGT
TCGGGACGGTTTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCA
CTAGAGTGCCCGGCTTGACCCGATGGCAACTAGGGATGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACACCGACGCACCTA
TACAGCAGTCTCTTGCGAGAAAAGGATGTTTCCACCCCGGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTT
GTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACGACGGGATTGGGTACCCGCCACACC
AAGCAATCATGGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCACCAGCGTCAGAAATGGTCCAGTGCGCCGCTTTCGCCACAG
GTGTTCCTCCCGATATCTACGCATTTCACC

>CUP2P4D07 Uncultured bacterium (Acidobacteria)
ACTATACTTGGACGGTACCCCTTGCGGGTTAGCGTACGGCTTCTAGTACAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAG
CGTGCTGATCTGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCG
ACGGTTTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGGGGCGGTTTCTCTAGA
GTGCCCAGCTTGACCTGATGGCAACTAGCGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAG
CGGCCCTTGCGGGCGCCGATGTTTCCACCGGATTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGG
CCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATGCTTATCGCGTTAGCTTCGGCAGTCGGGATTGGGTACCCGACACACCAAGCATC
CATAGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTCCCTCAGCGTCAGTTGCGATCCAGCGAGCCGCCTTCGCCTCGGATGTTCC
TGCGGATATCTACGCA

>CUP2P4D08 Uncultured bacterium (Alphaproteobacteria)
GGTTAGCGCACCGTCTTCAGGTAAAGCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCGTGCTGATCTGCGATTACTAGCGAT
TCCGACTTCATGTGCTCGAGTTGCAGAGCACAATCCGAACTGAGACGGCTTTTTGAGATTTGCGCAGGATCACTCCATTGCATCCCATTGTCACCGCCATTGTAGCACG
TGTGTAGCCCAGCCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCGGCTTATCACCGGCAGTCCCCTTAGAGTGCCCAACTGAATGATGGCAACTAA
GGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGAACTGAAGGGATCGATCT
CTCGTTCCCGCGACCGGGATGTCAAGGGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
TAATCTTGCGACCGTACTCCCCAGGCGGGATGCTTAAAGCGTTAGCTGCGCCACTGACGAGCAAGCTCGCCAACGGCTAGCATCCATCGTTTACGGCGTGGACTACCAG
GGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCACATCAGCGTCAGTACCGGGCCAGTGAGCCGCCTTCGCCACTGGTGTTCTTGCGAATATCTACGAATT

>CUP2P4D09 Uncultured Termite group 1 bacterium (Não classificada)
TTTCATTGCCGACGAGCGGCATTTCGGTTGCAATGGGCTTTCGTGGTGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATTCACCGCTGCAATTGCTGATCAGCGATT
ACTAGCGATTCCACCTTCACGGGGGCGAGTTGCAGCCCCCGATCTGAACTGAGGCGTAATTTGAGGATTTGCTCCACCTTGCGGTCTTGCTTCCCACTGTTTACGCCAT
TGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCACGTTATCCGCGGCAGTCTCCGAAGAGTCCTCCCCTTGCGAGGT
AGCAACATCGGATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGGCTAGCTCCCTTGCGGGTCGCCC
AATGTTTCCATCGGACTACTACTAGTCGTTCGAGCCCAGGTAAGGT

>CUP2P4D10 Uncultured bacterium (Acidobacteria)
ACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTT
GCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAG
GCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGAACTACGTGCAGGGGT

>CUP2P4D11 Uncultured bacterium (Acidobacteria)
CTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCAGCGTGCTGATCTGCCATTACTAGCGATTCCAGCTTCATGCAGG
CGAGTTGCAGCCTACAATCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGCTTGCAGCGCTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGAC
ATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTTCCGCCTTTCGGCATGGCAACACAGGACAAGGGTTGCGCT
CGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGGCTGGACCCCCTTGCGGGGTAGCGATGTTTCCACCGCCGGTAACCAGC
CGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACTGTACT
CCCCAGGCGGCACATTTAACGCGTTAGCTCCGGCACGGATCAACTGAATGACCCACACCAAATGTGCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTGTTTG
GTACCCACGCTTTCGTGTCTCAGCGTCAGTTACGGTCCAGAGAGCCGTC

>CUP2P4D12 Uncultured bacterium (Acidobacteria)
GGGCATACTTGGGCGCTGGCCTCCTTGCGGTTGGCTCGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGC
GTCGATCTGATACGCCATTACTAGCGATTCCAGCTTCATGCAGCCGAGTTGCAGACTGCAATCCGAACTGAGCGCGGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTCG
CAACAGTCTGTGCCGCGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCGTGCTGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTAGTA
GAGTTCTCCCTTGCGGGTAGCAACTACTAGTAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACTAC
TGTCCCTTGCGGGAAGACGATGTTTCCACCGTTGGTCAGTAGCGGTTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCG
GGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGCGCAGGACTTAACGCGTTAGCTGCGGGACGACCCGCCTACGCGGGCCATCCCAAGTCCT
GATGGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTNTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTTGCGGTCCAGCGAGCCGCCTTCGCCACGGGTGTTCC
TGCCGATATCTA

>CUP2P4E02 Uncultured bacterium (Acidobacteria)
CCCCGTAAGGTTGGCACGACGATTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGNGAACGTATTCACGGCGCCGTTCTGATGCGCCAT
TACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTGCGATTAGCTCCCCCTCACGGGTTCGCGACGCTCTGTGGCGCGC
ATTGTAACACGTGTGTGGCCCTGGACATAAAGGCCATGCTGACTTGACCTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTCATAGAGTTCTCCCTTGCGGGT
AGCAACTATGAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCGTGCAGCACCTCTACACAGGTCCCTTGCGGGAAGTC
TCTGTTTCCA

>CUP2P4E03 Uncultured bacterium (Alphaproteobacteria)
TGATCTACGTGGCGGTGCTCCTGCGGTTAGCGCACCGTCTTAAGGTAAACCAATCCCATGCCGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCCTG
CTGTTCTGCGATTACTAGCGATTCCACCTTCATGTACTCGAGTTGCAGAGTACAATCTGAACTGGGGCGGTTTTTTGGGATTAGCCGTTCTCGCGAAGTAGCTGCCCAC
TGTCACCGCCATTGTAGCACGTGTGTAGCCCAGGGTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTGTCGCCGGCGGTCCCTCTAGAGTGCCC
AACTGAATGATGGCAACTAAAGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGA

>CUP2P4E04 Uncultured bacterium (Acidobacteria)

TTCTAGTACAACCCACTTTCGTGATGTGACGCGGTGTGTACAAGGCCCGGGAACGTTTTCACGGCGTCGTTCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGT
CGAGTTGCAGACTGCAATCCGAACTGAGCATGGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTCGCGACGGTTTGTACCATGCATTGTAACACGTGTGTAGCCCTGGAC
ATAAAGGCCGTGCTGACTTGACGTCATCCCCACCTTCCTCTCCNGTTATCCTGGAGCAGTCCTCTTAGAGTTCCCCCTTGCGGGTGGCAACTAAGAGTAGGGGTTGCGC
TCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACCGGTGTCCCTTGCGGGAAGGCGGTGTTTCCACCGCTGGTCACCGG
CACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCT

>CUP2P4E06 Uncultured bacterium (Acidobacteria)
GTCATACTTGGGCGCTGCCTCCTTGCGGTTAGCGTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGT
CGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCA
ACGGTTTGTGCCCTGCATTGTAACACGTGTGTACCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTATCCGGAGCAGTCCACACAGAGT
CCTCTCTTGCGATATAACTGTGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGACACTGACAAGCCATGCAGCGCCTATACTAGTGTCCCTTGCG
GGAAGGCCGTATTTCTACAGCTGGTCACTAGC

>CUP2P4E07 Uncultured bacterium (Acidobacteria)
GGTTAGCGTGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGA
TTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACA
CGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATTCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCGAGTGGCAACTAC
GTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCGTGCAGCGCCTATACTCCTGTCCCTTGCGGGAAGGCCGTATTTCT
ACAGCTGGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACTTCCGAACGGAAGGCACCCCAAGTCCTGATCGTTTAGGGCTAGGACTACCAGNG
TATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCC

>CUP2P4E08 Uncultured bacterium (Não classificada)
GCGCTCCGTCCTCACGGGTTCGGCCAGCGACTTCGGGAGCACCAGACTCGGGTGATGTGACGGGCGGTGAGTGCAAGGCCCGGGAACGTATCAACGCAGTGTGCTGACC
TGCGTTTACTAGCAACTCCGACTTCATGCTGGCGAGTTGCAGCCAACAATCCGAACTGAGACCGGTTTTAAGGGATTGCCTTCACGTCGCCGTGTCGGAACCCGTTGTG
CCGGCCATTGTAGCGTGTGTGTAGCCCTGGACATAAAGGGCATGCGGACTTGACGTCATCCCCACCTTCCTCCGGGTTTCGCCCGGCAGTCTCCCTAGAAAATTCAACT
AAGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCACCACCTGTGTAGAAACCTCTTGCGAGGGGCGCTGACTTT

>CUP2P4E09 Uncultured bacterium (Betaproteobacteria)
ACGTGGTATCGCCTCCTTGCGGTTAGGTACTACTTCTGGTAAGCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGCTGAT
CCGCGATTACTAGCGATTCCAGCTTCACGTAGTCGAGTTGCAGACTACGATCCGGACTACGATGCATTTTCTGGGATTAGCTCCACCTCGCGGCTTGGCAACCCTCTGT
ATGCACCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCTGGCAGTCTCTCTAGAGTGCCCTT
TCGTAGCAACT

>CUP2P4E10 Uncultured bacterium (Alphaproteobacteria)
TCCCCCGGGTCGCCCGAGGGTTGGCGCACCGCCTTCGGGTAAAGCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCATGCTG
ATCCGCGATTACTAGCGCTTCCGACTTCATGCTCTCGAGTTGCAGAGAGCAATCCGAACTGAGACGGCTTTTTGAGATTGGCGTAGGGTCGCCCCATTGCCGCCCTCTG
TCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCATAAGGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCGGCTTGTCACCGGCAGTTTCTGCAAAGTGCCCGG
CTTGCCCGATGGCAACTGCAGATGGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCCGGCCAGCC
GAACTGACGAGGCCGATCTCTCGGCCCCCAACCGGGCATGTCAAGAGCTGGTAAGGTTCTGCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCC
CGTCAATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTGTGCTTAAAGCGTTTGCGGCGACACCGAAGAGCTGCGCTCCCCAACGTCTAGCACACATCG
TTTACAGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCC

>CUP2P4E11 Uncultured bacterium (Acidobacteria)
GGGTTAGCCTGCAGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGTATCGTTCTGATATACCATTACTAGCGA
TTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGAACGGTTTTTTCCGATTTGCTCCCCCTCGCGGGTTGGCTTCGGTTTGTACCGCCCATTGTAGCA
CGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCTCCAACTTATCGCTGGCGGTCTCCTGAGAGTGCTTCCTTGCGGATTAGCAACAC
AGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTCGACTCCCTTGCGGGATAGAAGTGTTTC
CACCTCCGTTAGCAAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
AGCCTTGCGACCGTACTCCCCAGGCGGCACACTTAACGCGTTAGCTCCGGCACGAACGAAATGAATCGCTCACACCAAGTGTGCATCGTTTAGGGCGTGGACTACCAGG
GTATCTAATCCTTGTTGGTTCCCCACGCTTTCGTGCCTCAGCGTCAGTCGTGGTCCAGTAAGCCGTCTACACCGCTGGTGTTCCTCCCGATATCTACGCATTTCACCGC
TACACCGGGAATTCCGCTTACCTCTCCCACTCTCCAGCCCCGCA

>CUP2P4F01 Uncultured bacterium (Alphaproteobacteria)
AACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTATGCGATTCCAAGCTTCATTGTGCTCGNAGTTG
CAGAGCACAATCCGAACTGAGACGGCTTTTTGAGATTTGCGCAGGGTTTCCCCATTGCGTCCCATTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCTGTAAGTGG
CCATGAGGACTTGACGTCATCCCCACCTTCTTCGCGGCTTATCACCGGCAGTCCCCTTAGAGTACCCAACTAAATGATGGCAACTAATGGCGAGGGTTGCGCTCGTTGC
GGGACTTAATCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTCTCCGGTCCAACCGAACTGAGAAGGCTCCATCTCTGGTGCCCGCGAACGGGATT
TCCAAGGCTGGTAAGGTTCTTGCGCGTTGCTTCGAATTGAACCACAATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTC
CCCAGGCGGGATGCTTAATGCGTTAGCTGCGCCACTGACGAGTAAACCCGACAACGGCTAGCATCCATCGTTTACGGTGTGGACTACCAGGGTATCTAATCCTGTTTGC
TCCCCACGCTTTCGCACCTCAGCGTCAGTACCGGGCCAGTGAGCCGCCTTCGCCACTGGTGTTCTTGCGAATATCTACGA

>CUP2P4F02 Uncultured bacterium (Acidobacteria)
ACTTGGGCGGTGCGTCCTTGCGGTTCGCGCACGACTTCTAGTACAGTCCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGGACGTATTCACCGCAGCGTTCT
GATCTGCGATTACTAGCGATTCCAGCTTCATGGAGTTGGGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTT
TGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCCGTTATCCGGCGCAGTTTCGCTAGAGTGCCC
GGCTTGACCCGATGGCAACTAGAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGCCC
TTGCGGGCGGGGATGTTTCCACCCCATTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCG
TCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATGCTTAACGCGTTAGCTGCGGCACGATCGGATTGGGTACCGATCACACCAAGCATCCATAGT
TTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTGTGGT

>CUP2P4F03 Uncultured bacterium (Acidobacteria)
ACTTCTAGTACAGTCCACTTTCGTGATGTGACGGGCGGTGTGTCAAGGCCCGGGAACGTATTCACCGCAGCGTTCTGATCTGCGATTACTAGCGATTCCAGCTTCATGG
AGTCGGGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGACCATTGTAGCACGTGTGTAGCCCTG
GACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCCGTTATCCGGCGCAGTTTCGCTAGAGTGCCCGGCTTGACCCGATGGCAACTAGAGATAAGGGTT
GCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACGGCCATGCAGCACCTCCGCAGCGGCCCGTGAGGGCGCCGATGTTTCCACCGGATTCCACT
GCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTA
CTCCCCAGGCGGGATGCTTATCGCGTTAGCTTCGGCACAGCCGGATTGGGTACCGG

>CUP2P4F04 Uncultured bacterium (Planctomycetacia)
CGTCGGCGCTTACCCCCTTGCGGTTGGCACGGCGATTCGGATGCCCCGGATTTCGTGGCTTGACGGGCGGTGTGTACAAGGCTCAGGAACACATTCACCGCAGTGTTGC
TGACCTGCGATTACTAGCGATTCCAACTTCATGAAGGCGAGTTGCAGCCTTCAATCTGAACTGGGGCGTGCTTTTTGGGATTGGCTCCCGCTCGCGCGTTTGCTTCCCT
CTGTCCACGCCATTGTAGCACGTGTGCAGCCCTGGGCATAAAGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCGGTTTAACACCGGCAGTCTCTCCAGAGTCCC
CGGCATGACCCGCTGGCAACTGGAGACAAGGGTTTCGCTCGTTACGCGACTTAACGCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGGTAGGTTC
CGGACTGGATACCGTTGGGGTAACGTTTCCGCACCCTACTTCCTACCCCTTTCGGACATGTCAAGCCCAGGATAAGGTTCTTCGCGTAGCCTCGAATTAAGCCACATGC

TCCACCGCTTGTGTGAGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCATACTCCCCAGGCGGGGTACTTAACACTTTTGCTTCGGCAGTGAACCCATGTTAAG
TCCACTACCCAGTACCCATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCC

>CUP2P4F05 Uncultured bacterium (Acidobacteria)
GCGCTGCCTCCTTGCGGCAGCGCGGCGACTTCTAGTACAACTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTAC
CCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCCTCTCTTG
CGAGTAGTAACTGTGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTAGTGTCCCTTGCGGG
AAGGCCGTATTTCTACAGCTGGTCACTAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGC
TAGG

>CUP2P4F06 Uncultured bacterium (Actinobacteria)
GTTGCGCTCGTTGCGGGACTTAACCAACTTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGCACTAGCTCCGAAGGGGGACCGTATTTCTACGGTTTTCCAGT
GCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTA
CTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGACACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTG
TTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAATTC
CACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCCACCGACCTCTCGAGGTTGAGCCTCGAGTTTTCACAGCGGACCTGCTTGGCCGCCTACACGCTCTTTACGCCCA
ATGAATCCGGACAACGCTTGCCCCCTACGTATTACCGCGGCTGCTGGCACTCAGTCAGTCA

>CUP2P4F07 Bradyrhizobium japonicum (Alphaproteobacteria)
CTGACCTACGTGGCGGCTGCTCCCTTGCGGTTTACGCACCGTCTTCAGGTAAGACAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGT
GGCGTGCTGATCCACGATTACTAGCGATTCCAACTTCATGGGCTCGAGTTGCAGGGCCCAATCCGAACTGAGACGGCTTTTTGAGATTTGCTAGGACTTGCGTCTTCGC
TTCCCATTGTCACCGCCATTGTAGCACGTGTGTAGCCCAGCCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCAGTCTCCTTA
GAGTGCTCAACTAAATGGTAGCAACTAAGGACGGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTC
CAGGCTCCGAAGAGAGGGTCACATCTCTGCGACCGGTCCTGGACATGTCAAGGGCTGGTAAGGTTCTGCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGC
GGGCCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGAATGCTTAAAGCGTTAGCTGCGCCACTAGTGAGTAAACCCACTAACGGCTGGCAT
TCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCCTCAGCGCCAGTATCGGGCCAGTGAGCCGCCTTCGCCACTGGTGTTC
TTGCGAATATCTACGAATTTCACCTCTACACTCGCAGTTCAATCACCTCTCCCGA

>CUP2P4F08 Uncultured soil bacterium (Não classificada)
ACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACTAGCAACTCCGGCTTCACG
CAGGCGGGTTGCAGCCTGCGATCCGAACTGAGACCGGCATTGGGGATTGGCTCCGCCTCGCGGCTTGGCCACCCATTGCGCCGGCCATTGTAGTGTGTGTGTAGCCCCA
GACGTAAGGGCCGTGCTGACTTGACATCATCCCCACCTTCCTCCGCGTTGCGCGCGGCAGTCGGGCCGGAGGGGACCGCCGGGTTCACCGACGGCCAACCGACCCCAGG
GGTTGCGCTCGTT

>CUP2P4F09 Uncultured alpha proteobacterium (Alphaproteobacteria)
GACTTACGTGGTCGGCTACTCCCTTGCGGGTTAAGCACCGGCTTCGGGTAAAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCG
GCATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCTCCCGAGTTGCAGAGAGCAATCCGAACTGAGACGGCTTTTTGAGATTAGCTTGGCATCGCTGCCTCGCC
GCCCTCTGTCACCGCCATTGTAACACGTGTGTAGCCCAGCCCATAAGGGCCATGAGGACTTGACGTCATCCCCGCCTTCCTCCGGCTTGTCACCGGCAGTTTCTGCAGA
GTGCCCAGCGCTACCTGATGGCAACTGCAGATGGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTC
CCGCCAGCCGAACTGAAGGACCGGATCTCTCCGGACCACACGGGACATGTCAAGGGCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGT
GCGGGCCCCCGTCAATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTGTGCTTACCGCGTTAGCTGCGACACCGAAGAGCTAGGCTCCCCAACGTCTAG
CACACATCGTTTACAGCGTGGACTACCAGCGTATCTAATCCTGTTTGCTCCCCAAGCTTTCGCGCCTCAGCGTCAGATCCGGTCCAGAGAGCC

>CUP2P4F10 Uncultured Acidobacteria bacterium (Acidobacteria)
ACAGCTCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTTTCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTG
CAGACTGCAATCCGAACTGAGCGCGCTTTTTTCCGATTAGCTCCCTCTCGCGAGTTGGCAACGGTTTGTAACGCGCATTGTAACACGTGTGTAGCCCTGGACATAAAGG
CCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCG

>CUP2P4F11 Bacterium Ellin5239 (Acidobacteria)
TTAGCTCACCGACTTCTAGTGCAACCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCATTCTGATCCGCGATTACTAGCGATTC
CAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCACGT
GTGTAGCCCTGGACATAAAGGCCATGAGGGCTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCACCAGAGTGCCCAACTAAATGATGGCAACTGGGG
ATAAGGGTTGCGCTCGTTGCGGGACTTAGCCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACAGCAGCCCCTTGCGGGGAAGGAATATTTCTAC
TCCGGTCCACTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCC
TTGCGACCGTACTCCCCAGGCGGACTGCTTAACGCGTTAGCTACGGCACGGCGGGATTGGGTACCCGTCACACCAAGCAGTCATCGTTTAGGGCTAGGACTGCCAGGGT
ATCTAATCCTGTTTGCTCCCCTAGCTTTCGTGCATCAGCGTCAGTTATGGTCCAGTGAGCCGCTTTCGCCACAGGTG

>CUP2P4G01 Uncultured bacterium (Acidobacteria)
CCCGGGAACGTATCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAACTTCGAGCAGGCGAGTTGCAGCCTGCTATCCGAACTGAGACCGACTTTCTCCGATTA
GCTCCACCTTGCGGTATCGCGACGGTTTGTATCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGATGTCATCCCCATCTTCCTCCGGTTT
ATCACCGGCAGTCTCTGCAGAGTGCCCAGCTTAACCTGATGGCAACAGCAAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGAC
AGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGCCCCCTTTCGGAGGATGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACA
TGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGA
TACCCGCCACACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCTCATCAGCGTCAGTGTCGGTCCAGGATG

>CUP2P4G02 Burkholderia tropica (Betaproteobacteria)
GGTGTGTACAAGACCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCAGCTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGATCGG
TTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCTCTGTTCCGACCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCAC
CTTCCTCCGGTTTGTCACCGGCAGTCTCCCCGGAGTGCTCTTGCGTAGCAACTGGGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCT
GACGACAGCCATGCAGCACCTGTGTTACGGCTCCCTTTCGGGCACCCCCACCTCTCAGCAGGGTTCCGTACATGTCAAGGGTAGGTAAGGTTTTGCGCGTTGCATCGAA
TTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTAAATCTTGCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTACCA
AGTCAATGAAGACCCGACAACCAGTTGACATCGTTTAGGGCGTGGACTACCAGTGTATCTAATCCTGTATGCTCCCCACGCTTTCGTGCATGAGCGCCAGTATTGAC

>CUP2P4G03 Uncultured Rubrobacteridae bacterium (Actinobacteria)
CATCATCGACTACTTGACGGCTCCTCCCTCGCGGGTAGGCCACGGCTTCGGGTATTGCCGACTTCGTGGTGTGACGGGCGGTGTGTCAGGCCCGGGAACGTATCACCGC
GGCGTTGCTGATCCGCGATTACTAGCAACTCCGACTTCATGGAGGCGAGTTTCAGCCTCCAATCCGAACCGGGACCGGCTTTTTGGGATTCGCTCCCCCTCGCGGGTTT
GCAGCCCTTTGTACCGGCCAATGTAGCACGTGTGTAGCCCTGGACATAAGGGTCATGCTGACTTGACGTCATCCCCANCTTCCTCCGATTTGTCACCGGCAGTCTCCCA
TGAGTCCCCGTCTTTTACGCTGGCAACATGGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAACACCTGTGC
ACGAGCCCCGAAGGGCTGCCGTATTTCTACGACACTCCCGTGCATGTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCG
GGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGTGCTTAATGCGTTAGCTTCGGCACAGGAGGAGTCGAAACCTCCCAAANCTAGCA
CCCATCGTTTACGGCGTGGACTACCAGCGTATCTAATCCTGTTCGCTCCCCAAGCTTTCGCGTCTCC

>CUP2P4G04 Uncultured bacterium (Não classificada)

CATCTGCCCCTGACGGTTGGCCAACGGCTTCAGGTGTTCCGGCTCCCATGGTGTGACGGGCGGTGTGTCAGGCCCGGGAACGTATCACCGTGGTGTGCTGACCCACGGG
TTACTAGCAACTCCTGGCTTCAGGCAGGCGAGTTGCAGCCTACCATCCGAACTGAGACGGCTTTGGGGGATTGGCTCCGCCTCGCGACTTGGCAACCCATTGTACCGGC
CATTGTAGCGTGTGTGTCGCCCTGGACGTAGGGGCCGTGCTGACTTGACGTCATCCCCACCTTCCTCCGCGTTGCGCGCGGCAGTCGGGCCCGAAAAGTCCAACGGACC
CCAGGGGTTGCTCTCGTTAGGGGACTTAACCCAATCACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGGAGCCGCCCGCGAACGGGACAGGGCATTACCC
CTGGTGCAACTCCATGTCAAACCCAGGTAAGGTTCTTCGCGTCGCATCGAATTAAACCACGCGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAACC
TTGCGGCCGTACTCCCCAGGCGGTCCACTCATCACGTTAGCTTCGGCACCGAAGGGGTCGATACCTCCAAGCACCTGGTGGACATCGTTT

>CUP2P4G05 Uncultured soil bacterium (Betaproteobacteria)
ACCAGTCATGAAGCTCACGTGGTAGGCGGCTCCCTCAGTTTGCACTGCGGGTTACCTACCTACTTCTGGTGGACCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAG
ACCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCTCGGGA
TTGGCTCCCCCTCGCGGGTTGGCAACCCTCTGTACCGGCCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGG
TTTGTCACCGGCAGTCTCCTTAGAGTGCCCTTGCGTAGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCC
ATGCAGCACCTGTGTTCCAGTTCCCTTTCGGGCACACCCACCTCTCAGCGGGCTTCCGGACATGTCAAGGGTAGGTAAGGTTGTTCGCGTTGCATCGAATTAATCCACA
TCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGATCACTTCACGCGTTAGCTACGGTACTGGAAAATCGCT
TCTCCAACACCTAGTGATCATCGTTTAGGGCGTGGACTACCAGCGTATCTAATCCTGTTTGCTCCCCAAGCTTTCGTGCCTCAGCGTCAGTGTTAGCCCAG

>CUP2P4G06 Uncultured bacterium (Acidobacteria)
TCATGAGTCATACCTTGGGCGTCTGCTCCTTGCGGTTAGCGTGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATT
CACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCG
GGTTGGCAACGGTTTGTACCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTC
CACGTAGAGTTCCCTCTTGCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTC
CACACTTGTCCCTTGCGGGAAGGTCGTATTTCTACAACTTGTCAAGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCT
TGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACTCCA
AGTCCTGATCGTTTAGGGCTAGGACTACCAGCGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTCATTCAGCGTCAGTTATGGTCCAGCGCGCCGCTTTCGCCACGGG
TGGTCCTGCAGATATCTACG

>CUP2P4G07 Uncultured bacterium (Acidobacteria)
GGGTTGATATGGCTACTTCTAGTACAACCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGCTGATCCGCGATTACTAGCGA
TTCCAACTTCAAGCAGGCGAGTTGCAGCCTGCTATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCCAGCTTGCGCTTTTGCGACGGTTTGTACCGGCCATTGTAGCA
CGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTGCAGAGTGCCCACCATAACGTGATGGCAAC
AGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGCGCCCTTTCG
GGCGTTGTCATTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
CCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTCGGCACGACAGGGATCGATACCCGTCACACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGG
GTATCTAATCCCGTTTGCTCCC

>CUP2P4G08 Alicyclobacillus pomorum (Bacilli)
GGTTACCTCACCGACTTCGGGTGTTGCCAACTCTCGTGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGGATTCACCGCGGCATGCTGATCCGCGATTACTAGCAA
TTCCGGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTACGAACGGCTTTCAGGGATTCGCTCCACCTCGCGGTCTCGCTTCCCGTTGTACCGCCCATTGTAGCA
CGTGTGTAGCCCAGGACATAAAGGGCATGATGATTTGACGTCATCCCCACCTTCCTCCGACTTACGCCGGCAGTCACCTGTGAGTCCCCGCCTTTACGCGCTGGTAACA
CAGGTCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAACCATGCACCACCTGTCTCCTCTGCCCCGCAGGGAAGGTACATCTC
TGCACCGGTCAGAGGGATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCTTCGAATTAAACCACATGCTCCACTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GTCTTGCGACCGTACTCCCCAGGCGGAGTGCTTATTGGGTTTCCTTCGGCACTGAGGGTGGTACCCCCCAANACCTAGCACTCATCGTTTACGGCGTGGACTACCAGCG
TATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCCTCAGCGTCAGTCACTGTCCAGCAAGGCGCCTTCGCCACTGGTATTCCTCCACATATCTACGCATTTCACC

>CUP2P4G09 Alicyclobacillus pomorum (Bacilli)
TGGGATCGTGTTGCGCAATACGCTTTCGGAATTCGGCTCCGTGGCCCGCGGCGTAAGCCGGGCCGACCAGAACCGCTACCTGCAATCCGTGGTCGAACTCACCAAGGTG
GAGCGTGATGGCAACGGCGCTAAGAATACCGATCCTGGCGGCAAAGTGACGCCCCTGACCGGAAACGAACTTGTCTCCATGAACATGTGGGGATTCCTGCCTTCCGTCT
TCCCGCTTCTCCGCGAGCGTTTCCATGCCTTCCTTGAGCGCAGCGGCAACGATCTCAAGTCCGAGCACTTCGTTCCCACTGCCGTCAACGAACTGGTATCATCAGGCCA
AGCCCGAGTCAAAGTGCTCAGTACCAACGACGCCTGGTTTGGCGTGACCTACCGCGAAGACCGTCCGCGCGTGGTGGACAGCATTGCCGCGCTCATCAAGAAAGGGAAG
TATCCAGAAAAGTTGTGGAATTGAACGGGAATAAGAGTCTCGCTCCATCACCCCAGCGACAAGGACCCGTCGCCGGGGACCCCGAGGCGGCGGCCGCGGCCTTTGCCAT
CGAGGGTGAATTCTCCGGCGCCGCGCCCTACGGCAGCGGCCACATCAATGACTCCTATCGCGCTGTCTTCCGGCGCAATGGCTGCCAGTCGCGATACATCCTGCAGAGG
ATCAATCACCGCATCTTCAAGAATCCCGTCGCCCTGATGGAAAACATCGAACGCGTGACCGCACACCTGGCAACGCAGGTTGCGGGAGATCCGAACCGGG

>CUP2P4G10 Uncultured Acidobacteria bacterium (Acidobacteria)
CGCTGCCTCCTTACGGTTAGCACAGCGACTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGCCGTCGTTCTGATACG
GCATTACTAGCGATTCCGGCTTCGTGCAGTCGAGTTGCAGACTGCAGTCCGAACTGAGCATGGTTTTTTCCGATTAGCTCCCCCTCACGGGTTCGCGACGGTCTGTACC
ATGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGA

>CUP2P4G11 Uncultured bacterium (Acidobacteria)
GCGCTTGCACCCTTGCGGTTTGCGCGGCGACTCTAGTACAGCTCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACG
CCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGANGTTTTCTCCAGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTG
CCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTT
GCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCCTTGCGG
GAAGGCCGTATTTCTACAGCTTGTCAGAAGCATTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAA
TT

>CUP2P4G12 Uncultured bacterium (Betaproteobacteria)
CCCCCTTGCGGTTAGGCAAACGGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGTGACATGCTGATCCACGAT
TACTAGCGATTCCGACTTCATGCAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCC
ATTGTATGACGTGTGAGGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTTGTCACCGGCAGTCTCACTAGAGTGCCCTTTCGTAGC
AACTAGTGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCCGGCTCCCTTTCGGGCACTCCC
ACATCTCTGCGGGATTCCGGGCATGTCAAGGGTAGGTAAGGTTTTGCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGA
GTTTAAATCTTGCGACCGTACTCCCCAGGCGGTCGACTTCACGCGTTAGCTGCGTTACCGAGAAAATGAATTCCCGACAACTAGTCGACATCGTTTAGGGCGTGGACTA
CCAGGGTATCTAATCCTGT

>CUP2P4H01 Uncultured bacterium (Verrucomicrobiae)
CATGATGTGACGGGCGGTGTGTACAAGGCCCGGTAACGTATTCACGGCGCCGTATCTGATGCGCCATTACTAGCGATTCCGGCTTCATGAAGGCGAATTGCAGCCTTCA
ATCCGAACTGGGCCCAGTTTTGATAGATTTCCTCCACCTCGCGGTCTCGGATCGTTCTGTACTGGGCATTGTAGTACGTGTGCGGCCCAGGTCGTTAGGGCCATACTGA
CTTGACGTCATCCCCACCTTCCTCCTCGTTTAAGCGAGGCAGTCTGAACAGAGTGCTCGGAGCTCTCGCTCCGGTAGCAACAGTTCACAGGGGTTGCGCTCGTGGCGGG
ACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAATTGTGTCTTGCGACACTCGCTGGCTTTCACCAACTTAGAGATGCATGTCAAG
GCCTGTTAAGGTTCTTCGCGTTGCATCGAATAGAGCCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTTCTTTGAGTATTAATCTTGCGAGCGTACTCCCCAGGC
GGCACGTTGAACGCGTTGGCTCCGGCGCAGAAGGGGTCGAATCCTCCCACACCAAACGTGCACCGTTTACTGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCC
TGGCCTTCGTGTCTCAGTGTCAGGAACTGTCCAGAGAC

>CUP2P4H02 Uncultured bacterium (Acodobacteria)

GCTTTCTCCGATTAGCTCCCTCTTGCGATATCGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGATGTCATCCCCA
TCTTCCTCCGGTTTATCACCGGCAGTCTCCGCAGATGTGCCCCACCATCACGTGATGGCAACAGCGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACG
ACACGAGCTGACGACAGCCATGCAGCACCTCGATGACGGCCCTTGCGGGAGCCTGCTTTCGCAGGATGTCCATCACCGTTCGAGCCTGGGTAAGGTTCTTCGCGTTGCG
TCGAATTGAACCACATGCTCCACCGTTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGAGCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGG
CACGGCAGGGATCGATACCCGCCACACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCTGATCAG

>CUP2P4H03 Uncultured soil bacterium (Acidobacteria)
GCTGCCTCCTTGCGGTCAGCTTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACG
CCATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCGATCCGAACTGAGCGCGCTTTTTTGCGATTAGCTCCCCCTCGCGGGTTCGCGACGCTCTGTAGC
GCGCATTGAAACACGTGTGTGGCCCTGGACATAAAGGCCATGCTGACTTGACCTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTCATAGAGTTCTCCCTTGC
GGGTAGCAACTATGAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGAACGAGCTGACGACAGCCATGCAGTACCTCTACACAGGTCCCTCGCGGGA
AGCCCCGATTTCTCGGGGTGGTCCTGTGCGGTTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGTTTGTGCGGGCCCCCGTCAATT
CCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGCAGGACTTAACGCGTTAGCTCCGGGACTTGCCCCGTACAGGGCAAACCCCAAGTCCTGATGGT

>CUP2P4H04 Burkholderia sp. (Betaproteobacteria)
GGTTAGACTAGCCACTTCTGGCAAAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGA
TTCCAGCTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCTCTGTTCCGACCATTGTATGA
CGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCCCTGGAGTGCTCTTGCGTAGCAACTGGGGAC
AAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGATGGCTCCCTTTCGGGCACTCCCACCTCTCAGC
GGGATTCCATCCATGTCAAGGGTAGGTAAGGTTTGTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCT
TGCGACCGTACTCCCCAGGCGGTCAACTTCACGCGTTAGCTACGTTGCCAAGTCAATGAAGACCCGACAACCAGTTGACATCGTTTAGGGCGTGGACTACCAGGGTATC
TAATCCTGTTTGCTCCCCACGCTTTCGTGCATGAG

>CUP2P4H05 Uncultured bacterium (Alphaproteobacteria)
GCTCCTTGCGGTTAGCGCGCCGTCTTCGGGTAAAGCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGCTGATCCGCGATT
ACTAGCGATTCCAACTTCATGCGCTCGAGTTGCAGAGCGCAATCCGAACTGAGACGGCTTTTCGAGATTTGCTCAGGGTCTCCCCTTCGCCTCCCGCTGTCACCGCCAT
TGTAGCACGTGTGTAGCCCAGCCTGTAAGGGCCATGAGGACTTGACGTCGTCCCCACCTTCCTCCGGCTTATCACCGGCAGTCCCCCTGGAGTGCCCAACTGAATGATG
GCAACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGGCCCCGAAGGGAAGATC
GCATCTCTGCAATCCGTCCAGGACATGTCAAAAGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGGATGCTTAAAGCGTTGGCTGCGCCACTGAAGAGCAAGCTCCCCAACGGCTAGCATCCATCGTTTACAGCGTGGAC
TACCAGGGTATCTAATCCTGTTTGCTCCCCATGCTTTCGCGTCTCAGCGTCAGTTCCGGGC

>CUP2P4H07 Uncultured soil bacterium (Acidobacteria)
GCGCCTGCCTCCTTGCGGTCAGCTTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGC
CCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTG
CGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACCTGTCCCTTGCGGG
AAGGCCGTGTTTCCACAGCTGGTCAGGTGCGCTTCGAGCCCAGGTAAGGTTCCTCGCGTAGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGTCTTGCGACCGTACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCTGATCGTTTAGGGC
TAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTTCCTCAGCGTCAGTAGTGGTCCAGCGCGCCGCTTTCG

>CUP2P4H08 Uncultured soil bacterium (Acidobacteria)
AGCCCACTTTCGTGATGTGACGGGCGGGTGTACAAGGCCCGGGGACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATCCAGCTTCATGCAGTCGAGTTGCAG
ACTGCAATCCGAACTGAGCGCGCTTTTTTGCGATTAGCTCCCCCTCACGGGTTCGCGACGCTCTGTGGCGCGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCA
TGCTGACTTGACCTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTCGTAGAGTTCCCCCTTGCGGGTAGCAACTACGAGTAAGGGTTGCGCTCGTTGCGGGAC
TTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACACAGGTCCCTTGCGGGAAGACCCGATTTCTCAGGTTGGTCCTGTGCGGTTCAAGCCC
AGGTAAGGTTCTTCGCGTTGCGTCGGATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGCA
GGACTTAACGCGTTAGCTCCGGGACTTGCCCCGTACAGGGCAAACCCCAAGTCCTGATGGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCT
TTCGTCCCTCAGCGTCAGTTGTGGTCCAGCG

>CUP2P4H09 Uncultured bacterium (Não classificada)
CGGCATACATGGGCGGTGCTCCCTGCGGGTTGGCGTGCCGACTTCCGGTACAGCAGGCTTCCATGGCGTGACGGGCGGTGTGTACAAGGCCCGAGAACGTATTCACCGC
GGCGTCTGATCCGCGATTACTAGCGATTCCAGCTTCACGGAGTCGAGTTGCAGACTCCGATCCGAACTGAGGGTGGTTTTCTGGGATTGGCTTGCTCTCGCGAGTTTGC
GACCCTTTGTGCCACCCATTGTAGCACGCTTGTAGCCCTGGACATAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTCACGGTTGACCCGTGCAGTCCCCTTAG
AGTGCCCGGCTTTACCCGGTGGCAACTAAGGGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAACACCTGAACC
GGCAGTCCCCGAAGGGAAGACCTGCTTTCACAGGTTGTCCGCCGTTGTCTAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACAGCATGCTCCACCGCTTGTGC
GGGCCCCCGTCAATTCCTTTGAGTTTTAACCTTGCGGCCGTAGTCCCCAGGCGGGGTACTTAATGCGTTAGCTGCGGCACTCAGGGGGTCAATACCCCGAACACCTAGT
ACCCATAGTTTACAGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCAAGCTTTCGCGTCTCAGCGTCAGCAACGATC

>CUP2P4H10 Uncultured bacterium (Acidobacteria)
TATACTTGGAAGGCTGCCCCTTGCGGTTGGCCACCTGCTTCTAGTATGGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCG
TTCTGATCTGCGATTACTAGCGATTCCAGCTTCATGGGGTCGGGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGAC
GGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCAACTTCCTCCCCGTTATCCGAGGCGGTTTCGCTAAAGT
GCCCGGCTTGACCCGATGGCAACTAACGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCG
GCCCTTGCGGGCGCCGATGTTTCCACCGGATTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGCTGCGTCGAATTTGAACCACATGCTCCACCGCTTGTGCGGGC
CCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATGCTTAACGCGTTAGCTGCGCCACGATCGGATTGGGTACCGATCACAGCAAGCATCC
AT

>CUP2P4H11 Uncultured bacterium (Acidobacteria)
CGCTGCCTCCTTGCGGTTGGCACGGCGATTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGCCGTTCTGATGC
GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTGCGATTAGCTCCCCCTCACGGGTTCGCGACGCTTTGTGG
CGCGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACCTCATCCCCACCTTCCTCTCCGTTATCCGGAGCAGTCCTCGTAGAGTTCCCCCTTG
CGGGTGGCAACTACGAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACACAGGTCCCTTGCGGG
AAGTCCCTATTTCTAGGGAGGGTCCTGTGCGGTTCAAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGCAGGACTTAACGCGTTAGCTACGGGACTTGCCCCGTACAGGGCAAACCCCAAGTCCTGATGGTTTAGGGC
TAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGTCCCTCAGCGTCAGTTGCGATCCAGCGAGCCGGCTTCGGCTCGGATGTTCCTGCGGATATCTAC
GCATTT

>CUP2P4H12 Uncultured bacterium (Não classificada)
GGACGGTGCGCCTGCGGTTCGTCACGGCTTCTAGTGCAGCCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCGTTCTGATCTGCGA
TTACTAGCGATTCCAGCTTCATGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTGGCTCCCCTTCGCAGGTTTGCGACGGTTTGTACCGAC
CATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCGCCGTTATCCGGCGCAGTTTCGCTAGAGTGCCCGGCATAACC
CGATGGCAACTAGAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGTGGCCCTTGCGGGCG
CCGATGTTTCCACCGGATTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCT
TTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATGCTTATCGCGTTAGCTTCGGCACAGTGGGATTGGGTACCCACTACACCAAGCATCCATG

ANEXO 11 – SEQÜÊNCIAS DOS CLONES OBTIDOS A PARTIR DA BIBLIOTECA CAM2 E SUA CLASSIFICAÇÃO (BLAST E RDPII)

>CAM2P1A01 Bradyrhizobium sp. JS 15-10 (Alphaproteobacteria)
GGGCGTAAAGGGTGCGTAGGCGGGTCTTTAAGTCAGGTGTGAAATCCTGGAGCTCAACTCCAGAACTGCCTTTGATACTGAAGATCTTGAGTTCGGGAGAGGTGAGTGG
AACTGCGAGTGTAGAGGTGAAATTCGTAGATATTCGCAAGAACACCAGTGGCGAAGGCGGCTCACTGGCCCGATACTGACGCTGAGGCACGAAAGCGTGGGGAGCAAAC
AGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGAATGCCAGCCGTTAGTGGGTTTACTCACTAGTGGCGCAGCTAACGCTTTAAGCATTCCGCCTGGGGAGTAC
GGTCGCAAGATTAAAGCTCAAAGGAATTGACGGGGGCCCGCGCAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACG

>CAM2P1A03 Uncultured forest soil bacterium (Acidobacteria)
GGGCGTAAAGGGTCGCAGGCGGTGTGGCAAGTCGGAAGTGAAATCTCTGGGCTTACTCAGAGGCTGCTTCCGAAACTGCCGTGCTCGAGTGCGAGAGAGGCAAGTGGAA
TTGCGGGTGTAGCGGTGAAATGCGTAGATATCCGCAGGAACATCCGAGGCGAAAGCGGCTTGCTGGATCGCAACTGACGCTGAGGGACGAAAGCTAGGGGAGCAAACAG
GATTAGATACCCTGGTAGTCCTAGCCCTAAACCATCAGGACTTGGGGTTTGCCCTGTACGGGGCAAGTCCCGGAGCTAACGCGTTAAGTCCTGCGCCTGGGGAGTACGG
TCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTTGAACCGCACAGG
ATCATTCCTGGAAACAGGAACTTCCCGCAAGGGACCTGTGTAGAGGTGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAA
CCCTTACTCGTAGTTGCCACCCGCAAGGGGGAACTCTACGAGGACTGCTCCGGATAACGGAGAGGAAGGTGGGGATGAGGTCAAGTCAGCATGGCCTTTATGTCCAGGG
CTACACACGTGTTACA

>CAM2P1A04 Uncultured bacterium (Acidobacteria)
CGGGGCGGTCGCTCGAAACTGCCGTGCTCGAGTGTGGGAGAGGGAAGTGGAATCCCGGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGCGGCGAAGGCGG
CTTCCTGGACCATAACTGACGCTGAGGCGCGAAAGCTAGGGAAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGTTGAGCACTGGGTGTTGCCCTTCAC
CGGGCAGTGCCGAAGCTAACGCATTAAGTGCTCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGT
TCAATTCGACGCAACGCGAAGAACCTTACCTGGACTCGAAATCTAGTCGACAGTCTCAGAGATGAGATCTTCCCGCAAGGGACGGCTGGATAGGTGCTGCATGGCTGTC
GTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTCATTCTTAGTTGCTCGCCCGAAAGGGAAGCATCCTAAGAAAACCGCCTCGGATAACG
GGGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCTTTATGCCCAGTGCAACACACGTGCTACAATGGC

>CAM2P1A05 Uncultured bacterium (Acidobacteria)
GTGAAAACTCTGGGCTCAACCAGAGCCTGCATCTAAAACTGGCGGGCTAGAGTTCTGGAGGGGGTAGCGGAATTCCTGGTGTAGCGGTGAAATGCGTAGATATCAGGAG
GAACACCGGTGGCGAAGGCGGCTACCTGGACAGAAACTGACGCTGAGGCACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATGG
ATACTTGGTGTGACTGGGATTGAATCCAGTCGTGCCGAAGCTAACGCATTAAGTATCCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGC
CCGCACAAGCGGTGGAGTATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAACGGCTAGTGACAGGTGGCGAAAGTCGCTTTTCCCGCAAGGGACA
CTAGTCGAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGCCTTTAGTTGCCACCAGGTTAAGCTGAGCA
CTCTAAAGGGACTGCCGGTGAAAAACCGGAGGAAGG

>CAM2P1A06 Uncultured bacterium (Actinobacteria)
TTGGGCGTAAGAGCTCGCAGGCGGTTTGATAAGTCGGGTGTGAAACCTCCAGGCTCAACCTGGAGCCGCCACTCGATACTGTCATGACTAGAATTCGGTAGGGGACCAC
GGAATTCCTGGTGTAGCGGTGAAATGCGCAGATATCAGGAGGAACACCAGCAGCGAAGGCGGTGGTCTGGGCCGACATTGACGCTGAGGAGCGAAAGCGTGGGGAGCGA
ACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGTTGGGCACTAGGTGTGGGGACTATTCAACGGTTTCCGTGCCGCAGCTAACGCATTAAGTGCCCCGCCTGGGG
AGTACGGCCGCAAGGCTAAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGCGGAGCATGTGGCTTAATTCGAGGCAACGCGAAGAACCTTACCTGGGTTTGACAT
GTAGGGAAAAGCCGTAGAGATACGGTGTCCTTCGGGGCCTTACACAGGTGGT

>CAM2P1A08 Uncultured bacterium (Betaproteobacteria)
GGGCGTAAGCGTGCGCAGGCGGTTTGTAAGCCAGATGTGAAATCCCCGGGCTTAACTGGGAACTGCATTTGGGACTGCAAGGCTTGAGTACGGCAGAGGGGGGTAGAAT
TCCTGGTGTAGCAGTGAAATGCGTAGATATCAGGAGGAATACCGATGGCGAAGGCAGCCCCCTGGGTCGATACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACAGG
ATTAGATACCCTGGTAGTCCACGCCCTAAACGATGTCAACTAGTTGTTGGGGGACTTACCTCCCTTAGTAACGCAGCTAACGCGTGAAGTTGACCGCCTGGGGAGTACG
GTCGCAAGATTAAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGATGATGTGGATTAATTCGATGCAACGCGAAAAACCTTACCTACCCTTGACATGCCAGG
AAGTCCGCTGAGAGGTGGATGTGCTCGAAAGAGAACCTGGACACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCA
ACCCTTGCCATTAGTTGCTACATTCAGTTGGG

>CAM2P1A09 Uncultured bacterium (Alphaproteobacteria)
AGTTAGAGGTGAAAGCCCGGGGCTCACTCCGGAAATTGCCTTTAAGACTGCATCGCTAGAATTGTGGAGAGGTAAGTGGAATTCCGAGTGTAGAGGTGAAATTCGTACA
TATTCGGAAGAACACCAGTGGCGAAGGCGACTTACTGGACACATATTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTCCACATACCCTGGTAGTCCACGCC
GTAAACGATGATGACTAGCTGTCTGGGCGCTTAGCGTTCAGGTGGCGCAGCTAACGCGTTAAGTCATCCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAAAGACAT
TGACGGGGGCCTGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGCAGAACCTTACCAGCGTCTGACATGCCAGGACGGTTTCCAGAGATGGATTCCTTCC
CTTACGGGGCCTGGACTCAGGTGCTGCAATGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTCGTCTTTATTGGGCGTAAAGG
GCGTGT

>CAM2P1B01 Uncultured bacterium (Acidobacteria)
GGCGTAAGGGCGCGTAGCGGTGCGGAAGTCACCTGTGAAATCTCCTGGCTCAACTGGGAGCTTGCAGGCGAAACTGCCGTGCTGGAGTGTGGGAGAGGTGCGTGGAATC
CCGGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCGCACTGGACCACAACTGACGCTGAGGCGCGAAAGCTAGGGGAGCAAACAGGAT
TAGATACCCTGGTAGTCCTAGCCCTAAACCATGGATGCTTGGTGTGATGGGTACCCAATCCCATCGTGCCGCAGCTAACGCGTTAAGCATCCCGCCTGGGGAGTACGGT
CGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAAGCGCAGTGGA
CCGGGGTGGAAACATCCCTTTCCGCAAGGACCGCTGCGGAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCT
TATCGTTAGTTGCCATCGGGTCAAGCCGGGCACTCTAGCGAAACTGCCTCGGATAACGGGGAGGAAGGTGGGGATGACGT

>CAM2P1B02 Agrobacterium rhizogenes (Alphaproteobacteria)
TACTGGGCGTAAAGCGCACGTAGGCGGTACATCAAGTCAGGTGTGAAAGCCCGGAGCTCAACTCCGGAACTGCCCTTGAAACTAGTGTACTAGAATCTTGGAGAGGCGG
GTGGAATTCCGAGTGTAGAGGTGAAATTCGTAGATATTCGGAAGAACACCAGTGGCGAAGGCGGCCCGCTGGACAAGTATTGACGCTGAGGTGCGAAAGCGTGGGGAGC
AAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGATAACTAGCTGTCCGGGCACATGGTGCTTGGGTGGCGCAGCTAACGCATTAAGTTATCCGCCTGGGG
AGTACGGTCGCAAGATTAAAACTCAAAGGAATTGACGGGGGCCTGCACAAGCGGTGGAGCATGTGGTTCAATTCGAAGCAACGCGCAGAACCTTACCAGCGTTTGACAT
CCTCATCGCGATTTCCAGAGATGGATTTCTTCAGTTCGGCTGGATGAGTGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAA
CGAGCGCAACCCTCGTCCTTAGTTGCCATCATTAAGTTGGGCACTCTAAGGAAACCGCCGGTGATAAGCCGGAGGAAGGTGGG

>CAM2P1B03 Uncultured bacterium (Acidobacteria)
GGGCGTAAAGGGTGCGCTAGGCGGTTTGGCAAGTCTTATGTGAAATCTATGGGCTCACTCATAGTCTGCATGAGAAACTGCCGGGCTGGAGTGTGGGAGAGGTGAGTGG
AATTCCCGGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCTCACTGGACCATAACTGACGCTGATGCACGAAAGCTAGGGGAGCAAAC
AGGATTAGATACCCTGGTAGTCCTAGCCCTAAACCATGACTGCTTGGTGTGACGGGTACCCAATCCCGCCGTGCCGTAGCTAACGCGTTAAGCAGTCCGCCTGGGGAGT
ACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCTGTGCTCGAAATGCA
GTGGACTGGAGTAGAAATATTCCTTCCCCGCAAGGGGCCGCTGTATAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCG
CAACCCTTATCCCCAGTTGCCATCATTTAGTTGGGCACTCTGGTGAAACCGCCTCGGATAACGGGGAGGAACGTGGGGATGACGTCAAGTCCTCATGGCCTTTATGTC

>CAM2P1B04 Uncultured bacterium (Actinobacteria)
GTCAGCTGTGAAAACTCGAGGCTCAACCTCGAGACGTCGGTTGAAACCGTTTGGCTAGAGTCCGGAAGAGGAGAGTGGAATTCCCGGTGTAGCGGTGAAATGCGCAGAT
ATCGGGAAGAACACCCGTGGCGAAGGCGGCTCTCTGGGACGGTACTGACGCTCAGACGCGAAAGCGTGGGGAGCGAACAGGATTAGATACCCTGGTAGTCCAAGCCGTA
AACGACGGGCACTAGGTGTGGCGGGTATCGACTCCCGCTGTGCCGAAGCTTACGCATTAAGTGCCCCGCCTGGGGAGTACGGCCGCAAGGCTAAAACTCAAAGGAATTG
ACGGGGGCCCGTACAAGCCAGCGGAGCATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCAGTGCTTGACATGCACTGGAAAACCGTAGAAATACGGTCCCCCTT
CGGGGCTAGTGTGCAGGTGGTGCATGGCTGTCGTCTGCTCGTGTCGTGAGATGTTGGGTTAC

>CAM2P1B05 Uncultured Acidobacteria bacterium (Acidobacteria)
CTAAGTCATACGTGAAATCCCTCGGCTTAACGGGGAACTGCGTCTGATACTGGATGGCTTGAGTTCGGGAGAGGGATGCGGAATTCCAGGTGTAGCGGTGAAATGCGTA
GATATCTGGAGGAACACCGGTGGCGAAGGCGGCATCCTGGACCGATACTGACGCTGAGTGAGCGAAAGCCAGTGGAGCAAACGGGATTAGATACCCCGGTAGTCCTGGC
CCTAAACGATGAATGCTTGGTGTGGCGGGTATCGATCCCTGCCGTGCCGAAGCTAACGCATTAAGCATTCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGA
ATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCCAGGCTTGAACAGCGAGTGACACACTCCGAAAGGAGTCTTCC
GCAAGGACACTCGTAGAGGTGCTGCATGGCTGTCGTCAGCCCGTGTCGTGAGATGTAGGGTTAAGTCCCGCAACGAGCGCAACCCTTGTCTTCTGTTGCCATCACGTTA
TGGTGGGCACTCTGAAGAGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCAGCATGGCCTTTATGTCTGGGGCTACACACGTGCTACA

>CAM2P1B08 Uncultured bacterium(Não classificada)
GGCGGTATCGTAAGTACTTTGTGAAATCCCTTCTCTCAATGTAGGAATTGCTTGGTATACTGCGATGCTTGAGGCAGGTAGGGGTGCTTGGAACTCTAGGTGGAGCGGT
GAAATGCGTAGATATCTAGAGGAACGCCAGTGGCGAAAGCGGAGCACTGGGCCTGTCCTGACGCTGAGACGCGAAAGCGTGGGTAGCAAACTGGGATTAGATACCCCGG
TAGTCCACGCCGTAAACGATGCGCACTAGGTATGCCTGACTCTGACGTCCGGCGAGCCGAAACAAAAGCGTTAAGTGCGCCGCCTGGGGAGTACGGCCGCAAGGCTAAA
ACTCAAAGGAATTGACGGGGGCTCACACAAGCGGTGGATGATGTGGCTCAATTCGAAGCAACGCGAAGAACCTTACCCGGGTTTGACATGCTAGGATTAGTTCTGTGAA
AGCAGAGTGACACGGCTTGCCGTGGAACTAGCACAGGTGCTGCATGGCTGTCGTCAGCTCGTGCTGTGAAGTGTCGGGTTAAGTCCCTTAACGAGCGAAACCCTTGTCG
CTAG

>CAM2P1B09 Uncultured bacterium(Não classificada)
CTTTGTAGTCGGAGGTGAATCCCATGGTCACATGGACACGCCTTCGAAACTGTGAAGCTTGAGGCTGGGAGAGGAAATCGGAATCCTGGTGTAGCGGTGAAATGCGTAG
ATATCAGGAGGAACACCGGTGGCGAAGGCGGATTTCTGGACCAGTTCTGACACTGATGAGCGAAAGCCAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTGGCTG
TAAACGATGGGCACTAGGTGTGGGAGGATCGACCCCTTCCGTGCCGCAGTTAACGCATTAAGTGCCCCGCCTGGGGAGTA

>CAM2P1B10 Uncultured bacterium (Acidobacteria)
GGTGTAAGGGTCACAGGCGGTGTGGCAAGTTGGGAGTGAAATCTCTGGGCTCAACTCAGAGGCTGCTTCCAAAACTGCTGTGCTTGAGTGTGGGAGTGGCGCGTGGAAT
TGCAGGTGTAGCGGTGAAATGCGTAGATATCTGCAGGAACACCCGTGGCGAAAGCGGCGCGCTGGACCATAACTGACGCTGAATGACGAAAGCTAGGGGAGCAAACAGG
ATTAGATACCCTGGTAGTCCTAGCCCTAAACGATCAGGACTTGGGGTGTCGCCCGTTCGGGCGTCGTCCCGGAGCTAACGCGTTAAGTCCTGCACCTGGGGAGTACGGT
CGCAAGACTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCTACGCGAGGAACCTTACCTGGGCTCGAAATGCTTAGGA
CCAGCTGTAGAAATACGGCCTTCCCGCAAGGGACCTGAGTATAGGCGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTAGGGTTAAGTCCCGCAACGAGCGCAAT
CCCTGCACACAGTTACTACTCGCAAGAGAGGACTCTGTGTGGACTGCTCCGGATAACGGAGAGGAACGTGGGGATGACGTCAAGTCCGCATGGCCTTTACGTCCAGGGC
TACACA

>CAM2P1B12 Uncultured bacterium (Acidobacteria)
GGTAAGTCACCTGTGAAACCTCCGGGCTCAACTCGGAGCCTGCAGGCGAAACTGCCGTGCTGGAGTGTGGGAGAGGTGCGTGGAATTCCCGGTGTAGCGGTGAAATGCG
TAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCGCACTGGACCACAGCTGACGCTGAGGCGCGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAG
CCCTAAACGATGATTGCTTGGTGTAGCAGGTACCCAATCCTGCTGTGCCGCAGCTAACGCGTTAAGCAATCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGG
AATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAAGCGCAGTGGACCGGGGTAGA

>CAM2P1C02 Uncultured beta proteobacterium (Betaproteobacteria)
GGGCGTAAGCGTGCGTAGCGGTCCGCAAGTCGCTGTGAAAGCCCGAGCTTACTTGGGAACTGCAGTGGAAACTATGGGACTTGAATCCGGCAGAGGGGGGTGGAATGCC
ACGTGTAGCAGTGAAATGCGTAGAGATGTGGCGGAACACCGATGGCGAAGGCAGCCCCCTGGGCTGAGATTGACGCTCAGGCACGAAAGCGTGGGGAGCAAACAGGATT
AGATACCCTGGTAGTCCACGCCCTAAACGATGACAACTAGGTGTTGGGGAAGCGATTTCTCAGTACCGCAGCTAACGCGTGAAGTTGTCCGCC

>CAM2P1C03 Uncultured bacterium (Acidobacteria)
GGGTGTAAAGGGTCGCAGGCGGTGTGGCAAGTCGGTGAGTGAAATTTCTGGGCTCAACTCAGAGACTGCTTCCGAAACTGCTGTGCTGGAGTGTGGGAGAGGCGCGTGG
AATTGCAGGTGTAGCGGTGAAATGCGTAGATATCTGCAGGAACACCCGTGGCGAAAGCGGCGCGCTGGACCACTACTGACGCTGAGGAACGAAAGCTAGGGGAGCAAAC
AGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATCAGGACTTGGGGTGCCACCCGTTCGGGTGTCGTCCCGGAGCTAACGCGTTAAGTCCTGCACCTGGGGAGTAC
GGTCGCAAGACTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCTACGCGAGGAACCTTACCTGGGCTCGAAGCGCACC
TGACCAGCTGTGGAAACACGGCCTTCCCGCAAGGGACAGGTGTGGAGGCGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGC
AACCCCTGCACGTAGTTGCCACTCGCAAGAGGGAACTCTACGTGGACTGCTCCGGATAACGGAGAGGAAGGTGGGGATGACGTCAAGTCCGCATGGCCTTTATGTCC

>CAM2P1C06 Uncultured beta proteobacteria (Betaproteobacteria)
GGGCGTAAGCGTGCGCAGGCGGTTCGTTGTGTCGGCGGTGAAAGCCCCGGGCTTAACCTGGGAATGGCCGTTGAAACTGGCGAACTGGAGTGTGGCAGAGGGGGGTGGA
ATTCCGCGTGTAGCAGTGAAATGCGTAGAGATGCGGAGGAACACCGATGGCGAAGGCAGCCCCCTGGGCTAACACTGACGCTCAGGCACGAAAGCGTGGGGAGCAAACA
GGATTAGATACCCTGGTAGTCCACGCCCTAAACGATGTCAACTGGGTGTTGGGGAAGCGATTTCCCAGTACCGTAGCTAACGCGTGAAGTTGACCGCCTGGGGAGTACG
GCCGCAAGGTTAAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATGATGTGGATTAATTCGATGCAACGCGAACAACCTTACCTACCCTTGACATGTCCGA
AAGCCCGCTGAGAGGTGGGTGTGCCCGAAAGGGAATCGGAACACAGGTGCTGCATGGCTGTC

>CAM2P1C08 Uncultured forest soil bacterium (Acidobacteria)
GGCGGTGTGACAAGTCGGTAGTGAAATCTCTGGGCTTACTCAGAGGCTGCTGCCGAAACTGTTGTGCTAGAGTGTGAGAGAGGCGAGTGGAATTACGGGTGTAGCGGTG
AAATGCGTAGATATCCGTAGGAACATCCGAGGCGAAAGCGGCTCGCTGGATCACAACTGACGCTGAGGGACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTA
GTCCTAGCCCTAAACCATCAGGACTTGGGGTTTGCCCTGTACGGGGCAAGTCCCGGAGCTAACGCGTTAAGTCCTGCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTC
AAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTTGAACCGCACAGGACCACCCCGAGAAATCG
GGGCTTCCCGCAAGGGACCTGTGTAGAGGTGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAA

>CAM2P1C10 Uncultured bacterium (Acidobacteria)
TTAAGTTAGATGTGAAAACTCTGGGCTCACCAGAGCTGCATCTAAACTGGCGAGCTAGAGTCTGGAGGGGGTACGGAATCCTGGTGTACGGTGAAATGCGTAGATTCAG
GAGGAACACCGGTGGCGAAGGCGGCTACCTGGACAGAAACTGACGCTGAGGCACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGA
TGGATACTTGGTGTGACCGGGGTTGAATCCGGTCGTGCCGAAGCTAACGCATTAAGTATCCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGG
GGCCCGCACAAGCGGTGGAGTATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAACGGCTAGTGA

>CAM2P1C11 Uncultured bacterium (Não classificada)
GTTGTTAAGGCTCCGGCCTACTGGAGTATTGCAATGAAAACTGGGCGCTAGAGGGTGAGAGAGAGAAGTGGAATTCCCGGAGTAGCGGTAAAATGCGTGGATCTCGGGA
GGAACACCAATGGCGAAGGCAGCTTCTTGGCTCATTCCTGACATTGAGGCACGAAAGCGTGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATA
ATCACTAGATGTTGGTTCGGCTTAGCTGGATCAGTGTCGTAGCTAACGCGTTAAGTGATTCGCCTGGGGAGTATGGTCGCAAGGCTAAAACTTAAAAGAATTGACGGGG
GTCCGCACAAGCGGTGGAACATGTGGTTTAATTCGACACTACGCGAGAAACCTTACCTAGGCTTGACATGTACTTGACAGCTGCAGAAATATGGTCTTTTGGGTTTCGG
CTCAAACAGGTACACAGGTGCTGCAT

>CAM2P1C12 Uncultured bacterium (Betaproteobacteria)
GGGCGTAAAGCGTGCGCAGGCGGCTTTGCAAGACAGATGTGAAATCCCCGGGCTTACCTGGGAACTGCATTTGTGACTGCATGGCTGGAGTGCGGCAGAGGGGGATGGA
ATTCCGCGTGTAGCAGTGAAATGCGTAGATATGCGGAGGAGCACCGATGGCGAAGGCAATCCCCTGGGCCTGCACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACA

GGATTAGATACCCTGGTAGTCCACGCCCTAAACGATGTCAACTGGTTGTTGGACGGCTTGCTGTTCAGTAACGAAGCTAACGCGTGAAGTTGACCGCCTGGGGAGTACG
GCCGCAAGGTTGAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATGATGTGGTTTAATTCGATGCAACGCGAAAAACCTTACCTACCCTTGACATGCCAGG
AATCCCGCAGAGATGTGGGAGTGCTCGAAAGAGAACCTGGACACAGGTGCTGCATGGCCGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGA

>CAM2P1D01 Uncultured bacterium (Não classificada)
ATTGTAAGTCCGTGTTGAAAGACTCGGCTCAACTGAGGGACCGGCTCGGATACTACAATTCTTGAGGCAATCAGAGGGTGATGGAATTCCCGGTGTAGCGGTGAAATGC
GTAGATATCGGGAGGAACACCAGTGGCGAAGGCGATCACCTGGGGTTGTTCTGACGCTGAGGAGCGAAAGCTAGGGGAGCAAACGGGATTAGATACCCCGGTAGTCCTA
GCCGTAAACGATGGATACTAGGTGTATGTGGTATCGACTCCATATGTGCCGTAGTTAACACAGTAAGTATCCCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAAAG
GAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTAGTTTAATTCGACGCAACGCGAAGAACCTTACCGAGGCTTGACATCCCTTGAAAGCCGTAGAAATGCGGTTTC
CGTAGCAATACGGCAAGGTGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTCGTTTTGTGTTGGTCCG
CAAGGATCTCTCACAAAAGACCGCCGGTGAGAAGCCAGAGGAAGGTGGGGATGACGTCAAGTCAG

>CAM2P1D02 Uncultured bacterium (Acidobacteria)
GGGCGTAAGAGTGCGTAGGCGGTGCTCTAAGTTCGGTGTGAAATCTCCCGGCTCACTGGGAGGGTGCGCCGGAAACTGGAGTGCTCGAACGTGGGAGAGGAAAGCGGAA
TTCCTGGTGTAGCGGTGAAATGCGTAGATATCAGGAGGAACACCTGCGGTGTAGACGGCTTTCTGGACCATTGTTGACGCTGAGACACGAAAGCGTGGGTAGCAAACAG
GATTAGATACCCTGGTAGTCCACGCCCTAAACGATGCATACTTGGTGTCGGCCATTCAGTTGGTCGGTGCCGGAGCTAACGCGTTAAGTATGCCGTCTGGGGAGTACGG
TCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAACGGCTTCAG
ACCGGTGATAGAAATATCGCCTTTCCCGCAAGGGACTGGAGTCGAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCA
ACCCTTGTCCTGTGTTGCTAATCCGCA

>CAM2P1D03 Mesorhizobium sp. CCBAU 25282 (Alphaproteobacteria)
GGGCGTAAGCGCACGTAGGCGGATATTAAGTCAGGGGTGAAATCCCGGGGCTCAACCCGGAACTGCCTTTGATACTGGGTATCTGGAGTCCGGAAGAGGTGAGTGGAAT
TCCGAGTGTAGAGGTGAAATTCGTAGATATTCGGAGGAACACCAGTGGCGAAGGCGGCTCACTGGTCCGGTACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAACAGG
ATTAGATACCCTGGTAGTCCACGCCGTAAACGATGGAAGCTAGCCGTTGGCAAGTTACTTGTCGGTGGCGCAGCTAACGCATTAAGCTTCCCGCCTGGGGAGTACGGTC
GCAAGATTAAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGCAGAACCTTACCAGCCCTTGACATCCCGGTCGC
GGTTTCCAGAAATGGATACCTTCAGTTCGGCTGGACCGGTGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAA
CCCTCGCCCTTAGTTGCCATCATTCAGTTGGGCACTCTAAGGGGACTGCCGGTGATAAGCCGAGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCCTTACGGGCTG
GGCTACACACGTGCTACAATGGTGGTGACAGTGGGCAGCGAGACCGCGAGGTCGAGCTAATCTCCAAAAGCCATC

>CAM2P1D05 Uncultured Myxococcales bacterium (Deltaproteobacteria)
CGCGTGTACGCGGCTTTGCAAGTCGGGTGTGAAATCCCTCAGCTCAACTGAGGAAGTGCGCCCGAAACTGCAGAGCTTGAGTACCGGAGAGGATGGCGGAATTCCCGAA
GTAGAGGTGAAATTCGTAGATATCGGGAGGAACACCGGTGGCGAAGGCGGCCATCTGGACGGATACTGACGCTGAGACGCGAAAGCGTGGGGAGCAAACAGGATTAGAT
ACCCTGGTAGTCCACGCCGTAAACGATGAGAACTAGGTGTCGTGGGTGTTGACCCCCGCGGTGCCGTAGCTAACGCATTAAGTTCTCCGCCTGGGAAGTACGGCCGCAA
GGCTAAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGCAGAACCTTACCTGGTCTTGACATCCTCGGAATCTGC
CAGAGATGGCGGAGTGCCCGCAAGGGAACCGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAAACGAGCGCAAGCCTC
GCCTTTAGTTGCCACGCAAGTGGATCTCTAGAGGGACTGCCGGTGTTAAACCGGAGGAAGGTGGGGATGACGT

>CAM2P1D06 Uncultured crenarchaeote (Thermoprotei)
AAGCATCGCAGCCGGTTTACAAGTCCTCCGTTAAATCCAACTGCTTACAGATGGGCCGCGGAGGATACTATAAGACTAGGAGGCAGGAGAGGCAAGCGGTACTCAGTGG
GTAGGGGTAAAATCCGTTGATCCATTGAAGACCACCAGTGGCGAAGGCGGCCTGCCAGAATGCGCTCGACGGTGAGGGATGAAAGCTGGGGGAGCAAACCGGATTAGAT
ACCCGGGTAGTCCCAGCCTGTAAACGATGCAGACTCGGTGATGGACTAGCTTAATGCTAGTCCAGTGCCGCAGGGAATCCGTTAAGTCTGCCGCCTGGGTAGTACGGTC
GCAAGACTGAAACTTAAAGGAATTGGCGGGGGAGCACCACAAGGGGTGAATCCTGCGGTTCAATTGGAGTCAACGCCGGGAATCTTACCGGGGGCGACAGCAGAGTGAA
GGTCAAGCTGAAGACTTTACTAGACAAGCTGAGCAGGAGTGTGCGATGGCCTGTCGCCAGCTTCGTGCCGTGAGGTGTCCTGTTAAGTCAGGTAACGAGCGAGACCCCT
GCTTCTAGTTGCTACTTTTATTCTTCGGAGT

>CAM2P1D08 Uncultured bacterium (Acidobacteria)
GTCTGATGTGAAATCTCCGGGCTCACTCGGAGTCTGCATCAGAAACTGCCATGCTTGAGTGTGGGAGAGGTGAGTGGAATTCCCGGTGTAGCGGTGAAATGCGTAGATA
TCGGGAGGAACACCTGTGGCGAAAGCGGCTCACTGGACCACAACTGACGCTGATGCGCGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAA
ACGATGATCGCTTGGTGTGATAGGTACCCAATCCTATCGTGCCGGAGCTAACGCGTTAAGCGATCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGA
CGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAAATGTAGTGGACCGGGGTGGAAACATCCCTTTTCGCAA
GAACCGCTATATAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCGCAACGAGCGCAACCCTTATTGCCAGTTGCCATCGGGTTATGCCG
GGCACTCTGGCGAA

>CAM2P1D10 Burkholderia sp. HSL-4 (Betaproteobacteria)
AGCGTGCGCAGGCGGTTCGCTAAGACCGATGTGAAATCCCCGGGCTTAACCTGGGAACTGCATTGGTGACTGGCGGGCTAGAGTATGGCAGAGGGGGGTAGAATTCCAC
GTGTAGCAGTGAAATGCGTAGAGATGTGGAGGAATACCGATGGCGAAGGCAGCCCCCTGGGCCAATACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACAGGATTAG
ATACCCTGGTAGTCCACGCCCTAAACGATGTCAACTAGTTGTCGGGTCTTCATTGACTTGGTAACGTAGCTAACGCGTGAAGTTGACCGCCTGGGGAGTACGGTCGCAA
GATTAAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATGATGTGGATTACTTCGATGCAACGCGAAAACCTTACCTACCCTTGACATGTACGGAACCTTGC
TGAGAGGTGAGGGTGCCCGAAAGGGAGCCGTAACACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTGT
CCCTAGTTGCTACGCAAGAGCAC

>CAM2P1D11 Aquabacterium sp. P-113 (Betaproteobacteria)
GGGCGTAAGCGTGCGCAGCGGTGATGCAGACAGATGTGAAATCCCCGGGCTCAACTGGGAACTGCATTTGTGACTGCATTGCTGGAGTGCGGCAGAGGGGGATGGAATT
CCGCGTGTAGCAGTGAAATGCGTAGATATGCGGAGGAACACCGATGGCGAAGGCAATCCCCTGGGCCTGCACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACAGGA
TTAGATACCCTGGTAGTCCACGCCCTAAACGATGTCAACTGGTTGTTGGACGGCTTGCTGTTCAGTAACGAAGCTAACGCGTGAAGTTGACCGCCTGGGGAGTACGGCC
GCAAGGTTGAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATGATGTGGTTTAATTCGATGCAACGCGAAAAACCTTACCTACCCTTGACATGCCCGGAAT
CCTG

>CAM2P1E01 Uncultured Acidobacteria bacterium (Não classificada)
GGCGTAAAGGGCGCGTAGCGTTCGGTAAGTCACTGTGAAACTCTGGGCTCAACTCAGAGCCTGCATGCGAAACTGCCGTGCTAGAGTGTGGGAGAGGTCGTGGAATCCC
GGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCTCACTGGACCAAAACTGACGCTGAGGCGCGAAAGCTAGGGGAGCAAACAGGATTA
GATACCCTGGTAGTCCTAGCCCTAAACGATGATTGCTTGGTGTGTCCGGTATCGAATCCCGACGTGCCGAAGCTAACGCGATAAGTATTCCGCCTGGGGAGTACGGTCG
CAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACG
CGAAGAACCTTACCT

>CAM2P1E02 Uncultured bacterium (Acidobacteria)
GGGTGTAAGGGTCGTAGGCGGTGTGGCAAGTCGGGAGTGAAATTTCTGGGCTTAACTCAGAGACTGCTTCCGAAACTGCTGTGCTCGAGTGTGGGAGAGGCGCGTGGAA
TTGCAGGTGTAGCGGTGAAATGCGTAGATATCTGCAGGAACACCCGTGGCGAAAGCGGCGCGCTGGACCACTACTGACGCTGAGGAACGAAAGCTAGGGGAGCAAACAG
GATTAGATACCCTGGTAGTCCTAGCCCTAAACCATCAGGACTTGGGGTGCCTTCCGTTCGGAAGTCGTCCCGGAGCTAACGCGTTAAGTCCTGCACCTGGGGAGTACGG
TCGCAAGACTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCTACGCGAGGAACCTTACCTGGGCTCGAAATGCTTCTG
ACCAGCTGTAGAAATACGGCCTTCCCGCAAGGGACAGGAGTATAGGCGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAA
CCCCTGCACGTAGTTGCCACTCGCAAGAGGGAACTCTACGTGGACTGCTCCGGATAACGGAGAGGAAGGTGGGGATGACGTCAAGTCCGCATGGCCTTTATGT

>CAM2P1E05 Uncultured Holophaga sp. ((Acidobacteria)
GCTTCTAAGTCGAACGTGAAATCCCCGGGCTCAACCGGGAACTGCGTCCGATACTGGAAGGCTTGAATCCGGGAGAGGGATGCGGAATTCCAGGTGTAGCGGTGAAATG
CGTAGATATCTGGAGGAACACCGGTGGCGAAGGCGGCATCCTGGACCGGCATTGACGCTGAGGCGCGAAAGCCAGTGGAGCAAACGGGATTAGATACCCCGGTAGTCCT

GGCCCTAAACGATGAATGCTTGGTGTGGCGGGTATCGATCCCTGCCGTGCCGAAGCTAACGCATTAAGCATTCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAA
GGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCCAGGCTTGAACTGCGAGTGACAACCTACGAAAGTAGGCT
TCCGCAAGGACGCTCGTAGAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTGTCTTCTGTTGCCATCGGG
TTATGCCGGGCACTCTGAAGAGACTGCCGGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAGTCAGCATGGCCTTTATGTCTGGGGCCACACACGTGCTACAATGGC
CGGTACAAACCGTCGCGA

>CAM2P1E06 Uncultured bacterium (Acidobacteria)
GGCGTAAGAGTGTGTAGGTGGTGTCCAAGTTTGTCGTGAAATCTCCCGGCTTAACTGGGAGGGTGCGTGCGAAAAACTGGAATGCTTGAGGATGGGAGAGGAAAGCGGA
ATTCCTGGTGTAGCGGTGAAATGCGTAGATATCAGGAGGAACACCCGTGGTGTAGACAGCTTTCTGGACCATTTCTGACACTGAGACACGAAAGCGTGGGTAGCAAACA
GGATTAGATACCCTGGTAGTCCACGCCCTAAACGATGCATACTTGGTGTGAGCCATTCATTTGGTTCGTGCCGGAGCTAACGCGTTAAGTATGCCGCCTGGGGAGTACG
GTCGCAAGTGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAACGGCTATG
GATCGACCGTAGAAATATGGTTTTCCCGCAAGGGACTGTAGTCGAGGTGCTGCATGGCTGTCGTCA

>CAM2P1E10 Uncultured bacterium KF/GS-JG36-31 (Acidobacteria)
CGGTGTGGCAAGTCGGTAGTGAAATCTCTGGGCTTAACTCAGAGGCTGCTGCCGAAACTGCTGTGCTCGAGTGCGAGAGAGGCGAGTGGAATTGCAGGTGTAGCGGTGA
AATGCGTAGATATCTGCAGGAACATCCGAGGCGAAAGCGGCTCGCTGGATCGCAACTGACGCTGAGGGACGAAAGCTAGGGGAGCAAACAGGATTAGATACCTGGTAGT
CCTAGCCCTAAACGATCAGGACTGGGCGTGGGCCCTGTACGGGGCTCGTGCCGTAGCTAACGCGTTAAGTCCTGCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAA
AGGAATTGACGGGGGCCCGTACAAGCGGTGGAACATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTTGAACCGCACAGGACCATCTTTGGAAACAGAG
ACTTCCCGCAAGGGACCTGTGTAGAGGTGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTCGGGTTAAGTCCCGCAA

>CAM2P1F02 Uncultured bacterium (Betaproteobacteria)
TACTGGGCGTAAGCGTGCGCAGGCGGTTTTGCAAGACAGATGTGAAATCCCCGGGCTAACCTGGGAACTGCATTTGTGACTGCATGGCTGGAGTGCGGCAGAGGGGGAT
GGAATTCCGCGTGTAGCAGTGAAATGCGTAGATATGCGGAGGAACACCGATGGCGAAGGCAGTCCCCTGGGCCTGTACTGACGCTCATGCACGAAAGCGTGGGGAGCAA
ACAGGATTAGATACCCTGGTAGTCCACGCCCTAAACGATGTCAACTGGTTGTTGGACGGCTTGCTGTTCAGTAACGAAGCTAACGCGTGAAGTTGACCGCCTGGGGAGT
ACGGCCGCAAGGTTGATACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATGATGTGGTTTAATT

>CAM2P1F04 Uncultured bacterium (Gammaproteobacteria)
CTGGGCGTAAAGCGTGCGTAACGGTAGCGTAAGTCGGGTGTGAAAGCCCCGGGCTCAACTGGGAATTGCATTCGAGACTGCTCTGCTAGGGTGCGGAAGAGGGAAGCGG
AATTTCCGGTGTAGCGGTGAAATGCGTAGATATCGGAAGGAACACCAGTGGCGAAAGCGGCTTCCTGGTCCAGCACCGACGTTCAGGCACGAAAGCGTGGGGAGCAAAC
AGGATTAGATACCCTGGTAGTCCACGCCATAAACGATGAGAACTAGACGTTGAGAGGGTAAGCCTCGCAGTGTCGTAGCTAACGCGCTAAGTTCTCCGCCTGGGGAGTA
CGGCCGCAAGGTTGA

>CAM2P1F05 Uncultured bacterium (Alphaproteobacteria)
CCGGGGCTCACTCCGGATGCTTTAAGACTGCATCGCTAGAATTGTGGAGAGGTAAGTGGAATCCGAGTGTAGAGGTGAAATCGTAGATATTCGGAAGAACACCAGTGGC
GAAGGCGACTTACTGGACACATATTGACGCTGAGTGCGAAAGCGTGGGGAGCAAACAGGATAGATACCCCGGTAGTCCACGCCGTAAACGATGATGACTAGCTGTCTGG
GCGCTTAGCGTTCAGGTGGCGCAGCTAACGCGTTAAGTCATCCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCGAAGAAATTGACGGGGGCCTGCACAAGCGGTGGA
GCATGTGGTTTAATTCGAAGCAACGCGCAGAACCTTACCAGCGTTTGACATGCCAGGACGGTTTCCAGAGATGGATCCCTTCCCTTACGGGACCTGGACACAGGTGCTG
CATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTCGTCTTTAGTTGCCACCATTTAGTTGGGCACTCTAAAGAAACTGCCG
GTGATAAGCCGGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCCTTACGCGCTGGGCTACACACGTGCTACAATGG

>CAM2P1F06 Uncultured bacterium (Verrucomicrobiae)
TTGGGCGTAAAGGGTGTGTAGGTGGCGCGCTAAGTCGGGCTGTGAAATTTCGGAGCTTACTCCGAAACTGCATTCGATACTGGCGTGCTTGAGGACTGGAGAGGAGACT
GGAATTTACGGTGTAGCAGTGAAATGCGTAGATATCGTAAGGAAGACCAGTGGCGAAGGCGGGTCTCTGGACAGTTCCTGACACTGAGACACGAAGGCCAGGGGAGCAA
ACGGGATTAGATACCCCGGTAGTCCTGGCAGTAAACGGTGCACGTTTGGTGTGGGAGGATTCGACCCCTTCTGCGCCGGAGCCAACGCGTTAAACGTGCCGCCTGGGGA
GTACGGTCGCAAGATTAAAACTCAAAGAAATTGACGGG

>CAM2P1F08 Uncultured Holophaga sp. (Acidobacteria)
GGGAACTGCGTCCGATACTGGAAGGCTTGAATCCGGGAGAGGGATGCGGAATCCAGGTGTAGCGGTGAAATGCGTAATATCTGGAGGAACCCGGGGCGAAGGCGGCATC
CTGGACCGGCATTGACGCTGAGGCGCGAAAGCCAGGGAGCAAACGGGATTAATACCCCGGTAGTCCTGGCCCTAAACGATGAATGCTTGGTGTGGCGGGTATCGATCCC
TGCCGTGCCGAAGCTAACGCATTAGCATTCCGCTGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATGACGGGGGCCCGACAAGCGGGGAGCATGTGGTCAATTCGA
CGCAACGCGAAGAACCTTACCCAGGCTTGAACTGCGAGTGACATCCTACGAAAGTAGGCTTCCGCAAGGACACTCGTAGAGGTGCTGCATGGCTGTCGTCAGCTCGTGT
CGTGAGATGT

>CAM2P1F10 Uncultured bacterium (Sphingobacteria)
TAAGTCAGTGGTGAAATCTCCGGGCTTAACCCGGAAACTGCCGTTGATACTATCTGTCTTGAATGCCGTGGAGGTGAGCGGAATATGTCATGTAGCGGTGAAATGCTTA
GATATGACATAGAACACCGATTGCGAAGGCAGCTCGCTACACGGTTATTGACGCTGAGGCACGAAAGCGTGGGGATCAAACAGGATTAGATACCCTGGTAGTCCACGCC
CTAAACGATGATCACTCGACATCAGCGATACACTGTTGGTGTCTGAGCGAAAGCATTAAGTGATCCACCTGGGAAGTACGACCGCAAGGTTGAAACCCAAAGGAATTGA
CGGGGGTCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGATACGCGAGGAACCTTACCTGGGCTAGAATGTCCCGCGACAGGTGGTGAAAGCTACCCTTGTAGCA
ATACACGCGGGATAAGGTGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAATCCCCATCACTAGTTGGCATCAGGTAATG
CTGGGAACTCTAGTGAAACTGCCGTCGTAAGACGCGAGGAAGGAGGGGATGATGTCCAGTCATCATGGCCTTTATGCC

>CAM2P1F11 Uncultured bacterium(Anaerolineae)
CTGGGCGTAAAGCGCGTGCAGGCGGTTCGGTAAGTTGGGCGTGAAATCTCCTGGCTTACTAGGAGAGGTCGTTCAATACTACCGGGCTAGAGAGTGGTAGAGGAAGATG
GAATTCCCGGTGTAGTGGTGAAATGCGTAGATATCGGGAGGAACACCAGTGGCGAAAGCGATCTTCTGGACCATTTCTGACGCTCAGACGCGAAAGCTAGGGTAGTAAA
CGGGATTAGAGACCCCGGTAATCCTAGCCGTAAACGATGTTAACTTGGTGTCGGTGGCTTAAACTCTGTCGGTACCGAAGCAAACGCGATAAGTTAACCGCCTGGGGAC
TACGATCGCAAGATTAAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCAGCGGAGCGTGTGGTTTAATTCGATGCTACACGAAGAACCTTACCCGGGTTTGACATGC
AAGTGGTAGTGATCTGAAAGGTGAACGACCCGCAAGGGAGCTTGCACAGGTGTTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTCGGTTAAGTCCGCTAACGAGC
GCAACCCTCGC

>CAM2P1F12 Uncultured bacterium (Acidobacteria)
TGAAATTTCTGGGCTTACTCAGAACCTGCTTCCGAAACTGCTGTGCTCGAGTGTGGGAGAGGCGCGTGGAATTGCAGGTGTAGCGGTGAAATGCGTAGATATCTGCAGG
AACACCCGTGGCGAAAGCGGCGCGCTGGACCATTACTGACGCTGAGGAACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATCAG
GACTTGGGGTGCCACCCGTTCGGGTGTCGTCCCGGAGCTAACGCGTTAAGTCCTGCACCTGGGGAGTACGGTCGCAAGACTGAAACTCAAAGGAATTGACGGGGGCCCG
CACAAGCGGTGGAACATGTGGTTCAATTCGACGCTACGCGAGGAACCTTACCTGGGCTCGAAATGCTGCTGACCAGCTGTAGAAATACGGCCTTCCCGCAAGGGACAGT
AGTATAGGCGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGCACGT

>CAM2P1G01 Uncultured bacterium (Acidobacteria)
TGTGAAATCTCCTGGCTCAACTGGGAGCTTGCAGGCGAAACTGCCGTGCTGGAGTGTGGGAGAGGTGCGTGGAATTCCCGGTGTAGCGGTGAAATGCGTAGATATCGGG
AGGAACACCTGTGGCGAAAGCGGCGCACTGGACCACAACTGACGCTGAGGCGCGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACCAT
GGATGCTTGGTGTGATGGGTACCCAATCCTATCGTGCCGCAGCTAACGCGTTAAGCATCCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGG
GCCCGCACAAGCGGTGGAGCATGTGGTTCAAT

>CAM2P1G03 Uncultured bacterium (Betaproteobacteria)
CTGGGAATGGCATTTGGGACTGCAGGCTTGAGTGCGGCAGAGGAGACTGGAATTCCTGGTGTAGCAGTGAAATGCGTAGATATCAGGAGGAATACCGATGGCGGAGGCA
GGTCTCTGGGCTGACACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACAGGATTAATACCTGGTAGTCCACGCCCTAAACGATGTCGACTGGTTGTTGGGGGTTTGA
CACTCTCAGTAACGAAGCTAACGCGTGAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATTATGTG

GATTAATTCGATGCAACGCGAAAAACCTTACCTACCCTTGACATGTCCGGAAGCCTGCTGAAAGGCGGGTGTGCTCGAAAGAGAACCGGAACACAGGTGCTGCATGGCT
GTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAATCCTTGCCATTAGTTGCCACCCGTAAGGGGGCACTCTAATGGGACTGCCGGTGACAAA
CCGGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCCTTATGGGTAAGGCTTCACACGTAATACAATGGCGCGTACAGAGGGTAACCAA

>CAM2P1G05 Uncultured bacterium (Acidobacteria)
TGGGCGTAAAGGGCGCGCAGGCGGTGTGGTAAGTCACCTGTGAAATCTCCCGGCTTACTGGGAGTCTGCAGGCGAAACTACCGTGCTGGAGTGTGGGAGAGGTGCGTGG
AATTCCCGGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCGCACTGGACCATAACTGACGCTGATGCGCGAAAGCTAGGGGAGCAAAC
AGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATGATTGCTTGGTGTAGCAGGTACCCAATCCTGCTGTGCCGCAGCTAACGCGATAAGCAATCCGCCTGGGGAGT
ACGGTCGCAAGGCTGAAACTCGAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAACTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAAATGCA
GGAGACCGGGGTGGAAACATCCCTTCCCCTTAAAAGGCTGCTGCATAG

>CAM2P1G06 Uncultured proteobacterium (Alphaproteobacteria)
GTCAGTGGTGAAAGCCCGGAGCTCCTCCGGAATTGCCATTGAAACTGTTGGACTGGAGTACGAGAGAGGTGAGTGGAATTCCCAGTGTAGAGGTGAAATTCGTAGATAT
TGGGAAGAACACCGGTGGCGAAGGCGGCTCACTGGCTCGTAACTGACGCTCAGGCGCGACAGCGTGGGGATCAAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAA
CGATGAATGCTAGCCGTTGGATAGCTTGCTATTCAGTGGCGCAGCTAACGCATTAAGCATTCCGCCTGGGGAGTACGGCCGCAAGGTTGAAACTCAAAGGAATTGACGG
GGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGCAGAACCTTACCAGGGTTGACATCCTGCGACCGCCTCTTAATAGGGGTTTTCCCGCAAGGG
ACGCAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACG

>CAM2P1G07 Uncultured bacterium (Acidobacteria)
ATCCAAAACTGGCGGGCTAAGTCTGGAGGGGGTATGGAATCCTGGTGTACGGTGAAATGCGTAATTCAGAGAACACCGGTGGCGAAGGCGGCTACCTGGACAGAAACTG
ACGCTGAGGCACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATGGATACTTGGTGTGACCGGGATTGAATCCGGTCGTGCCGAA
GCTAACGCATTAAGTATCCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGTATGTGGTTTAATTCGACGCAA
CGCGAAGAACCTTACCTGGGCTCGAACGGCTAGTGACAGGTGGCGAAAGTCGCTTTTCCCGCAAGGGACA

>CAM2P1G09 Uncultured bacterium (Acidobacteria)
CAGAGCCTGCATCTAAAACTGGCTGGCTAGAGTTCTGGAGGGGGTAGCGGAATTCCTGGTGTATCGGTGAAATGCGTAGATATCAGGAGGAACACCGGTGGCGAAGGCG
GCTACCTGGACAGAAACTGACGCTGAGGCACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATGGATACTTGGTGTGACTGGGAT
TGAATCCAGTCGTGCCGAAGCTAACGCATTAAGTATCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGTAT
GTGGTTTAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAACGGCTAGCGACAGGTGGCGAAAGTCGCTTTTCCCGCAAAGGACACTAGTCGAGGTGCTGCATGG
CTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAAC

>CAM2P1G10 Uncultured bacterium (Acidobacteria)
TGGGCGTAAAGGGCGCGTAGGCGGTCTGACAAGTCTGATGTGAAATCTCTGGGCTCAACCCAGAGTCTGCATTAGAAACTGTCGGGCTTGAGTATGGGAGAGGTGAGTG
GAATTTCCGGTGTAGCGGTGAAATGCGTAGATATCGGAAGGAACACCTGTGGCGAAAGCGGCTCACTGGACCATAACTGACGCTGAGGCGCGAAAGCTAGGGGAGCAAA
CAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATGATTGCTTGGTGTGACAGGTACCCAATCCTGTCGTGCCGAAGCTAACGCGATAAGCAATCCGCCTGGGGAG
TACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAAATGG
AGTGGAATCCGGTAGAAATATCGGCGTCTAGCAATAGACCGCTATATAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGC
GCAACCCTTATCTTCAGTTGCTACCATTTAGTTGAGCACTCTGACGAAACCGCCTCGGATAACGGGGAGGAAGGTGGGGATGACGCCAAGTCCTCATGGCCTTTATGTC
CAGGGCTACACACGTGCTACAATGGCCGGTACAAACCGCTGCAAACCCGCGAGGGGGAGCTAATCGGAAA

>CAM2P1G12 Uncultured forest soil bacterium (Não classificada)
CGTAAGCGCTCGTAGTGGATTGCAAGTCTGCAGGAAAGACCGGGCTCAACTCGGGAACCCGTGTGGATACTGCAAACCTTGAGGTATCAGAGGATGATGGAATCCCGGT
GTAGCGGTGAAATGCGTAGATTCGGGAGGAACACCAGTGGCGAAGGCGATCATCTGGGGCTAACCTGACACTGAGGAGCGAAAGCTAGGGGAGCAAACGGGATTAGATA
CCCCGGTAGTCCTAGCCGTAAACGATGGACACTAGGTGTAGGTGGTATCGACTCCATCTGTGCCGCAGTTAACACAATAAGTGTCCCGCCTGGGGAGTACGGCCGCAAG
GTTAAAACTCAAAGGAATTGACGGGGGCCCGCACCAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCGGGGCTTGACATCCTGCGACATCTTA
GGAGACTAAGTTTCCGGGCAACCGGACGCAGAGA

>CAM2P1H01 Uncultured bacterium (Betaproteobacteria)
CGTAAGCGTGCGCAGGCGGTTTTGCAGCCGGATGTGAAATCCCCGGGCTTACCTGGGAATGGCATTTGGGACTGCAAGGCTGGAGTGCGGCAGAGGAGACTGGAATTCC
TGGTGTAGCAGTGAAATGCGTAGATATCAGGAGGAACACCGATGGCGAAGGCAGGTCTCTGGGCTGACACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACAGGATT
AGATACCCTGGTAGTCCACGCCCTAAACGATGTCGACTGGTTGTTGGGGGTTTGACACCCTCAGTAACGAAGCTAACGCGTGAAGTCGACCGCCTGGGGAGTACGGCTG
CAAGGTTAAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATTATGTGGATTAATTCGATGCAACGCGAAAAACCTTACCTACCCTTGACATGTCCGGAAGC
CCGGTGAGAGCTGGGGGTGCCCGAAAGGGAACCGGAACACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCC
TTGTCATTAGTTGCTACATTCAGTTGGGCACTCTAATGAGACTGCCGGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCCTT

>CAM2P1H03 Uncultured bacterium (Acidobacteria)
GACAAGTCACTTGTGAAATCTCCGGGCTTACTCGGAACGGCCAAGTGATACTGTCGCGCTAGAGTGCGGAAGGGGCAATCAGAATTCTTGGTGTAGCGGTGAAATGCGT
AGATATCAAGAGGAATACCTGAGGTGAAGACGGGTTGCTAGGCCGACACTGACGCTGAGTGCGCGAAAGCCAGGGGAGCAAACGGGATTAGATACCCCGGTAGTCCTGG
CCCTAAACGATGAATACTTGGTGTCTGGAGTTTTTAGTGCTCCGGGTGCCGTCGCTAACGTTTTAAGTATTCCGCCTGGGGAGTACGCTCGCAAGAGTGAAACTCAAAG
GAATTGACGGGGACCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCTGGACTAGAATGTGAGGGAATGTTGGGTAATGCCATCAGT
CTGGGAAACCAGACCCAAAACAAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTATTGACAGTTGCCAAT
ATTAAGTTAGGAACTCTGTCAAGACTGCTGTTGATAAAACGGAGGAAGGTGGGGATGATGTCAAGTCA

>CAM2P1H04 Uncultured bacterium (Acidobacteria)
CTGCAGGCGAACTGCGTGCTGGAGTGTGGGAGAGGTGCGTGGAATTCCCGGTGTACGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCGCACTGG
ACACAACTGACGCTGATGCGCGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATGGATGCTTGGTGTGTCGGGTACCCAATCCCGC
CGTGCCGAAGCTAACGCGATAAGCATCCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAAT
TCGACGCAACGCGAAGAACCTTACCTGGGCTCGAAGCGCAGTGGACCGGGGTAGAAATATCCCTTTCCGCAAGGACCGCTGCGGAGGTGCTGCATGGCTGTCGTCAGCT
CGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTATCCCTAGTTGCCATCGGGTCAAGCCGGGCACTCTAGTGAAACCGCCCCGGATAAC

>CAM2P1H05 Uncultured bacterium (Alphaproteobacteria)
TGAAATCCTGGAGCTCACTCCAGAACTGCCCTTGATACTGAGGAGCTTGAGTCCGGGAGAGGTGAGTGGAACTGCGAGTGTAGAGGTGAAATTCGTAGATATTCGCAAG
AACACCAGTGGCGAAGGCGGCTCACTGGCCCGGTACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGGA
TGCTAGCCGTTGTCGGGTTTACTCGTCAGTGGCGCAGCTAACGCATTAAGCATCCCGCCTGGGGAGTACGGTCGCAAGATTAAAACTCAAAGGAATTGACGGGGGCCCG
CACAAGCGGTGGAGCATGTGGTTCAATTCGAAGCAACGCGCAGAACCTTACCAGCCTTTGACATCCCGGTCGCGGGCACCAGAGATGGAGCCTTTCAGTTCGGCTGGAC
CGGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTCGCCCTTAGTTGCCATCATTTAGTTGGGCACT
CTAAGGGGACTGCCGGTGATAAGCCGCGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCCTTACAGGCTGGGCTACACACGTGCTACAATGGCGGTGACAATGGGA
CGCAATGGGG

>CAM2P1H06 Uncultured bacterium (Verrucomicrobiae)
GTGAAATTTCGGAGCTTACTCCGAAACTGCATTCGATACTGGCGTGCTTGAGGACTGGAGAGGAGACTGGAATTTACGGTGTAGCATTGAAATGCGTACATATCGTAAG
GAAGACCAGTGGCGAGGGCGGGTCTCTGGACAGTGCCTGACACTGATGACACGAAGGCCAGGGGAGCAAACGGGATTAGATACCCCGGTAGTCCTGGCAGTAAACGGTG
CACGTTTGGTGTGGGAGGATTCGACCCCTTCTGCGCCGGAGCCAACGCGTTAAACGTGCCGCCTGGGGAGTACGGTCGCAAGATTAAAACTCAAAGAAATTGACGGGGG
CCCGCACAAGCGGTGGAGTATGTGGCTCATTTCGATGCGACGCGAAGAACCTTACCAGGCCTTGACATGCATCTCTAAGTTGGTGAAAGCCAGCGAGTCTCGAAAGAGA
CAATTTGCACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAAACCCTGTGAACTGTTGCCACGGAACCGAGAGGT
TCCAGCACTCTGTTCAGACTGACTCGCTTAAACGAGGAGGAAGGTGGGGACGACGTCAAGTCAGTATGGCCCTTAC

>CAM2P1H08 Uncultured bacterium(Deltaproteobacteria)
GGCGGTTCGTTAAGTCAGATGTGAAAGCCCCGGGCTCAACTCGGGAAGTGCATTTGAAACTGGCGAGCTTGAGTATGGAAGAGGATCGCGGAATTCCCGGTGTAGAGGT
GAAATTCGTAGATATCGGGAGGAACACCAGTGGCGAAGGCGGCGATCTGGGCCAATACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGATACCCTGGT
AGTCCACGCCGTAAACGATGGATGCTAGATGTCGCGGGTATTGACCCCTGCGGTGTCGCAGCTAACGCATTAAGCATCCCGCCTGGGGAGTACGGCCGCAAGGTTAAAA
CTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGCAGAACCTTACCTGGGTTAAATCCAACGGAACCCTGCAGAGATGT
GAGGGTGCCCTTCGGGGAATCGTTGAGACGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGTCGTTAGTT
GCTAACAGTTAGGCTGAGCACTCTAACGAGACCGCCGGTGTTAAACCGGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCCTTATGCCCAGTGCTACACACGTGCT
ACAATGGCCGGTACA

>CAM2P1H09 Uncultured bacterium (Verrucomicrobiae)
CGGTTCGGTAAGTCGGGTGTGAAATCTCGGGGCTTACTCCGAAACTGCATTCGATACTGCCGTGCTTGAGGACTGGAGAGGAGACTGGAATTTACGGTGTAGCGGTGAA
ATGCGTAGATATCGTAAGGAAGACCAGTGGCGAAGGCGGGTCTCTGGACAGTTCCTGACGCTGAGGCACGAAGGTCAGGGGAGCAAACGGGATTAGATACCCCGGTAGT
CCTGACAGTAAACGGTGCACGTTTGGTGTGGGAGGATTCGACCCCTTCTGCGCCGGAGCTAACGCGTTAAACGTGCCGCCTGGGGAGTACGGTCGCAAGATTAAAACTC
AAAGAAATTGACGGGGGCCCGCACAAGCGGTGGAGTATGTGGCTCAATTCGATGCAACGCGAAGAACCTTACCAGGCCTTGACATGCATCTCTAAGTTGGTGAAAGCCA
GCGAGTCCCGCAAGGGACAATTTGCACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGTGAACTGTTG
CCACCGAGCCGTGAGGCTCGAGCACTCTGTTCAGACTGCCCCGCTCTAACGGGGAGGAAGGTGGGGACGACGTCAAGTCAGTATGGCCCTTACGGCCTGGGCTGCACAC
GTAC

>CAM2P1H10 Uncultured bacterium (Actinobacteria)
GCAGGTCAGCTGTGAAAACTCAAGGCTCAACCTTGAGACGTCGGTTGAAACCGTATGGCTAGAGTCCGGAGGAGGAGAGTGGAATTCCCGGTGTAGCGGTGAAATGCGC
AGATATCGGGAAGAACACCCATGGCGAAGGCAGCTCTCTGGGACGGTACTGACGCTGAGACGCGAAAGCGTGGGGAGCGAACAGGATTAGATACCCTGGTAGTCCACGC
CGTAAACGATGGGAACTAGGTGTGGCGGGTGTCGACTCCCGCTGTGCCGAAGCTAACGCATTAAGTTCCCCGCCTGGGGAGTACGGACGCAAGGCTAAAACTCAAAGGA
ATTGACGGGGGCCCGCACAAGCAGCGGAGCATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCAGTGCTTGACATGCATTGGAAAACCGTGGAAACACGGTCCCC
CTTCGGGGCTAATGCACAGGTGGTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAATCCCTGTTCCATGTTGCCAGCGCGTA
ATGGCGGGGACTCATGGAAGACTGCCGGTGACAAAGCGTAACAAGGTAGAGCTCTCAGTCAGTCAAAGGGCG

>CAM2P1H11 Uncultured bacterium (Sphingobacteria)
TCAGTGGTGAAATCTCTGGGACTTACCCGGAAACTGCCATTGATACTATATGTCTTGAATATCGTGGAGGTCAGCGGAATGTGTCATGTAGCGGTGAAATGCTTAGATA
TGACATAGAACACCAATTGCGAAGGCAGCTGGCTACCCGAATATTGACACTGATGCACGAAAGCGTGGGGATCAAACAGGATTAGATACCCTGGTAGTCCACGCCCTAA
ACGATGGATACTCGACATACGCGATATACTGTGTGTGTCTGAGCGAAAGCATTAAGTATCCCACCTGGGAAGTACGATCGCAAGATTGAAACTCAAAGGAATTGGCGGG
GGTCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGATACGCGAGGAACCTTACC

>CAM2P2A01 Uncultured bacterium (Alphaproteobacteria)
GGGCGTAAAGGGTGCGTAGGCGGGTCTTTAAGTCAGGTGTGAAATCCTGGAGCTCAACTCCAGAACTGCCTTTGATACTGAAGATCTTGAGTTCGGGAGAGGTGAGTGG
AACTGCGAGTGTAGAGGTGAAATTCGTAGATATTCGCAAGAACACCAGTGGCGAAGGCGGCTCACTGGCCCGATACTGACGCTGAGGCACGAAAGCGTGGGGAGCAAAC
AGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGAATGCCAGCCGTTAGTGGGTTTACTCACTAGTGGCGCAGCTAACGCTTTAAGCATTCCGCCTGGGGAGTAC
GGTCGCAAGATTAAAGCTCAAAGGAATTGACGGGGGCCCGCGCAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACG

>CAM2P2A03 Uncultured forest soil bacterium (Acidobacteria)
GGGCGTAAAGGGTCGCAGGCGGTGTGGCAAGTCGGAAGTGAAATCTCTGGGCTTACTCAGAGGCTGCTTCCGAAACTGCCGTGCTCGAGTGCGAGAGAGGCAAGTGGAA
TTGCGGGTGTAGCGGTGAAATGCGTAGATATCCGCAGGAACATCCGAGGCGAAAGCGGCTTGCTGGATCGCAACTGACGCTGAGGGACGAAAGCTAGGGGAGCAAACAG
GATTAGATACCCTGGTAGTCCTAGCCCTAAACCATCAGGACTTGGGGTTTGCCCTGTACGGGGCAAGTCCCGGAGCTAACGCGTTAAGTCCTGCGCCTGGGGAGTACGG
TCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTTGAACCGCACAGG
ATCATTCCTGGAAACAGGAACTTCCCGCAAGGGACCTGTGTAGAGGTGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAA
CCCTTACTCGTAGTTGCCACCCGCAAGGGGGAACTCTACGAGGACTGCTCCGGATAACGGAGAGGAAGGTGGGGATGAGGTCAAGTCAGCATGGCCTTTATGTCCAGGG
CTACACACGTGTTACA

>CAM2P2A04 Uncultured bacterium (Acidobacteria)
CGGGGCGGTCGCTCGAAACTGCCGTGCTCGAGTGTGGGAGAGGGAAGTGGAATCCCGGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGCGGCGAAGGCGG
CTTCCTGGACCATAACTGACGCTGAGGCGCGAAAGCTAGGGAAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGTTGAGCACTGGGTGTTGCCCTTCAC
CGGGCAGTGCCGAAGCTAACGCATTAAGTGCTCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGT
TCAATTCGACGCAACGCGAAGAACCTTACCTGGACTCGAAATCTAGTCGACAGTCTCAGAGATGAGATCTTCCCGCAAGGGACGGCTGGATAGGTGCTGCATGGCTGTC
GTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTCATTCTTAGTTGCTCGCCCGAAAGGGAAGCATCCTAAGAAAACCGCCTCGGATAACG
GGGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCTTTATGCCCAGTGCAACACACGTGCTACAATGGC

>CAM2P2A05 Uncultured bacterium (Acidobacteria)
GTGAAAACTCTGGGCTCAACCAGAGCCTGCATCTAAAACTGGCGGGCTAGAGTTCTGGAGGGGGTAGCGGAATTCCTGGTGTAGCGGTGAAATGCGTAGATATCAGGAG
GAACACCGGTGGCGAAGGCGGCTACCTGGACAGAAACTGACGCTGAGGCACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATGG
ATACTTGGTGTGACTGGGATTGAATCCAGTCGTGCCGAAGCTAACGCATTAAGTATCCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGC
CCGCACAAGCGGTGGAGTATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAACGGCTAGTGACAGGTGGCGAAAGTCGCTTTTCCCGCAAGGGACA
CTAGTCGAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGCCTTTAGTTGCCACCAGGTTAAGCTGAGCA
CTCTAAAGGGACTGCCGGTGAAAAACCGGAGGAAGG

>CAM2P2A06 Uncultured bacterium (Actinobacteria)
TTGGGCGTAAGAGCTCGCAGGCGGTTTGATAAGTCGGGTGTGAAACCTCCAGGCTCAACCTGGAGCCGCCACTCGATACTGTCATGACTAGAATTCGGTAGGGGACCAC
GGAATTCCTGGTGTAGCGGTGAAATGCGCAGATATCAGGAGGAACACCAGCAGCGAAGGCGGTGGTCTGGGCCGACATTGACGCTGAGGAGCGAAAGCGTGGGGAGCGA
ACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGTTGGGCACTAGGTGTGGGGACTATTCAACGGTTTCCGTGCCGCAGCTAACGCATTAAGTGCCCCGCCTGGGG
AGTACGGCCGCAAGGCTAAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGCGGAGCATGTGGCTTAATTCGAGGCAACGCGAAGAACCTTACCTGGGTTTGACAT
GTAGGGAAAAGCCGTAGAGATACGGTGTCCTTCGGGGCCTTACACAGGTGGT

>CAM2P2A08 Uncultured bacterium (Betaproteobacteria)
GGGCGTAAGCGTGCGCAGGCGGTTTGTAAGCCAGATGTGAAATCCCCGGGCTTAACTGGGAACTGCATTTGGGACTGCAAGGCTTGAGTACGGCAGAGGGGGGTAGAAT
TCCTGGTGTAGCAGTGAAATGCGTAGATATCAGGAGGAATACCGATGGCGAAGGCAGCCCCCTGGGTCGATACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACAGG
ATTAGATACCCTGGTAGTCCACGCCCTAAACGATGTCAACTAGTTGTTGGGGGACTTACCTCCCTTAGTAACGCAGCTAACGCGTGAAGTTGACCGCCTGGGGAGTACG
GTCGCAAGATTAAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGATGATGTGGATTAATTCGATGCAACGCGAAAAACCTTACCTACCCTTGACATGCCAGG
AAGTCCGCTGAGAGGTGGATGTGCTCGAAAGAGAACCTGGACACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCA
ACCCTTGCCATTAGTTGCTACATTCAGTTGGG

>CAM2P2A09 Uncultured bacterium (Alphaproteobacteria)
AGTTAGAGGTGAAAGCCCGGGGCTCACTCCGGAAATTGCCTTTAAGACTGCATCGCTAGAATTGTGGAGAGGTAAGTGGAATTCCGAGTGTAGAGGTGAAATTCGTACA
TATTCGGAAGAACACCAGTGGCGAAGGCGACTTACTGGACACATATTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTCCACATACCCTGGTAGTCCACGCC
GTAAACGATGATGACTAGCTGTCTGGGCGCTTAGCGTTCAGGTGGCGCAGCTAACGCGTTAAGTCATCCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAAAGACAT
TGACGGGGGCCTGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGCAGAACCTTACCAGCGTCTGACATGCCAGGACGGTTTCCAGAGATGGATTCCTTCC
CTTACGGGGCCTGGACTCAGGTGCTGCAATGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTCGTCTTTA

>CAM2P2B01. Uncultured soil bacterium (Acidobacteria)
GGCGTAAGGGCGCGTAGCGGTGCGGAAGTCACCTGTGAAATCTCCTGGCTCAACTGGGAGCTTGCAGGCGAAACTGCCGTGCTGGAGTGTGGGAGAGGTGCGTGGAATC
CCGGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCGCACTGGACCACAACTGACGCTGAGGCGCGAAAGCTAGGGGAGCAAACAGGAT
TAGATACCCTGGTAGTCCTAGCCCTAAACCATGGATGCTTGGTGTGATGGGTACCCAATCCCATCGTGCCGCAGCTAACGCGTTAAGCATCCCGCCTGGGGAGTACGGT
CGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAAGCGCAGTGGA
CCGGGGTGGAAACATCCCTTTCCGCAAGGACCGCTGCGGAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCT
TATCGTTAGTTGCCATCGGGTCAAGCCGGGCACTCTAGCGAAACTGCCTCGGATAACGGGGAGGAAGGTGGGGATGACGT

>CAM2P2B02. Agrobacterium rhizogenes (Alphaproteobacteria)
TACTGGGCGTAAAGCGCACGTAGGCGGTACATCAAGTCAGGTGTGAAAGCCCGGAGCTCAACTCCGGAACTGCCCTTGAAACTAGTGTACTAGAATCTTGGAGAGGCGG
GTGGAATTCCGAGTGTAGAGGTGAAATTCGTAGATATTCGGAAGAACACCAGTGGCGAAGGCGGCCCGCTGGACAAGTATTGACGCTGAGGTGCGAAAGCGTGGGGAGC
AAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGATAACTAGCTGTCCGGGCACATGGTGCTTGGGTGGCGCAGCTAACGCATTAAGTTATCCGCCTGGGG
AGTACGGTCGCAAGATTAAAACTCAAAGGAATTGACGGGGGCCTGCACAAGCGGTGGAGCATGTGGTTCAATTCGAAGCAACGCGCAGAACCTTACCAGCGTTTGACAT
CCTCATCGCGATTTCCAGAGATGGATTTCTTCAGTTCGGCTGGATGAGTGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAA
CGAGCGCAACCCTCGTCCTTAGTTGCCATCATTAAGTTGGGCACTCTAAGGAAACCGCCGGTGATAAGCCGGAGGAAGGTGGG

>CAM2P2B03 Uncultured bacterium (Acidobacteria)
GGGCGTAAAGGGTGCGCTAGGCGGTTTGGCAAGTCTTATGTGAAATCTATGGGCTCACTCATAGTCTGCATGAGAAACTGCCGGGCTGGAGTGTGGGAGAGGTGAGTGG
AATTCCCGGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCTCACTGGACCATAACTGACGCTGATGCACGAAAGCTAGGGGAGCAAAC
AGGATTAGATACCCTGGTAGTCCTAGCCCTAAACCATGACTGCTTGGTGTGACGGGTACCCAATCCCGCCGTGCCGTAGCTAACGCGTTAAGCAGTCCGCCTGGGGAGT
ACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCTGTGCTCGAAATGCA
GTGGACTGGAGTAGAAATATTCCTTCCCCGCAAGGGGCCGCTGTATAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCG
CAACCCTTATCCCCAGTTGCCATCATTTAGTTGGGCACTCTGGTGAAACCGCCTCGGATAACGGGGAGGAACGTGGGGATGACGTCAAGTCCTCATGGCCTTTATGTC

>CAM2P2B04 Uncultured bacterium (Actinobacteria)
GTCAGCTGTGAAAACTCGAGGCTCAACCTCGAGACGTCGGTTGAAACCGTTTGGCTAGAGTCCGGAAGAGGAGAGTGGAATTCCCGGTGTAGCGGTGAAATGCGCAGAT
ATCGGGAAGAACACCCGTGGCGAAGGCGGCTCTCTGGGACGGTACTGACGCTCAGACGCGAAAGCGTGGGGAGCGAACAGGATTAGATACCCTGGTAGTCCAAGCCGTA
AACGACGGGCACTAGGTGTGGCGGGTATCGACTCCCGCTGTGCCGAAGCTTACGCATTAAGTGCCCCGCCTGGGGAGTACGGCCGCAAGGCTAAAACTCAAAGGAATTG
ACGGGGGCCCGTACAAGCCAGCGGAGCATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCAGTGCTTGACATGCACTGGAAAACCGTAGAAATACGGTCCCCCTT
CGGGGCTAGTGTGCAGGTGGTGCATGGCTGTCGTCTGCTCGTGTCGTGAGATGTTGGGTTAC

>CAM2P2B05 Uncultured Acidobacteria bacterium (Acidobacteria)
CTAAGTCATACGTGAAATCCCTCGGCTTAACGGGGAACTGCGTCTGATACTGGATGGCTTGAGTTCGGGAGAGGGATGCGGAATTCCAGGTGTAGCGGTGAAATGCGTA
GATATCTGGAGGAACACCGGTGGCGAAGGCGGCATCCTGGACCGATACTGACGCTGAGTGAGCGAAAGCCAGTGGAGCAAACGGGATTAGATACCCCGGTAGTCCTGGC
CCTAAACGATGAATGCTTGGTGTGGCGGGTATCGATCCCTGCCGTGCCGAAGCTAACGCATTAAGCATTCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGA
ATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCCAGGCTTGAACAGCGAGTGACACACTCCGAAAGGAGTCTTCC
GCAAGGACACTCGTAGAGGTGCTGCATGGCTGTCGTCAGCCCGTGTCGTGAGATGTAGGGTTAAGTCCCGCAACGAGCGCAACCCTTGTCTTCTGTTGCCATCACGTTA
TGGTGGGCACTCTGAAGAGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCAGCATGGCCTTTATGTCTGGGGCTACACACGTGCTACA

>CAM2P2B08 Uncultured bacterium (Não classificada)
GGCGGTATCGTAAGTACTTTGTGAAATCCCTTCTCTCAATGTAGGAATTGCTTGGTATACTGCGATGCTTGAGGCAGGTAGGGGTGCTTGGAACTCTAGGTGGAGCGGT
GAAATGCGTAGATATCTAGAGGAACGCCAGTGGCGAAAGCGGAGCACTGGGCCTGTCCTGACGCTGAGACGCGAAAGCGTGGGTAGCAAACTGGGATTAGATACCCCGG
TAGTCCACGCCGTAAACGATGCGCACTAGGTATGCCTGACTCTGACGTCCGGCGAGCCGAAACAAAAGCGTTAAGTGCGCCGCCTGGGGAGTACGGCCGCAAGGCTAAA
ACTCAAAGGAATTGACGGGGGCTCACACAAGCGGTGGATGATGTGGCTCAATTCGAAGCAACGCGAAGAACCTTACCCGGGTTTGACATGCTAGGATTAGTTCTGTGAA
AGCAGAGTGACACGGCTTGCCGTGGAACTAGCACAGGTGCTGCATGGCTGTCGTCAGCTCGTGCTGTGAAGTGTCGGGTTAAGTCCCTTAACGAGCGAAACCCTTGTCG
CTAG

>CAM2P2B09 Uncultured bacterium (Não classificada)
CTTTGTAGTCGGAGGTGAATCCCATGGTCACATGGACACGCCTTCGAAACTGTGAAGCTTGAGGCTGGGAGAGGAAATCGGAATCCTGGTGTAGCGGTGAAATGCGTAG
ATATCAGGAGGAACACCGGTGGCGAAGGCGGATTTCTGGACCAGTTCTGACACTGATGAGCGAAAGCCAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTGGCTG
TAAACGATGGGCACTAGGTGTGGGAGGATCGACCCCTTCCGTGCCGCAGTTAACGCATTAAGTGCCCCGCCTGGGGAGTA

>CAM2P2B10 Uncultured bacterium (Acidobacteria)
GGTGTAAGGGTCACAGGCGGTGTGGCAAGTTGGGAGTGAAATCTCTGGGCTCAACTCAGAGGCTGCTTCCAAAACTGCTGTGCTTGAGTGTGGGAGTGGCGCGTGGAAT
TGCAGGTGTAGCGGTGAAATGCGTAGATATCTGCAGGAACACCCGTGGCGAAAGCGGCGCGCTGGACCATAACTGACGCTGAATGACGAAAGCTAGGGGAGCAAACAGG
ATTAGATACCCTGGTAGTCCTAGCCCTAAACGATCAGGACTTGGGGTGTCGCCCGTTCGGGCGTCGTCCCGGAGCTAACGCGTTAAGTCCTGCACCTGGGGAGTACGGT
CGCAAGACTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCTACGCGAGGAACCTTACCTGGGCTCGAAATGCTTAGGA
CCAGCTGTAGAAATACGGCCTTCCCGCAAGGGACCTGAGTATAGGCGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTAGGGTTAAGTCCCGCAACGAGCGCAAT
CCCTGCACACAGTTACTACTCGCAAGAGAGGACTCTGTGTGGACTGCTCCGGATAACGGAGAGGAACGTGGGGATGACGTCAAGTCCGCATGGCCTTTACGTCCAGGGC
TACACA

>CAM2P2B12 Uncultured bacterium (Acidobacteria)
GGTAAGTCACCTGTGAAACCTCCGGGCTCAACTCGGAGCCTGCAGGCGAAACTGCCGTGCTGGAGTGTGGGAGAGGTGCGTGGAATTCCCGGTGTAGCGGTGAAATGCG
TAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCGCACTGGACCACAGCTGACGCTGAGGCGCGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAG
CCCTAAACGATGATTGCTTGGTGTAGCAGGTACCCAATCCTGCTGTGCCGCAGCTAACGCGTTAAGCAATCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGG
AATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAAGCGCAGTGGACCGGGGTAGA

>CAM2P2C02 Uncultured bacterium (Betaproteobacteria)
GGGCGTAAGCGTGCGTAGCGGTCCGCAAGTCGCTGTGAAAGCCCGAGCTTACTTGGGAACTGCAGTGGAAACTATGGGACTTGAATCCGGCAGAGGGGGGTGGAATGCC
ACGTGTAGCAGTGAAATGCGTAGAGATGTGGCGGAACACCGATGGCGAAGGCAGCCCCCTGGGCTGAGATTGACGCTCAGGCACGAAAGCGTGGGGAGCAAACAGGATT
AGATACCCTGGTAGTCCACGCCCTAAACGATGACAACTAGGTGTTGGGGAAGCGATTTCTCAGTACCGCAGCTAACGCGTGAAGTTGTCCGCC

>CAM2P2C03 Uncultured soil bacterium (Acidobacteria)
GGGTGTAAAGGGTCGCAGGCGGTGTGGCAAGTCGGTGAGTGAAATTTCTGGGCTCAACTCAGAGACTGCTTCCGAAACTGCTGTGCTGGAGTGTGGGAGAGGCGCGTGG
AATTGCAGGTGTAGCGGTGAAATGCGTAGATATCTGCAGGAACACCCGTGGCGAAAGCGGCGCGCTGGACCACTACTGACGCTGAGGAACGAAAGCTAGGGGAGCAAAC
AGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATCAGGACTTGGGGTGCCACCCGTTCGGGTGTCGTCCCGGAGCTAACGCGTTAAGTCCTGCACCTGGGGAGTAC
GGTCGCAAGACTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCTACGCGAGGAACCTTACCTGGGCTCGAAGCGCACC
TGACCAGCTGTGGAAACACGGCCTTCCCGCAAGGGACAGGTGTGGAGGCGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGC
AACCCCTGCACGTAGTTGCCACTCGCAAGAGGGAACTCTACGTGGACTGCTCCGGATAACGGAGAGGAAGGTGGGGATGACGTCAAGTCCGCATGGCCTTTATGTCC

>CAM2P2C06 Uncultured beta proteobacterium (Betaproteobacteria)
GGGCGTAAGCGTGCGCAGGCGGTTCGTTGTGTCGGCGGTGAAAGCCCCGGGCTTAACCTGGGAATGGCCGTTGAAACTGGCGAACTGGAGTGTGGCAGAGGGGGGTGGA
ATTCCGCGTGTAGCAGTGAAATGCGTAGAGATGCGGAGGAACACCGATGGCGAAGGCAGCCCCCTGGGCTAACACTGACGCTCAGGCACGAAAGCGTGGGGAGCAAACA
GGATTAGATACCCTGGTAGTCCACGCCCTAAACGATGTCAACTGGGTGTTGGGGAAGCGATTTCCCAGTACCGTAGCTAACGCGTGAAGTTGACCGCCTGGGGAGTACG
GCCGCAAGGTTAAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATGATGTGGATTAATTCGATGCAACGCGAACAACCTTACCTACCCTTGACATGTCCGA
AAGCCCGCTGAGAGGTGGGTGTGCCCGAAAGGGAATCGGAACACAGGTGCTGCATGGCTGTC

>CAM2P2C08 Uncultured forest soil bacterium (Acidobacteria)
GGCGGTGTGACAAGTCGGTAGTGAAATCTCTGGGCTTACTCAGAGGCTGCTGCCGAAACTGTTGTGCTAGAGTGTGAGAGAGGCGAGTGGAATTACGGGTGTAGCGGTG
AAATGCGTAGATATCCGTAGGAACATCCGAGGCGAAAGCGGCTCGCTGGATCACAACTGACGCTGAGGGACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTA
GTCCTAGCCCTAAACCATCAGGACTTGGGGTTTGCCCTGTACGGGGCAAGTCCCGGAGCTAACGCGTTAAGTCCTGCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTC
AAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTTGAACCGCACAGGACCACCCCGAGAAATCG
GGGCTTCCCGCAAGGGACCTGTGTAGAGGTGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAA

>CAM2P2C10 Uncultured bacterium (Acidobacteria)
TTAAGTTAGATGTGAAAACTCTGGGCTCACCAGAGCTGCATCTAAACTGGCGAGCTAGAGTCTGGAGGGGGTACGGAATCCTGGTGTACGGTGAAATGCGTAGATTCAG
GAGGAACACCGGTGGCGAAGGCGGCTACCTGGACAGAAACTGACGCTGAGGCACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGA
TGGATACTTGGTGTGACCGGGGTTGAATCCGGTCGTGCCGAAGCTAACGCATTAAGTATCCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGG
GGCCCGCACAAGCGGTGGAGTATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAACGGCTAGTGA

>CAM2P2C11 Uncultured bacterium(Não classificada)
GTTGTTAAGGCTCCGGCCTACTGGAGTATTGCAATGAAAACTGGGCGCTAGAGGGTGAGAGAGAGAAGTGGAATTCCCGGAGTAGCGGTAAAATGCGTGGATCTCGGGA
GGAACACCAATGGCGAAGGCAGCTTCTTGGCTCATTCCTGACATTGAGGCACGAAAGCGTGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATA
ATCACTAGATGTTGGTTCGGCTTAGCTGGATCAGTGTCGTAGCTAACGCGTTAAGTGATTCGCCTGGGGAGTATGGTCGCAAGGCTAAAACTTAAAAGAATTGACGGGG
GTCCGCACAAGCGGTGGAACATGTGGTTTAATTCGACACTACGCGAGAAACCTTACCTAGGCTTGACATGTACTTGACAGCTGCAGAAATATGGTCTTTTGGGTTTCGG
CTCAAACAGGTACAAGGTGCTGCAT

>CAM2P2C12 Uncultured bacterium (Betaproteobacteria)
GGGCGTAAAGCGTGCGCAGGCGGCTTTGCAAGACAGATGTGAAATCCCCGGGCTTACCTGGGAACTGCATTTGTGACTGCATGGCTGGAGTGCGGCAGAGGGGGATGGA
ATTCCGCGTGTAGCAGTGAAATGCGTAGATATGCGGAGGAGCACCGATGGCGAAGGCAATCCCCTGGGCCTGCACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACA
GGATTAGATACCCTGGTAGTCCACGCCCTAAACGATGTCAACTGGTTGTTGGACGGCTTGCTGTTCAGTAACGAAGCTAACGCGTGAAGTTGACCGCCTGGGGAGTACG
GCCGCAAGGTTGAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATGATGTGGTTTAATTCGATGCAACGCGAAAAACCTTACCTACCCTTGACATGCCAGG
AATCCCGCAGAGATGTGGGAGTGCTCGAAAGAGAACCTGGACACAGGTGCTGCATGGCCGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGA

>CAM2P2D01 Uncultured bacterium(Não classificada)
ATTGTAAGTCCGTGTTGAAAGACTCGGCTCAACTGAGGGACCGGCTCGGATACTACAATTCTTGAGGCAATCAGAGGGTGATGGAATTCCCGGTGTAGCGGTGAAATGC
GTAGATATCGGGAGGAACACCAGTGGCGAAGGCGATCACCTGGGGTTGTTCTGACGCTGAGGAGCGAAAGCTAGGGGAGCAAACGGGATTAGATACCCCGGTAGTCCTA
GCCGTAAACGATGGATACTAGGTGTATGTGGTATCGACTCCATATGTGCCGTAGTTAACACAGTAAGTATCCCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAAAG
GAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTAGTTTAATTCGACGCAACGCGAAGAACCTTACCGAGGCTTGACATCCCTTGAAAGCCGTAGAAATGCGGTTTC
CGTAGCAATACGGCAAGGTGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTCGTTTTGTGTTGGTCCG
CAAGGATCTCTCACAAAAGACCGCCGGTGAGAAGCCAGAGGAAGGTGGGGATGACGTCAAGTCAG

>CAM2P2D02 Uncultured bacterium (Acidobacteria)
GGGCGTAAGAGTGCGTAGGCGGTGCTCTAAGTTCGGTGTGAAATCTCCCGGCTCACTGGGAGGGTGCGCCGGAAACTGGAGTGCTCGAACGTGGGAGAGGAAAGCGGAA
TTCCTGGTGTAGCGGTGAAATGCGTAGATATCAGGAGGAACACCTGCGGTGTAGACGGCTTTCTGGACCATTGTTGACGCTGAGACACGAAAGCGTGGGTAGCAAACAG
GATTAGATACCCTGGTAGTCCACGCCGTAAACGATGCATACTTGGTGTCGGCCATTCAGTTGGTCGGTGCCGGAGCTAACGCGTTAAGTATGCCGCCTGGGGAGTACGGTC
TCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGCAGAACCTTACCAGCCCTTGACATCCCGGTCGC
ACCGGTGATAGAAATATCGCCTTTCCCGCAAGGGACTGGAGTCGAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCA
ACCCTTGTCCTGTGTTGCTAATCCGCA

>CAM2P2D03 Mesorhizobium sp. WSM3875 (Alphaproteobacteria)
GGGCGTAAGCGCACGTAGGCGGATATTAAGTCAGGGGTGAAATCCCGGGGCTCAACCCGGAACTGCCTTTGATACTGGGTATCTGGAGTCCGGAAGAGGTGAGTGGAAT
TCCGAGTGTAGAGGTGAAATTCGTAGATATTCGGAGGAACACCAGTGGCGAAGGCGGCTCACTGGTCCGGTACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAACAGG
ATTAGATACCCTGGTAGTCCACGCCGTAAACGATGGAAGCTAGCCGTTGGCAAGTTACTTGTCGGTGGCGCAGCTAACGCATTAAGCTTCCCGCCTGGGGAGTACGGTC
GCAAGATTAAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGCAGAACCTTACCAGCCCTTGACATCCCGGTCGC
GGTTTCCAGAAATGGATACCTTCAGTTCGGCTGGACCGGTGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAA
CCCTCGCCCTTAGTTGCCATCATTCAGTTGGGCACTCTAAGGGGACTGCCGGTGATAAGCCGAGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCCTTACGGGCTG
GGCTACACACGTGCTACAATGGTGGTGACAGTGGGCAGCGAGACCGCGAGGTCGAGCTAATCTCCAAAAGCCATC

>CAM2P2D05 Uncultured Myxococcales bacterium (Deltaproteobacteria)
CGCGTGTACGCGGCTTTGCAAGTCGGGTGTGAAATCCCTCAGCTCAACTGAGGAAGTGCGCCCGAAACTGCAGAGCTTGAGTACCGGAGAGGATGGCGGAATTCCCGAA
GTAGAGGTGAAATTCGTAGATATCGGGAGGAACACCGGTGGCGAAGGCGGCCATCTGGACGGATACTGACGCTGAGACGCGAAAGCGTGGGGAGCAAACAGGATTAGAT
ACCCTGGTAGTCCACGCCGTAAACGATGAGAACTAGGTGTCGTGGGTGTTGACCCCCGCGGTGCCGTAGCTAACGCATTAAGTTCTCCGCCTGGGAAGTACGGCCGCAA
GGCTAAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGCAGAACCTTACCTGGTCTTGACATCCTCGGAATCTGC
CAGAGATGGCGGAGTGCCCGCAAGGGAACCGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAAACGAGCGCAAGCCTC
GCCTTTAGTTGCCACGCAAGTGGATCTCTAGAGGGACTGCCGGTGTTAAACCGGAGGAAGGTGGGGATGACGT

>CAM2P2D06 Uncultured crenarchaeote (Thermoprotei)
AAGCATCGCAGCCGGTTTACAAGTCCTCCGTTAAATCCAACTGCTTACAGATGGGCCGCGGAGGATACTATAAGACTAGGAGGCAGGAGAGGCAAGCGGTACTCAGTGG
GTAGGGGTAAAATCCGTTGATCCATTGAAGACCACCAGTGGCGAAGGCGGCTTGCCAGAATGCGCTCGACGGTGAGGGATGAAAGCTGGGGGAGCAAACCGGATTAGAT
ACCCGGGTAGTCCCAGCCTGTAAACGATGCAGACTCGGTGATGGACTAGCTTAATGCTAGTCCAGTGCCGCAGGGAATCCGTTAAGTCTGCCGCCTGGGTAGTACGGTC
GCAAGACTGAAACTTAAAGGAATTGGCGGGGGAGCACCACAAGGGGTGAATCCTGCGGTTCAATTGGAGTCAACGCCGGGAATCTTACCGGGGGCGACAGCAGAGTGAA
GGTCAAGCTGAAGACTTTACTAGACAAGCTGAGCAGGAGTGTGCGATGGCCTGTCGCCAGCTTCGTGCCGTGAGGTGTCCTGTTAAGTCAGGTAACGAGCGAGACCCCT
GCTTCTAGTTGCTACTTTTATTCTTCGGAGT

>CAM2P2D08 Uncultured bacterium (Acidobacteria)
GTCTGATGTGAAATCTCCGGGCTCACTCGGAGTCTGCATCAGAAACTGCCATGCTTGAGTGTGGGAGAGGTGAGTGGAATTCCCGGTGTAGCGGTGAAATGCGTAGATA
TCGGGAGGAACACCTGTGGCGAAAGCGGCTCACTGGACCACAACTGACGCTGATGCGCGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAA
ACGATGATCGCTTGGTGTGATAGGTACCCAATCCTATCGTGCCGGAGCTAACGCGTTAAGCGATCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGA
CGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAAATGTAGTGGACCGGGGTGGAAACATCCCTTTTCGCAA
GAACCGCTATATAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTATTGCCAGTTGCCATCGGGTTATGCC
GGGCATCTGGCGAA

>CAM2P2D10 Burkholderia sp. NGR195A (Betaproteobacteria)
AGCGTGCGCAGGCGGTTCGCTAAGACCGATGTGAAATCCCCGGGCTTAACCTGGGAACTGCATTGGTGACTGGCGGGCTAGAGTATGGCAGAGGGGGGTAGAATTCCAC
GTGTAGCAGTGAAATGCGTAGAGATGTGGAGGAATACCGATGGCGAAGGCAGCCCCCTGGGCCAATACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACAGGATTAG
ATACCCTGGTAGTCCACGCCCTAAACGATGTCAACTAGTTGTCGGGTCTTCATTGACTTGGTAACGTAACGCGTGAAGTTGACCGCCTGGGGAGTACGGTCGCAA
GATTAAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATGATGTGGATTACTTCGATGCAACGCGAAAAACCTTACCTACCCTTGACATGTACGGAACCTTG
CTGAGAGGTGAGGGTGCCCGAAAGGGAGCCGTAACACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTG
TCCCTGTTGCTACGCAAGAGCAC

>CAM2P2D11 Uncultured bacterium (Betaproteobacteria)

GGGCGTAAGCGTGCGCAGCGGTGATGCAGACAGATGTGAAATCCCCGGGCTCAACTGGGAACTGCATTTGTGACTGCATTGCTGGAGTGCGGCAGAGGGGGATGGAATT
CCGCGTGTAGCAGTGAAATGCGTAGATATGCGGAGGAACACCGATGGCGAAGGCAATCCCCTGGGCCTGCACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACAGGA
TTAGATACCCTGGTAGTCCACGCCCTAAACGATGTCAACTGGTTGTTGGACGGCTTGCTGTTCAGTAACGAAGCTAACGCGTGAAGTTGACCGCCTGGGGAGTACGGCC
GCAAGGTTGAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATGATGTGGTTTAATTCGATGCAACGCGAAAAACCTTACCTACCCTTGACATGCCCGGAAT
CCTG

>CAM2P2E01 Uncultured acidobacteria bacterium (Acidobacteria)
GGCGTAAAGGGCGCGTAGCGTTCGGTAAGTCACTGTGAAACTCTGGGCTCAACTCAGAGCCTGCATGCGAAACTGCCGTGCTAGAGTGTGGGAGAGGTCGTGGAATCCC
GGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCTCACTGGACCAAAACTGACGCTGAGGCGCGAAAGCTAGGGGAGCAAACAGGATTA
GATACCCTGGTAGTCCTAGCCCTAAACGATGATTGCTTGGTGTGTCCGGTATCGAATCCCGACGTGCCGAAGCTAACGCGATAAGTATTCCGCCTGGGGAGTACGGTCG
CAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCT

>CAM2P2E02 Uncultured bacterium 9Acidobacteria)
GGGTGTAAGGGTCGTAGGCGGTGTGGCAAGTCGGGAGTGAAATTTCTGGGCTTAACTCAGAGACTGCTTCCGAAACTGCTGTGCTCGAGTGTGGGAGAGGCGCGTGGAA
TTGCAGGTGTAGCGGTGAAATGCGTAGATATCTGCAGGAACACCCGTGGCGAAAGCGGCGCGCTGGACCACTACTGACGCTGAGGAACGAAAGCTAGGGGAGCAAACAG
GATTAGATACCCTGGTAGTCCTAGCCCTAAACCATCAGGACTTGGGGTGCCTTCCGTTCGGAAGTCGTCCCGGAGCTAACGCGTTAAGTCCTGCACCTGGGGAGTACGG
TCGCAAGACTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCTACGCGAGGAACCTTACCTGGGCTCGAAATGCTTCTG
ACCAGCTGTAGAAATACGGCCTTCCCGCAAGGGACAGGAGTATAGGCGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAA
CCCCTGCACGTAGTTGCCACTCGCAAGAGGGAACTCTACGTGGACTGCTCCGGATAACGGAGAGGAAGGTGGGGATGACGTCAAGTCCGCATGGCCTTTATGT

>CAM2P2E05 Uncultured Holophaga sp. (Acidobacteria)
GCTTCTAAGTCGAACGTGAAATCCCCGGGCTCAACCGGGAACTGCGTCCGATACTGGAAGGCTTGAATCCGGGAGAGGGATGCGGAATTCCAGGTGTAGCGGTGAAATG
CGTAGATATCTGGAGGAACACCGGTGGCGAAGGCGGCATCCTGGACCGGCATTGACGCTGAGGCGCGAAAGCCAGTGGAGCAAACGGGATTAGATACCCCGGTAGTCCT
GGCCCTAAACGATGAATGCTTGGTGTGGCGGGTATCGATCCCTGCCGTGCCGAAGCTAACGCATTAAGCATTCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAA
GGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCCAGGCTTGAACTGCGAGTGACAACCTACGAAAGTAGGCT
TCCGCAAGGACGCTCGTAGAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTGTCTTCTGTTGCCATCGGG
TTATGCCGGGCACTCTGAAGAGACTGCCGGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAGTCAGCATGGCCTTTATGTCTGGGGCCACACACGTGCTACAATGGC
CGGTACAAACCGTCGCGA

>CAM2P2E06 Uncultured bacterium (Acidobacteria)
GGCGTAAGAGTGTGTAGGTGGTGTCCAAGTTTGTCGTGAAATCTCCCGGCTTAACTGGGAGGGTGCGTGCGAAAAACTGGAATGCTTGAGGATGGGAGAGGAAAGCGGA
ATTCCTGGTGTAGCGGTGAAATGCGTAGATATCAGGAGGAACACCCGTGGTGTAGACAGCTTTCTGGACCATTTCTGACACTGAGACACGAAAGCGTGGGTAGCAAACA
GGATTAGATACCCTGGTAGTCCACGCCCTAAACGATGCATACTTGGTGTGAGCCATTCATTTGGTTCGTGCCGGAGCTAACGCGTTAAGTATGCCGCCTGGGGAGTACG
GTCGCAATGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAACGGCTATG
GATCGACCGTAGAAATATGGTTTTCCCGCAAGGGACTGTAGTCGAGGTGCTGCATGGCTGTCGTCA

>CAM2P2E10 Uncultured bacterium KF/GS-JG36-31 (Acidobacteria)
CGGTGTGGCAAGTCGGTAGTGAAATCTCTGGGCTTAACTCAGAGGCTGCTGCCGAAACTGCTGTGCTCGAGTGCGAGAGAGGCGAGTGGAATTGCAGGTGTAGCGGTGA
AATGCGTAGATATCTGCAGGAACATCCGAGGCGAAAGCGGCTCGCTGGATCGCAACTGACGCTGAGGGACGAAAGCTAGGGGAGCAAACAGGATTAGATACCTGGTAGT
CCTAGCCCTAAACGATCAGGACTGGGCGTGGGCCCTGTACGGGGCTCGTGCCGTAGCTAACGCGTTAAGTCCTGCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAA
AGGAATTGACGGGGGCCCGTACAAGCGGTGGAACATGTGGTTCAATTCGACGCAACGCGAAGAACCTTACCTGGGCTTGAACCGCACAGGACCATCTTTGGAAACAGAG
ACTTCCCGCAAGGGACCTGTGTAGAGGTGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTCGGGTTAAGTCCCGCAA

>CAM2P2F02 Uncultured bacterium (Betaproteobacteria)
TACTGGGCGTAAGCGTGCGCAGGCGGTTTTGCAAGACAGATGTGAAATCCCCGGGCTAACCTGGGAACTGCATTTGTGACTGCATGGCTGGAGTGCGGCAGAGGGGGAT
GGAATTCCGCGTGTAGCAGTGAAATGCGTAGATATGCGGAGGAACACCGATGGCGAAGGCAGTCCCCTGGGCCTGTACTGACGCTCATGCACGAAAGCGTGGGGAGCAA
ACAGGATTAGATACCCTGGTAGTCCACGCCCTAAACGATGTCAACTGGTTGTTGGACGGCTTGCTGTTCAGTAACGAAGCTAACGCGTGAAGTTGACCGCCTGGGGAGT
ACGGCCGCAAGGTTGATACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATGATGTGGTTTAATT

>CAM2P2F04 Uncultured bacterium (Gammaproteobacteria)
CTGGGCGTAAAGCGTGCGTAACGGTAGCGTAAGTCGGGTGTGAAAGCCCCGGGCTCAACTGGGAATTGCATTCGAGACTGCTCTGCTAGGGTGCGGAAGAGGGAAGCGG
AATTTCCGGTGTAGCGGTGAAATGCGTAGATATCGGAAGGAACACCAGTGGCGAAAGCGGCTTCCTGGTCCAGCACCGACGTTCAGGCACGAAAGCGTGGGGAGCAAAC
AGGATTAGATACCCTGGTAGTCCACGCCATAAACGATGAGAACTAGACGTTGAGAGGGTAAGCCTCGCAGTGTCGTAGCTAACGCGCTAAGTTCTCCGCCTGGGGAGTA
CGGCCGCAAGGTTGA

>CAM2P2F05 Uncultured bacterium (Alphaproteobacteria)
CCGGGGCTCACTCCGGATGCTTTAAGACTGCATCGCTAGAATTGTGGAGAGGTAAGTGGAATCCGAGTGTAGAGGTGAAATCGTAGATATTCGGAAGAACACCAGTGGC
GAAGGCGACTTACTGGACACATATTGACGCTGAGTGCGAAAGCGTGGGGAGCAAACAGGATAGATACCCCGGTAGTCCACGCCGTAAACGATGATGACTAGCTGTCTGG
GCGCTTAGCGTTCAGGTGGCGCAGCTAACGCGTTAAGTCATCCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCGAAGAAATTGACGGGGGCCTGCACAAGCGGTGGA
GCATGTGGTTTAATTCGAAGCAACGCGCAGAACCTTACCAGCGTTTGACATGCCAGGACGGTTTCCAGAGATGGATCCCTTCCCTTACGGGACCTGGACACAGGTGCTG
CATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTCGTCTTTAGTTGCCACCATTTAGTTGGGCACTCTAAAGAAACTGCCG
GTGATAAGCCGGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCCTTACGCGCTGGGCTACACACGTGCTACAATGG

>CAM2P2F06 Uncultured bacterium (Verrucomicrobiae)
TTGGGCGTAAAGGGTGTGTAGGTGGCGCGCTAAGTCGGGCTGTGAAATTTCGGAGCTTACTCCGAAACTGCATTCGATACTGGCGTGCTTGAGGACTGGAGAGGAGACT
GGAATTTACGGTGTAGCAGTGAAATGCGTAGATATCGTAAGGAAGACCAGTGGCGAAGGCGGGTCTCTGGACAGTTCCTGACACTGAGACACGAAGGCCAGGGGAGCAA
ACGGGATTAGATACCCCGGTAGTCCTGGCAGTAAACGGTGCACGTTTGGTGTGGGAGGATTCGACCCCTTCTGCGCCGGAGCCAACGCGTTAAACGTGCCGCCTGGGGA
GTACGGTCGCAAGATTAAAACTCAAGAAATTGACGGG

>CAM2P2F08 Uncultured Holophaga sp.(Acidobacteria)
GGGAACTGCGTCCGATACTGGAAGGCTTGAATCCGGGAGAGGGATGCGGAATCCAGGTGTAGCGGTGAAATGCGTAATATCTGGAGGAACCCGGGGCGAAGGCGGCATC
CTGGACCGGCATTGACGCTGAGGCGCGAAAGCCAGGGAGCAAACGGGATTAATACCCCGGTAGTCCTGGCCCTAAACGATGAATGCTTGGTGTGGCGGGTATCGATCCC
TGCCGTGCCGAAGCTAACGCATTAGCATTCCGCTGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATGACGGGGGCCCGACAAGCGGGGAGCATGTGGTCAATTCGA
CGCAACGCGAAGAACCTTACCCAGGCTTGAACTGCGAGTGACATCCTACGAAAGTAGGCTTCCGCAAGGACACTCGTAGAGGTGCTGCATGGCTGTCGTCAGCTCGTGT
CGTGAGATGT

>CAM2P2F10 Uncultured bacterium (Sphingobacteria)
TAAGTCAGTGGTGAAATCTCCGGGCTTAACCCGGAAACTGCCGTTGATACTATCTGTCTTGAATGCCGTGGAGGTGAGCGGAATATGTCATGTAGCGGTGAAATGCTTA
GATATGACATAGAACACCGATTGCGAAGGCAGCTCGCTACACGGTTATTGACGCTGAGGCACGAAAGCGTGGGGATCAAACAGGATTAGATACCCTGGTAGTCCACGCC
CTAAACGATGATCACTCGACATCAGCGATACACTGTTGGTGTCTGAGCGAAAGCATTAAGTGATCCACCTGGGAAGTACGACCGCAAGGTTGAAACCCAAAGGAATTGA
CGGGGGTCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGATACGCGAGGAACCTTACCTGGGCTAGAATGTCCCGCGACAGGTGGTGAAAGCTACCCTTGTAGCA
ATACACGCGGGATAAGGTGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAATCCCCATCACTAGTTGGCATCAGGTAATG
CTGGGAACTCTAGTGAAACTGCCGTCGTAAGACGCGAGGAAGGAGGGGATGATGTCCAGTCATCATGGCCTTTATGCC

>CAM2P2F11 Uncultured bacterium (Anaerolineae)
CTGGGCGTAAAGCGCGTGCAGGCGGTTCGGTAAGTTGGGCGTGAAATCTCCTGGCTTACTAGGAGAGGTCGTTCAATACTACCGGGCTAGAGAGTGGTAGAGGAAGATG

GAATTCCCGGTGTAGTGGTGAAATGCGTAGATATCGGGAGGAACACCAGTGGCGAAAGCGATCTTCTGGACCATTTCTGACGCTCAGACGCGAAAGCTAGGGTAGTAAA
CGGGATTAGAGACCCCGGTAATCCTAGCCGTAAACGATGTTAACTTGGTGTCGGTGGCTTAAACTCTGTCGGTACCGAAGCAAACGCGATAAGTTAACCGCCTGGGGAC
TACGATCGCAAGATTAAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCAGCGGAGCGTGTGGTTTAATTCGATGCTACACGAAGAACCTTACCCGGGTTTGACATGC
AAGTGGTAGTGATCTGAAAGGTGAACGACCCGCAAGGGAGCTTGCACAGGTGTTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTCGGTTAAGTCCGCTAACGAGC
GCAACCCTCGC

>CAM2P2F12 Uncultured bacterium (Acidobacteria)
TGAAATTTCTGGGCTTACTCAGAACCTGCTTCCGAAACTGCTGTGCTCGAGTGTGGGAGAGGCGCGTGGAATTGCAGGTGTAGCGGTGAAATGCGTAGATATCTGCAGG
AACACCCGTGGCGAAAGCGGCGCGCTGGACCATTACTGACGCTGAGGAACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATCAG
GACTTGGGGTGCCACCCGTTCGGGTGTCGTCCCGGAGCTAACGCGTTAAGTCCTGCACCTGGGGAGTACGGTCGCAAGACTGAAACTCAAAGGAATTGACGGGGGCCCG
CACAAGCGGTGGAACATGTGGTTCAATTCGACGCTACGCGAGGAACCTTACCTGGGCTCGAAATGCTGCTGACCAGCTGTAGAAATACGGCCTTCCCGCAAGGGACAGT
AGTATAGGCGCTGCATGGCTGTCGTCAGCTCGTGCCGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGCACGT

>CAM2P2G01 Uncultured bacterium (Acidobacteria)
TGTGAAATCTCCTGGCTCAACTGGGAGCTTGCAGGCGAAACTGCCGTGCTGGAGTGTGGGAGAGGTGCGTGGAATTCCCGGTGTAGCGGTGAAATGCGTAGATATCGGG
AGGAACACCTGTGGCGAAAGCGGCGCACTGGACCACAACTGACGCTGAGGCGCGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACCAT
GGATGCTTGGTGTGATGGGTACCCAATCCTATCGTGCCGCAGCTAACGCGTTAAGCATCCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGG
GCCCGCACAAGCGGTGGAGCATGTGGTTCAAT

>CAM2P2G03 Uncultured bacterium (Betaproteobacteria)
CTGGGAATGGCATTTGGGACTGCAGGCTTGAGTGCGGCAGAGGAGACTGGAATTCCTGGTGTAGCAGTGAAATGCGTAGATATCAGGAGGAATACCGATGGCGGAGGCA
GGTCTCTGGGCTGACACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACAGGATTAATACCTGGTAGTCCACGCCCTAAACGATGTCGACTGGTTGTTGGGGGTTTGA
CACTCTCAGTAACGAAGCTAACGCGTGAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATTATGTG
GATTAATTCGATGCAACGCGAAAAACCTTACCTACCCTTGACATGTCCGGAAGCCTGCTGAAAGGCGGGTGTGCTCGAAAGAGAACCGGAACACAGGTGCTGCATGGCT
GTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAATCCTTGCCATTAGTTGCCACCCGTAAGGGGGCACTCTAATGGGACTGCCGGTGACAAA
CCGGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCCTTATGGGTAAGGCTTCACACGTAATACAATGGCGCGTACAGAGGGTAACCAA

>CAM2P2G05 Uncultured bacterium (Acidobacteria)
TGGGCGTAAAGGGCGCGCAGGCGGTGTGGTAAGTCACCTGTGAAATCTCCCGGCTTACTGGGAGTCTGCAGGCGAAACTACCGTGCTGGAGTGTGGGAGAGGTGCGTGG
AATTCCCGGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCGCACTGGACCATAACTGACGCTGATGCGCGAAAGCTAGGGGAGCAAAC
AGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATGATTGCTTGGTGTAGCAGGTACCCAATCCTGCTGTGCCGCAGCTAACGCGATAAGCAATCCGCCTGGGGAGT
ACGGTCGCAAGGCTGAAACTCGAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAACTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAAATGCA
GGAGACCGGGGTGGAAACATCCCTTCCCCTTAAAAGGCTGCTGCATAG

>CAM2P2G06 Uncultured proteobacterium (Alphaproteobacteria)
GTCAGTGGTGAAAGCCCGGAGCTCCTCCGGAATTGCCATTGAAACTGTTGGACTGGAGTACGAGAGAGGTGAGTGGAATTCCCAGTGTAGAGGTGAAATTCGTAGATAT
TGGGAAGAACACCGGTGGCGAAGGCGGCTCACTGGCTCGTAACTGACGCTCAGGCGCGACAGCGTGGGGATCAAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAA
CGATGAATGCTAGCCGTTGGATAGCTTGCTATTCAGTGGCGCAGCTAACGCATTAAGCATTCCGCCTGGGGAGTACGGCCGCAAGGTTGAAACTCAAAGGAATTGACGG
GGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGCAGAACCTTACCAGGGTTTGACATCCTGCGACCGCCTCTTAATAGGGGTTTTCCCGCAAGGG
ACGCAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACG

>CAM2P2G07 Uncultured bacterium (Acidobacteria)
ATCCAAAACTGGCGGGCTAAGTCTGGAGGGGGTATGGAATCCTGGTGTACGGTGAAATGCGTAATTCAGAGAACACCGGTGGCGAAGGCGGCTACCTGGACAGAAACTG
ACGCTGAGGCACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATGGATACTTGGTGTGACCGGGATTGAATCCGGTCGTGCCGAA
GCTAACGCATTAAGTATCCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGTATGTGGTTTAATTCGACGCAA
CGCGAAGAACCTTACCTGGGCTCGAACGGCTAGTGACAGGTGGCGAAAGTCGCTTTTCCCGCAAGGGACA

>CAM2P2G09 Uncultured bacterium (Acidobacteria)
CAGAGCCTGCATCTAAAACTGGCTGGCTAGAGTTCTGGAGGGGGTAGCGGAATTCCTGGTGTATCGGTGAAATGCGTAGATATCAGGAGGAACACCGGTGGCGAAGGCG
GCTACCTGGACAGAAACTGACGCTGAGGCACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATGGATACTTGGTGTGACTGGGAT
TGAATCCAGTCGTGCCGAAGCTAACGCATTAAGTATCCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGTAT
GTGGTTTAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAACGGCTAGCGACAGGTGGCGAAAGTCGCTTTTCCCGCAAAGGACACTAGTCGAGGTGCTGCATGG
CTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAAC

>CAM2P2G10 Uncultured bacterium (Acidobacteria)
TGGGCGTAAAGGGCGCGTAGGCGGTCTGACAAGTCTGATGTGAAATCTCTGGGCTCAACCCAGAGTCTGCATTAGAAACTGTCGGGCTTGAGTATGGGAGAGGTGAGTG
GAATTTCCGGTGTAGCGGTGAAATGCGTAGATATCGGAAGGAACACCTGTGGCGAAAGCGGCTCACTGGACCATAACTGACGCTGAGGCGCGAAAGCTAGGGGAGCAAA
CAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATGATTGCTTGGTGTGACAGGTACCCAATCCTGTCGTGCCGAAGCTAACGCGATAAGCAATCCGCCTGGGGAG
TACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAAATGG
AGTGGAATCCGGTAGAAATATCGGCGTCTAGCAATAGACCGCTATATAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGC
GCAACCCTTATCTTCAGTTGCTACCATTTAGTTGAGCACTCTGACGAAACCGCCTCGGATAACGGGGAGGAAGGTGGGGATGACGCCAAGTCCTCATGGCCTTTATGTC
CAGGGCTACACACGTGCTACAATGGCCGGTACAAACCGCTGCAAACCCGCGAGGGGGAGCTAATCGGAAA

>CAM2P2G12 Uncultured forest soil bacterium(Não classificada)
CGTAAGCGCTCGTAGTGGATTGCAAGTCTGCAGGAAAGACCGGGCTCAACTCGGGAACCCGTGTGGATACTGCAAACCTTGAGGTATCAGAGGATGATGGAATCCCGGT
GTAGCGGTGAAATGCGTAGATTCGGGAGGAACACCAGTGGCGAAGGCGATCATCTGGGGCTAACCTGACACTGAGGAGCGAAAGCTAGGGGAGCAAACGGGATTAGATA
CCCCGGTAGTCCTAGCCGTAAACGATGGACACTAGGTGTAGGTGGTATCGACTCCATCTGTGCCGCAGTTAACACAATAAGTGTCCCGCCTGGGGAGTACGGCCGCAAG
GTTAAAACTCAAAGGAATTGACGGGGGCCCGCACCAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCGGGGCTTGACATCCTGCGACATCTTA
GGAGACTAAGTTTCCGGGCAACCGGACGCAGAGA

>CAM2P2H01
CGTAAGCGTGCGCAGGCGGTTTTGCAGCCGGATGTGAAATCCCCGGGCTTACCTGGGAATGGCATTTGGGACTGCAAGGCTGGAGTGCGGCAGAGGAGACTGGAATTCC
TGGTGTAGCAGTGAAATGCGTAGATATCAGGAGGAACACCGATGGCGAAGGCAGGTCTCTGGGCTGACACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACAGGATT
AGATACCCTGGTAGTCCACGCCCTAAACGATGTCGACTGGTTGTTGGGGGTTTGACACCCTCAGTAACGAAGCTAACGCGTGAAGTCGACCGCCTGGGGAGTACGGCTG
CAAGGTTAAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATTATGTGGATTAATTCGATGCAACGCGAAAAACCTTACCTACCCTTGACATGTCCGGAAGC
CCGGTGAGAGCTGGGGGTGCCCGAAAGGGAACCGGAACACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCC
TTGTCATTAGTTGCTACATTCAGTTGGGCACTCTAATGAGACTGCCGGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCCTT

>CAM2P2H03 Uncultured bacterium (Acidobacteria)
GACAAGTCACTTGTGAAATCTCCGGGCTTACTCGGAACGGCCAAGTGATACTGTCGCGCTAGAGTGCGGAAGGGGCAATCAGAATTCTTGGTGTAGCGGTGAAATGCGT
AGATATCAAGAGGAATACCTGAGGTGAAGACGGGTTGCTAGGCCGACACTGACGCTGAGTGCGCGAAAGCCAGGGGAGCAAACGGGATTAGATACCCCGGTAGTCCTGG
CCCTAAACGATGAATACTTGGTGTCTGGAGTTTTTAGTGCTCCGGGTGCCGTCGCTAACGTTTTAAGTATTCCGCCTGGGGAGTACGCTCGCAAGAGTGAAACTCAAAG
GAATTGACGGGGACCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCTGGACTAGAATGTGAGGGAATGTTGGGTAATGCCATCAGT
CTGGGAAACCAGACCCAAAACAAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTATTGACAGTTGCCAAT
ATTAAGTTAGGAACTCTGTCAAGACTGCTGTTGATAAAACGGAGGAAGGTGGGGATGATGTCAAGTCA

>CAM2P2H04 Uncultured bacterium
CTGCAGGCGAACTGCGTGCTGGAGTGTGGGAGAGGTGCGTGGAATTCCCGGTGTACGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCGCACTGG
ACACAACTGACGCTGATGCGCGAAAGCTAGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCTAGCCCTAAACGATGGATGCTTGGTGTGTCGGGTACCCAATCCCGC
CGTGCCGAAGCTAACGCGATAAGCATCCCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAAT
TCGACGCAACGCGAAGAACCTTACCTGGGCTCGAAGCGCAGTGGACCGGGGTAGAAATATCCCTTTCCGCAAGGACCGCTGCGGAGGTGCTGCATGGCTGTCGTCAGCT
CGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTATCCCTAGTTGCCATCGGGTCAAGCCGGGCACTCTAGTGAAACCGCCCCGGATAAC

>CAM2P2H05 Uncultured bacterium (Alphaproteobacteria)
TGAAATCCTGGAGCTCACTCCAGAACTGCCCTTGATACTGAGGAGCTTGAGTCCGGGAGAGGTGAGTGGAACTGCGAGTGTAGAGGTGAAATTCGTAGATATTCGCAAG
AACACCAGTGGCGAAGGCGGCTCACTGGCCCGGTACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGGA
TGCTAGCCGTTGTCGGGTTTACTCGTCAGTGGCGCAGCTAACGCATTAAGCATCCCGCCTGGGGAGTACGGTCGCAAGATTAAAACTCAAAGGAATTGACGGGGGCCCG
CACAAGCGGTGGAGCATGTGGTTCAATTCGAAGCAACGCGCAGAACCTTACCAGCCTTTGACATCCCGGTCGCGGGCACCAGAGATGGAGCCTTTCAGTTCGGCTGGAC
CGGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTCGCCCTTAGTTGCCATCATTTAGTTGGGCACT
CTAAGGGGACTGCCGGTGATAAGCCGCGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCCTTACAGGCTGGGCTACACACGTGCTACAATGGCGGTGACAATGGGA
CGCAATGGGG

>CAM2P2H06 Uncultured bacterium (Verrucomicrobiae)
GTGAAATTTCGGAGCTTACTCCGAAACTGCATTCGATACTGGCGTGCTTGAGGACTGGAGAGGAGACTGGAATTTACGGTGTAGCATTGAAATGCGTACATATCGTAAG
GAAGACCAGTGGCGAGGGCGGGTCTCTGGACAGTGCCTGACACTGATGACACGAAGGCCAGGGGAGCAAACGGGATTAGATACCCCGGTAGTCCTGGCAGTAAACGGTG
CACGTTTGGTGTGGGAGGATTCGACCCCTTCTGCGCCGGAGCCAACGCGTTAAACGTGCCGCCTGGGGAGTACGGTCGCAAGATTAAAACTCAAAGAAATTGACGGGGG
CCCGCACAAGCGGTGGAGTATGTGGCTCATTTCGATGCGACGCGAAGAACCTTACCAGGCCTTGACATGCATCTCTAAGTTGGTGAAAGCCAGCGAGTCTCGAAAGAGA
CAATTTGCACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAAACCCTGTGAACTGTTGCCACGGAACCGAGAGGT
TCCAGCACTCTGTTCAGACTGACTCGCTTAAACGAGGAGGAAGGTGGGGACGACGTCAAGTCAGTATGGCCCTTAC

>CAM2P2H08 Uncultured bacterium (Deltaproteobacteria)
GGCGGTTCGTTAAGTCAGATGTGAAAGCCCCGGGCTCAACTCGGGAAGTGCATTTGAAACTGGCGAGCTTGAGTATGGAAGAGGATCGCGGAATTCCCGGTGTAGAGGT
GAAATTCGTAGATATCGGGAGGAACACCAGTGGCGAAGGCGGCGATCTGGGCCAATACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGATACCCTGGT
AGTCCACGCCGTAAACGATGGATGCTAGATGTCGCGGGTATTGACCCCTGCGGTGTCGCAGCTAACGCATTAAGCATCCCGCCTGGGGAGTACGGCCGCAAGGTTAAAA
CTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGACGCAACGCGCAGAACCTTACCTGGGTTAAATCCAACGGAACCCTGCAGAGATGT
GAGGGTGCCCTTCGGGGAATCGTTGAGACGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGTCGTTAGTT
GCTAACAGTTAGGCTGAGCACTCTAACGAGACCGCCGGTGTTAAACCGGAGGAAGGTGGGGATGACGTCAAGTCCTCATGGCCCTTATGCCCAGTGCTACACACGTGCT
ACAATGGCCGGTACA

>CAM2P2H09 Uncultured bacterium (Verrucomicrobiae)
CGGTTCGGTAAGTCGGGTGTGAAATCTCGGGGCTTACTCCGAAACTGCATTCGATACTGCCGTGCTTGAGGACTGGAGAGGAGACTGGAATTTACGGTGTAGCGGTGAA
ATGCGTAGATATCGTAAGGAAGACCAGTGGCGAAGGCGGGTCTCTGGACAGTTCCTGACGCTGAGGCACGAAGGTCAGGGGAGCAAACGGGATTAGATACCCCGGTAGT
CCTGACAGTAAACGGTGCACGTTTGGTGTGGGAGGATTCGACCCCTTCTGCGCCGGAGCTAACGCGTTAAACGTGCCGCCTGGGGAGTACGGTCGCAAGATTAAAACTC
AAAGAAATTGACGGGGGCCCGCACAAGCGGTGGAGTATGTGGCTCAATTCGATGCAACGCGAAGAACCTTACCAGGCCTTGACATGCATCTCTAAGTTGGTGAAAGCCA
GCGAGTCCCGCAAGGGACAATTTGCACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGTGAACTGTTG
CCACCGAGCCGTGAGGCTCGAGCACTCTGTTCAGACTGCCCCGCTCTAACGGGGAGGAAGGTGGGGACGACGTCAAGTCAGTATGGCCCTTACGGCCTGGGCTGCACAC
GTAC

>CAM2P2H10 Uncultured bacterium (Actinobacteria)
GCAGGTCAGCTGTGAAAACTCAAGGCTCAACCTTGAGACGTCGGTTGAAACCGTATGGCTAGAGTCCGGAGGAGGAGAGTGGAATTCCCGGTGTAGCGGTGAAATGCGC
AGATATCGGGAAGAACACCCATGGCGAAGGCAGCTCTCTGGGACGGTACTGACGCTGAGACGCGAAAGCGTGGGGAGCGAACAGGATTAGATACCCTGGTAGTCCACGC
CGTAAACGATGGGAACTAGGTGTGGCGGGTGTCGACTCCCGCTGTGCCGAAGCTAACGCATTAAGTTCCCCGCCTGGGGAGTACGGACGCAAGGCTAAAACTCAAAGGA
ATTGACGGGGGCCCGCACAAGCAGCGGAGCATGTGGTTTAATTCGACGCAACGCGAAGAACCTTACCAGTGCTTGACATGCATTGGAAAACCGTGGAAACACGGTCCCC
CTTCGGGGCTAATGCACAGGTGGTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAATCCCTGTTCCATGTTGCCAGCGCGTA
ATGGCGGGGACTCATGGAAGACTGCCGGTGACAAAGCGTAACAAGGTAGAGCTCTCAGTCAGTCAAAGGGCG

>CAM2P2H11 Uncultured bacterium (Sphingobacteria)
TCAGTGGTGAAATCTCTGGGACTTACCCGGAAACTGCCATTGATACTATATGTCTTGAATATCGTGGAGGTCAGCGGAATGTGTCATGTAGCGGTGAAATGCTTAGATA
TGACATAGAACACCAATTGCGAAGGCAGCTGGCTACCCGAATATTGACACTGATGCACGAAAGCGTGGGGATCAAACAGGATTAGATACCCTGGTAGTCCACGCCCTAA
ACGATGGATACTCGACATACGCGATATACTGTGTGTGTCTGAGCGAAAGCATTAAGTATCCCACCTGGGAAGTACGATCGCAAGATTGAAACTCAAAGGAATTGGCGGG
GGTCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGATACGCGAGGAACCTTACC

>CAM2P03A02 Uncultured Rubrobacteridae (Actinobacteria)
TATGAGTCCCCGACGAATCGCTGGCACATAGGACAGGGTTGCGCTCGTTGCGGGACGTAACCAAATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACT
AGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCAGTGCATGTCAAGCCCTGAGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGG
CCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCC
ATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTT
CCCGATATCTGCGCATTTCACCGCTACACCGGGAATTCCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCAACCGACGTCTCGAGGTTGAGCCTCGAGTTTTCACA
GCTGACCTGAATGGCCGCCTACACGCTCTTTACGCCCAATAAATCCGGACAACGCTTGCCCCCTACGTATTACCGCGGCTGCTGGCACTCAGTCAGTCA

 >CAM2P03A03 Uncultured Rubrobacteridae bacterium (Actinobacteria)
TTGCGCTCGTTGCGGGACGTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCA
GTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCG
TACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCC
TGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAAT
TCCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCAACCGACGTCTCGAGGTTGAGCCTCGAGTTTTCACAGCTGACCTGAATGGCCGCCTACACGCTCTTTACGCC
CAATAAATCCGGACAACGCTTGCCCCCTACGTATTACCGCGGCTGCTGGCACTCAGTCAGTCA

>CAM2P03A04 Unidentified eubacterium from the Amazon (Não classificada)
CATACTTAGCACTGTCCCCTTGCGGGTTACACGGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGCGGCAT
GCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGACG
GTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTG
CCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATG
CCCTTGCGGGAGTCGACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTTGAACCACATGCTCCACCGCTTGTGCGGGCCC
CCGTCAATTCCTTTGAGTTTCAGCCTTGCGANCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCA

>CAM2P03A05 Uncultured bacterium (Acidobacteria)
ACCTCCCTTGCGGGTTGGTCCGGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAACATTCTGATTTGC
GATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGG
CCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAAT
GTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCCAG
ACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTC

CTTTGAGTTTCACACTTGCGTGC

>CAM2P03A06 Uncultured soil bacterium (Não classificada)
TGTACAAGGCCCGGGAACGTATCACCGCGGCGTGCTGATCCGCGATTACTAACGATTCCAACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTT
CTCCGATTAGCTCGACCTTACGGTTTTGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCAACTTC
CTCCGGTTTATCACCGGCAGTCTCTGCAGAGTTGCCACCATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACAA
GCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGGCAACTTTCGTCGCTGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAAT
TGAACCACATGCTCC

>CAM2P03A07 Uncultured soil bacterium (Não classificada)
GTGATGTGACGGGCGGTGTGTACAATGGCCCGGGAACGTATCACGCGGCGTGCTGATCCGCGATTACTAACGATTCCAACTTCATGCAGGCGAGTTGCAGCCTACAATC
CGAACTGAGACCGGCTTTCTCCGATTAGCTCGACCTTACGGTTTTGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTT
GACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTGCAGAGTGCCCACCATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACC
CAACATCTCACGACACAAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGTGCAACTTTCGTCGCTTGGTCACTCGCTGTTCAAGCCTGGGTAAGG
TTCTTCGCGTTTGCGTCGAATTTGAACCACATGCTCCACCGCTTGTG

>CAM2P03A09 Uncultured bacterium (Acidobacteria)
AGTACAACCTACTTTCGTGATGTGGACGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGAAGTCG
AGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATA
AAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATATGGGTTGCGCTCGT
TGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTCTCTGGGTCTGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCC

>CAM2P03A10 Uncultured Rubrobacteridae (Não classificada)
ACTGCACACTAGCCCCGAAGGGGGACGTATTTCTACGGTTTCCAGTGCATGTCAAGCCCTGGTAAGTGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCT
TGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACAC
CTAGTGCCCATCGTTTACGGCGTGGACTACCAGTGTATCTAATCCTGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCTGTCCCAGAGAGCCGCCTTCGCCAC
GGGTGTTCTTCCCGATATCTTGCGCATTTCACCTGCTACACCGGGAATTCCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCAACCTGACGTCTCGAGGTTGAGCC
TCGAGTTTTCACATGCTTGACCTGAATTGGCTGCTACACGCTCTTTACGCCCAATAAATCCGGACAACGCTTGGCCCCTACGTATT

>CAM2P03A11 Uncultured Acidobacteria bacterium (Não classificada)
GTGATTCTAGTACAGCAGCTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACGCGGCATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAG
GCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCTGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGG
ACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTTGTCACCGGCAGTCTCTCCAGAGTGCCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTT
GCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCGGGAGTCGACTTTCGCCGATTGTCATCTG
CACTTCGAGCCCAGGTAAGGTTCTTCGCGTTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTA
CTCCCCAG

>CAM2P03B01 Unidentified eubacterium (Não classificada)
GACATACTTAGCACTGTCCCCTTGCGGGTTACACGGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGG
CATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCG
ACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGA
GTGCCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAG
ATGCCCTTGCGGGAGTCGACTTTCGCCGATTTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGG
CCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCGATAC

>CAM2P03B02 Uncultured soil bacterium (Não classificada)
TGTCCCCTTGCGGGTTACACGGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATGCTGATCCGCGA
TTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCGGC
CATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTGCCCAGCTTTACC
TGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCGGGAG
TCGACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTT
TGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCGATA

>CAM2P03B03 Uncultured Rubrobacteridae (Actinobacteria)
TTGCGCTCGTTGCGGGACGTAACCCAAATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCAG
TGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGT
ACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCT
GTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAATT
CCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCAACCGACGTCTCGAGGTTGAGCCTCGAGTTTTCACAGCTGACCTGAATGGCCGNCTACACGCTCTTTACGCCC
AATAAATCCGGACAACGCTTGCCCCCTACGTATTACCGCGGCTGCTGGCACTCAGTCAGTCA
>CAM2P03B04 Unidentified eubacterium (Não classificada)
TGTCCCCTTGCGGGTACACGGTGATTTCTAGTACAGCAGCTTCGTGATGTGACGGCGGTGTGTCAAGGCCGGGAACGTATCACGCGGCATGCTGATCCGCGATTACTAG
CGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTTGAGACCGGCTTTTTCCTGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCGGCCATTG
TAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTGCCCAGCTTTACCTGATG
GCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCGGGAGTCGAC
TTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGA

>CAM2P03B05 Uncultured soil bacterium (Não classificada)
GCTCCCTCCCTTGCGGGTTGGTGTGGCGACTTCTAGTACAACCTGGCTTCCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGCGGCGTGCTGATC
CGCGATTACTAACGATTCCAACTTCATGCAGGCGAGTTGCAGCCTACAATCCTGAACTGAGACCGGCTTTCTCCGATTAGCTCGACCTTACGGTTTTGCGACGGTTTGT
ACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCTGGCAGTCTCTGCAGAGTGCCCAC
CATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACAAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTT
GCGGAAGGCAACTTTCGTCGCTGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCCCCTTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGACTTTCAGCCTT
>CAM2P03B07 Unidentified eubacterium from the Amazon (Não classificada)
ATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCTG
GCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCTGGCAGTCTCTCCAGAGTGCCCAGCTTT
ACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCGG
GAGTCGACTTTCGCCGATTTGTCATCTTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCC
> CAM2P03B08 Uncultured soil bacterium (Não classificada)
TTGCGGGTTAACACGGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCTGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTAC
TAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACGGCCATTG
TAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCTGGCAGTCTCTCCAGAGTGCCCAGCTTTACCTGAT
GGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCGGGAGTCG
ACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCAACTGCTTGTGCGGGCCCCCGTCAATTCCTTTG
AGTT

>CAM2P03B10 Bacterium Ellin6099 (Acidobacteria)
CGGGAACGTATCACGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTC
CCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCA
ACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCAT
GCAGCACCTTGTTTTGGGTCTGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCCAATTAAACCACATG
CTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACG

>CAM2P03B11 Uncultured Rubrobacteridae (Actinobacteria)
CGACGAATCGCTGGCACATAGGACAGGGTTGCGCTCGTTGCGGGACGTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGA
AGGGGGACCTGTATTTCTACGGTTTTCCAGTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGCCCCCGTCA
ATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTA
CGGCGTGGACTACCAGGGTATCTAATCCTGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATAT
CTGCGCATTTCACCGCTACACCGGGAATTCCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCAACCGACGTCTCGAGGTTGAGCCTCGACTTTTCACAGCTGACCT
GAATGGCCGCCTACACGCTCTTTACGCCCAATAAATCCGGACAACGCTTGGCCCCTACGTATTACCGCGGCTGCTGGCACTCAGTCAGTCATACCGTATCGCCGCTCCC
GATTC

>CAM2P03B12 Unidentified eubacterium (Não classificada)
TCCCCTTGCGGGTACACGGTGATTCTAGTACAGCCAGCTTTCGTGATGTGAGCGGGCGGGGGGGGTACAAGGCCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATT
ACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCGGCCA
TTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTGCCCAGCTTTACCTG
ATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCGGGAGTC
GACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATTGCTCCANCCTGCTTGTGCGGGCCCCCGTCAATTCCT
TTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCGATACCC

>CAM2P03C01 Uncultured bacterium (Acidobacteria)
GGTACTACTCCCTTGCGGGTTGGTCCGGCCATTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAACATTCTGAT
TTGCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTA
CCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACT
TAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTC
CCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCA
ATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGTATTCATCGTTT
AAGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCGCTGTC

>CAM2P03C02 unclassified_Rubrobacteraceae (Actinobacteria)
ATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCAGTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGC
TCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGNCGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATAC
CCGTCACACCTAGTGCCCATCGTTTACGTGCGTGGACTACCAGGGTATCTAATCCTGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGC
CTTCGCCACGGGTGTTCTTCCCGATATCTTGCGCATTTCACCGCTACACCGGGAATTCCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCAACCTGACGTCT

>CAM2P03C04 Uncultured bacterium (Acidobacteria)
GCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGTGGTGTGTACAAGACCCGGGAACGTATTCACCGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCA
TGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTTGTACCTGGCCATTGTAGCACTGTGTGTAG
CCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATAG

>CAM2P03C05 Bacterium Ellin6099 (Acidobacteria)
TACTCCCTTGCGGGTTGGTCCTGGCACTTCTAGTAAACCTACTTTCGTGATGTGATGGGCGGTGTGTACAAGACCGGGAACGTATTCACCTGCAACATTCTGATTTGCG
ATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCTGG
CCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAAT
GTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACTGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCCAG
ACTCTTGGTGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTC
CTTTGAGTTTCACACTTGCGTTCGTACTCCCCAGGCGGAATACTAAAAACGTTA

>CAM2P03C06 Unidentified eubacterium from the Amazon (Não classificada)
CCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCA
TGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTTGCACCGGCAGTCTCTCCAGAGTGCCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGG
GACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCACATGCCCTTGCGGGAGTCGACTTTCGCCGATTTGTCATCTGCACTTCGAGC

>CAM2P03C07 Uncultured bacterium (Deltaproteobacteria)
GTGTGTACAAGGCCCGGGAACGTATTCACCCCTGCCTGCTGATCAGGGATTACTAGCGATTCCGACTTCAAAGAGTCGAGTTGCAGACTCTTATCTTGTACTGAGGTCA
GTTTTTTGCGATTGGCTCCCCCTCACGGGTTTGCAGCGCTTTGTGCTGACCATTGTAGCACGTGTGTAGCCCTGGACATAAGGGCCATGATGACTTGACGTCATCCCCA
CCTTCCTCCGACTTGAATATCGGCGGTCTCATTAGAGTTCCCGGCATGACCCGCTGGTAACTAATGATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACG
ACACGAGCTGACGACAGCCATGCAGCACCTAACTATGCGTTCTCCGAAGAGCANCCCGATACTTCTACCAGGTTCGCACACTTTCTAGCCCAGGTAAGGTTCTTCGCGT
TGCGTCGAATTAAACCACATGCTCC

>CAM2P03C10 Uncultured soil bacterium (Não classificada)
TCTAGTACAACCGGCTTCCGTGATTGACGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGCGGCGTGCTGATCCGCGATTACTAACGATTCCAACTTCATGCAGGCG
AGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCGACCTTACGGTTTTTGCGACGGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAAGA
CATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCTGGCAGTCTCTGCAGAGTGCCCACCATAAGGTGATGGCAACAGCAGACAAGGGTTG
CGCTCGTTGCGGGACTTAACCCAACATCTCACGACACAAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGGCAACTTTCGTCGCTGGTCACTCGC
TGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACT
CCCCAGGCGGAATGCTTAATG

>CAM2P03C12 Uncultured bacterium (Acidobacteria)
GGGCGGTGTGTACAAGACCGGGAACGTATCACCGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGAC
CGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCC
ACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGAC
ACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTG
CGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGAC
GGCACCCGGAGCTATAGAGACTCCAGACACCAAGTATTCATC

>CAM2P03D01 Uncultured bacterium (Acidobacteria)
TAAATCATACCGTGGTACCTACTCCCTTGCGGGTTGGTCCGGCCATTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCAC
CGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGAT
TGCGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGA
TAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTT

TTGGGTCTGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGT
GCGGGTCCCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAA

>CAM2P03D02 Uncultured bacterium (Acidobacteria)
TACTGTGGTACCTACTCCCTTGCGGGTTGGTCTGGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGCAACA
TTCTGATTTGCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACG
TTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTT
CTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTC
TGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTC
CCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAG

>CAM2P03D03 Uncultured bacterium (Acidobacteria)
CTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAG
ACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCAT
GATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGACTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGAC
TTAACCCAACATCTCACG

>CAM2P03D04 Uncultured bacterium (Não classificada)
GTTGGCCTGGCACTTCTAGTACAACTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCTGGGAACTGTATTCACCTGCAACATTCTGATTTGCGATTACTAGCGA
TTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCTGAACTGAGACCTGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTGTGTACCTGGCCATTGTA
GCACTGTGTGTAGCCCTAAGCATAAAGTGCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCA
ACTATCAATAG

>CAM2P03D06 Uncultured Rubrobacteridae (Actinobacteria)
CCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCTGTATTTCTACGGTTTTCCAGTGCATGTCAAGCCCTGGTAAGGTTCTTCTGCGTTGCGTCGAATTAAACCAC
ATGCTCCGCTGCTTGTGCGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGTGCTGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCTGGGAGTC
GATACCCTGCCACACCTAGTGCCCATCTGTTTACTGGCTGTGGACTACCAGTGTATCTAATCCTGTTCTGCTCCCCATGCTTTCGCTGTCTCAGCTGTCAGTACCTGTC
CCAGAGAGCCTGCCTTCTGCACGGGTGTTCTTCCCGATATCTTGCGCATTTCACCTGCTACACCTGTGGAATTCCACTCTCCTCTTCCGGACTCTAGCCAAATGGTTTC
A

>CAM2P03D08 Uncultured bacterium (Acidobacteria)
GGTACTACTCCCTTGCGGGTTGGTCCGGCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCGGGAACGTATCACCGCAACATTCTGATTT
GCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACC
GGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTA
ATTGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTG

>CAM2P03D10 Uncultured bacterium (Não classificada)
CATTCTAGTACAACCTACTTTCGTGATGTGTGGGCTGGTGTGTACAAGACCTGGGAACTGTATCACCTGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCAT
GAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCTGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCTGGCATTGTAGCACTGTGTGTAGCC
CTAAGCATAAATGGCATGATGACTTGACATCATCCCCATCTTCCTCCGTTTTATCAACATGCAGTCTTGATAGAGTTCTCAACTTAA

>CAM2P03D11 Unidentified eubacterium from the Amazon (Não classificada)
CATGCTGATCCTGTGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCTACAATCCGAACTGAGACGGCTTTTTCCGATTAGCTCCCCCTCGCGGCTCGCGAC
GGTTTGTACTGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTG
CCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGAT
GCCCTTGCGGGAGTCGACTTTCGCCGATTGTCATCTTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCC
CCCGTCAATTCCT

>CAM2P03D12 Uncultured Rubrobacteridae (Actinobacteria)
AGGACAGGGTTGCGCTCGTTGCGGGACGTAACCAACATCTCACGACACGAGCTGACGACAGCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTTCTACGG
TTTTCCAGTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTT
GCGGCCGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTAT
CTAATCCTGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACAC
CGGGAATTCCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCAACCGACGTCTCGAGGTTGAGCCTCGAGTTTTCACAGCTGACCTGAATGGCCGCCTACACGCTCT
TTACGCCCAATAAATCCGGACAACGCTTGCCCCCTACGTATTACCGCGGTTGCTGGCACTCAGTCAGTCATACGGTAT

>CAM2P03E01 Uncultured bacterium (Acidobacteria)
TCATACGTGGTACCTACTCCCTTGCGGGTTGGTCCGGCCATTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCAAC
ATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGAC
GTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGT
TCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGT
CTGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGT
CCCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGTATT
CATCGTTTAAGGCCAGGACTACCGGGGTATCTAATCCCGTTTGATCCCCTGGCTTT

>CAM2P03E02 Uncultured soil bacterium (Não classificada)
ACGACATACTTAGGCGCTCCCTCCCTTGCGGGTTGGTGTGGCGACTTCTAGTACAACCGGCTTCCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACC
GCGGCGTGCTGATCCGCGATTACTAACGATTCCAACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCGACCTTACGGTTT
TGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTG
CAGAGTGCCCACCATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACAAGCTGACGACAGCCATGCATCACCTCT
ACGAGTGTCCTTGCGGAAGGCAACTTTCGTC

>CAM2P03E03 Uncultured actinobacterium (Não classificada)
CACATAGGACAGGGTTGCGCTCGTTGCGGGAGTAACCACATCTCACGAACGAGCTGACGAAGCATGCACACTGCACACTAGCCCCGAAGGGGGACGTATTTCTACGGTT
TTCCAGTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGC
TGGCGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGTCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCT
AATCCTGTTCGCTCCCCACGCTTTCGCGTCTC

>CAM2P03E04 Uncultured bacterium (Acidobacteria)
CACTTCTAGTACAACCTACTTTCGTGATGTGATGGGTGGTGTGTACAAGACCGGGAACTGTATTCACGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATG
AAGTCGAGTTTGAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCTGGCCATTGTAGCACGTGTGTAGCCCT
AAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACATGCAGTCTTGATAGAGTTCTCAACTTA

>CAM2P03E06 Uncultured actinobacterium (Actinobacteria)
CGTTGCGGGACGTAACCAAATCTCACGACACGAGCTGACGACAGCATGCACACCTGCACACTAGCCCCGAAGGGGGACTGTATTTCTACGGTTTTCCAGTGCATGTCAA
GCCCTGGTAAGGTTCTTCGCTGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGCCCCCTGTCAATTCCTTTGAGTTTTAGCCTTGCTGGCGTACTCCCCAG

GCGGGGCACTTAATGCGTTAGCTTCTGGCACAGCGGGAGTCGATACCCGTCACACCTAGTGCCCATCGTTTACTGGCGTTGGACTACCAGTGTATCTAATCCTGTTCGC
TCCCCACTGCTTTCTGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCTGCTTCGCCACGGGTGTTCTTCCCGATATCTTGCGCATTTCACCGCTACACCGGGAATTCCA
CTCTCCTCTTCCGGACTCT

>CAM2P03F01 Uncultured bacterium (Acidobacteria)
TCATAATCATACGTGGTACCTACCTCCCTTGCGGGTTGGTCCGGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATT
CACCGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGA
GATTGCGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCANCTTCCTCCGTTTTATCAACAGCAGTCT
TGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTT
GTTTTGGGTCTGGTTTCCCAGACTCTTGGCGTTANCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAANCACATGCTCCAACGCT
TGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGGACCCGGAGCTAT

>CAM2P03F03 Unidentified eubacterium from the Amazon (Não classificada)
TGTCCCCTTGCGGGTTACACGGTGATTCTAGTACAGCCAGCTTTCGTGATGTGATGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGCGGCATGCTGATCCGCGAT
TACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCGGCC
ATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTGCCCAGCTTTACCT
GATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCGGGAGT
CGACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAANCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAACGCGTTAAC

>CAM2P03F04 Uncultured soil bacterium (Não classificada)
ATACTTAGGCGCCTCCTCCCTTGCGGGTTGGTGTGGCGCTTCTAGTACAACTGGCTTCCTGTGATGTGACTGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCG
GCGTGCTGATCCGCGATTACTAACGATTCCAACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCGACCTTACGGTTTTGC
GACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTGCAG
AGTGCCCACCATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACAAGCTGACGACAGCCATGCAGCACCTCTACG
AGTGTCCTTGCGGAAGGCAACTTTCGTCGCTGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGG
CCCCCGTCAATTCCTTT

> CAM2P03F09 Uncultured bacterium
GTACTACTCCCTTGCGGGTTGGTCCGGCACTTCTAGTACAACCTACTTTCGTGATGTGCGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCAACATTCTGATTTG
CGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCG
GCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAA
TGTTAGCAACTATCAATAAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTTGTTTC
CCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCAACGCTTGTGCGGGTCCCCGTCA
ATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACGTT

>CAM2P03F10 Uncultured bacterium (Acidobacteria)
GTACTACTCCCTTGCGGGTTGGTCCGGCACTTCTAGTACAACCTACTTTCGTGATGTGTGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGCAACATTCTGATTTG
CGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCG
GCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAA
TGTTAGCAACTATCAATAGGGGTTGCGCTCGTTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCC
AGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGGTTGTGCGGGTCCCCGTCAAT
TCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGTCGGAATACTAAAAACGTT

>CAM2P03F11 Unidentified eubacterium from the Amazon (Não classificada)
TGTCCCCTTGCGGGTTACACTGGTGATTCTAGTACAGCAGCTTCGTGATGTGACGGGTGGTGTGTACAAGGCCGGGAACTGTATTCACTGCGGCATGCTGATCCGCGAT
TACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCTGAACTGAGACCTGGCTTTTTCCTGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCT
GGCCATTGTAGCACTGTGTGTAGCCCTGGACATAAAGTGCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTGCCCAGCTT
TACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGC
GGGAGTCGACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTC

>CAM2P03F12 Uncultured soil bacterium (Não classificada)
AAGGCATGCTGATTGACGTCATCCCCACTTCCTCCGGTTTGTCACGGAGTCTCTCCAAGTGCCAGTTTACTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGA
CTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCGGGAGTCGACTTTCGCCGATTTGTCATCTGCACTTCGAGCCCAG
GTAAGGTTCTTCGCGTTGCGTCGAATTTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAA
TGCTTAACGCGTTAACTGCGGCACGGCAGGGATC

>CAM2P03G02 Uncultured actinobacterium (Actinobacteria)
CGTTGCGGGACGTAACCAAATCTCACGACACGAGCTGACGAAGCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCAGTGCATGTCAA
GCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGG
CGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGTTCGCTCCC
CACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCTGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAATTCCACTCTCC
TCTTCCGGACTCTAGCCAAACGGTTTCAACCGACGTCTCGAGGTTGAGCCTCGAGTTTTCACAGCTGACCTGAAT

>CAM2P03G03 Unidentified eubacterium from the Amazon (Não classificada)
CGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCGGCCATTGTA
GCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTGCCCAGCTTTACCTGATGGC
AACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCGGGAGTCGACTT
TCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTT
TCAGCCTTGCTGACGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCGATAC

>CAM2P03G06 Uncultured soil bacterium (Não classificada)
CGGGAACTGTATCACGCGGCGTGCTGATCCGCGATTACTAACGATTCCAACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTCTCCGATTAGC
TCGACCTTACGGTTTTGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCAACTTCCTCCGGTTTAT
CACCGGCAGTCTCTGCAGAGTTGCCACCATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAATATCTCACGACACAAGCTGACGACAG
CCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGGCAACTTTCGTCGCTGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTT

>CAM2P03G07 Uncultured actinobacterium (Actinobacteria)
CTGGCACATAGGACAGGGTTGGCTCGTTGCGGGACGTACCAATCTCACTGACACGAGCTGACGAAGCATGCACACCTGCACACTAGCCCCGAAGGGGGACTGTATTTCT
ACGGTTTTCCATGTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTA
GCCTTGCTGGCGTACTCCCCAGGCGGGGCACTTAATTGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCTGCCACACCTAGTGCCCATCGTTTACGGCTGTGGACTAC
CAGGGTATCTAATCCTGTTCGCTCCCCATGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGATCCTGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCA
CCGCTACACCGGGAATTCCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCAACCTGACGTCTCGAGGTTGAGCCTCG

>CAM2P03G09 Uncultured soil bacterium (Não classificada)
ACATACTTAGGCGCTCCTCCCTTGCGGGTTGGTGTGGGATTCTAGTACAACCGGCTTCCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGT
GCTGATCCGCGATTACTAACGATTCCAACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCTGGCTTTCTCCGATTAGCTCGACCTTACGGTTTTGCGAC
GGTTTGTACCTGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCTGGCAGTCTCTGCAGA
GTTGCCACCATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACAAGCTGACGACAGCCATGCAGCACCTCTACGA
GTGTCCTTGCGGAAGGCAACTTTCGTCGCTGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTTGAACCACATGCTCCACCGCTTGTGCGTT
CCCCCGTCAATTCCTTTGAGTTTCAGCCTT

>CAM2P03G10 Unidentified eubacterium from the Amazon (Não classificada)
GACATACTTAGCACTGTCCCCTTGCGGGTTACACGGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGG
CATGCTTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGC
GACGGTTTGTACCTGGCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAG
AGTGCCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGC
AGATGCCCTTGCGGGAGTCGACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCATCTGCTTGTGCG
GGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAG

>CAM2P03G11 Uncultured bacterium (Acidobacteria)
CGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCAACATTCTGATTTGCGATTACTAGCGATCCAACTTCATGAAGTCGAGTTGAGACTTCAATCC
GAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCTGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTG
ACATCATCCCCACTTCCTCCGTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACA
TCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTNTTGGGTCTGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAA

>CAM2P03G12 Uncultured Rubrobacteridae bacterium
CTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGG
GCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGTTCGCTCCCCACG
CTTTCGCGTCTCAGCGTCAGTACCTGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAATTCCACTCTCCTCTT
CCGGACTCTAGCCAAACGGTTTCAACCGACGTCTCGAGGTTGAGCCTCGAGTTTCACAGCTGACCTGAATGGCCGCCTACACGCTCTTTACGCCCAATAAATCCGGAC
AACGCTTGCCCCCTACGTATTACCGTGGCTGCTGGCACTCAGTCAGTCA

>CAM2P03H01 Unidentified eubacterium from the Amazon (Não classificada)
GACATACTTAGCACTGTCCCCTTGCGGGTTACACGGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTCACCGCGGC
ATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGA
CGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAG
TGCCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGA
TGCCCTTGCGGGAGTCGACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCC
CCCGTCAATTCCTTTGACTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCGATACCCGACAACCAAGCATTCAT
CGTTTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGTTATTCAGTGTCAGAAACAGTCCA

>CAM2P03H02 Unidentified eubacterium from the Amazon (Não classificada)
GACATACTTAGCACTGTCCCCTTGCGGGTTACACGGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGC
ATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGA
CGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAG
TGCCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGA
TGCCCTTGCGGGAGTCGACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCC
CCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCGATACCC

>CAM2P03H03 Uncultured soil bacterium (Não classificada)
TACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATG
CTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTGCCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTTGCGCTCGTTGCGGG
ACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCGGGAGTCGACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAG
GTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAAT
GCTTAACGCGTTAAC

>CAM2P03H05 Uncultured bacterium (Acidobacteria)
CACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCGGGAACGTATCACCGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGA
AGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCTGGCATTGTAGCACGTGTGTAGCCCTAA
GCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCG
CTCGTTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTTGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCC
CTCACATTCTAGCCTAGCTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCG
TACTCCCCAGGCGGAATACTAAAA

>CAM2P03H07 Uncultured bacterium (Actinobacteria)
CACATAGGACAGGTGTTGCGCTCGTTGCGGGACGTAACCCAAATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATT
TCTACGGTTTTCCAGTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
TAGCCTTGCGGCCGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACC
AGGGTATCTAATCCTGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACC
TGCTACACCGGGAATTCCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCAACCGACGTCTCGAGGTTTGAGCCTCGAGTTTTCACAGCTGACCTGAATGGCCTGCT
ACACGCTCTTTACGCCCAATAAATCCGGACAACGCTTGCCCCCTACGTATTAC

>CAM2P03H08 Unidentified eubacterium from the Amazon (Não classificada
CATACTTAGCACTGTCCCCTTGCGGGTTACACTGGTGATTCTAGTACAGCCAGCTTTCGTGATGTACGGGCGGTGTGTACAAGGCCCTGGGAACGTATTCACCTGCGGC
ATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCTGGCTTTTTCCTGATTAGCTCCCCCTCGCGGGCTCGC
GACTGGTTTTGTACCTGGCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTTGACTTGACGTCATCCCCACCTTCCTCCGGTTTTGTCACCTGGCAGTCTC
TCCAGAGTGCCCAGCTTTACCTTGATGGCAACATGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCAC
CTCTGCAGATGCCCTTGCGGGAGTCGACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCCGTCGAATTGAACCACATGCTCCACCGCT
TGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTT

>CAM2P03H09 Bacterium Ellin6099 (Acidobacteria)
TCCCTTGCGGGTTGGTCCGGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAACATTCTGATTTGCGAT
TACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCA
TTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTT
AGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCCAGACT
CTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTT
TGAGTTTCACACTTGCGTGCGTACTCCCCAAGCGGAATACTAAAAACGT

>CAM2P03H10 Uncultured Rubrobacteridae (Actinobacteria
TTGCGCTCGTTGCGGGACGTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCAG
TGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGNCGT
ACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCT
GTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAATT
CCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCAACCTGACGTCTCGAGGTTGAGCCTCGAGTTTTCACAGCTGACCTGAATGGCCGCCTACACGCTCTTTACGCC
CAATAAATCCGGACAACGCTT
>CAM2P03H11 Uncultured bacterium (Acidobacteria)
AGCGATTCCAACTTCATGAAGTCGAGTTGAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTA
GCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAA
CTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCCAGACTCTTGG
CGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGT
TTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGGTAT

>CAM2P4A02 Uncultured bacterium (Actinobacteria)
CTCACGACACGAGCTGACGACAGCATGCCACTGCACACTACCCCGAAGGGGGACCGTATTTCTACGGTTTTCCAGTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTG
CGTCAATAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGC
ACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTAC
CGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAATTCCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCA
ACCGACGTCTCGAGGTTGAGCCTCGAGTTTTCACAGCTGACCTGAATGGCCGCCTACACGCTCTTTACGCCCAATAAATCCGGACAACGCTTGCCCCCTACGTATTACC
GCGGCTGCTGGCACTCAGTCAGTCA

>CAM2P4A04 Bacterium Ellin (Acidobacteria)
CTCCCTTGCGGGTTGGTCCGGCCATTCTAGTACAACTACTTTCGTGATGTGACGGGCGGTGTGTCAGACCGGGAACGTATTCACCGCAACATTCTGATTTGCGATTACT
AGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGT
AGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCA
ACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCCAGACTCTTG
GCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAG
TTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGTATTCATCGTTTAAGGCCAGGAC
TACCGGGGTATCTAATCCCGTTT

>CAM2P4A05 Uncultured Acidobacteria bacterium (Não classificada)
CTGACATACTTAGCCTGTCCCCTGCGGGTTACACGGTGATTTCTAGTACAGCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCA
TGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCTGATTAGCTCCCCCTCGCGGGCTCGCGA
CGGTTTGTACCTGGCCATTGTAGCACGTGTGTAGCCCTGGACATAACAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCTGGCAGTCTCTCCA
GAGTGCCCAGCT

>CAM2P4A06 Uncultured bacterium (Actinobacteria)
TTGCGCTCGTTGCGGGACGTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCAG
TGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGT
ACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCT
GTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAATT
CCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCAACCGACGTCTCGAGGTTGAGCCTCGAGTTTTCACAGCTGACCTGAATGGCCGCCTACACGCTCTTTACGCCC
AATAAATCCGGACAACGCTTGCCCCCTACGTATTACCGCGGCTGCTGGCACTCAGTCAGTCA

>CAM2P4A07 Uncultured soil bacterium (Não classificada)
CACGGTGATTTCTAGTACAGCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCGACT
TCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTA
GCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTGCCCAGCTTTACCTGATGGCAACAGGAGACA
AGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCGGGAGTCGACTTTCGCCGATTGT
CATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGA
CCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCTGATACCGGCACACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGGGTATCTAA
TCCCGTTTGCTCCCCTGGC

>CAM2P4A08 Unidentified eubacterium (Acidobacteria)
GGGTTAACACGGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGA
TTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCGGCCATTGTAGCA
CGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTGCCCAGCTTTACCTGATGGCAAC
AGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCGGGAGTCGACTTTCG
CCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAG
CCTTGCGACCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCGATACCCGCCACACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGG
GTATCTAATCCCGTTTGCTCCCCTGGCTTTCGTTATTCAGTGTCAGAAACAGTCCAGAACGCCGCCTTCGCCACCGGTG

>CAM2P4A09 Bacterium Ellin (Acidobacteria)
ACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTCAAGACCCGGGAACGTATTCACCGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGA
AGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAA
GCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCG
CTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCCCT
CACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCGTA
CTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGTATTCATCGTTTAAGGCCAGGACTACCGGGGTATCTAATCCC
GTTTGCTCCCCTGGCTTTCGCGCTGTC

>CAM2P4A10 Uncultured soil bacterium (Acidobacteria)
TAGGCGCTCCCTCCCTTGCGGGTTGGTGTGGCGACTTCTAGTACAACCGGCTTCCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTGC
TGATCCGCGATTACTAACGATTCCAACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCGACCTTACGGTTTTGCGACGGT
TTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTGCAGAGTGCC
CACCATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACAAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTC
CTTGCGGAAGGCAACTTTCGTCGCTGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCG
TCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGACAGGGATCGATACCCGTCACACCAAGCATTCATCGT
TTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGTTTCGCT

>CAM2P4A11 Unidentified eubacterium (Não classificada)
GACATACTTAGCACTGTCCCCCTGCGGGTTACACGGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGC
ATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGA
CGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAG

TGCCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGA
TGCCCTTGCGGGAGTCGACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCC
CCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCG

>CAM2P4A12 Uncultured bacterium (Acidobacteria)
GGGTTAGCTCGGCGACTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTGCTGATCCGCGATTACTAGCG
ATTCCAACTCCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCCACCTTACGGCATCGCGACGGTTTGTACCGGCCATTGTAGC
ACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCCTCAGAGTGCCCAGCATAACCTGATGGCAA
CAGAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGAGTCCCCTTGCGGGAGCCGGCTTTC
GCCGGATGTGACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGCCACACCAAGCATTCATCGTTTAGGGCTAGGACTACCGG
GGTATCTAATCCCGTTTG

>CAM2P4B03 Bacterium Ellin (Acidobacteria)
GGGTTGGTCCGGCCATTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTCAAGACCGGGAACGTATTCACCGCAACATTCTGATTTGCGATTACTAGCGATT
CCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCACGT
GTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCA
ATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCCAGACTCTTGGCGTTAC
CCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCACA
CTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGTATTCATCGTTTAAGGCCAGGACTACCGGG
GTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCGCTGTCAGCGTCAGTGTCGG

>CAM2P4B05 Uncultured bacterium (Actinobacteria)
TTGCGCTCGTTGCGGGACGTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCA
GTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCG
TACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGCGTGGACTACCAGGGTATCTAATCCT
GTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAATT
CCACTCTCCTCTTCCGGACTCTAGCCAAACGGTTTCAACCGACGTCTCGAGGTTGAGCCTCGAGTTTTCACAGCTGACCTGAATGGCCGCCTACACGCTCTTTACGCCC
AATAAATCCGGACAACGCTTGCCCCCTACGTATTACCGCGGCTGCTGGCACTCAGTCAGTCA

>CAM2P4B06 Uncultured bacterium (Actinobacteria)
TATGAGTCCCCGACCGAATCGCTGGCACATAGGACAGGGTTGCGCTCGTTGCGGGACGTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCAC
ACTAGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCAGTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCG
GGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTG
CCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTT
CTTCCCGATATCTGCGCATTTCACCGCTACACCGG

>CAM2P4B08 Uncultured bacterium (Actinobacteria)
TTGCGCTCGTTGCGGGACGTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCAG
TGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGT
ACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCT
GTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAATT
CCACTCTCCTCTTC

>CAM2P4B09 Unidentified eubacterium (Acidobacteria)
GACATACTTAGCACTGTCCCCTTGCGGGTTACACGGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGC
ATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGA
CGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAG
TGCCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGA
TGCCCTTGCGGGAGTCGACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCC
CCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCGATACCCGCCACACCAAGCATTCA
TCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGGCTTTCGTTATTCAGTGTCAGAAACAGTCCAGAACGCCGGCTTCGGCACCGGTGTTCCT
CCAGATATC

>CAM2P4B10 Uncultured bacterium (Acidobacteria)
CGACATACTTAGGCGCCTCCCTCCCTGCGGGTTGGTGTGGCGACTTCTAGTACAACCGGCTTCCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCG
CGGCGTGCTGATCCGCGATTACTAACGATTCCAACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCGACCTTACGGTTTT
GCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTGC
AGAGTGCCCACCATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACAAGCTGACGACAGCCATGCAGCACCTCTA
CGAGTGTCCTTGCGGAAGGCAACTTTCGTCGCTGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCG
GGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGACAGGGATCGATACCCGTCACACCAAGCA
TTCATCGTTTAAGGGCCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCTTATCAGTGTCAGTTATGGTCCAGGATGCCGCCTTCGCCACCGGTG
TTCCTCCAGATAT

>CAM2P4C01 Uncultured bacterium (Actinobacteria)
CGCTGGCAACATGGAACAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGCATTAGCCCCGAAGGGGGA
CCGTGTTTCCACGGTTTTCCAATGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTT
TGAGTTTTAGCCTTGCGGCCGTACTCCCCAGGCGGGGAACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGACACCCGCCACACCTAGTTCCCATCGTTTACGGCGTG
GACTACCAGGGTATCTAATCCTGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCTGCCTTCGCCATGGGTGTTCTTCCCGATATCTGCGCA
TTTCACCGCTACACCGGGAATTCCACTCTCCTCTTCCGGACTCTAGCCATACGGTTTCAACCGACGTCTCAAGGTTGAGCCTTGAGTTTTCACAGCTGACCTGCACGGC
CGCCTACACGCTCTTTACGCCCAATAAATCCGGACAACGCTTGCCCCCTACGTATTACCGCGGCTGCTGGCACTCAGTCAGTCA

>CAM2P4C02 Uncultured Acidobacteria bacterium (Acidobacteria)
CACTTTCGTGATGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGAC
TGCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATG
AGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCACCAGAGTGCCCAACTAAATGATGGCAACTGGGGATAAGGGTTGCGCTCGTTGCGGGACT
TAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACAGCAGCCCCTTGCGGGGAAGGAATATTTCTACTCCGGTCCACTGCATTTCGAGCCCAG
GTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATC
GCTTATCGCGTTAGCTGCGGCACGGCGGGATTGGGTACCCGTCACACCAATCGATCATCGTTTAGGGCTGGGACTACCAGCGTATCTAATTCTGTTTGCTCCCCCA

>CAM2P4C04 Uncultured bacterium (Acidobacteria)
GCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACC
GGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTA
ATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCC
AGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCAGATGCTCCACCGGTTGTGCGGGTCCCCGTCAAT
TCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACG

>CAM2P4C06 Unidentified eubacterium (Não classificada)
ACATACTTAGCACTGTCCCCTTGCGGGTTACACGGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGC
ATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGA
CGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAG
TGCCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGA
TGCCCTTGCGGGAGTCGACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCC
CCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCGATACCC

>CAM2P4C07 Uncultured organism clone (Verrucomicrobiae)
CATACTTCGGCGCTTTAAGGGGCGACTTCGGGTACAAACGGCTTTCATGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGCCGTAGCTGATGCGCC
ATTACTAGCGATTCCGGCTTCATGGAGGCGAATTGCAGCCTCCGATCCGAACTGGGCCCAGTTTTAAGGATTTCCTCCACCTCGCGGTCTCGGATCATTCTGTACTGGG
CATTGTAGTACGTGTGCAGCCCAGGCCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCGTTTAAGCGAGGCAGTCTGAACAGAGTGCTGGAACCTCT
CGGTTCCGTGGCAACAGTTCACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAATTGTCTCTT
TCGAGACTCGCTGGCTTTCACCAACTTAGAGATGCATGTCAAGGCCTGGTAAGGTCCTTCGCGTTGCATCGAATTGAGCCACATACTCCACCGCTTGTGCGGGCCCCCG
TCAATTTCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGCACGTTTAACGTGTTAACTCCGG

>CAM2P4C08 Uncultured crenarchaeote (Thermoprotei)
CGATGAAGCGACGGGCGGTGTGTGCAAGGAGCAGGGACGTATCACTGCGCGATGATGACACGCGATTACTAGGGATTCCATATTCATGAGGACGAGTTTCAGCCCTCAA
TCATAACTGTGGTAAGTTTTGCGGATTGCCTCCCTCCTTTCGAAATCGGAACCTATTGTACTTACCATTGCAGCCCGCGTGTGGCCCGAGGGTTTCGGGGCATACTGACC
TGCCGTAGCCCCCTCCTTCCTCCGCCTTAGCGGCGGCAGTCCTTCTAATTAGCCCTTCTACTCCGAAGAATAAAAGTAGCAACTAGAAGCAGGGGTCTCGCTCGTTACC
TGACTTAACAGGACACCTCACGGCACGAGCTGGCGACGGCCATGCACCTCCTCTCAGCTTGTCTAGTAAAGTCTTCAGCTTGACCTTCACTCTGCTGTCGCCCCCGGTA
AGATTCCCGGCGTTGACTCCAGTTGAACCGCAGGCTTCACCCCTTGTGGTGCTCCCCCGCCAATTCCTTTAAGTTTCAGTCTTGCGACCGTACTACCCAGGCGGCAGAC
TTAACGGCTTCCCTGCGGCACTGGACTAGCATTAAGCTAGTCCATCACCGAGTCTGCATCGTTTACAGCTGGGACTACCCGGGTATCTAATCCGGTTTGCTCCCCCAGC
TTTCATCCCTCACCGTCGAGCGCATTCTGGCAAGCCGCCTTCGCCACTGGTGGTC

>CAM2P4C09 Bacterium Ellin (Acidobacteria)
CATAATCATACGTGGTAACTACTCCCTTGCGGGTTGGTCCGGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCAC
CGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGAT
TGCGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGA
TAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTT
TTGGGTCTGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGT
GCGGGTCCCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCA
AGTATTCATCGTTTAAGGCCAGGACTACCGGGGTATCTAATT

>CAM2P4C12 Bacterium Ellin (Acidobacteria)
GGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCGGGAACGTATCACCGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCA
TGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCC
TAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTT
GCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTCGAAATTGTCTCTTTTCGAGACTCGCCCTCACATTCTAGCC
TAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGG
AATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGTATTCATC

>CAM2P4D01 Uncultured bacterium (Verrucomicrobiae)
GCGCTTTTAGGGGCGACTCGGGTACAAACGGCTTCATGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGCCGTAGCTGATGCGCCATTACTAGCGA
TTCCGGCTTCATGGAGGCGAATTGCAGCCTCCGATCCGAACTGGGCCCAGTTTTAAGGATTTCCTCCACCTCGCGGTCTCGGATCATTCTGTACTGGGCATTGTAGTAC
GTGTGCAGCCCAGGCCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCGTTTAAGCGAGGCAGTCTGAACAGAGTGCTGGAACCTCTCGGTTCCGTGG
CAACAGTTCACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAATTGTCTCTTTCGAGACTCGC
TGGCTTTCACCAACTTAGAGATGCATGTCAAGGCCTGGTAAGGTCCTTCGCGTTGCATCGAATTGAGCCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTTCTTT
GAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGCACGTTTAACGTGTTAACTCCGGCGCAGAAGGGGTCGAATCCTCCCACACCAAACGTGCACCGTTTACTGCCAGG
ACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCCTTCGTGTCTCAGTGTC

>CAM2P4D04 Bacterium Ellin (Acidobacteria)
GGTACTACTCCCTTGCGGGTTGGTCCGGCCATTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCGGGAACGTATCACCGCAACATTCTGATTT
GCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACC
GGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTA
ATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCC
AGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAAT
TCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGTATTCATCGTTTAA
GGCCAGGACTACCGGGGTATCTAATCCCG

>CAM2P4D06 Bacterium Ellin (Acidobacteria)
ATAATCATACGTGGTACTACTCCCTTGCGGGTTGGTCCGGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGTGTGTACAAGACCCGGGAACGTATTCACCG
CAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTG
CGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATA
GAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTT
GGGTCTGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGC
GGGTCCCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAG
TATTCATCGTTTAAGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCC

>CAM2P4D07 Uncultured bacterium (Deltaproteobacteria)
CTCCTTAAGACTGCCTCCCTCGCGGGTTACGCAGCGTTCTGGAGCAACTGACTCCCATGGTGTGACGGGCGGTGTGTAAGCCCGGGAACGTATTCACCCCCACCTGCTG
ATTGGGGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCTGAAGCCGGTTTTTTGGGATTGGCTAGCTCTTGCGAGATCGCGACCCTTT
GTACCGGTCATTGTAGCACGTGTGTAGCCCTGGGCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTAACACCGGCAGTCTCGTTAGAGTGCTCG
GCCGAACCGTTAGCAACTAACGACAAGGGTTGCGCTCGTTGCGGGACT

>CAM2P4D09 Bacterium Ellin (Acidobacteria)
TCATAATCATACGTGGTACTACTCCCTTGCGGGTGGTCCGGCCATTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTTACAAGACCGGGAACGTATTCACCGC
AACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGC
GACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCGTTTTATCAACAGCAGTCTTGATAGA
GTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGG
GTCTGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGG
GTCCCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGTA
TTCATCGTTTAAGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCGCTGT

>CAM2P4D10 Uncultured Acidobacterium (Acidobacteria)

ATACGTGGTAGATGCCCTCTTGCGAGTTAGCCTCCTATTCTAGTACACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCGGGAACGTATCACCGCGCCGTTCT
GATGCGCGATTACTAGCGATTCCAACTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATCGCGACGTTTT
GTACCGGCCATTGTAGCACGTGTGTAGCCCTGAACATAAAGGCCATGATGACTTGACATCGTCCCCACCTTCCTCCGTTTTATCAACGGCAGTCACTCCAGAGTTCCCA
ACCTAATAATGGCAACTGAAGTTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCCGGT
TTCCCGGACTGATGGTGTTACCCAACATTCCCTCACATTCTAGTCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCG
TCAATTCCTTTGAGTTTCACTCTTGCGAGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCACTATAAACTCCAGACACCAAGTATTCATCG
TTTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGGCTTTCGCGCCTCAGCGTCAGTGTCAGCCCAGCAACCCGTCTTC

>CAM2P4D11 Bacterium Ellin (Acidobacteria)
ATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGAAGTCGAGTTGCAGACTTCAATCCG
AACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGAC
ATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACA
TCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTC
TTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCCCAGGCGGAATACTAAAAAC
GTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGTATTCATCGTTTAGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCGCTG
TCAGCGTCAGTGTCG

>CAM2P4D12 Uncultured bacterium (Deltaproteobacteria)
CTCCCCGAAGGGTTGGCTCAGCGACTTCTGGTACACACGGCTTTCGTGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGGAGCGTGCTGATCTCCGAT
TACTAGCGATTCCAGCTTCAGGCCGGCGAGTTGCAGCCGACCATCCGAACTAGGATCAGGTTTTTGAGATTGGCAACCTCTTGCGAGGGAGCGACCCATTGTCCTGACC
ATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTCACCGGGGCAGTCCCCTCAGAGTGCCCGGCATTACCC
GGTAGCAACAAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCACAGGCCCCGAAGGGAAG
GTGACTTTCATCACCGGTCCGGTGCATGTCAAACCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTT
TGAGTTTCAGCCTTGCGACCGTACTCCCCAGG

>CAM2P4E01 Uncultured Acidobacteria bacterium (Acidobacteria)
GGTACATGCCCCTCTTGCGAGTTAGCCTGCTACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAACATGCTG
ATTTGCGATTACTAGCGATTCCAACTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTTCCCCTTACGGGATCGCGACGTTTTG
TACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTCGGTAGAGTTCCCAA
CTTAATGATGGCAACTACCGATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTT
TCCCAGACGATCGGTATTACCCTCTCTTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGT
CAATTCCTTTGAGTTTCACTCTTGCGAGCGTACTCCCCAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCACTAATAACTCCAGACACCAAGTATTCATCGT
TTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCGCATCAGCGTCAGTGTCGCGCCAGCAAACCGTCTTCACCTCAGGTGTTCCTCTCGA
TATCTACGCATT

>CAM2P4E02 Uncultured soil bacterium (Acidobacteria)
ACAACCGGCTTCCGTGATGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATCACCGCGGCGTGCTGATCCGCGATTACTAACGATTCCAACTTCATGCAGGCGAGTTG
CAGCCTACAATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCGACCTTACGGTTTTGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGG
CCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTGCAGAGTGCCCACCATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTG
CGGGACTTAACCCAACATCTCACGACACAAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTTGCGGAAGGCAACTTTCGTCGCTGGTCACTCGCTGTTCAAGC
CTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCG
GAATGCTTAATGCGTTAGCTTCGGCACGACAGGGATCGATACCCGTCACACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCT
GGCTTTCGCTTATCAGTGTCAGTTATGGTC

>CAM2P4E03 Bacterium Ellin (Acidobacteria)
TCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTCAGACCGGGAACGTATTCACCGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCATGAAGTCG
AGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATA
AAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGT
TGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCCAGACTCTTGGCGTTACCCAAGATTCCCTCACAT
TCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCACACTTGCGTGCGTACTCCC
CAGGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGTATTCATCGTTTAAGGCCAGGACTACCGGGGTATCTAATCCCGTTTG
CTCCCCT

>CAM2P4E04 Uncultured Acidobacteriales bacterium (Acidobacteria)
CTCCTTGCGGTTAGCACACCAGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTA
CTAGCGATTCCAGCTTCATGGAGTCGGGTTGCAGACTCCAATCCGAACTGAGCCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGAGCAT
TGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGACCCGA
TGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACGCGAGCTGACGACAGCCATGCAGCACCTCCGCAGCAGTTCTTGCGAAAAGGG
ATGTTTCCACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTG

>CAM2P4E05 Uncultured bacterium (Alphaproteobacteria)
CCCTTGCGGTTAGCGCACCGTCTTCAGGTAAAGCCAACTCCCATGGTGTGACGGGCGGTGTGTCAGGCCCGGGAACGTATTCACCGCAGCGTGCTGATCTGCGATTACT
AGCGATTCCAACTACATGTGCTCGAGTTGCAGAGCACAATCCGAACTGAGACGGCTTTTTGAGATTTGCGCAGGGTTTCCCCATTGCGTCCCATTGTCACCGCCATTGT
AGCACGTGTGTAGCCCAGCCTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGCGGCTTATCACCGGCAGTCCCCTTAGAGTGCCCAACTAAATGATGGC
AACTATGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGAACTGAAAGGCT
CCATCTCTGGTGCCCGCGACCGGGATGTCAAAGGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTTAATCCTGCGACCGTACTCCCCAGGCGGGATGCTTAATGCGTTAGCTGCGCCACTGACGAGTAAACCCGACAACGGCTAGCATCCATCGTTTACGGCGTGGAC
T

>CAM2P4E08 Uncultured crenarchaeote (Thermoprotei)
ATATGCAAATCGCACCACTCGCCTAAAACCAACTTCGATGAAGCGACGGGCGGTGTGTGCAGAGCAGGACGTATCACTGCGCGATGATGACANCGCGATTACTAGGGAT
TCCATATTCATGAGGACGAGTTTCAGCCCTCAATCATAACTGTGGTAAGTTTGCGGATTGCTCCTCCTTTCGAAATCGGAACCTATTGTACTTACCATTGCAGCCCGCG
TGTGGCCCGAGGGTTTCGGGGCATACTGACCTGCCGTAGCCCCCTCCTTCCTCCGCCTTAGCGGCGGCAGTCCTTCTAATTAGCCCTTCTACTCCGAAGAATAAAAGTA
GCAACTAGAAGCAGGGGTCTCGCTCGTTACCTGACTTAACAGGACACCTCACGGCACGAGCTGGCGACGGCCATGCACCTCCTCTCAGCTTGTCTAGTAAAGTCTTCAG
CTTGACCTTCACTCTGCTGTCGCCCCCGGTAAGATTCCCGGCGTTGACTCCAATTGAACCGCAGGCTTCACCCCTTGTGGTGC

>CAM2P4E09 Uncultured bacterium (Deltaproteobacteria)
ATTTCTGGAGCAACTGACTCCCATGGTGTGACGGGCGGTGTTACAAGGCCCGGGAACGTATTCACCCCTGCCTGCTGATCAGGGATTACTAGCGATTCCAACTTCATGA
AGTCGAGTTGCAGACTTCAATCTGAACTGAGGCCGGTTTTTTGGGATTGGCTTGCCCTCGTGGGTTTGCGACCCTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTG
GGCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTAACACCGGCAGTCTCGTTAGAGTGCCCGGCCGAACCGCTGGCAACTAACGACAAGGGTTG
CGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGGACATCCAATTCCCTTGCGGGCACATCCACATCTCTGCGGACTTC
TGGAGGGTTCCAACCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTCGAGTTTTAGCCTTGCGGCC
GTACTCCCCAGGCGGAGTGCTTAACGCGTTAGCTACGACGCCTCCGGGGTCAATACCAGAAACATCTAGCACTCATCGTTTACGGCGTGGACTACCAGGGTATCTAATC
CTGTTTGCTCCCCACGC

>CAM2P4E10 Uncultured Xiphinematobacteriaceae (Verrucomicrobiae)

GGTACAAACGGCTTCATGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGCCGTAGCTGATGCGCCATTACTAGCGATTCCGGCTTCATGGAGGCGA
ATTGCAGCCTCCGATCCGAACTGGGCCCAGTTTTAAGGATTTCCTCCACCTCGCGGTCTCGGATCATTCTGTACTGGGCATTGTAGTACGTGTGCAGCCCAGGCCGTAA
GGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCGTTTAAGCGAGGCAGTCTGAACAGAGTGCTGGAACCTCTCGGTTCCGTGGCAACAGTTCACAGGGGTTGC
GCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAATTGTCTCTTTCGAGACTCGCTGGCTTTCACCAACTTAGAG
ATGCATGTCAAGGCCTGGTAAGGTCCTTCGCGTTGCATCGAATTGAGCCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTTCTTTGAGTTTTAATCTTGCGACCG
TACTCCCCAGGCGGCACGTTTAACGTGTTAACTCCGGCGCAGAAGGGGTCGAATCCTCCCACACCAAACGTGCACCGTTTACTGCCAGGACTACCGGGGTATCTAATCC
CG

>CAM2P4E11 Uncultured organism (unclassified_Bacteria)
AGAGCGACGGGCGATATGTACATAACTTAGAGTTTGTGTCACATATTAAAACTATTAAATTTACTCTTAAATCCAACTTTACACACATTTCTTGTGCTATTACGTAATT
TTTATTATTGTAATACATTATCTCTTTAATAAATTAAATCTTGATTTGACTTAAATAAGCTTAACTTGCTAGAAAAAACTATATAATTAATTCCTTAGACAACGATATA
TAGATAAAATCAAAGAATTGTAAAGTGTAGTATCTATTATGTAATATATTCCTCTAATAAAATAAATTACCGCCAAAATCTTTAAGTTTTAATTTTACTACTTTAGTAA
TAGATAGTTTTCATAGCTGGGTATCTAATCCAGGTCTTTAGTTAATTTTTTAATTTTAGTAAAATTAAAAACCTAAATAAAAGAATTTTACTTTTAAATAATTAGGAAC
TTAATGTTTATTAAATTACACAAAAAAATTAATTTTACACAACTGTGTAACCGCGGCGGCTGGCACTCAGTCAGTCA

>CAM2P4E12 Uncultured soil bacterium (Alphaproteobacteria)
CCTTCGGGTGAAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCTGGGAACGTATTCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCGCCTTCATG
CTCTCGAGTTGCAGAGAACAATCCGAACTGAGACGGCTTTTTGGGATTTGCTCACTCTCGCGAGTTTGCTGCCCTTTGTCACCGCCATTGTAGCACGTGTGTAGCCCAG
CGCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCAGTTTCTTTAGAGTGCCCAACTAAATGGTAGCAACTAAAGACGAGGGTTGC
GCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCAGGTCCCGTAAGGGAAGGAATCCATCTCTGGAAACCGTCCT
GGCATGTCAAACGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCAGGCCCCCGTCAATTTCTTTGAGTTTTAACCTTGCGGCCGT
ACTCCCCAGGCGGATGACTTAACGCGTTAGCTGC

>CAM2P4F01 Uncultured soil bacterium (Acidobacteria)
GCGCTGCTCCCTTACGGGTTGGCGCGACGACTTCTAGTACAACCACTTTCGTGATGTGACGGGCGGTGTGTACAGACCGGGAACGTATCACCGCGGCATGCTGATCTGC
GATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGACAAGCTTTTTGCGATTGGCTCCCCCTTGCAGGTTTGCAGCGCTTTGTACTT
GCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCANCTTCCTCCGTTTTGTCAACGGCAGTCTCAATAGAGTGCCCGGCCGAA
CCGCTGGCAACTATTGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGCACTCTGCCTGGTTTTAC
CCAGGAGGGCGTATCTCTACGCCGGTCAGAGGCATTCTAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCA
ATTCCTTTGAGTTTCAGTCTTGCGAACGTACTCCCCAGGCGGAATGCTTAAAGCGTTAGCGACGGGACCCGGGGACTAT

>CAM2P4F02 Bacillales bacterium (Bacilli)
TCCTCGAAAGGTTACCTCACCGACTTTGGGTGTTGCAACTCCCGTGGTGTGACGGGCGGTGTGTACAGGCCCGGGAACGAATTCACGCGGCATGCTGATCCGCGATTAC
TAGCAATTCCGGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTACGAACGGCTTTATGAGATTGGCTCCACCTCGCGGTTTCGCATCCCTTTGTACCGCCCATT
GTAGCACGTGTGTAGCCCAAGACATAAGGGGCATGATGATTTGACGTCATCCCCGCCCTCCTCCGGTTTGTCACCGGCAGTCCATTGTGAGTGCCCAACTGAATGATGG
CAACACAACGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAACCATGCACCACCTGTCACCACTGCCCCGAAGGGAAACTCT
ATCTCTAGAGCGATCAGCGGGATGTCAAGTCTTGGTAAGGTTCTTCGCGTTGCTTCGAATTAAACCACATGCTCCACTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAG
TTTCAGTCTTGCGACCGTACTCCCCAGGCGGAGTGCTTAATGCGTTAGCTTCGGCACTGAGGGTGGTACCCCCCAACACCTAGCACTCATCGTTTACGGCGTGGACTAC
CAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCGCCTCAGCGTCAGAAATCGGCCAGCAAGGCGCCTTCGCCACAGGTGTACCTCCACA

>CAM2P4F03 Uncultured organism (unclassified_Bacteria)
ACATATTAAAACTATTAAATTTACTCTTAAATCCAACTTTACACACATTCTTGTGCTATTACGTAATTTTTATTATTGTAATACATTATCTCTTTAATAAATTAAATCT
TGATTTGACTTAAATAAGCTTAACTTGCTAGAAAAAACTATATAATTAATTCCTTAGACAACGATATATAGATAAAATCAAAGAATTGTAAAGTGTAGTATCTATTATG
TAATATATTCCTCTAATAAAATAAATTACCGCCAAAATCTTTAAGTTTTAATTTTACTACTTTAGTAATAGATAGTTTTCATAGCTGGGTATCTAATCCAGGTCTTTAG
TTAATTTTTTAATTTTAGTAAAATTAAAAACCTAAATAAAAGAATTTTACTTTTAAATAATTAGGAACTTAATGTTTATTAAATTACACAAAAAAATTAATTTTACACA
ACTGTGTAACCGCGGCGGCTGGCACTCAGTCAGTCA

>CAM2P4F04 uncultured bacterium (Deltaproteobacteria)
TGTGACGGGCGGTGTGTACAGCCGGGAACGTATTCACCGCGGCGTTCTGATCCGCGATTACTAGCGATTCCGACTTCACGGAGTCGAGTTGCAGACTCCGATCCGAACT
GGGATCGGTTTTCTGGGATTAGCTTCAGCTCGCGCTTTCGCAGCCCATTGTACCGACCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGAGGACTTGACGTC
ATCCCCACCTTCCTCCGGCTTGACACCGGCAGTCCCTCTAGAGTGCCCAACTGAATGCTGGCAACTAAAGGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCT
CACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCACGGCTCCCTTGCGGGCACTCCCACATCTCTGCAGGATTCCGTGGATGTCAAGTCTGGGTAAGGTTCTTGC
GCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTTCCCAGGCGGGATGCTTATTGCGTT
AGCGTCGTCACGGCAGGGGTCAAAACCC

>CAM2P4F05 Uncultured bacterium (Acidobacteria)
CTTGGACGGTATCCCCTTGCGGTTAATTACGGCTTCTAGTACAACTGGCTTTCGTGATGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATTCACCGCTGCTTGCTGA
TCAGCGATTACTAGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGAACGGTTTTTTGAGATTAGCTCCCCCTCGCGGGTTTGCAACTCATTG
TACCACCCATTGTAGTACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTTTCACCGGCAGTCCCTTTAGAGTGCTCAG
CTTAACCTGGTGGCAACTAAAGGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTAGTGTCCCT
TGCGGGAAAAGCGACTTTCGCCACCTGTCACTAGCCGTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATACTCCACCGCTTGTGCGGGCCCCCG
TCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGGATACTTAATGCGTTAGCTTCGGC

>CAM2P4F08 Unidentified soil bactéria (Acidobacteria)
GGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGCTGATCCGCGATTACTAGCGATTCCAACTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGA
CCGGCTTTCTCCGATTAGCTCCCTCTTGCGAGATCGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCC
CCACCTTCCTCCGGTTTATCACCGGCAGTCTCCGCAGAGTGCCCACCATAACGTGATGGCAACAGCGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCA
CGACACGAGCTGACGACAGCCATGCAGCACCTCGACATCGGCCCTTGCGGGAGCCGGCTTTCGCCGGATGTCCAATGCCGTTCGAGCCTGGGTAAGGTTCTTCGCGTTG
CGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGTTTAATGCGTTAGCTTC
GGCACGGCAGGGATCGATACCCGCCACACCAAACATTCATCGTTTAGGGCTAGGACTACCGGGGTA

>CAM2P4F09 Uncultured bacterium (Deltaproteobacteria)
CTTGCTCCCTCGCGGGTTGGTCGGGCACTTCTGGAGAAACCGATCCCATGGTGTGACGGGCGGTGTGTACAGCCGGGAACGTATTCACCGCGGCATGCTGATCCGCGAT
TACTAGCGATTCCAACTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGGACCATTTTCTGGGATTGGCTCCGTATCACTACTTCGCGTCCCTCTGTAGGGTCC
ATTGTAGCACGTGTGTAGCCCTGAGCATAAGGGCCATGAGGACTTGACGTCATCCCCACCCTCCTCCGACTTCACGTCGGCGGTCCCGATAGAGTGCTCGGCCGAACCG
CTAGCAACTATCGGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACACCAGCCCCGAAGGGAAGG
TACATCTCTGCACCGGTCTGATGCCGTTCGAACCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGAGTGCTTAACGTGTTAACTTCGACACCGCAGGGGTCAATACCCGCGACGTCTAGCACTCATCGTCTACAGCGTGG
ACTACCAGGGTATCTAATCCTGTTTGCTACCCACGCTTTCGCGTCTCAGCGTCAATTGTCG

>CAM2P4F10 Uncultured bacterium (Acidobacteria)
GGTTGGCGCGACGACTTCTAGTACAACCCACTTTCGTGATGTGACGAGCGNGTGTGTACAAGACCGGGAACGTATCACCGCAGCATGCTGATCTGCGATTACTAGCGAT
TCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGACCGGCTTTTTGCGATTGGCTCCCTCTCGCGAGTTTGCAGCGCTTTGTACCGGCCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGTTTTGTCAACGGCAGTCTCAATAGAGTGCTCGGCCGAACCGCTAGCAACTA
TCGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGCACTCTGCCTAGGTTTCCCTAGGAGACCGTA
TCTCTACGGCTGTCAGAGGCATTCTAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGTCCCCGTCAATCCCTTTGAGTT

TCAGTCTTGCGACCGTACTCCCCAGGCGGGATGCTTAACGCGTTAGCTGCGGCACCCGGAGACTATAAAACTCCAAGACACCAAGCATCCATCGTTTAAGGCCAGGACT
ACCGGGGTATCTAATCCCGTTCGCTCCCCTGGCTTTCGCGCATCAGCGTCAGTGTCG

>CAM2P4F11 Uncultured Rubrobacteridae (Actinobacteria)
TTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTGGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCA
GTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCG
TACTCCCCAGGCGGGGTACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGACACCCGCCACACCTAGTACCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCC
TGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAAT
TCCACTCTCCTCTTCCGGACTCTAGCCATACGGTTTCAACCGACGTCTCGAGGTTGAGCCTCGAGTTTTCACAGCTGACCTGTATGGCCGCCTACACGCTCTTTACGCC
CAATAAATCCGGACAACGCTTGCCCCCTACGTATTACCGCGGCTGCTGGCACTCAGTCAGTCA

>CAM2P4F12 Bacterium Ellin6099 (Acidobacteria)
CACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAACATTCTGATTTGCGATTACTAGCGATTCCAACTTCAT
GAAGTCGAGTTGCAGACTTCAATCCGAACTGAGACCGGTTTTTGCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCNC
TAAGNCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGT
TGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCTGGTTTCCCAGACTCTTGGCGTTACCCAAGATT
CCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCC

>CAM2P4G01 Uncultured soil bacterium (Acidobacteria)
GGAACTCTCTCCCTTGCGGGTTGATATGGCTACTTCTAGTACAACCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGCTGA
TCCGCGATTACTAGCGATTCCAACTTCAAGCAGGCGAGTTGCAGCCTGCTATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCCAGCTTGCGCTTTTGCGACGGTTTG
TACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTATCACCGGCAGTCTCTGCAGAGTGCCCAC
CATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCCTT
GCGGAAGCGCCCTTTCGGGCGTTGTCATTCGCTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTCAGCCTTGCGACCGTGCTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCGGCACGACAGGGATCGATACCCGTCACACCAAGCATTCATCGTTTA
GGGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGCTCACTCAGCGTCAGTAATGGTCCAGGAT

>CAM2P4G02 Bacterium Ellin6067 (Betaproteobacteria)
CCTCCTTGCGGTTAGGCGACCGGCTTCTGGTGAAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGCGACATGCTGATCCGCGATT
ACTAGCGATTCCGACTTCATGCAGTCGAGTTGTAGACTGCAATCCGGACTACGACGCGCTTTAAGGGATTGGCTCTACCTCGCGGCTTAGCGAGCCCTCTGTACGCGCC
ATTGTATTACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCATTAGAGTGCCCAACTGAATGT
AGCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCCCTTTCGGGCACA
CCCAGCTCCCACCAGGCTTCCGGACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATAATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTT
TGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTCGACTTCACGCGTTAGCTTCGTTACTGAGAGTGTCAAACCCCCAACAACCAGTCGACATCGTTTAGGGCGTGG
GCTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGTGCATGAGCGTCAGTGTCAGCCCAGAGACCTGCCTTCGCCATCGGTGTTCCTCCTGATATCTACG

>CAM2P4G03 Uncultured bacterium (Gemmatimonadetes)
GGGTTCCGACACGGACTTCGGGCGCTCGCCACTTCCATGGCGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCAATACTGATCCGCGATTACTAGC
GATTCCAGCTTCATGCCGTCGGGTTGCAGACGACAATCCGAACTGAGGCCGGGTTTTGGGATTGCCTCGGCATTGCTGCCTCGGCCCCCTCTGTCCCAGCCATTGTAGC
ACGTGTGTAGCCCTAGACGTAAGGACCATGATGACTTGACGTCGTCCCCACCTTCCTCCCCGTTTCGGCACCGGCAGTCTTCCTAGAGTCCCCGCCATTACGCGCTGGCAA
CTAAGAACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCGCGAACTCCGAAGAGGGGCTCTCGCT
TCTGAGAGCTTACTCGCGCATGTCAAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTT
TCAACCTTGCGGTCGTACTCCCCAGGCGGGGTACTTCCTGCGTTAGCGCCGGCACCCAGAGGGTCGCTCCCCCAGGCACCTAGTACCCATCGTTTACGGCGTGGACTAA
CAGGGTATCTAATCCTGTTTGCTCCCCAAGCTGTCGCGCA

>CAM2P4G05 Acidobacteriaceae bacterium (Acidobacteria)
GGTTAGCGCACCGACTTCTAGTGCAACCACTTTCGTGATGTGACGGGCGGTGTGTCAGGCCCGGGAACGTATTCACCGCAGCATGCTGATCTGCGATTACTAGCGATTC
CAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCAGCGGTTTGTACCGGCCATTGTAGCACGT
GTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCTCAACTAAATGGTAGCAACTGGAG
ATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGCGGTCTATTGCTAGACGCCGATATTTCTAC
CGGATTCCACTACATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTCTCAGCC
TTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTTCGGCACGACAGGATTGGGTACCTGTCACACCAAGCAATCATCGTTTAGGGCTAGGACTACCAGGGT
ATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTATGGTCCAGTGCGC

>CAM2P4G06 Uncultured soil bacterium (unclassified_Bacteria)
GACATACTTAGGACTGCTCCCTTACGGGTTACGCGGCACTTCTATACAGCAGCTTTCGTGATGTGACGGGCGGTTTACAAGGCCCGGGAACGTATTCACCGCGGCGTGC
TGATCCGCGATTACTAGCGATTCCAACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCCCTCTCACGAGATCGCGACGGT
TTGTACCGGCCATTGTAGCACGTGTGTGGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTTCAGAGTGCC
CGGCATAACCCGATGGCAACAGAAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGATAGCTGCC
CTTGCGGGAGCCTACTTTCGTAGGATGTCAGCTA

>CAM2P4G07 Uncultured bacterium (unclassified_Bacteria)
GGCTTCTATGCACCACTTCGTGATGTGACGGGCGGTGTGCAAGCCGGGAACGTATCACCGCGGGTCTGATCCGGATTACTACGATTCCAGCTTCATGCAGTCGAGTTGC
AGACTGCAATCCGAACTGAGGCCGGCTTTCTCCGATTAGCTCCCCCTCGCGGGTTTGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTNCCCTGGACATAAAGGCC
ATGAGGACTGACGTCATCCCCACTTCCTCCCCGTTATCCGAGGCGGTTCTGCCAGAGTGCCCAACTAAATGGTGGCAACTGGAAGTAAGGGTTGCGCTCGTTGCGGGAC
TTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACATCGGCTCCTTGCGGGGAAGGGATATTTCTACCCCGGTCCAATGCATTTCGAGCCCA
GGTAAGGTTCTTCGCGTTGCGTCGAATTA

>CAM2P4G11 Unidentified eubacterium from the Amazon (unclassified_Bacteria)
CATACTTAGCGCTGTCCCCCTTGCGGGTTACGCGGCGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCA
TGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGAC
GGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGT
GCCCGGCATTACCCGATGGCAACAGGAAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGAT
GTCCTTGCGGAAATCGACTTTCGCCGAGTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGCTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCC
CCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTACGGCACGGCAGGGATC

>CAM2P4G12 Uncultured crenarchaeote (Thermoprotei)
AAACCAACTTCGATGAAGCGACGGGCGGTGTGTGCAAGGAGCAGGACGTATCACCGCGCGATGATGACACGCGATTACTAGGGATTCCATATTCATGAGGACGAGTTTC
AGCCCTCAATCATAACTGTGGTAAGTTTTGCGGATTGCCTCCTCCTTTCGAAATCGGAACCTATTGTACTTACCATTGCAGCCCGCGTGTGGCCCGAGGGTTTCGGGGC
ATACTGACCTGCCGTAGCCCCCTCCTTCCTCCGCCTTAGCGGCGGCAGTCCTTCTAATTAGCCCTTTTACTCCGAAGAATAAAAGTAGCAACTAGAAGCAGGGGTCTCG
CTCGTTACCTGACTTAACAGGACACCTCACGGCACGAGCTGGCGACGGCCATGCACCTCCTCTCAGCTTGTCTAGTAAAGTCTTCAGCTTGACCTTCACTCTGCTGTCG
CCCCCGGTAAGATTCCCGGCGTTGACTCCAATTGAACCGCAGGCTTCACCCCTTGTGGTGCTCCCCCGCCAATTCCTTTAAGTTTCAGTCTTGCGACCGTACTACCCAG
GCGGCAGACTTAACGGCTTCCCTGCGGCACTGGACTAGCATTAAGCTAGTCCATCACCGAGTCTGCATCGTTTACAGCTGGGACTACCCGGGTATCTAATCCGGTTTGC
TCCCCCAGCTTTCATCCCTCACCGTCGAGCGCAT

>CAM2P4H01 Uncultured bacterium (Acidobacteria)

AAGGTGCTCCTTGCGGTAGCACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATCACCGCGGCGTTCTGATCCGCGA
TTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGAC
CATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTGACC
CGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCTTTTAAGGGG
AAGGGATGTTTCCACCCCGGTCTCCTGCATTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTC
CTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTAGGGC
TAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTATGGTCCAGTGCGCCGCTTTCG

>CAM2P4H02 Uncultured bacterium (Alphaproteobacteria)
TCCTTGCGGTTAGCGCACCGTCTTCGGGTAAAACCAACTCCCATGCCGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCCTGCTGTTCTGCGATTA
CTAGCGATTCCACCTTCATGCACCCGAGTTGCAGAGTGCAATCTGAACTGGGACGGTTTTTTGGGATTAGCTGACTCTCGCGAGCTCGCTGCCCACTGTCACCGCCATT
GTAGCACGTGTGTAGCCCAGGGTGTAAGGGCCATGATGACTTGACTTCATCCCCACCTTCCTCCGGCTTGCCGCCGGCGGTCCCTCTAGAGTGCCCAACTGAATGATGG
CAACTAAAGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTGCGCCCCTTGCGGGGAAAACC
CATTTCTGAGTCGAGCACAGGATGTCAAACCCTGGTAAGGTTCTGCGCGTTGCGTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAG
TTTCAACCTTGCGGCCGTACTCCCCAGGCGGGATGCTTAATGCGTTAGCTGCGCCACTGACGAGCAAGCTCGCCAACGGCTAGCATCCATCGTTTACGGCGTGGACTAC
CAGGGTATCTAATCCTGTTTGATCCCCACGCTGTCGCGCCTGAGCGTCAGTAACGG

>CAM2P4H03 Uncultured Acidobacterium (Acidobacteria)
GCTGTACTTGGAAGGCTGCTCCTGCGGTTAGCACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGC
GTTCTGATCCGCGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCGATTAGCTCCCCCTCACGGGTTTGCGA
CGGTTTGTACCGACCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCGTTATCCGAGGCAGTTTCACTAGAG
TGCCCGGCTTGACCCGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGC
AGCCTTTTAAGGGGAAGGGATGTTTCCACCCCGGTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGGACCACATGCTCCACCGCTTGTGCGG
GCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTCATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAA
TCATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCTAGCTTTCGCGCCTCAGCGTCAGTTATGG

>CAM2P4H04 Uncultured alpha proteobacterium (Alphaproteobacteria)
GGCTGCTCCTTGCGGTTAGCGCGCCGTCTTCGGGTAAAACAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCGTGCTGATCCGC
GATTACTAGCGATTCCAACTTCATGCGCTCGAGTTGCAGAGCGCAATCCGAACTGAGACGGTTTTTCGAGATTTGCTAAGGGTCGCCCCTTCGCCTCCCGCTGTCACCG
CCATTGTAGCACGTGTGTAGCCCAGCCTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCGGCTTATCACCGGCAGTCCCCCTGGAGTGCCCAACTGAAT
GATGGCAACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGGCCCCGAAGGGAA
GATCGCATCTCTGCAATCCGTCCAGGACATGTCAAAAGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTAAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTC
CTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGGATGCTTAAAGCGTTAGCTGCGCCACTGAAGAGCAAGCTCCCCAACGGCTAGCATCCATCGTTTACAGCGT
GGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTTCGCGTC

>CAM2P4H05 Uncultured bacterium (Acidobacteria)
TCTTGCGGTTAGCACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAGGCCGGGAACGTATCACCGCGGCGTTCTGATCCGCGATTACTAGC
GATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCGACGGTTTGTACCGACCATTGTAG
CACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCTCCTCATTATCTGAGGCAGTTTCACTAGAGTGCCCGGCTTGACCCGATGGCA
ACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAGCGGCCTTTTAAGGGGCGCCGATG
TTTCCACCGGATTCCACTGCGCTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGT
TTCAGCCTTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTAGGGCTAGGACTA
CC

>CAM2P4H07 Unidentified eubacterium from the Amazon (Acidobacteria)
CACTGTCCCCCTTGCGGGTTACACGGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATTCACCGCGGCATGCTGATCC
GCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACTGAGACCGGCTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTAC
CGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTCTCCAGAGTGCCCAGCTT
GACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGACGCCCTTGCG
GGAGTCGACTTTCGCCGATTGTCATCTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATT
CCTTTGAGTTTCAGCCTTGCGACCGTACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCGATACCCGGCACACCAAGCATTCATCGTTTAGGG
CCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCTTTCGTTATTCAGTGTCAGAAAC

>CAM2P4H09 Uncultured Rubrobacteridae bacterium (Actinobacteria)
TTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCAG
TGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGT
ACTCCCCAGGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCT
GTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTCACCGCTACACCGGGAATT
CCACTCTCCTCTTCCGGACTCTAGCCATACGGTTTCAACCGACGTCTCGAGGTTGAGCCTCGAGTTTTCACAGCTGACCTGTAAGGCCGCCTACACGCTCTTTACGCCC
AATAAACCCGGACAACGCTTGCCCCCTACGTATTACCGCGGCTGCTGGCACTCAGTC

>CAM2P4H10 Uncultured crenarchaeote (Thermoprotei)
CGATATGCCAAATCGCACCACTCGCCTAAAACAACTTCGATGAAGCGACGGGCGGTGTGTGCAAGGAGCAGGACGTATCACCGCGCGATGATGACACGCGATTACTAGG
GATTCCATATTCATGAGGACGAGTTTCAGCCCTCAATCATAACTGTGGTAAGTTTTGCGGATTGCCTCCTCCTTTCGAAATCGGAACCTATTGTACTTACCATTGCAGC
CCGCGTGTGGCCCGAGGGTTTCGGGGCATACTGACCTGCCGTAGCCCCCTCCTTCCTCCGCCTTAGCGGCGGCAGTCCTTCTAATTAGCCCTTCTACTCCGAAGAATAA
AAGTAGCAACTAGAAGCAGGGGTCTCGCTCGTTACCTGACTTAACAGGACACCTCACGGCACGAGCTGGCGACGGCCATGCACCTCCTCTCAGCTTGTCTAGTAAAGTC
TTCAGCTTGACCTTCACTCTGCTGTCGCCCCCGGTAAGATTCCCGGCGTTGACTCCAATTGAACCGCAGGCTTCACCCCTTGTGGTGCTCCCCCGCCAATTCCTTTAAG
TTTCAGTCTTGCGACCGTACTACCCAGGCGGCAGACTTAACGGCTTCCCTGCGGCACTGGACTAGCATTAAGCTAGTCCATCACCGAGTCTGCATCGTTTACAGCTGGG
ACTACCCGGGTATCTAATCCGGGTTTTGGTCCCCCCAGCTTTCATCCCTCACCGTCGAG

>CAM2P4H11 Uncultured organism (Verrucomicrobiae)
CATCACATCCATACTTCGGCGCTTTAAGGGGCGACTTCGGGTACAAACGGCTTCATGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGCCGTAGCT
GATGCGCCATTACTAGCGATTCCGGCTTCATGGAGGCGAATTGCAGCCTCCGATCCGAACTGGGCCCAGTTTTAAGGATTTCCTCCACCTCGCGGTCTCGGATCATTCT
GTACTGGGCATTGTAGTACGTGTGCAGCCCAGGCCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCCTCCTCGTTTAAGCGAGGCAGTCTGAACAGAGTGCTG
GAACCTCTCGGTTCCGTGGCAACAGTTCACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAAT
TGTCTCTTTCGAGACTCGCTGGCTTTCACCAACTTAGAGATGCATGTCAAGGCCTGGTAAGGTCCTTCGCGTTGCATCGAATTGAGCCACATACTCCACCGCTTGTGCG
GGCCCCCGTCAATTTCTTTGAGTTTTAATCTTGCGACCGTACTCCCCAGGCGGCACGTTTAACGTGTTAACTCCGGCGCAGAAGGGGTCGAATCCTCCCACACCAAACG
TGCACCGTTTACTGCCAGGACTACCGGGGTATCTAATCCCGTTTGCTCCCCTGGCCTTCGTGTCTCAGTGTCAGGAACTGTCCAGAGACCCGCCTTCGCCACTGGTCTT
CCTTACGATATCTACGCATTTCACTGCTACACCGTAAATTCCAGTCTCCT

>CAM2P4H12 uncultured bacterium (Acidobacteria)
GCGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCAACTTCA
TGCAGGCGAGTTGCAGCCTGCAATCCGAACTGAGACCGGCTTTCTCCGATTAGCTCCCCCTCGCGGGCTCGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCC
CTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCCTCCGGTTTGTCACCGGCAGTCTTCTCAGAGTGCCCAGCTTAACCTGATGGCAACAGAGAACAAGG
GTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGTCCTTGCGGAAGTCGGCTTTCACCGATGGTCAT

CTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGAACG
TACTCCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCGATACCCG