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**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
Maio - 2008

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CONSTRUÇÃO DE BIBLIOTECA GENÔMICA 16S rRNA**

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Manaus - Amazonas
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*D*edicatória

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.*

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companheirismo.*

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*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*

1 7

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 complexity, 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 agrônomo, 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 O₂ e liberação de CO₂, da absorção seletiva de íons nutritivos, do consumo de H₂O, 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 (Wilson, 1988; Rosseló-Mora & Amann, 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 & Amann, 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 frequência 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 específica 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; Haldeman, 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.

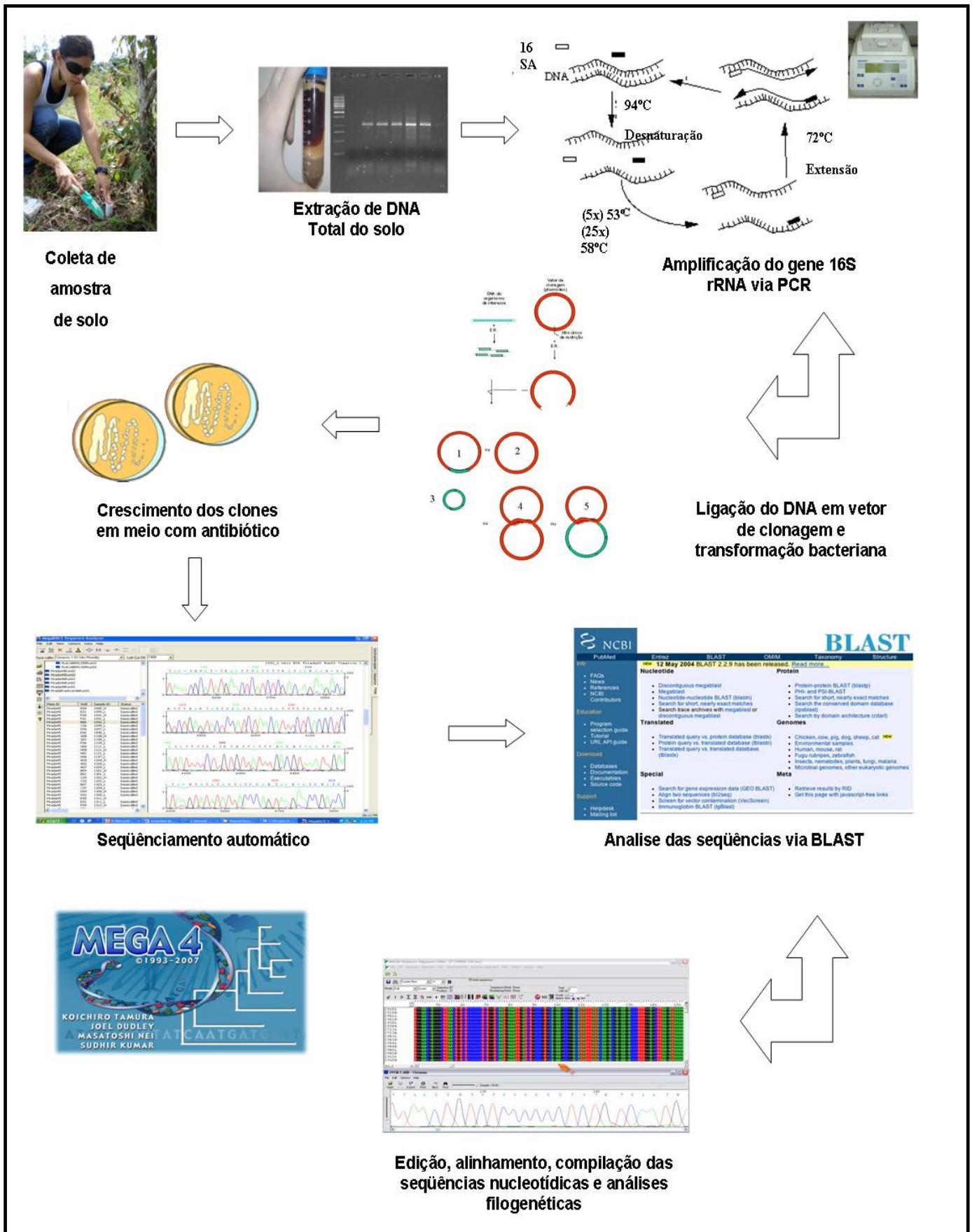


Figura 1 - Esquema ilustrativo para análise da diversidade bacteriana por meio da clonagem e seqüenciamento do gene 16S rRNA

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 arroxeadada, 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 países 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 anteriormente pertencente à SUFRAMA, na estrada do Puraquequara. As coordenadas geográficas da área são: 3° 01' 20" Latitude e 59° 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 4°C 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 Agrônomicas 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 $-80^\circ C$ para congelar e posteriormente para

descongelar foi colocado em água a 65°C 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 65°C por 2 horas, misturando eventualmente. Em seguida, as amostras foram centrifugadas por 1 hora a 5000 rpm a 10°C. O sobrenadante foi transferido para um tubo 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 10°C 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 10°C por 1 hora e 30 minutos. O sobrenadante foi retirado, assim como qualquer possível gota nas paredes do tubo. O *pellet* contendo DNA foi ressuscitado em quantidade mínima de 1 mL de T₁₀E₁₀ 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 centrífuga 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 câmara 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 50°C 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 Tris-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 ressuscitado 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™ (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 MgCl₂, 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 94°C por 1 min seguido por 30 ciclos como segue: desnaturação de fitas-molde a 94°C por 30 s, pareamento dos “primers” a 50°C por 30 s e extensão a 72°C por 2 min e um ciclo final de extensão a 72°C por 5 min. Em

seguida, a eletroforese em gel de agarose a 0,8% foi realizada para visualizar o amplicon, que foi corado com brometo de etídio (0,5 µg/mL) e visualizado em transluminador com auxílio 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 60-65°C 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 μ L do amplicon purificado; 1 μ L da solução salina (3:1) e 1 μ L do vetor pCR4-TOPO™ (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 nucleofílico e realiza a ligação do DNA. O sistema de ligação permaneceu em temperatura ambiente por 30 minutos sendo armazenado a -20°C.

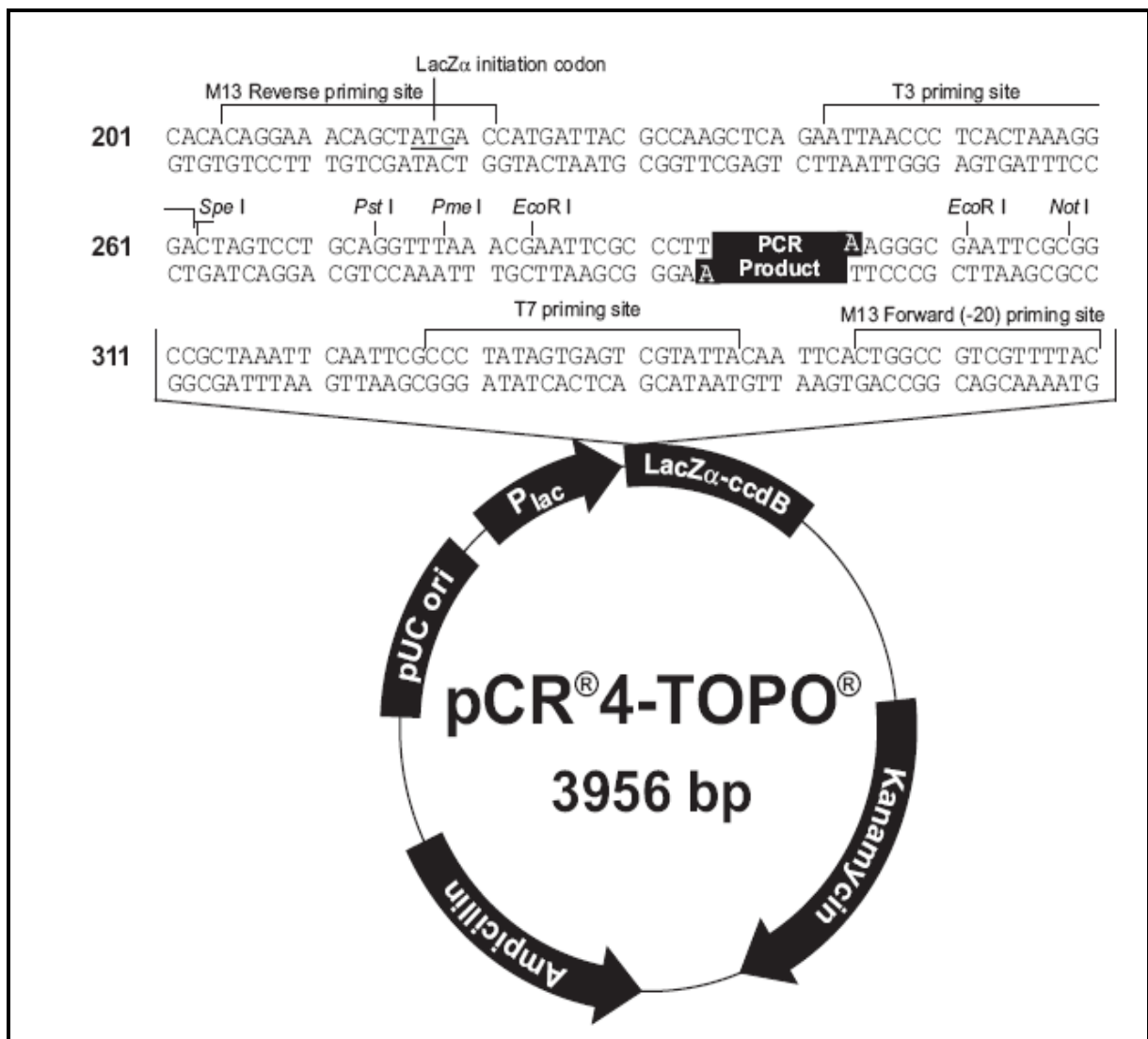


Figura 3 - Mapa do Vetor pCR[®]4-TOPO do Kit TOPO TA Cloning (Invitrogen)

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 37°C 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 auxílio 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 37°C 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 -80°C.

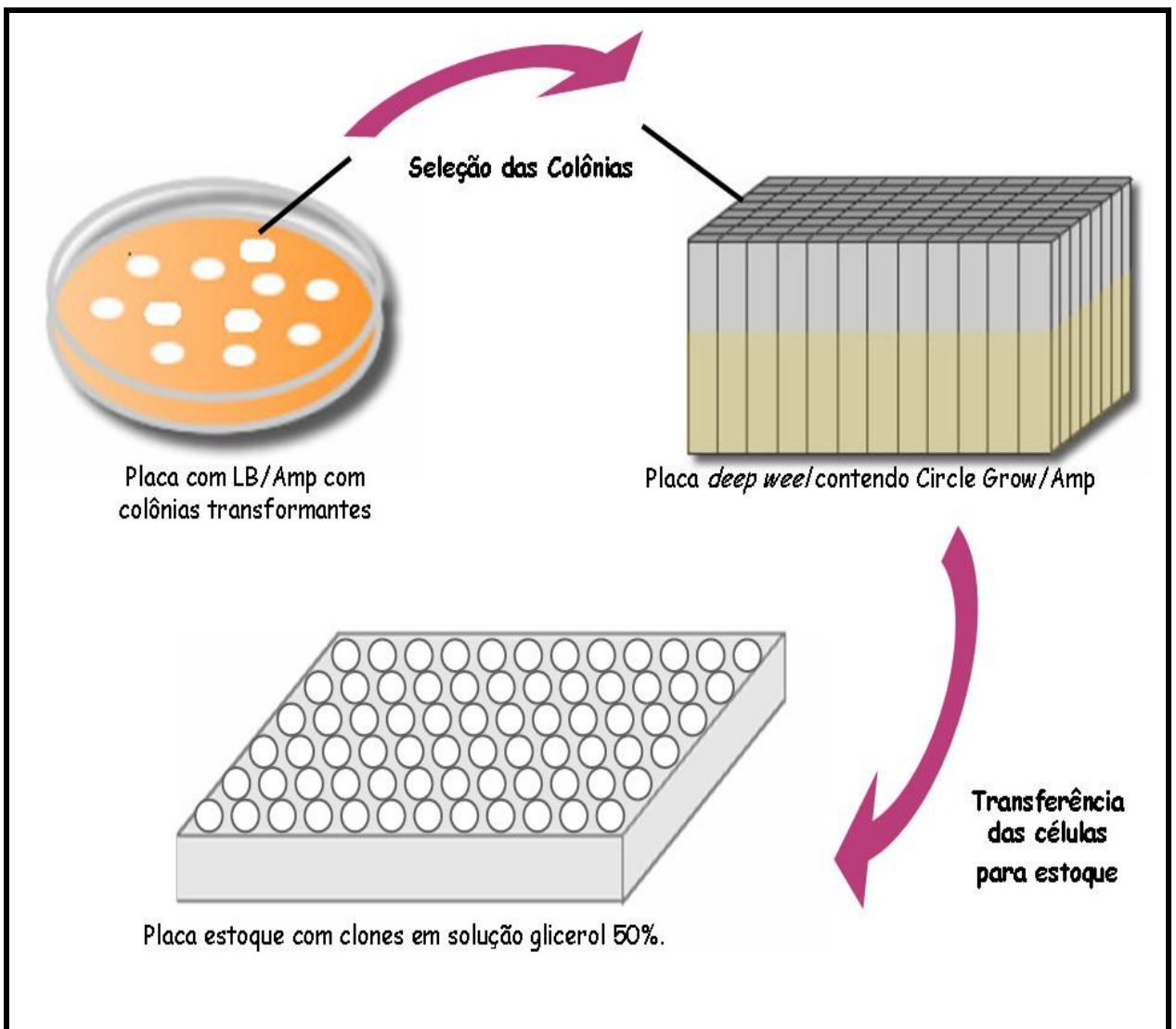


Figura 4 - Esquema ilustrativo da seleção de clones da biblioteca 16S rRNA

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 20°C durante 6 min a 4.000 rpm para sedimentar as células, descartando o sobrenadante. O sedimento bacteriano foi ressuscitado 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 20°C 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 ressuspensas 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 20°C 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 ácido 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 20°C a 4.000 rpm. O sobrenadante foi transferido para a microplaca com filtro (PVDF 0,2 μm - Millipore) e centrifugado a 20°C 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 20°C 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 20°C 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 ressuspensas 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 -20°C.

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 $\mu\text{g}/\text{mL}$) e as amostras foram visualizadas em transluminador com auxílio 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” (Amersham Bioscience) utilizando-se:

- | | | |
|--|---|-------------------------------|
| <ul style="list-style-type: none"> ● 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 | } | <p>Volume final
10 µL</p> |
|--|---|-------------------------------|

A reação foi submetida a um termociclador seguindo o programa: 1 ciclo a 95°C por 25 s, 30 ciclos de 95°C por 15 s, 50°C por 20 s e 60°C 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 4°C 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 4°C 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 4°C 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 ⁺⁺ cmolc kg ⁻¹	Mg ⁺⁺ cmolc kg ⁻¹	Al+H cmolc kg ⁻¹	K ⁺ mg/kg	P mg/kg	Fe mg/kg	Zn mg/kg	Mn mg/kg	N g/kg	C g/kg	M.O 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).

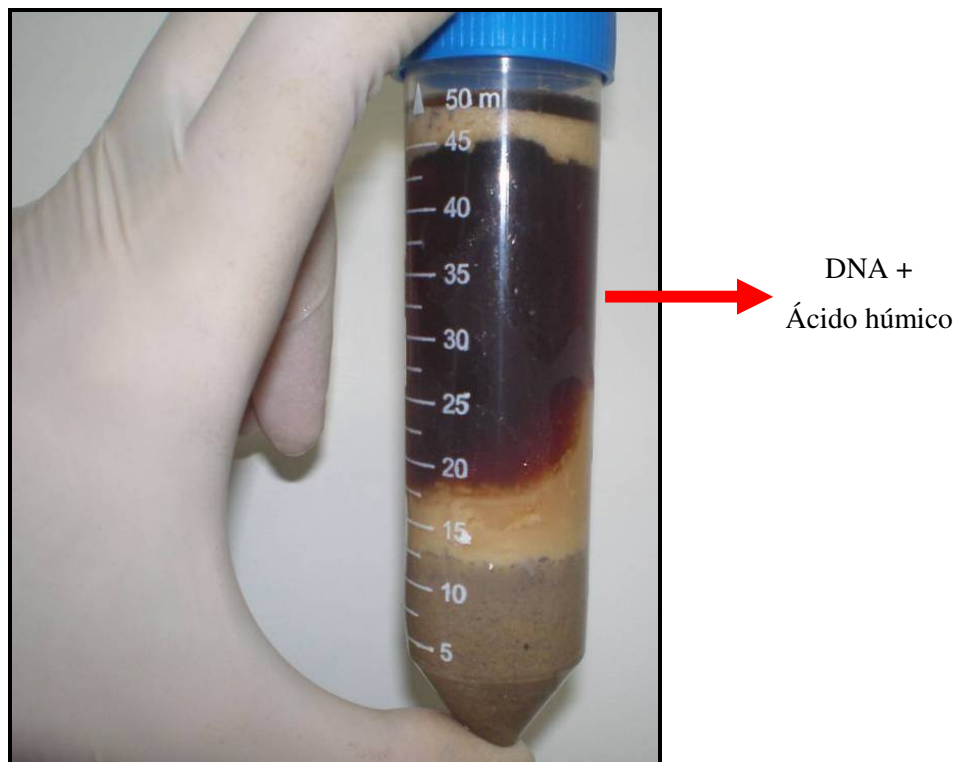


Figura 5 - Extração de DNA total do solo CAM 2, após os ciclos de congelamento-descongelamento

Os ácidos húmicos têm propriedades físico-químicas similares aos dos ácidos nucleicos, 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). Conseqüentemente, 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.

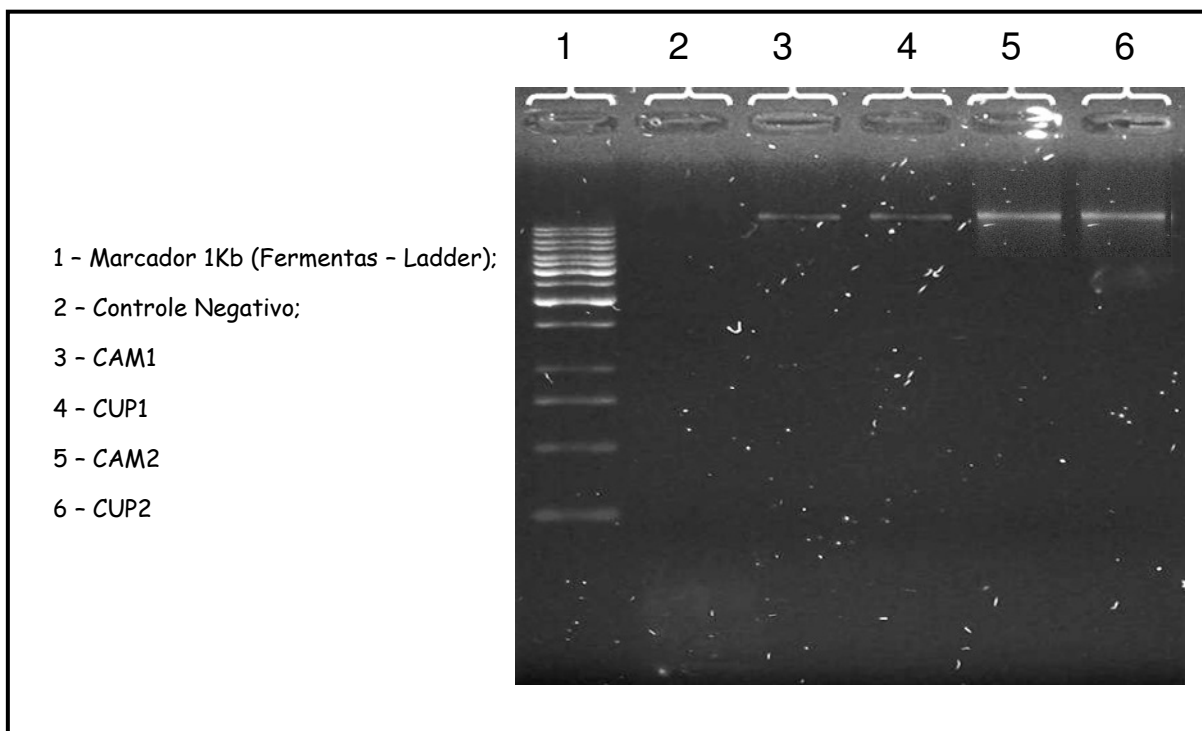


Figura 6 - Perfil eletroforético em gel de agarose a 0,8% contendo brometo de etídeo, constando o resultado da extração de DNA Total do solo das amostras devidamente identificadas

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 seqüenciamento. 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 inespecíficas 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).

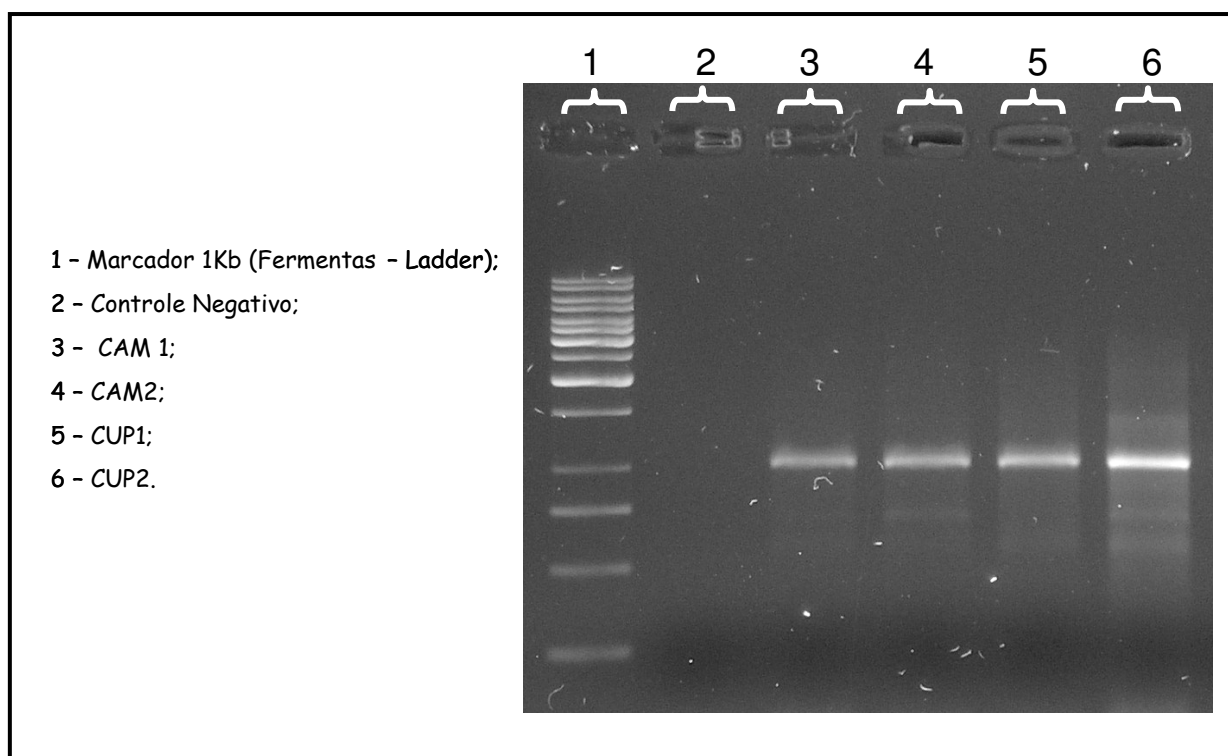


Figura 7 - Perfil eletroforético em gel de agarose a 0,8% contendo brometo de etídeo, constando o resultado da amplificação do DNA das quatro amostras devidamente identificadas utilizando “primers” para 16S rRNA

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 auxílio 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 37°C 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 filis 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.

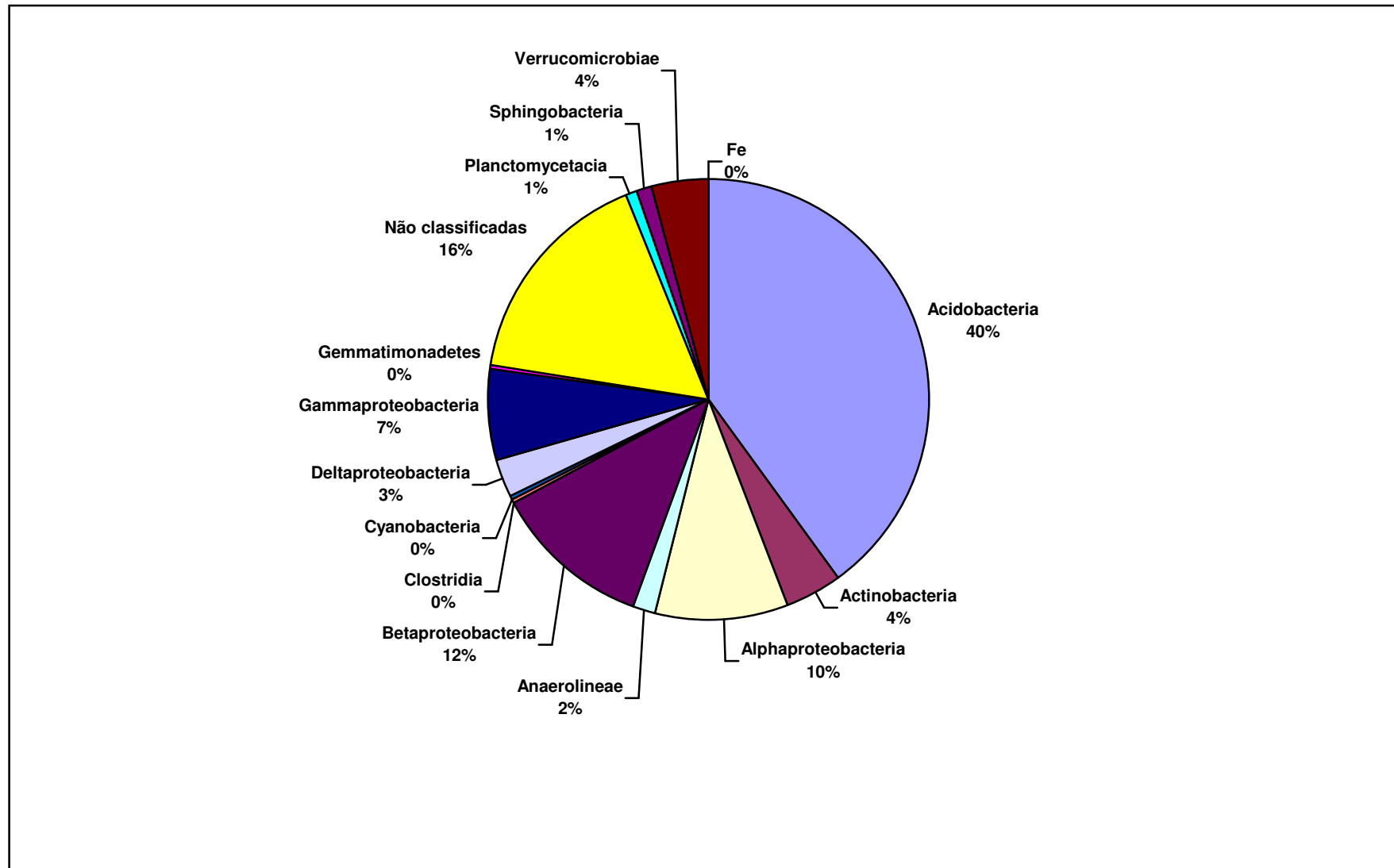


Figura 8 - Diversidade bacteriana de CUP1 de acordo com suas classes

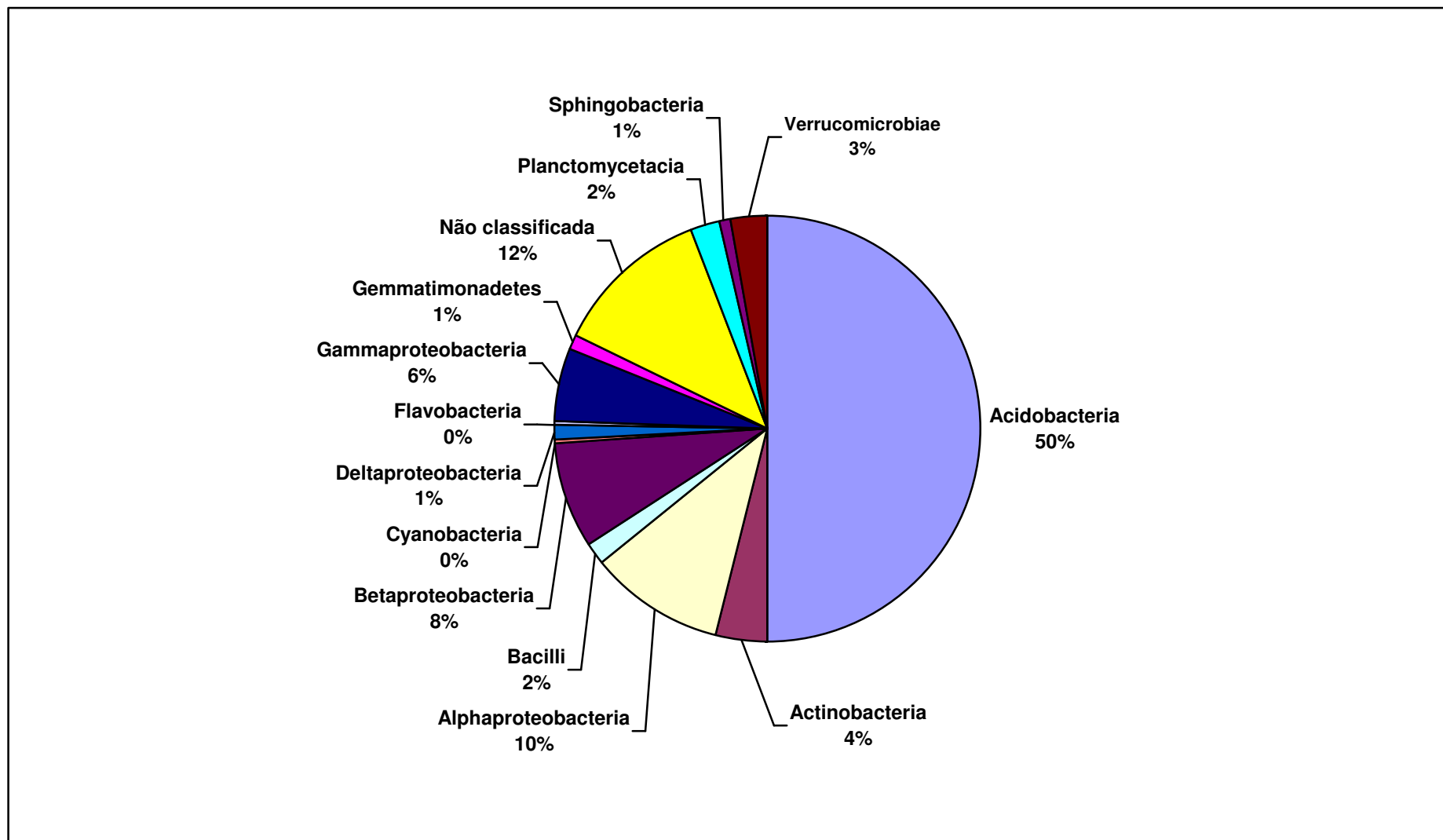


Figura 9 - Diversidade bacteriana de CUP2 de acordo com suas classes

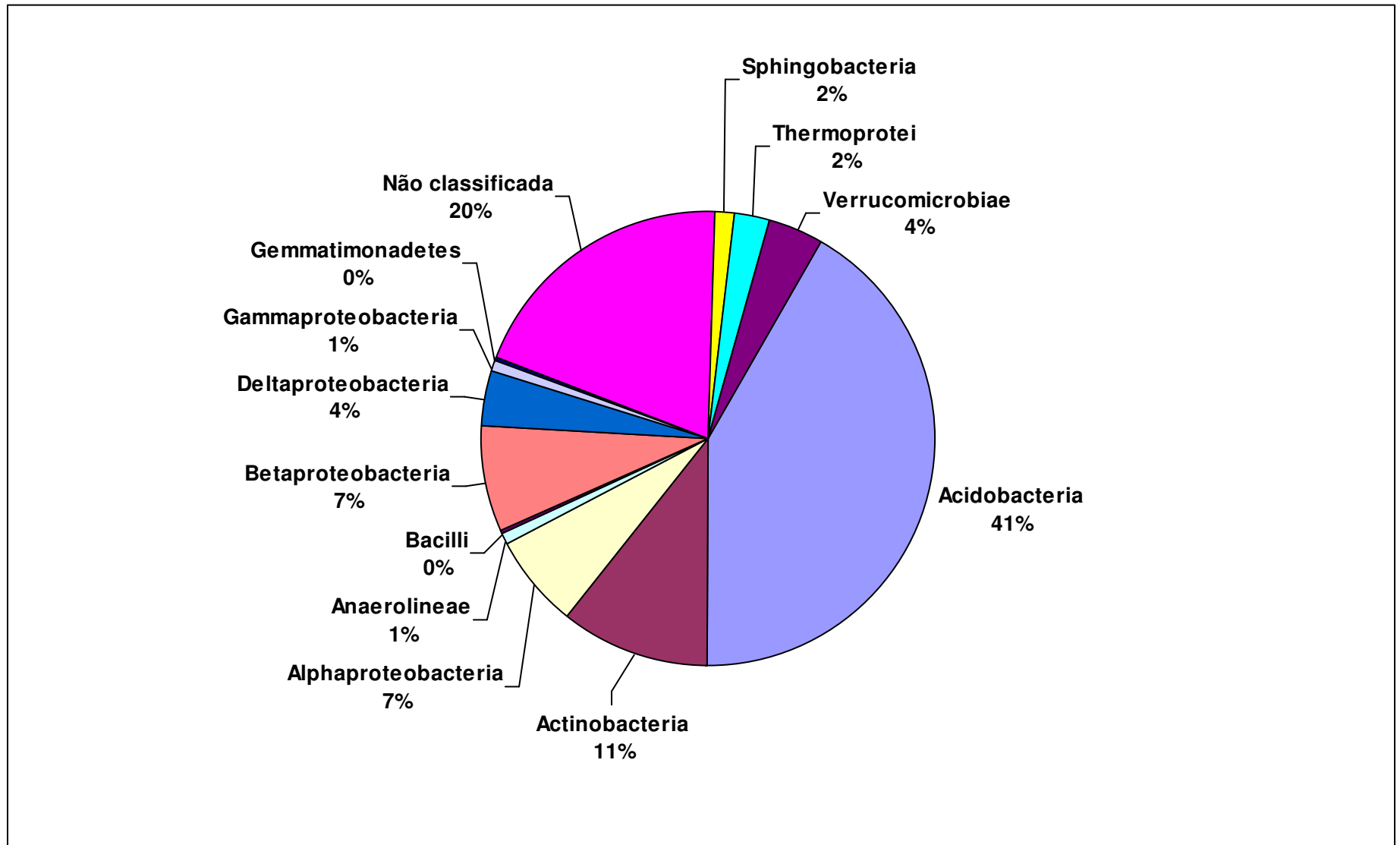


Figura 10 - Diversidade bacteriana de CAM2 de acordo com suas classes

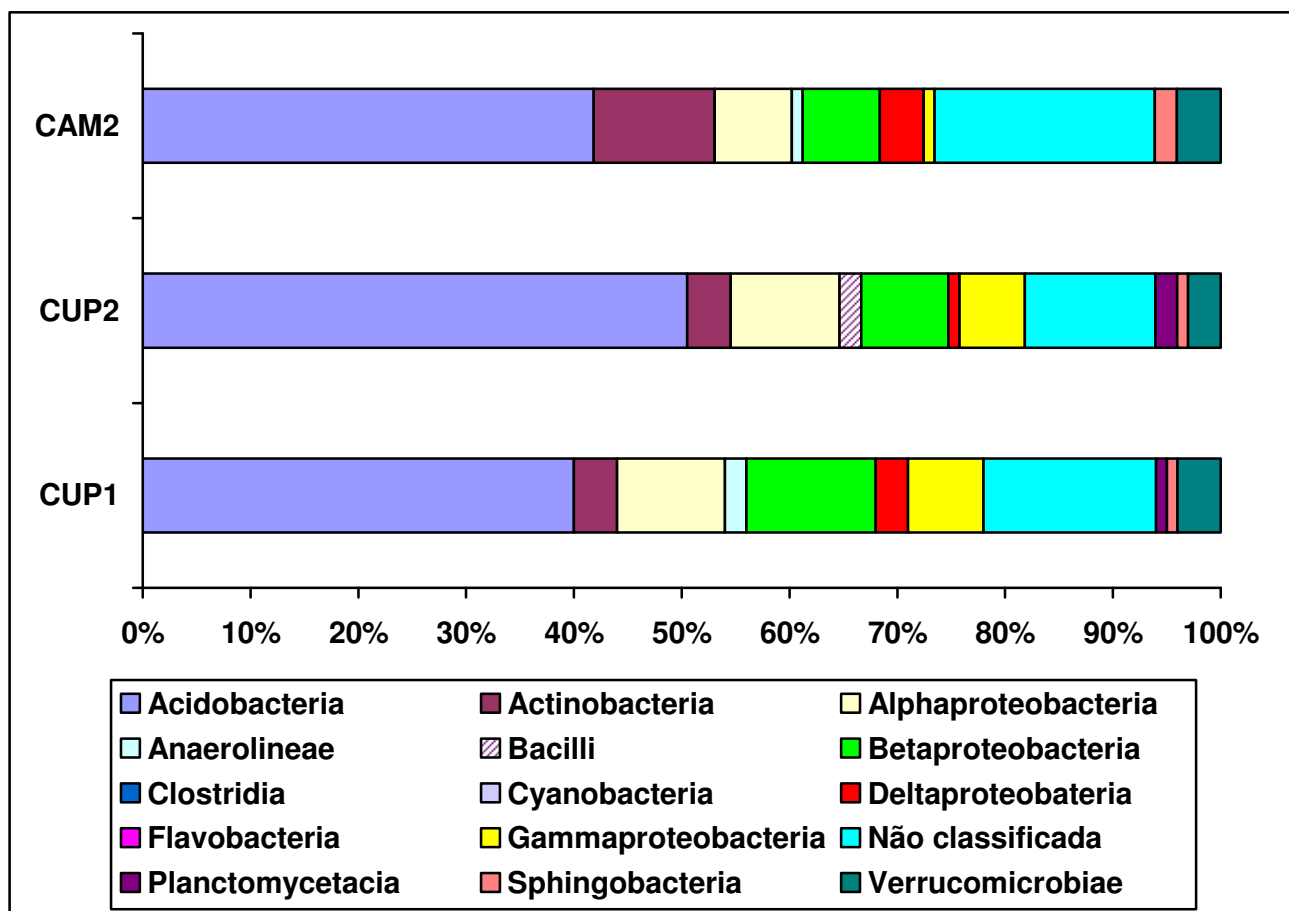


Figura 11 - Ocorrência relativa de seqüências de 16S rRNA das classes bacterianas das bibliotecas CUP1, CUP2 e CAM2.

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, aerossóis 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 ácido 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 frequência dentro de *Alphaproteobacteria*. Grupos de bactérias pertencentes a esses gêneros estão diretamente envolvidos no ciclo do N,

sendo bactérias fixadoras simbióticas, 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 *pmoA* 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 ($\text{CH}_4 + 2\text{H}^+ + \text{O}_2 \rightarrow \text{C}_3\text{OH}_3 + \text{H}_2\text{O}$) (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 *Burkholderiales* 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 frequência 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 acceptor 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 Filo *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 peptidoglicano (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	Identificação	Profund.	pH	Ca ⁺⁺	Mg ⁺⁺	Al+H	K ⁺	P	Fe	Zn	Mn	N	C	M.O
LTSP	abrev	cm	H ₂ 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 FÍSICAS 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 SEQUÊNCIAS 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 marenensis	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	Gammaproteobacteria
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 SEQUÊNCIAS 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 SEQUÊNCIAS 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 classificada
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	97.5	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 – SEQUÊNCIAS DOS CLONES OBTIDOS A PARTIR DA BIBLIOTECA CUP1 E SUA CLASSIFICAÇÃO (BLAST E RDPII)

>CUP1P1A01 Uncultured bacterium (Betaproteobacteria)
TGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTACCCGGGACATGTGTATCCCGGATTACTAGCGATTCCGACTTCAT
GAAGTCGAGTTGCAGACTTCAATCCGGACTACGACGCGCTTTCTGGGATTGGCTCCCCATCACTGGTTGGCAACCCCTCTGCACGCGCCATTGTATGACGTGTGTAGGCC
TACCTATAAGGGCCATGAGGACTTGACGTATCCCCACCTTCTCCGGTTTGTACCCGGAGTCCCATTAGAGTGTCAACTGAATGTAGCAACTAATGGCAAGGGTTG
CGCTCGTTGCGGGACTTAACCCA
ACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTGTGTCCAGGTTCCCTTTCCGGGACCACCTGCATTCTGCAGCGTTCCTGGCATGTCAAAGGTAGGTAAGG
TCTCTCGCTCGCATCGAATTAACCCACATCATCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTCGAATCTTGCAGCGTACTCCCCAGGCGGACG

>CUP1P1A02 Uncultured bacterium (Acidobacteria)
TGGCGTCTGCTCCTGCGGTTAGCGTACGACTTCTAGTACAACCTCACTTTCTGTGTGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGCGTCGATCGGT
ACGCCATTACTAGCGATTCCGGCTTATGTCAGTTCGAGTTGCAGACTGCAATCCGAACCTGAGCAGAGTTTTTCCGATTAGCTCCCCCTCGCGGTTGGCAACGGTTTTG
GCCCTGCATTGTAAACCGTGTGTAGCCCTGGACATAAAGGCCATGCGAATTCAGCTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCT
TGCAGGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCCTCCACACTTGTCCCTTGG
GGAAGTTCGATTTCTACAACCTGTCAAGTGCCTTCCGAGCCAGGTAAGGTTCTCGCGTTGCATCGAATTAACCCACATCATCCACCGCTTGTGCGGGCCCCGTCATTC
ATCCCTTTGAGTTTCTAGTCTTGGCAGCGTACTCCCCAGGTGCAGGTTAAACCGGTTAGTCCGGGACGACACCCGAACGGGTTGGCACCCCAAGTCTGTATCGTTTAG
GCTAGGACTACCAGGATCTAATCTGTTTGTCTCCCTAGCTTTCTGTCATTGAGC

>CUP1P1A03 Uncultured bacterium (Betaproteobacteria)
GGTTAGGCAACCTGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATCACCCGACATGCTGTATCCCGGATTACTAGCGAT
TCCGACTTCATGAAGTCGAGTTGCAGACTTCAATCCGGACTACGACGCGCTTTCTGGGATTGGCTCCCCATCACTGGTTGGCAACCCCTCTGTACGCGCCATTGTATGAC
GTGTGTAGCCCTACCTATAAAGGCCATGAGGACTTGACGTCAATCCCCACCTTCTCCGGTTTGTACCCGGCAGTCCCATTAGAGTGTCAACTGAATGTAGCAACTAAT
GGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCAGGTTCCCTTTCCGGGACCGCTGCATTTC
TGCAGCGTTCCCTGGCATGTCAAAGGTAGGTAAGGTTTTCGCGTTGCATCGAATTAACCCACATCATCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTTAA
TCTTGGCAGCGTACTCCCCAGGCGGACGACTTCCAGCGTTAGTGGGTTACTAAAGGATTAACCTCTCCAACAACCTAGTGTGATCATGCTGTAGGCGCTTGGGCGGACTTACCAG
GGTATCTAATCTGTAGTCCCAAGCTTTCGTGATGAGCGTCACTGTTGGCCAGGAGGCTGCCTTCGCCATCGGTGTTCTCTC

>CUP1P1A04 Uncultured Verrucomicrobia bacterium (Verrucomicrobiae)
GATGTGACGGGGCGGTGTACAGCCCGGAACGTATTACGGGGCGTACTGATGCGCCATTACTAGCGATTCCAGCTTCATGCCGTCGAGTTGCAGACGAAATCTGAAC
GGCCCGGTTTTGGGGGATTTGCTCCAGCTTACGCTTTCCTTTGTAACCGGGCATTGTAGTACGTGTGACGCGCTGGCCGTAAGGGCCATACGACTTGCAGTGC
ATCCCCACCTTCCCTCGTTGAAGCGGAGGAGTCTGTCCAGAGTGCCTCCCAATTAAGGGTGGCAACAGGACACAGGGGTTGCGCTCGTTGCGGGGACTTAACCCAACA
TCTCACGACAGGCTGACGACAGCCATGCAGCACCTGTGCAAGCTTCCCTTCCGGGATCGTCAGACTTTCATCTTCTACTACTTGCATGTCAAAGCCAGGTAAGGTT
CTTCG

>CUP1P1A08 Uncultured bacterium (Acidobacteria)
GCCTCCCTTGGCGGTTAGCTGACAGACTTCTAGTACAATCACTTTCTGTGTGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTTTACGGCAGCGTGTGATCTGCC
ATTTACTAGCGATTCCAGCTTCAATGACGGCGAGTTGCAGCCTGCAATCCGAACCTGAGAACCGTTTTTGGCGATTGGCTCCCCCTCGCGGTTAGCGACGCTTTGTACCGT
CCATTTAGCAGCTGTGTAGCCCTAGACATAAAGGCCATGAGGACTTGACGTCAATCCCCACCTTCTCCAGCTTATCGCTGGCGGTTCTCTCGGAGTTCCTCAACTGAAT
GATGGCAACACAGGACAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGCTGACACCCCTTGGCGGGT
ACCGATGTTTTCCACCGCCTTAACAGCCGTTTCGAGCCTAGGTAAGGTTTCTCGCGTTGGTGAAGGTTTCCGCGTTGCTTCCGCAATTAACCCACATGCTCCACCGCTTGT
CTTTGAGTTTACGCTTGGCAGTGTACTCCCCAGGCGCATATTAACCGGTTAGTCCGGCAGGATCAACTGAATGACCCANACCAATATGCATCGTTAAGGGCGT
GGACTACCAGGATCTAATCTGTTTGTCTACCCACGCTTTCGTGTCTCAGCGTCACTTACGGTCCAGAAAGCCGCTCTACACC

>CUP1P1A10 Uncultured bacterium (Clostridia)
TTATCTTACTTTGGGTACTCCCTCCTTGGCGTTGGGTCATACACTTTGGGTAATAAATCCCGTGGTGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTTTACCC
GGCCATCTGATCCCGGATTACTAGCGATTCCAACTTCAATGTAGTTCGAGTTGCAGACTACAATCCGAACCTTAGACGCAATTTTTGTGCTTTGCTTACTGCCACCGCT
CGCTTCACTTTGTTTACGCCATTGTAGCAGCTGTGTAGCCCAAGACATAAAGGGCATGATGATTGACGTGCGCCCACTTCTCCGTTTATCCAGGGTGTCCCTC
TAGTGTGCCACCTCAACGTGCTGGCTACTAAAGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGGGCTGACGACAACCATGCACCACCTGT
ATCCATCGCCCGAAGGGGAAAAGGTTATCTACCTCTGTCTGCTGGTATGTCAAAGCTTTCGCGGTTGCTTCCGCAATTAACCCACATGCTCCACCGCTTGT
GCGGGCCCCGTCATTTCTTTGAGTTTCAACCTTCCGGCGGTACTCCCCAGGTGGAATACTATTGCGTTTGGTTCGGCAACAGGATTGCTCCAGACACCTAGTAT
TCATCGTTTACGGCGTGACTACCAGGATATCTAATCTGTTTGTCTCCCCACGCTTTCGTGTCTCAGCGTCAATATTGCCCCAGTAAACCGCCTTCGCCACTG

>CUP1P1A11 Uncultured bacterium (Deltaproteobacteria)
TCCTTGGCGTTGGCGCAGGCACTTCTGGAGCAAACGACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTTTACCCCTGCTGCTGATCAGGGATTAC
TAGCGATTCCAACCTCAAAGAGTCGAGTTGCAGACTTCTATCTGACTGAGGCTACTTTTTGCGATTGGCTCCCCCTCGCGGTTTGCAGCGCTTTGTAGTAGCCATT
GTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACGTGCTCCCCACCTTCTCCGATTGAATATCGGGCGTCTCACTAGAGTCCCCGGCGAACCCTG
GGTAAGTGTATGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTAACCGCGCTTCTCCGAAGAGCACC
CCGATATTTCTACAGGTTTCGCGGTTTTCTAGCC

>CUP1P1A12 Acidobacteria bacterium (Acidobacteria)
GGACGGTGTCTTGGCGTACGCGCACCGGCTTCTAGTACAGCCACTTTCTGTGTGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTTTACCCGACGCGTGTGATC
TGCGATTACTAGCGATTCCAGCTTCAATGGAGTCGAGTTGCAGACTCCAATCCGAACCTGAGGATGACTTTTTCCGATTAGCTCCCCCTCGCGGTTTGGCAGCGTTTGT
TCACCCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCAATCCCCACCTTCTCCCGGTTATCCGGGGCGGTTTCCCGAGAGTCCCAACT
AAATGATGGCAACTGGCAATAAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTACGACGAGTCCCTTGG
GGAAGATGATATTTCTACCACTGCTCACTGCGCCTCGAGCCAGGTAAGGTTTCTCGCGTTGGTGAAGTGAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCAA
TTCTTTGAGTTTACGCTTGGCAGCGTACTCCCCAGGCGGATGCTTATCCGTTAGTTCGGCAGCGGAGTATGGGTTAGCTTACCAAGCAATCATCGTTTAG
GGCTAGGACTACCAGCGTATCTAATCTGTTTGTCTCCCCAGCTTTCGCGCCTCAGCGTCACTTGTGGTCCAGTGGCCG

>CUP1P1B02 Uncultured bacterium (Acidobacteria)
CACCGACTTCTAGTACACCCACTTTCTGTGATTGACGGGGCGGTGTGTACAAGGCCGGGAACGTTTACCCGCGGATGCTGATCCCGGATTACTAGCGATTCCAGCTTC
ATGGAGTCGGGTTGCAGACTCCAATCCGAACCTGAGTAGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCAGCGTTTGTACCGACCATTTAGCAGCTGTGTAGC
CTGGACATAAAGGCCATGAGGACTTGACGTCAATCCCCACCTTCTCCCGGTTTGTGCTCCGGGGCGGTTTCCGTTAGAGTGTCTCGCCATAACCGCTTAGCAACTAACGATAAG
GGTGTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGACGACGCTTGCAGGCGCCGATGTTTCCACCGGATT
CACTGCATTTCCAGCCAGGTAAGGTTTCTCGCGTTGCGTTCGAATGAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACGCTTTCGCG
CGTACTCCCCAGGCGGAACTTAACCGGTTAGTCCGGCACGGCGGATTTGGGTAACCCGACCAAGTGTTCATCGTTTAGGGCTAGGACTACCAGGATCTAAT
CCTGTTTGTCTCCCTAGCTTTCGCGCATCAGCGTCACTTGTGGTCCAGTGGCCGTTTC

>CUP1P1B03 Uncultured bacterium (Alphaproteobacteria)

GGTTAGCGCACCGTCTTCAGGTAAGGCCAACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCGTGTGATCTGCGATTACTAGCGAT
TCCAACTTCATGTGCTCGAGTTGCAGAGCACAATCCGAAGCTGAGACGGCTTTTGGAGATTGCGCAGGATTGCTCCATTGACTCCCACTGTCGCCGCCATTGTAGCAGC
TGTTGAGCCCGAGGCTTAAAGGCGATTAGGACTTACGGCTCATCCCACTTCTCCGGGGTATCACCGGCAGTCCCCCTTAGAGTTGCCAACTGAATGATGGAACTAA
GGGCGAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCACGCCCTTTCGGGGGAGGATCCCATCTC
TGGAAACCGTTCGTGGCATGTCAAGGGCTGGTAAGGTTCTGCGCGTTGCTTCCGAATTGAACCCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCTTTGAGTTTTA
ATCTTTCGACCGTACTCCCGAGGCGGATGCTTAATGCGTAAGCTGCGCACTGAAGGTTGAACCAACACCGGCTAGCATCCATAGTTTACGGCGTGGACTACCAGGG
TATCTAATCTGTTTGTCCCAAGCTTTCGCACCTAACGTCAGTACCGGGCCAGT

>CUP1P1B07 Uncultured Propionibacterium sp. (Actinobacteria)

TATCACAGTCCACCTTCGAGGTCCCCACACAGGTTAGGCCACCGGTTCCGGTGTACCAACTTTCATGACTTGACGGGGCGGTGTACAAGCCCCGGGAACGTATTCAC
CGCAGCGTTGCTGATCTGCGATTACTAGCGACTCCGACTTTCATGAGGTCGAGTTGCAGACCCCAATCCGAAGTGCAGCGGCTTCCGAGATTGCTCACCTCACAGG
CTCGCCACTCTCTGTACAGCCATTGTAGCATGCGTGAAGCCCTGGACATAAGGGCATGTAGACTTGACGTGCATCCCACTTCCCTCCGAGTTGACCCCGGGCTCTC
CACTGAGTCCCAACATAACGTGCTGGCAACAGTGAACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCT
GTGAACCGACCCCAAGAGGCGACACCCATCTCTGAGCACTCCCGATCCATGTCAAACCCAGGTAAGGTTCTACGCGTTGATCGAATTAATCCGATGCTCCCGCCGT
TGTGCGGGCCCCGTCAATTCTTTAGGTTTTAGCCTTTCGGCCGCTACTCCCAAGCGGGGTACTTAAAGCGTTAGCTACGGCACGGAAACCCGTGGAATGGACCC

>CUP1P1B08 Uncultured bacterium (Anaerolineae)

GTCCAGTCCACACACCTTCGACGGCGTCTCCTTGCCTTACACTACCGGCTTCAGGTGTACAGCTCCCATGACGTGACGGGGCGGTGTGTACAAGGCCCGGAGAACG
TATTCAACGCATATAGCTGACGCGGTTTACTAGCAACTCCGACTTCACGACGCGGAGTTGCAGCCTGCGATCTGAAGTGCAGGCGGTTTGGGGATTGGCTTACCT
CGCGGCTTAGCGACCCATTGTACCGCCATTGTAGCGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTGCATCCCACTTCCCTCCGCTTAAATACCGG
GTCGCCGATGACACATGAACATAACAGCGAGGTTGCGCTCGTTAGCGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGACCTGTGCAAGCT
CCCTTGGGGTGGTCCACTTTCAGATCTCTACCACCTTGCATGTCGAAGCCAGGTAAGGTTCTTCGTGTGGCATCGAATTAACCCACACGCTCCGCTGCTTGTGCGGG
CCCCGTCAAATTCTTTGAGCTTAAATCTTGGCATCGCAGTCCCAAGGCGGTAAGTATATCGCGTTAGCTGCGGCACTGATGGGGTTTATCCACCAACGCCAAGTTACA
TCGTTTTACAGCTAGGATTACCGGGTCTCTAATCCCGTTA

>CUP1P1B09 Uncultured gamma proteobacterium (Gammaproteobacteria)

GTAGGCGCCCTCCTTCCGCTCAGGCTACCTGCTTCTGGTGCAGTCAACTCCCATGGTGTGACGGGGCGGTGTGTACAAGACCCGGGAACGCATTACCGCAGCAATGCTG
ATCTGCGATTACTAGCGATTCCGACTTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTCCTGGGATTGGCTTCCGCTCGCGGTTGGCTTCCCTCT
GTATCTACCATTTGACACGTTGTAGCCCTGGTCATAAAGGCCATGTAGACTTGACGTCATCCCACTTCCCTCCGCTTGTGCGGGCGGCTCTCTTAGAGTGCCCA
ACTTAAATGATGGCAATGAAGCAATAGGCAAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGACCTGTCTCTGGGTTCTT
GGGCAACCCCATATCTCTACAGGGTCCCGAGGATGTCAAGACCCAGGTAAGGTTCTTCCGCTGTCATCGAATTAACCCACATGCTCCACCGCTTGTGCGGGTCCCGCTC
AATCTCTTGGATTTCAACTTTCGGCGCTACTCCCAAGGCGGAGGACTTAGCGGTTAGCTACGACACTGCGAGGCTTACCCTCTCACGCTTAGTCTCTCATCGTTA
TGGC

>CUP1P1B10 Uncultured bacterium (Alphaproteobacteria)

CCAGTCTGACCTACGTGCGCGGCTGCTCCTTCCGCTTAGCACGCGGCTCTTCGGGTAACCAACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTAT
TCACCGCGGCGTGTGATCCCGGATTACTAGCGATTCCAATCTCATGACCTCGAGTTGCAGAGTGCAGATCCGAAGTGCAGCGGCTTTTCGAGATTGCTCAGGGTCCG
TCTCGCATCCCGTGTTCGCGCATTTAGCACGTTGTAGCCCTGCTTAAGGGCCATGAGGACTTGACGTGCATCCCACTTCCCTCCGCTTATCACCGGCGGTTCC
CCTGGAGTCCCAACTGAATGATGGCAACTAAGGGCGAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGT
GTTCCCGCCCCGAAGGGAAGATCGCATCTCTGCGATCCGTCAGGACATGTCAAAGCTGTTAAGGTTCTGCGCGTTGCTTCGAATTAACCCACATGCTCCACCGCTT
GTGCGGGCCCCGTCAATTCCTTCGAGTTTTAATCTTCCGACCGTACTCCCAAGGCGGATGCTTAAAGCGTTAGCTGCGCACTGAAGAGCAAGCTCCCAACGGCTA
GCATCCATCGTTTACAGCGTGGACTACCAG

>CUP1P1B12 Unidentified eubacterium from the Amazon (Acidobacteria)

ATACTTAGCGCTACCTCCCTTCCGGGTAGCGCAGCGATTCTAGTACAGCCAGTTTCGTGATGATGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGCATGCT
GATCCGCGATTACTAGCGATTCCAATCTCATGACGCGGAGTTGCAGCCTACAATCCGAAGTGCAGAGTGCAGATCCCGACTTTCCTCCGATTAGCTCCCCCTCCGGGGTTCGAACGGTT
TGATCCGCGCATTTGACGAGTGTGTAGCCCGAGACATAAAGGCCATGCTGACTTGACGTCATCCCACTTCCCTCCGCTTATCACCGGCGGTTCCCGAGGTGCC
GCTTAACTGATGGCAACAGAGGACAAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACAGATGTCCT
TGGCAAAACCGACTTTCACCGCGTTCATCTGCATCTCGAGCTGGTAAGGTTCTTCCGCTGCGCTCGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCCGT
AATCTCTTGGATTTCAAGCTTCCAGCTTCCCGAGTTACTCCCAAGGCGGAAAGGTTAATGCGTTAGCTTCCGCACTGAAGAGCAAGCTCCCAACGGCTAATCGTTT
AGGGCCAGGACTACCGGGTATCTAATCCGTTTGTCTCCCTGGCTTTCGCGCTCAGCGTCAATATCGGTCCA

>CUP1P1C01 Uncultured bacterium (Alphaproteobacteria)

GACCTACCGTGGCGGCTGCTCCTTCCGCTTAGCGCACCGTCTTCAGTGAACCAACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGC
AGCCTGCTTTCGCGATTACTAGCGATTCCACCTTTCATGACCTCGAGTTGCAGAGTGCAGATCCGAAGTGCAGCGGCTTTTCGAGATTAGCATACTCTCCGGAGTTAG
CGTGTGATGCCCTTGGACATAAAGGCCATGCGGACTTGCAGTGCATCCCACTTCCCTCCGCTTATCACCGGCGGTTCCCGAGGTGCCAACTC
AGTGCCCAACTTAATGATGGCAACTAAGGGCGAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTG
AGCCCTTGGGGAAACTCCCTTTCAGGAGCGGTTCCAGGATGTCAAACCTGGTAAGGTTCTGCGCGTTGCGTTCGAATTAACCCACATGCTCCACCGCTTGTGCGGGCC
CCGTCAAATTTCTTTGAGTTTTCAACTTTCAGCTTCCCGGCTACTCCCAAGGCGGAAAGCTTAAAGCGTTAGCTGCGCACTGAAGAGCAAGCTCCCAACGGCTAATCGTTT
GTTTACGGCGTGGACTACCAGGTTATCTAATCTCTG

>CUP1P1C02 Uncultured bacterium (Acidobacteria)

GGTTAGCGTACGACTTCTAGTACAACCTCACTTTCGTGATGTGACAGGCGGTTGTGTACAAGGCCCGGGAACGTATCACGGCGTGCATCTGATACGCCATTACTAGCGA
TTCCGGCTTCATGACGAGTGCAGTGCAGACTGCAATCCGAAGTGCAGAGGTTTTCGAGATTAGCTCCCCCTCCGGGGTGGCAACGGTTTGTGCCCTGCATTGTAACA
CGTGTGATGCCCTTGGACATAAAGGCCATGCGGACTTGCAGTGCATCCCACTTCCCTCCGCTTATCACCGGCGGTTCCCGAGGTGCCAACTC
GTGACGGGGTTCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCGCTCCACACTTGTCCCTTGGGGGAAGATCGATTTCT
ACAATTTGCAAGTGCCTTCGAGCCAGGTAAGGTTCCCGGCTAGCTCGAATGAACCCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
GCTTTCGACCGCACTCCCGAGGTGCAGGACTTAAAGCGTTAGCTCCGGGACGACACCCGAAGCGGGTGGCAACCCAAAGTCTGATCGTTTAGGGCTAGGACTACCAGG
TATCTAATCTGTTTGTCCCTTAGCTTTCGTCATTACGCGTCAATTGTTCCAGCGGCT

>CUP1P1C03 Uncultured bacterium (Planctomycetacia)

TCTTCCGGCGTCCGTTGAGGCTCCGGCGACTTCGGATGCCCCCGCTTTGGTGGCTGACGGGGCGGTGTGTACAAGGCTCAGGAACACATTACCGCGGCGAGTGTGATC
CGCATTTACTAGCATTCCTGGCTTTCATGCGGGCGGTTGCAGCCGCAATCCGAAGTGCAGGCGGCTTTTCGAGATTGCGGGGCGCTTACCGCTTTCGCTCGCTTTCG
CGCCATTTGATGACGCTGTGCAGCCCTGGGCATAAAGGCCATGAGGACTTGCAGTGCATCCCACTTCCCTCCGCTTATCACCGGCGGTTCCCGAGGTGCCAACTC
TTACGTTTGGCAACTGGCCACAGGGTTTCGCTCGTTACGGGACTTAAACCAACATCTCACGACATGAGCTGACGACAGCCATGCAGCACCTGTGACAGTGTACCTT
CGGCTTACCAGCTTTCGCGGCTAATCCGTCATGTCGAAGCCAGGATAAGGTTTTCGCGTTCAGCTCGAATTAAGCCACATGCTCCACCGCTTGTGTTGAGCCCC
CGTCAATTCCTTTGAGTTTTAGCTTTCAGCTTTCGACCATCTCCCAAGGCGGGGACTTACGCTTTCGCTACGGCAGGGGGCCATCGCGGAGCCCTACCCAGTGCCCATC
GTTTACGGCCAGGACTACCGGGTATCTAATCCCGT

>CUP1P1C04 Uncultured bacterium (Acidobacteria)

GGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCTTCTGATCCGCGATTACTAGCGAT
TCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAAGTGCAGGCGGCTTTTCGAGATTAGCTCCCCCTCACGGGTTTCGACGCGTTCGACCCGATGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGCAGTGCATCCCACTTCCCTCCGCTTATCACGGAGCAGTTTCACTAGAGTGCAGCGGCTTGCAGCCATGGCAACT
AGGATAAAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGGCTTAAAGGGGAAGGATGTTT
CACCCCGCTTCCCTTTGAGTTTTAGCTTTCAGCTTTCGACCATCTCCCAAGGCGGGGACTTACGCTTTCGCTACGGCAGGGGGCCATCGCGGAGCCCTACCCAGTGCCCATC
AGCCTTGCAGCGTACTCCCAAGGCGGATGTTATCGCGTTAGCTGCGGACAGCAGGATTGGGTACCTGGTACCAAGCAATTCATC

>CUP1P1C05 Uncultured delta proteobacterium (Deltaproteobacteria)

GGTACAGCGGGCTTCCATGGTGTGACGGGCGGTGTGTACAATGCCCGGGAACGTATTACCGGGCATGTGATCCGCGATTACTAGCGATTCCACCTTCATGGAGTCCG
AGTTGCAGACTCCAATCCGAACGTAGAGCGGGCTTTTTGGGATTGGCTCCCCCTCGCGGGTTGCTGCCCTTTGTACCGCCATTTAGTACACGTGTGTAGCCCCGGACAT
AAGGGCCATGAGGACTTACCGTTCATCCCGNCTTCTCCCGTTTGACACGGGCGAGTCCCTCTAGAGTGCACCACTAAATGATGGCACTAGAGGCAAGGGTTGCGCTCG
TTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGAACCCAGAGGTCCCGAAGGGAAGACCTTATTTCTAAGGGTGTCTCTGTTC
TCTAGCCCCGGTAAGTTCTTCGCGTTGCGTCGAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTTA

>CUP1P1C08 Burkholderia sp. (Betaproteobacteria)

ACCACCTCCCATGGTGTGACGGCGGTGTGTACAAGACCCGGGAACGTATTACCGCGGCATGTGATCCGCGATTACTAGCGATTCCAGCTTACGCGAGTTCGAGTTGCAG
ACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACTCGCGGCTTGGCAACCCCTCTGTTCCGACCATTTGATGACGTGTGAAGCCCTACCCATAAGGGCCA
TGAGGACTTGACGTATCCCACTTCTCCGGTTTTGTCACCGGCAGTCTCCCGGAGTGTATTGCGTAGCAACTGGGGACAAGGGTTGCGCTCGTTGCGGGACTTAA
CCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGACGGCTCCCTTTCCGGCCACCCCGGCTCTCACCGAGTTCCGTCATGTCAAGGGTAGGT
AAGGTTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGCTCAATTCCTTTGAGTTTTAATCTTGCAGCCGTACTCCCGAGGGGTCAAC
TTCACGCGTTAGTACGTTACCAAGCCAATGAAGGCCCGACAACCAAGTTGACATCGTTTAGGGCGTGGACTA

>CUP1P1C09 Uncultured bacterium (Acidobacteria)

GCCGCTGCCCTCTTGCGGTTAGCATGCAGACTTCCAGTACAATCCACTTTCTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGGCATCGTTCTGAT
ACGCCATTACTAGCGATTCCAGCTTCCAGCGAGCGAGTTGACGCTGCGATCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTCTGCAGCGCAGTGT
ACCGGCCATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGCATCATCCACCTTCTCCAGCTTATCGCTGGCGGTCTCTCTGCGAGTGTCTATCT
TACGATGTGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCGCTTCCAGTACCCCTTGC
GGAGTAACCGTGTTTCCAGCATGTTAGCCAGCGTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCCGTC
AATTCCTTTGAGTTTTACGCTTTCGACCGTACTCCCGAGGGGCATACTTAAACGCTTAGCTC

>CUP1P1C10 Uncultured soil bacterium (Acidobacteria)

GCGTCTGCTCCTTGCGGTTAGCGCGAGCTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGGCCTCGATCTGATA
GCTTACTAGGACTTCCCGCTTATGCGAGTTCAGATTGCGAGACTGCAATCCGAACCTGAGCAGAGTTTTTTCCGATTAGTCCCCCTCGCGGGTTGGCAACCGTTTTGTC
CTGCAATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTACGCTCATCCCACTTCTCTCGGTTATCCGGAGCAGTCCAGCTAGAGTTCCCTCTTG
CGAGTGGCAACTACGTGACGGGTTGCGCTCGTTGCGGGACTTAAACCAACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCTATACTCTCTGCTCCCTTGGGG
AAGGCCGATTTTCTAGCTTGGTCAAGGCAATTCGAGCCTAGGTAAGTTCTTCGCGTAGCGTGAATTGAACACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
TCCTTTGAGTTTTAGCTTTCGCAACGTACTCCCGAGTGCAGGACTTAAACGCTT

>CUP1P1C11 Uncultured bacterium (Deltaproteobacteria)

GGTTGGCTCAGGCATCTCTGGAGCAATGACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCCTGCCTGCTGATCAGGGATTACTAGCGATT
CGACTTCAAAGAGTTCGAGTTCGAGACTCTTATCTGTACTGAGTGGTTTTTTGCGATTGGCTCCCCCTCGCGGGTTTGCAGCGCTTTGTACCAGCATTGTAGCACGT
GTGTAGCCCTGGACATAAAGGCCATGATGACTTACGCTCATCCCACTTCTCCGATTGAAATATCGCGGTCTCACTAGAGTCCCCGGCATGA

>CUP1P1C12 Uncultured eubacterium (Alphaproteobacteria)

CTTCGGGTGAATCCAATCCCATGGTGTAGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATGTGATCCGCGATTACTAGCGATTCCGCCTTCATGCACCTCG
AGTTGCAGAGTCAATCCGAACGTAGACCGGCTTTGGAGATTAGCTACCCCTCGCGGGTTGCTGCGCCACTGTCAACCGCCATTGTAGCACGTGTGTAGCCAGCGCGTA
AGGGCTACTAGGACTTACCGCTTACCCACTTCTCCGGCTTATCACCGCGGTTCTTTAGAGTACCAACTGAATGATGGTAACTAAAGGGAGGGTTGCGCTCGT
TGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCAGTCCCGAAGGGAAGAAATCCATCTCTGAAATCGTCCGGACATG
TCAAACCGTGGTAAGGTTCTGCGGTTGCTTCGAATTAACACACATGCTCCACCGCTTGTGACGGCCCCGTCGAATTCATTTAGTTTTAACCTTGCGGCCGTACTCC
CAGCGGATAACTAATGCGTTAGCTGCGCCACCAAGCTCTAAGAGCCCTGACAGCTAGTTATCATCGTTTACGGCGTGGACTACCA

>CUP1P1D01 Uncultured alpha proteobacterium (Alphaproteobacteria)

TCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGCATGTGATCCGCGATTACTAGCGATTCCAGCTTCATGCTCTCGAGTTGCAGAGA
ACAATCCGAACGTAGACCGGCTTTTCGAGATTGGCTCGGGTTCGCCCCCTCAGCTTCTCTGTACCAGCCATTGTAGCACGTGTGTAGCCAGCCATAAAGGCCATGAG
GACTTGCAGTATCCCGCTTCTCCGGCTTGTACCAGGAGTTCCTTCAGAGTCCCGGGTTGACCCGATGGCAACTGAAGGTGAGGGTTGCGCTCGTTGCGGGACT
TAAACCAACTCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGGAGCCGAATGAAGAACCCGATCTCTCGGGCCCAACGGGACATGCAAGGG
CTGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACACATGCTCCACCGCTTGTGCGAGCCCCGTCGAATTCCTTTGAGTTTTAACCTTGCGGCCGTACTCCCGAGCGG
TGCCTTAAACGCGTTAGCTGCGACACCGGAAGACTAGGTTCTCCCAACGCTGACGCGACATCGTTTACAGCGTGGACTACCAGTGTATCTAATCTGTTTGTCCCCAG
CTTTCGCGCTCAGCGTCACTTACGGTCCAG

>CUP1P1D02 Acidobacteria bacterium (Acidobacteria)

GGTACGCGACCGGCTTCTAGTACAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGAGTGTGATCTGCGATTACTAGCGAT
TCCAGCTTCATGGAGTTCAGTTCGAGACTCCAATCCGAACGTAGGATGACTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGGACGGTTTGTATACCCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGCAGTAAATCCCACTTCTCCCGGTTATCCGGGGCGGTTTCGCGAGAGTGGCCAACTAAATGATGGCAACTGG
CAATAAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGACGACAGCCATGCAGCACCTACGACAGCTCCCTT
ACCAGTGTCCACTGCGCTTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTTCAG
CCTTGCAGCCGACTCCCGAGGCGATTGCTTATCGCGTTAGCTTGGCAGCGGAGGATTGGGTACCTGCTACCAAGCAATCATCGTTTAGGGCTAGGACTACCAGG
GGTATCTAATCTGTTTGTCCCTTAGCTTTTCGCGCTCAGCGTCACTTGTGGTCCAGTGTGAGGCGCTTTCGCCACAGGTTTCTCCCGATATCTACG

>CUP1P1D03 Beta proteobacterium (Betaproteobacteria)

GTTAGGCTAACTACTTCTGGCAGAACCCGCTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCGCGGCAAGCTGATCCGCGATTACTAGCGATT
CCGACTTACAGCAGTTGAGTTGCGAGACTGCGATCCCGACTACGACCGGTTTTCTTGGGATTGGCTCCCCCTCGCGGGTTGGCAGCCCTCTGTACCAGCCATTGTATGAC
GTGTGTAGCCCTACCATAAAGGCCATGATGACTGACGTCATCCCC

>CUP1P1D06 Uncultured bacterium (Acidobacteria)

GGTTAGCGCACCGGCTTCTAGTACAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGNNTTACCGCGGCGTGTGATCCGCGATTACTAGCGATT
TCCAGCTTCATGTAGTGCAGTTGCGAGACTACAATCCGAACGTGGGGCCGGTTTTTCCGATTAGCTCCCCCTCATGGGTTTGGCAGCGTTTGTACCAGCCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGCAGTTCATCCCACTTCTCCCGGTTATCCGGGGCAGTTTCGCTAGAGTGGCCGGCTTACCCCTTGGCAACT
AGGGATAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGAGCAGTCCCTTGCGGGAAGGGATGTTTT
CCACCCCGCTTCCAGCTTCCAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTTG
AGCCTTGCAGCGTACTCCCGAGCGGAATGCTTATCGCGTTAACTGCGGCAGGATCGGATTGGATAACCATCACCAAGCAATTCATCGTTTAAAGGCTAGGACTA

>CUP1P1D08 Uncultured Myxococcales bacterium (Deltaproteobacteria)

CGGGTTGGCGCATCCACTTCTGAGGAATCGACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCCTGCCTGCTGATCAGGAATTACTAGC
GATTCGCACTTCAAAGAGTTCAGTTGCGAGACTTATCCGTAAGTGGCTTTTTTGGGATTGGCTTCCCTCGCGGGTTCGCGACCTTTGTACCAGCCATTGTAG
CAGCTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGCAGTACCTCCCGACTTCTCCCGATTTCGCGAGTTCGCGAGTTCGTTGAATATCCGCGAGTCTCGTTAGAGTGGCCAGCTTACTCCGCTGGC
AACTAACGACAGGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTAACTACAGTCTCCGAAGAGCACCCCG
ATCTTTCGACAGATTCTGCAATTTCTAGCCAGGTAAGTTCTTCGCGTTGCGTCAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTTTGA
GTTTTAGCTTTCGCGGCTACTCCCGAGCGGGTGTCTAATGCGTTAGCTGCGGCACCGAGGGTCAAAGCCCGGACACCTTAGC

>CUP1P1D09 Uncultured bacterium (Acidobacteria)

GGTTAGCCACCAGGCTTCTAGTACAGCCACTTTCGTGATGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATCACCGCGCGTTCGTATCCCGGATTACTAGCGAT
TCCAGTTCATGAAGTCGAGTTGACGACTTCAATCCGAACCTGAGGCCGGTTTTCGATAGTCTCCCTTCGCGGGTTCGACAGGTTTGTACCGACACTTTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATAGGACTTGACGTATCCCCACTTCTCCCGGTATTCGCGGGCGGTTTCGCCAGAGTGCCTCAACTGAATGATGGCACTGG
CAATAAGGGTTGCCCTCGTTGCGGGACTTAACCCAACATCTCAGCACAGGCTGACGACAGCCATGCAGCACTTATACCAGCCCTTCGCGGAAGGGATGTTCCAC
CCCAGTCCACTGCAATTCAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTGAACCACATGTCCACCCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGTC
TTGCAGCCGTACTCCCAGCCGATTGCTTATCGCGTTAGCTACGGCACGTCCGGATTGGGTACCCGACACCAAGCAATCATC

>CUP1P1D12 Uncultured soil bacterium (Acidobacteria)
AATGGGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATTCACGGCAGCGTGTGATGCTCCATTACTAGCGATTCCAGC
TTCATGCAGGGGAGTTGACGCTGCAATCCGAACCTGAGAACGGTTCCTGCGATTGGCTCCCTTCGCGGGTTCGACGCGTTTGTACCGTCCATTGTAGCAGCTGTGT
AGCCCTGGACATAAAGGCCATGAGGACTTGCAGTATCCCCACTTCTCCAGCTTATCGCTGGCGGTTCTCTGCGAGTTCCGCTTTCGCGATGGCAACACAGGACAA
GGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGCACAGGCTGACGACAGCCATGCAGCACTCGACTGGACCCCTTCGCGGGTAGCGATGTTTCCACC
GGTAACAGCGGTCGNAAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTGAACCACATGTCCACCCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTCAGCCTT
GCGACTGTACTCCAGCGGCATATTTAACCGGTTAGCTCCGGCAGCGACAGAATGAATGCCACCAAAATATGCATCGTTTAGGGCGTGACTACAGCGTATCT
AATCTGTTTGTACTACCAGCCTTTCGTGTCAGCGTCAGTTACGGTCCAGAGACCGTCTACACCAGCGGTTCCTCCTGATATCTACGCA

>CUP1P1E01 Uncultured bacterium (Acidobacteria)
GGTTAGCGTGACGACTTCTAGTACAGCTCACTTCGTGATGTGACGGGGCGTGTGTACAAGGCCGGGAATGATTACCGGCGTGCATCTGATACGCCATTACTAGCGAT
TCCGGTTCATGCAGTTCGAGTTGACGACTGCAATCCGAACCTGAGCAGAGTTTTTTCGATTAGTCTCCCTTCGCGGGTTCGCAACGGTTTGTACCGTCCATTGTAACAC
GTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGCAGTATCCCCACTTCTCCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTTCGCGAGTGGCAACTACG
TCCCTGGAGTGCCTTCGCGTAGCAACTAGGACAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGCACAGGCTGACGACAGCCATGCAGCGCCTATACTCCTGTCCTTCGCGGAAGGGCGTATTTCTA
CAGCTGGTCAAGACATTTCCAGCCAGGTAAGGTTCTTCGCGTAGCGTCAATTGAACCACATGTTCCACCCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTCAG
TCTTGCAGCCGTACTCCAGGTCAGGACTTAACCGGTTAGCTCCGGGACGACTTCCGAACGGAAAGGCACCCCAAGTCTGATCGTTTAGGGCTAGGACTACAGGGGT
ATCTAATCCTGTTGCTCCCTTTCGTTCCTCAGCGTCAGTAACGGTCCAGCGCGCCCTTTCGCCACGGG

>CUP1P1E02 Burkholderia sp. (Betaproteobacteria)
GTCATGAATCCTGCCGTGTGACGTCTCCTTCGCGTTAGACTAGCCACTTCTGGCAAAACCCACTCCCATGGTGTGACGGGGCGTGTGTACAAGGCCGGGAACGTAT
CACCGGGCATGCTGATCCGCGATTACTAGCGATTCCAGCTTACCGCAGTCGAGTTGACGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTTGGCTCCACCTTCGCG
GCTTGGCAACCTCTGTTCGACCATTGTATGACGCTGAAGCCCTACCATAAGGGCCATGAGGACTTGCAGTATCCCCACTTCTCCCGTTTGTACCCGGCAGTC
TCCCTGGAGTGCCTTCGCGTAGCAACTAGGACAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGCACAGGCTGACGACAGCCATGCAGACCTGTGTT
ACGGCTCCCTTCGCGCACCCCACTCTCAGCAGGGTTCCGTACATGTCAAGGGTAAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCCTTGTG
CGGTCGCCGTCAATTCCTTTGAGTTTAACTTCGCGACCGTACTCCCTGGCGGTCACTTCCAGCGTACGTTACCAAGCCAATGAAGGCCGACAAACCAGTT
GACATCGTTTAGGGCGTGACTACAGGGTATCTAATCCTGTTTGTCTCC

>CUP1P1E04 Uncultured Acidobacteria bacterium (Acidobacteria)
ATACTTAGCGCCTGTCTCCCTTCGCGGGTTACGACGCGACTTCTAGTACAGCAGCTTTCGTGATGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATTCACCGCGG
CATGCTGATCCCGGATTACTAGCGATTCCAACCTCATGCGCGGAGTTGCAGCCGACAATCCGAACCTGAGACCGACTTCTCCGATTAGTCCCCCTTCGCGGGCTTCGA
ACGGTTGATATCGCCATTTGACGCTGTGTAGCCCGACATAAAGGCCAGTCTGCAGTATCCCCACTTCCCTCCGTTTATCACCGCGAGTCTTCAG
GTGCCAGCGTAACCTGATGGCAACAGAGGACAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGCACAGGCTGACGACAGCCATGCAGCAGCTATAACAG
CGCTCCTTCGCGAAACCGGCTTTACACCGCGGTCACTGCAATTTCAGCGCTGGTAAAGGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCCTTGTGCGGGC
CCCCGCAATTCCTTTGAGTTTCAGCCTTGGCAGCGTACTCCCCAGCGGAGTGTAAATGC

>CUP1P1E05 Burkholderia sp. (Betaproteobacteria)
ATCCAGTGGTAGCGCCTTCGCGGGTTAGCTACTTCTGGTAAACCCACTCCCATGGTGTGAGGGCGTGTGTACAAGGCCGGGAACGTATTCACCGCGCATGC
TGATCCCGGATTACTAGCGATTCCAGCTTCCAGCAGTCGAGTTGCAGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTTGGCTCCACCTTCGCGGCTTGGCAACCT
CTGTTCCGACCATTTGATGACGTGTGAAGCCCTACCATAAAGGGCCATGAGGACTTGCAGTATCCCCACTTCTCCCGTTTGTACCCGGCAGTCTCTTTAGAGTGT
CTTGGTGAACAACGAAGGCTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGCACAGGCTGACGACAGCCATGCAGCAGCTTACCGCGGCTTCTTC
GAGCACTCCCGCTCTCAGCAGGATTCCGACCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCCTTGTGCGGGTCCCCGTCA
ATTCCTTTGAGTTTTAATCTTCGCGACCGTACTCCCGAGCGGTCACTTCCAGCGTTAGCTACGTTACTAAGGAAATGAATCCCAACAACAGTGTGACATCGTTTAG
CGGTGACTACAGGGTATCTAATCCTGTTTGTCTCCCAACGCTTTCGTGATGAGCGT

>CUP1P1E07 Propionibacterium acnes (Actinobacteria)
TATCACACTCCACTTTCGACGGCTCCCCACAACGGTTAGGCCACCGGCTTCGGGTTACCAACTTTCATGACTTGACGGGCGGTTGTGTACAAGGCCGGGAACGTATTC
CACCGCAGCGTGTGATCTGCGATTACTAGCAGCTCCGACTTCATGAGGTCGAGTTGCAGACCCCAATCCGAACCTGAGACCGGCTTTCGAGATTTCGCTCACCTCAC
AGGCTCGCCACTCTCTGTACAGCCATTTAGGATGCGTGAAGCCCTGGACATAAAGGGGATGATGACTTGACGTATCCCCACTTCTCCGAGTTGACCCGGGCGGT
TCCACTGAGTCCCAACATAAAGGCTGGCAACAGTGAACAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGCACAGGCTGACGACAGCCATGCACCA
CCTGTGAACCGACCCCAAAAGGACACCCATCTCTGAGCGCTCCGATCCATGTCAAACCCAGGTAAGGTTCTACGCGTGTGATCGAATTAATCCGATGCTCCGCC
GCTTGTGCGGGGCCCCGTCATTCCTTTGAGTTTTAGCCTTTCGCGGCTACTCCCGAGCGGGTACTTAAAGCGTTAGCTACGGCAGGAAACCGTGAATGGACCCC
ACACCTAGTACCACCGTTTACAGCGTGAACAGGGTATCTAAGCCTGTTTCGCTCCCAACGCTTTCGCTCCTCAGCGTCAGGAAAGGCCAGAGAACCGCTTCGC
CACTGGTGTCTCCTGATATCTGCGCATTCACCGCTCCACCAGGAATTCATTCTCCCTACTTCTCTC

>CUP1P1E08 Uncultured sludge bacterium (Anaerolineae)
CTTCAGCGGCGGCTCTTCGCGTTAGCCACCGGTTCAAGTGTGGCAGCTCCCATGACGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATTCACCGCAGTATA
GCTGTCTCGCGTTACTAGCAACTCCGACTTTCAGGAGGCGGGTTGCAGCCTGCCATCCGAACCTGAGACCGGCTTTCGCGGATTGGCTCCGCTCACGGCTTGGCGACC
CATTGTGCTGGCCATTGACGCTGTGTGTGCGCCAGNGTATAAAGGACATGCTGACTTGCATATCCCACTTCTCCCGGTTAATACCGGCGAGTTCGCGCCAGACAC
TTGTAACCTGGCGTAGGGTTGCGCTCGTTCAGTGGACTTAACCAAACACCTCAGCGCACGAGCTGACGACAGCCATGCATCACCTGTGACCGCTCCCGAAGGGTTCGTT
CCGCTTTCGCTTCACTACTACGGTCAATGTAATCCCTGTAAGGTTCTTCGCGTAGCCTCGAATTAACCAAACACCGCTCCGCTGCTTGTGCGGGTCCCCGTCATTCCTT
TGAGTTTTAACCTTCGCGCCGTAGTCCCGAGGGTGCATTTATGCGTGTGGCTGCGGCACCTGCGGGGTTTAGACCGCCAAAACCTAGTCCACATCGTTTATAGCTAG
GACTACCGGGTTTTCTAATCCGCTTCGCTCC

>CUP1P1E09 Uncultured bacterium (Anaerolineae)
TGTACACGCTCCATGACGTGAGGGCGGTTGTGTACAAGGCCGGGAACGTATCAACGCACTATAGCTGACCGCGGTTACTAGCAACTCCGACTTACCGAGGCGAGT
TGCAGCCTGCGATCTGAACCTGAGGACGGTTTGGGATTTGGCTTACTCTACCTCGGGTTCAGCAGCCATTTGACCCTTGGTACGCTGTGTAGCCTTGGACATAA
AGGCCATGCTGACTTGCAGTCAATCCCACTTCTCCCGCTTAAATACCGGCGGTTCCGATGACACATGTAACATAACAGGAGGTTGCGCTTTCAGCGACTTAAAC
GAACATCTCAGCACAGGCTGACGACAGCCATGCAACACCTGTGAAGTCCCTTCGCGGTCGGTCACTTTTCAGATCTCACCCTTGCATGTAAGCCAGGTAAG
GTTCTTCGTGGCATCGAATTAACCAACAGCTCCGCTGCTTGTGCGGGCCCCGTC

>CUP1P1E10 Uncultured bacterium (Verrucomicrobiae)
ATCACATCCATACTCCGACTGCTTCTTCGCGTTGGCAGCGGACTTCCGGTACAACGGCTTCATGATGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATTC
CGCGCCGTAGCTGATGCGCCATTTACTAGCGATTCCAACCTCATGCTCGTGCAGTGTGACGACACAATCTGAACCTGGGCCCCGTTTTTTGGGATTTGCTCCACTTACGG
TCTGCTTCCATTTGCGCGGACTTTGATGACGTGTGACGCCCTGGCGGTAAGGGCCATACTGACTTGCATCCCACTTCTCTCCCTTTCGTTAAGCGAGGCGAGT
GTGCAAGTGTCCAGCTTCTCGCGGGTGGCAACAGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGCACAGGCTGACGACAGCCATGCA
GCACCTGTGCAAGCTGGTATGTAACCTGTCAGGCTTTACCCCTCTACTACTTGCATGTAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTTAGCCACATCT
CCACCCTTGTGACGGCCCCGTCATTTCTCTGAGTTTTAATCTTCGCGACCGTACTTCCAGCGGCGATGCTTAAACCGGTTGGCTCCGCGACAAAAGGGGTTCGATTCC
TTTTACGCAAGCATGCACCGTTTTAC

>CUP1P1E11 Uncultured beta proteobacterium (Betaproteobacteria)
 GGTTAGCGACGGCTTCTGGTGAACCACTCCCATGGTGTGACGGCGGTGTGTCAGACCCGGGAACGTATACCACCGACATGCTGATCCGCGATTACTAGCGATTCC
 GACTTTCATCGAGTCGAGTTGACAGACTGCAATCCGGACTACGACGGCGTTAAAGGGATTGGCTCTACTCCGCGGCTTAGCAGCCCTCTGTACGCGCCATTGTATTACGTG
 TGAAGCCCTACCATAAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGGTTTGTACCCGGCAGTCTCATTAGAGTGCCCAACTGAATGTAGCAACTAATGAC
 AAGGGTTGCGCTCGTTGACGACTTAACCCAACATCTCAGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCCCTTTCGGGCACCCCGGCTCTCAC
 AGGCTTCCGGACATGCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATAAT

>CUP1P1E12 Burkholderia sp. (Betaproteobacteria)
 GGTTAGACTACCACCTTCGGCAAAACCACCTCCCATGGTGTGACGGCGGTGTGTACAAGACCCGGGAACGTATACCACCGCATGCTGATCCGCGATTACTAGCGATTCC
 AGCTTACGCGAGTCGAGTTGACAGACTGGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACTCCGCGGCTGGCAACCTCTGTTCCGACCATTGTATGACGTGTGA
 AGCCCTACCATAAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGGTTTGTACCCGGCAGTCTCCCTGGAGTGTCTTTCGCTAGCAACTAGGGACAAGGGTTG
 CGCTCGTTGCGGGACTTAACCAACATCTCACGACAG

>CUP1P1F01 Uncultured bacterium (Betaproteobacteria)
 GGTTAGACTAGCCACTTCTGGTAAAACCACCTCCCATGGTGTGACGGCGGTGTGTACAAGACCCGGGAACGTATACCACCGCATGCCGATCCGCGATTACTAGCGAT
 TCCAGCTTACGCGACCCGAGTTGACAGAGTGCATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACTCCGCGGCTGGCAACCTCTGTTCCGACCATTGTATGACG
 TGTGAAGCCCTACCATAAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGGTTTGTACCCGGCAGTCTCCCTGGAGTGTCTTTCGCTAGCAACTAGGGACAA
 GGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTATGGCTCCCTTTCGGGGCACTCCCGCTCTCAGCA
 GGATTCCATACATGTCAAGGGTAGGTAAGGTTTTCTCGCGTTGCATCGAATTAATCCACATCATCCACCGTTGTGCGGGTCCCGCTCAATTCCTTTGAGTTTTCATCT
 TGCGACCGTACTCCCGAGGCGTCCACTCA

>CUP1P1F03 Uncultured beta proteobacterium (Betaproteobacteria)
 GTGGCATCCGCTTCTGGGTTAGGCTAAGTCTTCTGGTGAACCACTCCCATGGTGTGACGGCGGTGTGTACAAGCCCGGGGAACGTATACCACCGACATGCTG
 ATCCCGGATTACTAGCGATTCCGACTTCATGTAGTCGAGTTGACAGACTACAATCCGGACTACGACCGGCTTTCGGGATTGGCTCCCGCTCCGCGGTTGGCAACCTCT
 GTACCGGCCATTGTATGACGTGTGAAGCCCTACCATAAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGGTTTGTACCCGGCAGTCCCATTAGAGTGCCCA
 ACTGAATGTAGCAACTAATGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCAGGTTCTCT
 TCGAGCACATCCATGTCTCCACGGACTTCTGGCATGTCAAGGGTAGGTAAGGTTTTCTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGCCCGCT
 CAATTCCTTTGAGTTTTAATCTTGCAGCCGACTCCCGAGGCGGTCAACTTACGCGGTTAGTGTGCTTACTAAGGGAGGTAAGTCCCCAACAACTAGTTGACATCGTT
 TAAGGCGTGGACTACCAGCGTATCTAATCTGTTGCTCCCGACGTTCTCGT

>CUP1P1F04 Uncultured Acidobacteria bacterium (Acidobacteria)
 ACATACTTAGCCCTCCCTTGGCGGTTGGCGGGGATTCTAGTACAGCCAGCTTTCGTGATGTGACGGCGGTGTGTACAAGCCCGGGGAACGTATACCACCGG
 CATGCTGATCCCGGATTACTAGCGATTCCAATTCATGACGGCGAGTTGACGCTGCAACTCCGAACTGAGACCGGCTTTCCTCCGATTAGCTCACTCTCCGCGAGTTTGGC
 ACGGTTTGTACCGGCCATTGTAGCAGTGTGTAGCCCGACACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCTCCGGTTTGTACCCGGCAGTCTCTCCAGA
 GTGCCCGGCAATACCAGTGGCAACAGGAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCAG
 ATGCCCTTGGCGGAGTCCGCTTTCGCGCATGGTCACTGACATTCGAGGCTGGGTAAGGTTTTCTCCGCTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGG
 CCCCCTCAATTCCTTTGAGTTTTCAGCCTTTCGACCGTACTCCCGAGGCGAATGCTTAACGCGTTAACTACGGCACGGCAGGGATCG

>CUP1P1F05 Uncultured bacterium (Acidobacteria)
 CGGTTGAATCACCAGGCTCTAGTACAATGGCTTTCGTGATGTGACGGCGGTGTGTACAAGCCCGGGGAACGTATACCACCGTGTCTGCTGATCAGCGATTACTAGCGAT
 TCCAGCTTCAATGGAGTCGAGTTGCGAGACTCCAATCCGAACTGAGACCGGTTTTTTGAGATTGGCTCCCGCTCCCGGCTTTCGAGCTACTTGTGCGGCCATTGTAGTAC
 GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGGTTTTTTCACCCGGCAGTCCCATTAGAGTGTCAACTTGACTTGGTGGCAACT
 AATGGCAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGACACGAGCTGACGACAGCCATGCAGCACCTCGACTAATGTCCCTTGGCGGAAAAGGATGTTTT
 CACCCCTGTACTAGCCCTTTCGAGCCGAGTAAAGTTCTTCGCGTTGCGTCCCAACTTAACCAACATACTCCACCGCTTGTGCGGGCCCGCTCAATTCCTTTGAGTTTC
 AGCCTTGGCAGCGTACTCCCGAGGCGGATACTAATGCGTTAGTCTTCGCCAGACTGGATTCAATCCAGTTACAGCAAGTATCCATCGTTT

>CUP1P1F06 Uncultured bacterium (Não classificada)
 TTTGGCGGATCCCGCTTTCGCGGTTAAGCTCCGACTTCTGTGACGGCGGCTTTCGTGGTGTGGCGGGCGGTGTGTACAAGCCCGGGGAACGTATACCACCGTGCCTGCT
 GATCAGCGATTACTAGCGATTCCGCTTCATGTGGGCGAGTTGACGCCCCAATCTGAACTGGGGCCCGGCTTTGGGTTTGGCTCCACTTACGGTATGCTTCCCAT
 GTACCGGCTTGTGTAACAGCTGTGTCGAGCTTCCGACTAAGGGCCATGAGGACTTGACGTCGTCGCGCTCCCGGTTTCGCGGGCAGTCTCCCTAGAAAATCAACTAAGGACAAG
 CCTTGGCGGATTAGCAACTTGGATAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGACACGAGCTGACGACAACCTGCAGCACCTCTGCTGGCTTCT
 TGCGGATACGCTCTGTTTTCAAGAGACTTACTACCAGTAGTTCAAGCCAGGTAAGGTTTTCTCGCGTTGCGTTCGAAATTAACCAACATGTTCCACCGCTTGTGCGGGCCC
 CCGTCAATTCCTTTGAGTTTCAACCTTTCGCGCGTACTCCCGAGGCGGCTATTTAATGCGTTAGCTGCGACGCGGAAGGGTGCATACCTCCAGATCTAATGAGCAT
 CGTTTAGGGCTAGGACTACCA

>CUP1P1F08 Uncultured bacterium (Não classificada)
 TCCGCTCTCAGGGTCGGCAGCGACTTCGGGAGCCAGACTCCGGTGTATGAGGGCGGTGAGTGCAGGCCGGGAACGTATTAACCGCAGTGTGCTGACCTGCGTTTTAC
 TAGCAACTCCGACTTCATGCTGGCGAGTTGACGCAACAATCCGAACTGAGACCGGTTTTAAAGGGATTGGCTTCAGCTCGCCGTGTCGGAACCCGTTGTGCGGGCCATT
 GTAGCGTGTGTGACTAGCCCTGGACATAAAGGGCCATGCGGACTTGACGTCATCCCGACTTCCCTCCGGTTTCGCGGGCAGTCTCCCTAGAAAATCAACTAAGGACAAG
 GGTGCGCTCGTTGCGGGACTTAACCCAACACTCAGCGCAGGCTGACGACAGCCATGCACCACCTGTGACAGAGCTTTCGAGGGGCGCTGACTTTCACCGG
 TTTCTCTACATGCAAGCCAGGTAAGGTTTTCTCGCGTTGCTTCGAAATTAACCAACAGCTCCGCTGCTTGTGCGGGCCCCGCTTATTCCTTTGAGTTTTAACCCTG
 CGCGGTAGTCCCGAGGCGGCAACTAATGCGTTGGCTGCGGCACTGATCGGGTCAATCCGAAACCACTAGTTCGCAACGTTTAGGGCGTGGACTACCCGGGTATC
 TAATCCGGTTGCTCCCG

>CUP1P1F09 Unidentified eubacterium from the Amazon (Não classificada)
 TCAGGTATTGGCGACTTCATGGTTTACGGGCGGTGTGTACAGCCGGGAACGTATTAACCGGAGTGTGCTGACCTACCGTTACTAGCGATTCCAGCTTCATGACGGCG
 AGTTTCAGCCTGCAATCCGAACAGAGCCGTTTTGATGGGTTTTGCTCCGCTCAGGACTTGGCAGCCCTTTGTACCGGCCATTGTAGCGTGTGTTAGCCAGGATG
 TAAAGGCAATACTGACCTGACATGATACCCCGCTCCCTCCCGTTACCGGGGCACTAGCTAGAGAAAATCAACTAATATAAGGGTTGCGCTCGTTGATGGACTTAA
 CCGAATCTCAGCAGCAGGCTGACGACGGCCATGCAGCACCTGTCTGCGGCCGGAAGGCACTCTCTCTTTCGAGAAAATAGCAGGATGCAACCCCTGGTAAAG
 GTTCTTCGGTTATCATCGAATTAAC

>CUP1P1F11 Uncultured soil bacterium (Acidobacteria)
 GCACACCTGCTTCTATTGGTCCACTCGTGTGAGGCGGTGTGTACAAGCCCGGGGAACGTATACCACCGAGCTGCTGATCTGCGATTACTACGATTCCAGCTTTCATG
 GAGTCCGGTTGCAAGCTCCAATCCGAACAGGACCGGTTTTTGGGATTGCTCCCGCTCCGCGGTTGCGACGCTTGTACCGCGCATTTGACGACGTTGTAGCACGTTGTAGCCCTG
 GACATAAAGGCCATGAGGACTTGACGTCATCCCGACTTCTCCCGGTTTACCGAGGCGGTTTCGCGAGAGTGCAGGCTTACCCGATGGCAACTGACGATAAGGGTT
 CGCTCGTTGCGGGACTTAACCCAACATCTCAGACACGAGCTGACGACAGCCATGCAGCACCTCCGACGCGGCTTTCGCGAAAAGGATGTTTCCACCCCGGTTCCACT
 GCGCTTTCGAGCCAGTAAGGTTTTCTCGGTTGCGTCAATTAACCAACATGCTCCACCGCTTGTGCGGGCCCCGCTAATTCCTTTGAGTTTTGAGCTTGCAGCCGTA
 TCCCCAGGCGGATGCTTAACCGCTTAGCTGCGGCAAGTGGATTGGGTACCCATCACACCAAGCATCCATAGTTTAGGGCTAGGACTACCAGGTTATCAATCCCTG
 TTTGCTCCCGTACTTTGCGGCTCAGGCTAGTTGTGTTCCAGTGCAGCCGCTTTCGCGCACAGGTTTCTCCCGATATCTACGCATTTACCAGTTAAACCGGGAATTC
 CAGCACCTTCCAAACTCCAGCAGCGAGTTTTCCGCTGCAAGCTCCCGTTGAGGTTGACGAGGATTCACAGGTGACTTACC

>CUP1P1F12 Uncultured alpha proteobacterium (Alphaproteobacteria)
 GGTTAGCGGTACCGTCTTAAGGTAATCCAACCTCCCATGGTGTGACGGCGGTGTGTACAAGCCCGGGGAACGTATACCACCGCAGCGTGTGATCTGCGATTACTAGCGA
 TTTACGCTTCAAGGCTCGAGTTGACAGCCCAATCCGAACTGAGACCGGTTTTTGGGATTGCGCAGGATTGCTCCATTGCATCCCATTTGACCCGCTTGTAGCAC
 GTGTGTAGCCCGGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGCGGTTATCACCCGAGTCCCGTTAGAGTGCCCAACTGAATGATGGCAACTA
 AGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCGAAGTGAAGGGATCGATC

TCTCGTTCCCGCGACCGGGATGTCAAGGGCTGGTAAGGTTCTTCGCGTTGCTTCGAATTGAGCCACATGCTCCACGCTTGTGCGGGCCCCGTC AATTCCTTTGAGTT
TTAATCTTGCAGCCGTACTCCCGAGCGGGATGCTCAAAGCGTTAGCTGCGCCA

>CUP1P1G01 Acidobacteria bacterium (Acidobacteria)

GGTCAGCGTGACGACTTCTAGTACAACCTCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGA
TTCCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACCTGAGCAGAGTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACCGGTTTGTGCCCTGCATTGTAAGA
CGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCAATCCCACTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCTCCCTACGGGTGGCAACTAC
GTGCAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCAGCAGCTGACGACAGCCATGCAGCGCCTATACTCTTGTCCCTTGCGGGAAGGCCATATTTCT
ACAGCTTGTCAAAGCATTTCGAGCCAGGTAAGGTTCCCTCGCATAGCCCTCGAATTGAAACCACATGTTCCACCCTTGTGCGGGCCCCGTC AATTCCTTTGAGTTTCA
GTCTTTCGACCGTACTCCCAAGTGCAGGACTTAACCGGTTGGCTCCGGGACGACCCGAACGGGTGGCACCCCAAGTCTGATCGTTTAGGGCTAGGACTACCAGGG
TATCTAATCTGTTTGTCCCTTAGCTTTCGTTCTCAGCGTCAGTAGTGGTCCAGCGCG

>CUP1P1G02 Uncultured bacterium (Acidobacteria)

ACAGCTCACTTTCGTGATGTGAGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTG
CAGACTGCAATCCGAACCTGAGCAGAGTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACCGGTTTGTACCCTGATTTAAACACGTGTGACCCCTGGACATAAAGG
CCATGCGGACTTGACGTCATCCCACTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCTCTTGTGCGAGTGGCAACTACGTGACGGGGTTGCGCTCGTTGCGG
GACTTAACCCAACACCTCACGGCAGGCTGACGACAGCCATGCAGCGCCTATACTCTGTCCCTTGCGGGAAGGCCGATTTTCTACAGCTGGTTCAGAAGCATTTCGAG
CTCCAGTTAGGTTTCCCGGTCGCTGCAATTGAAACCACATGTTCCACCCTGTTGCGGGCCCCGTC AATTCCTTTGAGTTTCAAGTCTTGCAGCCCTACTCCCAAGG
GCAGGACTTAACCGGTTAGCCCGGAGGACTTCCGAACGGAAGGCACCCCAAGTCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCTCT

>CUP1P1G03 Uncultured proteobacterium (Gammaproteobacteria)

GGACGGCGTCCCTTTCGCGTTAGACTACCGGCTTCTGGTGCAGCCAACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGTGGCATTGCT
GATCCACGATTACTAGCGATTCCAACCTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTGCGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTCGCGACCCCT
TGTACCGACCATTTGAGTACGTGTGTAGCCCTGGTATAAAGGCCATGATGACTTGCATCCTCCCACTTCTCCGTTTGTACCGGGCAGTCCCTAGAGTTCC
AACTTAATGATGGCAACTAGGGACGAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGCAGCAGAGCTGACGACAGCCATGCAGCACCTGTCTCTCAGTTCCC
GAAGGCACTCCCGCATCTCTGCAGGATTCGAGGATGTCAAGACCAGGTAAGGTTCTTCGCGTTGCATCGAATTAACCACATACTCCACCGGTTGTGCGGGCCCCGTC
CAATTCCTTTGAGTTTCAACCTTGCGGCGTACTCCCAAGCGGAGAACTTAGCGCGTTAGCTACGTCACTGAAAAGCAACCTTCCAACGACTAGTTCTCATCGTTT
ACAGCGTGGACTAC

>CUP1P1G04 Acidobacteriaceae bacterium (Acidobacteria)

GGGGCTGCTCCCTTTCGCGTTAGCTACCGGACTTCTAGTGCACCCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCATTCTGATCT
CGGATTACTAGCAGTTCAGCTTCAAGTTCGAGTTGCAGACTTCAATCCGAACCTGAGCGCGGCTTATCCGATTGGCTCCCGCTCGCGGGTTCCGACCGGTTCCGTAC
TGCCATTTGTAGCAGTTCGAGTCCCTGGACATAAAGGCCATGAGGACTGACGTCATCCCACTTCTCCCGTTTGTACCGGGCAGTCCCTAGAGTTCC
AACTTAATGATGGCAACTAGGGACGAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGCAGCAGAGCTGACGACAGCCATGCAGCACCTATATAGAGGCCATTTGTA
AAGCCGATATTTTCAACGATTTCTCTACATTTGAGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAACCACATACTCCACCGGTTGTGCGGGCCCCGTC AAT
TCCTTTGAGTTTTCAGCTTTCGCGGCTACTCCCAAGCGGAGAACTTAGCGCGTTAGCTACGTCACTGAAAAGCAACCTTCCAACGACTAGTTCTCATCGTTT
ACAGCGTGGACTAC

>CUP1P1G05 Uncultured Xanthomonadaceae bacterium (Gammaproteobacteria)

CCGTGGTAGCGTCCCTTTCGCGTTAGACTACCTACTTCTGGAGCAACCACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGACAATGC
TGATTCGCGATTACTAGCAGTTCAGCTTTCAGGAGTTCGAGTTGCAGACTCCGATCCCGGACTGAGAGAGGTTTTCTGGGATTGGCTTCCACTCGCGGCTTCGCAACCT
GTACTCCCTCCCTTTGATACGTGTGTAGCCCTGCGCGTAAAGGCCATGATGACTTGCATCCTCCCACTTCTCCGTTTGTACCGGGCAGTCCCTAGAGTTCC
CACCATAACGTGCTGGCAACTAGGGACAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGCAGCAGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGATT
CCCGAAGGCACCTCGCATCTCTGCAAGGTTCCGGACATGTC AAGGCCAGGTAAGGTTCTTCGCGCTCGCATCGAATTAACCACATACTCCACCGGTTGTGCGGGCCCC
CGTCAATTCCTTTGAGTTTTCAGTCTTGCAGCCGACTCCCAAGCGGCGAAGTAAACCGGTTAGCTTTCGACACTGAGTGCCAAGTTGCACCCACGTCAGTTTCGCATC
GTTTAGGGCGTGGACT

>CUP1P1G08 Uncultured bacterium (Não classificada)

CCTGCGGTTAGGCAACGGTTCTGGTGAACCCCACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGTGGCATGTGATCCAGGATTACTAGC
GATTCGAGTTCATGAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCATTGTAT
GAGCTGTAGGGCCCTTAACCCAACACCTCACGGCAGGACTGACGACAGCCATGCAGCACCTTACTGGCGGTGATTGTCACAAAAGAGCTTTCACCCCTCGGTTCCACCGA
ACAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGCAGCAGAGCTGACGACAGCCATGCAGCACCTGTGCCCCGGCTCCCTTTCCGGGACTCCACATCTCT
GCGGGATTCCGGGATGTC AAGGGTAGGTAAGGTTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGGTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTAAAT
CTTGCGAACGTACTCCCAAGCGGTCGACTTTCAGCGTTAGCTGCGTT

>CUP1P1G09 Uncultured Bacteroidetes bacterium (Não classificada)

TACACCCGGCTTCCATGGCTTACGGGGCGGTGTGTACAAGGTCGGGGAACGTATTCACCGTATCATTTGCTGATATACGATTACTAGCGATTCCAGCTTTCATGCAGTCGA
GTTGCAGACTGCAATCTGAACCTGAGAAAAGGTTTTTGGGATTAGCTTACGTCGCGGCTGTGCTGCCCTTTGTCTTCCCATTTGATGACGCTGTGTAGCCCTGGGCATA
AAGGCCATGATGACTTGCATCATCCCTTCTTCCGCTTACGACGGCAGTTTCACTAGAGTTCCAGCATTACCTGATGGCAACTAGTATGGGGTTGCGCTC
GTTGCGGGACTTAACCCAACACCTCACGGCAGGACTGACGACAGCCATGCAGCACCTTACTGGCGGTGATTGTCACAAAAGAGCTTTCACCCCTCGGTTCCACCGA
TTTAGCCAGGTAAGGTTCTCGCTATCATCGAATTAACCACATGCTCCACCGGTTGTGCGGACCCCGTCAATTCCTTTGAGTTTCAACCTTGCAGTGTACTTTC
CCAGGTTGGGATACTTAATGCTTTCGCTCAGACACCAAGTGTATCGCTGATGTCGAGTATCCATCGTTTAGGGCGTGGACTACCAGCGTATCTAATCTGTTTGTAT
CCCAAGCTTTCGT

>CUP1P1G10 Unidentified eubacterium from the Amazon (Acidobacteria)

GTTAGCGGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGCGGTTGTGTACAATCCCGGGAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGATT
CCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACCTGAGCAGAGTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACCGGTTTGTGCCCTGCATTGTAACAG
T

>CUP1P1G11 Uncultured bacterium (Acidobacteria)

CATACCTTGGGCGGCTGCTCCCTTTCGCGGTCAGCCTGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGC
AGCGCTGATCTGCCATTACTAGCAGTTCAGCTTTCATGCAGCGGAGTTGAGCCTGCAATCCGAACCTGAGAACCGGTTTTTTCGATTGGCTCCCCCTCGCGGGTTCCG
TTCGCTCTGTACCGCCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGCATCCTCCCACTTCTCCAGCTTATCGCTGGCGGCTCTCTCCG
GAGTTCGCGCTTTCGCGCATGGCAACACAGGACAAGGTTGCGCTGTTGCGGGACTTAACCCAACATCTCAGCAGCAGAGCTGACGACAGCCATGCAGCACCTCGACTG
GACCCCTTTCGCGGGTAGAGTTTTCACCTCCGTTGACCAAGCCGTTTCAGGCTGTTGAGGTTTCTTCGCGTTGCGTTCGATTGAAACCACATGCTCCACCCCGGTTGTG
GGCCCCGTC AATTCCTTTGAGTTTTCAGCTTTCGACTGACTCCCAAGCGGCATATTTAAACCGGTTAGCTCCGGCACGGACCGACTGAACG

>CUP1P1H01 Acidobacteria bacterium (Acidobacteria)

ATGAGTCATACCTTGGCGCTGCTCCTCGCGTAGCGGCGACTTCTAGTACAGTCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACG
CGCTCGATCTGATGCCATTACTAGCAGTTCAGGCTTTCATGCAGCTGAGTTGCAGACTGCAATCCGAACCTGAGCAGAGTTTTTTCGATTAGCTCCCCCTCGCGGGTT
GGCAACCGGTTTGTGCCCTGATCTGATACAGCTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGCATCCTCCCACTTCTCCGTTTTCGAGGAGCAGTCCAG
TAGAGTTCCCTCTGCGAGTGGCAACTACGTGACGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGGACAGGCTGACGACAGCCATGCAGCGCCTATACT
CCTGCTCCCTTTCGCGGATTTTCTACAGCTGGTTCAGAAGCATTTCAGGCCAGGTAAGGTTCTTCGCGTACGCTGCAATGAAACCACATGTTCCACCGCTTGTG
CGGGCCCCGTC AATTCCTTTGAGTTTTCAGTCTTGCAGCCGACTACTCCCAAGGTCAGGACTTAACCGGTTAGCTCCGGGACGACCCGAACGGGTGGCACCCCAAGTC
CTGATCGTTTAGGGCTAGGACTACCAGGATCTAATCTGTTTTCGCTCCCTAGCTTTCGTTCTCAGCGTCAGTAATGGTCCAGCGCGCGCTTTCGCCACGGGTGTT
C

>CUP1P1H02 Uncultured bacterium (Não classificada)

GGTTACCGCTGTAGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAAACGTATCACGCCATCGTTCTGATACGGCATTACTAGCGAT
CCAGCTTCATGCAGGGCGAGTTGCAGCCTGCAATCCGAACGTGAGAAGGGTTTTTTGGGATTGGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTCCCGTCCATTTGTAGCACG
TGTGTAGCCCTAGACATAAAGGCCATGAGGACTTGACGCCATCCCCACCTTCTCCAGGTTATCCCTGGCGGCTCTCTCGGAGTTCCACCATTAAAGTATGGCAACAC
AGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGGCTGACGACAGCCATGACGACCTCGACTCCGGTCCCTTTGCGGGAAAGTCCCTCGTTTT
TGAGGATTATCCAAAGCCTTCGAGCCTAGGTAAGTTCTTCGCGTTGCGTGAATTAACACATATGCTCCACCCTTGTGCGGGGCCCGCTCAATTCCTTTGAGTTTC
AGCCTTGCGACTGACTCCCGAGCGGCATATTTAACCGTTAGTCCGGCACAGATCAAATGAATGACCCAAACAAATATGCATCGTATAGGGCGTGGACTACCAGG
GTATCTAATCTGTATGCTAACCAAGCTTTCTGTTTACGCGTACGTTACGGTCCGAAAGCCG

>CUP1P1H03 Uncultured beta proteobacterium (Betaproteobacteria)

GGTTCGGGCTCCCTTGGGTTAGGCGACCGGCTTCTGTTGAAAGCCACTCCCATGGTGTGACGGGGCGGTGTGTACAAGACCCCGGGAACGTATTACCGCGACATGCTGA
TCCCGGATTACTAGCGATTCCGACTTATGCAGTCGAGTTGACAGCTGCAATCCGGACTACGACGCGCTTTAAGGGATTGGCTCTACCTCGCGGCTTAGCAGCCCTCTG
TACGGCCATTGTATTACGTGTGAAGCCCTACCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGGTTTTGTACCAGCGAGTCTCATTAGAGTGGCCAA
CTGAATGTAGCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCCCTTT
CGGGACACCCGACTCTCCACCCTCCCGGACTCAAGGTAAGTTTTTCGCGTTGCGTCAATTAACACATATGCTCCACCCTTGTGCGGGGCCCGCTCAATTCCTTTGAGTTTC
AATTCCTTTGAGTTTTAACCTTGCAGGCTACTCCCCAGGCGGTGACTTCACGCGTTAGCTTCGTTACTGAGAGTGTCAAATCCCAACACAGCAGTGCATCGTTA
GGGCGTGGACTACCAGGGTATCTAATCTGTTTGTCTCCCCACGCTT

>CUP1P1H04 Uncultured bacterium (Acidobacteria)

TGGGGCGCTGCTTCTTGGGTTGGCACAGCGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAAACGTATTACCGCGGGCGTGTG
GATCCGCGATTACTAGCGATTCCAGCTTCTGAGTTCGAGTTGCAGACTCCAATCCGAACGTAGGATGGCTTTTTCCGATTAGCCCCCTCGCGGGTTTGGCAGCGTT
GTACCACCCATTGTAGCAGTGTGAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGTTATCCGCGGGCGGTTTGGCAGAGTGGCC
AACTGAATGATGGCAACTGGCAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGGCTGACGACAGCCATGCAGCACCTATATAGCAGCCCTT
CGGGAAAGGGATGTTTTCCACCCTCCCGGACTCAATTCGAGCCAGGTAAGGTTTCTTCGCGTTGCGTCAATTAACACATATGCTCCACCCTTGTGCGGGGCCCGCT
AATTCCTTTGAGTTTTAACCTTGCAGGCTACTCCCCAGGCGGTGACTTCACGCGTTAGCTTCGTTACTGAGAGTGTCAAATCCCAACACAGCAGTGCATCGTTA
AGGGCTAGGACTACC

>CUP1P1H07 Unidentified eubacterium from the Amazon (Não classificada)

GACATACTAAGCGCTATGCCCTTGGGGTTACACAGCGATTCTAGTACAGCCAGCTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAAACGTATCACCG
CGCATGTGTACTCCGGATTACTAGCGATTCCAACCTTCATGCAGCGGAGTTGCAGCCTACAATCCGAACGTAGAGCCCGCTTCTGCGATTAGCTCACTCTCGCGAGTT
GGCAGCCTTTGTAAGCGCCATTGTAGCAGTGTGAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCTCCCGTTTGTACCAGGCGAGTCTCTCC
AGAGTCCCGCCATTACCAGTGGCAACAGGAAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGGCTGACGACAGCCATGCAGCACCTATG
CAAATGCTCTTGGCGAAGTTCGACTTTCGCGGATGGTCACTGCAATTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACACATATGCTCCACCCTTGTGCG
GGCCCGCTCAATTCCTTTGAGTTTACGCTTGCAGCCTTGCAGCCGACTCCCCAGGCGGATGCTTAACGCGTTAGCTTCGCGCACGATAGGATTGGGTACCTATCACAC
AAGCGATCATCGCTT
AGGGCTAGGACTACC

>CUP1P1H08 Uncultured bacterium (Não classificada)

CAGCGGCTTCAGGGTCCGACTTTCGTGGTTGAGCGGGCGGTGTGTACAAGGCCCGGGAAACGTATCACCGTGGTGTGCTGACCCAGGTTACTAGCAACTCCGCTTAC
GCAGGCGAGTTGAGCCTGCCATCCGAACGTAGAGCCGCTTTTTGGGATTGGCTCCCCCTCGCGGGTTGCTTCTACTGTGCGGGCCATTGAGCGTGTGTTGCGCCA
GGACGTCCGGGGCGTGTGACTTGACGTCATCCCCACCTTCTCCAGCTTACTCTGTTGGCAGTCTGGTCCGACATTAACCGCACAGGGGTTGCGCTGTTGCGGG
ACTTAACCAACACCTTCAGCCAGGCTGACGACAGCCATGCAGCACCTTGCCTGCGCTTCCCGAAGGAGCCCTCGTCTCCGAGGTTGTCAGGCGATGTCAAGCCCTG
GTAAGGTTCTTCCGCGTTCGAAATTAACACAGCCTCCGCTGCTTGTGCGGGTCCCCGTAATTCCTTTGAGTTTTAATCTTGCAGCCGACTCCCCAGGCGGACC
ACTTATTGGGTTTGGCTCCGCGACGACGGGGTGCATACGCGCGACACTAGTGGTCACTGTTACGGCCAGGACTACCGGGGATCTAATCCCGTTCGCTCCCTGGCT
TTGCCCCCTCAGGCTCAGGTGCTCCAGGACACTGCCTTCCGCTTTGGTTTCTCCGGATCTCTACGCAATTCAC

>CUP1P1H09 Uncultured soil bacterium (Verrucomicrobiae)

ATACTTCGACCTGCTTCTTGGGTTAGCACGGCAATTCGGGTACAAAGCCCTCATGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAAACGTATTACCGCGCCGTA
GCTGATGCGCCATTACTAGCGATTCCAACCTTCATGCGCTCGAGTTGCAGACGACAATCTGAACCTGGGGTGGTTTTAGGGGATTGTCTCCACTGACGGTCTCGCTTCC
TTTTGGCCAGCCATTGTAGTACGTGTGAGCCCTGGCCGTAAGGGCCACTGACTTGACGTCATCCCCACCTTCTCCCTCGTTTAAAGCGAGCAGTCTGTCCAGAGT
GCTCCAGCCCTCCTCGGGCGGGTGGCAACAGGACACAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGGCTGACGACAGCCATGCAGCACCTGCTG
ACGCTGGATTGCTACCTCGTCAGGCTTTCACCTTCTACTACGTACATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTGAGCCACATACTCCACCCTG
TGAGGCCCCCGTCAATTTCTTTGAGTTTTAATCTTGCAGCCGACTTCCCCAGGCGGACGTTAAGCGCTTGGCTACGCCACAAAAGGGGTGCGATTCTTTTACAGCA
AAGCTGCACCCTTT

>CUP1P1H10 Uncultured bacterium (Actinobacteria)

CCACTTCGACGGTCCCCACAGGTTAGGCCCGGCTTCGGGTGTACCAACTTCATGACTTGACGCGGTTGTACAAGCCCCGGGAACGTATCACCGCAGCGTGTGATG
TGCATTACTAGCGACTCCGACTTCATGAGTTCGAGTTGCAGACCCCAATCCGAACGTAGAGCCGCTTCCGAGATTGCTCACCTCACAGGCTCCGCACTCTCTGTA
CCAGCCATTGTAGCATGCGTGAAGCCCTGGACATAAGGGGCATGATGACTTGACGTCATCCCCACCTTCTCCGAGTTGACCCCGGGGCTCCACTGAGTCCCCACCA
TAACGTGCTGGCAACAGTGAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGGCTGACGACAGCCATGCACCAACTGTGAACCGACCCCAA

>CUP1P1H11 Uncultured bacterium (Acidobacteria)

ACGGCTATCTCTTGGGTTGAATGCCCCGCTTCTAGTACAACGGGCTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAAACGTATTACCGCTGCTTGTGAT
CAGCGATTACTAGCGATTCCAGCTTTCATGAGTTCGAGTTGCAGACTGCAATCCGAACGTAGAAATGGTTTTTTGAGATTGGCTCCCCCTCGCGGGTTTGGCAGCTATTGT
GCCATCCATTGTAGTACGTGTGAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGTTTTTACCGGGCAGTCCCTTTAGAGTGTCTCAGC
ATAACCTGGTGGCAACTAAAGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGGCTGACGACAGCCATGCAGCACCTCCGACTAGTGTCCCT
CGGGAAAAGCGACTTTCGCCACTTCCAGCTTCCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACACATATGCTCCACCCTTGTGCGGGGCCCGCT
CAATTCCTTTGAGTTTACGCTTGCAGCCGACTCCCCAGGCGGATACTAATCGTTAGCTTGGCACGACTGGATTCAATCCAGTCAACCAAGTATCCATCGTT
TAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGTCTCCCTAGCTTTCCGCGCTCAGGCTGAGTTCTGTCAGG

>CUP1P2A01 Uncultured bacterium (Gammaproteobacteria)

CTACCTACTTCTGGAGCAACCAACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAAACGTATCACCGCGACAATGCTGATTGCGGATTACTAGCGATTCCGAC
TTCGCGGAGTTCGAGTTGCAGACTCCGATCCGGACTGAGAGAGGTTTTCTGGGATTGGCTTACCCTCGCGGCTTCGCAACCCCTCTGTACCTCCATTTAGTACGTTGTT
AGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCTCCGGTTTTGTACCAGGCGAGTCTCCTTAGAGTTCCACCATTACGTGCTGGCAACTAAGGAC
AAGGTTTGGCGCTCGTTGCGGACTTAACCCAACTCTCAGCACAGGCTGACGACAGCCATGCAGCACCTGTTTTCCGATTCCCGAAGGCACTCCGCACTCTCTGAG
GATTCCGAGCATGTCAGAGCCAGGTAAGGTTCTTCGCGTTGCTCAATTAACACATATGCTCCACCCTTGTGCGGGGCCCGCTCAATTCCTTTGAGTTTACGTTCTG
CGACCGTACTCCCCAGGGCGGAACTTAACCGGTTAGCTTGCAGCTGAGAGCCAAGTTGCTCCCAACGTCAGTTGCGATCGTTTAGGGCGTGGACTACCAGGGTATC
TAATCTGTTTCCCGGCTTCTGTTGCTCAATGCTGCTTCCAGTAGG

>CUP1P2A04 Uncultured soil bacterium (Betaproteobacteria)

GTCGGCGCATCCCTTGGGTTAAGCGACCGGCTTCTGTTGAAACCCACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAAACGTATCACCGCGACATGCTGATC
CGGATTACTAGCGATTCCGACTTTCATGCAGTTCGAGTTGCAGACTGCAATCCGACTGACGACAGCCATGCAGCACCTGTTTTAAGGATTGGCTCCAGGTCGCCCTTGGCTACCTCTGTA
CGGCCATTTGATACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGGTTTTGTACCAGGCGAGTCCCATTAGAGTGGCCCTT
ACGGGTGGCAACTAATGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGGCTGACGACAGCCATGCAGCACCTGTTTTCCGATTCCCGAAGGCACTCCGCACTCTCTGAG
AGCACACCCGCTTTCAGAGGCTCCCGGACATGTCAGGGTAGGTAAGGTTTTTCGCGTTGCTCAATTAACACATATGCTCCACCCTTGTGCGGGTCCCGGCTCAA
TCTTTGAGTTTTAACCTTGCAGGCTGCTCCCGCGGCTGCTCCCGGCGGCTGACTTACCGGTTAGCTTCGTTACTGAGAGTGTCAAACCCCAACAACAGTGCATCGTTTAG
GCGTGGACTACCAGGGTATCTAATCTGTTTGTCTCCCC

>CUP1P2A05 Uncultured bacterium (Alphaproteobacteria)

CTGACTTAGCTGGTAGGCTGCTCCTTGCGGTTAGCGCACCTGCTTCCGGTAAACCCTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACCGTG
GCATGCTGATCCACGATTACTAGCGATTCCACCTTTCATGCACCTCGAGTTGCAGAGTGCATCTGAAGTGCAGCGGCTTTTGGGATTTGCTCCACCTTGCGGTCTTGCA
CCCCACTGTCACCGCCATTGTAGCAGTGTGTAGCCAGCCATAAGGGCCATGAGGACTTGACGTATCCCCGCTTCCCTCCGGTGTGACCGGCGAGTTTCGTCAAA
GTGCCAACTAAATGATGGCACTGACGATGAGGGTTGCCTGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGACCTGTGTGGGA
GCCAGCCAACTGAAGGACCCGTCTCTG

>CUP1P2A06 Uncultured bacterium (Acidobacteria)

AAGGTGCTCCTGCGGTAGCACACCTGCTTCTAGTACGGCCACTTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTACCGGCGGCTTCTGATCCGC
GATTACTAGCGATTCCAGCTTTCATGGAGTGCAGTTGCAGACTCCAATCCGAAGTGCAGCCGCTTTTCCGATTAGCTCCCCCTCACGGGTTTGCAGCGTTTGTACCG
ACCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCTGTTATCCGAGGAGTTTCACTAGAGTGCCCGGCTTGA
CCCGATGGCGACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGACGAGTTCTTGGAA
AAGGGATGTTTCCACCCCGGTCCACTGCGCTTCGAGCCAGGTAAGGTTCTCGCGTTGCGTCAAGTTGAACACATGCTCCACCGCTTGTGCGGGCCCCGCAATTC
CTTTAGTTTTAGCCTTGCACCCGATCCAGCCAGGATTGCTTATCGGGTACGTTTCGCGACGCGAGGATTGGGTACCTGCTACACCAAGCAATCATCG

>CUP1P2A07 Uncultured bacterium (Não classificada)

GTGCGCGACTTTTCGTGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTACCGTGGTGTGCTGACCCACGGTTACTAGCAACTCAGCCTTACGGCAGGCGAGTT
GCAGCTGCCATCCGAAGTGCAGCCGCTTTTGGGATTGGCTCCCGTGCAGGCTTCCCTACTGTCGCGGCCATTGTAGCGTGTGTGCGCCAGGACGTCGGGG
CCGTGCTGACTTGACGTCATCCCCACCTTCCCTCCAGTTACTCGTGGCAGTCTGCTGGACACTTATAACCGACCACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAA
CACCTCACGGCAGAGCTGACGACAGCCATGCAGCACCTGCGCCTGTCCGAAGGAAGCCTCGTCTCCGAGGTGCTCAGGGCCATGCAAGCCCTGGTAAGGTTCTT
CGCGTGCCTTCGAGTTAGACCACACGCTCCGCTGCTTGTGCGGGTCCCGCTCAATTCTTTAGTTTTAATCTTGCAGCCGACTCCCGAGGCGGACCACTTATTCGCT
TTGCGTCCGGCAGCAGCGGGTGCATACGCCGACACCTAGTGGTTCATCGTTTACGGCCAGGACTACCGGGTATCTAATCCCGTTCGCTCCCTGGCTTTCCGCCCTCA
GCTACAGGTGCCCTCCAGGACACTGCTTCCGCTTGGTG

>CUP1P2A08 Uncultured bacterium (Deltaproteobacteria)

TGGAGCAACTGACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTACCCCTGCCTGCTGATCAGGGATTACTAGCGATTCCGACTTTCATGAAGTCGA
GTTGCAGACTTCAATCTGAAGTGCAGCCGCTTTTGGGATTGGCTCCCGTGCAGGCTTCCCTACTGTCGCGGCCATTGTAGCGTGTGTGCGCCAGGACGTCGGGG
AGGGCCATGAGGACTTGACGTCATCCCCACCTTCCCTCCGTTTAAACCCGGCAGTCTCGTTAGAGTGCAGCGCCGAAACCGCTGGCAACTAACGACAAGGGTTGCGCTCG
TTGCGGGACTTAAACCAACATCTCACGACAGCTGACGACAGCCATGCAGCACCTGGACACCCGATTCCCTTCCGGGACCCCTCCATCTCTGGAAGGTTCCGGGGG
GTTCCAAACCCAGGTAAGGTTCTTCCGCTTGCCTGAATTGAACCAACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCTTTAGTTTTAGCCTTGGCGCCGTACTC
CCAGCGGAGTGCTTAAACCGTTAGCTACGACGCTCCGGGGTCAATACCAGAAACATCTAGCCTCATCGTTTACGGCGTGGACTACCGGATCTAATCCCTGTTT
GCTCCCAAGCTTTTCGCACTCAGCTCAGTATCTACCAAGTTCGCGCCTTCCGACCCGGTGTTCCTCCCGATATCTACGAAT

>CUP1P2A09 Burkholderia sp (Betaproteobacteria)

CGTGGTGACCGTCTCCTTGCGGTTAGACTAGCCACTTCTGGTAAACCCTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTACCGGCGGATGCTG
ATCCCGGATTACTAGCGATTCCAGCTTTCAGCAGTGCAGCTGCAGCTGCAGCTCCGGACTACGATCCGGTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCCTC
GTTCCGACCATTTGATGAGGTGTAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCTGTTATCCGAGGCAAGTTTCGCTAGAGTGCCT
TGCCTAGCAACCCAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTACGGCTCCCTTTCGG
GCACCTCCACCTTTCAGCAGGTTCCGATACATGCAAGGTAAGGTAAGGTTTTTCCGGTGTGATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGCTCAAT
TCCTTTGAGTTTTAATCTTGGCAGGCTACTCCCGAGGCGTCAACTTACCGGTTAGCTACGTTACCAAGCCAAATGAAGGCCGATAACCAAGTTGACATCGT

>CUP1P2A12 Uncultured bacterium (Acidobacteria)

CCCTTGCGGTGGCTCACCGACTTCTAGTACGGCCACTTTCGTGATGACGGGCGGTGTGTACAAGGCCGGGAACGTATTACCGCAGCGTCTGATCTGCGATTAC
TAGCGATTCCAGCTTTCATGGAGTCCGGTTGCAGACTCCAATCCGAAGTGCAGCCGCTTTTCCGATTAGCTCCCCCTCGCGGTTTGGCAGCGTTTGTACCGACCACT
GTAGCAGTGTGTGGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCTGTTATCCGAGGCAAGTTTCGCTAGAGTGCAGCGGCTTACCCGAT
GGCAACTGCGTAAAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTCCCGAGGCGGTTTCCGGAAAGGGA
TGTTTCCACCCCGGTTCCACTGCGCTTCGAGCCAGGTAAGGTTTCTCGCGTTGCGTCAAGTTGAACCAACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGA
GTTTACGCTTGCAGCCGACTCCCGAGGCGGATGCTTAAACCGTTAGCTGCGGCACGACCGGATTGGGTACCGATCACCAAGCATCCATAGTTTAAAGGCTAGGAC
TACCAGGATATCTAATCTGTTGCTCCCTAGCTTTCGCGCTCAGCGTCAAGTTGTTGTTCCAGTGCAGCGGCTTTCGCCACAGGTTTCCCTCCCGATATCT

>CUP1P2B01 Uncultured bacterium (Acidobacteria)

CACCGGCTTCTAGTATCACCCACTTTCGTGATTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTACCGCGCGGCTGCTGATCCCGGATTACTAGCGATTCCAGCTT
CATGAAGTCGAGTTGCAGACTTCAATCCGAAGTGCAGCCGCTTTTCCGATTAGCTCCCCCTCGCGGTTTGCAGCGGTTGTACCGGCCATTGTAGCAGCTGTGTAG
CCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCTGTTATCCGAGGCAAGTTTCGCTAGAGTGCAGCGGCTTACCCGAT
GGTTCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTCCCGAGGCGGTTTCCGGAAAGGGA
CCACTGCGCTTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTCAAGTTGAACCAACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTACGCTTGCGA
CCGACTCCCGAGCGGATTGCTTAAACCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTCTAGGCTAGGACTACCGGATCTCTAA
TCCTGTTTGCCTCCCTAGCTTTCGCGCATCAGCGTCAAGTTTATGGTCCAGTGCAGCGGCTTTCGCCACAGGTTTCCCTCCCGATATCTAAG

>CUP1P2B02 Oxalobacteraceae bacterium (Betaproteobacteria)

TAGCGCCCTTACGTTAAGCTTACCTACTTCTGGTAAACCCTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTACCGCGGCTGCTGATCC
GCGATTACTAGCGATTCCAACCTTTCAGCAGTGCAGTTGCAGACTGCGGACTACGATGCACTTCTGGGATTAGCTCCCCCTCGCGGTTTGGCGGCCCTCTGTAT
GCACATTGTATGACGTTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCGTTTGTACCGGCGAGTCTCATTAGAGTGTCTTGGC
TAGCAACTAATAGCAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTCCCGAGGCGGTTTCCGGAAAGG
TCCTCAATCTTCGAGGATTCCGTGACATGCAAGGTTGGTAAGGTTTTTCCGCTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGCTCAATTCCT
TTGATTTAATCTTGCAGCCGTTACTCCCGAGGCGTACTTTCAGCGTTAGCTGCGTTTACCAAGTCAATTAAGACCCGACAACCTAGTAGACATCGTTTAGGCGGTGGGA
CTACCGGATATCTAATCTCTGTTGCTCCCGGCTTTCGTGATGAGCGTCAATTTGACCCAGGGGCTGCCTTCCGCACTCGGTTTCCCTCCACATCTTACGCATT
TCACTGCTACAGTGAATTTCAACCCCTCT

>CUP1P2B03 Uncultured bacterium (Acidobacteria)

CACCGGCTTCTAGTGAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTACCGCGGCTTCTGATCCCGGATTACTAGCGATTCCAGCTT
CATACAGTGCAGTTGCAGACTTGAATCCGAAGTGCAGCCGCTTTTCCGATTAGCTCCCCCTCGCGGTTTGCAGCGGTTGTACCGACCACTTGTAGCAGCTGTGTAG
CCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCCGTTTCCCGAGGCGGTTCCCGCAGAGTGCAGCCAAATGATGGCAACTGGAGGTAAGG
GTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTATATACAGGTTCCCTTGCAGGACCGGATGTTTCCACCGGATT
CCTGTACATTTCCGAGCCAGGTAAGGTTCTTCCGCTTGCCTCAAGTTAAACCAACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTACGCTTGCGA
CCGACTCCCGAGCGGATTGCTTAAACCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTCTAGGCTAGGACTACCGGATCTCTAA
TCACTGCTACAGTGAATTTCAACCCCTCT

>CUP1P2B04 Uncultured bacterium (Acidobacteria)

GCGCTCCCTCCCTTGCGGTGGTATGGCGACTTCTAGTACAACCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTACCGCGGCGTGTGTA
TCCCGATTACTAGCGATTCCAACCTTTCAGTCCCGCGGAGTTGCAGCCGCAATCCGAAGTGCAGACAGACTTATCCGATTAGCTCCACCTTACCGTTCTCGGACGCTTTG
TATCTGCCATTGTAGCAGTGTGAGCCAGACATAAGGGCCATGCTGACTTGACGCTATCCCCACCTTCCCTCCGTTTATACCCCGGAGTCTGTGAGAGTGCCAC
CATAACGTTGATGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAGCCCAAGCTCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTACGAGTGTCTT
GCGGAAGCTCACTTTCGTGAGTGGTCACTCGTGTCAAGCCCTGGTAAAGTTCTTCCGCTTGCCTGCAATTGAACCAACATGCTCCACCGCTTGTGCGGGCCCCGCTCA
ATTCCTTTGAGTTTACGCTTGCAGCCGTTCCCGAGGCAAGTGTGTTAGGTTAGCTTTCGCGACGCGAGGATCGATACCCGCCACACCAAGCAATTCATCGTTTA
GGCCAGGACTACCGGGGATCTAATCCCGTTTGCCTCCCTGGCTTTCGCTCCTCAG

>CUP1P2B05 Burkholderia sp. (Betaproteobacteria)
CTAGCCACTTCTGGTAAAACCCACTCCCATGGTGTGACGGGGGTTGTACAAGACCCGGGAACGTATCACCGCGCATGCTGATCCGCGATTACTAGCGATTCCAGCT
TCATGCACTCGAGTTGCAGAGTGCAATCCGGACTACGATCGGTTTTCTGGGATTAGCTCCCCCTCGCGGGTTGGCAACCCCTCTGTTCCGACCATTGTATGACGTGTGAA
GCCCTACCCATAAAGGCCATGAGGACTTGACGTCACTCCACCTTCTCCGGTTTGTACCCGGCAGTCTCCTTAGAGTGTCTTTGCGTAGCAACTAAGGACAAGGGTTG
CGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACGCCATGACAGCCCTGTGCGCCGGTTCTCTTCAGCACTTCCACCTCTGACGGGAATTC
GACCATGTCAAAGGTAGGTAAGTTTTCTCGGTTGCATCGAATTAATCCACATCATCCACCGCTGTGCGGGTCCCCTCAATTCCTTTAGTTTTAATCTTGCAGCCG
TACTCCCCAGGGGTCAACTTCACCGCTTAGCTACTTAAGGAAATGAATCCCCAACACTAGTTGACATCGTTAGGGCGTGGACTACCAGGGTATCTAATCTCTG
TTGCTCCCCATGCTTTCGTGATGAGCGTCAGTATTGGCCCAGGGGGTGCCTTCGCCATCGGTATTCTCT

>CUP1P2B06 Uncultured bacterium (Acidobacteria)
GCCTTCCCCTCGCGGGTTCCGGGACGCTTGTACCGTCCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCAGCT
TATCGTGGCGGTTCTCTGCGAGTTCCGCTTTCGGCATGGCAACACAGGCAAGGTTGCGCTGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACA
GCCATTACGACCTCGACTGACCCCCCTTGGCGGGTAAAGATGTTCCACCTCCGTTGACCAGCCGTTCGAGCCAGGTAAGTTCTTCCGCTTGCCTCGAATTGAACC
ACATGTTCCACCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTACGGCTTGCAGCTGACTTCCCCAGGCGCATATTAACCGCTTAGCTCCGGCAGGATCAACT
GAATGACCCATACCAATATGATCGTTTAGGGCTGGACTACCAGCGTATCTAATCTGTTTGTACCCAGCTTTCGTGCTCAGCGCTAGTTACGGTCCAGAA

>CUP1P2B07 Uncultured bacterium (Acidobacteria)
CTTCTAGCAGCTCACTTTCGTGATGTGACGGGCGTGTGTACAAGGCCCGGGAACTTTCACGGCGTGTGTGATACGCCATTACTAGCGATTCCGGCTTTCATGC
AGTCGAGTTGACAGCTGCAATCCGAAGTACGAGAGTTTTTCGGATTAGCTCCCCCTCGCGGGTTGGCAACCGTTTGTGCCCTGCAATGTAACACGTGTGTAGCCCTG
GACATAAAGGCCATGGGGACTTGACGTCACTCCCACTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCTCTTGGGAGTGGCAACTACGTGCGAGGGTTG
CGCTCGTTGCGGGACTTAACCCAACCTCACGGCAGAGCTGACGACGCCATGACAGCCCTATACTCTGTCCCTTGGCGGAAGGCCGTATTCTACAGCTTGTGAG
AAGCATTTCCAGCCAGGTAAGTTCTCCTCGCTAGCGTCGAATGAACACATGTTCACCGCTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTAGTTTTCAGTCTTGCAGCCG
TACTCCCCAGGTGACGACTTAACCGCTTAGCTCCGGGACGAACCCGAACGGGTGGCACCCCAAGTCTGATCGTTTAGGGCTAGGACTACCA

>CUP1P2B08 Uncultured bacterium (Actinobacteria)
GTGACGTGACGGGCGTGTGTACAGGCCCGGGAACTATCACCGCGCGTGTGTGATCCGCGATTACTAGCGACTCCGGCTTACGGGGCCCGGTTGCAGACCCCGATC
CGAAGTACAGCCGGCTTCCGGGATTCGCTCACCTCACAGGCTCGCAGCCCTGTACCGGCCATTTGTAGCATGTTTGCAGCCCAAGACATAAGGGGCATGATGACTTC
GACGTACCCCCACCTTCTCCGAGTTGACCCCGGAGTCTCCCATGAGTCCCCCACTGAATGCTGGCAACATGGGACGAGGTTGCGCTCGTTGCGGGACTTAACCCA
ACATCTCACGACAGGACTGACGACGCCATGACACCTGTGACGGCCCCGAAGGCCAATGCTGTCCATGAGTTTCCCGGAGTTCCAACTTGGTAAGTTCTT
CGCGTTGCTCGAATTAAGCAACATGCTCCCGCGTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTACGCTTGCAGCCGTACTCCCCAGGCGGGGCGCTTAATGCCG
TAGCTGCGGACAGAGCCCGTGAAGGACCCANACTAGCCCAACGTTTACGGCGTGGACTACCAGGGTATCTAATCTGTTTCGCTCCCCACGCTTTCGCTCTC

>CUP1P2B09 Uncultured bacterium (Verrucomicrobiae)
AGGGCGACTTCGGGTACAACCGCTTTCATGATGTGACGGGCGTGTGTACAAGGCCCTGGGAACGTATTACGGCGCGCTGATGATCGCCATTACTAGCGATTCCGA
GCTTTCATGCGCTCGAGTTGCAGACGACAATCTGAACCTGGGCCCCGTTTTAGAGGATTTCGCTCACCTTACGGCTTCGCTTCCCTCTGTGCCGGGATTGTAGTACGTT
CGAGCCCTGGTGTGAAGGCCATACTGACTTGACGTCACTCCACCTTCTCTCGTTGAAGCAGGACGCTGTGTCAGAGTGTCCAGCCCTCCTCGGCGGGTGGCAAC
AGGACACAGGGTTGCGCTGTTCCGGGACTTAACCCAACATCCACGACAGAGCTGACGACAGCCATGCAGCAGCTGTCGAAGCTCCCTTCCGGGTGCTCCCACT
TTCATGTTTACCACTTGCCTGTAAGACAGGTAAGTTCTTCCGCTGCGATCGAATTAAGCCACATACTCCACCCTTGTGCAGGCCCCGCTCAATTTCTTTGAGT
TTAATCTTGCAGCCTACTTCCAGGGCGCTTATTAACCGCTTGTGCTACGCCACAAAAGGGGTCGATTCTTTTACAGCAAATAAGCAGCGTTACAGCTAGG

>CUP1P2B10 Uncultured Planctomyces sp. (Planctomycetacia)
GGCGACTTGGGATGCTCCCCGCTTTCGTGGCTGACGGGCGGTTGTGTACAAGGCCCTAGGAACACATTCACCGCAGCATAGCTGATCTGCGATTACTAGCGATTCCGGCT
TCATGAGGCGAATTGCAGCTGCAATCTGAACCTGGGCGGTTTTTGTAGATTGCTCCCGCTCGCGCGTTCGCGTCCCTTTGTCGCGACCCATTGTAGCAGCTGTGCA
GCCCTAGGCATAAAGGCCGTGATGACTTGACGCTCGTCCCGCTTCTCCGTTTAAACCGCGGCTCTCTTAGGGTCCCCAACTGAATGCTGGCAACTAGAGACAGG
GGTTTCGCTGTTGAAGGACTAAACCCGACATCTCACGACAGGAGTGCAGCAGCCATGCAGCAGCTGTGATCGTTCCACCCGAAGGGCGCTATTCCGCTTTCACGGAA
CTAATCCGAGCTGTGAAGCTAGGATAAGTTTCTTCGCTTGCCTGAAATGAGCCACATGCTCCACCGTGTGTGAGCCCCGCTCAATTCCTTTGAGTTTACGCTT
TGCGACATACTCCAGGCGGAGCACTTAACACTTTCGCTCCGTTAGGAAGGGCTACGCCCTC

>CUP1P2B11 Uncultured bacterium (Não classificada)
TGTGCGGACTTTCGTGGTGTGACGGGCGTGTGTACAAGACCCGGGAACGTATCACCGTGGTATGCTGACCCAGGTTACTAGCACTCTCCTTCATGCAGGCGGGT
TGCAGCTTCAATCTGAACTGAGGCCGACTTTCGCTGGGATTGGCTCCCCCTCGCGGGTTGGCGACCCGTTGTCTCGGCCATTGTAGCGTGTGTGCGCCAGGATATCA
GGGCGGTGCTGACTTGACGTCAATCCCACTTCTCCAGCTTACAGTGGAGTCTGACGACAGCCATTCACCCGGCAGGGGAGTAGGCTCGTTGCGGGACTTAACC
CAACCTCACGGCAGAGCTGACGACAGCCATGCAGCAGCTGTGCGGCTCCCTTGGCGGGCCCCCATCGCTGGACGCTCAGCGCGATGTCAACCCCTGGTAAGG
TGCTTTCGCTGCAATTAACACACAGCTCCGCTGCTTGTGCGGGTCCCCGCTCAATTCCTTATGAGTTTAACTTTCGCGACCGTACTCCCCAGGCGGACCACTTA
CTGGTTGCGCTCCGACCAACGGGTGATACGCTGCGACACCTAGTGGTTCATCGTTTACGGCTAGGACTACCC

>CUP1P2B12 Uncultured forest soil bacterium (Acidobacteria)
GGTTGGCTCACCTGCTTCTAGTGAACCACTTTCGTGATGTGACGGGCGTGTGTACAAGGCCCGGGAACTTTCACCGCAGCGTTCTGATCTGCGATTACTAGCGAT
TCCAGTTCATGGAGTGCAGTTGCAGACTCCAATCCGAAGTGAAGCCGGTTTTTCCGATTAGCTCCCCCTCACGGGTTTGGCAGCGTTTGTACCGGCCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCACTCCCGCTTCTCCCGCTTATCCGAGGCGGTTCTCACAGAGTGTCAACTAAATGGTAGCAACTGG
TAATAAGGTTGCGCTGTGTGCGGGACTTAACCAACATCTCACGACAGGAGTGCAGCAGCCATATAGCAGCCTATTGTAGGTTCCCAACTAAA
TGATGGCAACTAAGGACAAGGTTGCGCTGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCAGCTGTCTAGGTTCCCGAAGGCA
CCAAGCCATCTGCGAAGTTCCTAGGATGCAAGACAGGTAAGTTTCTTCGCTTGCATCGAATTAACACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTACG
CCTTGCAGCGTACTCCCCAGGCGGATCGCTTAACCGCTTAGCTTCCGACGGGCGGATTGGGTACCCGTCACACCAAGCGATCATCGTTTAGGGCTAGGACTACCAGG
GTACTAATCTGTTTGCCTCCCTTTCGTGATCAGCGTCAGTTGTGGTCCAGTAGCCCGCTTTCGCCACAGGTTTCCTTCGGATATCTACGCACTTACCGCTT
ACCCGAAATCCACTCACCTCTCC

>CUP1P2C01 Uncultured bacterium (Não classificada)
GCCTCCTTGCGGTTAGGCTACTTGTCTTGTGGTCAACTCCATGGTGTGACGGGCGTGTGTACAGGACCCGGGAACGTATTCACCGCAGCAATGCTGATCTGC
GATTACTAGCGATTCCGACTTCATGGAGTGCAGTTGCAGACTCCAATCCGGACTACGACAGGCTTTATGGGATTGGCTCCGCCCTCGCGGCTTAGCGACCTTTGTACT
GCCATTGTAGCAGCTGTGTGCGGGACTTAACCAACATCTCACGACAGGAGTGCAGTCACTCCCACTTCTCCGCTTTCACCGGCGTTCCTTAGGTTCCCAACTAAA
TGATGGCAACTAAGGACAAGGTTGCGCTGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCAGCTGTCTAGGTTCCCGAAGGCA
CCAAGCCATCTGCGAAGTTCCTAGGATGCAAGACAGGTAAGTTTCTTCGCTTGCATCGAATTAACACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTACG
TTCAGTTTTCAACCTTTCGCGGCTACTCCCCAGGCGGACTTTCGTCATCAGCGTCAGTTGTGGTCCAGTAGCCCGCTTTCGCCACAGGTTTCCTTCGGATATCTACGCACTTACCGCTT
GGACTACCAGGTTACTAATCTGTTTGTCTCCCAAGCTTTCGCACATGAACGTGAGTATTGGACCAGGAAGTGCCTTTCGCCACTGG

>CUP1P2C02 Uncultured bacterium (Acidobacteria)
CTCACTTCTGATGTGAGGGCGTGTGTACGGCCCGGGAAGTATCACCGCGTGTGATCTGATACGCCATTACTAGCGATTCCGGCTTTCATGAGTGCAGTTGCAGACTGC
AATCCGAAGTACAGGAGTTTTTCGATTAGCTCCCCCTCGCGGGTTGGCAACCGTTTGTACCTTGCATGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGG
ACTTACGTATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTCCGAGTGGCAACTACGTGCAGGGGTTCCGCTCGTTGCGGGACTTAAC
CCAACACTCACGGCAGAGTGCAGCAGCCATGACAGCCCTCCACAGTCCCTTCCGGGAAAGGCCGTATTCTACAGCTGCAGGTTGCAGTTCCGAGCCAGGTA
AGGTTCTCGGTTAGCGTGAATTAACCAATGTTCCACCGTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTACGCTTTCGAGCTTCCCAGGCTCCCAAGGACT
TAACCGCTTAGCTCCGGGACGACCCGACAGGGTGGCACCCCAAGTCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGTCTCCCTAGCTTTCGT
TCCTACGCTGAGTAGTGTCCAGCCGCGCTTTCGCCAGGGTGTCTCTGACAGATATCTACGCACTTTCACCGCTACACTTGAATTCACCGGCCCTCTCCCA

>CUP1P2C03 Uncultured Acidobacteria (Acidobacteria)

GGACGCTGCCTCTTGGCGTTAGCTCAACGCTCTTAGTACAGCCACTTTCGTGATGTGACGGGGCGTGTGTACAAGACCCGGGAACGTATTACCAGCAGCATGCTG
 ATCTCGGATTAAGTACAGGATTTCAACTTTCATGGAGTCGAGTTGACAGCTCCAATCCGAAGTGAAGACCGGTTTTTCCGATTAGCTCCATCTCGCGACTTTCGACGGGTTT
 GTACCGCTCATTGTAGACAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTACAGCTATCCCCACCTTCCCTCCGGTTTATCACCGGAGTTCGGTGGCAGTTCTCA
 ACTTAATGTTAGCAACACACGGTAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCGTGCAGCACCTCGCAGGCAGGAGCCG
 GTTATCCGGATCGCGGTGCTCCAGCACTTATCCACCGCACTTAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCCACATGCTCCACCGCTTGTGCGGGTCC
 CCGTCAATTCCTTTGAGTTTTCAGCCTTGCAGCCGTACTCCCAGGGCGCTGACTTAACCGGTTAGCTCCGGCACCCCGGACTTAAACCGGGAACCAAGTACAGCAT
 CGTTAAAGGCTAGGACTACCAGGGTATCTAATCCCGTTTGGCTCCCTAGCTTTCGCGCATCAGCGTCAAGTGTGGCCAGCGATCCGCTTC

>CUP1P2C04 Unidentified eubacterium (Não classificada)
 GGTACACAGCGATTCTAGTACAGCCAGCTTTCGTGATGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATACCAGCGGCATGCTGATCCGCGATTACTAGCGATT
 CCGACTTCATGACGGGAGTTGACGCTGCAATCCGAAGTGAAGCCGCTTTCCTCCGATTAGCTCCCGCTCGCGGGCTCGCGAGCGTTTGTACCAGCCATTGTAGCAGC
 GTGTAGCCCTGGACATAAAGGCCATGCTGACTTACGCTCATCCCCACCTTCCCTCCGGTTTGTACCGGCACTTCCCTCAGAGTGCCACAGCTTACCTGATGGCAACAG
 AGAACAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTCAGATGCCCTTGGGGGAATCGACTTTCGCC
 GAGTGTACTGCACTTCGAGCCAGGTAAGGTTCTTCGCGTACGCTCGAATGAACACATGCTCCACCGCTTGTGCGGGCCCCCGTCCAAATTCCTTTGAGTTTACG
 CCTTGGC

>CUP1P2C05 Uncultured bacterium (Acidobacteria)
 GCGCTCGCTCCTGGCGTTAGCGCGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATTACCAGCGCTGATCTGA
 TAGCCATTACTAGCATTCCGGCTTCATGACGTCGAGTTGACAGCTGCAATCCGAAGTGAAGACAGGTTTTTCCGATTAGCTCCCGCTCGCGGGTTGGCAACGGTTTTG
 TGCCCTGCATTGTAACAGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTACGCTCATCCCCACCTTCCCTCCGGTTATCCGGAGCAGTCCACGTAGAGTTCCCTC
 TTGCGAGTGGCAACTACGACAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGCATCCTGCCCTTACCC
 GGGAGGCCGATTTCTACAGCTGTTGAGGATTTTCAGCCAGGTAAGGTTCCCTCCGCTGAGCTCGAATTAACCCACATGTTCCACCGCTTGTGCGGGCCCCCGT
 AATTCCTTTGAGTTTTCAGCTTTCGACCCGACTTCCCAGGTGACGAGCTTAACCGGTTAGCTCCGGAGCATACCAGAACGGGTGGCACCCCAAGTCTGATCGTTTAC
 GGCTAGGACTACCAGGGTATCTAATCCCTGCTCCCTGGTCTTTCGCGCATCAGCGTCAAGTGTCCGGC

>CUP1P2C06 Uncultured bacterium (Acidobacteria)
 GCCTCCCCAAGGGTTAGCCCTGCTTCTAGTACAACCACTTCGTGATGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATTACCAGCGGCATGCTGATCCGCGAT
 TACTAGCGATTCCAGCTTACCGGAGTCGAGTTGACAGCTCCGATCCGAAGTGAAGACAGGTTTTTCCGATTGGCTCCCTCTGCGAGTTTGGCGGGTTGTACTCTGCC
 ATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTACGCTCATCCCCACCTTCCCTCCGGTTTATCAACCGGAGTCTCAGTAGAGTGGCCGGCATAACCC
 GCTGGCAACTACTGCAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGCATCCTGCCCTTTACCC
 AGGAGACCCCATCTCTGGGGCTGTCAGGAGCATTTAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCGCTTGTGCGGGTCCCGCTCAAT
 TCCTTTGAGTTTTCAGCTTTCGACCCGACTTCCCAGGGGACTTAATCGGTTAGCTCCGGGACCCAGGACTATGTAACCTCGGACACCAAGTATCCATCGTTTAA
 GGCCAGGACTACCAGGGTATCTAATCCCTGCTCCCTGGTCTTTCGCGCATCAGCGTCAAGTGTCCGGC

>CUP1P2C07 Uncultured bacterium (Gammaproteobacteria)
 GGTAGACTACCTACTTCTGGAGCAACCACTCCCATGGTGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATACCAGCGACAATGCTGATTCGCGATTACTAGCGA
 TTCCGACTTCAGCGAGTCAGTTGACAGCTCCGATCCGACTGAGAGAGGTTTTTCCGATTGGCTTCCCTCGCGGTTCCGCAACCTCTGTACTCCCATTTGATGTA
 CGTGTGATGCCCTGGACATAAAGGCCATGACTTACGCTCATCCCCACCTTCCCTCCGGTTTGTACCGGAGTCTCCCTTAGAGTTCCCAACATACGTTGCTGGCAAC
 TAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGATTCCCGAAGGCACCTCCGCGATC
 TCTGACAGGATCCGCGACATGTCAGGCCAGGTAAGGTTCTTCGCGTTGCAATTAACCCACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTAC
 AGTCTTGGACCGTACTCCCAGGGCGGAACCTAACCGGTTAGCTTTCGACTGAGAGCAAGTGTCTCCCAACGTCAGTTTGCATCGTTTAGGGCGTGGACTAC

>CUP1P2C08 Goodfellowia coeruleoviolacea (Actinobacteria)
 ACTCATCCCAAGGGTAGGCCATGGGCTTCGGGTGACCGACTTCGTGACTGACGGGGCGTGTGTACAAGGCCGGGAACGTATACCAGCGAGCTTGGCTGATCTGCG
 ATTACTAGCGACTCCGACTTACCGGGTTCGAGTTGACAGACCCCGATCCGAAGTGAAGACAGGTTTTTATGAGATTGCTCCACCTCACGGCTTCGACGCCCTCTGTACCGG
 CCATTTAGCATGTGTGAGCCCTGGACATAAAGGGCATGATGACTTACGCTCATCCCCACCTTCCCTCCGAGTTGACCCCGGAGCTCCCATGAGTCCCGGGCATTAC
 CGTGTGGCAACTGAGGACTGAGGACTTACGCTCATCCCCACCTTCCCTCCGGTTTGTACCGGCGGTTCCCTTAGAGTTCCCAACATACGTTGCTGGCAAC
 CAACATCTCTGCTGGCGTCTGTGATGTCAAACCCAGGTAAGGTTCTTCGCGTTGCAATTAATCCACATGCTCCCGCGTTGTGCGGGCCCCCGTCAATTCCTT
 TGAGTTTATAGCTTTCGCGCGTACTCCCAGGGCGGGCGTTAATGCGTTAGCTACGGCACGGAAACCGTGAATGTTCCCAACCTAGCGCCCAACGTTTACGGCGT
 GACTACCAGGGTACTAATTCCTTTCGCTTCCACGCTTTCGCTTCCAGCTTACGCTGACGTAACCGGCCAGATACCAGCGCTTCCGCAACCGGTTCTCTCTGATATCTGCGC
 ATTTACCAGCTACACAGGAATTCAGTCTCCCTGGCGAACTCAAGTCTGCGCGT

>CUP1P2C09 Uncultured bacterium (Gammaproteobacteria)
 CGGTACGGCTACTGCTTCTGGTGAATCAACTCCCATGGTGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATTACCAGCGACAATGCTGATCTGCGATTACTAGCG
 ATTCCGACTTCATGGAGTCGAGTTGACAGCTCCAATCCGGACTACGATAGGTTTTTCCGAGTTGGCTCCCACTCACGTTTGGCTTCCCTCTGTACTACCATTTGATAGC
 ACGTGTGATGCCCTGGACATAAAGGCCATGATGACTTACGCTCATCCCCACCTTCCCTCCGGTTTGTACCGGCGGTTCCCTTAGAGTTCCCAACATACGTTGCTGGCAAC
 AAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCAAAATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTTGGGCTCCTTGCAGGACCCCTAATCT
 CTTACGGGTTCCAGGATGTCAGACAGGTAAGGTTCTTCGCGTTGCAATTAACCCACATGCTCCACCGCTTGTGCGGGTCCCGCTCAATTCCTTTGAGTTTAC
 ACCTTGGCGCGTACTCCCAGGGCGGAGAACTTAGCGCGTTAGCTTGCAGCACTTGA

>CUP1P2C10 Uncultured bacterium (Acidobacteria)
 GGTGGCTCAGCGCTTCTAGTGAACCACTTTCGTGATGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATTACCAGCGGCATCTGATCCGCGATTACTAGCGAT
 TCCAGCTTCATGAGTCGAGTTGACAGCTCAATCCGAAGTGAAGCCGCTTTTTCCGATTAGCTCCCGCTCACGGGTTTGGCAGCGTTTGTACCAGCCATTGTAGCAC
 GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTACGCTCATCCCCACCTTCCCTCCCGTTATCCGAGGGCGTCTCGCCAGAGTGCCCAACTGAATGATGGCAACTGG
 TAATAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGCATCCTTGGGCTCCTTGCAGGACCCCTAATCT
 ACCCGGTTCCACTACATTTCCAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTACG
 CCTTGGCAGCGTACTCCCAGGGCGATGCTTAAACCGGTTAGCTTTCGCGACGGGGGATTGGGTA

>CUP1P2C11 Uncultured bacterium (Alphaproteobacteria)
 ATCTCCGGTAAACAACCTCCATGGCTGACGGGGCGTGTGTACAAGGCCGGGAACGTATTACCAGCGGCATGCTGATCCGCGATTACTAGCGATTCCACCTTCATGCA
 TCGAGTTGACAGAGTCAATCCGAAGTGGACAGGTTTTTGGGATCGGCTCCGGGTCGCGCTTCCGATCCCACTGTCACCGCCACTGTAGCAGTGTGTAGCCAGCC
 CGTAAGGGCCATGAGGACTTACGCTCATCCCCACCTTCCCTCCGGTTTGTACCGGCACTTTCCTCAAGAGTCCAGCTTAACTGATGGCAACTGGAGACGAGGGTTGC
 GCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCGGAGTCCGGCCGAACCGAAGGGACCGCTCTGTTCCGGCGAC
 TCCCATGTCAGGGCTGTAAGGTTCTTCGCGTTGCGTGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAACCTTGCGGCG
 TACTCCCAGGGCGGGTGTAAACCGGTTAGCTTACGACTGACGAGCAAGCTCGCAACGCTTAGACCCCATGTTTACGGCGTGGACTACCAGGGTATCTAATTCCTG
 TTTGCTCCCAAGCTTTCGCGCTTACGGTCAAGAACCGTCCAGAT

>CUP1P2C12 Serratia sp. (Gammaproteobacteria)
 CCGAAGGTTAGCTACTTCTTTGCAACCACTCCATGGTGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATTACCAGGTAGCATCTGATCCAGGATTACTA
 GCGATTCCGACTTTCATGGAGTCGAGTTGACAGCTCCAATCCGAAGTGAAGCCGCTTTTTGGGATCGGCTCCGGGTCGCGCTTCCGATCCCACTGTCACCGCCACTGTAGCAGTGTGTAGCCAGCC
 AGCAGGTGTAGCCCTACTCGTAAGGGCCATGATGACTTACGCTCATCCCCACCTTCCCTCCGGTTTGTACCGGCACTTTCCTCAAGAGTCCAGCTTAACTGATGGCAACTGGAGACGAGGGTTGC
 AACAAAGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATTTCAACACAGGACTGACGACAGCCATGCAGCACCTGTCTCAGAGTTCCCGAAGGCACCAAGC
 ATCTCTGCTAAGTTCTTGGATGTCAGAGTAGGTAAGGTTCTTCGCGTTGCAATTCGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCATTGAGT
 TTTAACTTGCAGGCGTACTCCCAGGGCGGTTAATTAACCGGTTAGCTCCGGAAGCCAGCTCAAGGGCACAACTCCAAATAGACATCGTTTACGGCGTGGACTAC
 CAGGATATCTAATTCCTGTTGCTCCCAACGCTTTCGCACTGAGCGTCAAGTCTTCGTTCCAGTGGGGCCGCTTCCGCAACCGGATCTCTCAGATCTCTACGATTTAC
 C

>CUP1P2D01 Uncultured bacterium (Acidobacteria)

TGTGGCGACTTCTAGTACAAACGGCTTCGTGATGTGACTGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGCGTGTGATCCGCGATTACTAGCGATTCCAAC
 TTCATGCAGGGAGTTGCAGCCTGCAATCCGAAGTGAACCGACTTTCTCCGATTAGCTCCCCCTTGGGGGCTCGCGAGGGTTTGTATCGGCCATTGTAGCACGTGTGT
 AGCCCCAGACATAAAGGCCATGCTGACTTGGCGTCATCCCCACCTTCCCTCCGGTTTATCACCGGCAGTCTTTGCAGAGTGCACCATAACGTGATGGCAACAGCAAAC
 AAGGGTTGCGCTCGTTTGGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCACCTCTACGAGTGTCTTGGGGAAGGCCCCCTTCGGGACTGG
 TCACTCGCTGTTCAAGCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACACATGCTCCACCGCTTGTGGGGCCCCCGTCAATTCTTTAGTTTCAGCCTTGGC
 ACCGTACTCCCCAGGCGAATGCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGCCACACCAAGCATTTCATCGTTTAGGGCCAGGACTACCGGGGTATCTA
 ATCCCGTTTGTCTCCCTGGCTTCGCTCCTCAGCGTCAGTGTGTGTCCAGGATGCCGCCCTTCGCCACCGGT

>CUP1P2D02 Uncultured bacterium (Acidobacteria)

ACTTCTAGTACAGCTCACTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGTGTGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCA
 GTCGAGTTGCAGACTGCAATCCGAAGTGAACCGACTTTTTCGATTAGCTCCCCCTCGCGGTGGCAACGGTTTGTACCTGCATTGTAACAGCTGTGTAGCCCTGG
 ACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCCTCCTCGTTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGCAGTGGCAACTACGTGCGAGGGTTGGCG
 TCGTTGCGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATACGAGCCATATACTCCTGTCCTTGGGGAAGGCGGATTTCACAGCTGGTCAGAAG
 CATTTCGAGCCCCAGGTAAGGTTCTCGCGTAGCGTGAATTGAACACATGTTCCACCGCTTGTGGGGCCCCCGTCAATTCTTTAGTTTCAGTCTTGCAGCCGTAC
 TCCCCAGGTGCAGGACTTAACCGCTTAGCTCCGGGACGACTTCCGAACGGGAAGGCCCAAGTCTGATCGTTTAGGGCTAGGACTACCGGGTATCTAATCCTGTTT
 GCTCCCCAGCTTTCGTTCCCTCAGCGTCAGTAACGGTCCAGCGCCGCTTTCGCCACCGGT

>CUP1P2D03 Uncultured soil bacterium (Acidobacteria)

GGCGCTGCCCTCCATGCGGGTTAGCGCTGCGACTTCTAGTACAGCCAGCTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGCGTGTGTA
 TCCGCGATTACTAGCGATTCCAACCTTCATGCAGCGGAGTTGCAGCCCGCAATCCGAAGTGAACCGGATTTCCTCCGATTAGCCCCACCTTGGGTATCGCGACGGTTT
 TATCGGCCATTGTAGCACGTGTGTGGCCCCAGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCCTCCGGTTTGTCAACCGGCGTCTCCTCAGAGTGGCCAC
 CATAAAGCTGTGGCAACAGAGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCACCTCGCAAGTGTCCCT
 GCGGAAGCGGACTTTCGCGGATGTCACTCGCGTTCGAGCCTGGGTAAGGTTCTTCGCGTTGCGTGAATTGAACACATGCTCCACCGCTTGTGGGGCCCCCGTCA
 ATTCTTTAGTTTCAGCCTTGCAGCCGTACTCCCCAGGCGGAGTCTTAATGCGTTAGCTTCGGCACGGCAGGGATCGATACCCGCCANACCAAGCACTCATCGTTA
 GGGCTAGGACTACCGGGTATCTAATCCCGTTTGTCCCCAGCTTTCGCGCTCAGCGTCAATGCCGTCAGGATGCCGCCCTTCGCCACCGGTGTTCCCTCAGATAT
 CTACG

>CUP1P2D04 Uncultured bacterium (Acidobacteria)

GTGCTCCTCGGTTAGCACACCTGCTTCTATACGGCCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGCGTGTGATCCGCGATT
 CTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCACTCCGAAGTGAAGCGGCTTTTCCGATTAGCTCCCCCTCAGCGGTTTGCAGCGGTTTGTACCGACCAT
 TGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCCTCCTGTTATCCGAGGCGAGTTTCACTAGAGTCCCGGCTTGACCCGA
 TGGCAACTAGGATAAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGGAGTGCAGCACAGCCATGCAGCACCTATGCAGCACCTTTAAGGGGAAG
 GGATGCTCCACCCAGTCTCAGCATTTCCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTGAACACATGCTCCACCGCTTGTGGGGCCCCCGTCAATTCTTT
 TGAGTTTACCGCTTGCAGCCGTACTCCCCAGGCGGATGCTTATCGCGTTAGCTTCGGCACGGCAGGATTGGATACCTGCTACACCAAGCAATCATCGTTTAGGGCTAG
 GACTNACCGATCTAATCCTGTTTGTCCCCAGCTTTCGCGCTCAGCGTCAATTGTTCCAGTGCAGCGGTTT

>CUP1P2D06 Uncultured bacterium (Não classificada)

GGTTCGAATGAGCAGTCTAGTACAACCATTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGCGTGTGATCCGCGATTACTAGCGATT
 CCAGCTTTCAGACTGCAATTCGAGACTGCAATCCGAAGTGAAGCGGTTTTCGCGATTGGCTCCCGCTCGCGGTTGGCCAGCGCTTTGTACGCGCTGTGAGGCGCTA
 TGTGTTGCGCTGGGCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCCTCCCGTTTATCCGAGGCGGTTCCCTTAGGGTGTCTCCCTTGGGGGAGCAACTAA
 GGGTAGGGTGTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGTGCAGCACAGCCATGCAGCACCTATCCAGCGCTCCCTTGGCGGAAGATCTCATCTCT
 GAGACTGTCAACTAGATTTCGAGTCCAGTTAGGTTCTTCGCGTTGCGTGAATTGAACACATGCTCCACCGCTTGTGGGGCCCCCGTCAATTCTTTAGTTTCAG
 CCTTGCAGCCGTACTCCCCAGGCGGAGCACTTAATGCGTTAGCTTCGGCACTGCCGCGTGAAGGGCAACCCAGTGTCTCATCGTTTAGGGCTAGGACTACCGGGT
 TCTAATCCTGTTTGTCCCTAGCTTTCGCGCTCAGCGTCAATTGTTCCAGTGCAGCGGTTT

>CUP1P2D07 Uncultured bacterium (Betaproteobacteria)

GCTTCTGGTGAACCCACTCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGTGACATGCTGATCCACGATTACTAGCGATTCCGACTCCATGC
 AGTCGAGTTGCGACTGCAATTCGAGACTACGACCGGCTTCCAGGATAGTTCGGCTCCCGCTCGCGGTTGGCCAGCGCTTTGTACGCGCTGTGAGGCGCTA
 CCCATAAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCCTCCCGTTTGTACCGGGCAGTCTCATAAAGTGCCTTTTCGTAGCAACTAGTGAACGGGTTGGCT
 CGTTGCGGGACTTAACCCAAAACCTCACGACAGAGTGCAGCACAGCCATGCAGCACCTGTGCCCGGCTCCCTTTCGGGCACTCCACATCTCTGCGGGATTCCGGCG
 ATGTCAAGGGTAGGTAAGGTTAATCCGCTTGCATCGAATTAATCCACATCAACCCAGCAGCTTGTGGGGTCCCGTCAATCCTTTGAGTTGAATCTTTCAGCCTACT
 CCCCAGGCGGTGACTTACCGGTTAGCTGCGTTACCAGAAAATGAATCCCGACAAGTGCAGCATCGTTTAGGGCTGGACTAACAGGTATCTAATCCTGT

>CUP1P2D08 Uncultured bacterium (Não classificada)

GGGAACGTATCACCGCGCGTGTGATCCGCGATTACTAGCGATTCCAGCTTTCATGCGCTCGAGTTGCAGAGGACAATCCGAAGTGAAGCGGCTTTTGTAGATTGGCCA
 AGGCTTTCGCGCTTCGACTCCACTGTCCAGCCATGTTAGCACGTGTGTAGCCAGCCATAAAGGCCATGAGGACTTGACGTCATCCCCGCTTCCCTCCGGCTTGTCA
 CCGGCAAGTTCCCTTCAGAGTGCACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCCTCCTCGTTTATCCGAGGAGTCCACCTAGAGTTCCAGCAGCC
 ATGCAGCACCTGTGACCGGCCAGCGAAGTGAAGGAGCGATCTCTCGCCCCATACCGGCGATGTCAAGAGTGGTAAGGTTCTTCGCGTTGCGTGAATTGAACCA
 CATGCTCCACCGCTTGTGGGGCCCCCGTCAATTCTTTGAGTTTAAACCTTGCAGCGGTTACTCCAGGCGGTTGCGCTTATCGCGTTAGCTGCGACACCAGAAAGGCTA
 AGCCTTCCAAAGCTTACGACCATCTGTTACGGCGTGGACTACCGGGTATCTAATCCTGTTTGTGCCCATGCTTTCGCGCTCAGCGTCAAGTTCAGGTCAGAGAGC
 GCCTTCGCCACCGGTTTCTTCCCAATATCTA

>CUP1P2D09 Uncultured bacterium (Acidobacteria)

GGTCAGCGTGAAGCAGTCTAGTACAATCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGTGTGATCTGATACGCCATTACTAGCGAT
 TCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAAGTGAAGCGGAGTTTTTTCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACAC
 GTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCCCTCCTCGTTTATCCGAGGAGTCCACGTAGAGTTCCCGCTTACGGGTTGGCAACTACG
 TGCAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCTTACTCTTGTCCCTTGCGGGAGGCGGTATTTCTA
 CAGCTGTCAAAGCATTTCCAGCCAGGTAAGGTTCTTCGCGTAGCGTGAATTGAACACATGTTCCACCGCTTGTGGGGCCCCCGTCAATTCTTTGAGTTTACG
 TCTTGCAGCCGTACGCCAGGTTGACGACTTAACCGGTTAGCTCCGGACG

>CUP1P2D10 Uncultured bacterium (Verrucomicrobiae)

GGTTGGCACGGCGACTTCCGGTACAAGCGGCTTCATGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGCGTGTGATGCGCCATTACTAGCGA
 TTCCAGCTTCATGCGCTCGAGTTGCAGAGCACAATCTGAAGTGGGCGGTTTTTGGGGATTGCTCCATCTTGCATCTTGTCTCCCTTTGTCCAGGCAATTTAGT
 CGTGTGACGCTTGGGCGTAAAGGCCATACTGACTTGACGTCATCCCCACCTTCCCTCCTCATTTAGATGAGGAGCTGTCCAGAGTGTCTCAAATCTCGTTGAGT
 GCAACAGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGGAGTGCAGCACAGCCATGCAGCACCTTCCCTTTCGGAATTCGTC
 CCACTTTCATGTTTACTACTTGCATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAGCCACATACTCCACCGCTTGTGCAGGCCCCCGTCAATTCTT
 TGAGTTTAACTTTCGACCGTACTTCCAGGCGGCAATTTATCGCTAAGCTTCGCCAAAGGGGTCGATCCCTTTTACAGCAAAATGCACCCTTACAGCTAG
 GACTACCGGGTATCTAATCCTGTTTGTCCCTAGCTTTCGTGCT

>CUP1P2D12 Uncultured bacterium (Não classificada)

GAGACGGTTACGGCAGAAACCGCTCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGCGGATGATGCGCGATTACTAGCGATTCCAGCTTC
 ATGACTCGAGTTGCAGAGTACAATCCGAAGTGAAGCGGCTTTTTCGATTGCTTGCCTTGCAGGCTTGCAGCGGATTCGACAGCCATGTCAACGCCATTTGTAACAGCTGTGTAGCC
 CAGGATGTAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCCTCCGGTTTACCCCGGAGTTTCCCTCAGAGTTTCCCTCAGAGTTTCCCTGTAACAGGAGCAGG
 GTTGGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGACTGAGGACAGCCATGCAGCACCTGTGCTCCACCCGAAAGTGAAGGACTCTATTTTCCAGGCTTC

ATAGAGGGCATGTCAAATCTGGTAAGGTTCTTCGGCTTGCCCTCGAATTAACCACATGTTCACCAGCTTGTGCGGGTCCCCGTCATTCCTTTGAGTTTTAATCTTGC
 GACCGTACTCCCCAGCGGGATGCTTAACGCGTTAGCTACGCCACCGAGGGGAAACCCCCGACGGGTAGCATCCATCGTTTACAGCGTGGACTACCGGGGTATCTAAT
 CCTGTTTGTATCCCCACGCTTTCGCGCTCAGCGTCAGTTGTCTCCAGATAGCCGCTTCGCCACCGGTTTCTCTTAATATCTACGTATTTACCAC

>CUP1P2E02 Uncultured bacterium (Acidobacteria)

CGCCGATTCTATAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGCGGCTTCTGATCCGCCATTACTAGCGATTCCAGCTTCA
 TGCAGGCGAGTTGCAGCTGCAATCCGAAGTGCAGAACGTTTTTTGGGATTGGCTCCCGCTCGCGGGTGGCAGCCCTTTGTACCGTCCATTGTAGCACGTGTGTAGCC
 CTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCAGGTTATCCCTGGCGGTCTCTCGCAGTTCACCTTTCCGTTATGGCAACACAGGCAAGGGT
 TGCCTCGTTGGCGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCACCTATACTACGGTCCCTTGGCGGAAGGCCTGCTTTCCAGACTGGTC
 CATAGCATTTCGAGCCAGGTAAGGTTCTTCGCGTTGGCTCGAATTAACCACATGCTCCACCCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTCAGCCTTGGAC
 TGTACTCCCCAGCGGCATATTTAACGCGTTAGCTCCGGCACAGACAAATGAATGGCCACACAAATATGCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCC
 TGTGTTGCTACCCACGCTTTCGTGCATCAGCGTCAGTTACGGTCCAGAAAGCCGTTTACACCACCGGTTTCTCTGATATCTACGCATTTCACC

>CUP1P2E03 Uncultured bacterium (Betaproteobacteria)

CCCCCTTGGCGTTAGGCAACCGCTTCTGGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACCGTGACATGCTGATCCAGGATTA
 CTAGCGATTCCGACTTATGACGTCGAGTTGCAGACTGCAATCCGACTACGACCGGCTTCCAGGATTAGCTCCCGCTCGCGGGTGGCAGCCCTTTGTACCGGCCAT
 TGTACGACGTGTGAGGCCCTACCATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCGGTTTGTACCGGCAGTCTCACTAGAGTGCCCTTTCTGTAGCAAC
 TAGTGGCAAGGGTTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCGCTTACCGGTGGC
 TCTCTCGGGATTCCCGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATATCCACCCTTGTGGGGTCCCGCTCAATTCCTTTGAGTT
 TTAATCTTGCACCGTACTCCCCAGCGGTCGACTTACCGGTTAGCTGCGTTACCGAGAAAATGAATCCCGACAAGTGTGACATCGTTTAGGGCGTGGACTACCA
 GGGTATCTAATCTGTTTGTCTCCCNAGCTTTCGTACATGAGCGTCAGTCTCATCCAGGGGGCTACCTTCGCATCGGTTTCTCCACATCTAAGCATTTCACTG
 CT

>CUP1P2E04 Acidobacteria bacterium (Acidobacteria)

CTCCTTGGCGCAGCGTGCAGACTTCTAGTACAACCTCACTTTCGTGATTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGCGTGCATCTGATACGCCATTAC
 TAGCGATTCCGCTTATGACGTCGAGTTGCAGACTGCAATCCGAAGTGCAGAGTTTTTTCCGATTAGCTCCCGCTCGCGGGTGGCAACGGTTTGTGCCCTGCATT
 GTAACACGTTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCGCTTACCGGTGGC
 AACTACGTCGAGGGGTTGGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACAGCTGACGACAGCCATGCAGGCGCTATACTCTGTCCCTTGGCGGAAGGCCAT
 ATTTCTACAGTTTGCAGAAGCATTTCGAGCCAGGTAAGGTTCTTCGCGTAGCGTCAATGAACCACATGTTCCACCCTTGTGCGGGCCCCGTCATTCCTTTGAG
 GTTTCAGTCTTGCAGCCTACTCCCGAGTGCAGACTTAGCCCTTGTAGTCCGGGACGACCCGAAACGGGTTGGCACCCTTCCGATCGGTTTACCGGCTTAGGAC

>CUP1P2E05 Uncultured bacterium (Não classificada)

CTGGGACTTCTAGTCAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGTATCATTCTGATATACCATTTACTAGCGATTCCAG
 TTTACGCGAGCGGAGTTGCAGCTGCGATCCGAAGTGCAGAACGTTTTATGCGATTGGCTCCCGCTCGCGGGTTCGAGCGCTTTGTACCGCCATTGTAGCACGTGTG
 TAGCCCTGGACATAAAGGCCATGACTTGACGTATCCCCACCTTCTCCAACTTATCGTGCAGGCTCTCTGAGAGTGCCCACTGAACGATGGCAACACAGGACA
 AGGTTTGGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCACCTCGACTCTACTCCCTTGGCGGATAACGACGTTTTCCACCGT
 GCTTGAAGGCGCTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACCACATGCTCCACCCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACGCTT
 GCGACCGTACTCCCGGCGGACTTAACCGCTTAGCTCCGCGACAGAGACTGAATGCCTACCCAAGTCCGCATCGTTACGGGCGTGGACTACCAGGGTATCT
 AATCTGTTTGTACCCACGCTTTCGTAAGTACGCGTCAGTAAT

>CUP1P2E06 Uncultured bacterium (Acidobacteria)

CGGTTAGCACACTGCTTCTATACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGCGGCTTCTGATCCGGGATTACTAGCGATTCC
 AGCTTCATGGAGTGCAGTTGCAGACTTCAATCCGAAGTGCAGGCGGCTTTTTCCGATTAGCTCCCGCTCACGGGTTTGGCAGCGTTTGTACCGACCATTTGTAGCACGTTG
 GTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCGCTTATCCGAGCAGTTTCACTAGAGTTCGCGGGTGGACCCGATGGCAACTAGG
 GATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCCTTAAAGGGGAAGGGATGTTTCCA
 CCCCCGCTCTCGATTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACCACATGCTCCACCCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACGCT
 CTTGCGACCGTACTCCCCAGCGGATTGCTTACCGGTTAGCTGCGGCACAGCAG

>CUP1P2E07 Ideonella sp. (Betaproteobacteria)

GGTTAGGCTAACTACTTCTGGCAGAACCCTCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGCGGAAGCTGATCCGCGATTACTAGCGGA
 TTTCCGACTTACGCGAGTGCAGTTGCAGACTGCGATCCGACTACGACCGGTTTTCTGGGATTGGCTCCCGCTCGCGGGTGGCAGCCCTCTGTACCGGCCATTGTATGA
 CGTGTGTAGCCCTACCATAAAGGCCATGAGGACTGACGTATCCCCACCTTCTCCGCTTGTGACCGGCAGTCTCATTAGAGTGCCTTTCTGTAGCAACTAATGAC
 AAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCACCTGTGTCAGGTTCTCTTTCGAGCCTCCACATCTCGC
 AGGATTCTGGCATGTCAAGGGTAGGTAAGGTTTATCGGTTGCATCGAATTAACCACATATCCACCCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTCAACCT
 TCGCGCGTAATCCCCAGCGGTCACCTTCCAGCGTTAGCTACGTTACTGAGAAGGAACCTTCCCAACACAGGTTGACATCGTTTAGGGCGTGGACTACCAGAGTATC
 TAATCTGTTTGTCTCCAGGCTTTCGTGCATGAGCGTCAGTGCAGGCCAGGGGATTGCTTCC

>CUP1P2E08 Uncultured bacterium (Acidobacteria)

CGATTAGCTCCCGCTCGCGGTTTGGCAACCGGTTTGTGCCCTGCATTGTATAACAGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTATCCCCACCTTCTCT
 TCCGTTATCCGGAGCAGTCCAGCTAGAGTTCCCTCTTGCAGTGGCAACTACGTGCAGGGGTTGGCTCGTTGCGGGACTTAACCCAACACTCACGGCACGAGCTGAC
 GACAGCCATGCAGCGCTATACTGCTGCTCCCTTGGCGGAAGGGCGTATTCTACAGTGTGTCAGCAGCATTTCGAGCCAGGTAAGGTTT

>CUP1P2E09 Uncultured bacterium (Não classificada)

ACCCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACCGGCCATGCTGATCCGCGATTACTAGCGATTCTAGCTTCATGGAGTCGGGTGGA
 GACTCCAATCCGAAGTGCAGGTCGGCTTTTTCCGATTAGCTCCCGCTTTCGCGAGGTTTGGCAGCGTTTGTACCGACCATTTGTAGCAGTGTGATGCGCTGGACATAAAGGCC
 ATGAGGACTTGACGTATCCCCACCTTCTCCCGTTGTCCGGGGGTTTCGCTAGAGTGCCCGCATACCGGTTAGCAACTAAGGATAAGGGTTGGCTCGTTGG
 GGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCCCTTGGCGGGCGGATGTTCCACCAGGATTCCACTGCATTTCCAGGCC
 CAGGTAAGGTTCTTCGCGTTGCGTCAATTAACCACATGCTCCACCCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACGCTTGCAGCGTACTCCCGAGGCGG
 AACACTTACGCGTTAGCTCCGGCACG

>CUP1P2E10 Uncultured bacterium (Não classificada)

ATCATGTTTACACAGTACAATGTGTTATCAATTCAAAATACTACTGACGACACTTCAACCAATAATAATCCAGGNCGTGACGGGCGAGTGTGCAAAAATCCAAAAA
 CCTATTACCGCTATCTCGCTGACAGATTACTAGCGATTCCCGCTTCAATTTTCAACTTGCATAAACTAATCGGAACACGACAACTTAAATATTTTTCACT
 TTGCAATTTCACTTTCTTTTGGTATACCATTTGACATATAAAACACCAATCCATAAAGGCGTAAAGATCAGTCTCAACCTTTCACTCGCTTAAACGAGAAATC
 CCTAATTTTAAAGTAAATTTAATAAAAGTACGCTTAATAAATTAATACCGCAAAATCAGAATTTGGCGTTCTGCGCGTTACTGGAATTAACCAACATCTCACAAACAG
 AGCTGATGACGACCATGCAACACCTGGGCAACACCTAGTAATACACTGTTACCAATATATCACACATCTACGAATATCACGGTAAACGTTATCTATCTGCTAGCT
 AGAATCGGTAAGATCAGCGGGTGTCTTCGATTACTTTACATGTTCCACCCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTAAACCTTTGGCATTGTACTCTCCAGG
 CGGAATATTTA

>CUP1P2E11 Uncultured Rhodospirillaceae (Alphaproteobacteria)

CCAGAGTGGCCAGCTTAACTGTATGCAACTGAAGATGAGGGTTGCGCTGCTTGGCGGACTTAACCCAACATCTCACGACACAGGCTGACGACAGCCATGCAGCACCTG
 TTGGACCGCCAGCTGAGAAATGAGACTCTCCACCACTAGCTCCGTTGCAAGAGCTGGTAAGGTTCTTCGCGTTGCGTCAATTAACCACATGCTCCACC
 CTTGTGCGGGCCCCGTCATTCCTTTGAGTTTAACTTGGCGGCTACTCCCGAGCGGTTGTGTTAATGCGTTAGCGCGACACCGAAAGACTAGGTCTCCCGAGC
 TCTAGCACACATCGTTTACAGCGTGGACTACCAGGATCTAATCTGTTTGTCCCGACGCTTTCGCGCTCAGCGTCAGTATCGTCCAGAGAGCGCCCTCCGCCAC
 TGGTGTCTTCCAATATCTACGAATTTACCTTCTACTGGAATTTCACTCTCTCCCGATCTCAAGCATCCAGTCCCAATGCTGTTCCAGGTTAAGCCCG

GGGCTTTCACATCTGACTTGAATGGCCGCTGCGCGCCCTTACGCCAGTAATCCGAACAACGCTTGCCCCCTTCGTATTACCGCGGGCTGGCACTCAGTCAGTCA
A

>CUP1P2E12 Uncultured bacterium (Alphaproteobacteria)

TAAAGCCAACCTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGACGCTGCTGATCTGCGATTACTAGCGATTCCAACCTTCATGTGCTCGAG
TTGCAGAGACAAATCCGAAGTCGAGACGGCTTTTGTAGATTGCGCAGGATCGCTCATTCACCTCCACTGTACCGCCATGTAGCACGCTGTAGCCAGCCGTAAG
GGCCATGAGGACTTGACGTCATCCACCTTCTCGCGGCTTATACCCGGCAGTCCCCTTAGAGTGCCCAACTGAATGATGGCAACTAAGGGCGAGGTTGCGCTCGTT
GCGGGACTTAACCAACATCTCAGCACAGAGCTGACGACAGCCATGACGACCTGTCTCCGGTCCAGCCGAAGTGAAGGGATCGATCTCTCGTCCCGCGACCCGGAT
GTCAAGGGCTGGTAAGGTTCTTCCGCTTGCTTCGAATTGAACCACATGCTCCACCCGCTGTGCGGGCCCGCTCAATTCTTTGAGTTTAACTTGCAGCCACTCC
CCAGGGCGGATGCTTAAAGCGTTAGCTGCGCCACTGACGAGCAAGCTCGCAACGGTAGCATCCATCGTTTACAGCGTGACTACCAGGATCTAATCTGTTTGT
CCCCAGCTTTCGCACTCAGGCTCAGTACCGGGCCAGTGAG

>CUP1P2F01 Uncultured bacterium (Acidobacteria)

GCGTCTGCTCCTTGCGGTTAGCGCGACGACTTCTAGTACAGCTCCTTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTATGCAGTGCAGTTCAGACTGCAATCCGAAGTGCAGAGGTTTTTCCGATTAGCTCCCGCTCGCGGTTGGCAACGTTTTGTGC
CTGTGATTGTAACACGCTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCTTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTG
CGAGTGGCAACTACGTGCAGGGTTGCGCTCGTTGCGGGACTTAACCAACACTCAGGCACGAGCTGACGACAGCCATGACGCGCTATACTCTGTCCTTGGCGGG
AAGGCCGTAATTTCTACAGCTGGTCAGAAGCATTTCGAGCCAGGTAAGGTTCTCGCGTAGCGTCAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCGCTCAAT
TCTTTGAGTTTCAGCTTTCGCGACCTACTCCCCAGGTGACGACTTAACGCGTTAGCTCCGGGACGACCCGAACGGGTGGCACCCCAAGTCTGATCGTTTAGGGC
TAGAATACCAGGATCTAATCTGTTTGTCTCCCTAGCTTTCGTTCTCAGCGTCAGTAATGGTCCAGCGC

>CUP1P2F02 Uncultured bacterium (Acidobacteria)

GCGTCTGCTCCTTGCGGTTAGCGCGAGACTTCTAGTACAGCTCCTTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACGGCGTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTATGCAGTGCAGTTCAGACTGCAATCCGAAGTGCAGAGGTTTTTCCGATTAGCTCCCGCTCGCGGTTGGCAACGTTTTGTGC
CTGTGATTGTAACACGCTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCTTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTG
CGAGTGGCAACTACGTGCAGGGTTGCGCTCGTTGCGGGACTTAACCAACACTCAGGCACGAGCTGACGACAGCCATGACGCGCTATACTCTGTCCTTGGCGGG
AAGGCCGTAATTTCTACAGCTGGTCAGAAGCATTTCGAGCCAGGTAAGGTTCTCGCGTAGCGTCAATTGAACCACATGTTCCACCGCTTGTGCGGGCCCGCTCAAT
TCTTTGAGTTTCAGCTTTCGCGACCTACTCCCCAGGTGACGACTTAACGCGTTAGCTCCGGGACGACTTCCGAACGGGAAGGCCCAAGTCTGATCGTTTAGGGC
TAGAATACCAGGATCTAATCTGTTTGTCTCCCTAGCTTTCGTTCTCAGCGTCAGTAATGGTCCAGCGC

>CUP1P2F03 Uncultured bacterium (Acidobacteria)

GAATCACC GGCTTCTAGTACAACGGGCTTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCTGCTGTGATCAGCGATTACTAGCGATTCCA
GCTTCTATGAGCTGAGTTGCAGACTCAATCCGAAGTGCAGAGGTTTTTGTAGATTGGTCCCGCTCGCGGTTTTCGACTCTTTGTGCCACCCATTGTAGTACGTTG
GTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTTCCGTTTTCACCGGAGTCCCCTTAGAGTGGCCAGCTTGACCTGTGGCAACTAAG
CGAGGGTTGCGCTCGTTGCGGGACTTAACCAACACTCAGGCACGAGCTGACGACAGCCATGACGACCTCGACTAGTGTCCCTTGGCGGAAAAGGATGTTCCAC
CCCTGTACCAGCGCTTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTCGAATTAACCACATACTCCACCGCTTGTGCGGGCCCGCTCAATTCTTTGAGTTTCAGCC
TTGCGACCTACTCCCCAGGGGATACTTAATGCGTTAGCTTCCGACGACTGATTAATCCAGTCCAGCAGCAAGTATCCATCGTTTAGGGCTAGGACTACCAGGTT
ATCTAATCTGTTTGTCTCCCTAGCTTTCGCGCTCAGCTCAGCTCTGTCCAGATAGCCGCTTGG

>CUP1P2F04 Uncultured bacterium (Anaerolineae)

GCACTGGTCTCCTTGCGGTTGCTGCTGACTTCAGCGCTGACCGCTCCCATGACGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGTATGGTGACC
TGCGGTTACTAGCAACTCCGACTTTCATGAGGGCGGGTTGCAGCCCTCAATCCGAAGTGCAGACCGGCTTTGTTGGATTGGCTCCGCTTGCGGCTTGGCGACCCATTGT
ACCGGCCATTGTAGCGTGTGTAGCCCTGGATATAAAGGCCATGCTGACTGACGTCATCCCCACCTTCTTCCGCTTGTGACGGGCGAGTCCGGTTACAGACAGTATAA
GTAAACCCCGGGTTGCGCTCGTTACAGGACTTAACCTAACCTCAGCAGCTGACGACAGCCATGACGACACTGACCGCTTCCAGCGCTTGTGCGGGCCCGCTCAAT
GGTTCGCTACTAGCCGATGTCAAACCCAGGTAAGGTTCTTCCGTTAGCTTCCGACGACTGATTAATCCACACGCTCCGCTGCTTGTGCGGGCCCGCTCAATTCTTTGAGTTTT
AACCTTGCAGCTACTTCCAGGTTGCTGACTTATCGCTTGGTTCGGCACCCAGCGGGTTGAGACCCCGACGCTAGTTCGACATCGTTTACGGCATGGACTACCG
GGG

>CUP1P2F05 Burkholderia sp. (Betaproteobacteria)

CTACGTGGTACGCTCCTTTCGCGTTAGACTAGCCACTTCTGGTAAACCCATCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGCATGC
TGATCCGCGATTACTAGCGATTCCAGCTTACGCGAGTGCAGTTCGAGACTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACTCGCGGTTGGCAACCC
CTGTTCGCGACTTGTATGACGTTGTAAGCCCTACCCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTTCCGCTTGTGACGGGCGAGTCTCCCTGGAGTGT
CTTGGCTAGCAACTAGGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCAGCAGCAGCTGACGACAGCCATGACGACACTGTTGTGATGGCTCCCTTTC
GGGACCCCGACTCACCAGGGTTCCATCCATGCAAGGTTAGTAAAGTTTTTTCGCTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGTCA
ATTCCTTTGAGTTTTAATCTTGCAGCCGACTTCCAGCGGTTCACTTCCAGCGTTAGCTACGTTACCAAGCCAATGAAGGCCCGCAACAGTGTGACATCGTTTAGG
GCGTGACTACCAGGATCTAATCTGTTTGTCTCCCAAGCTTTCGTCATGAGCGTCAGTA

>CUP1P2F06 Dyella japonica (Gammaproteobacteria)

TCCGTTGGTCCGCTCCCTTTCGCGTTAGACTAGCCACTTCTGGGAAACCCATCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCAGCATAG
CTGATTCGCGATTACTAGCGATTCCGACTTTCATGAGTGCAGTTCGAGACTCCAATCCGACTGGGATCGGCTTCTGGGATTGGCTCCACTCGCGGTTATGCAACCC
TCTGTACCAGCAATTGTAGTACGTTGTAGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCTTCCGCTTGTGACGGGCGAGTCTCCTTAGAGTTT
CACCATTACGTTGCTGGCAAGGTTGCGGCTTTCGAGCAAGGTTGCGCTCGTTGCGGGACTTAACCCAACTCAGCAGCAGCTGACGACAGCCATGACGACACTGTTGTGAT
TCCGAAGGCATCCCGCATCTCGAGGATTCCAGACATGTCAGGCCAGGTAAGGTTCTTCCGCTTGCATCGAATTAACCACATACTCCACCGCTTGTGCGGGCCCG
CCGTCATTCCTTTGAGTTTTCAGTCTTGCAGCCGACTTCCAGCGGTTCACTTCCAGCGTTAGCTACGTTACCAAGCCAATGAAGGCCCGCAACAGTGTGACATCGTTTAGG
CGTTTAGGCGTGGACTACCAGGATCTAATCTGTTTGTCTCCCAAGCTTTCGTCATGAGCGTCAGTA

>CUP1P2F07 Uncultured bacterium (Não classificada)

GGTTGCAATGACGACTTCTAGTACAACCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCGCGCGTACTGATCCGCGATTACTAGCGAT
TCCAGCTTCATGCGTGCAGTTCGAGACTGCAATCCGAAGTGCAGACCGGTTTTTGTGCGATTGGCTCCCGCTCGCGGTTGGCTACGCTTCTGACCGCCCATGTAGCAG
GTGTTGCGCTGGGCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTTCCGTTATCCGAGGCGGTTCCCTTAGGGTGTCCCTTGGGGCGAGCAACTA
AGGGTAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCAGCAGCAGCTGACGACAGCCATGACGACACTGTTGTGATGGCTCCCTTCCAGCGCTTGTGCGGGCCCGTCAAT
TGAGACTGTCAACTAGATCTCGAGTCCAGGTAAGGTTCTTCCGCTTGCCTCGAATTAACCACATGCTCCACCGCTTGTGCGGGCCCGCTCAATTCTTTGAGTTTCA
GCCTTGCAGACTTCCAGCGGAGCACTTAATGCGTTAGCTTCCGACTGCGCGTTGAAGGGCAAAACCAAGTGTCTATCGTTTAGGGCTAGGACTACCA

>CUP1P2F08 Uncultured bacterium (Acidobacteria)

GGCGTGTCTCCCTTTCGCTCAGCGCACGACTTCTATGCAACCCTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGCGATTCTGATCCGC
GATTACTAGCGATTCCAGCTTCTAGTGCAGTTCGAGACTCAATCCGAAGTGCAGACCGGTTTTTCCGATTAGCTCCCGCTCAGGGTTTTCGAGCGTTTTGTACCG
GCCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTTCCGTTATCCGAGGCGGTTCTGTCAGAGTGTCAACTAAA
TGGTAGCAACTGAAGATAAGGTTGCGCTCGTTGCGGGACTTAACCCAACTCAGCAGCAGCTGACGACAGCCATGACGACAGCCATGACGACACTATACTACGGCCCTTTCGCGGG
AAGGAAATTTCTACTCCCGTCCATAGACTTTCGAGCCAGGTAAGGTTCTTCCGCTTGGCTCGAATTAACCACATGCTCCACCGCTTGTGCGGGCCCGCTCAATTC
CTTTGAGTTTTCAGCTTTCGCGACCTACTCCCCAGGGGACTGCTTAACGCGTTAGCTACGGCAGCGGGATTGGTACCGCTCACACCAAGCAGTCACTGTTTAGGGC
TAGGACTACCAGGATCTAATCTGATGCTCCCTAGCTTTCGTCATCAGCGTCAGTATGGTCCAGTGAACCGCTTTCGCCAC

>CUP1P2F09 Uncultured bacterium (Não classificada)

TACTTAGACGGTCCCTCTTTCGAGTTAGGCCACGGCTTCCGGTGCAGCAATTCAGTGTACTGACGGGTTGTGTACAAGGCCCGGGAACGTATTACCGCGATT
TAGCTGACCTGCGGTTACTAGCGATTCCAGCTTTCATGAGCGGAGTGCAGCTGCAATCCGAAGTGCAGACCGGTTTTTGTGCGATTGGCTCCCGCTCAGGGATCGGG

CGCTCTGTCGCGCTCCATTGTAGCATGTGTGAAGCCCCAGGCGTAAGGGCCATGCCGACTTGACGTATCCCCACCTTCTCCCGCTTGACGGGGCAGTTCCGTAAGAG
 TTCGCCACTTTACGCTGGCAACATACCGTTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGAGCTGACGACAGCCATGCAACACCTGTCTTCGGG
 CTTGCTTGGCAAGGGGACTTTTCCAGCCCTTCCCTCGATGTCAAGCTGGGTAAAGTTCTTCGGTTAGTGACGAATTAATCCACATGCTCCACCGCTTGTGCGGG
 CCCCCGTCAATTCCTTTGAGTTTCAACCTTGGCGGCTACTCCCCAGGCGGAGTGCTTACTGCGTTGGCGACGGCACCCGGGGGTCGATACCCGAACACCTAGCACT
 CATCGTTTACGGCGTGGACTACCGGGTATCTAATCCCCG

>CUP1P2F10 Acidobacteria bacterium (Acidobacteria)

GGTCAGCGCACCGGCTTCTAGTACAGCCACTTTCGTGATGTGACGGGGCGTGTGTACAAGGCCCGNGAACGTATTCACCGCAGCGTGTGATCTGCGATTACTAGCGA
 TTCAGGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACCTGAGGATGACTTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCACGGTTTGTATCACCATTGTAGCA
 CGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCCGTTATCCGGGGCGGTTTCCGACAGTGCACCACTAAATGATGGCACTG
 GCAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGAGCTGACGACAGCCATGACGACCTACGACGAGTCCCTTTCGGGAAAGCGATATTC
 TACCGCAGTCCACTGCGCTTCGAGCCAGTAAGTTCTTCGGGTTGCGTCAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTCA
 GCCTTTCGACCGTACTCCCCAGGCGGATTGCTTATCGGTTAGCTTCGGCACAACAGGATTGGGTACTGTTACACCAAGCAATCATCGTTTAGGGCTAGGACTACCAG
 GGTATCTAATCTGTTTGTCTCCCTTAGCTTTCGCGCC

>CUP1P2F11 Uncultured bacterium (Não classificada)

GACGGCTGGCTCCTTTCGGGCTACCCACCGGCTTCGGGTGACGACAACCTCAGGTGACGTGACGGGGCGTGTGTACAAGGCCCGGAAACGTATTCACCGCAGTTTCGCTG
 ACCTGGGTTTACCAGGCTTCCGGCTTCATGCAAGGCGAGTTGACGCTGCAATCCGAACCTGAGAACGGATTTCCTGAGATTGCCTCACCTCACGGTCTCGGATCCCTCT
 GTGCACCGTCCATTGTAGCATGTTTGTAGCCAGGATGTAAGGGCCATGCTGACTTGACGTCTCACCTTCTCCGAGTTACCCCGGCGAGTTCCCAAGAGTTCC
 GTCTTACGCGCTGGCAACATGGGATGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGAGCTGACGACAGCCATGACGACCTGTGTGCGTGTCC
 CCTTGGGGGAAGGCTACTTTCATAGCATAGCACGCCATGTCAAACCTGGTAAGTTCTACGGTTAGTGACGTATTAAGCAACATGCTCCACCGCTTGTGCGGGCCCC
 CGTCAATTCCTTTGAGTTTCAACCTTGGCGGCTACTCCCCAGGCGGATACTTACTGCGTTAGCGGGCGCACCGGGGGTTCGATACCCCGACACCTAGTATCCATC
 GTTTAGGGCTGGACTACCGGGTATCTAATCCCGTTTGTCTCCCGAGCTTTCGCGCTCAGCGTCAAGTGTGCCCCAGGAGACCGCTTCGCCACTGGTGTCTTACC
 GATATCTACGCATTTTACC

>CUP1P2F12 Uncultured bacterium (Acidobacteria)

TAACCTCATGCCGGGATTGTCAGCGACAATCCGAACCTGAACAGACTTATCCGATAGCTCCACCTTACGGTCTCGCGACGGTTTGTATCTGCCATTGTAGCACGTGTGTA
 GCCCAGACATAAAGGCCATGCTGACTTGACGTATCCCCACCTTCTCCGGTTTATCACCTGGCAGTCTCTGCGAGAGTTGCCACCATAACGTGATGGCAACAGCAGA
 CAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGAGCTGACGACAGCCATGACGACCTCTACGAGTGTCTTTCGGGAAGCTACTTTCGTGAGTG
 GTCACCTCGCTTTCAGCCCTGGTAAGTTCTTCGGGTTGCGTCAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTCAAGCCTTGC
 GACCGTACTCCCCAGGCGGAATGCTTAAATGCGTTAGCTTTCGGCAGGCGAGGATCGATACCCGGCACACCAAGCAATTCATCGTTTAGGGCCAGGACTACCGGGTATCT
 AATCCCGTTT

>CUP1P2G01 Uncultured bacterium (Acidobacteria)

GGTTAGCACACCTGCTTCTAGTACGCCCTTCTGTGATGTAAAGCGGGCGTGTGTACAAGGCCCGGAAACGTATTCACCGCGGCTTCTGATCCGCGATTACTAGCGA
 TTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACCTGAGGCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCACGGTTTGTACCGACCATTTGTAGCA
 CGTGTGTAGCCCTGGCAATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCCGTTTATCCGAGGCGAGTTTCACTAGAGTGCCTGGCTTACCCGATGGCAAC
 TAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGAGCTGACGACAGCCATGACGACCTTGTGCGGGCCCCGTCATTCCTTTGAGTTT
 TCCACCCAGTCTCTGCAATTCGAGCCAGGTAAGTTCTTCGGGTTGCGTCAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTT
 CAGCCTTGGCAGCGTACTCCCCAGGCGGATTGCTTATCGGTTAGCTGCGGCGACAGGAGATTGGATACCTGCTACACCAAGCAATCATCGTTTAGGGCTAGGACTACC
 AGNGTATCTAATCTGTTTGTCTCCCTTAGCTTTCGCGCTCAGCGTCAGTTATGGTCCAGTGCAGGCTTTCGCCACAGTGTCTCCCGATATCTACGCAT

>CUP1P2G02 Uncultured bacterium (Não classificada)

GCTCAGGGTTGCGACTTCGTGGTGTGACGGGCGGTTGTGTACAAGGCCCGGAAACGTATCACCGTGGTGTGCTGACCCACGGTTACTAGCAACTCAGCCTTACGCGAGG
 GAGTTGCAGCCTGCCATCCGAACCTGAGACCGCTTTTTGGGATTGGCTCCCCGTCGCGGTTGCTTCTACTGTCGCGGCCATTGTAGCGTGTGTGTCGCCAAAGACGT
 CGGGGCGGCTGCTGACTTGACGTATCCCCACCTTCTCCACGTTACTCTGCGGAGTCTGGTGGGACTTATAACCGACACAGGGGTTGCGCTCGTTGCGGGACTTAA
 CCCAACCTCAGCGCACGCTGATGACAGCCATGACGACCTGACGACCTGTCGCGCTTCCCGAAGGAAGCCCTCGTCTCCGAGGCTGACGCGCATGTTCCGATTCGGAAGG
 TTCTTCGCGTTCGCTTCAATTAAACACAGCTCCGCTGCTTGTGCGGGTCCCCGTCATTCCTTTGAGTTTAAATCTTGCAGCCGACTCCCCAGGCGGACACTTAT
 TCGCTTTCGCTGCGCACGAGCGGGTTCGATACGCCGCACACCTAGTGGTTCATCGTTTACGGCCAGGACTACCGGGTATCTAATCCCGTTCGTTCCCTTGCTTTCGCG
 CCTCAGCGTCAGGTGCCATCCAGGACACTGCTTTCGCTTTCGCTTTCGCGGATCTCT

>CUP1P2G03 Uncultured bacterium (Gammaproteobacteria)

GGTTAGACTACCGCTTCTGAGCAACCACTCCATGGTGTGACGGGCGGTTGTGTACAAGGCCCGGAAACGTATCACCGCGACAATGCTGATTTCGCGATTACTAGCGA
 TTCCGACTTCACGGAGTCGAGTTGCAGACTCCGACTGAGAGAGATTTTCTGGGATTGGCTTACCTTCGCGGCTTCGCAACCTCTGATATCTCCATTGTAGTA
 CGTGTGTAGCCCTGGCTGTAAGGGCCATGATGACTTGACGTATCCCCACCTTCTCCCGTTTGTGACCGGCGAGTCTCCCTAGAGTTCCCAACCATGACTGCTGGCAAC
 TAGGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGAGCTGACGACAGCCATGACGACCTGTTTCCGATTCGGAAGGCACTCCGCAATC
 TCTGCAGGATTCGCGACATGCAAGACCAGGTAAGGCTCTGCGGTTGCAATCGAATTAACACATACTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTT
 AGTCTTGCAGCCGACTCCCCAGGCGGCAACTTAACCGGTTAGCTTCGACACTGAGTGGCTAAGTCCACCAACGTCAGGTTGCGATCGTTTAGGGCGTGGACTACCA
 GGGTATCTAATCTGTTTGTCTCCCGACTTTCGTGCTCAGCGTCCAGTCTGGTCCAGATGGCC

>CUP1P2G04 Uncultured soil bacterium (Alphaproteobacteria)

GGGCGGTACCCCTTTCGGGTTGGCGCACCCGACTTAAGGCCAAACCACTCCCATGGTGTGACGGGCGGTTGTGTACAAGGCCCGGAAACGTATTCACCGCGGCTAGCTGA
 TCCGATTACTAGCGATTCCACTTATGCACTCGAGTTGAGAGTGCATCTGAACCTGAGACGGCTTTCGGGATCGGCTCGGCTCGGACCTGGCATCCCGCTGTCA
 CCGCATTGTAGCACGTGTGAGCCAGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCCGGTTGTGACCGGCGAGTTCCTTCAGAGTGGCCACCA
 AACGCTGCGCAACTGAAGCGGAGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGAGCTGACGACAGCCATGACGACAGCCATGACGACCTGTCGCGGAGGCGCTTGC
 GGAACACTCATCTGAGTGCCTCCCATGTCAGCCCTGGTAAGGTTCTGCGGTTGCTTCGAATTAACACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTT
 TCCCTTTGAGTTTCAACCTTGGCGGCTACTCCCCAGGCGGTTGCTTATCGGTTAGCTACGACACTGAAGGGCTAGGCCCCCAACATCCAGCACACATCGTTTACA
 G

>CUP1P2G05 Dyella marenensis (Gammaproteobacteria)

CAAGGCCCGGAAACGTATTCACCGCAGCATAGCTGATCTGCGATTACTAGCGATTCCGACTTCATGAAGTCGAGTTGCAGACTTCGATCCGGACTGGGATCGGCTTCT
 GGGATTGGCTCACCTTCGCGGCTTGCACACCTCTGTACCGACCATGTAAGTACGTTGTAGCCCTGGCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCTCT
 CCGGTTTGTACCGGCGAGTCTCTTAGATCCCCACCTTACGTGCTGGCAACTAAGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGGAGC
 TGACGACAGCCATGACGACCTGTGTTCTGATTCCCGAAGGCACTCCGACTCTCTGACGAGATTCCAGACATGTCAGGCGAGTAAAGGTTCTTCGCGGAGGCTCGAAT
 TAAACACATACTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTCAAGTCTGCGACCGTACTCCCCAGGCGGCAACTTAACCGCTTAGCTTCGACACTGA
 TCTCCGAGTTGAGACCAACATCCAGTTCGCATCGTTTAGGGCGTGGACTACCAGGATATCTAATCTGTTTGTCTCCCAAGCTTTCGTGCTCAGCG

>CUP1P2G06 Uncultured Holophaga (Acidobacteria)

TCTGATACGCCATTACTACGATCGGCTTCATGCACTGAGTTCGAGATGCAATCCGAACCTGAGCGGCTTTCGATTAGCTCCCCCTCACGGGTTCCGCGAGGTTTGT
 ATCGCGCATTTGAACACGTTGTGATGCCCTGGACAATAAAGGCCGCTGCTGACTTTGACGTCATCCCCACCTTCTCTCCGNTTATCCGGAGCAGTCTCTTTAGAGTTCC
 CCTTTCGCGGTTGGCAACTAAGAGTAGGGTTCGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCACAGAGCTGACGACAGCCATGACGACAGCCATGACGAGGCTTCT
 TCGGAGAAGCGATGTTTCCACCGCTTGGTACCGGCACTTCAGCCAGTAAAGGTTCTTCGCGTTGCTGCAATTAACACATGTCAGGCGTACTCCCCAGGCGGCAACTTAACCGCTTAGCTTCGACACTGA
 TCAATTCCTTTGAGTTTACGCTTTCGACCGTACTCCCCAGGCGGAGGACTTAACCGCTTAGCTTCGCGGACGACCGGCAACCGGGGCTTCCCAAGTCTGATGGTT
 TAGGGCTAGGACTACCAGNGTATCTAATCTGTTTGTCTCCCTAGCTTTCGT

>CUP1P2G07 Uncultured bacterium (Não classificada)

AGGTGTACGGCTTCCATGGTGTGACGGGGCGTGTGTACAAGACCGGGAACGTATCACCGCAGTGTGTGACCTGCGATTACTAGCAACTCCACCTTCATGGCGGGGG
 TTGCAGCCGCCAATCTGAAGTGGGGNGCTTTGCTGGGATGGGTAGGCGTGCCTTGTGCGCCGTTGTACCAGCCATTGTAGCGTGTGTAGCCCGGGACGTAAAGG
 CGCGTGTAGCTTGCAGCTTCCCACTTCCCTCCGGTGGCGCGGCGAGTCTCGCTGGAAAAATACAACCAGCGACAGGGGTTGCGCTCGTTAGGGGACTTAACCCAAAC
 ACCTCACGGCAGAGCTGACGACAGCCATGACGACCTGTGCCAGCGTCCCTTGGGGTACGAGCATCTCTGCCCGTGGCTGGCATGTCAAACCCCGGTAAGGTTCT
 TCGCGTTCATCGAATTAACACACAGCTCCGCTGCTGTGCGGGTCCCGTCAATTCCTTTAGTTTTAATCTTGCAGCCGACTCCCAAGCGGCTTACTTATGCGT
 TAGCTGCGACAGACAGGCTGAAACTGCCTCTATCTAGTAGACATCGTTTAAACGCGTGGACTACCAGGGTATCTAATCTCTTGGCTCCCAAGCTTCCGCGCTGA
 CGGTACGACAGTCCGCGAGGCGATTGCCTTCGCCATTGGTGTACTTCCGGATCTCTACGCATTTACCCTTCCACCCGGAGTTCCATGCCCTCTCCGACGCTCAA

>CUP1P2G08 Uncultured bacterium (Verrucomicrobiae)

CATACTTCGGCACTTAAGGGGCGACTTCGGGTAACCGGCTTCATGATGTGACGGGCGGTGTACAATGCCTGGGAACGTATCACGGCGCGGTAGCTGATGCGCCAT
 TACTAGCGATTCCAGCTTCATGCTGTGAGTTGACAGACAACATCTGAAGTGGGCGCGGTTTTTGGGGATTGCTCCACCTTACGGTCTCGCTTCCCTCTGTGCGGGG
 ATTTGTAGTACGTGTGACGCGCTGGTCTGAAGGGCCATACTGACTTGCATCTCCCACTTCCCTCGTGTGAAGCGAGGCGAGTCTGTCCAAAGTGGCTCAGCCCTC
 GGCGGGTGGCAACAGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGAACAGAACTGACGAAAGCCATGCAGCACCTGTGCAAGCTCCCTTTG
 CGGGTTCGTCACCTTTCATGTTTACCACCTTGCATGTCAAGACAGGTAAGGTTCTTGCCTGTCATCGAATTAAGCCACATACTCCACCGCTTGTGACGGCCCCG
 TCAATTTCTTGAAGTTTTAATCTTGCAGCCGACTTCCAGCGCGGCTATTAAATGCGTTTGCATCGCCACAAAAGGGGTCGATTCCTTTTACAGCAAAATACGACCGT
 TTACGGCTAGGACT

>CUP1P2G09 Uncultured bacterium (Não classificada)

GCACCGGCTTAGTACAACCCACTTTCGTGATGTGACGGGCGGCGTGTACAAGGCCCGGGAACGTATTCACCGCGCGGTGCTGATCCGCGATTACTAGCGATTCCAGCT
 TCATGACGAGTTCGAGTTCGAGCTGCAATCCGAACTGGGCGCGGTTTTTCCGATTAGCTCCCTTCCGCGGTTTTGCCACGGTTTTGTACCGGCCATTGTAGCAGTGTGTA
 GCCCTGGACATAAAGGCCATGAGGACTTGCAGTTCATCCCACTTCCCTCCGTTTACCGGGGAGTTTTGCTAGAGTGCAGCGCTTGCAGCTTGGCAAGTACGGGATA
 AGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGACTGACGACAGCCATGACGACCTCCGCGAGTCTCTTGGGAGAAAGGGATTTCACCCCG
 GGTCCACTGCGCTTCGAGCCAGGTAAGGTTCTTCCGCTGCGTGAATTAAGCCACATGCTCCACCGCTTGTGCGGGCCCCGTCAATTCCTTTGAGTCTCAGCCTG
 CGACCGTACTCCCCAGCGGAATGCTTATCCGTTAACTTCCGCGACGATCGGAATGGATACCATCACACCAAGCATTATCAG

>CUP1P2G10 Uncultured actinobacterium (Actinobacteria)

TTTCGAGCGCTCCTTCCTTCCGTTAGGCCACCGGCTTCGGGTTTACCAACTTTCGTGTTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCCCGCGGTAGC
 TGATCCGGGATTACTAGCGACTCCGACTTCATGGAGTCGAGTTGACGACTCCCAATCCGAACTGAGACCGGCTTTTTGGGATTTCGCTCCTCTCGCGGATTAGCAGCCCT
 TTGTACCGGCTTTGATGACATTTAGCAGCCCTACGCGTAAGGGGCTGACGACTTGCATCTCCCACTTCCCTCCGAGTTGACCCCGGCGAGTCTCCTACGAGTCCC
 CGCATTAACCCGCTGGCAACAGGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGACTGACGACAGCCATGACGACCTTCCGCGAGTCTCAGCAGCC
 TTTCGACACCGTGTCTCCACCGCTTTCCTCGCTAGTTCAACGTAAGGTTTCTTCCGCTGTCATCGAATTAAGCAACATGCTCCGCGCTTGTGCGGGCCCCGT
 CAATTCCTTTGAGTTTTAGCCTTGGCGCGTACTCCCAAGCGGGGCACTTAATGCGTTAGTACGGCACAGAGAGC

>CUP1P2G11 Uncultured bacterium (Acidobacteria)

ATACTTAGGCACTCCCGCTCGGGTAGCGAGTACTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGCGCT
 GCTGATCCCGGATTACTAGCGATTCCAACCTTCATGACGGCGAGTTGACGCTGCAATCCGAACTGAGACCGGCTTTCCTCGGATTAGTCCCTCTTGGGAGATCCGCGAG
 GTTTGTACCGGCTTTGATGACAGCTGTGAGCCCGAGACATAAAGGCCATGCTGACTTGCATCTCCCACTTCCCTCCGTTTATCACCGCGAGTCTCCGCGAGTGT
 CCCACATAACGTGATGGCAACAGGACTTGCCTCGTTGCGGGACTTAACCAACATCTCACGACAGGACTGACGACAGCCATGACGACCTTCCGAGCTCCG
 CCCTTGGGGGAGCTGCTTTCGAGGATGTCCAAATGCCGTTTCGAGCCTGGGTAAGGTTTCTTCCGCTGCGTGAATTAAGCCACATGCTCCACCGCTTGTGCGGGCCCC
 CGTCAATTCCTTTGAGTTTACGCTTTCGACCGTACTCCCAAGCGGAATGCTTAATGCGTTAGCTTCCGCGAGGCGAGGATCGATACCGGNCANACCAAGCATTATC
 GTTAGGGCTAGGACTACCGGGATCTAATCCCGTTTGTCCCTAGCTTTCGCGTTACGCGTCAATGTCGGTCCAGGATGCCCGCTTCCGACCGGATTCCTCCA
 GATATCTACGC

>CUP1P2G12 Uncultured Verrucomicrobia (Verrucomicrobiae)

CATACTTCGGCACTGTCTCCTTTCGGTTACACATTGACTTCGGGTAACAACCGGCTTCATGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGCGCT
 AGCTGATGCGCATTACTAGCGATTCCAGCTTCATGCCGTCGAGTTGACAGACGACAATCTGAGCTGGGCGCGTTTTTGGGGATTGCTCCACCTTGCGGTCTCGCTTC
 CTTGTGACCGGCTTTGATGACAGCTGTGAGCCCGAGACATAAAGGCCATGCTGACTTGCATCTCCCACTTCCCTCCGTTTATCACCGCGAGTCTCCGCGAGTGT
 CCCACATAACGTGATGGCAACAGGACTTGCCTCGTTGCGGGACTTAACCAACATCTCACGACAGGACTGACGACAGCCATGACGACCTTCCGAGCTCCG
 CCCTTGGGGGAGCTGCTTTCGAGGATGTCCAAATGCCGTTTCGAGCCTGGGTAAGGTTTCTTCCGCTGCGTGAATTAAGCCACATGCTCCACCGCTTGTGCGGGCCCC
 CGTCAATTCCTTTGAGTTTACGCTTTCGACCGTACTCCCAAGCGGAATGCTTAATGCGTTAGCTTCCGCGAGGCGAGGATCGATACCGGNCANACCAAGCATTATC
 GTTAGGGCTAGGACTACCGGGATCTAATCCCGTTTGTCCCTAGCTTTCGCGTTACGCGTCAATGTCGGTCCAGGATGCCCGCTTCCGACCGGATTCCTCCA
 GATATCTACGC

>CUP1P2H01 Uncultured bacterium (Não classificada)

CGACGCTGCTCTCTTGGAGTTAGCCAGCGGCTTCAGGGGTTGCGGACTTTCGTGTTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACNGTGGTGTG
 TGCACCGGTTACTAGCAACTCCGCTTCAGCGAGGCGAGTTGACGCTGCCATCCGAACTGAGACCGGCTTTCGAGATTGCTCCCGTCCCGGTCGCTTCCTTA
 CTGTCGCGGCAATTGTAGCGTGTGTGCGCCAGGAGCTCGGGCGGTGCTGACTTGCATCTCCCACTTCCCTCCAGTTACTCGTGGCAGTCTGGTCCGACACTT
 ATAACCGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGACTGACGACAGCCATGACGACCTTGCAGGCTTCCCGAGGAAAGGCTCG
 CTTCCGAGTGTCTCAGGCGCATGTAAGGTTTCTTCCGCTGCTTCAATTAACCAACAGGCTCCGCTGCTTGTGCGGGTCCCGCTCAATTCCTTGTAGT
 TTTAATCTTGGACCGTACTCCCAAGCGGACACTTATTGCGTTTGCCTGCGCACGCGGTCGATACCGCGCACCTAGTGGTTCATGTTACGGCCAGGACTA
 CCGGGTATCTAATCCCGTTTCGCTCCCTGGCTTTCGCGCTCAGGCTGCTCCAGGACACTGCTTCCGCTTGGTGTCTCCGGATCTCTACGCATTTCA
 CCGTCCACCGGATTCATGCTCTGAGGCTCCAGT

>CUP1P2H02. Burkholderia sp. (Betaproteobacteria)

GGTTAGACTAGCCACTTCTGGTAAAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTACTCACCGCGCATGCTGATCCGCGATTACTAGCGA
 TTCCAGCTTACGCGAGTTCGAGTTGACGACTGCGATCCGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCCTGTTCCGACCATTTGATGA
 CGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCACTTCCCTCCGTTTGTACCAGGCGAGTCTCCCTAGAGTGTCTTGCAGTAACTAGGGAC
 AAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGACTGACGACAGCCATGACGACCTGTTTACGGCTCCCTTTCGGGCACTCCCACTCTCAGC
 AGGATTCGCTACATGTCAAGGGTAGGTAAGGTTTTTCCGCTGTCATCGAATTAATCCACATCTCACCCGCTTGTGCGGGTCCCGCTCAATTCCTTTGAGTTTTAATCT
 TGCAGCCGACTCCCAAGCGGCAACTTACCGGTTAGCTACGTTACCAAGTCAATGAAGCCCGGACAACCTAGTTGACATCGTTTAGGGCGTGGACTACAGGGGATC
 TAATCTGTTTGGCTCCCATGCTTTCGTGATGAGCGTCAAGT

>CUP1P2H03 Uncultured bacterium (Alphaproteobacteria)

GTCCGTAGCTCTCTTGGAGTTACCCACCGGCTTCGGGTAACAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGCATGCTG
 ATCCCGGATTACTAGCGATTCCGACTTTCATGCTCTCGAGTTGACAGAGGAATCCGAACTGAGACCGGCTTTTCGAGATTGGCTTGGCATCACTGCCCTCGCTCCCTCTG
 TCACCGCCATTGTAGCAGTGTGAGCCAGCCATAAGGGCCATGAGGACTTGACGTCATCCCGCTTCCCTCCGCTTGTACCAGGCGAGTTTCCGAGAGTGGCCAG
 CTCACATGCTGGCAACTCGGATGGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGACTGACGACAGCCATGACGACCTGTTTCCCGCCAGC
 CGAAGTGAAGAGTGGGTCTCCCAACCCATACGGGACATGTCAGGGGCTGTAAGGTTCTTCCGCTGCGTGAATTAACCAACATGCTCCACCGCTTGTGCGGGCCC
 CTGCTCAATTCCTTTGAGTTTTAATCTGCGGCGTACTCCCAAGCGGTTGCTTACCCTGCTGCGACACCGAAAAGCTAGGCTCCCAACGCTTAGCACACATC
 GTTTACAGCGTGGACTACAGGGTATCTAATCTGTTTGTCCCAAGCTTTCGCGCTCAGCGCTA

>CUP1P2H04 Burkholderia sp. (Betaproteobacteria)

ACTTCTGGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGCATGCTGATCCGCGATTACTAGCGATTCCAGCTTCCAGC
 AGTCCAGTTGACGACTGCGATCCGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCCTGTTTCCGACCATTTGATGACGTTGAAGCCCTA
 CCATAAGGGGCTAGGACTTGCAGTCTCCCACTTCCCGGTTTGCACCGGACTTCTCTTAGAGTGTCTTGGTAGCAACTAAGGCAAGGGTTGCGCTG
 TTGCGGGACTTAACCAACATCTCACGACAGGACTGACGACAGCCATGACGACCTGTGCGCGGTTCTCTTTCGAGCACTCCCGCTCTCAGCAGGATTCCGACCAT

GTC AAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTTAATCTTGCACCGTACTCC
CCAGGCGGTCAACTTACCGCTTAGCTACTGTTAAGGAAATGAATCCCCAACACTAGTTGACATCGTTTAGGGCGTGGACTACCAGNGTATCTAATCTGTTTGGT
CCCCAGCTTTCGTGATGAGCGTCAAGTGTGGCCAGGAG

>CUP1P2H05 Uncultured bacterium (Acidobacteria)

GGTTAGCGTGACGACTTCTAGTACAGTCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGAACTATCACGGCGTGCATCTGATACGCCATTACTAGCGATT
CCGGCTTTCATGCAGTGCAGTGCAGACTGCAATCCGAACAGTGCAGAGTTTTTTCCGATTAGCTCCCCCTCGCGGGTGGCAACGGTTTGTACCCTGCATTTGTAACACG
TGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGCAGTCACTCCACCTTCTCTCCGTTATCCGGAGCAGTCCAGTATAGTTCCTCTGCGAGTGGCAACTACGT
GCAGGGGTTGCGCTCGTTGCGGACTTAACCCAACACCTCACGGCACAGCTGACTACAGCCATGCAGCGCTTACTCCTGTCCCTTGGCGGAAGGCCGTTATTTCTAC
AGCTGGTCAAGAAGCATTTGAGCCAGGTAAGTTCCTCGCGTACGCTGCAATGAACCACATGTTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTCTCAGT
CTTGGACCGTACTCCCCAGGTGAGGACTTAACCGCTTAGCTCCGGGACGACTTCCGAACGGAAAGCCCAAGTCTGATCGTTTAGGGCTAGGACTACCAGGGTA
CTAATCTGTTTGGCTTCCCTAGCTTTCGTTCTCACGCTCCGTAACGGTCCAGCGG

>CUP1P2H07 Burkholderia sp. (Betaproteobacteria)

CACCTCCATGGTGTGACCGGTTGTACAAGACCCGGAACTATCACGGGATGCTGATCCGGATTACTACGATTCCAGCTTACCGAGTGCAGTTGCAACTGCGATC
CGGACTACGATCGGTTCTGGGATTGGCTCACTCGCGTTGGACTCTGTCCGACATTGTATGACGTGTGAACCTACCATAAGGGCCATGAGACTTGCAGTCACTCCCA
CTTCTCCGGTTTGTACCCGGCAGTCTCTTAAGTGTCTTTCGCTACAACCTAAGGACAAGGTGCGCTCGTTGCGGGACTTACCCAACTCTCACGAACGAGCTGACGAC
AGCCATGACAGCACTGTGCGTGGTTCTCTTTGAGCAGCTCCCGCTCTCAGCAGGATTCCGACATGTCAAGGGTAGGTAAGTTTTTCGCGTTGCATCGAATTAATC
CACATCATCCACCGCTTGTGCGGGTCCCCGTCATTCCTTTGAGTTTTAATCTTGCAGCGTACTCCCCAGCGGTCAACTTCCAGCGTTAGCTACGTTAGTAAAGAAA
TGAATCCCCAAGAAGTGTGACATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCTGTTTGGTCCCCAAGCTTTCGTGCATGAGCGTCAAGTGTGGCCAGGAGG
CTGCTTCCGCATCGGATTCCTCT

>CUP1P2H08 Uncultured bacterium (Alphaproteobacteria)

TTCCGGTAAACAACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGAACTATCACGGCGGATGCTGATCCGGATTACTAGCGATTCCGACTTTCATGCACCTC
GAGTTGCAGAGTGCATCCGAACAGTGCAGACTTTTAGGGATTGGCTCCCTTCGCAAGTTCGCAACCTCTGTAGTTCGCTTGTAGCAGGTGTGAGCCACCCCGT
AAGGGCCATGAGGACTTGCAGTCACTCCACCTTCTCCGGCTTACCACCGCGGTCCCATTAGAGTGCACCACTAAATGATGGCAACTAATGGCGAGGTTGCGCTCG
TTGCGGGACTTAAACCAACTCTCACGACACAGCTGACGACAGCCATGCAGCACCTGTGTCCCTGCCCGCAAGGGGAACTGCATCTCTGACGCGATCAGGGCATGT
CAAAAGGTGGTAAGTTCTGCGCGTGTCTGCAATTAACCAACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTCGAGTTTTAATCTTGCAGCGTACTCCCC
AGGCGGAGTGTCTAATGCGTTAGCTGCGTCCAGCATGCATGCATGCCACAACACTAGCAGTCACTCGTTTACGGCGTGGACTACCAGNGTATCTAATCTGTTTGGTCC
CCAGCTTTCGCGCCTACGCGTCAAGTACGGGCGTGTGCTGCTTCCGCACTGTTTCCCGCAATATCTACGAATTTCACTCTACACTCGGCATT

>CUP1P2H09 Uncultured bacterium (Não classificada)

CCTTCGGCCCTCCGCTCCCTCACGGGTTGCGGCAGCGACTTCCGGAGCACAGATTCAAGTGTGACGGCGGTGAGTGAAGGCCCGGAACTATTCACCGCAGT
GTGCTGACCTGCGGTTACTAGCAACTCCGACTTTCATGCTGGCGAGTTGCAGCAACAACTCCGAACAGTGCAGCGGCTTAAAGGGATTGCCTTACGCTGCGCGTGTGGAA
CCCGTTGTACCGCCATGTTAGCGTGTGTGAGCCCTGGACATAAGGGCATGCGGACTTGCAGTCACTCCACCTTCTCCGGTTTCGCGCGGAGTCCCATAGAAA
ATTCAACTAAGGACAGGTTGCGCTCGTTGCGGGACTTAAACCAACACCTCACGGCACGAGCTGACGACAGCCATGCACCCACTGTGTAGAAAACCTTTCGCGAGGGC
GCTGGCTTTCACAGCGTTTCTTCTACATGTCAAGCCAGGTAAGTTCTTCCGCTTGCCTCGAATTAACCAACAGCTCCGCTGCTTGTGCGGGCCCCGCTATTC
TTGAGTTTTAACCTTTCGCGCGTGTGCTCCAGCGCGCAACTTAATGCTTGTGCTGCGGACTGATCGGGTCAATCCGACCAACACTAGTTTCGCAACGTTTAGGGC
TGGACTACCAGGATCTAATCCGGTTGCTCCACGCTTTCGCTCTCAGCGTCAAGT

>CUP1P2H10 Uncultured actinobacterium (Acidobacteria)

AGCGCTGCTCCTTAGTTGGCAGCGGATTTCTAGTACAGCCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGAACTATTCACGGCGCGGTTCTGATGC
GCCATTACTAGCGATTCCGGCTTTCATGCAGTGCAGTGTGCAGACTGCAATCCGAACAGTGCAGCGGCTTTTTGCGATTAGCTCCCGCTCGCGGGTTCGCGAGCGTTTGTGG
CGCGCATTTGTAACAGCTGTGAGCCCTGGACATAAAGGCCATGCTGACTTGCAGTCACTCCCACTTCTCCGTTATCCGGAGCGTCCCTGATAGTTCCCGCTT
CGGGTGGCAACTACGAGTAAGGTTGCGCTCGTTGCGGGACTTAAACCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTTACACAGGTCCCTTGGCGG
AAGTCCCTATTTCTAGGAGGGTCTGTGCGGTTCAAGCCAGGTAAGTTCTTCCGCTTGCCTCGAATTAACCAACAGCTCCGCTGCTTGTGCGGGCCCCGCTCAAT
TCCTTTGAGTTTACGCTTGCAGCGTACTCCCCAGCGCGCAACTTAATGCTTGTGCTGCGGACTGATCGGGTCAATCCGACCAACACTAGTTTCGCAACGTTTAGGGC

>CUP1P2H11 Uncultured bacterium (Acidobacteria)

GCGGTTGTGTACAAGGCCCGGAACTATTCACGGCGCGTGTGATGCGCCATTACTAGCGATTCCGGCTTTCATGCAGCCGAGTTGCAGACTGCAATCCGAACAGTGC
CGGATTTTTGCGATTAGCTCCCGCTCGCGGTTTCGAGCGCTTTGTGTCGCGCATTTGTAACAGCTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGCAGTCACTCC
CCACTTCTCTCCGTTATCCGGAGCAGTCCCGTTAGAGTTCCCGCTTTCGCGGTTGGCAACTAAGGATAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACACTCACGG
CAGGACTGCAGACAGCCATGCGCTCGTTGCGGGACTTAAACCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTTACACAGGTCCCTTGGCGG
TGCCTCGAATTAACACATGTTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACGCTTGCAGCGTACTCCCCAGCGCAGGACTTACACGTTAGCT
CCGACAGGGCTCCGAACGGGACCCAGCCAAAGTCTGATGGTTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGTCTCCCTAGCTTTCGCTCTCAGCGTCAAG
TTGCGTCCAGTAG

>CUP1P2H12 Bdellovibrio sp. (Deltaproteobacteria)

TGCTCCTTGCGGTTAGCGCAGCGACTTCTGGTACAACCAACTTTCATGGTGTGACGGCGGTGTGTACAAGGCCCGGAACTATCACGGCGGCTTCTGATCCGCGA
TTACTAGCGATTCCAATTCATGGTCTGAGTTGCAGAGCAACTGAACTTAGATAGCTTTTCTCCGATTAGCTCCATCTCGCGACTTTCGCTTCAAGTTGTGACTAC
CATTGTAGCAGCGGTGAGCCCTAGGCATAAAGGGCCATGAGGACTTGCAGTCACTCCCACTTCTCCGTTTAAACACCGGCACTCCATCTAGAGTGCACCAACTGAATG
TTGGCAACTAAGTACAGGTTGCGCTCGTTGCGGGACTTAAACCAACACTCACGGCACGAGCTGACGACAGCCATGCAGCACCTTACACAGGTCCCTTGGCGGACTC
GGCTTTCGCGCAATATCCAGTACATGTCAAGCTTAGTAAAGTTCTTCCGCTTGCATCGAATTAACCAACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTT
TGAGTTTTAATCTTGCAGCGTACTCCCCAGCGGGTACTTAAACCGCTAGCTTCTGCTACTGAAGGGTCAATACCTCCAACAACAAGTATCCATCGTTTATGGTGGC
GACTACCAGGGTATCTAATCTGTTTGCATCCCGGACTTTCGGGCTGAGTGTCCGCTGTGATCCGCA

>CUP1P3A01 Uncultured bacterium (Betaproteobacteria)

GCTCCTTGCGGTTAGCGCAGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGAACTATCACGGCGGCTGATCTGATACGCCATT
ACTAGCGATTCCGGCTTTCATGCAGTGCAGTGTGCAGACTGCAATCCGAACAGTGCAGAGGTTTTTCCGATTAGCTCCCGCTCGCGGGTGGCAACGGTTTGTGCCCTGCA
TTGTAACAGCTGTGAGCCCTGGACATAAAGGCCATGCGGACTTGCAGTCACTCCCACTTCTCTCCGTTATCCGGAGCAGTCCAGTATAGTTCCTCTTGCAGTGC
GCAACTAGCTTGCAGGTTGCGCTCGTTGCGGGACTTAAACCAACACTCACGGCACGAGCTGACGACAGCCATGCAGCACCTTACTCCTGCTCCCTTGGCGGAAGGCC
GTATTTCTACAGCTGTGAGAGCAATTCGAGCCAAAGTAAAGTTCTTCCGCTGAGCTCGAATTAACCAACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTT
GAGTTTCACTTGCAGCGTACTCCCCAGGTCAGGACTTAAACCGCTAGCTTCCGCTACTGCTACTGAAGGGTCAATACCTCCAACAACAAGTATCCATCGTTTATGGTGGC
TACCAGGGTATCTAATCTGTTTGCATCCCGGACTTTCGGGCTGAGTGTCCGCTGTGATCCGCA

>CUP1P3A02 Uncultured bacterium (Não classificada)

GCTCAGCCGCTTAGCACAGCCACTTCTGATGATGAGGGCGGTGTGTACAAGGCCCGGAACTATTCACGGCGGCTGATCTGATACGCCATT
ATGCACTCGAGTGCAGACTGCAATCCGAACAGTGCAGAGGTTTTTGCATTGGCTCCCGCTCGCGGGTGTGCGCTTGTGCTGCCATTGTAGCAGGTGTGATG
CCTGGACATAAAGGCCATGGTACTTGCAGTGTGCTCCACCTTCTCCGTTTGTACCAGGCTCCCACTAGAGTGCACCACTAATGCTGGCAACTAGTGGTAAGGG
TTCGCTCGTTGCGGGACTTAAACCAACACTCACGGCACGAGCTGACGACAGCCATGCAGCACCTTACTCCTCCCGCAAGGGAAAGCCATCTCTGAGCGCGCAAG
GTAGGATTTAAACCGGTAAGTTCTTCCGCTTGCCTCGAATTAACCAACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTGTAGTTTACGCTTGCAGCGT
ACTCCCCAGGGGATACTTAAACCGTTAGCTCCGGCACGGGGACTTACAGAACCC

>CUP1P3A03 Uncultured soil bacterium (Não classificada)

TTCCAGTACTCCCACTTCCATGGCTTGCAGGGCGGTGTACAAGGCCCGGAACTATTCACCGCATCATGGCTGATATGCGATTACTAGCGAATCCAGCTTTCATGAG
GTCAGTTGCAGACTCAATCCGAACAGTGCAGCGGTTTTAAAGATTAGCATCATGTTACCATGTAGCTGCCCTCTGATCCGGCCATTGTAGCAGTGTGATGCCAGGA

CGTAAGGGCCGTGATGACTTGACGTCATCCCCACCTTCTCACCGCTTGC GCGGGCAGTCTCATTAGAGTCCCAGCTTAACCTGTTGGCAACTAATGATAGGGGTTGC
GCTCGTTGCGGGACTTAACCCAAACCTCACGGCAGGAGTGCAGCAGCCATGCAGCACCTAGTTTCAGGTCAATTGCTGACTGACATATTTCTACATCATTCTTAAAC
TTTCAAGCCCTGGTAAGGTTCTTCGGGTATCATCGAATTAAGCCACATGCTCTCCCGTTGTGCGGGCCCGCTCAATTCCTTTGAGTTTCAACCTTGGCGTTCGTACTC
CCCAGTGGATTACTTAATGCTTTCGCTCAGACGCGTACGGCGTATTGCACACATCGAGTAATCATCGTTT

>CUP1P3A04 Uncultured Bradyrhizobium sp. (Alphaproteobacteria)

ACCAGTTCGCTGACCTACGTGGCGGTGCTCTTGGCGTTAGCGCACCGTCTTTATGTAACAACCTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATC
ACCGTGGCGTGTGATCCACGATTACTAGCGATTCCAACCTTATGGGCTCGAGTTGCAGAGCCCAATCCGAACGTGAGACGGCTTTTGGAGATTTGCCAGTGTTCGCGC
TTCCGATCCCATGTGACCGCCATTGTAGCACGTGTGTAGCCAGCCCGTAAGGGCCATGAGGACTTGACGTATCCCCACCTTCTCGCGGCTTATCACGGCAGTCT
CCTTAGAGTGTCAACTGAATGGTAGCAACTAAGGACGGGGTTCGCTCGTTGGCGGACTTAACCCAAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTG
TGTTCGGGCTCCGAAGAGAAGGTACGCTCTCTGCGACCGGTCCCGGACATGTAAGGGCTGTAAGGTTCTGCGCGTTCGCTGGAATTAACCCACATGCTCCACCGCT
TGTGCGGGCCCGCTCAATTCCTTTGAGTNTAATCTTGCGAACGTACTCCCAGGCGGAATGCTTAAAGCGTTAGCTGGCCACTAGTGAGTAAACCCACTAAGC

>CUP1P3A05 Uncultured bacterium (Não classificada)

ATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACCGGCGGTGCTGATCCGCGATTACTAGCGATTCCAGCTTTCAGTGTGAGTGTGACACTGCAATCCGAA
CTGAGGCCGGTTTCTTGGCATTGGCTCCCCCTCACGGGTTGGCAACCGCGTCTGTACCGACCATGTATACGTTGTAAGCCCTGGCCATAAGGCCATGAGGACTTGA
CGTATCCCCACCTTCTCT

>CUP1P3A06 Uncultured bacterium (Acidobacteria)

GGCGTCTGCTCTTGGCGTAGCGTACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGCGTTCGATCTGATC
GCCATTACTAGCGATTCCGGCTTCATGCACTGAGTTCAGACTGCAATCCGAACGTGAGCAGAGTTTTTCCGATTAGCTCCCGCTCGCGGTTGGCAACGGTTTGTAC
CTGCAATTTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTACGCTATCCCCACCTTCTCTCGGTTATCCGGAGCAGTCCACGTAGAGTTCCTCTTGG
CGAGTGGCAACTACGTGACGGGTTGCGCTCGTTGGCGGACTTAACCCAAACCTCACGGCAGGAGTGCAGACAGCCATGCAGCGCTATACTCTGTCCCTTGGCGG
AAGGCCGATTTCTACAGCTTGGTCAGAAGCATTCGAGCCAGGTAAGGTTCTCGCGTAGCGTCAATTAAGCCACATGTTCCACCGCTTGTGCGGGCCCGCTCAAT
TCCTTTGAGTTTTCAGTCTTGCAGCCGACTCCCAGGTGACGACTTAACGCGTTAGCCCGGGACGACTTCCGAACGGAAAGGCCCAAGTCTGATC

>CUP1P3A07 Uncultured bacterium (Não classificada)

TGCGGACTTCTAGTAAACCACTTCGTGATGTAGGCGGTGTGTACAAGGCCGGGAACGTATCACGCTGGCGTTCGTATCCAGCATTACTAGCGATTCCAGCTTTCATGCA
GGCAGTTGCGAGCTTCAATCCGAACGTGAGAAGCGTTTTTGGGATTGGCTCCCCCTCGCGGTTGGCAGCCCTTTGTACCGTCCATTGTAGCACGTGTGTAGCCCTGG
ACATAAAGGCCATGAGGATTGACGTCATCCCCACCTTCTCTAGGTTATCCCTGGCGGTTCTTCCGAGTTCCCTCGCGAATGGCAACAGGCAAGGGTTGCG
CTCGTTGCGGGACTTAACCCAAACATCTCACGACAGGAGTGCAGACAGCCATGCAGCACCTATACTGCAGTCCCTTGGCGGAAGGCCGGCTTAAACAGCTGGTCCACA
GCATTTGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCGCTCAATTCCTTTGAGTTTACGCTTGGCAGTGTGA
CTCCCAGGCGGCATATTAACCGCTTAGCTCCGGCACAGACCAATGAATG

>CUP1P3A08 Uncultured bacterium (Não classificada)

ACTTCGGGAGCACAGACTCGGGTGTGACGGGCGGTGAGTGAAGGCCGGGAACGTATTAACGCGAGTGTGCTGACCTGCGTTTTACTAGCAACTCCGACTTCTGTG
CTGGCGAGTTGCGGCCAACAATCCGAACGTGAGACCGGTTTTAAGGGATTGCTTACAGTCCGCGGTGTCGGAACCCGTTGTACCGGCAATGTAGCGTGTGTAGCCCT
GGACATAAAGGCCATGCGGACTTGCAGTCACTCCCACCTTCTCCGGTTTCCGCGGAGTCTCCCTAGATGATTAACATAAGGACAGGGGTTGCGCTCGTTGCGGGA
CTTAACCCAAACCTCACGGCAGGAGTGCAGACAGCCATGCACCACCTGTGTAGAGACCTTTCGAGGGGCGCTGACTTTCACAGCGTTTCTCTACATGTAAGC
CCAGGTAAGGTTCTTCGCGTTCGCTCGAATTAACCCACAGCGTCCGCTGCTTGTGCGGGCCCGCTATTCCTTTGAGTTTAACTTGGCGCGTAGTCCCAGGGC
CGGAACCTAATGCGTTAGCTGCGGCACTGATCGGGTCAATCCGACCA

>CUP1P3A09 Mucilaginibacter sp. (Sphingobacteria)

GCTTACGGCACCCAGCTTCCATGCTTGCAGGGCGGTGTGTACAAGGCCGGGAACGTATTAACGCGAGCATTGCTGATCTGCGATTACTAGCGAATCCAACCTCACG
GGTTCGAGTTGCGAGACCCGATCCGAACGTGGAATGGCTTTTTGAGATTGGCTTCTTGTACCAAGTTCGCTGCTGCTTGTACCATCCATTGTAGCACGTGTGTAGCCCT
GGACGTAAGGGCCATGATGACTTGCAGTCTCCCTTCTCTACTTGGTAGGAGTCTGTTTAGAGTCCCACTTTACATGCTGGCAACTAGTGGTAAGGGTTGCGCT
TGCCTCTGTTGCGGGACTTAACCCAAACCTCACGGCAGGAGTGCAGACAGCCATGCAGCACCTTCCAGCCGCTATTGCTAGGGGGATGTATCTTACACCTTGCACCTGGG
ATTTAACCAGGTAAGGTTCTTCGCGTTCGCTCGAATTAACCCACATGCTCCACCGCTTGTGCGAGTCCCGCTCAATTCCTTTGAGTTTACGCTTGGCAGCTGCGACCT
AACTTTCAAGCCGGGTAAGGTTCTTCGCGTATCATCGAATTAACCCACATGCTTCCGCTTGTGCGGGCCCGCTCAATTCCTTTGAGTTTACCCCTTGGCGGGCTGA
CTCCCAGGTGGAACACTTAACGCTTTCGCTTAGAGCTGACCGTATATC

>CUP1P3A10 Uncultured bacterium (Não classificada)

CTAGTACAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGCCCTGGGAACGTATTAACGCGTTCGCTGATACGCGATTACTAGCGATTCCAACCTCCATGGAGT
CGAGTTGCGAGACTTCCAACTCCGAACGTGAGAAGCGTTTTTCCGATTAGCTCCCGCTCGCGGTTGCGAGCGGCTGTACCGTCCATTGTAGCACGTGTGTAGCCCTGGAC
ATAAAGGCCATGATGACTTGCAGTCACTCCCACCTTCTCCGGTTTATCACCGGAGTTCACCTAGAGTCCCAACTAAATGCTGGCAACTAGTGGTAAGGGTTGCGCT
CGTTGCGGGACTTAACCCAAACATCTCACGACAGGAGTGCAGACAGCCATGCAGCACCTTCCAGCCGCTATTGCTAGGGGGATGTATCTTACACCTTGCACCTGGG
ATTTAACCAGGTAAGGTTCTTCGCGTTCGCTCGAATTAACCCACATGCTCCACCGCTTGTGCGAGTCCCGCTCAATTCCTTTGAGTTTACGCTTGGCAGCTGCGACCT
CCAGGCGGATACTTAACGCGTTAGCTCCGGCACCGGGACTATAAAACCCGACACCAAGTATCCATCGTTTAGGGCTAGGACTACCAGGTATCTAATCTGTTT
GCTCCCTAACTTTCGCGCATCGCGTCACTATACGCCAG

>CUP1P3A12 Uncultured soil bacterium (Não classificada)

GGTGTCTGCGGTTACTACGGTTCTATACAGTCCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTAACGCGAGTGTGATCTGCGATTACTAGCG
ATTCAGCTTTCATGGAGTTCGAGACTTCCAACTCCGAACGTGAGGCGGGTTTTTCCGATTAGCTCCCGCTCGCGGTTTGGGACGGTTTGTACCGACCATTTGAGC
ACGTGTGATAGCCCTGGACATAAAGACCATGAGGACTTGCAGTCACTCCCACCTTCTCCCGTTATCCGGGGCGGTTTCTGTTGAGTGGCCAGCTTACCTGATGGCAA
CTAAAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACAGGAGTGCAGACAGCCATGCAGCACCTCCGAGCAGTCTTTCGCAAAAGGGATATTT
CTACCCCGCTTCACTGCGCTTCGAGCCAGGTAAGGTTCTTCGCTTTCGCTGCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCGCTCAATTCCTTTGAGTTTTC
AGCTT

>CUP1P3B01 Uncultured bacterium (Actinobacteria)

GGGTTAGGCCACGGCTTCGGGTTGCTCACTCCCGTGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTAACGCGGCAATGCTGATCCCGGATTACTAGCA
ACTCCGCTTTCATGCAGCGGATTTTCAGCTGCAATCCGAACCGAGCAGCGCTTTAAGCGATTTCGCTCCACCTCGCGGTATCGCAACCTCTGTACGCGCAATGTAGC
ACGTGTGTAGCCCTGGACATAAAGGGCATGATGACTTGCAGTCACTCCCACCTTCTCCGGTTTTCGCGGTTTGTACCGGCACTTCCGATGAGTCCCAACTAAATGCTGGCAACA
TGCAGCGGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACAGGAGTGCAGACAGCCATGCACCACCTGTGAAAGTGCAGGGAAGGATGTGTTCC
ACACCGGCTCACTACATGTAAGCCAGGTAAGGTTCTTCGCTGCGCTGCAATTAACCCACATGCTTCCGCTTGTGCGGGCCCGCTCAATTCCTTTGAGTTTTCG
CCTTGGCGGCTTCACTCCAGCGGGCAACTTAATGCGTTAGCTTCCGCTTTCGCTGCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCGCTCAATTCCTTTGAGTTTTC
GATCTAATCTGTTGCTCCCGACGCTTTCGCGTCTCAGCGTCACTAAGCTCCAGCGAG

>CUP1P3B02 Uncultured bacterium (Acidobacteria)

TGCTCTTTCGCGTTAGCGTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTAACGCGCTGATCTGATACGCC
ATTACTATCGATTCCGGCTTTCATGCACTGAGTTCGAGACTGCAATCCGAACGTGAGCAGCGCTTTTCCGATTAGCTCCCGCTCACGGGTTGGCAACGGTTTGTACCGC
GCATTTGAACAGTGTGTAGCCCTGGACATAAAGGGCATGAGTTCGAGTCACTCCCACCTTCTCCGTTTTCGCGGTTTTCGCGGAGTCCACACAGAGTCCCTCTTGGCA
GTAGTAACGTGTGCGAGGCTTTCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACAGGAGTGCAGACAGCCATGCAGCGCTATACTCCGGTCCCTTTCGCGGAA
CGCGTATTTCTACAGCTGGTCCGAGCACTTTCGAGCCAGTAAAGTTCTTCGCGTACGCTGCAATTAAGCCACATGTTCCACCGCTTGTGCGGGCCCGCTCAATTTCC
TTGAGTTTTCAGTCTTGCAGCCGACTCCCAGGTGACGACTTAACGCGTTAGCTCCGGGACGCGCCGAAACCGGACCGCCACCCAAAGTCTGATCGTTTAGGGCTAG
GACTAC

>CUP1P3B03 Unidentified eubacterium from the Amazon (Acidobacteria)

CATACTTAGGGCCGTCTCCCTTGGCGGTTACGCGAGCAGTTCTAGTACAGCCAGCTTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGG
CATGCTGATCCCGGATTAAGCTAGCGATTCCAACCTCATGCCGGGAGTTGAGCGGCAGCAATCCGAAGTACAGCCGACTTTCTCCGATTAGCTCCCGCTTGGCGGTTGCA
ACGGTTTGTATCGCCATGTAGCAGCTGTGTAGCCCGAGACATAAAGGCCAGTGTGACTGACGTATCCCACTTCCCTCCGGTTTATCACCGGCGAGTCTCCTCAGA
GTGCCAGCGTAACCTGATGGCAACAGAGGACAAGGGTTGGCTCGTTGGCGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACAG
CGCTCCTTGGGAAACCGGCTTTACCGCGCGTCACTGCATTTCCAGCCCTGGTAAAGTTTCTCCGCTTGGCTCGAATTAACCCACATGCTCCACCGCTTGTGCGGG
CCCGCTCAATTCCCTTTCAGCCTTGGCAGCCGACTCCCGAGCGGAGTGTAAATGCGTTAGCTTCGGCACGGCAGGATCGATACCCGGCAGACCAAGCAGCT
ATCGTTTAGGGCCAGGACT

>CUP1P3B05 Uncultured bacterium (Sphingobacteria)

TACACCGGCTCCATGGCTTACGGGCGGTGTGTACAAGTCCGGGAACGTATTCACCGTATCATTGCTGATATACGATTACTAGCGATTCCAGCTTCATGCAGTCGAG
TTGCAGACTGCAATCTGAAGTGAAGAGTTTTGGGGATTAGCTTCCATCACTGTGCTGCCCTTTGTCTCCCGCATTTGTAGCAGCTGTGTAGCCCTGGGCATAA
AGGCCATGATGACTTGACATCATCCCTCCCTTCCGCGTCTTACGACGGCAGTTTCACTAGAGTTCCAGCTTTACCTGATGGCAACTAGTATGGGGGTTGCGCTCG
TTGGCGGACTTAACCCAACACCTCACGGCAGGACTGACGACAGCCATGCAGCACCTTACAGGAGACGTATTGCTACGAAACAGCTTTACCGGCGAGTCTCTGTCAT
TCTAGCCAGGTAAGGTTCCGCGTATCATCGAATTAACCCACATGCTCCACCGCTTGTGCGGACCCCGCTCAATTCCTTTAGTTTCAACCTTGGCGTGTACTTCC
CAGGTGGGATACTTAATGCTTTCGCTCAGACACCAACCGTGTATCCGCTGATGTCGAGTATCCATCGTTTAGGGCGTGGACTACCAG

>CUP1P3B07 Uncultured Xanthomonadaceae bacterium (Gammaproteobacteria)

CAGTCATTGACACTCCGTTGGTAAGCGTCCCGCTTGGCGTTAGACTACTCTTGGAGCAACCACTCCCATGGTGTGACGCGGTGTGTACAAGGCCCGGGAACGTAT
TCACCGCGCAATGCTGATTCGGGATTACTAGCGATTCCGACTTCACGGAGTCGAGTTGCAGACTCCGATCCGACTGAGAGAGGTTTTCTGGGATTGGCTTCACCTCG
CGGCTTCGCAACCCCTCTGTACTCCCATTTGTAGTACGTGTGTAGCCCTGGCCGTAAGGGCCATGATGACTTGACGTATCCCACTTCCCTCCGGTTTTGTACCGGCA
GTCTCCTTAGAGTTCCCAACCATTACGTGCTGGCAACTAATGACAAGGGTTGCGCTCGTTGGCGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAG
CACCTGTGTCCGATTCCGGAAGGCACTCCCGCATCTCTGACGATTCCGGACATGTCAGGGCAGGTAAGGTTCTTCGCGTTGCATCGAATTAACCCACATACTCCAC
CGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACGCTTTCGCAACGACTCTCCCGAGGCGGCAACTTAAC

>CUP1P3B08 Uncultured bacterium (Gemmatimonadetes)

GTTGGTCCCTTGGCGGTTCCGACACGGACTTCGGGCGCTCACAGTTCCATGGCTACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGTGGCGTAGCTGATCCA
CGATTACTAGCGATTCCAGCTTCCATGGAGGCGAGTTGCAGCCTCCAATCCGACTGAGGTTCGGCTTTCCGGGATTGGCTCACCTTCGCGAGGCTCGCAACCTCTGTACC
GGCATTGTAGCAGCTGTGTAGCCCTAGACGTAAAGGACATGATGACTTGACGCTGCCCGACCTTCCCTCCGGTTTGGCACGGCAGTCTTCCAGAGTCCCGCCATA
ACGCGCTGGCAACTGGGAACGGGGTTGGCTCGTTGGCGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCTGGTGTCCCGAAGG
AGGCCCTGGTTTTCTCAAGGTTTTCCACGACATGTCAGGCTTAGTAAAGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCAA
TTCTTTGAGTTTACGCTTTCGCGCGTACTCCCGAGGCGGGTACTTAATGCGTTAGCGCCGACTCAGGGGGTTCGCTCCCGAACGACTAGTAACCATCGTTTTAC
GGCTGGACT

>CUP1P3B09 Uncultured bacterium (Não classificada)

GGGCGGCTTCAGGTTGCGACTTTCGTGGTGTGTGACGGCGGTGTGTACAAGGCCCGGGAACGACTTCCGTTGGTGTGCTGACCCAGCGTTACTAGCAACTCCGGCTT
AGGCAGGCGGGTTGCAGCTGCCATCCGAAGTGCAGCTGGATTGGCGGATTAGCTCCCGCTTCGGGGTTGGCGAACCGATTGTGCCAGCCATTGTAGCGTGTGTGTGG
CCTAGGACGTCAGGCGGCTGCTGACTTGACGCTCATACCACTTCCCTCCAGTGTCTCGCGGACTTGGTCCGACACCCATGAGCCACACAGGCGGTTGCGCTCGTTG
CGGACTTAACCCAACACTCAGCGCAGGACTGACGACAGCCATGCAGCACCTGTGTCGCTGACTTTCGCGTTCGCAATTAACCCACATGCTCCACCGCTTGTGCGGGTCCCG
CCTGGTAAGGTTGCTTCCGCTCGCATCGAATTAACCCACAGCTCCGCTGCTTGTGCGGGTCCCGCTCAATTCCTTTGAGTTTAACTTTCGCGAGCGTACTCCCGAGGCG
GACCATTTCGTCGCTTAGCGCGGCACGAGGGGTCGATACCCCGCGCCTGATGGTTCATCGTTTACGGCCAGGACTACGGGGTATCTAATCCCGTT

>CUP1P3B10 Burkholderia sp. (Betaproteobacteria)

TACGTTGGTACGCTCCCTCCGCGTTAGACTAGCCACTTCTGGTAAAACCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGATTACCGCGGCATGC
TGATCCCGAGATTACTAGCTGATTCCATGCTTCCAGCCAGTCGAGTTGCAGACTGCGATCCGGAATACGATCCGTTTTCTGGGATTGGCTCCACTCGCGGCTTGGCAA
CCCTCTGTTCCGACCATTTGATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCACTTCCCTCCGGTTTGTACCGGCGAGTCTCCCTAGAG
TGCTTTCGCTAGCAACTAGGCAATGTTGCGCTCGTTGGCGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCACGACAGCAGCTGTGTTACCGCTCCC
TTTCGGGCACTCCCACTTTCAGCAGGATTCCGTACATGTCAGGGTAGGTAAGGTTTTTCGCGTTGCTGCAATTAACCCACATGCTCCACCGCTTGTGCGGGTCCCG
GTCAATTCCTTTGAGTTTAACTTTCGCGACCGTACTCCCGAGGCGGTAACCTTCGCGGTTAGCTACGTTACCAAGTCAATGAAGACCCGACAAGTGTGACATCGTT
TAGGGCGTGGACTACCAGGGTATCTAATCTGTTTCTCCCGCTTTCGTCATGAGCGTCACTA

>CUP1P3B11 Uncultured Verrucomicrobia bacterium (Verrucomicrobiae)

ATCACACCATCTTCGCGCTGCTCCCTCCGCGTTAGCACGGCGACTTCGGGTACAAGCGGCTTTTCATGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGATTCA
GGCACCAGTACTAGCTGATTCCATGCTTCCAGCCAGTCGAGTTGCAGACTGCGATCCGGAATCGAATCGGCTGATTTCGGGATTGGCTCCACTCGCGGCTTGGCAA
TCTGCTCCCTTTGATACGACATTGTAGTACGTGTGACGCGCTGGCCGTAAGGGCCACTACTGACTTGACGTCATCCCACTTCCCTCCATTTAGATGAGGCGAGT
GTTCAGAGTGTCCAACTCTCGTTTGGGTGGCAACAGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCA
GCACTGTGCAAGCTTTCCTTTCGCGAATCGTCCCACTTTTCATGGTTCTACTACTTGCATGTCAGGCCAGGTAAGTTTCTTCGCGTTGTCGAAATTAAGCCACATACT
CCACCGCTTG

>CUP1P3B12 Uncultured bacterium (Acidobacteria)

GGTTGGCTCACCGGCTTCTAGTCAACCACTTTCGTTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGATTACCGCGGCTTCTGATCCGCGATTACTAGCGAT
TCCAGTTCATGAGTGCAGTTGCAGACTGCAATCCGAAGTGCAGCCGCTTTCCTCCGATTAGCTCCCGCTTCGGGGTTTGGCAGGTTTGTACCGGCGATTGTAGCAC
GTGTGAGCCCTGGACATAAAGGCCATGAGGATTGACGTCATCCCACTTCCCTCCCGTTATCCGAGGCGGTTTCGCGAGAGTGCACCACTAAATGGTGGCACTGGA
AGTAAGGTTGCGCTCGTTGCGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTTATACATCGGCCCTTGGCGGGAAGGGATATTCTA
CCCCGTTCAATGCATTTCCAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTTCAGC
CTTGGCAGCGTACTCCCGAGGCGACTGCTAACCGGTTAGCTACGGCAGCAGCCGGGATTGGTTACCGTCAACCAAGCAGTCACTCGTTTAGGGCTAGGACTACCAGG
TATCTAATCTGTTTGTCCCTAGCTTTCGTCATCAGCGTCACTTGTGTTCCATTGAGCGCTTTCGCCACAGGTTTCTCCCGATATCTACGCAATTCA

>CUP1P3C01 Uncultured bacterium (Acidobacteria)

GGTTAGCGCGAGGACTTCTAGTACAGCTCACTTTCGTTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGATTACCGCGCTGATCTGATACGCCATTACTAGCGA
TTCCGGCTCCATGACGTCGAGTTGCAGACTGCAATCCGAAGTGCAGGAGTTTTCCTCCGATTAGCTCCCGCTTCGGGGTTGGCAACGTTTGTGCCCTGCATTGTAACA
CGTTGTAGCCCTGGACATAAAGGCCATGAGGATTGACGTCATCCCACTTCCCTCCCGTTATCCGAGGAGCTCCACCTAAATGGTGGCACTGGA
GTGACGGGTTGCGCTCGTTGCGGACTTAACCCAACACTCACGGCAGGAGCTGACGACAGCCATGACGCGCTTACTGCTGCTCCTTGGCGGGAAGGCGGATTTCT
ACAGCTGGTACGAGCATTTCGAGCCAGGTAAGGTTCTTCGCGTACGCTCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTTCAGC
GTTTGGCAGCGTACTCCCGAGGCGACTGCTAACCGGTTAGCTACGGCAGCAGCCGGGATTGGTTACCGTCAACCAAGCAGTCACTCGTTTAGGGCTAGGACTACCAGG
TATCTAATCT

>CUP1P3C02 Uncultured bacterium (Acidobacteria)

ACGGTATCCCGTTGGCGTTAATTAACCGGCTTCTAGTACAAGTGGCTTTCGTTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGATTACCGCGCTGCTGTGATCA
CGGATTACTAGCGATTCCGCTTACGAGTTCGAGACTGCAATCCGAAGTGCAGGAGTTTTCCTCCGATTAGCTCCCGCTTCGGGGTTGGCAACGTTTGTGCCCTGCATTGTAACA
CGCCATTGTAGTACGTTGAGTCCCTGGACATAAAGGCCATGAGGATTGACGTCATCCCACTTCCCTCCCGTTATCCGAGGAGCTCCACCTAAATGGTGGCACTGAGT
AACCTGGTGGCACTAAGGCGAGGTTGCGCTCGTTGCGGACTTAACCCAACACTCACGGCAGGAGCTGACGACAGCCATGACGCGCTTACTGCTGCTCCTTGGCGGGAAGGCGGATTTCT
GGGAAAGCGACTTTCGCCACTTTCGACTAGCCGTTTCGAGCCAGTAAAGTTCTTCGCGTTGCGTCAATTAACCCACATACTCCACCGCTTGTGCGGGCCCCGTC
ATTCTTTGAGTTTTCAGCTTTCGAGCCGACTCCCGAGGCGGATACTTAATGCGTTAGCTTCGGCAGGACTGGATTCAATCCCGAGTCAACCAAGTATCCATCGTTA
GGCTAGGACTACCAGGGTATCTAATCTGTTGCTCCCTAGCTTTCGTCCTCAGCGTCACTTTCGCT

>CUP1P3C03 Uncultured bacterium (Acidobacteria)

GGTTAGCGTGACGACTTCTAGTACAACCTCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACGGCGTCGATCTGATACGCCATTACTAGCGAT
TCCGGCTTCATGCAGTGCAGTTGCGAGACTGCAATCCGAACCTGAGCAGAGTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTTGTGCCCTGCATTGTAACAC
GTGGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCACTCCCCACCTTCTCCCTTATCCCGGAGCAGTCCACGTAGATTCCCTTGGCGAGTGGCAACTAGC
TGCAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCAGAGCTGACGACAGCCATGCAGCGCTCCACACTTGTCCCTTGGCGGAAGGCCGATTTCTTA
CAGCTTGTCAAGTGCCTTCCAGCCAGGTAAGGTTCTCCGCTAGCGTCAATGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCCTTGTAGTTTACG
TCTTGGCACCCTACTCCCAAGGTGACGACTTAACCGCTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCCCTGATCGTTTAGG

>CUP1P3C04 Uncultured bacterium (Acidobacteria)

GTAGCACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACGGCGCTGATCTGATACGCCATTACTAGCGAT
TCCAGCTTCATGGAGTGCAGTTGCGAGCTCCAATCCGAACCTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGGCAGCGTTTTGTACCGACCATTTAGTAC
GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCACTCCCCACCTTCTCCCTCGTTATCCGAGGCAGTTTCACTAGAGTGGCCGGCTTGACCCGATGGCAACT
AGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGAGCCTTTAAGGGGAAGGGATGTTT
CCACCCCGTCTCCTGCATTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCCTTGTAGTTTAC
AGCCTTGCAGCCGACTCCCAAGGTGGATTGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTA

>CUP1P3C05 Uncultured alpha proteobacterium (Alphaproteobacteria)

AGTCGCTGACTTACGTGGCCGGCTGCTCCTTGGCGTTAGCGCACCGCTTTCGGGTAACCAACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTATC
ACCGCAGCGTGCATGCTGCGATTGACAGAGCAATCCGAACCTGAGACGGCTTTTGGGATTAGCTCCCCATTGCTGG
GTGGCTGCCACTGTACCGCCATTTAGCAGCTGTGTAGCCAGCCGTAAGGGCCATGATGACTTGACGTCACTCCCACTTCTCCGGCTTATACCGGCAGTCC
ACTAAGTGGCCAACTAAATGATGGCAACTAATGGCGAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGT
TCTCCGACCTATTGCTAGGAGGAATCCATTTCTGAAACCGCCGGAGAAATGCAAGGACTGTAAGGTAATTCGCGTTCGCTCAATGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCCTTGTAGTTTAC
TGTGCGGGCCCCCGTCAATTCCCTTGTAGTTTAACTTGGCGGCTACTCCCAAGGGGATGCTTAAATGCGTTAGCTGCGCCATCAACAAGCATGCTTGTGACGGCT
AACATCCATCGTTAAGCGGTGGACT

>CUP1P3C06 Uncultured bacterium (Alphaproteobacteria)

CGGTTGGCACACCGCTTTCAGGTAACCAACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACGGCGCGCGCTGATCCGCGATTACTAGCGATT
CAGCTTTCATGCTCGAGTTGACAGAGAACAATCCGAACCTGAGACGGCTTTTGGAGATTGGCGCAGGATCGCTCCCTTCCGCGCTTGTACCGCCATTGTAGCACGT
GTGTAGCCAGCCATAAAGGCCATGAGGACTTGACGTCACTCCCGCTTCTCCGGCTTGTACCGGCAGTTCCTTCAGAGTGGCCGGCTTAACCGGATGGCAACTGA
AGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGCAGCCGAACGAAGAAGCCGATCT
TTCGGCCCCATACGGGACATGCAAGGGCTGGTAAGGTTCTTCGCGTTGCTCGAATGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCCTTGTAGTTT
TAACCTTGGCGGCTACTCCCAAGGGGTGCGTTAAGCGGTTGCTGCGACACCGGAAAG

>CUP1P3C07 Uncultured Verrucomicrobia bacterium (Verrucomicrobiae)

CACCTTTAGGGGCGGTTCCGGTGAACCGGCTTCATGATGCGACGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACGGCGCGGTAGCTGATGCGCCATTACTAGCGA
TTCCAGCTTCATCCCGTGCAGTTGACAGCACAATCTGAACCTGGCCCGGTTTTGGGAGGTTTGTCCAGCTTACGCTTTCCTTCCCTTGTACCGGCACTTGTAGTA
CGTGTGACGCGCTGGCCGTAAGGGCCATACTGACTTGACGTCACTCCCACTTCTCCCTCGTTGAAAGCGAGGCAGTCTGTCCAGAGTGTCCCAATTAAGGGGTGGCAA
CAGGACACAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAGCTTCCCTTGGCGGATCGTCAGAC
TTTCACTTCTACTACTTGCATGTGCAAGGGTAAAGGTTCTTCGCGTTGCTCAATGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCCTTGTAG
TTTTAACTTGGCGGCTACTTCCCAAGGGCGCGTTTTAACTGTTAACTTCCCGCGAGCGGGTTCGATTCCACTCACAGCAACCGCACCGCTTTAGGGCCAGGACT
ACCGGGATCTAATCCCGTTTGTCCCTTGGCTTTCGTGCTCAGCGTCAAGAAATGTCAGAGACTCGCTTCCGCACTGTTGTT

>CUP1P3C08 Uncultured bacterium (Betaproteobacteria)

CCTCCTTGGCGTTAGCGCAGCGGTTCTGGTGAACCCACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACCGCGACATGCTGATCCCGGATT
ACTAGCGATTCCGACTTCATGCACTGCAGTGCAGTTCGAGACTGCAATCCGAGCTACGACCGGCTTAAAGGGATCGGCTTACCTCCGCGCTTGGCTTCCCTTGTACCTACCAA
TTGATTACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCACTCCCACTTCTCCGGTTTGTACCGGCAGTCTCATTAGAGTGGCCAACTGAATGTA
GCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCCCTTCCGGCACAC
CCAGCTTCCACAGGTTCCGAGGTTGCAAGGGTAAAGGTTCTTCGCGTTGCTCAATGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCCTTGTAG
GAGTTTTAACTTGGCGGCTACTTCCCAAGGGCGCGTTTTAACTGTTAACTTCCCGCGAGCGGGTTCGATTCCACTCACAGCAACCGCACCGCTTTAGGGCCAGGACT
CTACCGGGATCTAATCCCGTTTGTCCCTTGGCTTTCGTGCTCAGCGTCAAGAAATGTCAGAGACTCGCTTCCGCACTGTTGTT

>CUP1P3C09 Uncultured gamma proteobacterium (Gammaproteobacteria)

TCCCTGCGGTTAGGCTACTGCTTCTGGTGAATCAACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACCGCAGCAATGCTGATCTGCGATTAC
TAGCGATTCCGACTTCATGGAGTGCAGTTCGAGACTCCAATCCGAGCTACGATAGGTTTTTGTGGGATGGCTCCCGCTCGCGGTTGGCTTCCCTTGTACCTACCAA
TGTAGCAGTGTGATAGCCCTGGTCATAAAGGCCATGATGACTTGACGTCACTCCCACTTCTCCGGTTTGTACCGGCAGTCTCATTAGAGTGGCCAACTGAATGATG
GCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCAGGTTCCCGAAGGCACTCCC
GCATCTCTCAGGATTCGCGGATGCAAGGATGCAAGACCAGGTAAGGTTCTTCGCGTTGCTCAATGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCCTTGA
GTTTCACTTGGCGGCTAATCCCA

>CUP1P3C12 Uncultured bacterium (Acidobacteria)

GGTTAGCGGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACGGCGTGCATCTGATACGCCATTACTAGCGAT
TCCGGCTTCATGCAGTGCAGTTGCGAGACTGCAATCCGAACCTGAGCAGAGTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTTGTGCCCTGCATTGTAACAC
GTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCACTCCCACTTCTCCCTCGTTATCCGAGGCAGTTCACGTAGATTCCCTTGGCGAGTGGCAACTAGC
TGCAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCAGAGCTGACGACAGCCATGCAGCGCTTACTGCTGTCCCTTGGCGGAAGGCCGATTTCTTA
CAGTGGTGCAGCAGATTTCAGCCAGGTAAGGTTCTCCGCTAGCGTCAATGAACCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCCTTGTAGTTTACG
TCTTGGCACCCTACTCCCAAGGTGACGACTTAACCGCTTAGCTCCGGAC

>CUP1P3D01 Uncultured bacterium (Acidobacteria)

AGGCTGCTCCTTGGCGTTAGCACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACGGCGGCTTCTGATCCG
CGATTACTAGCGATTCCAGCTTCATGGAGTGCAGTTGCGAGACTCCAATCCGAACCTGAGGCCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGGCAGCGTTTTGTACC
GACCTTGTAGCAGGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCACTCCCACTTCTCCCTCGTTATCCGAGGCAGTTTCACTAGAGTGGCCGGCTTG
ACCCGTAAGCCAACTAGGATAAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCCCTTAAAG
GGGAAGGGATGTTTCCACCCCGTCTCCTGCATTTCGAGCCAGGTAAGGTTCTTCGCGTTGCTCAATGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCTTGTAGTTTACGCTTGCAGCCGACTCCCAAGGGGATGCTTAAATGCGTTAGCTTGGCACGCGAGGATGGGTACCTGCTACCAAGCAATCAT

>CUP1P3D03 Uncultured Acidobacteria bacterium (Acidobacteria)

GGTTAGCTCGGCGACTTCTAGTACAGCCAGCTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACGGCGGCTGCTGATCCGCGATTACTAGCGA
TTCCAACTTCAGCCGGCGAGTTGACGGCGACAAATCCGAACCTGAGCAGGCTTTCCTCGATTAGCTCCACCTTCCGCTTCCGCGAGGTTTTGTACCTGCCATTGTAGCA
CGTGTGTGCGCCAGACATAAAGGCCATGCTGACTTGACGTCACTCCCACTTCTCCCTCGTTTGTACCGGCAGTCTCTTCCAGAGTGGCCAGCTTGACCTGATGGCAAC
AGAAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGATAGTGCCTTGGCGGAGCCTACTTTCCG
TAGGTTGCTCAGCTACCGTTCCAGGTTTCCGCTTTCGCGTTGCTCGAATGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCCTTGTAGTTTACG
CCTGCGACCGTACTCCCAAGGGGATGCTTAAATGCGTTAGCTTGGCACGCGAGGATCGATACCGGGCAACAAGCATTATC

>CUP1P3D04 Uncultured forest soil bacterium (Alphaproteobacteria)

GGTTAGCGCAGCGCTTCCGGTAAAGGCCAATCCCATGGTGTGAGGGCGGTTGTGTACAAGGCCCGGGAAACGTATTCACCGCAGCCTGCTGTTTCCGATTACTAGCGAT
CCACTTTCATGACCCAGGTTGACAGTGCATGACTGAGGAGGTTTTGGGATTCGATCCACTCCGCTGGTTCGCTGCCACTGTACCGCCATTGTAGCAGCT
GTGTAGCCAGGCGTAAGGGCCATGAGGACTTGACGTCACTCCCACTTCTCCGGCTTGTGCGGGCGGTTCCCTTGTAGTGGCCAACTAAATGATGGCAACTAAAG

GCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGACCTGTCTCCGCGCCCTTGCGGGGACCACCCATCTCTGG
GCTTAGCAGCGGATGCAAGGCTTGTAGGTTCTGCGCGTTGCGCTGCAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAACCT
TGCGGGCTACTCCCAGCGGGATGCTTAATGCGTTAGCTGCGCCACTGATAAGCATGCTTACCAACG

>CUP1P3D05 Uncultured bacterium (Não classificada)

GGGTTAGCGCAGACTTTTAGTACAGCCGCTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGAACTATCACCGCGCATGCTGATCCGCGATTACTAGCGA
TTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAATGGGACTGATTTTTGGGGATTAGCTCCACCTCGCGGCTTTGCGACCTTTGTATCAGCCATTGTAGCA
CGTGTGTAGCCCGGGGATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGGTTTATCACCGGCGTCTCTCCAGAGTGCAGGCTTTACCTGCTGGCAAC
AGGAGGCAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGCTGACGACAGCCATGCAGACCTCTACACGAGTCCCGAAGGAACACTGTATCTC
TACAGCTGTCCCGTGCAGTTCAACCCCGGTAAGGTTCTTCCGCTTGCCTGCAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTCA
GCCTTGCACCGTACTCCCAGCGGAGTCTTAATGCGTTAGCTTCCGACAGAAAGGTTTATACCTTCTACACCAGC

>CUP1P3D06 Uncultured bacterium (Não classificada)

ATACTTCATATCGCCTCCCTATAAGGGTAGCTAAAATAATCTGGTATGAACAACCTTCGTGGTGTGGCGGGCGGTGTGTACAAGGTCGAGAACGATCACCGCGCGT
CTGTATGCGCGATTACTAGCGATTTCAACTTCATGGAGCCGGTTGCGAGCTCCAACTGAACTTAGACTGGCTTTTTGAGATTTGCTTCCCTCGCGGTTTGTCTGCT
CTTTGTACCAGCATTGTAACAGCTGTGTAGCCCTAGACATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCTTACTAGTTTCTTAGTCACTCCCGCAGAGTGC
CCCCAAAAATGAGGTAGCAACTGACGGCAAGGTTGCGCTCGTTAGAGGACTTAACCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGACCTGTGTATTTGT
TCGAGCAAGCTCGAAAAGCCGATTTCTACAGCTGTCAAATACATGTCAAAGCTAGGTAAGGTTCTCCGCTAGTGTCAATTAACCCACATGTTCCACCCTTGTGGG
GACCCCGTCAATTCCTTTGAGTTTAACTTTCGACCGTACTTCTCAGGGGATCACTTAACGCGTGTAGCTAGACAGCAATTT

>CUP1P3D08 Unidentified eubacterium from the Amazon (Não classificada)

GGCGTATGTCCTTGGCGGTTCCACACAGCGATTCTAGTACAGCCAGCTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGAACTTACCGCGCGCATGCTGA
TCCGCGATTACTAGCGATTCCAACCTTCATGCTGGCGAGTTGCAGCCAAACATCCGAATGAGACCGACTTATGCGATTAGCTCACTCTCGCGAGTTCGCGACGCTTTG
TATCGGCCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCTCCGGTTTGTACCCGGCAGTCTCTCCAGAGTGC
CATTACCCCGATGGCAACAGGAAACAAGGTTGCGCTCGTTGCGGGACTTAACCAAACATCTCACGACACGAGTGCAGCAGCCATGCAGACCTATGCAGCTTCTCT
GCGAAATCGACTTTCGCGCAGCTTTCGCTGCAATTCGAGCCAGGTAAGGTTCTTCCGCTCGCTGCAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCGTC
ATTCTTTGAGTTTACGCTTGCAGCCGTAATCCAGCGGAACTTCTTAATGCGTTAACTTCGCGACCGCAGGATACCCCGGCAACCAAGCATTTCATCGTTA
GGCCAGGACTACCGGGTACTTAATCCGTTTGCCTTCCCTGCTTCTTTCAGTGTAGATGCCGTCAGAAACG

>CUP1P3D09 Nevskia sp. (Gammaproteobacteria)

TCCTTGCCTTAGACTACCGGCTTCTGGTGCAGCACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGAACTATCACCGGACAAGTGTGATCCGCGATTA
CTAGCGATTCCGACTTCATGAGTTCGAGTTGCAGACTCCAATCCGACTACGATCGGCTTCTGGGATTAGCTCCCCCTCGCGGGTTGGCAACCCCTCTGTACCAGCAAT
TGTAGTACGTGTGAGCCCTGCTATAAGGCCATGATGACTTGACGTCATCCCCACCTTCTCCGGTTTGTACCCGGCGCTCTCTTAGAGTGCAGCCGAACTGCT
GGCAACTAAGGCAAGGGTTGCGTTGCTTGGCGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGACCTGTGTTCGAGTTCCCGAAGGCC
CGCATCTCTGACGGTCT

>CUP1P3D10 Uncultured gamma proteobacterium (Gammaproteobacteria)

GTCAGGCTACTGCTTCTGGTGCAGTAACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGAACTTACCCGCGCAATGCTGATCTGCGATTACTAGCGA
TCCGACTTCATGGATCGAGTTGCAGACTCCAATCCGACTACGATAGATTTCTGGGATTGGCTCCCGCTCGCGGTTGGCTTCCCTCTGTATCTACCATTTGTAGCA
CGTGTGTAGCCCTGGTCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCTCCGGTTTGTACCCGGCGGTCTCTCAGAGTGCAGCACTTAATGATGGCAACTA
AGGACAAGGTTGCGCTCGTTGCGGGACTTAACCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGACCTGTCTCTGGGTTCTTGGCGCACCCCGCATATCTC
TACAGGTTCCCGAGTGTCAAGGACAGTAAAGTTCTTCCGCTTGCATCGAATTAACCCACATGCTTCCACCCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTCAA
CCTTGCAGCCGTAATCCAGCGGAGGACTTAGCGGTTAGCTACGACACTGCGAGGCTTACCCTCTCAACGCTTAGTCTCATCGTTTATGGCGTGGACTACCAGGG
TATCTAATCCTGTTTGTCTCCCAAGCTTTCGTGCTGAACGTCGGTGTGACAGGAAAGCCGCTTTCGCGCACTGGTGTCTTCCGATATCTACGCAATTTCA

>CUP1P3D11 Uncultured bacterium (Gammaproteobacteria)

GTCAGGCTACTGCTTCTGGTGCAGTAACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGAACTTACCCGCGCAATGCTGATCTGCGATTACTAGCGA
TCCGACTTCATGGATCGAGTTGCAGACTCCAATCCGACTACGATAGATTTCTGGGATTGGCTCCCGCTCGCGGTTGGCTTCCCTCTGTATCTACCATTTGTAGCA
GTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCTCCGGTTTGTACCCGGCGGTCTCTCAGAGTGCAGCACTTAATGATGGCAACTA
GGACAAGGTTGCGCTCGTTGCGGGACTTAACCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGACCTGTCTCAGCGTTCTTGGCGCACCCCGCATATCTC
GAGGATTCGCGGATGTCAAGGACAGTAAAGTTCTTCCGCTTGCATCGAATTAACCCACATGCTTCCACCCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTCAA
CTTGCAGCCGTAATCCAGCGGAGGACTTAGCGGTTAGCTACGACACTGCGAGGCTTACCCTCTCAACGCTTAGTCTCATCGTTTATGGCGTGGACTACCAGGG
TATCTAATCCTGTTTGTCTCCCAAGCTTTCGTGCTGAACGTCGGTGTGACAGGAAAGCCGCTTTCGCGCACTGGTGTCTTCCGATATCTACGCAATTTCA

>CUP1P3D12 Uncultured bacterium (Acidobacteria)

ACGACATACTTAGCGCTCTCCCTTGGCGGTTGGTATGGCGACTTCTAGTACAACCGGCTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGAACTTACCCG
CGCGGTGCTGATCCGCGATTACTAGCGATTCTAATCTCATGCGCGGAGTTGCAGCCGACAATCCGAATGAGACAGACTTATCCGATTAGCTCCACCTTACCGTCTC
GCGACGTTTGTATCTGCCATTGTAGCAGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCTCCGGTTTATCACCGGCGAGTCTCTGC
AGAGTCCCCACATAACGATGAGCAACAGCAGCAAGGTTGCGCTCGTTGCGGGACTTAACCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGACCTTCTA
CGAGTGTCTTCCGGAAGCTCACTTTCGTGAGTGTCACTCGCTGATCGAATTAACCCACATGCTTCCACCCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTCAA
GGCCCCGTCATTCCTTTGAGTTTACGCTTGCAGCCGTAATCCAGCGTACTCCCAGCGGAACTGCTTAATGCGTTAGCTTCCGACGCGAGGATCGATACCCGCCATACCAAGCA
TTCATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCGTTTGTCTCCCTGGCTTTCGCTCCTCAGTGT

>CUP1P3E01 Uncultured bacterium (Acidobacteria)

TCCTTGCCTTAGCGCGCGGACTTCTAGTACAACCCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGAACTTACCGCGCGGTTCTGATCCGCCATTA
CTAGCGATTCCAGCTTCATGAGCGAGTTGCAGCCGCAATCCGAATGAGACCGGTTTTTGGGATTGGCTCCCGCTCCCGCTCGCGGTTGGCAGCCCTTTGTACCGTCCAT
TGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTTCCAGTTATCCCTGGCGGTCTCTGCGAGTTCACCTTTCTGTATG
GCAACACAGGACAAGGTTGCGCTCGTTGCGGGACTTAACCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGACCTTACTACGGTCCCTTGGCGGAAAGGCC
TGCTTTCACAGACTGGTCCGTAGCATTTCGAGCCAGGTAAGGTTCTTCCGCTTGGCTCGAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCGTCATTCCTTT
GAGTTTACGCTTGCAGTGTACTCCCAGCGGCAATTTAAGCGGTTAGCTCCGCGACAGACCAATGAATGGCCACACCAAAATATGCATCGTTTAGGGCGTGGAC
TACCAGGATCTAATCCTGTTTGTACCCACGCTTTCGTGATCAGCGTACGTTACGGTCCAGAA

>CUP1P3E02 Uncultured soil bacterium (Acidobacteria)

GCTCCTTGCCTTGGCGCGGACTTCTAGTACAACCCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGAACTTACCGCGCGGTTCTGATCCGCCATTA
ACTAGCGATTCCAGCTTCATGAGCGAGTTGCAGCCGCAATCCGAATGAGACCGGTTTTTGGGATTGGCTCCCGCTCCCGCTCGCGGTTGGCAGCCCTTTGTACCGTCCA
TTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTTCCAGTTATCCCTGGCGGTCTCTGCGAGTTCACCACTAATGAT
GGCAACACAGGACAAGGTTGCGCTCGTTGCGGGACTTAACCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGTACCTATACTGTGATCCCTTGGCGGAAAGGC
CTGCTTTCACAGACTGGCCAGACGATTTTCGAGCCAGGTAAGGTTCTTCCGCTTGGCTCGAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCGTCATTCCTTT
GAGTTTACGCTTGCAGTGTACTCCCAGCGGCAATTTAAGCGGTTAGCTCCGCGACAGACCAATGAATGGCCACACCAAAATATGCATCGTTTAGGGCGTGGAC
TACCAGGATCTAATCCTGTTTGTACCCACGCTTTCGTGATCAGCGTACGTTACGGTCCAGAA

>CUP1P3E03 Uncultured soil bacterium (Alphaproteobacteria)

GTGGACGTTACCCCTTGGCGGTTGGCGCACCAGCTTAAGGCCAAACCACTCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGAACTTACCGCGCGGTTGCG
TGATCCGCGATTACTAGCGATTCCACCTTCATGCACCCGAGTTGCAGAGTGCATCTGAACTGAGACGGCTTTTGGGATCGGCTCGGCTTGCAGCTGGCATCCCGC
GTCCAGCCGATTTGAGCAGTGTGTAGCCAGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGCTTGTGACCCGGGACTTCTTAGAGTGGCC
AGCCAACTTGTGCACTGAGGCGAGGTTGCGCTCGTTGCGGGACTTAACCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGTACCTGTGCGGGAGGTC
CTTGGGAAAGGTTCACTCTGGACCGGCTTCCCATGTCAAAGCCTGGTAAGGTTCTGCGGTTGCTTCAATTAACCCACATGCTCCACCCTTGTGCGGGCCCC

GAAGGTGCTCCTGCGGTTAGACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTCTGATCCGGC
 ATTACTAGCGATTCCAGCTTTCATGGAGTCGAGTTGCAGACTGCAATCCGAACCTGAGCCGGCTTTTCCGATTAGTCCCCCTCACGGGTTTGCAGCGGTTTGTACCGA
 CCATTGTAGCACGTGTGTAGCCCTTGACATAAAGGCCATGAGCACTTGACGTATCCCCACCTTCCCTCCGTTATCCGAGGCAGTTTCTACTAGAGTGCCCGGCTTGAC
 CCGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCAGCACAGAGCTGACGACAGCCATGCAGCACCTCCGACGAGTCTTTCGCGAAA
 AGGGATGTTTCCACCCCGTCCACTGCGCTTCAGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATGAACCACATGCTCCACCCTGTGCGGGCCCCCGTCAATTC
 TTTGATTTTCCAGCTTCCGACCTACTCCCAAGCCGATTGCTTATCCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGGTAAACCAAGCAATCATCGTTTAGGGC
 TAGGACTACCAGGTATCTAATCCCTGTTTGCCTCCCT

>CUP1P3F07 Uncultured beta proteobacterium (Betaproteobacteria)

CCCCCTGCGGTTAGGCTAACTACTTCTGGCAAACCGCTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCAAGCTGATCCGCGATTAC
 TAGCGATTCCGACTTCCAGCAGTCGAGTTGCAGACTGCGATCCGGACTACGACCGGTTTTCTGGGATTGGCTCCCCCTCCGCGGTTGGCAGCCCTCTGTACCGGCCATT
 GTATGACGTGTGTAGCCCTACCATAAAGGCCATGAGGACCTGACGTATCCCCACCTTCTCCGTTTGTACCCGGCAGTCTCATTAGAGTGCCCTTTCGTAGCAACT
 AATGACAAGGGTTGCGCTCGT

>CUP1P3F08 Uncultured alpha proteobacterium (Alphaproteobacteria)

CTCCTTGCAGGTTAGCGCGCGCTTCCGGTAAACAACCTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGTGATCCGCGATTAC
 TAGCGATTCCAACCTTATGACACTCGAGTTGCAGAGTGCATCCGAACCTGAGACGGTTTTTTCGAGATTGTAGGGGTCGCCCCCTTCGCTCCCGTTGTCACCGCCATTG
 TAGCACGTGTAGCCACAGCCTGAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCGTTATCACCGGCAGTCCCGCTGGAGTGCCCACTGAATGATGGC
 AACTAAGGCGAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCAGCACAGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGGCCCGAAGGGAAGATCCG
 ATCTCTGCAATCCGTCAGGACATGTCAAAGCTGGTAAGGTTCTGCGGTTGCTTCGAATTAACCAACATGCTCCACCCTGTGCGGGCCCCCGTCAATTCCTTTGA
 GTTTAATCTTCCGACCGTACTCCCAAGCCGATGCTTAAAGCTTATGCTGCGCCACTGAAGGCAAGCTCCCT

>CUP1P3F09 Uncultured bacterium (Sphingobacteria)

ATGGCTTACCGGCGGTGTGTACAAGGTCGCGGAACGTATCCCGTATCATTGCTGATATACGATTACTAGCGATTCCAGCTTATGCAGTTCGAGTGCAGACTGCAA
 TCTGAACCTGAGAAAGAGTTTGGGGATTAGCTTCCATCACTGTGTCGCTGCGCTTTGCTCTCCCATTTAGCACGTGTGTAGCCCTGGGCATAAAGGCCATGATGAC
 TTGACATCATCCCTCCTTCCGCTTCTTACGACGGCAGTTTCTACTAGAGTTCACGCTTACCTGATGGCAACTAGTGTGGGGTTCGCGCTCGTTGCGGGACTTAA
 CCAACACCTCAGCGCAGAGCTGACGACAGCCATGACGACCTTACAGACAGTGTATGCTACAAAATGAGCTTTCACCCACGGTCTCTCTGCAATTCAGCCAGGTA
 AGGTTCTCGCTGATCATCGAATTAACCAACATGCTCCACCGCTTGTGCGGACCCCGTCAATTCCTTTGAGTTTCAACCTTGGCGGTGCTACTTCCAGGTTGGGATAC
 TAATGCTTTCGCTCAGACACCAACAGTGTATCGCTGATGTCGAGTATCCATCGTTTAGGGCGTGGACTACCAGCGTATCTAATCTGTTTATGATCCCAAGCTTTTCGTC
 CCTCAGTGCAATAAAGTGT

>CUP1P3F10 Uncultured bacterium (Acidobacteria)

GGTTAGCACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTGTGATCCGCGATTACTAGCGAT
 TCCAGCTTCCATGGAGTCGAGTTGCAGACTCCAATCCGAACCTGAGGCGCGGTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCAGCGTTTGTACCGACCATGTAGCAC
 GTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCGTTTCCGAGGCAGTTTCTACTAGAGTCCCGGCTTACCCGATGGCAACT
 AGGGATAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCAGCACAGAGCTGACGACAGCCATGCAGCACCTTATGCAGCAGCCTTAAAGGGGAAGGGATGTTT
 CCACCCCGTCTCCTGCAATTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATGAACCAACATGCTCCACCCTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTC
 AGCTTTCGACCGTACTCCCAAGCCGATGCTTATCCGCTTACTGCGGACAGCAGGATTGGGTACTGCTACCAAGCAATCATGTTTAGGGCTAGGACTACCA
 CGGTATCTAATCTGTTTGTCTCCCTAGCTTTCGCGCTCAGCGTCAAGTATGGTCCAGTGCAGCGCTTTCGCGCACAGG

>CUP1P3F11 Burkholderia sp. (Betaproteobacteria)

TCTCCTTGCAGGTTAGACTAGCCACTTCTGGCAAAACCTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATGCTGATCCGCGAT
 TACTAGCGATTCCAGCTTCCAGCAGTCGAGTTGCAGACTGCGATCCGGACTACGATCCGTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCAGCGTTTGTACCGACCATGTAGCAC
 ATTGTATGACGTGTGAGCCCTACCATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCGTTTGTACCGGCAGTCTCCCGGAGTGTCTTCCGTTAGCA
 ACTGGGACAAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCAGCACAGAGCTGACGACAGCCATGCAGCACCTGTGTGACGGCTCCCTTTCGGGCACTTCCA
 CCTCTCAGCAGAACTCCGTCATGTCAAGGGTAGGTAAGGTTTTTTCGCGTTGATCGAATTAATCCACATCATCCACCCTGTGCGGGTCCCGCTCAATTCCTTTGAG
 TTTAATCTTGGCAGCCTACTCCCAAGCCGATGCTTAAAGCTTACTGCGGACAGCAGGATTGGGTACTGCTACCAAGCAATCATGTTTAGGGCTAGGACTACCA
 CAGGATCTAATCTGTTTGTCTCCCTAGCTTTCGCGCTCAGCGTCAAGTATGGTCCAGTGCAGCGCTTTCGCGCACAGG

>CUP1P3F12 Bradyrhizobium genosp. (Alphaproteobacteria)

GGCTGCCCCCTTTCGTTAGCGCACCGTCTTCAAGTAAAGCCAACCTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGTGGCGTGTGATCCAGC
 ATTACTAGCGATTCCAACTTTCATGGGCTCGAGTTGCAGAGCCCAATCCGAACCTGAGACGGCTTTTTCGATTAGCTCCCCCTCCGCGGTTGGCAACGGTTTGTACCTGCAATGTAACA
 CATTGTAGACGTGTGAGCCCTACCATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCGTTTGTACCGGCAGTCTCCCGGAGTGTCTTCCGTTAGCA
 GGTAGCAACTAAGGACGGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCAGCACAGAGCTGACGACAGCCATGCAGCACCTGTCTCCGGTCCAGCCGAACTGA
 AGAACCCGCTCTCGTGTCCGCGACCGGGATGTCAGGGCTGGTAAGGTTCTGCGGTTGCGTGAATTAACCAACATGCTCCAACCGGTTGTGCGGGCCCCCGTCAAT
 TCCTTTGAAGTTTAACTTTCGCAACCTACTCCCAAGCCGGAATGCTTAAAGCGTTAGCTGGGCCACTAA

>CUP1P3G02 Uncultured bacterium (Acidobacteria)

GGTTAGCGTGACACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGTGCATCTGATACGCCATTACTAGCGA
 TTCCGGCTTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACCTGAGCAGAGTTTTTTCGATTAGCTCCCCCTCCGCGGTTGGCAACGGTTTGTACCTGCAATGTAACA
 CGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTATCCCCACCTTCCCTCCGTTTATCCGGAGCAGTCCACGTAGAGTTCCTCTTTCGAGTGGCAACTAC
 GTGACGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCAGCACAGAGCTGACGACAGCCATGCAGCACCTTACTCTCCCTTCCCGGGAAGCCGATTTTCT
 ACAGCTGCTCAGAGCATTTCGAGCCAGGTAAGGTTCTTCGCGTAGCTGCAATGAACCAACATGTTCCACCCTGTGCGGGCCCCCGTCAATTCCTTTGGGTTTCA
 GTCTTGCAGCCTACTCCCAAGGTCAGGACTTAAACCGGTTAGCTCCGGGACGACTTCCGAACGGAAGGCACCCCAAGTCTGATCGTTTAGGGCTAGGACTACCAGGG
 TATCTAATCCCTGTTTCCCTCCCTAGCTCTGTTCT

>CUP1P3G03 Uncultured bacterium (Acidobacteria)

TGCCTCCCTTGCAGGTTAGCCTGTAGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGCCATCATTCTGATACGG
 CATTACTAGCGATTCCAGCTTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACCTGAGAACGGTTTTTGGGGATTGGCTCCCCCTTGCAGGTTGGCAGCCCTTGTACCG
 TCCATTGTAGCAGTGTGTAGCCCTAGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCAGTTTATCCCTGGCGGTTCTCTGCGAGTTCCACCGATAA
 AGGTATGGCAACACAGGACAGGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCAGCACAGAGCTGACGACAGCCATGCAGCACCTGACGACCCATGACGACCTCCGCTCCG
 GAAGTCTCATTTCGAAAGTTGTCAAAGCCGTTTCGAGCCTAGGTAAGGTTCTTCGCGTTGCGTGAATGAACCAACATGCTCCACCCTGTGCGGGCCCCCGTCAAT
 TTCTTTGAGTTTACGCTTGCAGCTGACTCCCAAGCCGATATTTAAACCGTTAGCTCCGGCACGGATCAAATGAATGACCCAAACCAATATGCATC

>CUP1P3G04 Uncultured bacterium (Não classificada)

CGACTTCGGGAGCAGACTCGGTTGATGTGACGGGCGGTGATGCAAGGCCCGGGAACGTATCACCGCAGTGTGCTGACTGCGGTTACTAGCAACTCCGACTTCAAT
 TGTGGCGAGTTGCAGCAACAATCCGAACCTGAGACCGGCTTTTAGGATTTGCTTCCAGTTGCGGTGTCGGAACCCGTTGTACCGGCCACTGTAGCGTGTGTTTGGCC
 TGGACATAAAGGCCATGCGGACTTGCAGTTCATCCCCACCTTCCCTCCGTTTTCGCCCCGAGTCTCCCTAGAAGATTCAACTAAGACAGGGTTGCGCTCGTTGCGGG
 ACTTAAACCAACACTCCAGGCAGGACTGACGACAGCCACTGCTGAGAACCTCTGCGAGGGCGCTGACTTTCACCGGTTTCTTCTACATGTCAA
 CCAGGTAAGGTTCTTCCGCTCGCTGCAATTAACCAACACCTCCGCTGCTTGTGCGGGCCCCCGGCTATTCCCTTTGAGTTTTAAACCTGT

>CUP1P3G05 Uncultured bacterium (Não classificada)

TTCGCGCTCCGTTCCCTCAGCGGTTGCGGCAGCGACTTCCGGAGCACCAGACTCGGGTGTGATGTGACGGGCGGTGAGTGAAGGCCCGGGAACGTATCACCGCAGTGTG
 CTGACTGCGGTTACTAGCAACTCCGACTTTCATGCTGGCAGTTCGAGCAACAATCCGAACCTGAGACCGGCTTTTAGGATTTGCTTTCAGTTGCGGTTCCGGAACCC
 GTTGTACCGCCATTGTCAGCTGTGTTGCTGGACTGAGACATAAAGGCCATGCGGACTTGACGTATCCCCACCTTCCCTCCGTTTTCGCCCCGAGTCTCCCTAGAAGATTCAACTAAGACAGGGTTGCGCTCGTTGCGGG
 TCAACTAAGGACAGGGGTTGCGCTCGTTGCGGGACTTAAACCAACACTCAGGCACGAGCTGACGACAGCCATGCACCCTGTGTAGAACCTTCTGCGAGGGGCTTTCCTACATGTCAA

TGACTTTTACCAGCGTTTCTTACATGTCAAGCCAGGTAAGGTTCTTCGCGTGCCTCGAATTAACCACACGCTCCGCTGCTGTGCGGGCCCCCGCTATTCCCT
TGAGTTTTAACCTTGCAGCGTGTAGTCCCGAGGCGGTGAACCTTAATGCGTTAGCTGCGGCACTGATCGGGTCAATCCGACCAANACCTAGTTTCAACAGTTTAGGGCGTG
GACTACCCGGGTATCTAATCCGGTTGCTCCCAAGCTTTCCGGCTC

>CUP1P3G06 Acidobacteria bacterium (Acidobacteria)

GCTCCTTGCAGTTAGCGTGACGACTTCTAGTACAACCTCACTTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGCTCGATCTGATACGCCAT
TACTAGCGATTCCGGCTTATGCAGTGCAGTTGCAGACTGCAATCCGAAGTGCAGAGTTTTTTCCGATTAGCTCCCGCTCGCGGGTTGGCAACGGTTTGTGCCCTGC
ATTGTAACACGTTGTAGCCCTGGACATAAAGGCCATGCGGACTTGCAGTGCATCCCGACCTTCTCTCCGTTATCCGGAGCAGTCCACGTAAGTTCCTCTTGCAGT
GGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGACTTAACCCAACACTCACGGCACAGCTGACGACAGCCATGCAGGCCCTCCACACTTGTCCCTTGCAGGAAAGT
CGTATTCTACAACCTGTCAAGTGCCTTCGAGCCAGGTAAGGTTCTTCGCGTGCCTCGAATTAACCACATGTTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTT
TGAGTTTACGTTTGCAGCCGTAATCCCGAGTGCAGGACTTAACCGGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCTGTATCG

>CUP1P3G08 Uncultured actinobacterium (Actinobacteria)

TGCTTCTAGTGAACCACTTTCGTGATGTGACGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCATTCTGATCTGCGATTACTAGCGATTCCAGCTTCATAGAG
TCGAGTTGCAGACTTAATCCGAAGTGCAGGCGGCTTTCCGATTAGCTCCCGCTCACGGGTTTGCAGACAGTTTGTACCGGCCATTGTAGCACGTTGTAGCCCTGGACA
TAAAGGCCATGAGGACTTGCAGTGCATCCCGCCTTCTCCCGCTTATCCGAGGCGGTCTCACAGAGTGCCTAACTAAATGATGGCACTGGTAATAAGGGTTGCGCTC
GTTGCGGGACTTAACCCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTATATAGCAGCCTATTGCTAGGAAGGAATTTCTACTCCGGTCCACTACAT
CTCGAGCCAGGTAAGGTTCTTCGCTGCGTGAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGT

>CUP1P3G09 Uncultured bacterium (Não classificada)

GCCGACTTCAGTGCCTGACCAGCTCCCATGACGCGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCATTCTGATCTGACGCGCGGTTACTAGCAACTCCGACTT
CATGTGGCGGAGTTGCAGCCCACTTGAAGTGCAGGCGGCTTGTGATTAGCTCCCGCTTGCAGGTTGGCTGCCATTGTACCGACCATTTGTAGCGTGTGTGTC
GCCCTGGACATAAAGGCCATGCTGACTTGCAGTGCATCCCGACCTTCTCCCGCTTGCAGGGCAGTTCGCGGTAGACAGTCTAACTACCGCCGAGGGTTGCGCTCGTT
CAGGACTTAACCCACACTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGACGCTCCTTCCGCTGCGGACGTTTCCACGCGCTACTAGCCCATGTCCAG
TCCAGGTAAGGTTGCTTTCGTTAAGCTTGAATTAACCACAGCTCCGCTGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTTCAGCTTGCAGCCGTAATCCCGAGG
GGGATGCTTACAGTTTCCCTCCGACAGAGCGGACTTAACCGCCAGGCTTCGATCCATCGTTTACGGCATGGACTACCGGGGTTTCTAATCCCG

>CUP1P3G10 Acidobacteria bacterium (Acidobacteria)

GCCCTGCGGTTGGCTCACCGGCTCTAGTGAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGCGGTTCTGATCCGCGATTAC
TAGCGATTCCAGCTTTCAGCTGCAGTGCAGTGCAGACTGCAATCCGAAGTGCAGGCGGCTTTTCCGATTAGCTCCCGCTTGCAGGTTGGCTGCCATTGTACCGCCATT
GTAGCACGTTGTGAGCCCTGGACATAAAGGCCATGAGGACTTGCAGTGCATCCCGACCTTCTCCCGCTTATCCGAGGCGGTTCTGCCAGAGTGCCTAACTAAATGGTGC
CAACTGGAAGTAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTATACTACGGCCCTTGCAGGGGAAAGGA
GTTTTCCACCCCGGTTGCATGCAATTCGAGCCAGGTAAGGTTCTTCGCTTGCCTTGCCTGCAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGA
GTTTACGCTTGCAGCCGTAATCCCGAGGCGGACTGCTTAACCGGTTAGCTACGGCACGCGGGATTGGGTACCCGTCACACCAAGAGTCACTGTTTAGGGCTAGGAC
TACCAGGTAATCAATCTGTTTGCAGCCGACTTTCGTCAT

>CUP1P3G11 Uncultured Acidobacteria bacterium (Acidobacteria)

ATGGATCATACTTGGCGGCTGCGCCCTTGCAGGCTGAGCTGAGCTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCC
ACGGCACGCTGTGATCTGCCATTACTAGCGATTCCAGCTTTCATGCAGGCGGTTGACGCTGCAATCCGAAGTGCAGGCGGTTTTCGATTGGCTCCCGCTCGCGG
GTTAGCGCGGCTTGTACCGCCATTGTAGCACGTTGTGAGCCCTGGACATAAAGGCCATGAGGACTTGCAGTGCATCCCGACCTTCTCCAGCTTATCGCTGCGGCTC
CTGCGAGTTCCGCTTCCGACTGCAACACAGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGCAGCTGACGACAGCCATGCAGCACCTC
GACTGGACCCCTTGCAGGGTAAAGATGTTTCCACCTCCGTTGACGAGCCGTTGAGCCAGGTAAGGTTCTTCGCTTGCCTGCAATTAACCACATGCTCCACCGCT
TGTGCGGGCCCCGCTCAATTCCTTTGAGTTTACGCTTGCAGCTGTAATCCCGAGGCGGCAATTAACCGGTTAGCTCCGGCACAGATCAACTGAATGACCC

>CUP1P3G12 Uncultured bacterium (Acidobacteria)

CGGCTGCTTCTTGCAGTTAGCCACCGGCTTCTAGTACAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCGTTCTGATCCGC
GATTACTAGCGATTCCAGCTTTCAGTGCAGTGCAGACTTCAATCCGAAGTGCAGGCGGCTTTTCCGATTAGCTCCCGCTTGCAGGTTTGCAGCGGTTTGTACCG
GCCATTGTAGCACGTTGTGCGCCCTGGACATAAAGGCCATGAGGACTTGCAGTGCATCCCGACCTTCTCCCGCTTATCCGGGGCGGTTTCCGACAGTGTGCGCATAA
CCCGGTAGCAACTGGCAATAAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTATAGAGCAGCCCTTGCAGG
AAGGATGTTTCCACCCCGGTTCACTTTCGAGCCAGGTAAGGTTCTTCGCTTGCCTGCAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGA
CTTTGAGTTTACGTTTGCAGCCGTAATCCCGAGGCGGATTGCTTATCGCTTAGCTGCGGCACATCGGGATTGGGTACCCGACACACCAAGCAATCATCGTTTAGGGC
TAGGACTACCAG

>CUP1P3H01 Uncultured delta proteobacterium (Deltaproteobacteria)

ATCACGACTTCCGGTACAGCGGCTTCCATGTTGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATTACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCACCT
TCATGGAGTCGAGTTGCAGACTCCAATCCGAAGTGCAGGCGGCTTTTGGGATTGGCTCCCGCTTGCAGGTTTGAACCCCTTGTACCGCCATTGTAGCACGTTGTGTA
GCCCGGATATAAGGCCATGAGGACTTGCAGTGCATCCCGCCTTCTCCCGTTTGCAGCGGCGGCTTCTAGAGTGCCTAACTAAATGATGGCAACTAGAGGCAAG
GGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTGAACAGAGGTTCCCGGAAAGGGAAGACCTTATTCTAAGGTT
GTCTCTGTTGCTTACCGCGGTTCACTTTCGAGCCAGGTAAGGTTCTTCGCTTGCCTGCAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGA
GCCGTAAGTCCCGAGGCGGCACTTAATGCTTGTAGTGCAGCCAGGCTCAATACCACGAAACCTAGTCCCATCGTTTACAGCGTGGACTACAGGGTATCTA
ATCCTGTTGCTCCACGCTTTCGCGTCTACGCTCAGTATCCGT
CC

>CUP1P3H02 Leptolyngbya badia (Cyanobacteria)

TGCTTCCGGCCTCCTCCAGAATGGTTGGAGTACGACTTCCGGGCTGGCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGTATGCT
GACCGGCGATTACTAGCGATTCCCGCTTCTAGTGCAGGCGGTTGCGAGCTGCAATCTGAACTGAGCCACGTTTATGGGATTAGCGCACCATCGCTGGCTGGCAACCCCTT
TGTCCGTAGCATTGTAGTACGTTGTAGCCAGGACGATGGGGCATGCTGACTTGCAGTGCATCCCGACCTTCTCCCGTTTGTACCGGCGAGTCTTCCAGAGTGGCC
AACTCAATGCTGGCAACTAAAGACGAGGTTGCGCTCGTTGCGGGACTTAACCTAATCTCACGACAGGCTGACGACAGCCATGCAGCACCTGACCCACCTGTTGTCGCTCCC
GAAGGACCCCTCCCTTCAAGAAAGTTGCGGACATGTCAGCCCTGGTAAGGTTCTTCGCTTGCATGCAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGCT
CAATTCCTTTGAGTTTCACTTTCGAGGCTACTCCCGAGGCGGCTACTTAACCGGTTAGCTCCGGCATGACCGGGTGCATAGCGTCAACGCTAGTACCCATCGTT
TACGGCTAGGACTACAGGGGATCTAATCCCTTTCGCTCCCTAGCTTTTCGCTCAGTGTGATGTA

>CUP1P3H03 Uncultured acetobacteraceae bacterium (Alphaproteobacteria)

GTGTGTACAAGGCCCTGGGAACGTATCACCGCGCATGCTGATCCGCGATTACTAGCGATTCCGCGCTTATGCACCCGAGTTGCAGAGTGAATCTGAACTGAGACGGC
TTTTGGGGATCGGCTCGGCTTGCAGCTGGCATCCCGCTGTACCGCCATTGTAGCACGTTGTAGCCAGGACATAAAGGCCATGAGGACTTGCAGTGCATCCCGAC
TTCTCCGCTTGTACCGGCGAGTCTTCTCAGAGTGCAGCCAAACCCGATGGCAACTGAATGCGAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACA
CGAGCTGACGACAGCCATGAGCCACTGTGTTGGGAGGCTTGCAGGAGGCTTTCGCGGCGCTTCCCGCTTGCAGGCTTGTGCAAGGCTTGTGCGGGCCCCGCT
CGAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTCAACCTTGCAGGCTTCCCGAGGCGGTTGCGCTTATCGCTAAGTACGACA
CTGAATGACTATGTCACCAAAATCCAGCCACATCGT

>CUP1P3H05 Uncultured bacterium (Acidobacteria)

GGTTTGCAGGCGGCTTCTAGTACAACCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGTGCATCTGATACGCCATTACTAGCGAT
TCCGGCTTCTAGTGCAGTGCAGTGCAGACTGCAATCCGAAGTGCAGGAGGTTTTTCCGATTAGCTCCCGCTTGCAGGTTGGCAACGGTTTGTGCCCTGCATTGTAACAC
GTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGCAGTGCATCCCGACCTTCTCCCGTTTATCCGGAGCAGTCCACGTAAGTTCCTCTTGCAGTGGCAACTAGC
TGCAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACTCACGGCACAGCTGACGACAGCCATGCAGGCCCTATACTCTGCTTCCGTTGCGGGCCCCGCTATTCTA
CAGCTTGTGAGAAGCATTTCGAGCCAGGTAAGGTTCTTCGCTGAGCTGCAATTAACCACATGTTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTACG

TCTTGGCACCCTACTCCCCAGGTGCAGGACTTAAACCGCTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCTGACCGTTTAGGGCTAGGACTACCAGGGT
ATCTAATCTGTTTT

>CUP1P3H06 Uncultured bacterium (Acidobacteria)

ATACCTTGGGCGTTGCTCCTTGCAGTTAGCGCGACGACTTCTAGTACAGCTCACTTTCTGTGATGTGACGGGGCGTGTGTACAAGGCCCGGGAACGTTTACACGGCGTTCGA
TCTGTATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACGTAGCAGAGTTTTTCCGATTAGCTCCCCCTCACGGGTTGGCAACG
GTTTGTGCCCTGCATTTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTT
CCCTCTTGCAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAAACCAACACCTCACGGCACGAGCTGACGACAGCCATGACGCGCTTACTCTCTGTC
CTTGGCGGAAGGCGTATTCTACAGCTGGTCAGAAGCATTTCCGAGCCAGGTAAGGTTCCCTCGCGTAGCGTCAATTGAACACATGTTCCACCGCTTGTGCGGGCCC
CCGTCAATTCCTTTGAGTTTCACTCTTGCAGCCGACTCCCCAGGTGCAGGACTTAAACCGCTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCTGATCG
TATAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGTCCCTAGCTTTCTGTTCTCAGCGTCAGTTGTGGTCCAGCGCGCGCTTTCGCCACGGGTGTTCTCTGACG
ATATCTACG

>CUP1P3H09 Uncultured alpha proteobacterium (Alphaproteobacteria)

GGTTAGCGCACCACTTCCGGTGAACAACCTCCCATGGTGTACGGGGCGTGTGTACAAGGCCCGGGAACGTTTACCCGGCATGCTGATCCGGGATTACTAGCGATTTC
CGCCTTCATGCTCTCGAGTTGCAGAGAACAATCCGAACGTAGAGCGGCTTTTGGAGATTAGCTCAACCTCCGCGGTTTGCAGCCCTCTGTACACCGCATTTGTAGCAGCTG
GTAGCCAGCGGTAAGGGCCATGAGGACTTGACGTATCCCCACCTTCTCTCCGGTATACCCGGCAGTTTCTTACAGTGCCCAACTAAATGGTAGCAACTAAAGA
CGAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGAGTGCAGCAGCCATGACGACCTGTGTCAGGTCCCGTAAGGGAAGGAATCCATCTCTGG
AAACCGTCTGCGCATGCAACGCTGGTAAGGTTCTGCGGCTGCTTCAATTAACCAACATGCTCCACCGCTTGTGACGCCCCCGTCAATTTCTTTGAGTTTAAAC
TTGCGGCGTACTCCCCAGGGGATGACTTAAACCGCTTAGCTGCGCCACCGGAACTCCAAGAGCCCCGACAGCCAGTATCATCGTTT

>CUP1P3H10 Uncultured bacterium (Acidobacteria)

CGCTTGCACCCCTTGCAGTTGCGGGCGACTTCTAGTACAACCTCACTTTCTGTGATGTGACGGGGCGTGTGTACAAGGCCCGGGAACGTTTACCGCGTTCGATCTGATA
CGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACGTAGCAGAGTTTTCTCCGATTAGCTCCCCCTCGCGGTTGGCAACGGTTTGTG
CCCTGCAATGTAACAGCTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCAGT

>CUP1P3H11 Burkholderia sp. (Betaproteobacteria)

TATCGCCTCCTTGGCGTTAGGTTACTTCTGGCAAAACCACTCCCATGGTGTGACGGGGCGTGTGTACAAGGCCCGGGAACGTTTACCCGGCATGCTGATCCGCGA
TTACTAGCGATTCCAGCTTACAGTTCGAGTTGCAGACTACGATCCGGACTACGATGGCGTTTTCTGGGATTGGCTCCCCCTCGCGGTTGGCAACCCCTCTGTAGCGCA
CATTGTATGACCGTGTGAAGCCATTACCATAAGGGCCATGAGGACTTGACGTATCCCCACCTTCTCTCCGTTTGTACCCCGCAGTCTCTCTAGAGTGCCTCTGTGAGC
AACTAAAGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGAGTGCAGCAGCCATGACGACACCGGTTGCCACTTTCCTTTCCGGCACCTGA
TGCATCTCTGTTTGTAGTGCATGTAAGGTTAGTAAGGTTTTCTCGGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTG
AGTTTTAATCTTGCAGCCGTACTCCCCAGGGGTCAACTTCCCGGTTAGCTGCGTT

>CUP1P4A01 Uncultured bacterium (Acidobacteria)

TCCTTGGCGTTAGCGCACCGGCTCTAGTGCAACCACTTTCGTGATGTGACGGGGCGTGTGTACAAGGCCCGGGAACGTTTACCCGGCGCTTCTGATCCGCGATTACT
AGCGATTCCAGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACGTAGGCGCGCTTTTCCGATTAGCTCCCCCTCGCGGTTTGCAGCGGTTTGTACCAGCCATTG
TAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCTCCGTTATCCGAGGCGGTTTACAGAGTGCCECAACTAATGATGGC
AACTGGGGATAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGAGTGCAGCAGCCATGACGACCTTACAGCAGCCCTTGCAGGGAAGGAAT
GTTTCCACTCCGTTCCACTGCAATTTCCAGCCAGGTAAGGTTCTTCCGCTTGCCTGCAATTAACCAACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAG
TTTCCAGCTTGGCAGCGTACTCCCCAGGGGATGCTTATCCGCTTAGCTGCGGACAGCGGATTTGGGTACCCGTCACACCAAGCAATCATCGTTTAGGGCTGGGACT
ACCAGGGTATCTAATCTGTTTGTCCCCAGCTTTCGTGCATCAGCGTCAGTTATGGTCCAGTAGCC

>CUP1P4A02 Uncultured bacterium (Não classificada)

CCAGTCACGACCACTCGACATCTGCCCTGACGGTTGGCAACGGCTTCCAGTGTTCGGCTCCCATGGTGTGACGGGGCGTGTGTACAAGGCCCGGGAACGTTTACCC
GTGGTGTGCTGACCCAGCTTGTGTAACAACCTCCGGCTTACAGGACGGCGAGTTGCAGCCTGCCATCCGAACGTGACCGGCTTTAGGGGATTGGCTCCACTCCGCGGTT
GTGTAGCCCTTACCATAAAGGGCCATGAGGACTGAGGACTGACGTATCCCCACCTTCTCTCCGTTTGTACAGCGGAGTCTCATTAGAGTGCCECTTCCGAGCAACTAATGACAA
CCGAAAAGTACAACGGACCCAGGGGTTGCGCTCGTTAGGGGACTTAAACCAACCTTCCAGGACAGGAGTGCAGCAGCCATGACGACCTTGTGGAACCCGGGACGA
ACCGGACAGCGGATAAACCGTGTGCACTCCATGTCAAACCCAGGTAAGGTTCTTCCGCTGCGATCGAATTAACCAACAGCTCCGCTGCTTGTGCGGGCCCCCGTCA
ATTCCTTTGAGTTTTAACCTTGGCGCGTACTCCCCAGGGGTCCTACTATCAGCTTAGCTGCGGACCCGAAGGGGTCGATACCTCCAGCACCTTGGTGGACATCGTTTA
CAGCTGGGACTACCA

>CUP1P4A03 Bacterium Ellin321 (Betaproteobacteria)

GGTTAGGCTAACTACTTCTGGCAGAACCCGCTCCCATGGTGTGACGGGGCGTGTGTACAAGGCCCGGGAACGTTTACCCGGCGAAGCTGATCCGCGATTACTAGCGATT
CCGACTTACGCACTGAGTTGCAGACTGCGATCCGGACTACGACCGGTTTTCTGGGATTGGCTCCCCCTCGCGGTTGGCAGCCCTCTGTACCAGCCATTGTAATGACG
GTGTAGCCCTTACCATAAAGGGCCATGAGGACTGAGGACTGACGTATCCCCACCTTCTCTCCGTTTGTACAGCGGAGTCTCATTAGAGTGCCECTTCCGAGCAACTAATGACAA
GGGTTGCGCTGTTGCGGGACTTAAACCAACATCTCACGACAGGAGTGCAGCAGCCATGACGACCTGTGTTCTAGTTCTCTTTCGAGCACTTTCACATCTCTGCAA
AATTTAGACATGTAAGGGTAGGTAAGGTTTTTCCGCTTGCATCGAATTAACCAACATCATCCACCGCTTGTGCGGGTCCCCGTCAATTCCTTTGAGTTTCAACCTTG
CGCGGTAATCCCCAGGGGTCAACTTCCAGCGTACTGACGTTACTGAGAAGGAACCTTCCCAACAGCAAGTGTGACATCGTTTAGGGCGTGGACTACAGGGTATCTA
ATCTGTTTGTCTCCC

>CUP1P4A04 Uncultured bacterium (Acidobacteria)

TCATACTGGCGCTATCTTCCCTTGCAGTAGAATGAGGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGGCGTGTGTACAAGGCCCGGGAACGTTTACCCAGCTCA
TTCTGATACGTGATTACTAGCGATTCCAGCTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACGTAGACCGGTTTTTCCGATTGGCTCCCTCTCGCGAGTTCCGCGAC
GGTTTGTACCAGCCATTGTAGCAGTGTGTAGCCCTGGGCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCTCCGTTTGTACAGCGGAGTCTCATTAGAGTGCCECTTCCGAGCAACTAATGACAA
GCTTCCCTTGCAGTACCACTAAGGGTGTAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGAGTGCAGCAGCCATGACGACCTTGTGGAACCCGGGACGA
CCTTGCAGGAAAATCTATCTCTGAGACGGTCAACAAAATTTCCAGTCCAGGTAAGGTTGCTTCCGCTTGCCTGCAATTAAGCCACATGCTCCACCGCTTGTGCGGGCCCC
CGGTCAATTCCTTTGAGTTTCAAGCCTTGCAGCGTACTCCCCAGGGGAACTTAAATGGTGTAGCTTCCGACAGCCCGTGGAGGGCTACACCCAGTATTCATCGTT
TAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGTCTCCCTAGCTTTCCGCGCTCAGCGTCGGTTATGGTCCAGATAG

>CUP1P4A05 Uncultured bacterium (Acidobacteria)

TTCTAGTACAGCTCACTTTCGTGATGTGACGGGGCGTGTGTGCAAGGCCCGGGAACGTTTACCCGGCGTTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCA
TCGAGTTGCAGACTGCAATCCGAACGTAGCAGAGTTTTTCCGATTAGCTCCCCCTCGCGGTTGGCAACCGGTTTGTGCCCTGCATTTGTAACACGTGTGTAGCCCTGGA
CATAAAGGCCATGAGGACTTGCAGTATCCCCACCTTCTCTCCGTTTACCGGAGCAGTCCCTCTCCGTTTGTGCGGACTTACAGGAGTTCCCTTCCGAGTGGCAACTACGTCAGGGGTTGCGCT
CGTTGCGGGACTTAAACCAACCTCACGGCACGAGTGCAGCAGCCATGACGCGCTTACTCTGTCCTTGCAGGGAAGGCGTATTCTACAGCTGGTCAGAAGC
ATTTCCAGCCAGGTAAGGTTCTTCCGCTAGCGTCAATTAACCAACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCACTTGCAGCCGACT
CCCCAGGTGACGACTTAAACCGGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGT
CTCCCTAGCTTTCGTTCTCAGCGTCAGTAGTGGTCC

>CUP1P4A06 Uncultured Acidobacteria bacterium (Acidobacteria)

GACTTCTAGTACGGCCACTTTCGTGATTGACGGGGCGTGTGTACAAGGCCCGGGAACGTTTACCCGGCGTTCGATCTGCGATTACTAGCGATTCCAGCTTCACTG
AGTCGGGTTGCAGACTTCAATCCGAACGTAGGCGCGGTTTTCCGATTAGCTCCCCCTCGCGGTTTGCAGCGGTTTGTACCGACCATTTGTAGCAGCTGTGTGGCCCTG
GACATAAAGGCCATGAGGACTTGCAGTATCCCCACCTTCTCTCCGTTTACCGAGCAGTTCGCTTAGAGTGCAGCCGATTAACCGATGCAACTAGCGATAAAGGGTT
GCGCTCGTTGCGGGACTTAAACCAACCTCACGGCACGAGTGCAGCAGCCATGACGCGCTTACTCTGTCCTTGCAGGGAAGGCGTATTCTACAGCTGGTCAGAAGC
ATTTCCAGCCAGGTAAGGTTCTTCCGCTAGCGTCAATTAACCAACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCACTTGCAGCCGACT
CCCCAGGTGACGACTTAAACCGGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGT
CTCCCTAGCTTTCGTTCTCAGCGTCAGTAGTGGTCC

>CUP1P4A07 Uncultured bacterium (Acidobacteria)

TCCTTTGCGGGTTGGTATGGCGACTCTAGTACAACCGGCTTCGTGATGTGAGGCGGTGTGTACAAGGCCGGGAACGTATCACCGCGCGTGTGATCCGCGATTACT
AGCGATTCCAACCTCAAGCAGGCGAGTTGCAGCCTGCTATCCGAACAGAGCCGACTTTCTCCGATTAGTCCCCCTTGGCGGCTCGCGACGGTTGTATCGGCCATTG
TAGCACGTGTAGCCCCAGACATAAAGGCCATGTGACTTGACGCTCATCCCCACCTTCCCTCCGGTTTATCACCGGCAGTCTTTGCAGAGTGCCCGAGCATTACCTGATG
GCAACAGCAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACGCCATGCAGCACCTTACGAGTGTCTTGGCGAAGTCAAC
TTTCGTCGATGGTACTCGCTGTCAAGCCTGGGTAAAGTTCTTCGCGTTGCGTCAATGAACCACATGCTCCACCCTTGTGCGGGCCCCGTCGAATTCCTTTGAGT
TTCAGCCTTGCAGCCGTACTCCCAGGCGGAATGCTTAATGCTTAGCTTCGGCACGACAGGGATCGATACCCGTACACCAAGCATTCATCGTTTAGGGCCAGGACTA
CGGGGTATCTAATCCCGTTTGTCCCTGGCTTCGCTCTCT

>CUP1P4A08 Unidentified eubacterium (Verrucomicrobiae)

GGTTGGCGCACATACTTCGGGTAAAACCGGCTTCATGACGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCAAGGTGCCGTTGCTGATACACCTTTACTAGCGAT
TCCGGCTTCATGGAGTCGAGTTGCAGACTCCAATCTGAACCTGGGCCTGGTTTTGGGATTTGCTCCACCTCGCGGTATTGCGTCTTTGTACCAGGCATTGTAGCACG
TGTGCAGCCCTGGGTGAAGGGCCACTACTGACTTGACGCTCGTCCCCACCTTCCACCTCTACAAGAGGTTTGTCTCCCTAGAGTCCCGGCATTACCCCGTGGCAACT
AAGGACAGGGTTGCGCTTGTTCGGGACTTAACCGAACATCTCACGACACGAGCTGACGACGCCATGCAGCACCTTGTCAAAATTTGTATTGTACACTACCCGGCT
TTCACCGGCTTAGAGATGCAATGTCAAACCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAGCCACATGCTCCACCCTTGTGCGGGCCCCGTCGAATTCCTTTGAGT
TTAGTCTTGCAGCCGTAGTCTCAGGCGGTGACTTAACCGCTTAGCTCGAGCCCTGAGAGGGTCAATCCCCAAAGCCTAGTGCACAACGTTTACAGTATGGACTAC
AGGGGTATCTAATCCCTTTTGTCCCGTACTTTCGAGCCTGAGTTCAGGATTTGTCACGGGCTGCCCTTCGCGCTCGGTGTCTCCAGAT

CT

>CUP1P4A09 Uncultured bacterium (Acidobacteria)

GGTTGGCCTGCGCGCTTCTAGTACAACCCACTTTCGTGATGTACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACGGCATCGTTCTGATATGCCATTACTAGCGAT
TCCAGCTTCATGACGGCGAGTTGCAGCCTGCAATCCGAACAGGACCGTTTTTGGGATTTGCTCCCGCTCACGGGTTGCTGCGCTTTGTACCAGGCATTGTAGCAC
GTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACGCTCATCCCCACCTTCCCTCAGCTTATCGCTGGCGTCTCCTGAGAGTGTCTTTCGCGAGTGGCAACACA
GGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACGCCATGCAGCACCTATACTACTGCTCCCTTGGCGGAACCCCAATCTTTC
GACCAGGCTCAGCAGCATTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTC
AGCCTTGCAGACGTACTCCCAGGCGGNATACTTAACCGGTTAGCTTCGGCACCGGCCAAGTGAATGGCCGACACCAAGATGCAATCGTTTAGGGCTGGACTACCAGG
GTATCTAATCCTGTTGCTACCCAGCCTTTCGCTGCTCAGCGTTCAGCCATGGTCCAGAAAGCCGCTTACACCACCGGTGTTCTCTCTG

>CUP1P4A10 Uncultured bacterium (Alphaproteobacteria)

GGTCGTGCTCCTTGGCGTTGGCGCAGCGCTTCGGGTAAAACAATCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCGCGTGTGATCC
CGGATTACTAGCGATTCCAGCTTCATGCCCTCGAGTTGCAGAGGACAATCCGAACAGGACCGTTTTTGGGATTTGCTCCCGCTCACGGGTTGCTGCGCTTTGTACC
CGCCATTGTAGCACGTGTGTAGCCAGCCATAAAGGCCATGAGGACTTGACGCTCATCCCCCGCTTCCCTCCGGCTTGTACCGGCAGTTCCTTTAGAGTGCCAGCATA
ACCTGATGGCACTAAAGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACGCCATGCAGCACCTTGTGCACCAGGCGAGCCGAA
CTGAAGAAACAGATTTCCATTCCATACCGGCATGTCAAGAGCTGGTAAGGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCGCT
CAATTCCTTTGAGTTTTAACCTTGGCGGCTACTCCCAGGCGGTGCGCTTATTCGCGTTAGCTGCGCACCGGAAAGTAAAGCTTCCCAACGCTTAGCGCACATCGTTT

AC

>CUP1P4A11 Uncultured bacterium (Acidobacteria)

AAGGCTGCTCCTTGGCGTTAGCACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCGCGTGTGATCC
GGGATTACTAGCAACTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACAGGACCGTTTTTCCGATTAGCTCCCGCTCACGGGTTGCGACGGTTGTGATC
CGACATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGCTCATCCCCACCTTCCCTCCTGTTATCCGAGGCAGTTCCTAAAGTGGCCCGCTT
ACCCGATGGCACTAAGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACGCCATGCAGCACCTTGTGCACCAGGCGAGCCGAA
GGGAAAGGATGTTTTCCACCCAGTCTCCTGCAATTCGAGCCAGTAAAGGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCGCTCA
ATTCTTTGAGTTTACGCTTGCAGCCGTACTCCCAGGCGGATTGCTTATTCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTA
GGGCTAGGAC

>CUP1P4A12 Uncultured bacterium (Anaerolineae)

GGCGGCTGCCCCTTGGCGTTGGCTGACCGACTTCAGGCGTGACAGCTCCCATGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCACTATGCTGACG
CGGGTTACTAGCAACTCCGACTTCATGGAGTCGAGTTGCAGACTGCAATCCGAACAGGACCGTTTTTGGGATTTGGCTCCGCTTGCAGACTTGGCTACCTATTGTT
ACCGACATTGTAGCGTGTGTAGCCCTGGATATACAGGCCATGCTGACTTGACGCTCATCCCCACCTTCCCTCCGGCTTGTACGGGCAGTTCGCTTAGACTATCTAAC
TAACCCGAGGGTTGCGCTCGTTTCCAGGACTTAACCTACACCTCAGGGCAGGAGCTGACGACAGCCATGCAGCACAGTGCAGCCACTCCGACTGTTTCCCAATC
TTGCAATGCGCATGTCAAACCCAGGTAAGGTTCTTCGCTGAGCTCGAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTTAGCCTT
GCGACCGTACTCCCAGGCGGATGCTTACCGTTTTCCCTCCGACAGGAAAGGACTTCTCCGNCACCGCTCGCATCCATCGTTTACGGCATGGACTACCGGGTTTT
CTAATCCCGTTCCGTTCCCATGCTGTGCTGCTCAGCGTCAGTAATGCGCCAGGA

>CUP1P4B01 Uncultured bacterium (Acidobacteria)

TATCTCCTCGGTTAATTCGCGGTTCTAGTACAACCTGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCTGCTTGTGATCAGCGATTA
TAGCGATTCCAGCTTCATGCACTCCGACTTCATGGAGTCGAGTTGCAGACTGCAATCCGAACAGGACCGTTTTTGGGATTTGGCTCCCGCTTGCAGACTTGGCTACCTATTGTT
TGTAGTACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGCTCATCCCCACCTTCCCTCCGGTTTTTACCAGGCAGTCCCTTTAGAGTGTCTCAGCATAAAGCTGG
TGGAACTAAAGCAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTAGTCCCTTGGGGGAAAA
GACTTTTCGCCACTCTCTGTTGCGCCGACCGGATGTCAAAGGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCGTCGAATTCCTTT
TGAGTTTACGCTTGCAGCCGTACTCCCAGGCGGATGCTTAATGCGTTAGCTTCGGCACAGCCGATTCAATCCCGCTCACACCAGATCCATCGTTTAGGGCTAG
GACTACCAGGATCTAATCCTGTTTGTCCCTAGCTTTCGTGCTCAGCGTCAGTTCTGTCCAGGTAGCCGGCTTCCGCCAGGTTGCTTCTCT

>CUP1P4B02 Uncultured bacterium (Alphaproteobacteria)

GGCCGGCTGCCCTTGGCGTTGGCGCACCGCTCTTAAGGTAATCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCAGCGTGTGAT
CTCGGATTACTAGCGATTCCAACCTTCATGTGCTCGAGTTGCAGAGCACAATCCGAACAGGACCGTTTTTGGGATTTGGCTCCCGCTTGCAGACTTGGCTACCTATTGTT
ACCGCATTGTAGCAGTGTGTAGCCCACTGTAAGGGCCATGAGGACTTGACGCTCATCCCCACCTTCCCTCCGGCTTATCACCGGCAGTCCCTTTAGAGTGCCTCAGCATAAAGCTGG
TAATGATGGCACTAAGGGCAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCCGTTCCAGCCGA
ACTGAAAGGCTCCACTCTCTGTTGCGCCGACCGGATGTCAAAGGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCGTCGAATTCCTTT
TCAATTCCTTTGAGTTTTAATCTTGCAGCCGTACTCCCAGGCGGATGCTTAATGCGTTAGCTTCGGCACAGCCGATTCAATCCCGCTCACACCAGATCCATCGTTTAGGGCTAG
ACGGCGTGGACTACCAGGATCTAATCCTGTTTGTCCCCACGCTTTCGCACCTCAGCGTCAGTACCAGGCGCAGT

>CUP1P4B03 Uncultured bacterium (Não classificada)

GGGCGCTATCTTCTTGGGTTAGAAATGACGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCGCGNTTCT
GATCCGCGATTACTAGCGATTCCAGCTTCATGCTCGAGTTGCAGAGCACAATCCGAACAGGACCGTTTTTGGGATTTGGCTCCCGCTTGCAGACTTGGCTACCTATTGTT
GTACCGGCCATTGTAGCAGTGTGTAGCCCTGGCATAAAGGCCATGAGGACTTGACGCTCATCCCCACCTTCCCTCCCGTTATCCGAGGCGGTTCCCTTGGGTTGCTT
CCCTTGGCGGTTAGCAACAAGGGTAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATCCAGCCGCTCC
TTGGGGAAAGCCCTCATCTCTGAGAGCGGTCAGTATGATTTTCGAGTCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCCTTGTGCGGGCCCC
GTCGAATTCCTTTGAGTTTTAGCCTTGCAGCCGTACTCCCAGGCGGAGCCTTAATGCGTTAGCTTCGGCACACCCCGTGAAGGGCTACACCAGTGTCTCATCGTTA
AGGCGGGACTACCAGGATCTAATCCT

>CUP1P4B05 Bradyrhizobium sp. (Alphaproteobacteria)

CAGTCTGCGACTAGCTGCGGCTGCCCTTCGTTACGCACTCTTCAGTAAAACAACCTCCCATGGTGTAGGGCGGTGTGTACAATGCGGGGAACGTATCACCGTGGCGT
GCTGATCCAGATTACTAGCGATTCCAACCTCATGGGCTCGAGTTGCAGAGCCCAATCCGAACAGGACCGTTTTTGGGATTTGGCAAGGGTTGCCCTTAGCGTCCC

ATTGTCACCCGCATTGTAGCAGTGTGTAGCCAGCCGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCTCGCGGCTTATCACCCGGCAGTCTCCCTTAGAGTG
CTCAACTAAATGGTAGCACTAAGGACGGGGGTTGGCGCTGTTGCGGGACTTAACCCAAACATCTCACGACACAGGCTGACGACAGCCATGCAGCACCTGCTCCGGTCC
ACCGCAACTGAAGAACTCCGCTCTCGGAGTCCGCGACCGGGATGTCAGGGCTGTAAGGTTCTGCGCGTTCGCGTCAAAATAAACCCACATGCTCCACCGCTTGTGCGGG
CCCCGTCAATTCCTTTGAGTTTAACTTTGCGACCGTACTCCCCAGCGGAATGCTTAAAGCGTTAGCTGCGCCACTAGTGAGTAAACCCACTAACGGCTGGCATTCA
TCGTTTACGGCGTGGACTNACCAGGTATCTAATCTGTTTGTCTCCACCGCTTTCGTGCCTCAGCGTCAGTATCGGGCCAGTGAGCCGCTTCGCCACTGGTGTCTTG
CGAA

>CUP1P4B06 Uncultured gamma proteobacterium (Gammaproteobacteria)
CGGTGTGTACAAGGCCCGGAACGTATTCACCCGACGATAGCTGATCTGCGATTAAGGACTTCCGACTTCATGGAGTTCGAGTTGCAGACTCCAATCCGGACTGGGAT
CGGCTTCTGGGATTGGCTCCACCTCGCGGTATTGCAACCCTCTGTACCAGCATTGTAGTACGTTGTGTAGCCCTGGCCGTAAGGGCCATGATGACTTGACGTCATCCC
CACCTTCTCCGGTTTGTACCCGGCAGTCTCCTTAGAGTTCCACCATTACGTGCTGGCAACTAAGGACAAGGGTTGCGCTGTTGCGGGACTTAACCCAAACATCTCAC
GACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCTGATTCCCGAAGGCATCCCGCATCTCTGCAGGATTCCAGACATGTCAAGGCCAGGTAAGGTTCTTCGCGTT
GCATCGAATTAACCCACATACTCCACCGCTTGTGCGGGCCCCGTCATTTCTTTGAGTTTTCAGTCTTGCAGCCGACTCCCCAGCGCCGAACCTAACCGCTTAGCTT
CGACACTGATCTCCGAGTTGAGACCAACATCCAGTTCGCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCTGTTTGTCTCCACCGCTTTCGTGCCTCAGCGTCA
GTGTTGATCCAGATG

>CUP1P4B07 Uncultured bacterium (Acidobacteria)
CGGGTAGTGTGGCGATTCTAGTAAACCGGCTTTCGTGAGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACCCGCGGCTGCTGATCCGCGATTACTAGCGATTCC
AATCTCAAGCAGGCGAGTTGCAGCCTGCTATCCGAACTGAGAAGCGCTTCTCCGATTAGCTCCACCTTGCCTGATCGCGACGGTTGTACCGGCCATTGTAGCACGTG
GTAGCCCCAGACATAAAGGCCATGTGACTTGACGTCATCCCCACCTTCTCCGGTTTATCACCCGGCAGTCTCTTACAGAGTGCCAGCATAACCTGATGGCAACAGAA
GACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTACAAAGTGTCTTCCGGAAGCTCCCTTTCGGGAG
TGGTACTCGCAGTTCAAGCCTGGTAAAGTTCTTCGCGTTGCGTCAAAATGAACACATGCTCCACCGCTTGTGCGGGCCCCGTCATTTCTTTGAGTTTACGCCCTT
CGGACCGTACTCCCCAGCGGAATGCTTAAATGCGTTAGCTTCGGCACGGCAGGG

>CUP1P4B08 Uncultured bacterium (Deltaproteobacteria)
TCCTCGGTTGGCGCAGCATTCTGGAGCAACGATCCCATGGTTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACCCGCTGCCTGCTGATCAGCGATTACTAGCG
ATTCGACTTCAAAGAGTCGAGTTGCAGACTCTTATCTGTACTGAGGTTGCTTTTTGCGATTGGCTTCCCTCGCGGGTTGCGGGCTTTGTAGCAACACTTGTAGC
ACGTGTGTAGCCCTGGACATAAAGGGCCATGATGACTTGACGTCGTCACCCACTTCTCCGATTGAAATATCGCGGCTCTACTAGAGTCCCGGCCGAACCGCTGGTAA
CTAGTATAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTAACCTAGCGCTCTCCGAAGAGCACCCCGAT
ATTTTACCAAGGCTCGCACGTTTCTAGCCAGGTAAGGTTCTTCGCGTTGCGTCAAAATGAACACATGCTCCACCGCTTGTGCGGGCCCCGTCATTTCTTTGAGT
TTTAGCCTTGGCGCCTACTTCCAGCGGGGGTGTAAATGCGTTGCTACGGCACACAGGAGTCAAAGCCGTGACACCTAGCACCCATCGTTTACGGCGTGGACTA
CCAGGATCTAATCTGTTGCTCCACCGCTTTCGTGCTCAGCGTC

>CUP1P4B09 Uncultured bacterium (Verrucomicrobiae)
ACCATACTTCGGCCCTGCTTCTGGGTTAGCACGGCAGCTTCGGTACAAAGCGGCTTTCATGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACGGCAC
CGTAGCTGATGGCCATTACTAGCAGATTCCGGCTTCATGCGCTTGCAGAGTTGCAGACGACAATCTGAACCTGGGCCCCGTTTTCGGGGATTGCTCCACCTGACGGTCTTGC
TTCCTTTGTACCGGGCATTGTAGTACGTTGTCAGCCCTGGCCGTAAGGGCCACTACTGACTGACGTCATCCCCACCTTCTCTCTCATTTAGATGAGGCGAGTCTGTCCA
GAGTGTCCGAACCTCTGTTTGGTGGTGAACAGGACACAGGGGTTGCGCTGTTGCGGGACTTAACCCAAACATCTCACGACACGAGCTGACGATAGCCATGCAGCACCT
GTGCAAGCTCCCTTGGGGGCTGCTCCACTTTTCATGTTTCTACCCTTGCATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCATCGAATTAAGCCACATACTCCACCG
CTTGTGCGAGGCCCGCTCAATTTCTTTGAGTTTAACTTTCGCGACCGTACTTCCAGCGGGCATAATTAACCGCTTGGCTACGCCCAAAAAGGGGTGAGTTCCTTTTAC
AGCAAAATGTGACCCCTTACCGCTAGGACTACCAGGGTATCTAATCTGTTTGTCTCCCTAGCTTTCGTGCCTCAGTGTCAAGGAGTGTCCAGGACTCGCTTCGCCA
CTGGTGTCTCTCGATATCTACGCATTTCACTGCTACA

>CUP1P4B10 Burkholderia terricola (Betaproteobacteria)
TCCTCCTTGGGTTAGACTAGCCACTTCTGGTAAAACCCACTCCCATGGTGTACGGGCGGTGTGTACAAGACACGGGAACGTATTCACCGCGCATGCTGATCCGCGAT
TACTAGCGATTCCAGCTTACGCACTCGAGTTGCAGAGTGCATCCGGACTACGATCGGTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCGACCTCTGTTCCGACC
ATTGTATGACGTTGAAGCCTTACCATAAAGGGCCATGAGGACTACGCTACCCACCTTCCCTCGGTTTGTACCGGCACTCCCTGGAGTGTCTTTCGCGTAGCA
ACTAGGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTACGGCTCCCTTTCGGGCACTCCA
CCTCTCAGCAGGATTCCGATACGTCAAGGGTAGGTAAGGTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGCTCAATTTCTTTGAG
TTTTAATCTTGGCAGCCTTCTCCGGTATCTCAAGTTAAACCCATGCTACCGGTTAGCTACGTTACCAAGCAATGAAGGCCCGCAACAGGTTGACATCGTTTAGGGCGTGGACTAC
CAGGGTATCTAATCTGTTTGCCTCCACCGCTTTCGTGATGAGCGTCAATTTGGCCAGGGGGTGGCTTCGGCATCGGGATTCTCCACATCTCTACGCATTTAC
TGTACACGTGGA

>CUP1P4B11 Uncultured bacterium (Sphingobacteria)
TACACCCAGCTTCCATGGCTTACCGGGCGTGTGTACAAGGTCGGGAACGTTTACCCGATCATTTGCTGATATACGATTACTAGCGATTCCAGCTTTCATAGGTCGAGT
TGCAGACCTCAATTTGAACCTGAGACAGGTTTTTTGAGATTAGCATCTGTTACCAGGTAGCAACCCCTTGTACCTGCCATGTGACGACGCGTGTAGCCCTGGGCATAAAA
GGCCATGATGACTTGACATCATCCCTCCTTCTCGCGCTTACGGCGGCGAGTTTCACTAGAGTTCACGACATTACCTGATGGCAACTAGTGTAGGGGTTGCGCTCGT
TGCGGGACTTAACCCAAACCTCAGGCGAGCTGACGACAGCCATGTCAGCAGCTTACAAATTTGTTGATTTGCTACAAGGTGAGCTTTCACCCAGCTCAAAAATGCATT
TAGCCAGGTAAGGTTCTCCGGTATCTCGAATTAACCCATGCTACCGGTTAGCTACGTTACCAAGCAATGAAGGCCCGCAACAGGTTGACATCGTTTAGGGCGTGGACTAC
CAGGGTATCTAATCTGTTTGCCTCCACCGCTTTCGTGATGAGCGTCAATTTGGCCAGGGGGTGGCTTCGGCATCGGGATTCTCCACATCTCTACGCATTTAC
TGTACACGTGGA

>CUP1P4B12 Uncultured bacterium (Não classificada)
GCGGCTGGCTCCTTGGCGTTACCCACCGACTTCGGGTGCAGACAACCTCAGGTGACGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCAGTTTACTGTA
CCTGCGGTTACTAGCGATTCCGGCTTACGCGAGGCGAGTTGACGCTGCGATGCAAAACCTGGTAAGGTTTACGGTTAGTACGATTAATAACCAACATGCTCCACCGCTTGTGCGGGCCCC
GTACATTCCTTTGAGTTTCAACCTTGCGGCGTACTCCCCAGCGGGGACTTACTGCGTTAGCTGCGGCACAGGGGGTGCATACCCCTGACACCTAGTATCCATCG
TTTAGGGTGGGACTACCCGGGTATCTAATCCCGTTCGCTCCCGGACTTTCGCGCATCAGCGTCAAGAATGCCCAAGAGCCGCTTCGCCACTGGTGTCTTACAG
ATATCTACGCATTTACC

>CUP1P4C01 Uncultured bacterium (Acidobacteria)
TCCTTGGGTTAGCGTGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACGGCGTGCATCTGATACGCCATTA
CTAGCGATTCCGGCTTCAATGAGTTCGAGTTCGAGACTGCAATCCGAACCTGAGCAGAGTTTTTCCGATTAGCTCCCGCTCGCGGTTGGCAACGGTTTGTACCCCTGCAT
TGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACGTTAGAGTTCCTTTCGCGAGTGG
CAACTACGTGACGGGTTGCGCTCGTTGCGGGACTTAACCCAAACCTCAGGCGAGCTGACGACAGCCATGCAGCGCCATACTCTGTCCTTTCGCGGGAAGGGCG
TATTTCTACAGCTGGTCAAGGATTCGAGCCAGGTAAGGTTCTTCGCGTACGCTCAAAATGAACACATGTTCCACCGCTTGTGCGGGCCCCGTCATTTCTTTG
AGTTTACGCTTTCGCGGACTTCCACCGTGCAGGACTTAACCGGTTAGCTCCGGGACGACTTCCGAACGGAAGGCACCCCAAGTCTGATCGTTTAGGGCTAGGACT
ACCAGGGTATCTAATCTGTTTGTCTCCCT

>CUP1P4C02 Duganella nigrescens (Betaproteobacteria)
TCTACGTGGTAGCGCTCCTTGGGTTAGCTACTTCTGGTAAAACCGCTCCCATGGTGTAGGGCGGTGTGTACAAGACCGGGGAACGTATCACCGCGACATGCTGATC
CGCGATTACTAGCGATTCAACTTCAATGATGAGTTCGAGACTCAAAATCCGACTACGATACACTTCTGGGATTAGCTCCCGCTCGCGGTTGGCGGGCTTCTGTA
TGTAACCTGTATGACGTTGAAGCCCTACCCATAAGGGCCATGAGGACTTACGCTATCCACCTTCCCTCGGTTTGTACCGGCTTCTTAGAGTGTCTTTCG
GTAGCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGAGGTTCTCTTTCGAGCA

CTCCCAGATCTCTCCGGGATTCCTGCCATGTCAAGGGTAGGTAAGGTTTTTCGGTTCGATCGAATTAATCCACATCATCCACCCTGTGTCGGGGTCCCGTCAATTCC
 TTTGAGTTTTAATCTTTCGACCGTACTCCCCAGCGGTCTACTTCACGGCTTAGCTCGCTTACTAAGTCAATTAAGACCAACAACACTAGTAGACATCGTTTAGGGCGTG
 GACTACCAGCGTATCTAATCTGTTTGTCTCCACCGCTTTCGTGCATGAACGTCAGTTTTG

>CUP1P4C03 *Dyella japonica* (Gammaproteobacteria)
 GGTAGACTAACGGCTTCTGGAGCAACTCACTCCCATGGTGTGACGGCGGTGCGTACAAGGCCGGGAACGTATTCACCGCAGCATAGCTGATCTGCATTACTAGCG
 ATTCCGACTTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTGGGATCGGCTTCTGGGATTGGCTCCACCTCGCGGTATTGCAACCCTCTGTACCGACCATTGTAGT
 ACGTGTGATAGCCCTGGCCGTAAGGGCCATGATGACTTACGCTCATCCCCACCTTCTCCGGTTTGTACCCGGCAGTCTCCTTAAAGTTCCACCATTACGTGTGGCAA
 CTAAGGACAAGGGTTGCGCTGCTTGGCGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGACGACACCTGTGTTCTGATTCCCGAAGGCACTCCCGCAT
 CTCTGCAGGATTCCAGACATGTCAAGGCCAGGTAAGGTTCTTCGCTGTCATCGAATTAACCCACATACTCCACCCTGTGTCGGGGCCCCGTCATTCCTTTGAGTTT
 CAGTCTTGCACCGTACTCCCCAGGGCGGAACTTAACGCGTTAGCTTCGACACTGATCTCCGAGTTGAGACCAACATCCAGTTCGCATCGTTTAGGGCGTGGACTACC
 A

>CUP1P4C04 Unidentified eubacterium (Acidobacteria)
 GGGAAAGCTACACCGCAGCGTGTCTGCGATTACTAGCATTACAGCTTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACAGGATGACTTTTTCCGATTAGCT
 CCCCCTCGCGGGTTTGGCAGCGTTTGTATCACCCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGTTATC
 CGGGGCGGTTTCCGACAGAGTGCACCACTAAATGATGGCAACTGGCAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGATGACAGCCA
 TGCAGCACCTACGACAGCTCCCTTGGCGGAAGATGATATTTCCACACTGTCCACTGCGCTTCGAGCCAGGTAAGGTTCTTCGCGTTCGCTGCAATTAACCCACATG
 CTCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACGCTTTCGACCGTACTCCCCAGGGCGGATTGCTTATCGGTTAGCTTCGGCAGCGGAGGATTGGGTA
 CCTGCTACACCAAGCAGTATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTCTCCCTAGCTTTCGCGCTCAGCGTCAGTTAGGTCAGTGTAGCGCG
 TTTCCGCAAGGTTTCTCCGATATCTACGCAATTCACCGCTACCCGG

>CUP1P4C05 Uncultured bacterium (Não classificada)
 TTGCCGACTTTCGTTGGTGTGACGGCGGTTGTGACAGCCCGGGAACGATTCACCGTGGTGTGCTGACCCACGGTTACTAGCAACTCCAGCTTCAGGCAGGGCGGTT
 GCAGCCTGCACCTCCGAACAGACTGAGACTGGATTAGCGGATTAGCTCCCCCTCGCGGGTTGGCCACCAGATTGTGCCAGCCATTGTAGCGTGTGTGTCGCCAGGACGTAAGG
 GCGGTGCTGACTTGACGTCATCCCCACCTTCTCCACGTTGATCGCGGACGCTGTGTCGGACACCTGTAACCGACCACAGGGGTTGCGCTCGTTGCGGGACTTAACCCA
 ACACCTCACGGCACGACTGACGACAGCCATGACGACCTGTGCCACTACCCTTGGCGACCTCCGATCTCTCGGAGTTTAAAGGTCATGCAAGCCCTGGTAAGGTTGCT
 TCGCGTCGATCGAATTAACCCACAGCTCCGCTGCTTGTGCGGGTCCCCGTCATTCCTTTGAGTTTAAATCTTGCAGCCGCTACTCCCCAGGGCGGATATCTACTGTG
 TTAACACGGCACATATGGAGTCGATACACATACACCTAGTATCCATCGTTTACGGCTAGGACTACCAGGGGATCTAATCCCGTTTGTCTCCCTAGCTTTCGCTCCTC
 AGCGTCAGAACCAACCCAGGTCGATCGCTTCCGCTTCCGCTTCCGCTTCCGCT

>CUP1P4C06 *Dyella ginsengisoli* (Gammaproteobacteria)
 TGGTCTGCTCCCTCGCGTTAGACTAACGGCTTCTGGAGCAACTCACTCCCATGTTGACGGCGGGTGTACAAGGCCCGGGAACGTATTCACCGCAGCATAGCTGATC
 TGCGATTACTAGCGACTCCGACTTCCAGAACTCGAGTTGCGAGACTTCGATCCGACTGGGATCGGCTTCTGGGATTGGCTCCACCTCGCGGTATTGCAACCCTCTGTA
 CCGACATTGTAGTACGTTGTAGCCCTGGCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCTCCGTTTGTACCCGCGAGTCTCCTTAGAGTTCACCA
 TTACGTTGCTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGACGACACCTGTGTTCTGATTCCCGA
 AGGCACTCCCGCATCTCTGCAGGATTCCAGACATGCAAGGCCAGGTAAGGTTCTTCGCGTTCGCTGCAATTAACCCACATATCCACCCTGTGCGGGCCCCGTCAT
 ATTCCTTTGAGTTTAAATCTTGGACCGTACTCCCCAGGGCGGAACTTAACCGGTTAGCTTCGACACTGATCTCCGAGTTGAGACCAACATCCAGTTCGCATCGTTTA
 GGGCGTGGACTACCAGGGTATCTAATCCTGTTTGTCTCCCAAGCTTTCGTCCTCAGC

>CUP1P4C07 Uncultured bacterium (Betaproteobacteria)
 GGTAGGCGCCCTCCTTGGCGTTAGGAACTGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGCGGGTGTGTAAGGCCCGGGAACGTATTCACCGCGACATGCTGA
 TCCCGGATTACTAGCGATTCCGACTTCAATGAAGTCGAGTTGCAGACTTCAATCCGGACTACGACGCGCTTCTGGGATTGGCTCCCGCTCGCGGGTTGGCAACCCCTCTG
 TAGCGCCATTGTGACGTTGTGCGGCTTACCCTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCCGTTTGTACCCGCGGTTCCGATTAGAGTGTCTCAA
 CTGAATGTGGCAACTAATGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGACGACACCTGTGTTGAGGTTCCCTTT
 CGGGCACCCGCGCATCTCTGCAGCGTTTCCATCATGCAAGGTTAGGTAAGGTTTTTCGCGTTCGCTGCAATTAACCCACATATCCACCCTGTGCGGGCCCCGTCAT
 AATTCCTTTGAGTTTAAATCTTGGACCGTACTCCCCAGGGCGGAACTTAACCGGTTAGCTTCGACACTGATCTCCGAGTTGAGACCAACATCCAGTTCGCATCGTTTA
 AGGGCGTGGACTACCAGGGTATCTAATCCTGTTTGTCTCCCAAGCTTTCGTCCTCAGCGTCAGTGTGGCCAGGAGGCTGGCTTCGCCATCGGTGTTCTCCACATC
 TCTACGCATTTAC

>CUP1P4C08 Uncultured bacterium (Não classificada)
 GGCGGTGCTCTCTTGGAGTTAGCGCACCAGTTCATGATACCCCACTTTCGTTGATTACGGGCGGTGTGTAAGGCCCGGGAACGTATTCACCGCGCGTGTGATCCGC
 GATTACTAGCGATTCCAGCTTGTGAGCTGCTGCGGTTGCAGACTCCAATCCGAACAGGCGGACTTTCGCGTTGCGCTCCCGCTCGCGGGTTCCGATTGGGTTGATCC
 GCCATTGTAGCAGCTGTGATAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGTTTGTGCGAGGCAAGTTCCGCCAGAGTAGCTCGGCATA
 ACCCGGTGGCAACTGGCAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGACGACACCTCCGTTGGCGGCTCCTTGGCG
 AAAGGATGTTTCCACCCTGGCCACCAGCTTTCGAGCCAGGTAAGGTTTTCGCGTTCGCTGCAATTAACCCACATATGCTCCACCCTGTGCGGGCCCCGTCATTC
 CCTTTGAGTTTACGCTTGGACCGTACTCCCCAGGGCGGAACTTAACCGGTTAGCTCCGCGCAGCGGGATTGGGTACCCGCCACCAAGTGTTCATCGTTTAGGG
 CTAGGACTACCAGCGTATCTAATCCTGTTTGTCTCCCTAGCTTTCGCGCTCAGCGTCAGTGTGGTCCAGTGGCGC

>CUP1P4C09 Uncultured bacterium (Acidobacteria)
 TCCTTGGGTCAGGCGGCGACTTCTAGTACAGTCACTTCTGATGTACGGGCGGTGTGTAAGGCCCGGGAACGTATCACGGCGTGCATCTGATACGCCATTACTAGC
 GATTCCCGGTTTACAGCTGAGTTGACAGCTGAATCCGATTGAGCAGGTTTTTCCGATTAGCTCCCGCTCGCGGGTTGGCAACCGTTTGTACCTGCAATTAACA
 CGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCAATCTCCTTCCGTTATCCGGAGCAGTCCACAGAGTCCCTCTTTCGAGTAGTAACTGT
 GTGACGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGACGACGCTATACTAGTGTCCCTTGGCGGAAGGCAATTTCT
 ACAGCTGGTCACTAGCAATTCGAGCCAGGTAAGGTTCTCGCGTAGCGTCAATTAAGCCACATGTTCCACCCTGTGCGGGCCCCGTCATTCCTTTGAGTTTCA
 GCTTGGC

>CUP1P4C10 Uncultured bacterium (Acidobacteria)
 TGACTGTACTGGAAGGTGCTCCTTGGCGGACACACCTGCTTCTATACGGCCACTTCTGATGTGACGGGCGGTGTGTAAGGCCCGGGAACGTATTCACCGCGGCTT
 CTGATCCCGGATTACTAGCGATTCCAGCTTCAATGGAGTCGAGTTGCAGACTCCAATCCGAACAGGCGGCTTTCGATTAGCTCCCGCTCAGGGTTTGGACGGTT
 TTTGACCGACATTTGACAGCTGTGAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCTGTTTACAGGCAAGTTTCACTAAAGTGC
 CGGCTTGCAGGATGGCAACTAGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGACGACACCTCCGAGCGGT
 CTCTTGCAGACGCGGATGTTTCCACCGGATTCCACTCGCTTCGAGCCAGGTAAGGTTTTCGCGTTCGCTGCAATTAACCCACATATGCTCCACCCTGTGCGGGGCC
 CCGCTCAATTCCTTTGAGTTTACGCTTGGACCGTACTCCCCAGGGCGGAACTTTCGCTTATCGCGTTAGCTTGGCGACAGCAGGATTGGGTACCTGTACACCAAGCAAT
 ATCGTTTAGGGCTAGGACTACCAACGATCTAATCCCTGTTTGTCTCC

>CUP1P4C11 Uncultured bacterium (Acidobacteria)
 AAGGCTGCTCCTTGGCGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTTGATGTGACGGGCGGTGTGTAAGGCCCGGGAACGTATCACCGCGGCTTCTGATCC
 CGGATTACTAGCGATTCCAGCTTCAATGGAGTCGAGTTGCAGACTCCAATCCGAACAGGCGGCTTTCGATTAGCTCCCGCTCAGGGTTTGGACGGTTTGTAC
 GACCAATTTAGCAGCTGTGATGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCTGTTTACAGGCAAGTTTCACTAGAGTCCCGGCTT
 GACCCGATGGCAACTAGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGACGACACCTATGACAGCCTTTAA
 GGGAAAGGATGTTTCCACCCTGGCTCCTGCAATTCGAGCCAGGTAAGGTTTTCGCGTTCGCTGCAATTAACCCACATATGCTCCACCCTGTGCGGGGCCGCTCA
 ATTCTTTGAGTTTACGCTTGGACCGTACTCCCCAGGGCGGAACTTTCGCTTATCGCGTTAGCTTGGCGCAGCAGGATTGGGTACCTGTACACCAAGCAATCATCGTTA
 GGGCTAGGACT

>CUP1P4C12 Uncultured bacterium (Acidobacteria)

GGTCGAATCACCGGCTTCTAGTACAACCTGGCTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAAACGTATTAACCGTGCTTGTGATCAGCGATTACTAGCGA
 TTCCAGCTTTCATGCAGTTCGAGTTCGACAGCTGCAATCCGAACCTGAGAACCGTTTTTGTAGATTGGCTCCCGCTCGCGGGTTTGCACACTATTGTGCCGTCCATTGTAGTA
 CGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCAATCCCACTTCTCCGGTTTTTACCGGCGAGTCCCTTTAGAGTGTCAAGTTGACCTGGTGGCAAC
 TAAAGGCAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTAGTGTCCCTTGCAGGAAAAGACTT
 TCAGCCCTGTCAGTACCGCTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACACATACTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
 CAGCCTTGGCACCCTACTCCCAAGCGGGATACTTAATGCGTTAGCTTTCGCGACGACCGGATTCAATCCCGGTACACCAAGTATCCATCGTTTAGGGCTAGGA

>CUP1P4D02 Uncultured Acidobacteria (Acidobacteria)

GGTTAGACCCAGCGCTTTCAGGTGTGCGCACTTTCGTGGTGTGACGGGCGGTGTGTACAAGACCCGGAAACGTATCACCGTAGTATGCTGACCCACGGTTACTAGCAAC
 TCCGACTTCCAGGCGCGGGTTGACGCTACCATCCGAACCTGAGAACCGCTTTGCTGGGATCCGCTCCCGCTCGCGGGTTGGCTCCCGTTGTCGCGTCCATTGTAGCG
 TGTGTGTCGCCCAGGATGTAAGGGCGTGTGACTTGACGTCAATCCCGCTTCTCCCGTTGATCGAGGCACTCTCGTCCGAGAGTTTCAACCCAGACAGAGGGTTG
 CGCTCGTTGCGGGACTTAAACCAACACCTCACGGCAGGCTGACGACAGCCATGCAGCACCTTGCAGCGCTCCCTTGCAGGACGACCATCTTGGCGGTGACCG
 GCATGTCAAACCTTGTAAGGTTTTCGCGCTGCGCTCAATTAACACACCGCTCCGCTGCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTAACTTTCGACCGTA
 CTCACCGGCGGACCTTACTCGCTTGGCTGCGGACCGGAAGGGTTCGATCTCCACACCTAGTGGTCATCGTTTACGGCTAGGACTACCGGGGTATCTAATCCCG
 TTCGCAACCCCTAGCTTTCGCGCTGAGCGTACGTTACCGCAGGAGAC

>CUP1P4D03 Burkholderia nodosa (Betaproteobacteria)

GGTTAGACTAGCCACTTTCGCAAAAACCCACTCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGAAACGTATCACCGGCGATGCTGATCCGCGATTACTAGCGA
 TTCCAGCTTTCAGCAGTTCGAGTTCGACAGCTGCGATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCTCTGTTCCGACATTGTATGA
 CGTGTGAAGCCCTACCCATAAAGGCCATGAGGACTTGATGTCATCCCACTTCTCCGGTTTGTGACCGGCGAGTCTCCCTGGAGTGTCTTGCAGTACCACTAGGGAC
 AAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTACGGCTCCCTTTCGGGACATCCACCTCTCAGC
 GGACTTCCGTACATGTAAGGGTAGGTAAGGTTTTCGCGTTGCGTCAATTAACACATATCCACCGCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTAACTT
 TGCAGCCGTTACTCCCAAGCGGTAACCTTACCGGTTAGCTACGTTACCAAGCCAAATGAAGGCCGACAACAGTTGACATCGTTTACGGCGTGGAC

>CUP1P4D04 Uncultured bacterium (Acidobacteria)

CGCTGCTCCTTTCGCGCTGACCTGACAGCTTCTAGTACAATCCACTTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAAACGTATCACCGGACGCTGCTGATCTG
 CCATTACTAGCGATTCCAGCTTTCATGCAGGCGAGTTGACGCTGCAATCCGAACCTGAGACCGGTTTTTGTGCGATTGGCTCCCGCTCGCGGGCTTGCAGCGCTTTGTACC
 GGCCATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGCTATCCCGCTTCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTTCCCGCTTTC
 GGCATGGCAACACAGGAAAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCTTTCGCGG
 GTAGCGATGTTTCCACCGCGGTAACCGAGCCTTCGAGCCAGGTAAGGTTTCTTCGCGTTGCGTCAATTAACACATGCTCCACCGCTTGTGCGGGCCCCCGTCAAT
 TCCTTTGAGTTTTCAGCTTTCGACTGTACTCCCAAGCGGCATATTAACCGGTTAGCTCCGGCACGGATCAACTGAA

>CUP1P4D06 Uncultured bacterium (Acidobacteria)

GGGTTGATATGGCGACTTCTAGTACAACCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAAACGTATCACCGGCGATGCTGATCCCGGATTACTAGCGA
 TTCCAATTCAGCAGGCGAGTTGACGCTGCTATCCGAACCTGACGACGACTTTCCTCCGATTAGCTCCACCTTTCGCGTTCGCGAGGTTTGTATCTGCCATTGTAGCG
 CGTGTGTAGCCCTCAGACATAAAGGCCATGCTGACTTGACGCTCAATCCCGCTTCTCCCGTTTGTGACCGGCGAGTCTTTCAGAGTCCCGCACTTAACTGATGGCAAC
 AGAAGACAAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTACAGAGTTCCTTGCAGGAAAGCTCCCTTCG
 GATTGTCACCTCGCTGTTCAAGCCTGGGTAAGGTTTTCGCGTTGCGTCAATTAACACATGCTCCACCGGTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTAACTT
 CCTTGCAGCGTACTCCCAAGCGGAAATGCTTAAATGCGTTAGCTTTCGCGACGGCAGGATCGATACCCGNCANACCAAGCATTATCGTTTAGGGCCAGGACTACCGGG
 GTACTAATCCCGTTTGTCTCCCTGGCTTTCGCTCCCTAG

>CUP1P4D07 Uncultured eubacterium (Alphaproteobacteria)

AATCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAAACGTATCACCGGCGATGCTGATCCCGGATTACTAGCGATTCCACCTTTCATGCACTCGAGTTGCAGAGT
 CCAATCTGAACCTGAGACCGTTTTTGGGATTTCCTCCACTCGCGGTTATGCAACCCACTGTCACCGCCATTGTAGCACGTGTGAGCCAGCCATAAAGGCCATGAG
 GACTTGACGCTATCCCGCTTCTCCCGCTTGTGACCGGCGAGTTTCGTCAGAGTGCACCACTAAATGATGGCAACTGACAAATGGGGTTGCGCTCGTTGCGGGACTTA
 ACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTGGGAGCCAGCGAAGTGAAGGCGTTTCATCTTGAACACCAAACTCCCATGTAAGAGCT
 GGAAGGTTTCGCGCTGCTTTCGAATTAACACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTAACTTTCGCGGCGTACTCCCAAGCGGTTG
 TGCTTAAAGCGTTAG

>CUP1P4D08 Amycolatopsis fastidiosa (Actinobacteria)

CCATCGCAGTCCACCTTCGACCATCCCCCATAATGGGTTGGGCCATGGGCTTCGGGTGTACCGACTTTCGTGACGTGACGGGCGGTGTGTACAAGGCCCGGGAAACGT
 ATCACCGCAGGCTTGTGATTCGCGATTACTAGCAGCTCCGACTTTCACGGGTCGAGTTGACAGCCCGATCCGAACCTGAGACCGGCTTTAAGGGATTTCGCTCCACCTC
 AGGCTTCGCCCCTCTGTGACCGGCGATTGTAAGCATGTTGTAAGCCCTGGACATAAAGGGCGATGATGACTTGACGTCATCCCGCTTCTCCGAGTTGACCCCGGCA
 GTCTCCCATGAGTCCCACTTTCAGTGTGCGCAACATGGAACGAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACGGCCATGCAC
 CACTGTACACCCACCAAGGGGGCTACGCTCTGCAAGTTTTCGAGGATGTCAGGCGGTAAGGTTTTCGCGTTGATCGAATTAATCCACATGCTCCGCGC
 TTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTCGCGGCTTTCGCGGCGTACTCCCAAGCGGCGGCTTAAATGCGTTAGCTACCGCACGGAGAACTGGAATGCTCCCA
 NACCTAGCGCCCAAGTTTACAGCGTGGACTACAGGGTATCTAATTCGTTTCGCTCCCG

>CUP1P4D09 Uncultured bacterium (Acidobacteria)

GGTCAGCGACCGGCTTCTAGTACAGCCACTTTCGTGGTTGCGGGCGGTGTGTACAAGGCCCGGGAAACGTATCACCGCAGCGTGTGATCTGCGATTACTAGCGATT
 CAGCTTTCATGGAGTTCGAGTTCGACAGCTCCAATCCGGACTGGGATTTGGCTTTTCCGATTAGCTCCCGCTCGCGGGTTTGCAGCGGTTTGTACCAACATTGTAGCAGCT
 GTGTGCGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCGCTTCTCCCGTTTATCCCGGGCGGTTTCGCGAGAGTCCCAACTAAATGATGGCAACTGGCA
 ATAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTACGAGCAGCCCTTGCAGGAAAAGAGTATTCTAC
 TCCGTTCCACTGCGCTTCGAGCCAGGTAAGGTTTTCGCGTTGCGTCAATTAACACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTCAGCG
 TTGCGACCGTACTCCCAAGCGGCGTAAACCGTACGCTCCGCGCACGACAGGATTGGTATCCACTGTACACCAAGCGATCATCTCAGGGGCTAGGACTAC

>CUP1P4D10 Uncultured bacterium (Acidobacteria)

TCCTTTCGCGTTAGCACACTGCTTCTAGTACGCGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAAACGTATCACCGGCGGTTCTGATCCGCGATTA
 CTAGCGATTCCAGCTTTCATGGAGTTCGAGTTCGACAGCTCCAATCCGAACCTGAGGCGGGCTTTTCCGATTAGCTCCCGCTCACGGGTTTGCAGCGGTTTGTACCGGACT
 TGTAGCACGTTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCGCTTCTCCCGTTTATCCGAGGCGAGTTTCACTAGAGTGCAGGCTTTCAGCCGTA
 TGGCAACTGAGGACTTGACGTCATCCCGCTTCTCCCGTTTGTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTACGAGCAGCCCTT
 TTAAGGGGAAAG
 GGATGTTTCCACCCAGTCTCCGATTCGAGCCAGGTAAGGTTTTCGCGTTGCGTCAATTAACACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTCAGCG
 TGAGTTTTCAGCTTTCGCGGCTACTCCCAAGCGGATGCTTATCCGCTTAGCTGCGGCACGAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTAGGGCTAG
 GACTACCAAGNATCTAATTCCTGTTTTCGCTCCCTAGCTTTCGCGCACGACAGGATTGGTATCCACTGTACACCAAGCGATCATCTCAGGGGCTAGGACTAC
 TTTAC

>CUP1P4D11 Burkholderia tropica (Betaproteobacteria)

TCTGGCAAAACCACTCCCATGGTGTAGGGCGGTGTGTACAAGGCCCGGGAAACGTATCACCGGCGATGCTGATCCGCGATTACTAGCGATTCCAGCTTACGACAGTCA
 GTTGACAGCTGCGATCCGACTACGATCGGTTTCTGGGATTGGCTCCACTCCGCGCTTGGCAACCTCTGTTCCGACATTGTATGACGTTGTAAGCCCTACCCATA
 AGGGCCATGAGGACTTGACGTCATCCCGCTTCTCCCGTTTGTGACCGGCGAGTCTCCCTGGAGTCTTTCGCTAGCAACTAGGGACAAGGGTTGCGCTCGTTGCGG
 GACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTACCGCTTCCCGTTCGCGGACCCCGCTTTCGCGGAAAGGATGTTCAAG
 GTAGGTAAGGTTTTCGCTGTCATCGAATTAACACATCTCCACCGCTTGTGCGGGTCCCGCAATTCCTTTGAGTTTAACTTTCGCGGCTACTCCCGAGC
 GGTCAACTTTCAGCGTTAGCTACGTTACCAAGTCAATGAAGACCCGACAACAGTTGACATCGTTTAGGGCGTGGACTACAGGGTATCTAATCCTGTTTTCGCTCCCG
 GCTTTCGTCGATGAGGCTCAGTATTGACCA

>CUP1P4D12 Uncultured forest soil bacterium (Acidobacteria)

CGGTTAGCTCACCTGCTTCTAGTGCAACCACCTTTTCGTGATGTANGGGCGGTGTGTACAAGGCCCGGGAAACGTATCACCGCGGCATTCTGATCCGCGATTACTAGCGAT
TCCAGCTTCATAGAGTCAGTTGTCAGACTCTAATCCGAACCTGAGGCCGGCTTTTTCGATTAGCTCCCCCTCACGGGTTTGCAGCGTTTGTACCGGCCATTGTAGCAC
GTGGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCCGCTTCTCCCGTTATCCGAGGCGGTCTCACAGAGTGTCTCAACTAAATGGTAGCAACTGG
TAATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGCGGTCTATTGCTAGACCGCGATGTTTCC
ACCGGATTCCACTACATTTCCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTCAG
CCTTTCGACCGTACTCCCCAGGCGGATCGCTTAACGCGTTAGCTTCGCGACGGCGGATTGGGTACCCGTCACACCAAGCGATATCGTGTAGGGCTAGGACTACCAGG
GTATCTAATCCTGTTTGTCCCTAGCTTTTCGTGCATCAGCGTCAGTTGTGGTCCAGTGAGCGCTTTCGCCACAGGTGTTCTTCCGATATCTACGCATTTCCACC

>CUP1P4E01 Uncultured bacterium (Actinobacteria)

TTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCATGCACCATGTGCTAGCCCCGAAGGGGACCGTATTTCTACGGTTTTCCAGT
GCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTGAATTAACCACATGCTCCGCTGCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTTCAGCTTTCGCGCGGTA
CTCCCCAGGCGGGGAACCTTAATGCGTTAGCTTCGGCACAGCGGGGATCGACACCCCGCACACCTAGTCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCTG
TTCGCTCCCCACGCTTTCGCGTCTCAGCGTCACTCCGAGAGCCGCTTCGCCACGGGTGTTCTTCCGATATCTGCGCATTTACCAGCTACACCGGGAATTC
CACTCTCCTTTCGCGACTTACCGCTACGGTTTCAACCGACGCTTCGAGGTTGAGCCTCGAGTTTTACAGCTGACCTGTGCGGGCCGCTACACGCTTTCAGCCCA
ATAAATCCGGACAACGCTTCCGCTACGTAATACCGCGCTGCTGGCACTCAGTCAGTCA

>CUP1P4E02 Uncultured soil bacterium (Acidobacteria)

CATACTTGGGCGTCTGCTCCTTGGCGTTGGCACGACGACTTCTAGTACAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACGGCGTC
GATCTGATACGCCATTACTAGCGATTCCAGCTTATGACGATCGAGTTGACAGCTGCAATCCGAACCTGAGCGCGCTTTTTCGATTAGCTCCCCCTCACGGGTTTCGCGA
CGCTCTGTGGCGCGCATTGTAACACGCTGTGAGCCCTGGACATAAAGGCCATGCTGACTTGACCTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCTCTGATAGAG
TTCCCGCTTGGCGGTAGCAACTACGAGTAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTCTACACAGGTC
CCTTGGCGGAAGACCGGATTTCACAGCTGCTGTCGCGTTCAAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTGAACACATGTTCCACCGCTTGTGCGGGCC
CCCGTCAATTCCTTTGAGTTTACGCTTTCGCGACTCCCCAGGCGCAGGACTTAACGCGTTAGCTCCGGGACTTGCCTCCGTCACAGGGCAAACCCCAAGTCTGATG
GTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGTCTCCCTAACCTTTCGCTCCGCTCAGCGTCAGTTGCGATCCAGCGAGCCGCTTTCGCTCGGATGTCCTGCG
GGATATCTACGCATTTACC

>CUP1P4E04 Uncultured bacterium (Acidobacteria)

GGCGGTGTGTACAAGGCCCGGGAAACGTATCACCGCGCGTTCGTGATCCGCGATTACTAGCGATTCCAGCTTTCATGGAGTCGAGTTGACAGCTCCAATCCGAACCTGAGGT
CGGCTTTTTCGATTAGCTCCCCCTCACGGGTTGCGACGGTTTGTACCAGCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCC
CACCTTCTCCCGTTATCCGAGGCGGTTTCGCCAGAGTGCACCACTGAAATGATGCAATAAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGA
CACGAGCTGACGACAGCCATGACAGCACCTATATAGCATCCCTTCCGCGGAAGGGATGTTTCCACCCCGGTCACATATTCGAGCCAGGTAAGGTTCTTCGCGTTGG
TCGAATTGAACCATGTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTACGCTTTCGCGACTCCCCAGGCGGATGCTTATCGCGTTAGCTTCGG
CACGTTGGGATTGGGTA

>CUP1P4E05 Uncultured bacterium (Verrucomicrobiae)

TTCCGACACTTTTTAGGGGCGGCTTCGCGTTGCAACCGGCTTTCATGATGTGACGGGCGGTGTGTACAAGGCTGGGAACGTATTCACGGCGCGGTAGCTGATGCGCCATT
ACTAGCGATTCCAGCTTCATGCCGTGAGTTGACAGCAGCAATCTGAACCTGGCCCGGTTTTCGGGGATTGCTCCAGCTTACGCTCTGCTTCCCTTTGTACCGGGCA
TTGTAGTACGTGTGACAGCTGGCCCTGGCCATAAGGGCCACTGACTGACTTGACGTCATCCCCACCTTCTCTCCGTTGAAGCGAGGCGAGTCTTCCAGAGTGTCTCCAATTAAGG
GGTGGCAACAGGACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAGCTTCCCTTTCGCGGAT
GCTCAGACTTTCATCCTCTACTACTTGCATGTCAAGGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTGAGCCACATATCCACCGCTTGTGCGGGCCCCGTCGAAT
TCTTTGAGTTTTAACCTTCCAGCGCTACTTCCAGCGCGCGCTTTAACGTTTAACTTCGCCACGAGCGGGTTCGATTCCATTCACAGCAAACCGCGCACCGTTTAGGG
CCAGGACTACCAGGGTATCTAATCCCGTATGCTCCCTGGCTTTCGTGCT

>CUP1P4E06 Uncultured bacterium (Acidobacteria)

TCTTCTTGGCGTTAGAATTACGACTTCTAGTACAAACCCTTTCGTGATGTGACGGGCGGGGTGTACAAGGCCCGGGAAACGTATTCACCAGCTGTTCTGATACGTTGA
TTACTAGCATTCCAGCTTCATGACGCGGAGTTGACGCTGCAATCCGAACCTGAGCCCGGTTTTTTCGATTGGCTCCCCCTCGCGGGTTAGCAACGGTTTGTACCGGCG
CATTGTAGCAGCTGTGATAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCCGCTTCTCCCGTTATCCGAGGCGAGTCTCCCTTAGGGTGTCTTCCGCGG
TAGCAACTAAGGGTAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACAGCCGTCCTTTCGCGGAAAG
CCTCATCTGAAAGCCGCGGACTGCAATTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTTCGATTGAACCATGCTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTT
TGATTTTCAGCTTTCGCGACTCCCCAGGCGGAACTTAATGCGTTAGCTTCGGACA

>CUP1P4E09 Uncultured bacterium (Acidobacteria)

ACTTCTAGTACAACCCACCTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACCAGCGGCTGCTGATCCGCGATTACTAGCGATTCCAGCTTCATGG
AGTCGAGTTGACAGCTCCAATCCGAACCTGAGGATGGCTTTTCCGATTAGCTCCCCCTCGCGGGTTTTCGCGGTTTTCGCGGTTTGTACCACCCATTGTAGCAGCTGTGTAGCCCTG
GACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGTTTTCGCGGGCGGTTTTCGCGAGGTGCCCACTGAAATGAGCAACTGGCAATTAAGGGTTGCG
CTCTGTTCGCGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTATATAGCAGCCCTTTCGCGGAAAGGATGTTTCCACCCCGCCACTAC
ATTTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTTCGAATTGAACCATGCTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTTCAGCTTTCGCGACTT
CCCCAGGCGGATCGCTTAACGCGTTAGCTCCGCGACGATAGGATTGGTACCTATCACCAAGCGATCATCGTTTAGGGCTAGGACTACCA

>CUP1P4E10 Uncultured bacterium (Acidobacteria)

GGTATGTGGCGACTTCTAGTACAACCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACCAGCGGCTGCTGATCCGCGATTACTAGCGA
TTCCAACTTACGAGCTTCCGGCTTACGACGCTGCAATCCGAACCTGAGCCCGGCTTCTCCGATTAGCTCCACCTTACGGTATCCGCGAGGTTTGTACCGGCCATTGTAGCA
CGTGTGTAGCCCGAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCTCCGTTTATCACCGGAGTCTCTTCAGAGTGCACACCAATAGCTGATGGCAAC
AGAAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTACGAGTGTCTTTCGCGAAGACTCTTTCG
GAGTGTGTCATCTGCTTAGGAGGGTCTGCGGTTCAAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTGAACCATGCTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTCAG
CCTTTCGAGCCGTTACTCCCCAGGCGAATGCTTAATGCGTTAGCTTCGGCACGCGAGGATCGATAACCGNACACCAAGCATTATCGTTTAGGGCCAGGACTACCGGG
GTATCTAATCCCGTTTGTCCCTGTGCTTCGCTCATCAGCGTCAGTATCGGTCCAGGA

>CUP1P4E11 Uncultured actinobacterium (Actinobacteria)

GAGCGCTGCTTCTTCGCGTTGGCACGGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACCAGCGGCTGCTGATCCGCGATTACTAGCGA
TGCCCACTTACGAGCTTCCGGCTTACGACGCTGCAATCCGAACCTGAGCCCGGCTTCTCCGATTAGCTCCACCTTACGGTATCCGCGAGGTTTGTACCGGCCATTGTAGCA
CGTGTGTAGCCCGAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCTCCGTTTATCACCGGAGTCTCTTCAGAGTGCACACCAATAGCTGATGGCAAC
AGAAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTACGAGTGTCTTTCGCGAAGACTCTTTCG
GAGTGTGTCATCTGCTTAGGAGGGTCTGCGGTTCAAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTGAACCATGCTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTCAG
CCTTTCGAGCCGTTACTCCCCAGGCGAATGCTTAATGCGTTAGCTTCGGCACGCGAGGATCGATAACCGNACACCAAGCATTATCGTTTAGGGCCAGGACTACCGGG
GTATCTAATCCCGTTTGTCCCTGTGCTTCGCTCATCAGCGTCAGTATCGGTCCAGGA

>CUP1P4E12 Uncultured bacterium (Acidobacteria)

GTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAAACGTATTCACCAGCGGCTGCTGATCCGCGATTACTAGCGATTCCGCGCTTTCATGACGTCGAGTTGACAGCTGCAATC
CGAACTGAGCAGAGTTTCTCCGATTAGCTCCCCCTCGCGGTTTGGCAACCGGTTTTCGCGCTGCAATTGTAACAGGTGTTAGCCCTGGACATAAAGGCCATGCGGACTTTCG
ACGTCATCCCCACCTTCTCTCCGTTATCCGAGCAGCTCCAGTAGAGTTCCCTCTTCGCGAGTGGCAACTACGTGACGGGTTGCGCTCGTTTCGCGGACTTAACCCAAC
CCTCACGGCACGAGTACTGACAGCCATGCAGCGCTATCTCCGTTCCCTTCGCGGAGGCGGATTTTACAGCTTGTGCAAGACTTTCAGCCAGGTAAGGTTTCG
CTCCGCTGAGCTGCAATTGAACCATGTTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTTCAGCTTTCGCGACTTCCCAAGGTCAGGACTTAACG
CGTTAGCTCCGGAGCAGACCCGAAAGGGTGGCACCCCAAGTCTGATCGTTTAGGGCTAGGACTACAGGGTATCTAATCCTGTTTGTCCCTAGCTTTCGTTCTCT
AGGTCAGTAGTGTCCAGCGCC

>CUP1P4F01 Uncultured bacterium (Não classificada)

ACACCCAGCTTCCATGGCTTACGGGGCGGTGTGTGCAAGGTCGGGGAACGATATCACCGTATCATTGCTGATATACGATTACTAGCGATTCCAGCTTCATGGAGTCGAG
TTGCAGACTCCAATCTGAACTGAGAGGCGTTTTTGGGATTGGCTCCCTATCGCTAAGTGCCAGCCCTTTGTACGCCCATTTGTAGCACGTGTGCAGCCCTGGGCATAA
AGGCCATGATGACTTGACATCATCCCTCCTTCTCGGCTTACGACGGCAGTTTTCAGTAGAGTTCCAGCGTTACCTGATGGCACTACTGATGGGGTTGCGCTCG
TTGCGGGACTTAACCCAAACCTCACGGCAGGAGTACGACAGCCATGCAGCACCTTACTAAGTGTGATTGCTACAAAAGAGCTTCCACCTCGGTCACCTTAGCAT
TCTAGCCACAGTAAGGTTCCCTCGGTATCATCAATTAACCCAGTGTCCACCGCTTGTGCGGACCCCGCAATTCTTTGAGTTTCAACCTTGGCGTCTGACTTCC
CAGGTGGGATACTAATGCTTTCGCTCAGACACACAGTGTATCGGTATGTCAGATCCATCGTTTAGGGCGTGGACTAC

>CUP1P4F02 Uncultured bacterium (Deltaproteobacteria)

ACTGCTCCTTGGCGTTAGCGCGCCGTTTTCTTGGAGCACTGACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGATTACCCCTACCTGCTGATTA
GGGATTACTAGCGATTCCGACTTCATGCAGTTCGAGTTGCAGACTGCAATCTGAACTGAGGCCGTTTTTTCCGATTGGCTCCCTCGCGGTTAGCAACGGTTTTGTAC
CGGCCATTGTAGCACGTGTGTAGCCCTGGGCATAAGGGCCATGAGGACTTACGTCATCCCCACCTTCTCCGGTTTAAACACGGCAGTCTCGTTAGAGTCTCAGCCG
AAGTGTAGCACTAACACAGGGGTTGCGCTCGTTGGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTGGACACTCGGTTCTCTTG
CGAGCACATCCACATCTCTGCGGACTTCCGAGGGTTTCAACCCAGGTAAGGTTCTTCCGCTTGCCTGCAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCCGTC
AATTCCTTTAGGTTTTAGCTTCCGCGTATCCCGGCGGTTTCCAGGCGGGGTTCTTACCGGCTTGTGCGGGCCCCGTAATTCTTTGAGTTTACAGTCTGCGACCTACTAGCACCCATCGTTT
ACGGCGTGGACTACCAGGTTATCTAATCTGTTTGTCTCCAGGCTTTCGCGCTCAGGTCAGTATCC

>CUP1P4F04 *Dyella marenis* (Gammaproteobacteria)

CGTAAGGGCATGATGACTTGCATATCCACTTCCCTCGGTTGTCACGGAGTCTCCTAAGTTCACATTACTGCTGGCAACTAAGGACAAGGGTTGCGCTCGTTGG
GGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTGTGTTCTGATTCCCGAAGGACTCCCGCATCTCTGCAGGATTCCAGACATGTCAAGG
CCAGGTAAGGTTCTTCCGCGTATCCCAATTAACCCACATACTCCACCGCTTGTGCGGGCCCCGTAATTCTTTGAGTTTACAGTCTGCGACCTACTAGCACCCATCGTTT
CGCAACTTAAACGGTTAGCTTCGACA

>CUP1P4F05 Uncultured bacterium (Não classificada)

GGGGCTGCGTTCCTGGGGTTCGGCGCACCGACTTCTAGTACAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGATACCCGAGCGTTCTGATC
TGCGGTTACTAGCGATTCCAGCTTCATGGAGTTCGGGTTGCAGGCTCCAATCCGAACGAGGCCGCGTTTTTCCGATTAGCTCCCTTCCGAGGTTTGCAGCGGTTTGT
ACGACCATTTGATGACGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTACGTCATCCCCACCTTCTCCCGGTTATCCGGCGAGTTTTCGAGAGTGCCCAATAA
TAACCCGATGGCAACTAGAGATAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTCCGAGCGGGCCCCGTA
GGGCGGGATGTTTCCACCCATTCAGTTCGCGCTTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTGCAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCCGTCAA
TTCTTTGAGTTTACGCTTGCAGCGTACTCCCGAGGCGGATGCTTAAACCGGTTAGTACGGCACGATCCGATTGGGTACCGATCACCAAGCATCCATGGTTTAG
GGCTAGGACTAC

>CUP1P4F06 Uncultured bacterium (Acidobacteria)

CCCTTACGGTTGGCGTACCAGCTTCTAGTGAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGATACCCGCGGCTTCTGATCCGCGATTAC
TAGCGATTCCAGCTTCATGGAGTTCGAGACTCCAATCCGAACGAGGCCGCGTTTTTCCGATTAGCTCCCTTCCGAGGTTTGCAGCGGTTTGTACCGGCTTCT
GTAGCACGTTGTAGCCCTGGACATAAAGGCCATGAGGACTTACGTCATCCCCACCTTCTCCCGGTTATCCGGCGAGTTTTCGAGAGTGCCCAATAAATGATGG
CAACTGGAAGTAAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTTACATCCGCGCTTTCGCGGGGAAAGGA
TATTTCTACCCCGTCCAATTCGATTTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTGCAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCCGTCAAATTCCTTTGA
GTTTACGCTTGCAGCGTACTCCCGAGGCGGACTGCTTAAACCGGTTAGTACGGCACGCGGGATTGGGTACCCGTCACACCAAGCAGTATCGTTTAAAGG

>CUP1P4F08 Unidentified bacterium (Não classificada)

GGTGTGTACAAGGCCGGGAACGATACCGCTATCATCTGATATAGCATTACTAGCGATTCCGCTCTGCGAGCGATTGCAGTAAATCCGAACGAGGACGGTTTTGGCGA
TTACTCCCTTTCGCGGTTGGAGCGTTTTGTACCGCCATTTGACCGTGTGGCGCTGACATAAAGGCCATGATGACTTACGTCATCCCCACTTCTCCAGCTTATCGCTG
CGGCTTCTGAGTTCGCGCTTTCGCGCATGCAACAGGACAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCT
TCGACTCCAGTCCCTTTCGCGGAAACCGGTTTTCCACAGTCTGTCGAAAGCGGTTTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTGCAATTGAACACATGCTCCACCG
CTTGTGCGGGCCCCCGTCAAATTCCTTTGAGTTTACGCTTGCAGCGTACTCCCGAGGCGGCATACTTAAACCGGTTAGTCCGGCACGAAACCGAATGAACGGCTCACAC
CAAGTATGCATCGTTTAGGGCGTGGACTACCAGGTTATCTAATCTCTGTT

>CUP1P4F09 Uncultured alpha proteobacterium (Alphaproteobacteria)

CTCCTTGGCGTTAGCGCACCGGCTTCGGGTAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGATACCCGTTGGCGTCTGATCCAGGATTA
CTAGCGATTCCGACTTCATGCATCGAGTTCAGAGTGCAGTCCGAACGAGACGGCTTTTTGAGATTAGCTCAGCCTCGCGGCTTGTGCTCCCATTTGTCACCGCCATT
GTAGCACGTTGTGGCCAAACCGTAAAGGCCATGAGGACTTACGTCATCCCCACCTTCTCCCGGTTGTACCCGCGAGTTTCTCAGAGTGCCAGCCGAACTGATG
GCAACTGAAGATGAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTGTCAGGCTTATTTGATAGAGGAA
CCGTTTTCTGGAAACCGCTTGCATGTCAAGGTTTTGTAAGGTTCTTCCGCTTGCCTGCAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCCGTCAAATTCCTTT
GAGTTTTAACTTTCGCGGCTACTCCCGAGGCGGAGTGTAAATGCGTTAGTGCCTGACTGAGGTTGCAA

>CUP1P4F10 Uncultured bacterium (Acidobacteria)

GCTTCTTGGCGTACGCGCGGCGACTTCTAGTACAACCTACTTCTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGATACCCGCGTCTGATCCAGGATTA
TACTAGCGATTCCGCGCTTCCGCGCTTTCGAGTTCGAGACTGCAATCCGAACGAGTGTGTTCTCCGATTAGCTCCCTTCCGCGGTTGGCAACGGTTTTGTCCTCG
CATTGTAACAGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTACGTCATCCCCACCTTCTCCGTTATCCGGAGCAGTCCAGTATAGGTTCCCTTTGCGAG
TGGAACTACGTCAGGGGTTGCGCTCGTTGCGGGACTTAAACCAACCTCACGGCAGGAGTGCAGCACAGCCATGCAGCGCCTCCACACTTGTCCCTTTCGCGGAAAGG
CCGATTTCTACAGCTTGTCAAGTTCGCGGCTTCGAGCCAGGTAAGGTTCTTCCGCTGAGCTGCAATTGAACACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAATTCCT
TTGAGTTTACGCTTTCGAGCCGTTACTCCCGAGGTCAGGACTTAAACCGGTTAGTCCGGGACGACACCCGAAACGGGTTGGCACCCAGTCTGATCGTTTAGGGTAGG
ACTACCAGCGTATCTAATCTGTTTGTCTCCCTAGCTTTCGCTATTACGCGTCAAGTGTGGTCCAGCGCGCGCTTTCGCGCACGGGTTCTCTGAGATATCTACGCA
TTCA

>CUP1P4F11 Uncultured *Verrucomicrobia* bacterium (Verrucomicrobiae)

GACGGCGACTTCGCGTACAAGCGGCTTCATGATGTACGGGCGGTGTGTACAAGGCCGTTGGGAACGATTAACCGCACCGTAGCTGATGTCATTACTAGCGATTCCGGC
TTCATGCCCTCGAGTTGCAGACGACAATCTGAACTGGGCCGATTTTAGGGGATTTGCTCCACCTGACGGTCTTGTCTCCCTTTGTATCGGGCATTGTAGTACGTGTGC
AGCCCTGGCCGTAAGGGCCACTGACTTACGTCATCCCCACCTTCTCTCATTAGATGAGGCGAGTGTGTCAGAGTGTCTTAAACTCTCGTTTGTAGTGGCAACAG
GACACAGGGGTTGCGGCTTTCGCGGCTTCGAGCCAGGTAAGGTTCTTCCGCTGAGCTGCAATTGAACACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAATTCCT
CATGTTTCTACTACTTGCATGTCAAGGCCAGGTAAGGTTCTTCCGCTTGCATCCCAAAAGGCGCAATACTCCACCGCTTGTGCGGGCCCCCGTCAAATTCCTTTGAGTTT
TAATCTGCGACCGCACTTCCAGCGGCATATTTAAACCGGTTAGCTGCGCCAAAGGGGTCGATTCTTTTACAGCAAAATATGACCGGTTTACGGCTAGGACTACC
AGGGTATCTAATCTGTTTGTCTCCCTAGCTTTCGCTCAGCTGTCAGAAATCGTCC

>CUP1P4G01 Uncultured bacterium (Alphaproteobacteria)

AACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGATTAACCGTAGCATGCTGATCTACGATTACTAGCGATTCCAATTTTATGACTACTGAGTTGCGAG
GTACAACTCCAACTGAGACGGGCTTTTTGAGATTAGCTAGCCCTTTCGCGGATTCGCGACTCATTGTACCCGCAATTTGTAACAGTGTGTAGCCAGGATGTAAGGGCCGTG
AGGACTTACGCTATCCACCTTCTCCGGCTTATCACCGGCGAGTTTCTCAGATGCTCAGACTTACCTGGTAGCAACAGAGGACGAGGTTGCGCTCGTTGCGGGA
CTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTGTTTCCCGCCAAAGTGAAGGACTCTTTTTCGGGAGTCCAAAAGGGACATGTCGAA
TCTTGTAAGGTTCTTTCGATTGCTGCAATTAACCCACATGTTCCACCGCTTGTGCGGGTCCCGCTCAAATTTCTTTGAGTTTAAATCTTGCAGCCGTTACTCCCGAGG
GGGTTGCTTAAACCGGTTAGCTGCGCTACTCAGGGTAACCCCGAACAGCTAGCACCCATCGTTTACAGCACGGACTACCAGGTTATCTAATCTGTTTGTATCCCGG
CTTTCGCGCTCAGGCTAGTTGCTGCTCAGAT

>CUP1P4G02 Uncultured alpha proteobacterium (Alphaproteobacteria)

GGCGGTGTGTACAAGGCCGGGAACGTATCACCGCGGGCGCTGATCCGCGATTACTAGCGATTCCAGCTTCATGCTCTCGAGTTGCAGAGAACATCCGAAGTGCAG
GGCTTTTCGAGATTGGCTCGGGTCGCCCCCTCCGCTCCCTCTGTACACGCCATTGTAGCAGCTGTGTAGCCCCAGCCATAAAGGCCATGAGGACTGACGTATCCCC
GCCTTCTCCGGCTTTGTACCCGAGTTCCTTCAGAGTGGCCGGTTACCCGATGGCAACTGAAGGTGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCACG
ACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGCAGCCGAACGAAGAAGCCGATCTCTCGGCCATACGGGACATGTCAAGGGCTGGTAAGGTTCTTCGC
GTTGCGTCGAATTGAACCATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTAACTTGCAGCCGCTACTCCCGAGGCGGTGCGCTTAACCGGTTAG
CTGCGACACCGCGAGCTAGGTCGCGGCAACGCTAGCGCACATCGTTTACAGCGGAGGACTACACAGGATATCAATCCTGTTTGTCTCCCGCCTTCGCGCTCAGCGT
CAGTTACGGTCCAGAGACGCCCTTCGCCACCGGTGTTCTTCCCAATATCTACGA

>CUP1P4G05 Unidentified bacterium (Não Classificada)

CGACTGCCCCCTTACGGTTGGCCGGGCGGCTTCAGGTGTTGCCCGCTTTCGTGGTGTAGCGGGCGGTGTGTACAAGGCCGGGAACATACCCGCGGTGTGCTGAC
CCACGGTTACTAGCACTCCGCCCTTACCGCAGGCGAGTTGACGCTGCGATCTGAACGTAGACCGGGCTTGTACTGGATTAGCTCCGGCTCGCGCCCTCGCTTCCCGTTG
TACCGGCCATTGTAGCGTGTGTGTAGCCCGGGACGTAAGGGCCATGCTGACTTACGCTCATCCCCGCTTCTCCGGTTTGTCTCCCGGAGTCCGGCCAGACAGCCTAA
CTGGCCCAAGGGTTGCGCTCGTTGCGGGACTTAACCAACACCTCAGGCGACGAGTGCAGACGCCATGCAACACCTGCACAGGTGCTCCGAAGAGCCAGACCATCT
CTGCGCTGTTACCTGCATGCTCAAGCCCCGGTAAGGTTCTACGCGTTGCGTCGAATTAAACACACGCTCCGCTGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTT
AGCCTTGGCGCCGACTCCCGGCGGCACTTACGCGGTGCTCCGCGTCCGCGGAGGCTGATACCTCCACACCTAGTCCCGCTTTAGGGCCAGGACTACCG
GAGTATCAATCCGTTGCTCCCTGGCTTTCGCGCTCAGCGTACGGTTCGGCCAGCCGCGCCCTTCGCCACTGGTGTTCGCCG

>CUP1P4G06 Uncultured soil bacterium (Alphaproteobacteria)

GCTGCTCCCTTTCGGGTTAGCGCACCGTCTTCGGGTGAAACCACTCCCATGGTGTGACGGGGCGGTGTGTACAGGCCTGGGAACGTATACCCGCGGGTGTGATCCGC
GATTACTAGCGATTCCGCCCTTATGCTCTCGAGTTGCAGAGAACAATCCGAACGTAGACGGCTTTTGGGATTGTCTCACCTCGCGGGTTTGTGCCCCGTTGTACCG
CCATTGTAGCAGCTGTGTAGCGCTGAGGCAATAAGGCCATGAGGACTTACGCTGATCCCCACCTTCCCTCCCGCTTATACCGGGCGGTTTTCGCCAGATGCCAACT
GGTAGCAACTAAAGACGAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCCAGGTCGCGTAAGGGAA
GGAATCCATCTCTGAAACCGCTCCTGGCATGTCAAACGCTGGTAAGGTTCTGCGCGTTGCTTGAATTAAACACATGCTCCACCGCTTGTGCAGGCCCCCGTCAATTT
CTTTGAGTTTTAACCTTGCAGCCGCTACTCCCGAGGCGGAGGACTTAACCGGTTAGCTGCGCCACCGGAACGCCAAGCGCCCGACAGCTAGTCTCATCGTTTACGGCG
TGGACTA

>CUP1P4G08 Uncultured bacterium (Acidobacteria)

ACGGCTGCTCCCTTTCGGGTTAGCGCACCGGCTTCTAGTACAGCCACTTTCGTGATGTACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCGGGCTTCTGATC
CGCGATTACTAGCAGTCCAGCTTTCATGAAGTCGAGTTGCAGACTTCAATCCGAACGTAGGTCGGCTTTTCCGATTAGCTCCCTTCGCGAGTTTGCACGGTTTGT
CCGACCATTTGTAGCAGTGTGTAGCGCTGAGCATAAAGGCCATGAGGACTTACGCTGATCCCCACCTTCCCTCCCGCTTATACCGGGCGGTTTTCGCCAGATGCCAACT
AAATGATGGCAACTGGCAATAAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTATGCAGCACCCCTTGC
GAAGAGATGTTTCCACCTCGTGCATGCTTTCAGCCAGGTAAGGTTCTTCGCGTTGCTTGAATTAAACACATGCTCCACCGCTTGTGCAGGCCCCCGTCAATTT
CCTTTGAGTTTTACCTTGCAGCCGCTACTCCCGAGGCGGAGGACTTAACCGGTTAGCTGCGCCACCGGAACGCCAAGCGCCCGACAGCTAGTCTCATCGTTTACGGCG
TGGACTA

>CUP1P4G09 Uncultured bacterium (Acidobacteria)

CAAGGCCGGGAACGTATTCACGGCAGCGTGTGATCTGCCATTACTAGCGATTCCAGCTTTCATGCAGGCGAGTTGCAGCCTGCAATCCGAACGTAGAAACGGTTTTT
CGATTGGTCCCTTCGCGGCTTTCAGCGCTTTCGTACCGTCCATTGTAGCAGGTGTGTTNCCCTGGACATAAAGGCCATGAGGACTTGCAGTCAATCCCACTTCCCTCA
GCTTATCGTGGCGGCTCCTGCGATCCGCTTTCGGCATGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCAAAATTCACGAACGAGCTGACGAAGCATG
AGCAGCTCGATGGACCCCTTTCGGGGTACGATGTTCCACCGCCGTTAACCGAGCTTTCAGAGCCAGGTAAGGTTTCTTCGCGTTGCGTGAATTGAACACATGCTCCAC
CGTTTGCAGCCGCTTTCGCGGCTTTCGAGTTTTCAGCTTTCAGCCTTTCAGCTGACTCCCGAGGCGCATATTAACCGGTTAGCTCCGCGCAGGATCACTGAATGACCCAC
ACCAAAATGATCGTTTAGGGCGTGGACTACAGCGTATCTAATCCTGTTTGT

>CUP1P4G10 Uncultured bacterium (Acidobacteria)

AAGGCCGGGAACGTATTCACGGCGTGCATCTGATACGCCATTACTAGCGATTCCGGCTTTCATGCAGTGCAGTTGCAGACTGCAATCCGAACGTAGCAGAGTTTTCTCC
GATTAGCTCCCTTCACGGGTTGGCAACGGTTTTGTGCCCTGCATTGTAACAGCTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGCAGTCAATCCCACTTCCCTCA
CGTTTATCCGAGCAGTCCACGTAGAGTTCCCTTTCGAGTGGCAACGAGTGCATGTCGCAAGGTTGCGCTCGTTGCGGGACTTAACCAACACCTCACGGCACGAGCTGAG
ACAGCCATGCAGCGCTTACTCCTGCTCCTTTCGGGGAAGGCCGATTTCTACAGCTGGTCAGAAGCATTTCAGAGCCAGGTAAGGTTTCTTCGCGTACGCTGCAATTGA
ACCACATGTTCCACCGCTTTCGCGGGCCCCGTCATTCCTTTGAGTTTTCAGTCTTCGCGCCGCTACTCCCGAGGTCAGGACTTAACCGGTTAGCTCCGGGACGACACC
CGAACGGGTGGCAACCGTACTTCCCGAGGCGCATATTAACCGGTTAGCTCCCGAGGCGCATATTAACCGGTTAGCTCCGGGACGAGTCACTGTTTTCGCGGTTAGGCGTGG
CGCCGCTTTCGCCACGGGTTTCTGCGATATCTACGCATT

>CUP1P4G11 Uncultured bacterium (Acidobacteria)

CTCCCTTGCGGGTACGCTGCAGACTTCTAGTACAATTCACTTTCGTGATTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCACGGCAGCGTGTGATCTGCCAT
TACTAGCGATTCCAGCTTTCATGACGGCGAGTTGCAGCCTGCAATCCGAACGTAGAACCGGTTTTTTCGATTGCTTCCCTTCGCGGGTTTCGGGACGCTTGTACCGTCC
ATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGCAGTCAATCCCGACTTCCCTCCAGCTTATCGTGGCGGTTCTCTGCGAGTTCGGCTTTCGGCA
TGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCTTTCGGGGTAA
AGATGTTTCCACCTCGTTGACGAGCGTTTCAGAGCCAGGTAAGGTTTCTTCGCGTTGCGTGAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCT
TTGAGTTTCAGCCTTTCAGCTTACTTCCCGAGGCGCATATTAACCGGTTAGCTCCCGAGGCGCATATTAACCGGTTAGCTCCCGAGGCGCATATTAACCGGTTAGGCGTGG
ACTACAGGATATCAATCCTGTTTGTACCCAGCCTTTCGTGCTCAGCGTCACTTACGGTCCAGAAAGCCGCTTACACCCAGGCTTCTCCTGATATCTACGC

>CUP1P4G12 Uncultured bacterium (Actinobacteria)

TAGGCCACCGGCTTCGGGTTGCTCGCTTTCGTGGTGTACGGGGCGGTGTGTACAAGGCCGGGAACGTATCACCGCGGATGCTAGATCCGCGATACTAGCAACTCC
ACCTTCATGGAGGCGAGTTACGCTCCAATCCGAACCGAGGCGCATTATGGGATTGTCTCCACCTCACGGTATTGCTGCCCTTGTATGCGCCAATGTAGCAGCTGT
GTAGCCCTGGACATAAAGGGCATGAGGACTTGCAGTCAATCCCACTTCCCTCCGTTTGTACGAGGCACTTCCATGAGTTGCCAACTGAATGCGGGGTGGCAACATAGGAC
GGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACACCTGTGATGGTTCGGAAGGAAAACCGGTTTCCAGGGCG
GTCACCAACATGCAAGCCAGGTAAGGTTTTCGCGTTGCGTGAATTAAACACATGCTCCGCTGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTTAGGCTTGC
GGCCGTTACTCCCGAGGCGGGTACTTGTGCGTTAGCGACGGCAGGAGGAGTGCACACCTTCCACCTAGTACCCATCGTTTACGGCGTGGACTACCGGGGTATC
TAATCCTGTTGCTCCCAAGCTTTCGCGCTCAGTGT

>CUP1P4H01 Uncultured bacterium (Não classificada)

TAGATCACCGATTTCGTGTGACGCGGGCTTTCGTGGTGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATCACCGCAGCCTGCTGATTCGCGATTACTAGCGATTCC
GCCTTACCTGGGGGAGTTGCAGCCACGATCTGAACCTGGGGCCGGCTTTCAGGGTTTGGCTCCACCTTACGGTATTGCTTCCCGTTGTACCGACCATTTGTAGCAGCTG
TAGCCCTGGACATAAAGGGCATGAGGACTTGCAGTCAATCCCACTTCCCTCCGTTTGTACGAGGCACTTCCATGAGTTGCCAACTGAATGCGGGGTGGCAACATAGGAC
AATAGGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTCTGCTGGCTTCTTGCAGGATCAGCCCTTTTTCAA
AGGACTTACTACAGTAGTTCAAGCCAGGTAAGGTTTCTTCGCGTTGCGTGAATTAAACACATGCTCCACCGCTCGTGGGGCCCCGTCATTCCTTTGAGTTTTAGGCTTCA
ACCTTGGCGCCGATACTCCCGAGGCGCTAATTAAGCGTTAGCTTTCGCGGCGGAGGGGTCGATACCTCCAAACCTAATGAGCATCGTTTATGGCTAGGACTACAG
GGTATCTAATCCTGTTTGTCCCTAGCTTTCGAGATCAGAGTCACTGACGGTCCAGTACGCTGTTTTCGGCATAAGGATTCTCCCG

>CUP1P4H02 Uncultured bacterium (Gammaproteobacteria)

CTGGTCAATCACTTCCATGGTGTGAGGGCGGTGTGTACAAGACCCCTGGAACGATTACCGCGACGTTGCTGATTTCGCGATTACTAGCGATTCCGACTTCCAGGAGTCC
GAGTTGCAGACTCCGATCCGACTACGACTGGCTTTCGGGATTGGCTCCCTCCGCGGTTGGCAGCCCTCTGTACCGACCATTTGTAGCAGCTGTGTAGCCCTGGTCA
TAAGGGCCATGATGACTTGCAGTCAATCCCACTTCCCTCCGTTTGTACCCCGCGGTTCTCCCTAGAGTTCCCAACTAAATGATGGAACTAGGGACAAGGGTTGCGCTC
GTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTTCGCGTCCCGAAGGACCCCGCATCGTGCAGGTTCCGAGGATG
TCAAGACAGGTAAGGTTTCTTCGCGTTGCATGAATTAAACACATGCTCCACCGCTTGTGCGGGTCCCGCTCAATTCCTTTGAGTTTCAACCTTGCAGGCGTACTCC

CAGGCGGAGAACTTAGCGGTTAGCTACGACACCGAGAGGCTAATCCCTCCCGACATCTAGTTCTCATCGTTTACGGCGTGGACTACCAGCGTATCTAATCTGTTTGC
TCCCCACGCTGTCGCACCTGAGTGTAGTATTGGGCCAGGTAGCCGCCCTTCGCCACTGATGTTCTCCCGATATCTACGCATT

>CUP1P4H03 Uncultured bacterium (Betaproteobacteria)

ACTTCTGGCAGAACCCGCTCCATGGTGTGAGGGCGGTGTGTACAAGATTCCGGAAACGTATTCACCCGACATGCTGACCCGCGATTACTAGCGATTCCGACTTCACGCA
GTCGAGTTGCAGACTACGATACCCGGACTACGACTGGTTTTATGGGATTAGTCCCCCTCGCGGGTTGGCAACCCCTCTGTACCAGCCATTGTATGACGTGTGTAGCCCTAC
CCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGGTTTGTACCCGGCAGTCTCATTAGAGTGCCTTTCTGTAGCAACTAATGACAAGGGTTGCGCTCGT
TGCGGGACTTAACCCAACTCTCAGCAGCAGCTGACGACAGCCATGCAGCACCTGTGTTCTGGCTCTTTTCGAGCACTCCACATCTCTGCGGGATTCCAGACATG
TCAAGGGTAGGTAAGTTTTTCGCGTTGCATCGAATTAACCCACATCATCCACCGCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTCAACCTTGGCGCGTACTCCC
CAGGCGTCAACTTCACCGTTAGTTCGTTACTGATCCAGTGAAGGACCAACAACAGTTGACATCGTTTAGGGCGTGG

>CUP1P4H04 Uncultured eubacterium (Betaproteobacteria)

GGTTAGGCTAACTACTTCTGGCAGAACCCGCTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCCGGCAAGCTGATCCGCGATTACTAGCGAT
TCCGACTTCACGCAGTCGAGTTGCAGACTGCGATCCGGACTACGACCGGTTTTCTGGGATTGGCTCCCCCTCGCGGGTTGGCAGCCCTCTGTACCGGCCATTGTATGAC
GTGTGATAGCCCTACCCATAAGGGCCGTGAGGACTGACGTCATCCCCACCTTCCCTCCGGTTTGTACCCGGCAGTCTCATTAGAGTGCCTTTCTGTAGCAACTAATGACA
AGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCAGCAGCTGACGACGGCCATGCAGCACCTGTGTTCAAGTTCTTTTCGAGCACTTCACATCTCTGCG
AAATTCGTGACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAACCCACATCATCCACCGCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTCAACCTT
GCGGCGTACTCCCAGGCGGTCAACTTCACCGGTTAGCTACGTTACTGAGAAGGAACCTTCCAAAAACAGTTGACATCGTTTAGGGCGTGGACTA

>CUP1P4H05 Uncultured bacterium (Acidobacteria)

AAGGCTGCTCCTTGCGGTTAGCACACCTGCTTCTAGTACGGCCCACTTTCGTGATGTGACGGGCGGTGTACAAGGCCGGGAACGTATTCACCCGCGGTTCTGATCCG
CGATTACTAGCGATTCCAGCTTCATGGGTCGAGTTGCAGACTCCAATCCGAACTGAGGCGGGTTTTTCCGATTAGCTCCCCCTCAGCGGTTTGCAGCGTTTGTACC
GACCATTGTAGCACGTGTGAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCTCTCGTTATCCGAGGCAGTTTCACTAGAGTGCCCGGCTTG
ACCCGATGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCAGCAGGCTAACGACAGCCATGCAGCACCTATGCAGCAGCCTTTAAG
GGGAAGGATGTTTCCACCCCGTCTCTGCAATTCGAGCCAGGTAAGTTCTTCG

>CUP1P4H07 Uncultured bacterium (Não classificada)

GGACTTACTTAGTAACTTCAAGCAAACTGACTCTCTGATGTGACGGGCGGTGTGTACAAGGCTAATTGACATATTCACCGCAACGTTCTGATTGCGATTACTAG
TGATTTCAACTTCATATAAGCGAGTTTACGCTTATAATCCGAACTGGGAAAATTTTTGAAGATTAACGAAAAGTATAAATTTTTGTAACTTTTTGTAACTTTTCACTT
AGCACATGTGTAGCCCAATCCATTAGGGTCACACTGACTTACTTACTTCTCACCTTCCCTCAACTTATCGTTGACAGTATCTTTAAAGTTATTTTCAAAAATTTTGA
CTATTTCAAAAATCAGTAAACACTATATAAAGACAAAGGTTACGCCCGTTTAGGGAAATTAACCAAACATCTCAGCAGCAGGCTGACGACAGCCGTGCAGCACCTGTA
AAAGTTATTTGATAGTTATATTTGCTTAAAGTGCAAAACATACGAAAATATTATTCAAGGATTGGTAAGGTTTTGCGGGGATTATCGCATTAACCCACATGCTCCA
CCACTAGTATTAGCCCGCTCAATTCCTTTGAGTTTCAACCTTCCGATCCGACTTCTCAGGGCGGAGTGTATAGCGTTAGCTTAAAAATCTAAATAAGTATTTGATAA
CAGTATGATTTTGAATACTACGTAACCTTACATTAATACACAGCCTCATAGTTTACAGTATGAGCTACCGGGGTATCTAATCTGTTTGTACCCATACTTTCGCTCT
CAACGTCAGTTTT

>CUP1P4H08 Uncultured bacterium (Acidobacteria)

GGTTAGCGCGAGCTTCTAGTACAGCTCACTTCTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCCGCGCTCGATCTGATACGCCATTACTAGCGATT
CCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCAGAGTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTTGTAACCG
TGTGTAGCCCTGGACATAAAGGCCATGCGGACTGACGTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACGATAGATTCCCTCTTGCAGTGGCAACTACGT
GCAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCACGGCAGGCTGACGACAGCCATGACAGCCCTATCTCTGTCCTTGGGGAAAGCCGTATTTCTAC
AGCTGGTCAGAAGCATTTCGAGCCAGGTAAGGTTCTCGCGTAGCGTCGAATTAACCCACATGTTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTCACT
CTTGGACCGTACTCCCAAGGTGCGAGACTTAACCGGTTAGCTCCGGGACGACCCCGAACGGGTGGCACCCCAAGTCTGATCGTTTAGGGCTAGGACTACCAGCGTA
TCTAATCTGTTTGCCTCCCTAGCTTTCGTTCTCAGCGTCAGTAAATGGTCCAGCGCGGTTTTCCGCCAGGGTGTCTCTGCAGATATCTACGC

>CUP1P4H10 Uncultured bacterium (Gammaproteobacteria)

TAGGCGCCCTTGCGGTACGGCTACTGCTTCTGGTGCAGTAACTTCCATGGTGTACGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCCGAGCAATGCTGATCT
GCGATTACTAGCGATTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTTCTGGGATTGGCTCCCGCTCGCGGTTGGCTTCCCTCTGTAT
CTACCATTGTAGCACGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGCAGCTCATCCCCACCTTCTCCGGTTTGTACCCGGCGGTCTCCTTAGTGTGCCCAACTG
AATGCTGGCAACTAAGGCAAGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCAGCAGGCTGGCGACAGCCATGCAGCACCTGTCTCCAGGCTCCTTGGCG
CACCCCTAAATCTTTCAGGGTTCCTGGGATGTCAAGGCCAGGTAAGGTTCTTCGCTTGCATCGAATTAACCCACATGCTCCACCGCTTGTGCGGGTCCCGTCAATT
CCTTTGAGTTTCAACCTTGGCGCGTACTCCCGAGGCGGAGAACTTAGCGGTTAGTACGACACTGCAGGGCTT

>CUP1P4H11 Uncultured bacterium (Betaproteobacteria)

CCCCCTTGGCGTTAGGCAACGGCTTCTGTTGAACCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATCACCCGACATGCTGATCCACGATTA
CTAGCGATTCCGACTTCATGCACTGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCAT
TGTATGACGTGTGAGGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGGTTTGTACCCGGCAGTCTCACTAGAGTGCCTTTCTGTAGCAAC
TAGTGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGCAGCAGGCTGACGACAGCCATGCAGCACCTGTGCCCGGCTCCCTTCCGGGACTCCACACA
TCTCTGCGGGATTCCGGGATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGTCAATTCCTTTGAGTT
TAACTTTCGACCGTACTCCCGAGGCGGTGACTTCACCGTTAGCTGCGTTACCGAGAAAATGAATTCGCCAAGTACTGACATCTG

>CUP1P4H12 Uncultured bacterium (Acidobacteria)

TGTGACGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCAGGACAGGCTGACGACAGCCATGCAGCGCTTACTCCGGTCCCTTGGGGAAAGGCCGATTCTTCT
ACAGCTGGTCCGAAGCATTTCGAGCCAGGTAAGGTTCTTCGCGTAGCGTCAATTAACCCACATGTTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTCA
GTCTTGCAGCCGTACTCCCGAGGTCAGGACTTAACCGTTAGCTCCGGGACGACGCCCGAACGGGCGAAAACCAAGTCTGATC

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

>CUP2P1A01 Uncultured bacterium (Alphaproteobacteria)
 CGGTGCTCCTTGCAGTTAGCGCAGCTCTTCAGGTAAGGCCAATCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGAGCGGTGTGATCTGCG
 GATTACTAGCGATTCCGACTTCATGTGCTCGAGTTGACAGACCAATCCGAAGTGTGACAGCGGCTTTTGGAGATTGCGCAGGATCACTCCATTGCATCCCATTGTCACCG
 CCATTGTAGCAGCTGTGTAGCCAGCCCGTAAGGGCCATGAGGACTTACGCTCATCCCCACCTTCCCTCGCGGCTTATCACCGGCAGTCCCTTAGAGTGCCCAACTGAA
 TGATGGCAACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGACACCTGTCTCCGGTCCAGCCGAACGT
 AAGGGATCGATCTCTCGTTCCCGCGACCGGATGTCAAGGGCTGGTAAGTTCTGCGGCTGTCTCGAATTGAACACATGTCTCCACCGCTGTGCGGGCCCCCGTCAA
 TTCCTTTGAGTTTTAATCTTGCAGCGTACTCCCGAGCGGGATCTTAAAGCGTTAGCTGCGCCACTGACGTGCAAGCTGCCAACGGCTAGCATCCATCGTTTACGG
 CGTGGACTACCAGTGTATCTAATCTGTTGCTCCCAAGCTTTCGCACATCAGCGTC

>CUP2P1A02 Uncultured bacterium (Acidobacteria)
 AGACTTCTAGTACAATTCACTTTCTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCGGCGTGCATCTGATACGCCATTACTAGCGATTCCGGCTTCAT
 CGAGTCGAGTTGCGAGCTGCAATCCGAAGTGTGACAGAGTTTTTCCGATTAGCTCCCGCTCGCGGTTGGCAACGGTTGTACCCCTGCATTATAACACGTGTGTAGCCG
 TGGACATAAAGGCCATGCGGACTTACGCTCATCCCCACCTTCCCTCCGTTATCCGGAGCAGTCCACACAGAGTCCCTCTTGGCAGTAGTAAGTGTGTGACGGGGTTG
 CGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTGACTCCGGCCGAACCGAAGGGAGCGTCTCTGCTCCCGCGA
 AAGCATTTCCGAGCCAGGTAAGTTCTCCGCTAGCGTGAATTTGAACCATGTCTCCACCGCTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTACGTCTTGGCAGCG
 TACTCCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGGACGACGCCGAACGGGCGCC

>CUP2P1A03 Bacterium Ellin5003 (Alphaproteobacteria)
 ATCTTCGGGTAGAACAACCTCCATGGCGTACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCGGCGCATGCTGATCCGCGATTACTAGCGATTCCACCTTCATGC
 ACTCGAGTTGACAGAGTGCAACCCGAAGTGGGACGGGTTTTTGGGATCGGGTCCGGCTCCGGCTTCCGATCCCACTGTACCGGCCATTGTAGCAGCTGTGTAGCCAGC
 CGTAAGGGCCATGAGGACTTACGCTCATCCCCACCTTCCCTCCGCTTGTACCCGGCAGTTTCTCCAAAGTGCCAGCTTAACCTGATGGCAACTGGAGACGAGGGTTG
 CGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTGACTCCGGCCGAACCGAAGGGAGCGTCTCTGCTCCCGCGA
 GTCACATGTCAAGGGCTGGTAAGGTTCTTCCGCTTCCGCTGAATTGAACACATGTCTCCACCGCTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAACCTTCCGGCC
 GTACTCCCCAGGGGGTGTAAACGCGTTAGCTGCGGACTGACGAGCAAGCTCGCCAACGCTAGC

>CUP2P1A04 Draba nemorosa (Cyanobacteria)
 CCCCCCTTTCGGGTTAGGTAACGACTTCGGGCATGGCCAGCTCCCATAGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTAACCGCCGATGGCTGACGGCG
 ATTACTAGCGATTCCGGCTTCATGCAGCGGAGTTGCAGCTGCAATCCGAAGTGTGACAGCGGTTTTTGGAGTTAGCTCACCCCTCGCGGATCCGACCCCTTTGTCGGG
 CCATTGTAGCCCGTGTGTGCGCCAGGGCATAAAGGGCATGATGACTTTCAGCTCATCTCACCTTCCCTCCGCTTATCACCGGCAGTCTGTTACAGGGTTCCAAACTCAAC
 GGTGGCAACTAAACACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACTTACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGCTTCCCGAAGGCAC
 CCCCCTCTTTAAGAGGATTGCGGGCATGTCAAGCCCCGTAAGGTTCTTCCGTTTGCATCGAATTAACACATGTCTCCACCGCTTGTTCGGGCCCCCGTCAATTCCT
 TTGAGTTTCAATCTTGCAGACGTAACCTCCAGGGGACTTAAACGCGTTAGCTACAGCACTGACGCGGTCGATACGCACAGCGCTAGTATCCATCGTTTACGGCTA
 GGACTACTGGCGTATCTAATCCATTGCTCCCTAGC

>CUP2P1A05 Uncultured bacterium (Acidobacteria)
 TACTTGGGCGCTTGCTTCTTCCGCTGAGCGCGGCACTTCTAGTACAACCTCACTTTCTGATGNACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCGCGCTCGAT
 CTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGCTGAGTTGCAGACTGCAATCCGAAGTGTGACAGAGTTTTTCTCCGATTAGCTCCCGCTCGCGGTTGGCAACGG
 TTTGTCCCTGCAATTTAACACGTGTGTAGCCCTGGACATAAAGGGCATGCGGACTTGCAGCTCATCCCCACCTTCCCTCCGTTATCCGGAGCAGTCCACGTAGAGTTT
 CCTTTGCGAGTGGCAACTACGTGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACTTACGGCACGAGCTGACGACAGCCATGCAGCACCTCCACACTGTC
 TTGCGGGAAGGCCGATTTCTACAGCTGTCAAGTGCCTTCCAGCCAGGTAAGGTTCTTCCGTTTGCATCGAATTAACACATGTCTCCACCGCTTGTTCGGGCCCC
 CGTCAATTCCTTTGAGTTTACGCTTTCGACCGTACTCCCGAGGTGAGGACTTAAACGCGTTAGCTCCGGGACGACACCCGAAACGGGTTGGCACCCCAAGTCTGATCGT
 TTAGGGCTAGGACTACCAGGGTATCTAATCTGTNTGCTCCCTAGCTTTCTGCTATTACGCTCAGTTGTGGTCCAGCGCCCGCTTTCGCCACGGGTT

>CUP2P1A06 Uncultured Acidobacteria bacterium (Acidobacteria)
 TACTTGGGCGCTTGCTTCCCTTCCGCTGAGCGCGGCACTTCTAGTACAACCTCACTTTCTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCGCGCT
 CGTTCTGATATAGCATTACTAGCGATTCCAGCTTCATGCAGCGGAGTTGCAGCTGCAATCCGAAGTGTGACAGAGTTTTTGGCGATTAGCTCCCGCTCGCGGTTGGCA
 CGGCTTTGTACCGCCATTGTAGCAGTGTGTGGCCCTGGACATAAAGGGCATGATGACTTGCAGCTCATCCCCACCTTCCCTCCAGCTTATCGCTGGCGGTTCTCTGAGA
 GTTGGCCCTTTCGGCATGCCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACTTACGGCACGAGCTGACGACAGCCATGCAGCACCTCCGACTCCA
 NCCCTTGGCGAGTACGATGTTTCCACCGCGTTGAGAAGCGGTTCCAGCCAGGTAAGGTTCTTCCGCTTCCGCTGCAATTAACACATGTCTCCACCGCTTGTTCGGG
 ACCCCCGTCAATTCCTTTGAGTTTACGCTTTCGCAACGTAACCTCCAGGGGCACTTAAACGCGTTAGCTCCGGCACGAAACGATGAACGGGTCACCAAGTATGC
 ATCGTTTAGGGCGTGGACT

>CUP2P1A07 Alcaligenes faecalis (Betaproteobacteria)
 CTACGTGGTATCGCCCCCTTGCAGTTAGGCTAATCTTCTGGTAAACCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTTTACCGCGGACATG
 CTGATCCCGGATTACTAGCGATTCCGACTTACGCGAGTGCAGTTGCAGACTGCGATCCGGACTACGATCCGGTTTCTGGGATTGGCTCCCGCTCGCGGTTGGCGANCC
 TCTGTCCGACCATTTGATGACGTGTGAAGCCCTACCCATAAAGGGCATGAGGACTTGCAGCTCATCCCCACCTTCCCTCCGTTTGTACCGGCAGTCTCATTAGAGTGC
 CCTTTCGTAGCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACTTCCAGCACAGGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCTCTTG
 CGAGCACTTGCACAAATCTCTCCGGCATCCAGACATGTCAAGGGTAGGTAAGGTTTTTCCGCTTGCATCGAATTAATCCACATCATCCACCGCTTGTTCGGGTTCCCGT
 CAATTCCTTTGAGTTTTAATCTTGCAGCGTACTCC

>CUP2P1A08 Uncultured Acidobacteria bacterium (Acidobacteria)
 GGTAGCGGACGACTTCTAGTACAGCTCACTTCTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCGCGCTCGATCTGATACGCCATTACTAGCGAT
 CCCGGCTTCATGCAGCTGAGTTGCGAGCTGCAATCCGAAGTGTGACAGCGGCTTTTTTCCGATTAGCTCCCTCTCGCGAGTTGGCAACGGTTTGTAAACGCGATTGTAACAC
 GTGTGTAGCCCTGGACATAAAGGGCATGCGGACTTGCAGCTCATCCCCACCTTCCCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCCTTCCGGAGTGGCAACTA
 CGTGCAGGGTTGCGCTGTTGCGGGACTTAACCCAACACTTACGGCACGAGCTGACGACAGCCATGCAGCACCTCCACACTGTCCTTCCGGGGAAGGCCGTTGTTT
 CACAGCTGGTACGTTGCGCTTCCAGCCAGGTAAGGTTCTTCCGCTGAGCTGCAATTTGAACACATGTCTCCACCGCTTGTTCGGGCCCCCGTCAATTCCTTTGAGTTT
 AGTCTTGCAGCGTACTCCCGAGGTGCAGGACTTAAACGCGTTAGCTCCGGGACGACACCCGAAACGGGTTGCACCCCAAGTCTGATCGTTTAG

>CUP2P1A09 Uncultured bacterium (Verrucomicrobiae)
 TCGGGTACAAGGGCTTTCATTGATGTGACGGGCGGTGTGTACAATGCCGGGAACGTTTACCGCGCTCGATCTGATACGCCATTACTAGCAATCCGGCTTCATGGAG
 TCGAATTTGAGCCCTCCAATCCGAAGTGGGCCAGTTTTAAGTGAATTTCTCCACCTCGCGGATTCGGATCGTTCTGTACTGGGATTGTAGTACGTTGTGACGCCAGGC
 CGTAAGGGCCATACTGACTTGCAGCTGCTCCCGCTTCCCTCCGTTTAAAGCGAGGAGTGTGAACAGAGTGTGGAACCTCTCGGTTCCGTGGCAACAGTTTACAGGG
 GTTCCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGTGCAGCACAGCCATGCAGCACCTGTGCAAAATGTTCTTTCGAGACTCGCTGGCTTCCACCACT
 TAGAGATGCATGTCAAGGCTGGTAAGGTTTTTCCGCTTGCATCGAATTTGAGCCACATACTCCACCGCTTGTTCGGGCCCCCGTCAATTCCTTTGAGTTTTAATCTTGC
 GACCGTACTCCCGAGGGCAGCTTTAACGCGTTGGCTCCGGCGCAGAAGGGTTCGAATCTCCANACCAACGTCACCGTTTACTGCCAGGACTACCGGGTATCT
 AATCCCGTT

>CUP2P1A10 Uncultured bacterium (Actinobacteria)

GGCTTCGGGTGTTACAACCTTCGTGGTGTGACGGGGCGGTGTGACAAGGCCGGGAACGTATCACCCGGCGTGGCTGATCCGGGATTACTAGCGACTCCGACTTCATG
 GAGTCGAGTTGCAGACTCCAATCCGAAGTGCAGAGCCGGCTTTTGGGATTCGCTCCTCCGCGGATTAGCAGCCCTTTGTACCGGCCATTGTAGCATGTTAGCAGCCCT
 ACGGCTAAGGGGCATGCAGACTGACATCATCCACCTTCCTCCGAGTTGACCCGGCAGTCTCCTTACCGCTGGCAACATAGGACAAGGTT
 TGCCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCACCCTATCCGAGGCCCTTTCGGACACCGTGTCTCCACGGCTTTCTCTGC
 GTAGTTCAACGTAGGTAAGTTCCTCGCGTTGCATCGAATTAAGCAACATGCTCCGCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTTAGCCTTGCGGCCGTAC
 TCCCAGGGGGGCATTAATGCGTTAGCTACGGCACAGAGCGTTGAAACTCCCACACCTAGTGCCCAACGTTTACGGCGTGGACTACCAGGGTATCTAATCCTGT
 TTGC

>CUP2P1A11 Uncultured bacterium (Actinobacteria)

GGTTAGCACAGCGACTTCTAGTACAACCCACTTTCGTGATGNACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCACGGCGTCTTCTGATACGCCATTACTAGCGAT
 TCCGGCTTCATGCAGTCCGGTTGCAGACTGCAATCCGAAGTGCAGAGCCGGCTTTTTCGATTAGCTCCCTCCGCGGTTCCGCGACGGTTGTACCGCGCATTTGTAACAC
 GTGTGTAGCCCTGGACATAAAGGCCGTGCTGACTTGACGTATCCCCACCTTCTCCTCCGTTATCCGGAGCAGTTCTCTTAGAGTTCCCTTTCGGGGTGGCAACTAAG
 AGTAGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCCTTACCAGTGTCCCTTGCGGGAAGGGCATGTTTCCA
 CCGCTGGTCACTGGCACTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCCACATGTTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACG
 CCTTGCACCGTACTCCCAGGGCGAGGACTTAA

>CUP2P1A12 Uncultured bacterium (Verrucomicrobiae)

GGGAACGTATCACGGCGTGTAGCTGATACGCCATTACTAGCGATTCCGGCTTCATGAAGTCGAGTTGCAGACTTCAATCTGAAGTGGGCCAGTTTGTAGTATTCCT
 CCACCTCCGCGGTTTAGGATCGTTCTGTGCTGGGCATTGTAGTACGTGTGCAGCCAGGCCGATAGGGGCCACTACTGACTTGACGTCTGCTCCACCTTCTCCCGTTTGA
 GCGGGGCGTCTGAACAGAGTGTCCGAGCTCACGCTCCGGTGGCAACAGTTTACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACG
 ACAGCCATGCAGCACCCTGTCAAAATTCCTTTCGGGACTCGCTGGCTTTACCAACTTAGAGATGCATGCAAGGCCGTTTACCGTTTCTCGCTGCAATCGAATTTGA
 AGCCACATACTCCACCGCTTGTGCGGGCCCCGTCATTTCTTTGAGTTTTAATCTTGCAGCCGACTTCCCAGGGCGCACGTTTAAACCGTTAGCTCCGGCGCAGAAG
 GGGTCGAATCCTCCACAGCAACGTCACCGCTTACTGTGACGACTACCAGGGTATCTAAT

>CUP2P1B01 Uncultured bacterium (Acidobacteria)

CCCTTGGCGTTGGCTCACGGCTTCTAGTGCAACCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCGGCATTCTGATCCGGGATTAC
 TAGCGATTCCAGCTTCATGCAGTTCGAGTTGCAGACTGCAATCCGAAGTGCAGAGCCGGCTTTTTCGATTAGCTCCCTCCGCGGTTTGCAGCGGTTGTACCGGCCATT
 GTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCCGTTTATCCGAGGCGGTTTTCGTGAGTGTCAACTAAATGGTGA
 CAACTGAAGATAAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCCTATATTACGGCCATTGTGGGAAGGGA
 TATTTTACCCCGGTCATAAATTTGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGA
 GTTTCAGCCTTGCAGCGTACTCCCAGGGCGGACTGCTTAAACCGTTGGGTACGGCACGGCGGGATTGGGTACCCGTACACCAAGGAGTCACTGTTTAGGGCTAGGAC
 TACCAGGGTATCTAATCCTGTTTGTCCCTAGCTTTCGTGATCAGCGTCA

>CUP2P1B02 Uncultured bacterium (Betaproteobacteria)

GGTCGGCTCCTTCGCGTTAGCGGACCGGCTTCTGGTGAACACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCGCATGCTGATCC
 GCGATTACTAGCGATTCCGACTTCATGCAGTTCGAGTTGCAGACTGCAATCCGACTACGACGCGCTTAAAGGGATTGGCTTACTCCGCGGCTTAGCAGCCCTCTGTAC
 GCGCCATTGTATTACGTGTGAAGCCCTACCCATAAAGGGCCATGAGGACTTGACGTATCCCCACCTTCTCCCGTTTGTACCGCGGAGTCTCATTAGAGTGGCCCACTG
 AATGTAGCAACTAATGACAAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCCTGTTTCCGGTTCCTTTCCGG
 GCACCCCGAGCTCCTCACCGGCTTCCGGACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCAATCAATTAACCCATAATCCACCGCTTGTGCGGGTCCCGTCAAT
 TCCTTTGAGTTTTAACCTTTCGCGCGTACTCCCAGGGCGTGCAGTTTACGCGTTAGCTTCTGTTACTGAGAGTGTCAAACT

>CUP2P1B03 Uncultured bacterium (Acidobacteria)

GGCATTGCCCGCTTTCGCGGTTAGCTCAGTGACTTCTAGTACAGCCAGCTTTCGTGATTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCACGGCGTGCATCTGA
 TAGCCATTACTAGCGATTCCGACTTCATGCAGTTCGAGTTGCAGACTGCAATCCGACTACGACGCGCTTAAAGGGATTGGCTTACTCCCGCTTACGGGTTGGCAACGGTTT
 TGCCCTGCATTGTAACAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCCGTTTTCACCGCGGAGTCCCTTTAGAGTGGCCAG
 CTTGACTTGTGGCAACTAAGGCCGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCCTGACTGGTGTCCCT
 TCGGGAAAGGATGTTTCCACCGCTTGCAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTT
 TCAATTCCTTTGAGTTTACGCTTGCAGCCGACTCCCAGGGCGGATACTTAAACCGTTAGCTGCGGCGACACCGGATTGGGTACCGATCACACCAAGCATCCATAGT
 TTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTGCTCCCTAGCTTTCGCGCTCAGCGTCAGT

>CUP2P1B04 Uncultured Acidobacteria bacterium (Acidobacteria)

GGGTAGCATGCAGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCTATCGTTCTGATATAGCATTACTAGCG
 ATTCAGCTTCTATGCAGGCGTTCGAGCTGCAATCCGAAGTGCAGACTGAGGACGGTTTTTGGCGATTAGCTCCCTCCGCGGTTTGGCAGCGGTTGTACCGGCCATTGTAGC
 ACGTGTGTGGCCCTGGACATAAAGGCCATGATGACTTGACGTATCCCCACCTTCTCCCAACTTATCGTGGCGGCTTCTGAGAGTTGCGCTTGCGGCATGCCAACA
 CAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCCTGACTCCAGTCCCTTGCGGGAAAACCTTTGTTT
 CCAAGTCTGTCCGAAGCGTTTCCACCGCTTGCAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTT
 CAGCCTTGCAGCGTACTCCCAGGGCGCATACTTAAACCGTTAGCTCCGGCACGAACCGAATGACGGCTCACACCAAGTATGCATCGTTTAGGGCTGGACTAACAG
 GGTATCTAATCCTG

>CUP2P1B05 Uncultured bacterium (Acidobacteria)

GACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCAGCGTGTGATCTGCGATTACTAGCGATTCCAGCTTCA
 GGAGTCGAGTTGCAGACTGCAATCCGAAGTGCAGACTGAGGTCGGCTTTTCCGATTAGCTCCCTCCGCGGTTTGGCAGCGGTTTGCAGCGGTTTGTACCGACCATTTGAGCAGCTGTGAGCC
 TGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCCGTTTATCCGGGGCGGTTTACTAGAGTGGCCGACTTGACTCGTGGCAACTAGGGATAAGGG
 TTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCCTCCGAGCAGTCTTGTGAGAAAGGGATATTCTACCCCGGTC
 CACTGCGCTTCCAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACGCTTTCGCGAC
 CGTACTCCCAGGGCGATTGCTTAAACCGTTAGCTGCGGCACAGCAGGATTGGGTACTGCTACACCAAGCAATCATCGTTTAGGGCTAGGACTACCA

>CUP2P1B06 Uncultured bacterium (Acidobacteria)

AGCGGGGACTCTATAACTCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGTCCGGGAACGTATCACGGCGTGCATCTGATACGCCATTACTAGCGATTCCGGGT
 TCATCGAGTTCGAGTTGCAGACTGCAATCCGAAGTGCAGAGTTTTTCCGATTAGCTCCCTCCGCGGTTGGCAACCGGTTTGTGCCCTGCATTGTAACACGTTGTGTA
 CCGCTGGACATAAAGGCCATGCGGACTTGACGTATCCCCACCTTCTCCTCCGTTTATCCGGGGCGGTTTACTAGAGTGGCCGACTTGACTCGTGGCAACTAGGGATAAGGG
 GTTGCCTCGTTGCGGGACTTAACCCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGGCGCTTCCATACCTGTACCTTGCGGGAAGGCCGATTTCTACAGCTTG
 TCAAGTGCCTTCGAGCCAGGTAAGGTTCTTCGCGTACCCTGCAATTAACCCACATGTTCCATCGTTGCTGCGGCCCGGTCATTCCTTTGAGTTTACGCTTTCG

>CUP2P1B07 Uncultured soil bacterium (Verrucomicrobiae)

ATCCAGTTACGTACTACTTAGGCTGCTTTCGCGTTAGCACAGACTCTCGGTACAAGGACTCCCATGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGT
 ATTCAGCGGCGGAGTGTAGTGCAGCTTACTAGCGATTCCGGCTTACTAGGCGAGTTGCAGCCGAGTTGCAGCCATCAATCCGAAGTGGGCCAGTTTTTCAGGATTTCTCCACCTC
 GCGGATTCCGATCATTCTGTACTGGGCATTGTAGTACGTGTGACGCCCTCCGCGTAAAGGCCATCTGACTTGACGTATCCCCACCTTCTCCCGTTTTCACAGGGCA
 GTCTGAACAGAGTGCCTTTCGCACTTTCGAACAGTTTTCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGC
 CCGTGTCAAAAGGCAATTTGCTACGCTGCGCGCTTTTACCGGGCACACATGCTTCAAGGCCAGGTAAGGTTCTTCGCGTTGCAATTAACCCACATGTTCCATCGTTGCTGCGGCCCGGTCATTCCTTTGAGTTTACGCTTTC
 CCGCTTGTGCGGGCCCCGTCATTTCTTTGAGTTTTAATCTTGCAGCCGACTTCTTCAGGGCGCACGTTTAAACCGTTAGCTCCGGCACGACGGGGTCAATCCCGG
 CACACCAACGTCACCGCTTAC

>CUP2P1B08 Uncultured bacterium (Não classificada)

CTTACGGTTACAGCGGCGGCTTCCGGTGCAGTAACTCAGGTGACGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCAGCGTGTGATCTGCGTTTTAC
 TAGCGATTCCGACTTCATGAAGCGAGTTGCAGCCTTCAATCCGAAGTACCAGCGGATTTAAGAGATTGGCTTACCCTCCGAGTTGCGTCTCGTTGTTGCGGGGATT

GTAGCAGTGTGTAGCCCGGGACGTAAGGGCCATGCTGACTTGACGTCATCCCCACCTTCTCCGGCTTCTACCGGGGCTCGTGTGAGAGATCTTGTGGACCAACA
 CACGACGAGGGTTCGCTCGTTGCGGGACTTAACCCAACACCTCAGCGGCAGCTGACGACAGCCATGCAGCACCTGTCTGGAAGTAGGGTTGCCCTAAGCCGTATT
 TCTACGGTTGCTCCTCGATGTCAGGCGGTAAGGTTCTTCGCGTTCGATTCGAATTAACACCATGTTCCACCGCTTGTGCGGGACCCCGTCAATTCCTTTGAGTTTC
 AGTCTTGCAGCCGACTCCCCAGGTGCAGGACTTAACCGGTTAGTCCGGGACGACACCCGAAACGGGTG

>CUP2P1B09 Uncultured bacterium (Acidobacteria)

TCTAGTACAACCAATTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGAAACGTAATCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTCCG
 AGTTGCGAGACTGCAATCCGAAGTGCAGAGGTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATTGTAACACGTTGTAGCCCTGGACAT
 AAAGGCCATGCGGACTTGACGTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCCCTCTTGCAGAGTAGTAACCTGTGTGACGGGTTGCGCTCGT
 TCGGGGACTTAACCCAACACCTCAGGCACGAGCTGACGACAGTATCGACGGCCTATACTGGTGTCCCTTGCGGGAAGGCCGTAATTTCTACAGCTGGTCACCAGCATT
 TCGAGCCAGGTAAGGTTCTCGCGTAGCGTGAATTAACACCATGTTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTTCAGTCTTGCAGCCGACTCCCG
 CAGGTGCAGGACTTAACCGGTTAGTCCCGGACGACACCCGAACGGGTGGCACCCTTCTAGTCTGTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGTCT
 CCCCTAATCTTCG

>CUP2P1B10 Uncultured bacterium (Acidobacteria)

GGTGTAGCTACCGACTTCTAGTACAGCTCACTTCTGTGATGTGACGGGCGGTGTGTACAAGGCCCGGAAACGTAATCACCGCAGCGTGTGATCTGCGATTACTAGCGA
 TTCCAGCTTCATGGAGTTCGAGTTGCAGACTCCAAATCCGAAGTGGTTCGGCTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCAGCGGTTTGTACCGACCAATTGTAGCA
 CGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGGTTATCCGGGCGGTTTCACTAGAGTACCAGCTTGTAGCTCGCTGGCAAC
 TAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGGACAGGACTGACGACAGCCATGCAGCACCTCCGACGCGCCCTTTAAGGGGCGCCGATGTT
 TCCACCGGATCCACTGCGCTTCGAGCCAGGTAAGGTTCTTCGCGTTCGCTCGAATTAACACCATGCTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTT
 CAGCCTTGCAGCCGACTCCCCAGGGGATGTTATCACGTTAGCTTCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCATCCATCGTTTAGGGCTAGGACTACC
 AGGTATCTAATCTGTTTGTCTCCCTAGCTTTCCGCGC

>CUP2P1B12 Uncultured bacterium (Não classificada)

ACCTCGACGCTGCTCCTCTCTCCGAAGACAATAGGTTAGCCAGCGGGTTCAGGTGTTGCCGACTTTCGTGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTA
 TTCACCGTGGTTCGCGGACCCACGGTTACTAGCAACTCCGGCTTCAGGCAGCGGGTTGCAGCCTGCCATCCGAAGTGAAGATGAGTTTGCAGGATTGTCTCCCCCTC
 GCGGGTTCCCTTCCCAATTTGCTCACCCATTTGACGCTGTGTGTCGCCCCAGGACGTAAGGGCGGTTGCTGACTTGACGTCATCCCCACCTTCTCGTTTAGCGTGGCAAC
 GTCTCGCGGACAGCCTAACCGGCGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCAGGCACGAGCTGACGACAGCCATGCAGCACCTGTGTGCCCGCC
 ACCGAAGTGGACACCTGCTCCAGGTGGTGCAGGCACATGTCAAACCTTGGTAAGGTTCTTCGCGTTCGATCGAATTAACACACAGCTCCGCTGCTTGTGCGGGTCCC
 CGTCAATTCCTTTGAGTTTAACTTTCGACCGTACTCCCCAGCGGACTTCCAGGTTAGCTTCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCATCCATCGTTTAGGGCTAGGACTACC
 GGTATCTAATCTGTTTGTCTCCCTAGCTTTCCGCGC

>CUP2P1C01 Uncultured soil bacterium (Acidobacteria)

GGCTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGAAACGTAATCACCGCAGCGTGTGATCTGCGATTACTAGCGATTCCAGCTTCACT
 GGAGTCGAGTTGCAGACTCCAAATCCGGACTGGGATTGGCTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCAGCGTTTGTACCAACCAATTGTAGCAGTGTGTAGCCCT
 TGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGGTTATCCGGGCGGTTTGCAGAGTGCACCAACTAATGATGGCAACTGGCAATAAAGGGTT
 CGCTCGTTGCGGGACTTAACCCAACATCTCAGGACAGGACTGACGACAGCCATGCAGCACCTACGACGCGGTTCCCTTGCGGGAAAGCGATATTTCTACCGCGGTCCA
 CTGCGCTTCGAGCCAGTAAAGTTCTTCGCGTTCGCTCGAATTAACACCATGCTCCACCGCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTTCAGCCTTGCAGCCG
 TACTCCCCAGGGGATCGCTTAACGCGTTAGCTCCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCGATCATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCC
 GTTTGCTCCCCCTAGCTTTCGCGCCTCAGCGTCAAGTTGTGGTCCAGTGAGCCGCTTTC

>CUP2P1C04 Uncultured bacterium (Não classificada)

CCCCCTCAGCGCACTCCTTCGCGGCTCCTGCTCCTCACGGGTTCCGGCCAGCGACTTCGGGAGCACCAGACTCGGGTGTGACGGGCGGTGAGTGAAGGCCCGGGAA
 CGTATCAACGCAAGTGTGCTGACCTGCGTTTACTAGCAACTCCGACTTTCGTGGCGAGTTGCAGCCAACTCCGAAGTGCAGCCGGTTTAAAGGGATTGCCTTCAGC
 TCGCGTGTGCGGAAACCGTTTGTGCGGCCATTGTAGCGTGTGTGTAGCCCTGGACATAAAGGGCATGCGGACTTGACGTCATCCCCACCTTCTCCGGGTTTCCGCGCG
 CAGTCTCCCTAGAAAATCAACTAAGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACACCTCAGGCACGAGCTGACGACAGCCATGCACCACCTGTGTAGAAA
 CCTTTGCGAGGGGCGCTGACTTTCCAGCGGTTTCTTCTACATGTCAAGCCAGTAAAGGTTTGTGCGGCTCGCTCGAATTAACACACAGCTCCGCTGCTTGTGCGG
 GCCCCCGCTATTCCTTTGAGTTTAACTTTCGCGCCGTTAGTCCCCAGGGCGGCACTTAATG

>CUP2P1C05 Uncultured bacterium (Actinobacteria)

TCACGATCCACTTCGACGGTCCCTCCTAAAGGTTGGGCCAGCGGTTCCGGTGTACCAGCTTTCGTGGTGTGACGGGCGGTGTGTACAAGGCCCGGAAACGTAATCACCC
 CGGCGTTCGTGATCCGGGATTACTAGCGACTCCGACTTTCATGGAGTTCGAGTTCGAGACTCCAATCCGAAGTGCAGCCGGTTTAAAGGATTGGCTCCTCCTCGCGGATTA
 GCAGCCCGTTGACCGGCCATTGTAGCATGTGTGACGCTTGGAGCTAAGGGGATGATGACTTGCAGCTTCGACCCACCTTCTCCCGGTTTCCGCGGCGGATTCCTCA
 CGAGTCCCCGGCATTACCCTGTGCCAACATAGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGGACAGGAGCTGACGACAGCCATGCACCACCTGTG
 TAAGGCCCGGAAAGGACAGCTATCTCTACGGCTTTCCCTTACATGTCAAACCCAGGTAAGGTTTCTTCGCGTTCGCTCGAATTAAGCCACATGCTCCGCGGTTGTGCGG
 GCCCCGCTCAATTCCTTTGAGTTTAACTTTCGCGNCGTACTCCCCAGCGGACTTAAAGGTTTGTGCGGTTAGCTACGGCACGAAACCGTTGAATAGTTCACACCTTAGTG
 CCCAACGTTTACGGCGTGGACTANAGGGTATCTAATCTGTTTCGCTCCCCAGCTTTCGCTCCTCAGCGTCAATAACGGGCCAG

>CUP2P1C07 Uncultured bacterium (Acidobacteria)

ATGAGCATACTGGACGGTCCCTCCTTTCGAGTACACACCGGCTTCTAGTGCAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGAAACGTAATCA
 CCGCAGCATTCTGATCTGCGATTACTAGCGATTCCAGCTTTCATGGAGTTCGGGTTGCAGACTCCAATCCGAAGTGGTTCGGCTTCTCCGATTACCTCCTCCTCGCGG
 TTCGGGACGGTTTGTACCGACCATTTAGCACGTTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGGTTTCCGCGGCGGTTTC
 ACTAGAGTCCCGGCTTACCCGATGGCAACTAGGGATGAGGGTTGCGCCGTTGCGGGACTTAACCCAACATCTCAGGACAGGAGCTGACGACAGCCATGCAGCACCT
 ATACAGCAGTCTCTGCGAGAAAAGGATGTTCCACCCCGGCTCCTGCTGATTTCCAGCCAGGTAAGGTTTCTTCGCGTTCGCTCGAATTAACACCATGCTCCACCGCT
 TGTGCGGGCCGTCGAATTCCTTTGAGTTTAACTTTCGCGNCGTACTCCCCAGCGGACTTAAAGGTTTGTGCGGTTAGCTACGGCACGAAACCGTTGAATAGTTCACACCTTAGTG
 CAAGCAA

>CUP2P1C08 Uncultured bacterium (Acidobacteria)

GGGCGGTTCCTGCGGTTAGCCACGACTTCTAGTGAACCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGAAACGTAATCACCGCGGCACTTCTGATCCCG
 GATTACTAGCGATTCCAGCTTTCATGTAGTCGAGTTGCAGACTACAATCCGAAGTGGTTCGGCTTTTCCGATTAGCTCCCCCTCAGGGTTTGCAGCGGTTTGTACCG
 ACCATTGTAGCAGCTGTGACCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGGTTTATCCGCGGCGGTTTCCGAGAGTGCACCACTAAA
 TGATGGCAACTGGAAGTAAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGGACAGGAGCTGACGACAGCCATGCAGCACCTATATTACGCTCCCTTGCGGGA
 AAGCGATATTTCTACCGGGTCCATAAATTTCCAGCCAGGTAAGGTTTCTTCGCGTTCGCTCGAATTAACACCATGCTCCACCGCTTGTGCGGGCCCCGTCGAATTC
 CTTTGAAGTTTTCAGCCTTTCGACCGTACTCCCCAGGGGACTGCTTAAACCGGTTAGCTACGGCACGCGGGATTGGGTACCCGTCACACCAAGCAGTATCGTTTAGGGC
 TAGGACTACCAGGGTATCTAATCTG

>CUP2P1C09 Uncultured bacterium (Gammaproteobacteria)

GTGGTAGGCGCCCCCTTGCCTGACGGTCACTGCTTCTGGTGCAGTAACTTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGAAACGTAATCACCGCAGCAATGCT
 GATCTGCGATTACTAGCGATTCCGACTTTCATGGAGTTCGAGTTCGAGACTCCAATCCGACTACGACAGATTTTCTGGGATTGGCTCCCGCTCCGCGCTTGGCTTCCCTC
 TGTATCTGCCATTGTAGCAGTGTGTTGCCCTGGCCATAAAGGGCATGATGACTTGACGCTAACCCCACTTCTCCCGGTTTATCCGAGGCGGTTTCCCTTAGAGTGGCA
 ACTGAATGTTGCAACTTCCGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGGACAGGAGCTGACGACAGCCATGCAGCACCTGCTCCAGGCTCCTT
 ACGGCACCCCTGAATCTTACGGTTCTGGGATGTCAAGGCCAGGTAAGGTTTCTTCGCGTTCGCTCGAATTAAGCACATGCTCCACCGCTTGTGCGGGTCCCCGCT
 AATTCCTTTAGGTTTCAACCTTCG

>CUP2P1C10 Uncultured bacterium (Alphaproteobacteria)

GATTACTAGCGATTCCAACCTTCATGTGCTCGAGTTGCAGAGCACAATCCGAAGCTGAGACGGCTTTTTGAGATTGCGCAGGGTTTCCCATTCGCGTCCCATGTGTCACCG
 CCATTTAGCAGCGTGTAGCGCCAGCCTGTAAGGGCCATGAGGACTTGACGTGATCCCCACCTTCCCTCGCGGCTTATCACCGGAGTCCCTTAGAGTGCCCACTAAA
 TGATGGCAACTAAGGCGAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAACTGACGACAGCCATGCAGCAGCTGTCTCCGGTCCAGCCGAAGT
 GAAGGGCTCCATCTCTGGTGCAGCGACGGGATG

>CUP2P1C11 Uncultured bacterium (Acidobacteria)

CAATCATGAGTCATACTTGGCGCTTGTCTCCCTTGCAGTTAGCAGCGGACTTCTAGTACAACCTACTTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGT
 ATCACGGCTCGATCTGATACGCCATTACTAGCGATTCCGGCTTATGACGTCGAGTTGCAGACTGCAATCCGAAGCTGAGCAGAGTTTTTCCGATTAGCTCCCCCTCG
 CGGGTTGGCAACGTTTTGTGCCCTGCATTGTAACAGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTATCCCCACCTTCCCTCTCCGTTATCCGGAGCAG
 TCCACACAGAGTCTCTCTTGCAGTAGTAACGTGTGTCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCC
 TATACTCGTGCCTTGCAGGAAAGGCGTATTTCTACAGCTGGTACGAGCATTTCGAGCCAGGTAAGGTTCCCTCGCTAGCGTGAATTAACCCATGTTCCACCG
 CTTGTGCGGGCCCCGTCATTCCTTTGAGTTTTCAGTCTTGCAGCCGTACTCCCCAGGTCAGGACTTAACCGGTTAGCTCCGGGACGACTTCCGAACGGAAAGCCACCCAAAGTCTGATCGTTTAGG
 CAAGTCTGATCG

>CUP2P1C12 Uncultured bacterium (Acidobacteria)

GGCGTCTGCTCCTTGGCGTAGCGGACGACTTCTAGTACAGCTCACTTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTGCATCTGAT
 ACGCCATTACTAGCGATTCCGGCTTTCATGCGAGTCGAGTTGCAGACTGCAATCCGAAGCTGAGCAGAGTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTTGT
 GCCCTGCATTGTAACAGCGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTATCCCCACCTTCCCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCT
 TGCAGTGGCAACTAGTGCAGGGTTGCGCTCGTTGCGGGACTTAACCCAACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCTATACTCTGTCCCTTGGG
 GGAAGGCGGTTTCTACAGCTGGTCAAGCATTTCGAGCCAGGTAAGGCTCCTCGCTAGCGTGAATTAACCCATGTTCCACCGCTTGTGCGGGCCCCGTC
 ATTCCTTTGAGTTTTCAGTCTTGCAGCCGTACTCCCCAGGTCAGGACTTAACCGGTTAGCTCCGGGACGACTTCCGAACGGAAAGCCACCCAAAGTCTGATCGTTTAGG
 GCTAGGACTACCA

>CUP2P1D01 Uncultured forest soil bacterium (Gemmatimonadetes)

GACACCGACTTCCGGCGCTCATCGCTTCCATGGCGTGCAGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGTGGCGTGGTGTATCCAGATTACTAGCGATTCCA
 GCTTCATGCCCGGGTTGCAGGCGACAATCCGCATGAGGACAGTTTTGGGATTGGCTTGGCATGTACTCCGAGCCCTCTGTACTGTCCATTGTAGCAGCTGTG
 TAGCCCTAGACGTAAGGACCATGATGACTTGCATTCGACCCACCTTCCCTCCGTTTGGCACCGGACAGTCCCCAGAGTCCCGGGCGGTTACCGCCGCGCTGGCAA
 CAGGGGGCAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCAGCTGTGCAGCTGCCCGAAGGACCCCTCCATC
 TCTGGAGAGAATCACGTGCATGCAAGCCTAGGTAAGGTTCTTCCGCTTGCCTGCAATTAACCCATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTT
 TCAGCCTTCCGGCCGTACTCCCCAGCGGGGCACTTAATCGTTAGCGACGGCACTGAAGGTCGCTCCTCCGAGCACCTAGTGCCCATCGTTTA

>CUP2P1D02 Uncultured bacterium (Acidobacteria)

GGCGTCTGCTCCTTGGCGTTAGCTTACCGACTTCTAGTACAGCTCACTTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCAGCGTGTGATC
 TGCGATTACTAGCGATTCCAGCTTTCATGGAGTCGAGTTGCAGACTCCAATCCGAAGCTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCGCAGGTTTGCAGCGGTTTGT
 CGGACATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCGTTATCCGGGGCGGTTTACTAGATGCCCCGACT
 TGACTCGTGGCAACTAGGATAAAGGTTGCGCTCGTTGCGGGACTTACGCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCAGCTCCCGAGCAGTCTCTTG
 CGAAGAAAGGATATTTTACCCCGCTCCACTGCGCTTGCAGCCAGGTAAGGTTCTTCCGCTTGCCTGCAATTAACCCATGCTCCACCGCTTGTGCGGGCCCCGTC
 AATTCCTTTGAGTTTTCAGCTTGCAGCCGTACTCCCCAGCGGATTCGCTTAACCGGTTAGCTGCGGCACAGCCGATTGGGTACCGGCTACACCAAGCAATCATCGTTT
 AGGGCTAGGACTACCGGATCTAATCTG

>CUP2P1D03 Uncultured bacterium (Alphaproteobacteria)

GGCGGCTGCTCCTTGGCGTTAGCGCACCGCTTTCAGGTAAGGCCAATCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCAGCGTGTGAT
 CTGCGATTACTAGCGATTCCAACCTTCATGTGCTCGAGTTGCAGAGCACAATCCGAAGCTGAGACGGCTTTTTGAGATTGCGCAGGATTGCTCCATTGCATCCCACTGTC
 ACCGCCATTGTAGCAGTGTGTAGCCCGAGCCGTAAGGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCGCGGTTATCACCGGAGTCCCTTAGAGTGGCCAA
 TAAATGATGGCAACTAAGGGCGAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCAGCTGTCTCCGGTCCAGCCGA
 ACTGAAGGATCCATCTCTGTTTCCCGCAGCCGGATGCAAGGGCTGTAAGGTTCTGCGGCTTGTGCTGCAATTAACCCATGCTCCACCGCTTGTGCGGGCCCCG
 TCAATTCCTTTGAGTTTTCAGCTTGCAGCCGTACTCCCCAGCGGATTCGCTTAACCGGTTAGCTGCGGCACAGCCGATTGGGTACCGGCTACACCAAGCAATCATCGTTT
 ACGGCTGGACTGCCAGNATCTAATCTGTTTGTCTCCACCGCTTTCGACCTCAGGTCAGTACCGGGCCAGTGAAGCCG

>CUP2P1D04 Uncultured bacterium (Acidobacteria)

GGTTAGCACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGCACAAGGCCCGGGAACGTATTACCGCGGCGTTCGTATCCGGGATTACTAGCGA
 TTCCAGCTTTCATGGAGTCGAGTTGCAGACTCCAATCCGAAGCTGAGGCGCGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCAGCGGTTTCGTACCGACATTGTAGCA
 CCGTGTGAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCGCGGTTATCACCGGAGCAGTTTACTAGAGTCCCGGCTTACCGCGATGGCCAA
 TAGGGATAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCAGCTCCCGCAGCAGTTCGTGCGAAAGGATGTTTC
 CAACCCGCTCCACTGCGCTTGCAGCCAGGTAAGGTTCTTCCGCTTGCCTGCAATTAACCCATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACA
 GCCTTGCAGCCGTAACCCAGCGGATGACTTATCGCG

>CUP2P1D05 Uncultured soil bacterium (Acidobacteria)

GAATTACACCTTGGGCGGTGCTCCCTTGCAGTTAGCGCACCGACTTCTAGTCAACCACTTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCC
 GCAGCATGCTGATCTCGGATTACTAGCGATTCCAGCTTTCATGAAGTCGAGTTGCAGACTTCAATCCGAAGCTGAGGCGCGCTTTTTCCGATTAGCTCCCCCGCGGGTT
 TGACGGGTTTGTACCGCCATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCGTTTATCCGAGGGCGGTTTCCG
 CAGAGTGCCTCAACTAAATGTAAGGCAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCAGCTGTGTGACCGTT
 ACAGGCCATTGCTGGGCGCCCTATTTCTAGGAGATTCTGTACATTTGAGCCAGGTAAGGTTTTCGCGTTCGCTGCAATTAACCCATGCTCCACCGCTTGTGCGGGT
 CGGGCCCCGTCATTCCTTTGAGTTTTCAGCTTGCAGCCGTACTCCCCAGCGGATTCGCTTAACCGGTTAGCTGCGGCACGACAGGATTGGGTACCTGTACACCA
 GCAATCATC

>CUP2P1D06 Burkholderia caryophylli (Betaproteobacteria)

CAGTATGATCTACGTGGTGCAGTCCCTCCTTGCAGTTAGACTACCACTTCTGTTAAACCACTCCCATGGTGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGC
 GGCATGCTGATCCGCGATTACTAGCGATTCCAGCTTTCATGACTCGAGTTGCAGAGTGCAATCCGAGCTACGATCGGTTTTCTGGGATTGGCTCCCCCTCGCGGGTTGG
 TGACCTCTGTTCCGACATTGTATGACGTGTGAAGCCATCCCATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCGTTTGTACCGGCGAGTCTCCTTA
 GAGTGCCTTGCAGTAAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCAGCTGTGTGACCGTT
 TCTTTTCAGCAGCTCCCACTCTCACGCGGATTCCTGATGTAAGGTTGAGGTTTTCGCGTTCGCTGCAATTAACCCATGCTCCACCGCTTGTGCGGGT
 CCCGTCATTCCTTTGAGTTTTCAGCTTGCAGCCGTACTCCCCAGCGGATTCGCTTAACCGGTTAGCTGCGGCACGACAGGATTGGGTACCTGTACACCA
 GTTATGGGCGGACTACCGGATCTAATCTG

>CUP2P1D07 Uncultured bacterium (Alphaproteobacteria)

TCTTGGCGTTAGCGCACCGCTTTCGGTAAAGGCCAATCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCAGCGTGTGTTTTCGCGATTA
 CTAGCGATTCCACCTTTCATGACCCGAGTGCAGAGTGCATCTGAACTGGGAGCGGTTTTTTCGATTAGCTCACCTCCGCGGCTTGCAGTCCGCTTGTACCGCCAT
 TGTAGCAGTGTGAGCCAGGTTGAAGGCCATGAGGACTTGACGTATCCCCACCTTCCCTCCGTTTGCAGCGGCGGCTTCCCTGAGTCCCACTGAATGATG
 GCAACTAAAGGCGAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGAGCTGACGACAGCCATGCAGCAGCTGTGTGACCGTT
 CTGTTCCAGCGTACGCTGGGATGTAACCCCTGTAAGGTTTTCGCGTTCGCTGCAATTAACCCATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTGA
 GTTCAACCTTGCAGCCGTACTCCCCATGCGGAACGCTTAATGGC

>CUP2P1D08 Uncultured bacterium (Acidobacteria)

CGCTGCTCCTTGGCGTTAGCGTGGCGACTTCTAGTACAGCTCACTTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGTGCATCTGATAC
 GCCATTACTAGCGATTCCGGCTTTCATGACGTCGAGTTGCAGACTGCAATCCGAAGCTGAGCAGAGTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTTGTG

CCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTATCCCCAACTTCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCTCTCTTG
CGAGTAGTAACGTGTGACAGGGTTCGCTCGTTGCGGGACTTAACCCAAACCTCACGGCACAGGTGACGACAGCCATGACGCGCTATACTAGTGTCCCTTGGCGG
AAGCCGATTTCTACAGCTGGTCACTAGCATTTCGAGCCAGGTAAGGTTCTCTCG

>CUP2P1D09 Uncultured bacterium (Acidobacteria)

GCCTACAGACTTCTAGTACAATCCACTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATACCGGACGCTGTGATGCTCCATTACTAGCGATTCCAGC
TTCATGACAGCGGAGTTGACGCTGCAATCCGAACTGAGACCGGTTTTTTTGGCATTGCTCCGCTCCGCTCCGGACGCTTTGTACCGGCCATTGTAGCAGTGTGT
AGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTCTCCAATTCGCTGGCGGTCTCCTGCGAGTTCACCTTTCCGATGGCAACACAGGACAA
GGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAGTACGACAGCCATGACGACCTCGACTGGACCCCTTGGGGGTAGCGATGTTTTCCACCGC
GTTGACAGCGGTTGACGCCAGGTAACGTTCTTCGCGTTGCGCTCGAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACGCTT
GCGACTGTACTCCCCAGGCGCATATTTAACGGTTAGTCCGGCACGGATCAACTGAATGACCCACACCAATAAT

>CUP2P1D10 Burkholderia caryophylli (Betaproteobacteria)

GGTTAGACTAGCCACTTCTGGTAAAACCCACTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATACCGCGGCATGCTGATCCGCGATTACTAGCGAT
TCCAGTTCATGCACTCGAGTTGCAGAGTGCAATCCGGACTACGATCGGTTTTCTGGGATTGGCTCCCTCCCGGGTTGGCGACCTCTGTTCCGACATTGTATGAC
GTGTGAAGCCCTACCATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCGGTTTGTACCGGCGAGTCTCCTTAGAGTGCCTTTGCGTAGCAACTAAGGACA
AGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAGTACGACAGCCATGACGACCTGTGTGACGGTTCTCTTTGAGACTCCACCTCTCAGCG
GATTCCATCGTCAAGGGTAAAGTTTTTCGCGTTGCAATGAATTCACATCCACCGCTGTGCGGGTCCCGTCAATTCCTTTGAGTTTTAATCTT
GCGACCGTACTCCCCAGGCGGTAACCTTACGCGTTAGTACGTTACTAAGGAAA
TGAATCCCAACAACACTAGTTGACATCGTTTGGGCGTGGACTACCA

>CUP2P1D11 Uncultured bacterium (Acidobacteria)

CTATACTTGGGCGGCTGCCCTTGGCTCAGGACTTCTAGTACAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATACCGCGCAGC
GTCTGATCTGCCATTACTAGCATTCCAGCTTCATGGAGTCCGGTTGACAGTCCAAATCCGAACTGAGTGGCTTTTCCGATTAGCTCCCTCCGGGTTTGGCA
CGGTTTGTACCGACCATGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCGCGTTATCCGGCGCAGTTTTCGCTAGAG
TGCCCGGCTTGACCCGATGGCACTAGAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAGTACGACAGCCATGACGACCTCCGCGAGC
AGTCTTTGCGGAAAGGGATGTTTTCCACCCCGGCTCCACTGCGCTTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTGAACACATGCTCCACCGCTTGTGCGGG
CCCCGTAATTCCTTTGAGTTTTCAGCCTTGGCAGCTACTCCCCAGGCGGGATGCTTAACGCGTTAGTGTGCGGACGACCGGATGGGTACCGATCACACCAAGCATCCA
TAGTTTAGGGTAGGACTACAGGATATCTAATCTGTTTGTCCCTAGCTTTCGCGCTCAACGTCAGTTGTG

>CUP2P1E01 Uncultured Caulobacter sp. (Alphaproteobacteria)

CTTCGGGTAAGCATCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTACTACCGCGGCATGCTGATCCGCGATTACTAGCGATTCCGACTTTCATGCTCTC
GAGTTGCAGAGCAATCCGAACTGAGACGACTTTTAGGATTGCTCCCTCCCGGGTTAGGAACCTCTGTAGTCCGCAATTGTAGCAGCTGTGTAGCCACCCCTGT
AAGGGCCATGAGGACTTGACGTATCCCCACCTTCTCCGGCTTACCACCGGCGGTCCCTTTAGAGTGCTCAGCAAACCTGGTAGCAACTAAAGGGCAGGGGTTGCGGT
CGTTGCGGGACTTAACCCAAACATCTCACGACACGAGTACGACAGCCATGACGACCTGTGTCTTAGTCCCGAAGGGAAAACCGGATCTCTCCGG

>CUP2P1E02 Uncultured bacterium (Alphaproteobacteria)

CCAGTCCGTGACCTACTGTGGTGGTGTCCCTTGGGGTTACGCGCCGCTTACAGTAAAGCCAACTCCCATGGTTGACGGGCGGTGTGTACAAGGCCCGGGAACGTAT
CACCGCAGCGTGTGATCTGCGATTACTAGCATTCCGACTTTCATGTGCTCAGTGTGACAGACAAATCCGAACTGAGACGGCTTTTGGAGATTGCTCAGGGTTACCC
CTTTGCTTCCCATGTCACCGCATTGTAGCAGTGTGTAGCCAGCCGTAAGGGCCATGAGGACTTGACGTATCCCCACCTTCTCCGCGGTTATCCCGGCAGTC
CCCTTAGAGCCCAACTGCAACTAGGCAACTAAGGGCGAGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAGTACGACAGCCATGACGACCT
GTCTCCGGTCCAGCCGAAGTGAAGGAGTCCATCTCTGTTCCCGCAGCCGGGATGTCAAGGGCTGTGAAGGTTTGTGCGGTTGCTTCAATGAACACATGCTCCACC
GCTTGTGCGGGCCCCGTAATTCCTTTGAGTTTTAATCTTGCAGCCGTAACCTCCAGGCGGGGGGTTAATGCGTTAGTGTGCGCCACTGACGAGCATGCTCGCCAAAG
GCTAGCCCCATCGTTTACGGCGTGGACTACAGNGTATCTAATCTGTTTGTCCCGCAGCTTTCGACATACAGC

>CUP2P1E03 Uncultured bacterium (Betaproteobacteria)

TGTGTACAAGGCCCGGGAACGTATCACCGCAGCATGCTGATCCGCGATTACTAGCAGTTCGACTTTCATGGAGTTCGAGTGTGACAGTCCAAATCCGGACTACGACGCGCT
TTCGCGGATTGGCTCCCTCCCGGGTTGGCAACCTCTGTACGCGCCATTGTATGACGTGTGTAGCCCTACCATAAAGGGCCATGAGGACTTGACGTATCCCCACCT
TCTCCGCTTTGTACCGCGCAGTCCATTAGAGTGTCTCAACTGAATGTAGCACTAATGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAG
CTGACGACAGCCATGACAGCACTGTGTCTAGGTTCCCTTTCGCGGACCCGCTGATCTCTGACGCTTCCATGACATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGACATG
AATTAACACATCATCCACCGCTTGTGCGGGCCCCGTAATTCCTTTGAGTTTTAATCTTGCAGCCGTAACCTCCAGGCGGATGACTTTCAGCGTTAGTGTGCGTTAC
TAAAGGATTAATCTCCAAACACTAGTATCATCTGTTTAGGGCGTGGACTACAGGGATATCTAATCTGTTTGTCTCCCGCAGCTTTCGCGTGA

>CUP2P1E04 Uncultured bacterium (Não classificada)

CTTACGGTTGACGCGGGCGCTTCCGGTACATAAAGCTCAGGTGACGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATACCGGACGCTAGCTGATCTCGGGTTACT
AGCGATTCCGACTTTCATGAAGCGAGTTGCAGCTTCAATCCGGACTGAGAAACGGTTTGTGAGATTAGCTTCCCTCCCGGGTTGCAACTCGTTGTCGTTCCATTG
TAGCAGTGTGTAGCCGGACGTAAGGGCCATGCTGACTTGACGTATCCCCACCTTCTCCGGCTTGTACCGGCGGTCCCGCTGAGAGATCTTTTGGACCAACAC
ACGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACCTCACGGCACGAGTACGACAGCCATGACGACCTGTCTCGGTTCCATTGTGCGAAAACCTAGTCT
CCTAGGATAGCGCAGGATGTCAAGCCCGGTAAGGTTCTTCGCGTTGCGTCAATTAACCCAAACATGCTCCACCGCTTGTGCGGG

>CUP2P1E05 Uncultured bacterium (Acidobacteria)

TCATACTGGGCGCTGCCTCCCTGCGGTACGCGCGGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATACCGCGCTC
GATCTGATACGCCATTACTAGCATTCCGGCTCCATGAGTTCGAGTGTGACAGTGCAAATCCGAACTGAGCAGAGTTTTTCCGATTAGCTCCCTCCGGGTTGGCAA
CGGTTTGTGCCCTGCAATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAG
TTCCCTTTGCGAATGGCAACTAGCTGACGGGTTGCGCTCGTTGCGGGACTTAACCCAAACCTCACGGCACGAGCTGACGACAGCCATGACGCGCTCCACACCGGT
CCCTTGGGGAAAGGGCGTGTTCACAGCTTGTCCAGTGTGCTGAGCCAGGTAAGGTTCTTCGCGTAGCGTCAATTAACCCAAACATGTTCCACCGCTTGTGCGGGC
CCCCGTAATTCCTTTGAGTTTCACTTTCGACCGTACTCCCCAGGTGACGAGCTTAACGCGTTAGTCCGGGACGACGACGACGAGCTGCGGCACCCCAAGTCTGAT
CG

>CUP2P1E06 Uncultured soil bacterium (Gammaproteobacteria)

GGTACGGCTACTGCTTTCGGTGCAGTAGACTTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATACCGGACGAACTGCTGATCTGCGATTACTAGCGAT
TCCGACTTCATGGAGTGCAGTTGCAGACTCCAATCCGGACTACGATAGATTTTCTGGGATTGGCTCCCGCTCCGCGGTGGCTTCCCTCTGTTTCTACCATTTGATGAC
GTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTATCCCCACCTTCTCCGGTTTGTACCGGCGGTCTCCTTAGAGTGCCCAACTGAATGCTGGCAACTAA
GGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAGTACGAGCAGCTGTCTCCAGCTCTTTCGCGGCTTTCGCGGACCCCGAATCTCT
TCAGGTTCTCGGGATGTCAAGCCAGGTAAGGTTCTTCGCGTTGCAATTAACCCAAACATGCTCCACCGCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTCAAC
CTTGGCGGCTAACTCCCT

>CUP2P1E07 Uncultured bacterium (Acidobacteria)

GGGTTGGTGCAGGACTTCTAGTACAACCGGCTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATACCGGCGGCTGCTGATCCGCGATTACTAGCGA
TTCCAACTTCAAGCAGCGAGTTGACGCTGCTATCCGAACTGAGACCGACTTCTCCGATTAGCTCCCTTGGGGCTTCGCGAGGTTTTGTATACGCCATTGTAGCA
CGTGTGTAGCCCGACATAAAGGCCATGCTGACTTGACGTATCCCCACCTTCTCCGGTTTATACCGGCGGTCTTTCGAGAGTCCCACTTACTGATGAGCAAC
AGCAAAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAGTACGAGCAGCTGTCTCCAGCTCTTTCGCGGCTTTCGCGGAACTCACTTTCCG
TCGATGGTCACTCGTGTTCAGGCTGGGTAAGGTTCTTCGCGTTGCGTCAATTAACCCAAACATGCTCCACCGCTTGTGCGGGCCCCGTAATTCCTTTGAGTTTCAAG
CCTTGCAGCCGTAACCTCCAGGCGAATGCTTAAATGCGTTAGTTCGGCACGACAGGATCGATACCGCTCACACCAAGCATTATCGTTTAGGGCCAGGACTACCGGG
GTACTAATCCCGTTTGTCCCTGGCTTTCGCTCCTCAGCGTCACTAGTAGTCC

>CUP2P1E08 Uncultured bacterium (Alphaproteobacteria)
GTTAGCGCGCGTCTTCGGGTAACCAACTCCCATGGTGTACGGGGCGGTGTGTACAGGCCCGGGAACGTATACCAGCGCGGTGCTGATCCGCGATTACTAGCGAT
TCCAACCTCATCGCTCGAGTTGCAGAGCGCAATCCGAACCTGAGACGGCTTTTCGAGATTGCTAAGGGTCGCCCTTCGCCTCCCGCTGTACCCGCCATTGTAGACAG
TGTGTAGCCAGCCTGTAAGGGCCATGAGGACTTGACGTCATCCACCTTCTCCGGCTTATACCAGCGAGTCCCGCTGGAGTGCCCACTGAATGATGGCAACTAAG
GGCAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCGCGACACGAGCTGACGACAGCCATGACGACCTGTGTTCCCGCCCCGAAGGGAAGATCCGATTTCTG
CAATCCGTCAGGACATGCAAAAGCTGTAAGGTTCTGCGCGTGTGCTCGCAATTAACCCACATGCTCCACCGCTGTGGGGGCCCGCTCAATTCCTTTGAGTTTAA
TCTTGGACCGTACTCCCGAGCGGGATGCTTAAAGCGTTAGTTCGCCACTGAAGAGCAAGCTCCCAACGGCTAGCATCCATCGTCTACAGCGTGGACTACCAGGGT
AT

>CUP2P1E09 Uncultured bacterium (Acidobacteria)
CGACATACTTAGCGCTCTCCCGCTCGGGTGTAGTAGCGACTTCTAGTACAACCGGCTTTCGTGATGTACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACC
GGCGTGTGATCCCGGATTACTAGCGATTCCAACCTTCAAGCAGGCGAGTTGCAGCCTGCTATCCGAACCTGAGACCGGCTTCTCCGATTAGCTCCACCTTGGGTTTTG
CGAGGTTTTGTACCGGCCATTGTAGCAGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCACCTTCTCCGGTTTTATCACCAGCGTCTCTGCA
GAGTGCCAGCTTAACCTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCAGCAGACGAGCTGACGACAGCCATGCAGACCTCTAC
GAGTGTCTTGGGAAGCACCTTTCGTAGTTTGTCACTCGCTTTCGCAAGCTGGTAAGGTTCTTCGCGTTGCTTCCGCTGCAATTAACCCACATGCTCCACCGCTTGGCGG
GCCCGCTCAATTCCTTTGAGTTTACGCTTGCAGCCGACTTCCCGAGCGGAATGCTTAAAGCGTTAGCTTCCGCGTGTGCGGAGCCCGCTCAATTCCTTTGAGTTTAA
TCATCG

>CUP2P1E10 Uncultured bacterium (Planctomycetacia)
CATCTTCGGCGCTGCGCTTCCGACTCCGAGCCTCGGATGCCCGCGCTTGGTGGCTTGACGGGGCGGTGTGTACAAGGCTCAGGAACACATTCACCAGCGCAGTGTCT
ATCGCGGATTACTAGCGATTCCGGCTTTCATGCGGGCGGGTTGCAGCCCGCAATCCGAACCTGAGGGACGATTTTTGCGATTGGCGCGGTCTTGCAGCCTGGCAACGCTCT
GTCCATCCCATTTGATAGCAGTGTGCAGCCCTGGGCATAAAGGGCCATGATGACTTGACGTCGCTCCCGCCTTCTCCGGCTTAAAGCGCGCGGTCTGATCAGAGTCCCG
CCTTACCGCGTGGCAACTGACCACAGGGTTTTCGCTCGTTACGGGACTTAACCCAAACCTCAGGCACGAGCTGACGACAGCCATGCAGACCTGTGATGTTCCAC
CTTTCGGCGTACCGCGCTTTCGCTGCG

>CUP2P1E11 Uncultured bacterium (Gammaproteobacteria)
GTCATCGACACAGTGGTAGGCGCCCGCTTTCGGTCAAGCTACCTGCTTCTGGTGCAGTAGACTTCCATGGTGTACGGGGCGGTGTGTACAAGGCCCGGGAACGTATT
CACCGCAGCAATGCTGATCTGCGATTACTAGCGATTCCGACTTTCATGGAGTCGAGTTGCAGACTCCAACTCCGACTACGATAGATTTCTGGGATTGGCTCCCGCTCGC
CGGTTGGCTTCCCTGATCTACCATTGTAGCAGTGTGTAGCCCTGGCCATAAGGGCCATGATGACTTGACGTCGCTCCCGCCTTCTCCGGCTTAAAGCGCGCGGTCTGATCAGAGTCCCG
TCTCTTAGAGTCCCAACTGATGCTGGCAACTAAGGACAAGGGTTGCGCTTTCGCGGACTTAACCCAAACCTCAGGCACGAGCTGACGACAGCCATGCAGACCTGTGATGTTCCAC
GTCTCCAGGTTCTTCCGCGCACCCCGAATCTTTCAGGGTTCCTGGGATGTCAAGGCCAGGTAAGGTTCTTCCGCTGTGATCGAATTAACCCACATGCTCCACCGCT
TGTGCGGGTCCCGTCAATTCCTTTGAGTTTCAACCTTGGCGCCG

>CUP2P1E12 Uncultured bacterium (Acidobacteria)
ACAGCCCACTTTCGTGATGTACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCAGCGGTGCTGATCTGCGGTTACTAGCGATTCCAGCTTTCATGGAGTCGAGTT
GCAGACTCCAATCCGACTGGGATTTGGCTTTTTCCGATTAGCTCCCGCTCGCGGTTTTGCGAGCGTTTTGTACCAACCATTTGATAGCAGTGTGTGGCCCTGGACATAAAG
GCTAGGACTTGCAGCTATCCACCTTCTCCCGTTTATCCGAGCGGTTTTGCGCAGAGTCCCAACTAAATGATGGCAACTGACAATAAGGGTTGCGCTCGTTGC
GGGACTTAACCAACATCTCAGCAGCAGGCTGACGACAGCCATCCGACAGCCCTCCGTTAGCGGTTCCCTTGGGGAAAGAGATATTTCTACCTCCGCTCACTACGTTTCA
GCCAGGTAAGGTTCTTCCGCTTGCCTGCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACGCTTGCAGCCGACTCCCGAGG
CGGATCGCTTAAAGCGTTAGCTCCGCGCACAGGATTGGGTACCTGTACACCAAGCGATCATAGTTTAGGGTAGGACTACCAGGGTATCTAATCTGTTTGCCTCC
CTAGCTTTCGTG

>CUP2P1F01 Uncultured bacterium (Acidobacteria)
CTTGGCGTCAAGCTGCGGACTTCTAGTACAACCCACTTTCGTGATTAAACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCAGCGGTGCTGATCTGCCATTACTA
GCGATTCCAGCTTTCATGACGGCGAGTTGCAGCCTGCAATCCGAACCTGAGACCGGTTTTTTGCGATTGCCTCCACCTCGCGGCTTGGGAACGATTTGACCGGCCATTGT
AGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCGCTTCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTGCAGCTTGCAGCTGAGCAAC
ACAGGACAAGGGTTGCGCTCGTTGCGGACTTAACCCAAACATCTCAGCAGCAGGCTGACGACAGCCATGCAGCAGCCATGCAGCAGCTCCGCTCCACTCCCTTGCGGGATAGCGGTGT
TCCACCGCGGTAAGAGCGGTTGAGCCAGGTAAGGTTCTTCCGCTTGCCTGCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTT
TCAGCCTTCCGACTGTACTCCCGAGCGGCATATTTAACCGCTTAACTCCGGCACAGA

>CUP2P1F02 Uncultured bacterium (Alphaproteobacteria)
CAACTCCATGGTGTACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCAGCGGTGCTGATCTGCGATTACTAGCGATTCCAACCTTTCATGTCTCGAGTTGCAGA
GCACAATCCGAACTGAGACGGCTTTTTGAGATTGCGAAGGATTACTCCTTTCGCTCCCTGTGACACCGCATTGTAGCAGTGTGTAGCCAGCGCTGTAAGGGCCATG
AGGACTTGACGTCATCCCGCTTCTCCGGCTTATCACCAGCGTCCCGTTAGAGTGCCTCAACTAAATGATGGCAACTAAGGGCGAGGTTGCGCTCGTTGCGGGACT
TAACCCAAACCTCAGCAGCAGGCTGACGACAGCCATGCAGCAGCTGTCTCCGGTCCAGCCGAACTGAAGAGCTCCATCTCTGGTGTGCGACCGGGATGTCAAAGG
CTGTAAGGTTCTTCCGCTTGTCTCGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTAACTTTCGACCGTACTCCCGAGCGG
GATGCTTAATGCGTTAGCTGCGCCACTGAAGGGTAAACCCAAACGGCTAGCATCCATCGTTTATGGCGTGGACTACCAGGGTATCTAATCTGTTTGCCTCCCGC
TTTCGACCTCAGCGTACG

>CUP2P1F03 Uncultured bacterium (Acidobacteria)
CTCCTTGGCGTTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATGTACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCAGCGTGTGATCTGATACGCCATTA
CTAGCGATTCCAGCTTTCGCGCAGGGCAGTTGCAGCCTCGATCCGAACCTGAGACCGGTTTTTTGCGATTGGCTCCCGCTCCCGGTTTTGACAGCGCATTGTACCGGCCAT
GTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCGCTTCTCCAGCTTATCGCTGGCGGCTCCTGCGAGTGTCTTTCGATGTG
GCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCAGCAGCAGGCTGACGACAGCCATGCAGCAGCTCCAGCCGAGCCCTTGGCGGATGAA
GTGTTTCCACGATCTGTTAGCTTTCGAGCCGCTTGCAGCCAGGTAAGGTTCTTCCGCTTGCCTGCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTT
GAGTTTACGCTTGCAGCGTACTCCCGA

>CUP2P1F04 Uncultured bacterium (Acidobacteria)
CTTGAAGGCTGCTCCTTGGCGTTAGCACACTGCTTCTAGTACGGCCACTTTCGTGATGTACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCAGCGCGTTT
TGATCCGCGATTACTAGCGATTCCAGCTTTCATGGAGTCGAGTTGCAGACTCCAACTCCGAACCTGAGGCGCGGTTTTTTCCGATTAGCTCCCGCTCAGCGGTTTTGCGACGGT
TGTACCGCACTTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCGCTTCCCGCTTCCCGCTTTCGCTGTTTCCGAGGAGGTTTCACTAGAGTGC
CGCTTTCAGCCGATGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCAGCAGCGAGCTGACGACAGCCATGCAGCAGCTTGCAGCAGCTTGCAGCAGC
TTTTAAGGGGAAGGATGTTCCACCGGCTTCTGCAATTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTGCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCC
CGTCAATTCCTTTGAGTTTTCAGCCTTTCGAGCCTTCCCGAGGATGGCTTATCGCTTGCCTGCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTT
CGTTTAGGCTAGGACTACCAGCGGTATCTAATCTGTTTGCCTCCCGT

>CUP2P1F05 Uncultured bacterium (Acidobacteria)
TTGCGGTTCCGCGCGGACTTCTAGTACAACCTCCTTTCGTGATTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCAGCGTGTGATCTGATACGCCATTACTAGC
GATTCGGCTTTCATGACGTCAGTTGCAGACTGCAATCCGAACCTGAGCAGAGTTTTTTCCGATTAGCTCCCGCTCAGCGGTTGGCAACGTTTTGTCCTTGCATTTGATA
CAGCTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCGCTTCTCCTCCGTTATCCGAGGAGTCCAGCTAGAGTTCTCTTTCGAGTGTGCAACT
ACGTGACGGGTTGCGCTCGTTGCGGGACTTAACCCAAACCTCAGCGCAGGCTGACGACAGCCATGCAGCAGCTTACTCCTGCTCCCTTGCGGGAAGTCCGATTT
CTACAGATTGTCAGAGCTTTTCGAGCCAGGTAAGGTTCTTCCGCTAGCGTCAATTAACCCACATGTTCCACCGCTGTCGCGGGCCCCGTCATTCCTTTGAGTTT
CAGCCTTGCAGCGTACTCCCGAGCGGATACTTAAAGCGTTAGCTTCCGCGACAGCCGATTAATCCCGGCTCAGCCAAAGTATCCATCGTTTAGGGCTAGGACTACC
AGGGTATCTAATCTGTT

>CUP2P1F07 Uncultured soil bacterium (Acidobacteria)

ACTTGGGCGCTGCTCCTTGGCGTTCAGCTTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTACGGGCGTGCAT
TGATAGCCGCTACTAGCCGATTCGCGCTTATGACAGTTCGAGTTGACAGCTGCAATCCGAACTGAGCAGAGCTTTTTCCGATTAGCTCCCCCGCGGGTGGCAACGGT
TTGTGCGCTGCAATTTGAAACAGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTACAGCTATCCCCACCTTCCCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCC
CTCTTGGAGTGGCAACTACGTGACGGGTTGCGCTCGTTGCGGGACTTAAACCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCGCTCCACACCTGTCCCT
TGCGGGAAGGCCGTTTCCACAGCTGGTTCAGTTCGCGCTTCGAGCCAGGTAAGGTTCTCCGCTAGCGTCAATTGAACCCATGTTCCACCGCTTGTGCGGGCCCC
GTCAATTCCTTTGAGTTTCAAGTCTTGCACCGTACTCCCCAGGTGACAGCTTAAACCGCTTAGCTCCGCGTACGCTCAATCCCCACCTTCCCTCCGCTTAAACCGCGGTTCTG
TAGGGTAGGACTACCAGGGTATCTAATCTGTTTGTCCCTAGCTTTCGTTCTCAGCGTCACTAGTGGTCCAGCGCGGCTTTCGC

>CUP2P1F08 Uncultured soil bacterium (Planctomycetacia)
CCATCGCGGAGTATCTTAACGCTTGTCTCTTGGCGTTACTACAGCGTATGGATGCCCCCATTCGTTGGCTTGACGGGGCGGTGTGTACAAGGCTCAGGAACACATTCAC
CGCGGTATGCTGACCCGCGATTACTAGCGATTCCAGCTTCATGACGCGAGTTGACGCTGCAATCCGAACTGAGGCGCGTTTTTTGGGATTTGCTTGTCTCCGCGAGT
TCGCTTCCCTTTGTGCGCGCCATTGTATGACGTGTGCAGCCCTAGTCTATAAAGGCCATGAGGACTTACGCTCAATCCCCACCTTCCCTCCGCTTAAACCGCGGTTCTG
CTAGAGTCCCGACTTACTCGTGGCAACTAGCGACAAGGTTTCGCTCGTTAAGGGACTTAAACCGACATCTCACGACAGAGCTGACGACAGCCATGCAGCACCTG
TGACGTTTCAACCTTGGCGCTGTGCGCTACTTTCATAGGGTTAATCCGTCGATCAAGAGCTAGGATAAGGTTCTTCGCGTAGCCTCGAATTAAAGCCATCATCCA
CCGCTTGTGTGAGCCCGCTCAATTCCTTTGAGTTTTCAGCTTGCAGCCATACT

>CUP2P1F09 Uncultured bacterium (Acidobacteria)
TGCACCAATCATGAGTCATACTTGGGCGCTTGCACCTTGGCGTTTGGCGGGGACTTCTAGTACAACCTCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGG
AAGCTATTACCGCGTGCATCTGATACGCCATTACTAGCGATTCCGCGCTTCATGACGTCGAGTTGACAGCTGCAATCCGAACTGAGCAGAGTTTTCCCGATTAGCTCC
CCCTCGCGGGTTGGCAACGGTGTGCTCCCTGCAATTGTAACAGCTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTACGCTCAATCCCCACCTTCCCTCCGTTATCCG
GAGCAGTCCACGTAGAGTTCCCTTTCGAGTGGCAACTACGTGACGGGGTTGCGCTCGTTGCGGGACTTAAACCAACACCTCACGGCACGAGCTGACGACAGCCATGC
AGCGCTTACTCCTGCTCCCTTTCGCGGGAAGGCCGATTTCTACAGCTTGTCAAGAGCATTTCGAGCCAGGTAAGGTTCTCCGCTAGCGTCAATTGAACCCATGTT
CCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTTCAGTCTTGCAGCCGACTCCCCAGGTGACGAGCTTAAACCGCTTAGCTCCGGGACGACCCGAAACGGGTC
GCACCCAAAGTCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTGCTCCCTAGCTTTCGTTCTCAGCGTCACTAGTGGT

>CUP2P1F10 Uncultured soil bacterium (Gammaproteobacteria)
GGTACGGCTACTGCTTCTGGTGCAGTAGACTTCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGAAACGTATCACCGCAGCAATGCTGATCTGCGATTACTAGCGATT
CCGACTTCATGAGTGCAGTTGACAGCTCCAATCCCGACTACGATAGATTTTCCGGGATTGGCTCCCGCTCGCGGCTGGCTTCCCTCTGATCTACCATTTGAGCAG
TGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCCTCCGTTTGTACCGGGCGGTTCTTATAGATGCCCACTAAATGCTGGCACTAAG
GACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGCTTACGACAGCCATGCAGCACCTGTCTCCAGGCTTTCGCGGACCCCAATCTCTT
CGGGTTTCTGGGATGCAAGGCCAGGTAAGGTTCTTCGCGTTGATCGAATTAACCCATGCTCCACCGCTTGTGCGGGTCCCGCTCAATTCCTTTGAGTTTCAACC
TTGCGGCGTACTCCCCAGGGGAGAACTTAGCGGTTAGCTACGACACTGCGAGGCTTACCCTCTCAACGCTAGTCTCATCGTTTATGGCTGGACTACCAGGGTA
TCTAATCTGTTTGTCCCGCTTTC

>CUP2P1F11 Uncultured bacterium (Acidobacteria)
GGTACGGCACCGGCTTCTAGTACAACCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCAGCGCGTGTGATCCGCGATTACTAGCGATT
TCCGATTCATGAGTGCAGTTGACAGCTCCAATCCCGACTACGATAGATTTTCCGGGATTGGCTCCCGCTCGCGGCTGGCTTCCCTCTGATCTACCATTTGAGCAG
TGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCCTCCGTTTGTACCGGGCGGTTCTTATAGATGCCCACTAAATGCTGGCACTAAG
GACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGCTTACGACAGCCATGCAGCACCTGTCTCCAGGCTTTCGCGGACCCCAATCTCTT
CGGGTTTCTGGGATGCAAGGCCAGGTAAGGTTCTTCGCGTTGATCGAATTAACCCATGCTCCACCGCTTGTGCGGGTCCCGCTCAATTCCTTTGAGTTTCAACC
TTGCGGCGTACTCCCCAGGGGAGAACTTAGCGGTTAGCTACGACACTGCGAGGCTTACCCTCTCAACGCTAGTCTCATCGTTTATGGCTGGACTACCAGGGTA
TCTAATCTGTTTGTCCCGCTTTC

>CUP2P1F12 Uncultured bacterium (Alphaproteobacteria)
TCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGCATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCTCTCGAGTTGACAGAG
CAATCCGAACTGAGACGGCTTTTTGAGATTGGCGCGGGTTCGCGCCGCTGTCACCGCCATTGTAGCAGTGTGTAGCCAGCCCGTAAGGGCCATGAGG
ACTTGAAGTCAATCCCGCTTCCCTCCGCTTGTACCGGGCAGTTTCTGAAAGTGCCCGGCTTGCAGGATGGCAACTGCAGATGGGGTTCGCGCTGTGCGGGACTTA
ACCAACATTTACGACAGGAGTGCAGCAGCCATGCAGCACCTGTGTCGCGCCAGCCAA

>CUP2P1G01 Uncultured soil bacterium (Acidobacteria)
CACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCATGCTGATCTGCGATTACTAGCGATTCCAGCTTCATGAAGTCAGTTGACAG
CTTCAATCCGAACTGAGGCGCGCTTTTTCCGATTAGCTCCCGCTCACGGGTTTGTACCGGCTTGTACCGCCATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCAT
GAGGACTTGACGTCATCCCCACCTTCCCTCCCGTTTCCGAGGCGGTTTTCGCGAGTGTCTCAACTAAATGGTGAAGTGGAGATAAGGGTTCGCGCTCGTTGCGGGG
TTAACCAACATCTCACGACAGGAGTGCAGCAGCCATGCAGCACCTATATAGCAGCCATTGCTGGGAGGGATATTTTACCCCGGTTCACTACATTTGAGCCCA
GGTAAGGTTTCTCGCTTGCCTCGAATTAACCCATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTTCAGCTTGCAGCCGTTACTCCAGCGGAT
TGCTTAAACCGTTAGTGTGCGGACGACAGGATTGGGTACCTGTACACCAAGCAATCATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGTCCCGCTAGC
TTTCGCGCTCAGCGTCACT

>CUP2P1G02 Uncultured bacterium (Acidobacteria)
ATACTTAGGCGCGCTTCCCTTGGCGGTTGATGAGCGACTTCTAGTACAACCGGCTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGG
CGTGTGATCCGCGATTACTAGCGATTCCAATCTCAAGCAGCGAGTTGACGCTGCTATCCGAACTGAGACCGATTTCCTCCGATTAGCTCCCGCTTACCGGCTCGCG
ACGGTTTGTATCGGCCATTGTAGCAGTGTGTAGCCCGAGACATAAAGGCCATGCTGACTTACGCTCATCCCCACCTTCCCTCCGTTTATACCGGGCAGTCTTTCGAGA
GTGCCAGATTACTGATGGCAACAGCAACAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTTACCGGCTTGC
GTGCTTTCGCGAAGGCACTTTCGCTCGCTGCTCAGTTCGCTGTTCAAGCCTGGTAAGGTTTCTTCGCGTTGCGTCAATTAACCCATGCTCCACCGCTTGTGCGGG
CCCCGCTCAATTCCTTTGAGTTTTCAGCTTGCAGCCGACTCCCCAGGGGAACTGTTAATGCGTTAGCTTCCGACGGCAGGATCGATACCCGCTACACCAAGCATT
ATCGTTTAGGGCCAGGACTACCAGGGTATCTAATCCGTTTGTCCCTAGCTTTCGCTCACTCAGGCTCAGAATGGGTCCAGGATG

>CUP2P1G03 Uncultured bacterium (Acidobacteria)
ACGGCTGCCCTTGGCGTTGGCTCACCGGCTTCTAGTGAACCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGGCGTTCGTGATC
CGGATTACTAGCGATTCCAGCTTCATGACGTCGAGTTGACAGCTGCAATCCGAACTGAGGCGGGCTTTCGCGATTAGCTCCCGCTCGCGGGTTGCGAGCGTTTGTG
CCGGCATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCCTCCGTTTATCCGAGGCGGTTCTGCCAGATGCCCACT
AAATGGTGAAGGTTGCAAGTAAAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTATACATCCGGCCCCGTA
GGGAAGGGATATTTTACCCCGTCCAAATGCAATTCGAGCCAGGTAAGGTTTCTTCGCGTTGCGTCAATTAACCCATGCTCCACCGCTTGTGCGGGCCCCGCTCAA
TTCTTTGAGTTTTCAGCTTGCAGCCGACTCCCCAGGGGACTGTTAACCGTTAGCTACGGCACGGCGGGATTGGGTACCCGCTACACCAAGCAGTCACTGTTTAG
GCTAGGACTACCAGGATCTAATCTGTTTGTCCCTAGCTTTC

>CUP2P1G04 Uncultured bacterium (Gammaproteobacteria)
CTTGGGTCAGGCTACTGCTTCTGGTGCAGTAGACTTCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCAATGCTGATCTGCGATTACTA
GGGATTCCGACTTCATGAGTGCAGTTGACAGCTCCAATCCCGACTACGATAGATTTTCCGGGATTGGCTCCCGCTCGCGGCTGGCTTCCCTCTGATCTACCATTTG
AGCAGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCCCTCCGTTTGTACCGGGCGGTTCTTATAGATGCCCACTAAATGCTGGCA
ACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTTCCAGGCTTCCCTCCGCTTTCGCGGACCCCGGAA
TCTTTCAGGGTTCCGCGGATGCAAGGCCAGGTAAGGTTTCTTCGCGTTGATCGAATTAACCCATGCTCCACCGCTTGTGCGGGTCCCGCTCAATTCCTTTGAGTT
TCAACTTTCGCGGCTACTCCCCAGGGGAGAACTTAGCGGTTAGCTACGACACTGCGAGGCTTACCTCTCA

>CUP2P1G05 Uncultured bacterium (Acidobacteria)
ACTTTCGTGATTTGGCGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGTGCATCTGATACGCCATTACTAGCGATTCCGCGCTTCATGACGTCGAGTTGACAGCTG
CAATCCGAACTGAGCGCGCTTTTTCCGATTAGCTCCCGCTCGCGGGTTGGCAACGGTGTGTAACCGCGATTGTAACAGCTGTGTAGCCCTGGACATAAAGGCCATGCG

GACTTGACGTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCTCTCTTGGCAGTAATAACTGTGTGACAGGGGTGCGCTCGTTGCGGGACTTAA
 CCCAACACCTCAGCGGACGAGCTGACGACAGCCATCAGCGCCCTATACTCCGGTCCCTTGCAGGAAAGCCGATTTCTACAGCTGGTCCGAAGCATTTCGAGCCAGGT
 AAGGTTCTCCGCTACGCTCGAATTGAACCACATGTTCCACCCTTGTGCGGGCCCGTCAATTCTTGGAGTTTCAGTCTTGCAGCCGTACTCCCGAGGTGCAGGAC
 TTAACGCGTTAGCTCCGGGACGACGCCGAACGGGCGACACCCCAAGTCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGTCCCTAGCTTTCC
 TTCTCAGCGTCAGTTATGGTCCAGCGG

>CUP2P1G06 Uncultured bacterium (Não classificada)

CTTGGGCGGCTGCGTCTTGGCGTTCCGCGCACCGACTTCTAGTACAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGACGCGTT
 CTGATCTGCGATTACTAGCGATTCCAGCTTTCATGGAGTCGGGTTGCAGACTCCAATCCGAACGTAGGTTCGGCTTTTCCGATTAGCTCCCGCTTCGCGAGGTTTGCAGCG
 TTTGTACCGACCATTTAGTACAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGCGTTATCCGGCGCAGTTTCGTAGAGTGC
 CCGGCATAACCCGATGGCACTAGAGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGACACGAGCTGACGACAGCCATGACGACCTCCGACGCGG
 CCTTGGCGGGCGGGGATGTTTCCACCCTTCCACTGCGCTTCGAGGCCAGTAAAGTTCTTCCGCTTGCATCGACTTAAACCACATGCTCCACCCTTGTGCGGGCCCC
 CGTCAATCTTTGAGTTTAACTTTCGACCGTACTCCCGAGGGGATGCTTAATGCGTTAGTTCGCCACTGAAGGTTAAACCAACACGGCTAGTATCCATCGT
 TTAGGCGTGGACTACCGGGTATCTAATCTT

>CUP2P1G07 Uncultured bacterium (Gammaproteobacteria)

GTGGTAGGCGCCCTCTTGGCGTTCAGGCTACCTGCTTCTGGTGCAGTAAACTTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGACGCAATG
 TGATCTGCGATTACTAGCGATTCCGACTTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACGTAGCAGATAGATTTCTGGGATTGGCTCCCGCTCGCGGTTGGCTTCCC
 TCTGTATCTACCATTGTAGCAGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACCTTCTCCGCGTTTGTACCGGCGGTCTCCTTAGAGTGC
 CCAACTAAATGCTGGCACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCAGACACGAGCTGACGACAGCCATGACGACCTGTCTCCAGGCTC
 TTGCGGCACCCCTAAATCTCTTACGGGTTCTGGGATGTAAGGCCAGTAAAGTTCTTCCGCTTGCATCGACTTAAACCACATGCTCCACCCTTGTGCGGGTCCCG
 GTCAATCTCTTGGAGTTTAACTTTCGCGCGTACTCCCGAGGGGAGAACTTAGCGGTTAGTACGACTGCGAGGCTTACCCTTCAACGCTAGTTCATCGT
 TTAGGCGTGG

>CUP2P1G08 Uncultured Acidobacteria bacterium (Acidobacteria)

GCGCTTGGCTTCCGTTGCGGTCGCGCGGCGACTTCTAGTACAGCTCACTTTCGTTGATTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGTTCGATCTGATA
 CGCCATTACTAGCGATTCCCGCTTTCATGCACTGAGTTGCAGACTGCAATCCGAACGTAGCAGAGTTTCTCCGATTAGCTCCCGCTCGCGGTTGGCAACGGTTTGTG
 CCTGCTTGAACAGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACTGAGTCTCTCTT
 GCGAGTAGTAACAGTGTGACGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCAGGCGCAGGCTGACGACAGCCATGACGCGCTTACTGTTGCTCCCTTGGCG
 GAAGGCCGTTTCTACAGCTGCTCCAGCATTTCGAGCCAGGTAAGGTTCTCGCTGAGCGTCAATTTGAAGCACATGTTCCACCCTTGTGCGGGCCCCGTC
 ATCTCTTGGAGTTTCACTTTCG

>CUP2P1G09 Uncultured Acidobacteria bacterium (Acidobacteria)

CATACCTTGGGCGCTTGGCTCTTGGCGTTCGCGCGGCGACTTCTAGTACAACCTCACCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACGGCGT
 CGATCTGATAGCCATTACTAGCAGTTCCGGCTTTCATGCACTGAGTTGCAGACTGCAATCCGAACGTAGCAGAGTTTTCGATTAGCTCCCGCTCGCGGTTGGCA
 CGCCTTGTGCGCTGATGTAACAGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACTGAGTCTCTCT
 TTCCCTCTTGGAGTGGCAACTACGTCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCAGGCGCAGGCTGACGACAGCCATGACGCGCTTACTGTTGCTCCCTTGGCG
 TCCCTTGTGGGAAGGCATATTTCTACAGTGTGTCAGAAATTAACCCACATGCTCCACCCTTGTGCGGGAGCCCGTCAATTCCTTGGAGTTTAAACCTTGGCTTCGCGGG
 CCCCCGTCATTCCTTTGAGTTTCACTTTCGACCGTACTCCCGAGGTCAGGACTTAACGCGTTAGCTCCGGGAGCACCCCGAACGGTGGCANCCAAAGTCTGTA
 TGGTTTAGGGCTAGGACTACCAGGGTATCTAATCTCT

>CUP2P1G10 Chitinophaga terrae (Sphingobacteria)

CCCGACTTTCATGGCTTACGCGGCGGTTGACAAAGTCCGGGAACGTATACCGTATCATTGCTGATATACGATTACTAGCGATTCCAGCTTTCATGAGGTCGAGTTGCA
 GACCTCAATCCGAACGTAGATAGAGTTTTTGGATTAGCAGCTTGTACCAAGTAGCAGCCCTTGTCTTACCATTGAGCAGGTTGTAGCCCTGGCATAAAGGCC
 ATGATGACTTGACATCATCCCTCTCTCCGCTTACGACGGCAGTTTACTAGAGTTCCACCATTACGTGCTGGCAACTAGTATAGGGGTTGCGCTCGTTGCG
 GACTTAACCCAACTCAGGCGCAGGCTGACGACAGCCATGACGACCTTACAGACTGTGATTGCTACAAAAAGAGCTTTCACCCAGCGTCAATCTGCATTCTAG
 CCAGGTAAGGTTCTCCGCTATCATCGAATTAACCCACATGCTCCACCCTTGTGCGGGAGCCCGTCAATTCCTTGGAGTTTAAACCTTGGCTTCGCGGG
 GGGATACTTAATGCTTTCGCTCAGACACTTACATGTATCGAAATGTCGAGTATCCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCTGTTTATCCCCACGC
 TTTCTGCTC

>CUP2P1G11 Uncultured bacterium (Acidobacteria)

GGTTAGCGCGGACTTCTAGTACAGTCACTTTCGTTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGTTCGATCTGATACGCCATTACTAGCGAT
 TCCGGCTTTCATGCACTGAGTTGCGAGTTCGAGACTGCAATCCGAACGTAGCAGAGTTTTCGATTAGCTCCCGCTCGCGGTTGGCAACGGTTTGTGCCCTGCA
 GTGTGAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCTCTCTTGGCAGTAGTAAGTGTG
 TGCAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCAGGCGCAGGCTGACGACAGCCATGACGCGCTTACTCATGTCCTTGGCGGAAGGCCGATTTCTA
 CAGCTGGTCATAAGCATTTCGAGCCAGGTAAGGTTCTCGCTGAGGTCGAATTTGAACCACATGTTCCACCCTTGTGCGGGCCCCGTCATTCCTTTG

>CUP2P1G12 Uncultured bacterium (Acidobacteria)

CTCCTTGGCGTTAGCGTGGCGACTTCTAGTACAGCTCACTTTCGTTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGTTCGATCTGATACGCCATT
 ACTAGCGATTCCGGCTTTCATGCACTGAGTTGACAGCTGCAATCCGAACGTAGCAGAGTTTTCGATTAGCTCCCGCTCGCGGTTGGCAACGGTTTGTGCCCTGCA
 TTGTAACAGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCGACAGAGTCTCTCTTGGCAGTA
 GTAAGTGTGTCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCAGGCGCAGGCTGACGACAGCCATGACGCGCTTACTAGTGTCTTGGCGGAAGGCC
 GTATTTCTACAGCTGCTACTAGCATTTCGAGCCAGGTAAGGTTCTCGCTGAGGTCGAATTTGAACCACATGTTCCACCCTTGTGCGGGCCCCGTCATTCCTTT
 GAGTTTCACTTTCGACCGTACTCCCGAGGTCAGGACTTAACGCGTTAGCTCCGGGACGACCCCGAACGGTGGCACCCCAAGTCTGATCGTTTAGGGCTAGGAC
 TACCAGGGTATCTAA

>CUP2P1H01 Uncultured bacterium (Acidobacteria)

ACAGCTCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGTTCGATCTGATACGCCATTACTAGCGATTCCGGCTTTCATGCACTGAGTT
 GCAGACTGCAATCCGAACGTAGCAGAGTTTTCGATTAGCTCCCGCTCGCGGTTGGCAACGGTTTGTGCCCTGCAATTGTAACAGTGTGTAGCCCTGGACATAAAG
 GCCATCGGACTTGACGTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCAGTATAGGTTTCCCTCTTGGCAGTGGCAACTACGTCAGGGGTTGCGCTCGTTGCG
 GGACTTAACCCAACTCAGGCGCAGGCTGACGACAGCCATGACGCGCTTACTCTTCCGTTGCGGGAGCCCGTCAATTCCTTGGAGTTTAAACCTTGGCTTCGAG
 GCCAGGTAAGGTTCTCCGCTAGGCTGAGTTGAACCACATGTTCCACCCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTCACTTTCGACCGTACTCCCGAGG
 TGCAGGACTTAACCGCTTAGCTCCGGGACGACTCCGAACGGAAAGTCTGATCGTTTAGGGCTAGGACTACCAGGNTATCTAATCTGTTTGTCCCT
 AGCTTTCGTTCCGCTAGTAAACGGTCCAGCGGCTTTCGCCACGGG

>CUP2P1H02 Uncultured bacterium (Acidobacteria)

ACCAATCATGAGTCATACCTTGGGCGCTTGTCTCCCTTGGCGTTAGCACGGGACTTCTAGTACAGCTCACTTTCGTTGATGTGACGGGCGGTGTGTACAAGGCCCGGGA
 CGTATTACCGCGTTCGATCTGATACGCCATTACTAGCGATTCCGGCTTTCATGCACTGAGTTGACAGTTCGAGACTGCAATCCGAACGTAGCAGAGTTTTCGATTAGCTCCCG
 CTCGCGGTTGGCAACGGTTTGTGCCCTGCAATTGTAACAGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCTCTCCGTTATCCGGA
 GCACTCCACAGAGTCTCTTGGGAGTAGTAAGTGTGTCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCAGGCGCAGGCTGACGACAGCCATGACG
 CGCTTACTCGTCTTGGCGGAAGCCGATTTCTACAGCTGCTCAGGACTTTCGAGCCAGGTAAGGTTCTCGCTGAGGTCGAATTTGAACCACATGTTCC
 ACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTCACTTTCGACCGTACTCCCGAGGTCAGGACTTAACGCGTTAGCTCCGGGACGACCCCGAACGGTGGC
 ACCCAAGTCTGATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTT

>CUP2P1H03 Uncultured bacterium (Acidobacteria)

TGAGCTGTACCTTGAAGGCTGCTCCTTGCGGTGTAGCACACCTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCAC
 CCGGGCGTTCGTATCCCGGATTAAGGATTCAGCTTTCATGGAGTCGAGTTGACAGACTCCAATCCGAAGTGGAGCCCGCTTTTCCGATTAGCTCCCTCCACGGGT
 TTGCGACCGTTTGTACCGACCATTTGACACGTTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGCCATCCCCACCTTCTCCTCGTTATCCGGAGGCGATTTCA
 CTAGAGTGCCTGGCTTACCCGATGGCAACTAGGGATAAGGGTTCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTA
 TGCAGCAGCCTTTAAGGGGAAGGGATGTTTCCACCCCGTCTCCTGCGTTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCCACATGCTCCACCGCTT
 GTGCGGGCCCCGTCATTCCTTTGAGTTTCAGCCTTGCAGCCGACTCCCCAGCGGATGCTTATCGCGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACC
 AAGCAATCATGCTAGGGTAGGACTACCAGGGTATCTAATCCTGTTTGCCTCCCTAACCTTTCGCGCTCAGCGTCAGTTATGGTCC

>CUP2P1H04 Uncultured bacterium (Acidobacteria)

GCGCTGCTCCTTGCGGTGTAGCGTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGCGTGCATCTGATACG
 CCATTACTAGCATTCCGGCTTCATGCGGTCGAGTTGCAGACTGCAATCCGAAGTGGAGCAGGTTTTTCCGATTAGCTCCCTCCCGGGTGGCAACGGTTTGTGCC
 CTGCAATTGAACACGTGTGAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCTCCTCGTTATCCGGAGCAGTCCACACAGAGTCCCTCTTGC
 GAGTAGTAAGTGTGTCAGGGTTCGCTCGTTGCGGGACTTAACCCAACACTCACGGCAGAGCTGACGACAGCCATGCAGCGCTATACTCATGCTCCTTGCGGGA
 AGCCGCTATTTCTACAGCTGCTAAGCATTTCGAGCCAGGTAAGGTTCTTCGCGTAGCGTGAATTAACCCACATGTTCCACCGCTTGTGCGGGCCCCCGT

>CUP2P1H05 Uncultured bacterium (Acidobacteria)

TGATCTATACTTGGGCGGTACTCCCTTGCGGGTGACGGCACCAGCTTCTAGTACAGACCCTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCA
 CCGCAGCGTGTGATCTGCGATTACTAGCAGTTCCAGCTTCATGGAGTTCGAGTTGCAGACTCCAATCCGAAGTGGAGTGGCTTTTCCGATTAGCTCCCTCCACGGG
 TTTGCGACCGTTTGTACCCCATTTGAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCTCGTTATCCGGGGCGGTTTC
 TCTAGAGTGCACCACTTACGTGATGGCAACTAGTGATAAGGGTTCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCT
 ACGCAGCAGCCCTTGCGGGAAGGGATGTTTCCACCCCGTCCACTGCGCTTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCCACATGCTCCACCGCTT
 TGCGGGGCCCCGTCATTCCTTTGAGTTTCAGCCTTGCAGCCGACTCCCCAGCGGGATGCTTAACCGGTTAGCTCCGACAGCGTGGGATGGGTACCCACCATCA
 AGCATCCATCGTTTAGGGTAGGACTACCAGGGTATCTAATCCT

>CUP2P1H08 Uncultured bacterium (Acidobacteria)

TCCTTGCGGTGTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGCATCGTTCTGATACGCCATTAC
 TAGCGATTCCAGCTTCCAGCAGGCGAGTTGCAGCCTGCGATCCGAAGTGGAGCAGGTTTTTTCGATTGCTCCCTCCCGGGTTTGCAGCGATTGTACCGGCCATT
 GTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCTCAGTTATCGTGGCGGTTCTCCTGCGAGTGTATCTTCGATGTGG
 CAACACAGGACAAGGGTTCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTCGACCGGACCCCTTGCGGGATTAACCG
 GTTTCCAGCATCGTTAGCCGGCGTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTG
 AGTTTCAGCCTTGGC

>CUP2P1H09 Uncultured bacterium (Acidobacteria)

AGTACAGCTCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTTCAGCGGCTGCATCTGATACGCCATTACTAGCAGATTCCGGCTTTCAGCATCG
 AGTTGCATGACTGCAGTCCGAATCCGAGTGGCAGGTTTTTCCGATTAGCTCCCTCCCGGGTGGCAACGGTTTTTGCCTTCGATTACACAGCTGTGTAGCCCTGGACA
 TAAAGGCCATGCGGACTGACGTCATCCCCACCTTCTCCTCGTTATCCGGAGTCCACGTAAGGTTTCCCTTTCGAGTGGCAACTAGCTGACAGGGGTTGCGCTCG
 TTGCGGGACTTAACCCAACACTCACGGCAGAGCTGACGACAGCCATGCAGCGCTATACTCCTGCTCCTTGCGGGAAGGCGGATTTCTACAGCTGGTTCAGAGCAT
 TTCGAGCCAGGTAAGGTTCTCCTGCGTAGCTGCAATTAACCCACATGTTTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTCAGCTTTCGCGCGTACTCC
 CAGGTGACGACTTAACCGGTTAGCTCCGGGACGACTTCCGAACGGAA

>CUP2P1H10 Uncultured soil bacterium (Actinobacteria)

ACCACCTTCGACGGCTCCCTCCCTTACGGGTTAGGCCACGGCTTCCGGTGTGCGGACTTTCGTGACGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATCACCGCG
 ACGTGTGCTGATTCGCGATTACTAGCAGCTCCGACTTCATGGGTCGAGTTGCAGACCCCAATCCGAAGTGGAGCAGGTTTTTGGGATTGCTCCACCTTGCGGTCTCG
 CAACCTTTGTACCGGCCATTGTAGCATGTTTGCAGCCCAAGACATGTTAGGGGATGAGGACTTGACGTCATCCCCACCTTCTCCTCGTTATCCGGAGTGGCAACTAGCTG
 GAGTCCCGGCAATTATCCGCTGGCAACATAGGACGAGGGTTCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGC
 AGGACCTTACGACACCATCTACGGCTTTTCCTGCAATGTCAAACCTTGGTAAGGTTCTTCGCGTTGCGTGAATTAAGCAACATGCTCCGCGCTTGTGCGGG
 CCCCCGTCATTCCTTTGAGTTTTCAGCTTGCAGCCGACTCCCCAGCGGGGCGTAAATGCGTTAGCTGCGGCACGGAAATCCGTGGAAGGATCCACACCTAGCGCC
 CAACGTTTACGGCGTGGACT

>CUP2P1H11 Bacterium Ellin6095 (Betaproteobacteria)

ACGTGGTAGCGGCCCTTGCGGTGTAGCTACTTCTGTTGACCCACTCCCATGGTGTACGGGGCGGTGTGTACAAGCCGGGAACGTATTCACCGGCACATGCTGAT
 CCGCGATTACTAGCGATTCCGACTTCATGCGAGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCGCGGATGGCTCCCTCCCGGGTGGGCAACCTCTCG
 TACNCGGCCATTGTATGGCGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCTCGTTTGTACCGGCAAGTCCCTAGAGTGGCCCT
 TGCAGTAACTAGGGACAAGGGTTCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCGGTTCCTTTCCGG
 GCACCCCACTTCTCAGCAGGTTCCAGACATGTCAGGGTAGGTAAGGTTGTTTCGCGTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGCTCAAT
 TCCTTTGAGTTTTAACCTTGCGGCGTACTTCCAGCGGCTGCACTTACGCGTGTAGCTGCGGCACGGAAATCCGTGGAAGGATCCACACCTAGCGCC
 GTGGACTA

>CUP2P1H12 Uncultured bacterium (Não classificada)

GACTTCCGGAGCACCAGACTCCGGTGGTGTGACGGGGCGGTGAGTGAAGCCGGGAACGTATCACCGCGGTGTGCTGACCGGGGTTACTAGCAACTCCGACTTCATG
 CAGGGGGTTGCAGCTGCAACCCGAAGTGGAGCCGTTTTAAGGGATTACCTTACGCTGCGCGGCTCGGAGCCGTTGTACCGGCCATTGTAGCGTGTGTAGCCCT
 GAACATAAAGGGCATGCTGAGCTTGAAGCTATCCCACTTCTCCTCGGTTTCGCGGGAGCTTCCCTAGAAGTTCAACTAAGGACAGGGGTTGCGCTCGTTGCGGGA
 CTTAACCCAACACTCACGGCAGAGCTGACGACAGCCATGCAGCCACTTGCAGCGCCATTGCTGAGAGACTGGCTTTCACAGGCTTCCGAACATGTCAGGC
 CCAGGTAAGGTTCTTCGCGTAGCTCGAATTAACCCACACGCTCCGCTGCTTGTGCGGGCCCCCGCTATTCCTTTGAGTTTTAACCTTGCGGCGGCTACTTCCAGGGG
 GCGAACTTAATGCGTTAGCTGCGGCACTGACGAGGTTCAATTCGCCAACACT

>CUP2P2A01 Uncultured bacterium (Betaproteobacteria)

GGTTAGGCAACCGGCTTCTGGTGAACCCACTCCCATGGTGTGACGGGGCGGTGTGTACAAGCCGGGAACGTATCACCGTGACATGCTGATCCAGGATTATTAGCGA
 TTCGACTTCATGACGTCGAGTTGCAGACTGCAATCCGGACTACGACCGGCTTTCAGGATTAGCTCCCTCCCGGGTGGCAGCCCTTTGTACCGGCCATTGTATGAC
 CGTGTGAGGGCTTACCATAAAGGGCATGAGGACTTGACGTCATCCCCACCTTCTCCTCGGTTTGTACCGGGAGTCTCACTAGAGTGGCTTTCGTAGCAACTAGTGAC
 AAGGGTTGCGCTCGTTGAGGCTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTCCCTTTCGCGGGTTCGCGGCTCCACATCTCTGC
 GGGATTCCGGGATGTCAGGGTAGGTAAGGTTTTTCGCGTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGCTCAATTCCTTTGAGTTTTAATCT
 TGCAGCCGACTCCCAAGCGCTGACTTACCGGTTAGCTGCGTTACCAGAAAAATGAATCCCGCAACTAGTGCACATCGTTTAGGGCGTGGACTACCAGGGTATC
 TAATCCTGTTGCTCCCACTTTCG

>CUP2P2A02 Uncultured bacterium (Acidobacteria)

GCCTCCTGCGGTTAGCATGACAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCACGGCATCGTTCTGATACGCCA
 TTAAGCAGATTCCAGCTTTCAGCAGCGGAGTTGCAGCCTGCGACTCCGAAGTGGAGCAGGTTTTTTCGATTGCTCCCTCCCGGGTGGCAGCCATTGTACCGGC
 CATTGTAGCAGCTGTGATCCCTGGACATAAAGGCCATGATGACTGACTTCCCACTTCTCCTCAGCTTATCGCTGGCGGTTCTCCTGAGGCTTCCATCTCTCGAT
 GTGGCAACACAGGACAAGGGTTCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTCCCTTTCGCGGGTCCCACT
 ACCGTTTTCACGATCGTTAGCCAGCCGTTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTC

>CUP2P2A03 Cystobacter miniatus (Deltaproteobacteria)

GCGGTTACTCCTTGCGGTATACGCCACTTCTGGACAAGTGCAGTCCGATGGTGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGTAGCTGCTGATCTA
 CGATTACTAGCATTCCGCTTCCAGTGCAGTTGCAGACTCCAATTCGAGTTCGAGCCGCTTTATGCGATTGGCTCCCTCCTCAGGAGTGGCAGCGCTTTGTACC
 GCGCATTGTAGCAGCTGTGAGCCCTGGTCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCTCGGTTTAAACCGGCAAGTCCCTTAGAGATCCACTTGGC

TGGCAACTAAAGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTCGGCTCCCTTTCGGGGCAC
 CCGCCATCTCTGGCGGCTTCCGAGGATGTCAAGACCAGGTAAGGTTCTGCGGCTTGCCTGCAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCCGTCAATTCCT
 TTGAGTTTTAGCCTTTCGGCCGTTACTTCCAGGCGGAACTTAATGCCTTAGTACGGCACCAGCGGGGTCAACACCCACGACACCTAGTCTCATCGCTTACAGCCT
 GGACTACCAGGGTATCTAATCTGTTTGTCTCCACGCTTTCGCGTCT

>CUP2P2A04 Uncultured bacterium (Planctomycetacia)

GGCTCCGGCGACTTCGGATGCCCGCGCTTGTGGTGTGACGGCGGTGTGTACAAGGCTCAGGAACACATTCACCAGCGGATGCTGATCCGCGATTACTAGCGATT
 CGGCTTCATGCGGGCGGTTGCAGCCCGCAATCCGAACCTGGGGGGCGGTTTTTTCGATTAGCTCGGCTTGGCGCTTGGCGACGCTGTGTCGCCCCATTGTAGTACGT
 GTGCGACCCAGCATAAAGGCCATGAGGACTTGACGTATCCCCCGCTTNNCTCCGGCTTTCACGCCNCGCGGTCTGGGTCTAGAGTTCNNGCCATGACCGCGTG
 GCACTAGACACAGGGTTTCGCTCGTTAGGGGACTTAACCCAACCTCACGGCACGAGCTGACGACAGCCATGCAGCACCTGTGACGTTGTACCTTGCGGCTCGC
 CGAGTTCCCGCGGCTAATCCGTGCATGTCAAGCCTG

>CUP2P2A05 Uncultured soil bacterium (Acidobacteria)

GGGTTACAGCAGACTTCTAGTATCACCCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCAGCGGTTCTGATCTGCGATTACTAGCGA
 TTTCCAGCTTCATGGAGTCGGTTGCAGACTCCAATCCGAACCTGAGGCGGCTTTTTCCGATTAGCTCCCCCTCGCGGTTTGCAGCGGTTTGTACCCGACATTGTAGCA
 CGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACTTCTCCCGTTATCCGAGGCGGTTTCGCTAGAGTGCAGCTTACCTGATGGCAAC
 TAACGATAAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGACGAGCTTTCGCGAAAGGGATGTTTC
 CACCCCGTCCACTGCGCTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTGAACACATGCTCCACCCTTGTGCGGGCCCCCGTCAATTCCTTGTAGTTTCA
 GCCTTTCGACCGTACT

>CUP2P2A06 Uncultured bacterium (Acidobacteria)

GGTTAGCTGCGACTTCTATAAGCTCACTTGTATGTGACGGCGGTGTGTACAAGGCCCGGGAATTCGCGCTCATCTGATACGCCATTACTACGACCGGCTTCATGCAGTGC
 AGTTGCAACTGCAATCCGAACCTGAGCAGAGTTTTTCCGATTACTCCCCCTCGCGGTTGGCAACGTTTGTGCCTGCATTGTAACACGCTGTGTACCTGGACATAAAG
 GCCATCCGCACTTGACGTATCCCCACTTCTCCGTTATCCGAGGAGTCCACACAGAGTCTCTCTTGCAGTAGTAACCTGTGTGACGGGTTGCGCTCGTTGCG
 GGACTTAACCCAACCTCACGGCAGGAGCTGACGACAGCCATGCAGCGCTTACTCCCGCCCTTTCGCGGAAGGCGGTTTCTACAGCTGTGCGAAGCATTTCGAG
 CCCAGGTAAGGTTCTTCGCGTAGCGTCAATTGAACACATGTTCCACCCTTGTGCGGGCCCCCGTCAATT

>CUP2P2A07 Uncultured bacterium (Não classificada)

GGTTAGCGCAGGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGCGGTGTGTACAAGTCCCGGGTAACTGATTACCCGACGCTGTGATCTGCGATTACTAGC
 GATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACCTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCGCAGGTTTGCAGCGGTTTGTACCGAGCATTGTAG
 CAGGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACTTCTCCCGTTATCCGCGGGCGGTTTCACTACAGTGCCTACTTACTGCTCGTGGCA
 ACTAAGGATAAAGGTTGCGCTCGTTGCTGGACTTAACCCAACATCTTATGACAAGAGCTGATGACAGCCATGCTGCAGCTCCGACGAGTCTTTCGCGAAAGGGGTA
 TTTCTATCCC

>CUP2P2A12 Uncultured bacterium (Acidobacteria)

GCGGCTGCTCCTTTCGGTTAGCTTACCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCAGCGCTGTGATC
 TCGGATTACTAGCGATTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACCTGAGGTCGGCTTTTTCCGATTAGCTCCCCCTCGCGGTTTGCAGCGGTTTGTG
 CCGACCATGTGACAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACTTCTCCCGTTATCCGCGGGCGGTTTCACTAGAGTCCCGGCT
 TGACCCGATGGCAACTAGGGATAAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGACGAGTCTTGC
 GGAAAGGGATATTTCTACCCCGTCCACTGCGCTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTGAACACATGCTCCACCCTTGTGCGGGCCCCCGTCAA
 TTCTTTGAGTTTACGCTTTCGACCGT

>CUP2P2B01 Proteobacterium (Alphaproteobacteria)

GTCCGCTGCTCCTTTCGGTTAGCTCACCGCTTCCGGTAAACCAACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGTGGCATGCTGATC
 CACGATTACTAGCGATTCCGACTTTCATGCACTCGAGTTGCAGAGTGAATCCGAACCTGAGACGGCTTTTTGAGATTAGCTTGCCTCGCGGGCTCGCGACCCATTGTCA
 CCGCCATTGTAGCAGTGTGTAGCCCAACTGTAAGGGCCATGAGGACTTGACGTATCCCCACTTCTCCCGTTATCCGCGGCTTGCAGGGAGTTTCTCAGAGTCCCGAGCCG
 AACTGATGGCAACTACGTGACGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGGACCTTGTGTGGGAGCCACCCGAA
 GTGAAGGTCGCGCTCTCTGGCAACCATACTCCCCATGTCAAAGGTTGGTAAGGTTCTGCGCGTTGCTTCAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCCGT
 CAATTCCTTTGAGTTTTAACCTTTCGGCGGTAAGGTTCTCCAGGCGGAGTGTCTAATGCGTTAGTGTGCTCACTGAGGTGCATGCACCCCAACAACTAGCACTCATGTTA
 CGCGTGGACTACCAGTGTATCTAATCTGTTTGTCTCCACGCTTTCGACATGA

>CUP2P2B02 Uncultured bacterium (Acidobacteria)

GCGCTGCTCCTTTCGGTTAGCTTACCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCTGCTGATGATA
 CGCCATTACTAGCGATTCCGCTTTCATGCACTCGAGTTGCAGACTGCAATCCGAACCTGAGCAGAGTTTTTCCGATTAGCTCCCCCTCGCGGTTGGCAACGGTTTGTG
 CCTGCTTGTAAACAGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTATCCCCACTTCTCCCGTTATCCGAGGAGTCCAGCTAGAGTTCCCTCTT
 GCGAGTGGCAACTACGTGACGGGTTGCGCTCGTTGCGGGACTTAACCCAACCTCACGGCACGAGCTGACGACAGCCATGCAGGACCTCCACACTGTCCCTTTCGG
 GAAGGCGGTTTCCACAGCTGCTGAGTGCCTTTCGAGCCAGGTAAGGTTCTTCGCGTAGCTGCAATTGAACACATGTTCCACCCTTGTGCGGGCCCCCGTCAA
 TTCTTTGAGTTTACGCTTTCGACCGTACTCCCGAGGTTGAGGACTTAACCGGTTAGCTCCGGGACGACCCGAAAGGGTGGCACCCCAAGTCTGATCGTTAGGG
 CTAGGACTACCAGGATCTAATCTGTTTGTCTCCCTAGCTTTCGTTCTCT

>CUP2P2B05 Chloroflexi bacterium (Não classificada)

CCACCTCGACCGCTGCCCCCGGAGGCGGGTTGGCCCGCGCTTCAAGTGTGCGCGCTCCCATGGTGTGACGGCGGTTGTGTACAAGGCCCGGGAACGTATTC
 ACCCGGTTGTGCTGACCCCGGTTACTAGCAACTCCGGCTTACGCAAGCGGGTTGAGCCTGCGATCCGAACCTGGGCGCGGCTTGGGGATTGGCTCCGCTCGCGG
 GTCGCGGCCCGCTGCCCCGGCCATTGTAGCGTGTGTGCGCCCGGGCTAGGGGCGGCTGCTGACTTGACGCTGCTCCCACTTCTCCCGGTTGCGCGCGGAGTCCG
 GCCGACACTCCTGCAACCGGCCCGGGGGTTGCGCTCGTTAGGGACTTAACCCAACCTCACGGCACGAGCTGACGACAGCCATGCAGGACCTTGCATAGCTCC
 TCGCGGCGAGGGCGTTCACCCCGTGGTATGATGTCAAGCCCGGGTAAGGTTCTGCGCGTTCGCGTCAATTGAACACAGCTCCGCTGCTTGTGCGGGCCCCCG
 TCAATTCCTTTGAGTTTCAACCTTTCGCGCGTACTCCCGAGGCTCCACTCACACGTTGGCTGCGGCACCGAGGGGTCGATACCCCGGACCCCGGTGGACATCGT
 TTACGGCGGCGACTAC

>CUP2P2B06 Uncultured bacterium (Alphaproteobacteria)

CTTGGCGTTAGCGCACCGCTTTCAGTAAAGCCAACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCAGCGCTGTGATCTGCGATTACT
 AGCGATTCCAACCTCATGTGCTCGAGTCGAGAGCACAATCCGAACCTGAGACGGCTTTTTGAGATTGCGCAGGGTCTCCCCATTGCGTCCCATTTGTACCAGCCATTGT
 AGCAGTGTGTGGCCAGCTGTAAGGGCCATGGGACTTGACGTATCCCCACTTCTCCCGGTTATCCCGGAGTCCCTTAGAGTGCACCACTAAATGATGGC
 AACTAAGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGGACCTGCTCCGGTCCAGCCGAACTGAAGGGCT
 CCATCTCTGGTCCCGCGAGGGATGTCAAAGGCTGGTAAGGTTCTTCGCGTTGCTTCAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCCGTCAATTCCTTT
 GAGTTTGTACTTTCGACCGTACTCCCGAGGCGGATGCTAATGCGTTAGCTGCGCCACTGACGAGTAAACCCGACACCGGCTAGCATCCATCGTTTACGGCGTGGAC
 TACCAGGATCTAATCTGAT

>CUP2P2B07 Uncultured Acidobacteria (Acidobacteria)

TGACATACTTAGCGCCTATGCCCTCGGGTACACAGCGATTCTAGTACAGCCAGCTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGG
 CATGCTGATCCCGGATTACTAGCGATTCCAACCTCATGCAAGCGGATTTGAGCCTCAATCCGAACCTGAGACGGCTTTCGCGATTAGCTCACTCTCGCGAGTTCGG
 ACGTTTTGACCGGCACTTAGCAGCTGTAGCCCTGGACATAAAGGGCTGACTGACGTATCCCCACTTCTCCCGTTTGTACCGGAGTCTCTCAGAGTTCGCGA
 GTGCCCGGATACCAGTGGCAACAGGAAACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGGACCTTGCAGC
 ATGCTTTCGGAAGTGCAGTTTCGCGGAT

>CUP2P2B09 Uncultured bacterium (Não classificada)

TAGGTATTCGCCCCGATAAAGGTTGGCAAAAAAATACTTCGGGTACAAACAGCTTTCGTGGTGTGACGGGCGAGTGTGTACAAGGTCGGTGAACGTATCACCGCGCCGTT
ACTTATACCGCATTTACTAGCGATTTCAACTTCACGGGGTCAGATTGACAGCCCAATCCGAATCAGACCGACTTTATAGGATTAGCTTACCTTCGACGGCTTGCACCC
TTTTGTATCGGCCATTGTAAACAGCTGTAGCCCTAGGCATAAAGGCCATTGATGACTTGACCTTCCACCCTTCCTCCTGGTTTCCAGGGCAGTCCCATCAGAGTGC
CTTATTAATAAAGTAGCAACTGACAGCAAGGGTTGCGCTCGTTAGAGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTGTGCAATTGT
CTGAACCGAAGCTCAAAAAGCCGATTTCTACGAGTGTCAAAAGCATGTCAAGCCTAGTAAAGGTTCCCTCGCGTAGTGTGCAATTAACCACATGTTCCACCCTGTT
CGAACCCCGTCAATTCTTTAGTTTAACTTTGCGACCGTACTTCCAGGGCAATCACTTAACGGGTTAGCTTCGACACCAATCCGGCAGAGCCAGACTGACGTCTA
GTGATTATCGCTTAC

>CUP2P2B10 Uncultured bacterium (Gammaproteobacteria)

AGGCTACTGCTTCTGTGTCAGTAACTTCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTACCGCAGCAATGCTGATCTGCGATTACTAGCGATTCC
GACTTCATGGAGTCGAGTTGACAGACTCCAATCCGGACTACGATAGATTTTTCTGGGATTGGCTCCCGCTCGCGGTTGGCTTCCCTCTGTATCTACCATTGTAGCACGTG
TGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCACTCCACCCCTTCCCTCGGTTTGTACCCGGCGGTCTCCTTAGAGTGCACCACTGAATGCTGGCAACTAAGGA
CAAGGGTTGCGCTCGTTGCGGGACTTAACCCATCATCTCACGACACGAGCTGACGACAGCCATGACGACCTGTCTCCAGGCTCTTTGCGGCACCCCGAATCTCTCCG
GGTTCCTGGGATGTCAAGGCCAGGTAGGTTCTTCGCGTTGCATCGAATTAACCACATGCTCCACCCTGTGCGGGTCCCGTCAATTCTTTAGTTTCAACCTT
GCGCCGTACTCCAGCGGAGAACT

>CUP2P2B12 Uncultured bacterium (Acidobacteria)

GCCGCTGCCCTCCTTGGGTCAGCTGCAGACTTCTAGTACAATCCACTTTCGTGATTGACGGGCGGTGTGTACAAGGCCCGGAACGTATTACGGCAGCGTGTGATC
TGCCATTACTAGCGATTCCAGCTTTCATGACAGCGGAGTTGACAGCTCCAATCCGACTGAGACCGGTTTTTTGCGATTGGCTCCCGCTCGCGGGTTGTAGCGCTTTGTA
CCGGCCATTGTAGCAGTGTGATGACCTGGACATAAAGGCCATGAGGACTTGACGTCACTCCACCTTCCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTTCCGCTT
TCGGCATGGCAACACAGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTCGCGCTGGACCCCTTGG
GGTAGCGATGTTCCACCCTGTAACAGCCGTTGAGCCAGGTAAGGTTCTTCGCGTTGCGTGTGCAATTAACCACATGCTCCACCCTGTGCGGGCCCCGCTCA
ATTCTTTGAGTTTACGCTTGCAGCTGTACTCCAGGGCGCATATTTAACCGGTTAGCTCCGGCAGGATCAAC

>CUP2P2C02 Uncultured Gemmatimonadetes (Gemmatimonadetes)

GGGTTCCGACACGGACTTCGGGCGCTCACAGCTTCCATGGCGGTGACGGGCGGTGTGTACAAGGCCCGGAACGTATTACCGCGGCGTAGCTGATCCGCGATTACTAGCG
ATTCCAGCTTTCATGGAGTCGAGTTGACAGCTCCAATCCGACTGAGCCGCGTTTCGAGGCTTGGCTCCAGGTTGCCCTGTGCGACGGCCGTGTACCGGCCATTGTAGC
ACGTGTGATGACCTTGACGATTAAGGACCATGATGACTTGACGTGTCCTCCACCTTCCCTCCGTTTGGCACCGGAGTCCCGGAGAGTCTCAGCTTTACCTGTGAGCAA
CACGGGCGGGAGTTGCGCTCGTTGCGGGACTTAACCCAACT

>CUP2P2C05 Uncultured soil bacterium (Acidobacteria)

TGCGGTCAGCGCACCGGCTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCAGGAACGTATTACCGCAGCGTGTGATCTGCGATTACTA
GCGATTCCAGCTTTCATGGAGTCGAGTTGACAGCTCCAATCCGACTGGGATTTGGCTTTTTCCGATTAGCTCCCGCTCGCGGGTTTGGCAGCGTTTGTACCAACCATTTG
AGCACGTTGTGGCCCTGGACATAAAGGCCATGAGGACTTGACGTCACTCCACCTTCCCTCCGTTTCCGAGGCGGTTTCGCGCAGAGTCCCAACTAAATGATGGCA
ACTGACAATAAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACAGCCATGCTGACGGTCCCTTGGCGGAAAGAGATA
TTTTACTTCCGCTTCACTGCTTCCAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCACATGCTCCACCCTTGTGCGGGCCCCCTCAATTCTTTGAGT
TTCAGCTTGCAGCCGACTCCCGAGGGGATCGTTAACCGGTTAGCTCCGGCACGACAGGATTGGGTACCTGTACACCAAGCGATCATAGTTTAGGGCTAGGACTA
CCAGGATCTAATCTGTTTGTCT

>CUP2P2C06 Uncultured bacterium (Gammaproteobacteria)

TAGGCGCCCTTTCGGGTCAGGTCAGCTGCTTCTGGTGCAGTAACTTCCATGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTACCGCAGCAATGCTGAT
CTGCGATTACTAGCGATTCCGACTTTCATGGAGTCGAGTTGACAGCTCCAATCCGACTACGACAGATTTTCTGGGATTGGCTCCCGCTCGCGGTTGGCTTCCCTCTGT
ATCTGCGATTGTAGCAGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCACTCCACCTTCCCTCCGTTTGTACCCGGCGGTCTCCTTAGAGTGCACCAAC
TGGATGATGGCAACTAAGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTGCTCCAGGTTCCCTTGC
GGCACCCTCGAATCTCTTCAGGGTTCTGGGATGTCAAGGCCAGTAAAGGTTCTTCGCGTTGCATCGAATTAACCACATGCTCCACCCTGTGCGGGTCCCGCTCA
TTCTTTGAGTTTCAACCTTGCGGCCGTACTCCCGAGGGAGGACTTAGCGGTTAGTACGACACT

>CUP2P2C09 Uncultured soil bacterium (Não classificada)

GGGCGGCTTCGGGTACACTAATCGTACGCTGACGGGCGGTGTGTACAAGGCCCGGAACGTATTACCGCAGCGTACTGATCTACGGTACTACGATTCCGATCTGAAGG
CGATGACGCTTCAATCCGAAGTGAAGTGGTTGTGAGATTAGCNTTGCCTCGCGGTTGCAACTCGTTGCCATTCCATTTGTAGCCGTGTGTCGGGGACGTTAG
GGCCATGCTGACTTGACGCTTCCCGCTTCCCTCCGCTTGTCCCGCGGTTCCCGCTGAGAGATCTTGCAGCAACACCGCGGCGAGGGTTGCGCTCGTTGCGGGACTTA
ACCAACACCTCACGGCACGAGCTGACGACGCCATGACGACACTGTCTTCGCTCCGGTTGCCCGGAACCTTAGTCTCCTAAGTGTGCGCAGGATGTCAAGCCCC

>CUP2P2C11 Unidentified bacterium (Acidobacteria)

TCCTTGGGTTGGCGGGCGGACTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGAACGTATTACGGCGTCTGTCTGATACGCCATTA
CTAGCGATTCCAGCTTTCATGACGTCGAGTTGACAGCTGCAATCCGAAGTACGATGTTTTCAGATTAGCTCCCGCTCGCGGGTTCCGACAGGTTTGTACCATGACAT
TGTAACACGTTGTAGCCCTGGACATAAAGGCCGCTGACTTGACGTCACTCCACCTTCCCTCCGTTTGTCCGGAGCAGTCTTCTTAGAGTTCCCGCTTGGCGGTGG
CAACTAAGAAATAGGGTTGCGCTCGTTGCGGGACTTAACCAACACTCACGGCACGAGCTGACGACAGCCATGACGACAGCCCTACTACTGCTCCCTTGGCGGAAGACGA
TATTTCTACCGTTGGTCAGTAGCAGTTCAAGCCAGGTAAGGTTCTTCGCTTGGCTGCAATTAAGC

>CUP2P2D02 Uncultured bacterium (Planctomycetacia)

GTTCATCTTCGGCGCTGCTCGCGGTCGACGACTTCGGATGCCCGCGCTTGGTGGCTTGTGACGGGCGGTGTGTACAAGGCTCAGGAACACATTACCGCGGCGAGTGT
GATCCGCGATTACTAGCGATTCCGGCTTTCATGCGGGCGAGTTGACGCCGCAATCCGAAGTGAAGGCGGATTTTTGCGATTAGCTCGACCTTGCGGCCTGGCAACCGTT
TGTCCGCCCATTTGTAGCACGTGTGACAGCCCTGGGATAAAGGCCATGATGACTTGACCTGACCTGCTCCCGCTTCCCTCCGCTTGCAGCCGCGGCTGTATCAGAGTCCCC
GCCTTG

>CUP2P2D03 Uncultured bacterium (Acidobacteria)

GGTCAGCTTGGCGGATTCTATACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGAACGTATTACGGCGTGCATCTGATACGCCATTACTAGCGATT
CGGCTTCATGACGTCGAGTTGACAGCTGCAATCCGAAGTACGAGAGTTTTCGATTAGCTCCCGCTCGCGGGTTGGCAACCGGTTTGTGCCCTGCATTGTAACACGT
GTGAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCACTCCACCTTCCCTCCGTTTGTCCGGAGCAGTCCAGTAGAGTTCCCGCTTGGCGGGTGGCAACTACGTT
CAGGGGTTGCGCTCGTTGCGGGACTTAACCAACACTCACGGCACGAGCTGACGACAGCCATGACGCGCTCCACACTTGTCCCTTGGCGGAAGGCCGATTTCTACA
GCTTGTCAAGTGCCTTCGAGCCAGGTAAGGTTCTTCGCGTACGCTGCA

>CUP2P2D06 Uncultured forest soil (Acidobacteria)

TCCTTGGGTTGGCTCGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGAACGTATTACGGCGTGCATCTGATACCGTATTA
CTAGCGATTCCAGCTTTCATGACGTCGAGTTGACAGCTGCAATCCGAAGTACGAGCAGGTTTTATCCGATTAGCTCCCGCTCGCGGGTTCCGCAACAGTTTGTACCGTGCAT
TGTAACACGTTGTAGCCCTGGACATAAAGGCCGCTGACTTGACGTCACTCCACCTTCCCTCCGTTTATCCGGAGCAGTCCATAGAGTTTCCCTTGGCGGGTGG
CAACTACTAGTAGGGTTGCGCTCGTTGCGGGACTTAACCAACACTCACGGCACGAGCTGACGACAGCCATGACGCGCTCCACACTTGTCCCTTGGCGGAAGGCCGATTTCTACA
TATTTCTACCGTTGGTTCAGCGGTTCAAGCCAGGTAAGGTTCTTCGCGTACGCTGCA

>CUP2P2D07 Uncultured bacterium (Betaproteobacteria)

ACGTGTCGCGCCCCCTTGGGTTAGGCAAAAGCGGTTCTGGTGAACCCCACTCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTACCGTGACATG
CTGATCCAGGATTACTAGCGATTCCGACTTTCAGTTCGAGTTGACAGCTGCAATCCGACTACGACCGGCTTCCAGGATTAGCTCCCGCTTGGCGGGTTGGCAGCC
TTTGTACCGCCATTGTATGACGTGTGAGGCCCTACCCATAAAGGCCATGAGGACTTGACGTCACTCCACCTTTCATCCGTTTGTACCGGCAGTCTACTAGAGTGC

CCTTTTCGTAGCAACTAGTGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCGGCTCCCTT
CGGGCACTCCACATCTCTGCGGGATTCCGGGCATGTCGAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCT

>CUP2P2D09 Uncultured bacterium (Acidobacteria)

TCATGACTATACTTGGACGGCTGCTCCCTTTCGGGTTAGCTTACCGGCTTCTAGTACAGTCCACTTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTC
GCCGACGCTGCTGATCTGCAGTACTAGCATTCCAGCTTCATGGAGTCGAGTTGACAGACTCCAATCCGAACAGTGGCCGGCTTTTCGGATTAGCTCCCGCTCGCGG
GTTTGGCAGCGTTTGTACCGACCATGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCCGTTATCCGGGGCGGTTT
CGTTAGAGTGCCACGCTGACCTGATGGCACTAAAGATAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACA

>CUP2P2E02 Uncultured alpha proteobacterium (Alphaproteobacteria)

GCTCCTTTCGGGTTGGACACCGCTTTCAGGTAAAACCAACTCCCATGGTGTACGGGCGGTGTGTACAAGGCCGGGAACGTTTACCGCGGCGTGTGATCCGCGATTAC
TAGCGATTCCAGCTTATGCTCTCAGTTGCGAGTTCAGAGAACAAATCCGAACAGTGGAGCGCTTTTCGAGATTGGCTTGGGGTCGCCCCGTGCGCTCCCTCTGTACCGCCATTG
CAGCAGTGTGTAGCCAGCCATAAAGGCCATGAGGACTTGACGTATCCCCGCTTCTCCGGCTTGTACCGGCGAGTTCCTTCAGAGTCCCGGCTCGACCCGATG
GCAACTGAAGGTGAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGCAGCCGAACGAAG
GCCGATCTCTCGGCCCATGCAAGGGCTGGTAAGGTTCTTCGGGTCGAGTCAAGCTGAACCCACATGCTCCACCGCTTGGCGGGCCCCGCTCAATTCT
TTGAGTTTTAACCTTGGCGCGTACTCCCGAGCGGTGCGCTTAAACGCGTTAGCTGCGACACCGGAGGACTAGTCCCCCAACGTCTAGCGACATCGTTTACAGCGTG
GACTACCAGGGTATCTAATCCTGTTGCTCCCGACGCTTTCGCGCCTCAGCGTCA

>CUP2P2E06 Uncultured soil bacterium (Acidobacteria)

CCCCTTTCGGGTCGCGCTGCAGACTTCTAGTACAATCCACTTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTTTACCGCGAGCGTGTGATCTGCCAT
TACTAGCGATTCCAGCTTCAATGCAGCGAGTTGCAGCCTGCAATCCGAACAGTGGAGCGGTTTTTTCGATTGGCTCCCGCTCGCGGGTTTCGCGGCGATTGTACCGCC
ATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCANCTTCTCCAGCTTATCGCTGGCGGCTTCTCGGAGTTCGCGCTTTCGGGA
TGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAACTTGACGACAGGCATGCAGCACCTCGACTGGATCCCTTTCGGGGT
AGCGATGTTTTCCACCGCGTTAAACCGCCGTTACCGCCAGGTAAGGTTCTTCGCGTTCGATCGAATTGAACCCACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTC
CTTTGAGTTTACGCTTGGACTGTACTCCCGAGGGCACATTAACG

>CUP2P2E12 Uncultured bacterium (Gemmatimonadetes)

CAGCAGCTCGCCTTTCGGGGCTTGGTCCCTTTCGGGTTCCGACACGACTTTCGGGCGCTCATCGCTTCCATGGCGTGACGGGCGGTGTGTACAAGGCCGGGAACGTAT
TCACCGTGGCGTGGCTGATCCACGATTACTAGCGATTCCAGCTTTCATGCGCGGGGTTGACGGCGACAATCCGCACTGAGGACAGCTTTTGGGATTGGCTTGGCATTGC
TACCTCGCACCTCTGTGATGCTTCCATTGTAGCAGTGTGTAGCCCTGCAATCCGAACAGTGGAGCCATGATGACTTTGACCCAGCCCTTCCCGGTTTGGCACCGCGAGT
CCCCCAGAGTCCCGGGCGGCTTACCGCGCCGCTGGCAACAGGGGCAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCA
TGCAGCACCTGTGACGTCGCCCGAAGGACCCTCCATCTCTGGAGAGAATACGTTGCATGTCAAGCTTAGGTAAGGTTCTTCGCGTTCGCTCGAATTAACCCACATG
CTCCACCGCTTTCGGGGCCCCGCTCAATTCCTTGGAGTTCA

>CUP2P2F02 Uncultured bacterium (Acidobacteria)

TTGGACGGCTGCTTCTTCGGGTTAGCCACCGGCTTCTAGTACAGCCACTTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTTTACCGCGGCGTTT
TGATCCGCGATTACTAGCGATTCCAGCTTTCATGAACTCGAGTTGCAGACTTCAATCCGAACAGTGGAGCGCTTTTCGATTAGCTCCCGCTCGCGGGTTGCGACGCT
TGTACCCACCATTTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGATGATGACTTACCGCTTCCCGCTTCTCCCGTTTCCCGAGTGGCTTCGCGAGTGGC
CAGCATAACCTGATGGCACTGACAATAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGCAGCC
TTTGGGGAAAGGATGTTTTCCACCCAGTCCACTACATTTTCGAGCCAGGTAAGGTTCTTCGCGTTCGCTCGAATTGAACCCACATGCTCCACCGCTTGTGCGGGCCCC
GTCAATTCTCTTGGATTTCAGTTCTGCGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGGGATACCCACACCAAGCAATCATCG
TTTAGGGCTAGGACTACCAGGTTATCTAATCTGTTGCTCCCGTACTTTCGCGCTCAGCGTCAAGTGTGTTGTTCCAGTGA

>CUP2P2F03 Uncultured bacterium (Não classificada)

GGGCGGTGTGTACAGCCCGGGAACGTTACCGCGGCGTGTGATCCGCGATTACTAGCGATTCCAGCTTTCATGTAGTTCGAGTTGACAGACTACAATCCGAACGGGGC
GGCTTTTCCGATTAGCTCCCGCTCACGGGTTTTCGCGAGGTTTGTACCGCCATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCG
ACCTTCTCCCGGTTATCCGGGCAAGTTTCGCTAGAGTGGCCGCTTTCGCGGTTGCAACTGAGGATAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACG
ACAGGACTGACGACAGCCATGCAGCACCTCCGACGAGTCCCTTTCGCGGAAAGGATGTTTTCCACCCCGGTCCTGCGCTTTCGAGCCAGGTAAGGTTCTTCGCGTT
CGCTCGAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTACGCTTTCGACCGTACTCCCGAGCGAATGCTTATCCGCTTAACTG
CGCACGATCGGATTGGATACCGATCACACCAAGCATTTCATCGTTTAAAGGCTA

>CUP2P2F05 Uncultured bacterium (Betaproteobacteria)

GGTTAGCAAAACGGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGCCCGGGAACGTTTACCGGTGACATGCTGATCCAGGATTACTAGCGA
TTCGACTTTCATGACGAGTTCGAGTGCAGACTGCAATCCGGACTACGACCGGCTTTCAGGATTAGCTCCCGCTCGCGGGTTGGCAGCCCTTGTACCGCCATTGTATGA
CGTGTGAGGCCCTACCCATAAAGGCCATGAGGACTTGACGTATCCCGCTTCTCCGTTTGTACCGGCGAGTCTCACTAGAGTGCCTTTCGTTAGCAACTAGTGCAC
AAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCGGCTCCCTTTCGGGCACTCCACATCTCTGC
GGGATTCCGGGCATGTCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGCTCAATTCCT

>CUP2P2F06 Uncultured actinobacterium (Actinobacteria)

CCAATGTACAGTGTGACTGACATAGGCATGATGACTTGAGCTATCCCACTTCTCCGTTTGTACCGGCGAGTCTCGATGATCCCAATAAATGCTGGCAAC
ATGCGACGGGGTTGCGCTCGTTGCGGGACTTAAACCCANNACATTTCTCACGACACGAGCTGACGACAGCCATGCACACCTGTGAATTCGCTCCGAGGAAGANNCCG
TGTTTTCCACGTTTGTGAGGAACATGCAAGCCAGGTAAGGTTTTCGCGTTCGCTCGAATTAACCCACATGCTCCCGTGGTTGTGCGGACCCCGCTCAAT

>CUP2P2G02 Uncultured bacterium (Acidobacteria)

GGTTTCGCGGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTTTACCGCGTGCATCTGATACGCCATTACTAGCGA
TTCGCGTTTCATGACGAGTTCGAGTGCAGACTGCAATCCGAACAGTGCAGAGGTTTTTCGATTAGCTCCCGCTCGCGGGTTGGCAACCGTTTGTGCCCTGCATTGTAACA
CGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTATCCCGCTTCTCCGTTTTCGAGGAGCTCCACACAGAGTCCCTCTTTCGAGTAGTAAGTGT
GTGACGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCGCT

>CUP2P2G03 Uncultured Delftia (Betaproteobacteria)

CGGTGTGTACAAGCCCGGGAACGTTTACCGCGGCGTGTGATCCGCGATTACTAGCGATTCCGACTTTCACGAGTTCGAGTTGACAGACTGCGATCCGGACTACGACT
GGTTTTATGGGATTAGCTCCCGCTCGCGGGTTGGCAACCTCTGTACCGCCATTGTATGAGTGTGTAGCCCGCTTTCGAGTGCATTAAGGGCCATGAGGACTTGACGTATCCCG
ACCTTCTCCGTTTGTACCGGCGAGTCTCATAGAGTGCACCACTGAATGAGCAACTAATGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACA
CGAGTGCAGCAGCCATGCAGCACCTGTGTGAGGTTTCTTCGAGCAGCAATCCATCTCTGGAACCTTCTGCCATGTCAAAGGTGGGT

>CUP2P2G06 Uncultured soil bacterium (Acidobacteria)

ATGGTACTTCTATACCCGCTTTCGTGATGACGGGCGGTGTGTACAAGGCCGGGAACGTTTACCGCGGGTGTGATCCGCGATTACTAGCGATTCCAACCTCAAG
CAGGCAGTTCAGCCTGCTATCCGAACAGTGCAGCGGCTTCTCCGATTAGCTCCAGTTCGCGTTTTGCGACGTTTGTACCGCCATTGTAGCAGTGTGTAGCCCCA
GACATAAAGGCCATGCTGACTTGACGTATCCCGCTTCTCCGTTTATACCGGCGAGTCTCTGACAGTGCACCCATAACGTGATGGCAACAGCAGACAAGGGTT
GCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCAACGAGTGTCTTGGGAAAGCCGCTTTCGGCGTTTGTCAATCG
CTGTTCAAGCCTGGGTAAGGTTCTTCGCGTTGCGTTCGATTGAACACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTACGCTTTCGACCGCTAC
TCCCAGGCGGAATGCTTAATGCGTTAGCTTTCGCGACGACAGGATCGATACCCGTC

>CUP2P2G09 Uncultured bacterium (Acidobacteria)

CTTGGCGTTACGACGAGCTTCTAGTACAGCCACTTTCGTGTTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTTTACCGCGTGTGCTGATACGCCATTACTA
GCGATTCCAGCTTTCATGAGTTCGAGACTGCAATCCGAACAGTGCAGCGGTTTTATCCGATTAGCTCCCGCTCACGGGTTGCGGACGTTTGTACCGCGCATTGT

AACACGTGTGTAGCCCTGGACATAAGGGCCGTGCTGACTTGACGTATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCTCTTAGAGTTCCTCCCTGCGGGTGGCAA
CTAAGAGTAGGGGTTGCGCTCGTTGCGGGACTTAACCCAAACCTCACGG

>CUP2P2H02 Uncultured bacterium (Gammaproteobacteria)

TACCTACTTCTGGTACAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGCGACATTCTGATTGCGGATTACTAGCGATTCCGACT
TCATGGAGTCGAGTTGCGGACTCCAATCCGGACTACGGGACGCTTCCGGGATCCGCTCCCTCCCGGAGTTGGCTTCCCTCTGTACGCCCATTTGTAGCACGTGTGTA
GCCCTACCATAAAGGCCATGATGACTTGACGTCGTCGCCCTTCTCCGGTCTTCCACAGCAGTCTCTTAGAGTCCCCACCATTACATGTTGGCAACTAAGGATA
AGGGTTGCGCTCGTTACGGGACTTAACCAACATCTCACAAACAGAGCTGACGACAGCCATGCAGCACCTGTCTTAGGTTCTTTCCGGCACTTCCACATCTCTGAGA
ATTCTTAGGATGTCAAGGGTAGGTAAGGTTCTTCCGGTTGCATCGAATTAACCCACATGCTCCACCCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTAAACCTTGC
GGTCTACTCCCAGCGGAAGACTTATCGGTTAGCTTCCGATACTAATCAGTCATGCTGACCAACATCTAGTCTTCACTGTTTACAGCGTGGACTACCAGGGTATCTA
ATCCTGTTTGTCCACGCTCTCGGCCTCAGCGT

>CUP2P2H04 Uncultured bacterium (Não classificada)

ACTTAGGCGGGTCTCTTGGCGTTGGCACACCGACTTCGGGTACTACCAACTTTCGTGGTTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGCTGCCTG
ACTTAGCGGATTACTCAGCTTATGCANGTCGAGTTGCAGATGCAATCCGANTGAGACCGGTTTTTGGGAATTACCTCCACTCCGGTATCGGAACCC
CTGTNACCGGCATTGTNNAGCACGTGTGAGCCCGAGACTAAGGGCCATGAGGACTTGACGTCATCCCCACTTCTCCGGTTTATCACCGGAGTCTCTTAGAG
TGCTCGGCATTACCCGTTAGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCACC
AGC

>CUP2P2H05 Uncultured bacterium (Acidobacteria)

CACACTCATACTGGACGGTATCCCTTGGCGTTAATTACCGGCTTCTAGTACAACCTGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCG
CTGCTTGTGATCAGCGATTACTAGCGATTCCAGCTTATGCAGTCGAGTTGCAGATGCAATCCGAACTGAGAACGGTTTTTGGATTAGTCTCCCTCCGGGTTT
GCAACTCATTGTACCGCCATTTAGTACGTTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACTTCTCCGGTTTTTACCAGGCGAGTCCCTTT
AGAGTCTCAGCTTAAGTGGCACTAAAGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGA
CTAGTGTCCCTTGGGGAAAGCGACTTTCGCCACCTGTCACTAGCCGTTGAGCCAGGTAAGGTTCTTCCGCTTGGCTCGAATTAACCCACATCTCCACCGTTGT
CGGGCCCCCGTCAATTCCTTTGAGTTTACGCTTGCAGCCGTACTCCCAGGCGGGATACTTAATGCGTTAGCTTCCGACAGCTGGATTCAATCCAGTCACACCAA
GTATCCATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCCTGTTTGTCCCTAGCTTTCGTGCTCAGCGTCAGTTTCTGT

>CUP2P2H06 Uncultured bacterium (Acidobacteria)

GGTTAGCACAGCGACTTCTAGTACAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACGGCGTCTGTTGATACGCCATTACTAGCGA
TTCAGCTTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACTGAGCATGGTTTTTCCGATTAGCTCCCTCCAGGGTTCCGACAGGTTTGTACCATGCATGTAACA
CGTGTGAGCCCTGGACATAAAGGCCGCTGCTGACTTGACGTCATCCCCACTTCTCCCGTTATCCGGAGCAGTCTCTTAGAGTTCCTCCCTTGGGGTGGCAATAA
GAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCA

>CUP2P2H07 Uncultured actinobacterium (Acidobacteria)

GGGCGCTGCTCCCTTGGCGTTAGCACGGCGACTTCTAGTACAACCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACGGCGTCTGTTCTGA
TACGCCATTACTAGCGATTCCAGCTTCAAGAGTTCGAGTTGCAGACTGCAATCCGAACTGAGCCGCTTTTTTGGCATTAGCTCCCTCCGGGTTTGCACACGCTCTG
TAGCGGCATTGTAAACAGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACACTTCCCGCTTCTCCGTTATCCGGAGCAGTCTCTTAGAGTTCTCC
TTGCGGGTAGCAACTAAGAGTAGGGTTGCGCTCGTTGCGGGACTTAACCAACACCTCACGGCACAGGCTGACGACAGCCATGCAGCACCTTACACAGTTTCTTGC
GAAAGTCCCTGTTTCCAGGGATGGTCCGGTGCACCTCAAGTCCAGGTAAGGTTCTTCCGCTTGGCTCGAATTGAACCCACATGTTCCACCGCTTGTGCGGGCCCCCGT
AATTCCTTTGAGTTTACGCTTCCGACCGTACTCCCAGGCGGGACTTAACCGGTTAGCTACGGCAGTATCCGTACAGGATACAGCCAGCTCCTGATGGTTTGA
GGCTAGGACTACCANGGTATCTAATCCAGTTTGTCCCTAGCTTTCGTCCCTCAGCGTCAGTTTGT

>CUP2P2H11 Uncultured bacterium (Deltaproteobacteria)

GGGACTGCTCCCTTGGCGTTAGCACATCCACTTCTGGAGCAATCGACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCCTGCCTGCTGA
TCAGGATTACTAGCGATTCCAACCTCAAGAGTTCGAGTTGCAGACTTCTATCTGACTGAGCCGCTTTTTTGGCATTGGCACCCCTTTCGCGATTGCGACGCTCTG
TACCCACCATTTGTAGCACGTTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACTTCCCTCCGATTGAAATTCGGCGAGTCTCGCTAGAGTGCCCA
ACTGAATGATGGCAACTAGCGATAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTAATACAGGTTCTCC
GAAGACACCCCGACCTTTCGACAGGTTCTGCAATTTCTAGCCAGTAAAGGTTCTGCGCGTTGCTCGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCCG
TCAATTCCTTTGAGTTTGTGCTTGGCAGCCTACTCCCAGGCGGGTGTAAAGGCTTGGCTACGGCACCGCAGGGTCAAAGCCCGGACACCTAGCACCCAT

>CUP2P3A02 Uncultured bacterium (Gammaproteobacteria)

GGTCAGGCTACCTGCTTCTGGTGCAGTAAACTTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGACGAACTGCTGATCTGCGATTACTAGCG
ATTCCGACTTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGTCAGATTTTTCGGGATTGGCTCCCGCCCGCGGTTGGCTTCCCTCTGTATCTGCCATTGTAGC
ACGTTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCACTTCTCCGGTTTGTACCAGGCGGTTCTCTTAGAGTGGCCAACTGAATGATGGCAACT
AAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGCTCAGGTTCTTCCGGGACTCCCGCATCT
CTGACGATTCCGTTGATGTCAAGGCCAGGTAAGGTTCTTCCGCTTGCATCGAATTAACCCACATGCTCCACCCTTGTGCGGGTCCCGCTCAATTCCTTTGAGTTTCA
ACCTTGGCGCGTACTCCCAGGCGGAGGACTTAGCGGTTAGCTACGACACTGCGAGGCGTAACCTTCAACGCTAGTCTCTCATGTTTATGGCATGGACTACCAGG
CTATCTAATCCTGTTTGGCTCCCATGCTTTCGTACCTGAACGTCGGTGTGACACAGGAAGCC

>CUP2P3A03 Uncultured actinobacterium (Actinobacteria)

ACGGCTCGGGTGTGCGACTTCGTGGTGTGCGGGCGGTGTGTACAAGGCCCGGGAACGTATACCCCGCGGTTGCTGATCCGGGATACTAGCGACTCCGACTTCACGCGAT
CGAGTTGCAGACTGCGATCCGAACTGAGACCGGCTTTTTGGGATTGCTCATCTNCGCGGAATAGCAGCCCTTGTACCGGCCATTGTAGCATGTTGTCAGCCCTGGA
CGTAAGGGGCATGATGACTTGACGTCATCCCCACTTCTCCGAGTTGACCCCGGAGCTCTTACGAGTCCCGCGGTTACCCTGCGGCAACATAGGACAAGGGTTGC
GCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTGCGGACCCCTTCCGGGACCCGATCTTCCGGGCTTTTCCCTGCGTA
GTTCAACCCAGGTAAGGTTCTTCCGCTTGCCTCGAATTAAGCCACATGCTCCCGGCTTGTGCGGGCCCCCGTCAAT

>CUP2P3A05 Uncultured bacterium (Acidobacteria)

GGTTAGCTTACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGACGCGTCTGATCTGCGATTACTAGCGAT
TCCAGCTTACGAGTCGAGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTCCGATTAGCTCCCTCCAGGGTTTGGCAGCGTTTGTACCGACCATTTGTAGCAC
GTGCTTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACTTCTCCCGGTTTCCGCGGGCGGTTTCACTAGAGTGGCCGAGTTGACCCGATGGCAACT
AGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCAACAGTCTTCCGGAAGGGATATTTCT
ACCCGGTCCACTGCGCTTCCAGCCAGGTAAGGTTCTTCCGCTTGCCTCGAATTAACCAACATGCTCCANCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
CCTTGCAGCCGACTTCCAGGCGGAGTCTTATCCGCTTAGCTTCCGCGGAGGATTGGGTAACCCGANACCAAGCATCCATCGTTTAGGGCTAGGACTACCAGC
GTATCTAATCCTGTTTGTCCCTAGCTTTCGCGCATCAGCGTCAGTTGTGGTCCAGTGGCCGCTTTC

>CUP2P3A06 Uncultured bacterium (Sphingobacteria)

GACACTCCTTACGGTATCGTCTTAGTACACCAACTTCCATGGCTGACGGGCGGTGTGTACAAGGTCGGGGAACGTATTACCCGTCGATCTGCTACACGATTACTA
CGGATTCAGCTTCAAGTTCGAGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTTTGGGATTGCTCACCATCGTGGTGGCTGCCCTTTGTAACGCCATTGT
AGCAGGTTGTAGCCCTGGGCAATAAAGGCCATGATGATTTGACGTCATCCCCCTTCTCTGCTTACGACAGGCGAGTCTTTTAGAGTCCCGGCAATACCAGCTGG
CACTAAAGATAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTAACTCTGCTGATTGCTACAAGACC
CCTTTCAGGATTCGCAATCACTTACGCTTCCGCTTCCGCTTGCATGCAATTAACCCACATGCTCCACCCTTGTGCGGACCCCGCAATTCCTTTGA
GTTTCAACCTTCCGCTGACTTCCAGGTTGTAACCTTAACGCTTTTGTGTCGACTAAGTGTATCGCTAATGTCGA

>CUP2P3A07 Uncultured bacterium (Verrucomicrobiae)

CATGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCCCGCTACTGATGCGCCATTACTAGCGATTCCGGCTTCATGGAGGCGAATTGCAGCTCCAAT
 CCAACTGGGCCAGTTTGGAGAGATTTCCTCCACCTCGCGGTATCGGATCGTTCTGTACTGGGCATTGTAGTACGTGTGACGCCAGGCGTAAGGGCCATACTGACTT
 GACGTGCTCCCACTTCCCTCGTTAAAGCAGGCGAGTCTGAACAAGAGTGTGGAACCTCTCGGTTCCGTTGGCAACAGTTCACAGGGGTTGCGCTCGTTGCGGGACT
 TAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAAATTGTCTCTTTCCGAGACTCGTGGCTCTCACCAACTTAGAGATGCATGTCAAGGCC
 TGGTAAGGTTCTTCGCGTTGCATCGAATTGAGCCACATACTCCACCGCTTGTGCGGGCCCGCTCAATTTCTTTGAGTTTAAATCTTGGCAGCCGTACTCCCCAGGCGGC
 ACGTTTAAACGCGTTGCTCCGGCGCAGAAGGGGTCAATCT

>CUP2P3A08 Uncultured bacterium (Actinobacteria)

GGCTTCGGGTGTGACCGACTTTCTGCGGTGTGACGGGGCGGTGTGTACAGGCCCGGGAACGTATCACCCCGCGTGTGATCCGGGATTACTAGCGACTCCGACTTCATG
 GAGTCGAGTTCAGACTCCAATCCGAAGTACGACCGGCTTTAGGGATTGGCTCCTCTCGCGGAATAGCAGCCCGTGTACCGGCCATTGTAGCATGTGTGACGCCCTG
 GACGTAAGGGGCATGATGACTTGAATTCGACCCCACTTCTCCGAGTTGACCCCGGCGAGTCTCTACGAGTCCCGCCATACGCGCTGGCAATATAGGATAAGGGTT
 GCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGTAAGGCCCGAAGGACACCGTATCTCTACGGCTTTCCCTAC
 ATGTCAAACCCAGGTAAGGTTCTTCGCGTTGCCCTCGAATTAAGCCACATGCTCCGCCCTTGTGCGGGCCCGCTCAATTTCTTTGAGTTTACGCTTTCGCGCGTACT
 CCCCAGGCGGGGCACTTAATGCGTTAGCTGCGGCACGGAACCGTTGAATAGTTCCACACCTAGTGCCCAACGTTTACGGCGTGGACTACCAAGGGTATCTAATCCTGT
 TCGCTCCCAACGCTTTCGCTCCTCAGCGTCAATGTGCGGCCAGACCACCGCTTTCGCTGCTGGTGTCTCCTGATATCTGCGCAATTTACC

>CUP2P3A09 Uncultured bacterium (Acidobacteria)

CGACATACTTAGCGCTCTCCTCGCGGTTGATATGGGATTCTATAACGGCTTCGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGGTGTGA
 TCCGGATTACTAGCGATTCCAATCCAAGCAGGCGAGTTGACGCTGCTATCCGAACTGACGACCGGCTTCTCCGATTAGCTCCACCTTGGCGTATCGCGACGGTTTGT
 ACCGGCCATTGTAGCAGTGTGTAGCCCCAGACATAAAGGCCATGTGACTTACGCTCATCCCACTTCTCCCGTTTATCACCGGCAGTCTCTTACAGAGTGCCACGC
 TTAACCTGATGGCAACAGAGAAGCAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGAGCAGTCCCTG
 CGGAAGCTCCCTTTCGGGAGTGTCTACTGCTTCAAGCCTGGTAAGGTTCTTCGCGTTGCGTCAAAATGAACACATGCTCCACCGCTTGTGCGGGCCCGGTCAA
 TTCTTTGAGTTTACGCTTTCGCGACCGTACTCCCCAGGCGGAATGCTTAATGCGTTAGCTTCCGACCGGACGGGATCGATACCCGNCACCAAGCATTCATCGTTTGA
 GCCAGGACTACCGGGGTATCTAATCCCGTTTGTCTCCCTGGCTTCGCTCCTCAGCGTCAAGTGTCCAGTGAAGGTTCCAGTGAAGCCGCTTTCGCCACAGGTTTCT

>CUP2P3A10 Uncultured soil bacterium (Acidobacteria)

GGGTACGCGACCGGCTTCTAGTACAGCCCACTTCGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGACGCGTGTGATCTGCGATTACTAGCG
 ATTCAGCTTCATGAGTGTGAGTTCAGACTCCAATCCGGACTGGGATTGGCTTTTTCCGATTGGCTCCCGCTCGCGGGTTTGGCAGGGTTTGTACCAACATTGTAGC
 ACGTGTGTGGCCCTGGACATAAAGGCCATGAGGACTTACGCTCATCCCACTTCTCCCGTTTATCCGAGGCGGTTTCCGACAGTGGCCAACTGAATGATGGCACT
 GACAATAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGAGCAGTCCCTGCGGAAAGGGATATTT
 CTACCCCGTCCACTACGCTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAAAATGAACACATGCTCCACCGCTTGTGCGGGCCCGGTCAAATTCCTTTGAGTTT
 AGCTTTCGACCGTACTCCCCAGGCGGATGCTTAACGCGTTAGCTCCGACCGGACGCGGATTGGTACCTGTGACACCAAGCATCTCGTTAAGGCTAGGACTACCA
 GCGTATCTAATCTGTTGCTCCCTAGCTTTCTGCTCCTCAGCTCAGGTCAGTAAATGGTCCAGTGAAGCCGCTTTCGCCACAGGTTTCT

>CUP2P3A11 Uncultured bacterium (Actinobacteria)

TTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACATTAGCCCGGAAGGGGGACCATATTTCTACGGTTTTCTA
 ATGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCAAAATGAACACAGCTCCCGCTGTGCGGGCCCGGTCAAATTCCTTTGAGTTTACGCTTTCGCGCGC
 TACTCCCAAGCGGGGCACTTAATGCGTTAGCTTCCGACAGCGGACTGATACCCCACTTAGTGCCTTTCGCGGCTGAGTGCCTTTCGCGGCTGAGTGCCTTTCGCG
 TGTTGCGCTCCCAAGCTTTCGCGTCTCAGCGTCAAGCTTCCAGAGAGCGGCTTTCGCGACGGGTTTCTTCCGATATCTGCGCATTTCACCGCTACACCGGGAAT
 TCCACTTCTCCTTTCGCGACTTAGCCAAACGGTTTCAACCGACGCTTCGAGTTGAGCTTCGAGTTTTCACAGCTGACCTGTATGCGCGCTACACGCTCTTACCGC
 CAATAAATCCGACAACGCTTGGCCCTACGTATTTCCGCGCTGCTGGCACTCAGTCACTA

>CUP2P3B01 Uncultured bacterium (Não classificada)

CATGGAGTCGAGTTGACAGTCCCAATCCGAAGTACGAGCGGCTTTTTCCGATTAGCTCCCGCTCACGGGTTTGGCAGGGTTTGTACCGGCCATTGTAGCAGTGTGTAG
 CCCTGGACATAAAGGCCATGAGGACTTACGCTCATCCCACTTCTCCCGTTTATCCGAGGCGGTTTTCGTCAGAGTGTCAACTAAATGGTAGCAACTGAAGATAAGG
 TGTGCGCTCGTTGCGGGACTTAACCAACATCCCAAGCAGAGCTGACGACAGCCATGCAGCACCTTACGAGTGTCTTTCGGAAGAACACTTTCGATGTTGTCAC
 CTGCTGTTCAAGCTGGGTAAGGTTCTTCGCGTTGCGTCAAAATGAACACATGCTCCCAAGCTTGTGCGGGCCCGGTCAAATTCCTTTGAGTTTACGCGCTTTCG
 TACTCCCAAGCGGGAATGCTTAATGCGTTAGCTTCCGACAGCGGATCGATACCCGCCACACCAAGCATTCATCGTTTACGGCCAGGACTACCGGGTATCTAATCC
 CGTTTGTCCCTGCGTTTCGCTCCTCAGCGTCAAAATGGTCCAGGATGCCGCTTCG

>CUP2P3B02 Nitrobacter winogradskyi (Alphaproteobacteria)

TAGCATCGTTCGCAAAATCGTTTGTGCTGCGGCGTCAAGCCGCTGGAATTGACCGACACATCACTCCGCACATCTGCCGCGACACAGCTGCGACGTGGGCGATGCAGGCGG
 GCGCAACATCTGGGATGCTGCGCACTGGCTCGGGATGAGCGCGGAGTTTGGAGCGGGTATATGGCCACCATCATCCGAGTTTCCAGGCTGATGTTGCCGAGAGAT
 ATCGGACAGAAAGCGGACAGAAATACCGTGAACAAACGCGGATTGACGGCTTAGAAGTACGAAAAACCTCGAATTTTCAGGAGATACGAGGTGAACAAACACGTTT
 GGGACGACGGGGTTCGAGTTCAAATCCTGCGCTCCGACCATCTTCAAGTACTTATAATTACGATGTCTTTTCAGCGCAGCGAAAGGCGCAATGAAGAGCCGCTGCG
 TCGCGTTAACTACACTATTGTGTCAGCGGTGCAACAAAGTGGCTTACTATATGAGGCCATTTCCGCGAGCTCTCGGATCATCGATAGCATTCGGATCGCGGCAATTC
 GCCATTGGGCCATCGCAAAATCGAGGGCGCTATGACGGCGTACGA

>CUP2P3B03 Uncultured bacterium (Não classificada)

CAATCCGAAGTACGAGCGGCTTTTCCGATTAGCTCCCGCTCGCGGTTTTCGACGGTGTGACCGACATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCATGAGGAC
 TTGAACGTCATCCCACTTCTCCCGTTTATCCGAGGCGGTTTCGCTGAAAGTGCACGCTTGACCTGATGGCAACTAAACGAATAAGGGTTGCGCTCGTTGCGGGAC
 TTAACCCNAACATTTTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCCGCAGCTCTTCGGAAAAGG

>CUP2P3B04 Uncultured bacterium (Não classificada)

GGCGGTGCTCCCTTACGGTTAGCGCACGACTTCTATACAGTCAATTCGGATTAGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCAGCGTGTGATCTGCGATTACT
 AGCGATTCCAGTTCATGAGTGTGAGTTCGAGACTCCAATCCGAAGTACGAGTGGGCTTTTTCCGATTAGCTCCCGCTCGCAGTTTGGCAGCGTTTGTACCGACATTG
 TACAGTGTGATACCTGGACATAAAGGCCATGAGACTTACGCTCATCCCACTTCTCCCGTTTATCCGCGGCGGTTTCACTAGAGTGGCCGACTTGCAGTCTGCGTGGCA
 ACTAGGGATAAGGGTTGCGCTCGTTGCGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGCA

>CUP2P3B05 Uncultured soil bacterium (Acidobacteria)

CCCCTTGCGGGTACGTCGAGCTTCTAGTACAATCCACTTCGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCAGCGTGTGATCTGCCATTA
 CTAGGATTCCAGCTTCATGACGAGCGAGTTGACGCTGCAATCCGAAGTACGAGTGGTTTTTGCGATTGGCTCCCGCTCGCGGGTTTGGCGGCTTTGTACCAACCAT
 TGTAGCAGTGTGATGCGCTGCATAAAGGCCATGAGGACTTACGCTCATCCCACTTCTCCAGCTTATCGCTGGCGGCTTCTGCGAGTTCCGCTTTCGCGATG
 GCAACACAGGCAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGAGCAGCCATGCAGCACCTCCGCA
 ATGTTTCCACCGCGGTTAACCAGCGGTTGAGCCAGGCAAGGTTCTTCGCGTTGCGTCAAAATGAACACATGCTCCACCGCTTGTGCGGGCCCGGTCAAATTCCTTT
 GAGTTTACGCTTGCAGTACTCCCAAGCGGATTTAAACGCGTTAGCTCCGCGCAGGACAGAAATGAACCTGCCACACCAAAATATGCATCGTTTACGGCGTGGAC
 TACCAGGTTACTAATCTGTTGATTACCCAGCTTTCGTTGATTCAGCGTCAAGTTCAGGTTCCAGAAAGCGGCT

>CUP2P3B06 Uncultured bacterium (Alphaproteobacteria)

TAAAGCACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCAGCGTGTGATCTGCGATTACTAGCGATTCCAATTCATGTGCTCGAGT
 TGCAGAGCAACTCCGAAGTACGAGCGGCTTTTTGAGATTGCGCAGGATGCTCCTTGCATCCCATTTGCACCGCATTGTAGCAGTGTGTAGCCAGCCGTAAGG
 GCCATGAGGACTTACGCTCATCCCACTTCTCCGCGGTTATCCCGGAGTCCCTTAGAGTCCCAACTAAATGATGGCAACTAAGGGCGAGGTTGCGCTGTTG
 CGGACTTAANCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGCTCCGGTCCAGCCGAAGTGAAGGGATCGATCTCTGTTCCCGCGACCGGGATG
 CCAAGGGCTGGTAAGGTTTCGCGGTTGCTTCGAATTA

>CUP2P3B07 Uncultured soil bacterium (Acidobacteria)

GACGGTGTCCCTTGGCGGGTACGGCCACCGGCTTCTATACAGCCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCAGCGTGTGATC
 TGCGATTACTAGCAGTTCCAGCTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTGGGATTGGCTTTTCCGATTAGCTCCCCCTCGCGGGTTTGCAGCGGTTTGTA
 CCAACCACTGTAGCAGCTGTGTGGCCCTGGACATAAAGGCCATGAGGACTTACAGCTATCCCACTTCCCTCCCGTTATCCGAGGCGGTTTCCGAGAGTGGCCAACT
 GAATGATGGCAACTGACAATAAGGGTTGCGCTCGTTGGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTACGTAGCAGTCCCTGGCG
 GGAAAAAGATATTTCTACCTCGGTCCACTACGCTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTGAACCACTATGCTCCANCGCTTGTGCGGGCCCCGCTCAA
 TTCTTTGAGTTTACGCTTTCGGAACGTACTCCCAAGCGGATCGCTTAACGCGTTAACTCCGGCAGCAGAGATTGGGT

>CUP2P3B08 *Inquilinus* sp. (Alphaproteobacteria)

ACACCGTCTTCGGGTAAGCATCCCATGGTGTGACGGGCGGTGTGTACATGCCCGGGAACGTATTCACCGCAGCCTGTGTTCTGCGATTACTAGCGATTCCACCTTCATG
 CACCCGAGTTCAGAGTGAATCTGAAGTGGGACGGTTTTTGGGGATTAGCATCCACTCGCGTGGTGTGCCACTGTCCACGCCATTGTAGCAGCTGTGTAGCCAG
 GCCGTAAAGGGCCATGAGGACTTACGCTATCCCACTTCTCCGCTTATCCGCGGCTTACGCGGGCGGTCCCTTTAGAGTGCACCACTTAATGATGGCAACTAAAGGCGAGGGTTGC
 GCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTGGACGCCAGCCGAAGTGAAGACTCGATCTCTCGGGTCAAAC
 GTCCATGTTAAGAGCTGGTAAGGTTCTTCGCGTTGCGTGAATTGAACCACTATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTAACTTTCGCGCC
 GTACTCCCAAGCGGTTGCGCTTATCGCGTTAGCTGCGACACCCAGAGAACTAAGTTTCCCAACGCTTAGCGCACATCGTTTACGGCGTGGACTACAGGGTATCTAATCC
 TGTTTGTCCCAACGCTTTCGCGCTCAGCGTCCAGTATCGG

>CUP2P3B09 Uncultured *Acidobacteria* bacterium (Acidobacteria)

GGTTAGCTCACCAGTCTAGTGAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCGCATTCTGATCCGCGATTACTAGCGA
 TTCCAGCTTCATGCAGTCCAGTTCAGACTGCAATCCGAAGTGGGCGGCTTTTCCGATTAGCTCCCCCTCACGGGTTTGGCAGCGTTTGTACCGGCCATTGTAGCA
 CGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTACGCTATCCCACTTCTCCCGTTATCCGAGGCGGTTTACCAGAGTGCACCACTAAATGATGGCAACTG
 GGATAAAGGGTTGCGCTCGTTGGCGGACTTAANCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATACAGCAGCCCTTGGCGGGGAAGGAATATTC
 TACTCCGCTCCACTGCAATTCAGGCCAGGTAAGGTTCTTCGCGTTGCGTGCAGTTAAACCACTATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTCA
 GCCTTGGCAGCCTACTCCCAAGCGGACTGCTTAACGCGTTAGCTACGGCAGCGGGGATTGGGTACCCGCTCACACCAAGCAGTATCGTTTAGGGCTAGGACTACCA

>CUP2P3B10 Uncultured bacterium (Betaproteobacteria)

GAAGTACAGTGGTTCGCGCCCTTGGCGTTAGGCAACCGCTTCTGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACGTGACATGC
 TGATACAGATTACTAGCATTCCGACTTCATGCACTGAGTTGCAGACTCCCACTCCGACTACGACCGGCTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTT
 GTACCGGCCATTGTATGAGCTGTGAGGCCCTACCATAAAGGCCATGAGGA

>CUP2P3B12 Uncultured soil bacterium (Verrucomicrobiae)

ACACTTCGGGTACAGCGATCCCATGATTGACGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGCAGCCTAGCTGATGCGCCATTACTAGCGATTCCGGCTTCATGTA
 GCGAGTTGCAGCTACAATCCGAAGTGGGCCAGTTTTCCAGGATTTCCACCTCGCGGATTCCGATCATTCTGTACTGGGCATTGTAGTACGTGTGACGCGCTGGC
 CGTAAGGGCCATCTGACTTGCAGTCAATCCCACTTCTCCCGCTTTCACAGGGCAGCTGAAACAGAGTGCATCTTGGGAGTTTGCACACAGTTACAGGGGTTGGCG
 TCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCAAAGCGCGTATTGCTACGCTTGGCCGGCTTTCACCGCGCACAAAT
 GCATGTAAGGCGAGTAAGTTCTTCGCGTTGCAATTAAGCCACATCTCCACCGCTTGTGCGGGCCCCGCTCAATTTCTTTGAGTTTAACTTTCGCGCCGTA
 CTCTCAGGCGGACGTTAAACCGCTTACGCTCCGGCAGCAGCGGGTGAATCCGCGCACCAACCAAGCTGCACCTTTACTGCTAGGACTGGGGGATCTAATCCCGG
 TTTGCTCCCTAACCTTCGCGCTCAGCGTACAGGAGCTGTCCAGAGATCCGCTTTCGCCACCGGTTCTCTCACGATATCTACGCATTTCACTG

>CUP2P3C01 Uncultured forest soil bacterium (Acidobacteria)

TTTGTGCCCTGCATTTAAGCACTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGAAGTGCATCCCACTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTC
 CCTTTCCGAGTTGGCACTTGCAGTTCAGTTCAGGCTTGCCTCGTTGCGGGACTTAACCCAACCTCACGGCAGGCTGACGACAGCCATGCAGCGCTCCACACTGTCCC
 TTGCGGGAAGGCGGTGTTTCCACAGCTGGTACAGTGGCTTCGAGCCAGGTAAGGTTCTTCGCGTAGCGTGAATTAACCCACATGTTCCACCGCTTGTGCGGGCCCC
 CGTCAATTCCTTTGAGTTTCACTTTCGACCGTACTCCCAAGTGCAGGACTTAACCGCTTAGCTCCGGGACGACCCCGAAGGGTGGCACCCCAAGTCTGATCGT
 TTAGGCTAGGACTACCAGGATCTAATCCTGTTTGTCCCTTAGCTTTCGTTCTCAGCGTCACTAGTGGTCCAGCGCGCCGCTTTCGCCACGG

>CUP2P3C03 Uncultured actinobacterium (Acidobacteria)

GATTAGCTCCCTCGCGGGTCCGAACTCTGTACATGCATGTAAACAGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTACCTCATCCCACTTCTCTCCGTTA
 TCCGGAGCAGTCTCGTAAGTCTCCCTTTCGCGGTAGCACTACGAGTAAGGTTGCGCTCGTTGCGGGACTTAACCCAACCTCACGGCAGGAGCCCGCAGCAGCC
 ATGCAGCGCTATACTC

>CUP2P3C04 Uncultured bacterium (Não classificada)

GAGAAGCTATCACCGGGATGGCTGATCCGGATTACTAGCGATCCACTTTCACGGAGTGCAGTTCAGACTCCGATCCGAAGTGGGACGGTTTTGGGATTAGCTTGCTCT
 CGCGAGTTGCAACCCCTTTGTACCGCCATTTGTAGCAGCTTGTACCCCTGGGACTAAGGGCCATGATGACTTGCAGTCAATCCCACTTCCCTCCCGTTGACCGGGCAGTC
 TCCCTAGAGTGTCACTTTATCTGTTAGCTAAGGAAAGGGTTGTGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAACACN
 CTGAACCGGAGTCCCGAAGGGAAGACTACTTTCATAGGCTGTCCACCGTGTGTAGCCAGGTAAGGTTCTTCGCGTTGCGTCAAGT

>CUP2P3C05 Uncultured bacterium (Gammaproteobacteria)

TCTTGTGGTTCAGGCTACTGCTTCTGGTGCAGTAACTTCCATGGTGTGACGGGCGGTGTGTAAGACCAGGGAACGTATCACCGCAGCAACCGTGTGCGATTACTAG
 CGATCCGACTTACAGGCTTGCAGTTCAGACTCCAACTCCGAGTACGATGAGTTTCTGGATGGTCCCGCTCGCGCGTGGTTCCCTCTGTATCTACCATTGTACCCTG
 TGTCCCTGGCCATAAAGGCCATGATGACTTGCAGTCAATCCCACTTCTCCGTTTGTCAAGCGGCTTCTTAGTGTGCCAACTAAATGCTGGCAACTAAGGACAAG
 GGTTCGCGTCTGTGCGGGACTTAACCAATCTCACGAACGACTGACGACAGCCATGCAGCACCTGTCTCCAGGCTCTTCCGGCACCCCTAAATCTCTCAGGGTTCTT
 GGGATGTAAGGCCAGGTAAGGTTCTTCGCGTTGCAATTAACCCACATGCTCCACCGTTGTG

>CUP2P3C06 Uncultured bacterium (Acidobacteria)

TGCTCCTTGCGGTACGCTTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCGTGCATCTGATACGCCA
 TACTAGCGATTCCGGCTTCATGCAGTTCGAGTTCAGACTGCAATCCGAAGTGGGAGAGTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCGCTG
 CATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGCAGTCAATCCCACTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCTCTTGGCGAG
 TGGCAACTACGTGCAGGGTTGCGCTCGTTGCGGACTTAACCCAACCTCACGGCAGGAGTGCAGCAGCCATGCAGCGCTCCACACTGTCCCTTGGCGGAAGG
 CCGTGTTCACAGCTGGTTCAGTGCCTTCGAGCCAGGTAAGGTTCTTCGCGTAGCGTGAATTAACCCACATGTTCCACCGCTTGTGCGGGCCCCGCTCAATTCCT
 TTGAGTTCCAGTCTTGGCAGCCTACTCCCAAGTGCAGGACTTAACCGCTTACGCTCCGGGACGACCCCGAAGGGTGGCACCCCAAGCTCGATGTTTAGGGCTAGG
 ACTACAGNGTACTAATCCTTTCGCTCCCTTAGCTTTCGTTCTCAGGCTAGTGGTCCAGCGCGCGCTTTCGCCACGGG

>CUP2P3C07 Uncultured bacterium (Acidobacteria)

GGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCGTGCATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCAGTTCGAGTTCGAGACTGCAATCCGAAGTGG
 CAGAGTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTGCCCTGCATGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGCAGTCAATC
 CCCACTTCTCTCCGTTATCCGGTGCAGTCCACAGAGTCTCTCTTCCGAGTGAAGTGTGTGACGGGTTGCGCTCGTTGCGGGACTTAACCCAACCTCACG
 GCAGAGCTGACGACAGCCATGAGCGCCATATACTCCGGTCCCTTACGGGAGGCGGATTTTCTACAGTGGTCCGAAGCATTTCCAGCCAGGTAAGGTTCTTCGCGT
 AGCGTCAATTAACACCATGTTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTCACTTTCGCGCTTCCAGGCTACTCCCAAGTGCAGGACTTAACCGGTTAGT
 CCGGACGACGCGCAAGCGGCGCCAACCAAGTCTGATCGTTTAGGGCTAGGACTACCAAGTATCTAATCCTGTTTGTCCCTAACCTTTCGTTCTCAGCGTCA
 TTGTTGCCAGCGCGCGCTTTCG

>CUP2P3C08 Uncultured soil bacterium (Gammaproteobacteria)

TGAACACTCCGTGGTGTGCGCCCTTGGCGTTAGGCTAACGGTTCTGGAGCAATCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGC
 AGCATAGCTGATCGGATTACTAGCGATTCCGACTTCATGAAGTGCAGTTCAGACTTCAATCCGAGTGGGATCGGCTTCTGGGATTGGCTCCACTCGCGGCTC
 GCAACCTCTGACCGACTTGTAGTACGTGTGAGCCCTGGCCGTAAGGGCTAGTACACTTGCAGTCAATCCCACTTCTCCGTTTGTACCGGCGAGTCTCTCT
 AGAGTTCCACCACTAGCTGCTGGCAACTAAGGACAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGT

TCTGGTTCCCGAAGGCATTTCCGCATCTCTGCAGAAATCCAGACATGTCAAGGGCAGGTAAGGTTCTTCGCGTTGCATCGAATTAACCACATACTCCACCCTGTGTC
GGGCCCCGCTCAATTCCTTTGAGTTTCAGTCTTCGACCGTACTCCCCAGGCGGCAACTTAACCGGTTAGCTTCGACACATGATCTCCGAGTTGAGACCAACATCCAGT
TCGCATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCCTG

>CUP2P3C09 Uncultured bacterium (Bacilli)

AGTCATCGACCCACTTAGGCGGCTGGCTCCATAAAGGTTACCTCACCGACTTCGGGTGTTGCAACTCCCATGGTGTGACGGGCGGTGNTACAAGGCCCGGGAACGAAT
TCACCGCGGCATGCTGATCCGCGATTACTAGCAATCCGGCTTCATGCAGGCGAGTTGCAGCTGCAATCCGAACACGAAACGGCTTTATGAGATTAGCTCCACCTCAC
GGTCTCGCATCCCTTTGACCGCCATTGTAGCACGTGTGTAGCCAGGACATAAGGGGATGATGATTTGACGTCATCCCCACCTTCTCCGGTTTGTACCGGCGAGT
CCATTGTGAGTGTCAACTAAATGGTAGCAACAATGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACACGAGCTGACGACCAACATGCACCAAC
TGTACCCTGCCCCAAGGGAAGGCTTATCTCTAAACCGGTCAGCGGATGTCAAGTCTTAGTAAGGTTCTTCGCGTTGCTTCAATTAACCACATGCTCCACTGCT
TGTGCGGGCCCCGTCATTCCTTTGAGTTTCAGTCTTGCAGACGTAATCCCCAAGCGGAGTGCTTAATGCGTTAGCTTCGGCACTGAGGGTG

>CUP2P3C10 Uncultured bacterium (Acidobacteria)

ACGGCTGCTCCCTTGGGGTACGCGACCGGCTTCTAGTACAGCCACTTTCTGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCAGCAGCGTGTGA
CTGCGGATTACTAGCATTCCAGCTTCATGGAGTTCAGATTGCGAGACTCCAAATCCGGACTGGGATTTGCTTTTCCGATTAGCTCCCCCTCGCGGGTTGCGACGGTTG
TACCAACATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGTTATCCGG

>CUP2P3C11 Uncultured soil bacterium (Deltaproteobacteria)

GTGTGTCAGGCCCGGAAGTATCCCGCGCATGTGATCCGATTACTAGCGATCCGCTTATGGAGTCGAATTGCAGACTCCAATCCGAACAGGACCGGCTTTTTG
GGATTGCTCCACTCGCGGATTTCGAGCCCTTTGTGCGGCGCATTTGAGCAGTGTGAGTGGCCCTGGGCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCT
CGGCTTAACACCGGCAGTCCCACTAGAGTGGCCAGCATGATCTGTAGGCAACTAATGGCAGGGGTTGCGCTCGTTGGGGACTTAACCCAACTCACGACACGAGCT
GACGACAGCCATGCAGCAGCTGCTTGGAGCTCCCGAAGGCACCTCCTGTTTCCAGGAGGTTCTCCAGATGTCAAGCCAGGTAAGGTTCTTCGCGTTGCTTGAAT
GAACACATGCTCCACCCTGTGCGGGCCCCGTCATTCCTTTGAGTTTGTAGTCTTGCAGCCGACTCCCCAGGCGGGTGCTTAACCGGTTAGCTGCGGCACACG
GGGCCA

>CUP2P3C12 Uncultured soil bacterium (Acidobacteria)

ATTCCAGCTTATTGGAGTCCGGTTGCAGACTCCAATCCGAACAGGCGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCAGCGTTTGTACCGGCCATTGTAG
CAGGTGTGAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGTTATCCGAGGCGGTTTCGCTAGAGTGCCCGGCTTGACCCGATGGCA
ACTAACGATAAAGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACACGAGCTGACGACAGCCATGCAGCAGCTCCGAGCGGTTCTTGGGAAAGGGATGTT
TCCACCCCGGCTCCAGCTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCCAACTGTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTT
CAGCCTTGGCAGCCTACTCCCCAGGCGGGATGCTTAACCGGTTAGCTGCGGCACGATGGGATTGGTACCATCACACCAAGCATCCATGTTTAGGGCTAGGACTACC
AGGGTATCTAATCCTGTTTGTCCCTTAGCTTTCCGCGCTCAGCGTCA

>CUP2P3D01 Uncultured bacterium (Gammaproteobacteria)

GGTGTGACGGCGGTGTGACAAGACCGGAACGATTCACCGGCAACTGTGATCTGCGATTACTAGCGATTCCGACTTCATGGAGTTCGAGTTCGAGACTCCAATCC
GGACTACGACAGATTTCTGGGATTGGCTCCCGCTCGCGCGTTGGCTTCCCTCTGTATCTGCCATTGTAGCAGGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTG
ACGTCATCCCCACTTCTCCGGTTTGTACCGGCGGCTCCTTAGAGTCCCAACTGAATGGTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAA
CATCTCACGACACGAGCTGACGACAGCCATGCAGCAGCTGTCTCCAGGCTTCTACGGCACCCCTAAATCTCTCAGGGTTTCTGGGATGTCAAGACAGGTAAGGTT
TTCGCGTTGCATCGAATTAACCACATGCTCCACCCTTGTGCGGGTCCCGCTCAATTCCTTTGAGTTTCAACCTTGCAGCGGCTACTCCCCAGGCGGGAAGCTTAGCGC
GTTAGCTACGACACTGCGAGGCTTACCCTTCAACGCTTCTAGTCTCATCGTTTATGGCGTGGACTACCAGGGTATCTAATCCTGTTTGTCTCCACCGTTTCTGTCGCTG
AAGCTCGGTGCTGGACCGGAAGCCGCTTTCCGCACTGGTGTCTTCCGATATCTACGCATTTACCAGCTACACCGGAAATTCGCGTTCCCTTCCGACCCATGACA
GAGCAGTCTCGAATGCAATTC

>CUP2P3D02 Uncultured bacterium (Acidobacteria)

GGCGGCTGCGTCTTGGCGTCCGCGACGACTTCTAGTACAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCAGCAGCGTTCTGATCT
CGGATTACTAGCGATTCCAGCTTCATGGAGTTCGGTTGCGAGCTCCAATCCGAACAGGTCGGCTTTTCCGATTAGCTCCCCCTCGCGGGTTTGGCAGCGTTTGTAC
CGACATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGGTTATCCGGGCGAGTTTCGCTAGAGTTCGCGGCTT
GACCCGATGGCAACTAG

>CUP2P3D04 Uncultured bacterium (Não classificada)

GTCTCTGCGAGTCTCTCTTGCAGGATGGCAACACAGGACAAGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACACGAGCTGACGACAGCCATGCAGCA
CCTCGACCGGACCTCTTCCGAGTAGCGATGTTCCACCAGCGTTAACCGGCGGTTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCACATGCCCCAC
CGTTGTGCGGG

>CUP2P3D05 Uncultured bacterium (Acidobacteria)

ACGGCTGCGGCCCTTGGGGTTCGCTCACCGGCTTCTAGTGCAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCAGCAGCGTTCTGAT
CTGCGATTACTAGCGATTCCAGCTTCATGGAGTTCAGGTTGCAGACTCCAATCCGAACAGGTCGGCTTTTTCCGATTAGCTCCCCCTTCGAGGTTTGGCAGCGTTTGT
ACCGACATTTGAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGCGTTATCCGGGCGAGTTTTCGCTAGAGTTCGCGGCG
ATAACCCGATGGCAACTAGAGATAAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACACGAGCTGACGACAGCCATGCAGCAGCTCCCGAGCGGCGCTT
CGGCGCGGATGTTTCCACCGATTCCACTGCGCTTTCAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCACATGCTCCANCCCTTGTGCGGGCCCCGTC
ATTCCTTTGAGTTTACGCTTTCGACCGGACTCCCCAGGCGGGATGCTTATCGCGTTAGCTTCGGCACAGTGGGATTGGGTACCACACTACACCAAGCATCCATGGTTA
GGG

>CUP2P3D06 Uncultured bacterium (Acidobacteria)

GACTTCTAGTACAGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCAGCAGCGTTCTGATCTGCGATTACTAGCGATTCCAGCTTCAT
GGAGTCCGGTTGCGAGCTCCAATCCGAACAGGTCGGCTTTTTCCGATTAGCTCCCCCTTCGAGGTTTGCAGCGTTTGTACCGACCATTTGTAGCAGGTGTGTAGCCC
TGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGCGTTATCCGGGCGAGTTTCGCTAGAGTTCGCGGCGATAACCCGATGGCAACTAGAGATAAGGG
TTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACACGAGCTGACGACAGCCATGCAGCAGCTCCGAGCGGCGCTTTCGCGGGGGGATGTTTCCACCCCTTCCA
CTGCGCTTGCAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACGCTTTCGCGGCGG
TACTCCCCAGGCGGGATGCTTAACCGGTTAGCTGCGGCACAGCCGATTTGGTACCAGGCTACACCAAGCATCCATGGTTTAGGGCTAGGACTACCAGGGTATCTAATCC
GTTTTGCTCCCC

>CUP2P3D08 Uncultured bacterium (Não classificada)

CAGTACAGTATACATGAACGGTACTCCCTTGGGGTTGGCGCACCGGCTCCGGTACAACGGGCTTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGT
TTCACCGCGGCTGTGATCCGCGATTACTAGCGATTCCGGCTTTCATGACGTCGAGTTGCAGACTGCAATCCGAACAGGAGCGGTTTGGGATTGGCTTACTCTCG
CGAGCTCGCATCCCTTTGTACCGCCATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGGCTTACCGCGGCGAG
TCTCCTTAGAGTGCACCGCATGACCGGGGCAACTAAGGACAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACACGAGCTGACGACAGCCATGCAG
CACCTGAACCGGCGAGTCCCCAAGGGAAGCCCATCTCTGGGGCGGTCGCGGTTGTCTAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTAACCACATGCTCCA
CCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTAACTTTCGCGGCGGTAATCCCCAGGCGGGGACTTAATGCGTTAGCGGCGGACGGGAGGTTCAATACCCCC
AAACCTAGTCCCATGCTTTACAGCGTGGACTACCAGGGTATCTAATCCTGTTGATCCCCACGCTTTCGCGCCTCAGCGTCAGTATCCGTTCC

>CUP2P3D09 Uncultured bacterium (Não classificada)

CTTGGCGTGCCTTGGCGTGGGCGCAGATTCTATACAATCCATTCTGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCAGCAGCGTGTGATCTGCA
TACTAGCGATTCCAGCTTCATGACGCGAGTTGCAGCCTGCAATCCGAACAGGTAAGGTTTCTGCGATTGGCTCCCCCTCGCGGGTTGCGAGCGCTTGTACCGTCC
ATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCAGCTTATCGTGGCGGCTCCTGCGAGTTCCCACTAATG

TGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCTTGGGGGTTAG
CGATGTTTCCACGCGCGTAACAGCCGTTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTGAACCACATGCTCC

>CUP2P3D10 Uncultured bacterium (Verrucomicrobiae)

ATACTTCGGCGCTTTGAGGGCGCATCGGGTACAAACGGTTTCATGATGTGACGGGCGGTGTGTACAAGGCCCGGAAACGTATCACGGGCGGTAGCTGATGCGCCATTAC
TAGCGATTCCGGCTTCAATGAAGCGAATTGCAGCCTTCAATCCGAACCTGGGCCAGTTTGTATAGATTTCCTCCACCTCGCGGCTCCGGATCGTCTGTACTGGGCAATTG
AGTACGTGTGACGCCAGCCGTAAGGGCCATACTGACTTGCATGCTCC

>CUP2P3D11 Uncultured bacterium (Acidobacteria)

GTTCACTTCGTGATGTACGGGCGGTGTGTACAAGCCCGGAACGTATCACGAGCGTGTGATCTGCGATTATACGATCCAGCTTCATGGGAGTCCGGTTGCAGACTCCA
ATCCGAACCTGAGCACGGCTTTTTCCGATTAGCTCCCCCTCACGGGTTTGGCAGCGTTTGTACCGTGCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGA
CTTGACGTATCCCCACCTTCTCCCGTTATCCGAGGCGGTTTCGCTAGAGTGCCTGGCTTACCCGATGGCAACTAACGATAAAGGTTGCGCTCGTTGCGGGACTTA
ACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGAGCGGCCCTTGGGGCTGAGATGTTCCACCTCATCCACTGCGCTTCGAGCCAGGTAA
GGTTCTTCGCGTTGCGTCCGATTGAACCACATGCTCCACCGCTTGTGGGGCCCGGCTCAATTCCTTTGAGTTTCAGCCTTGGCAGCGTACTCCCCAGGCGGGATGCTT
ATCGCGTTAGCTGCGCCAGCCGGGATTTGGTACCCGCCACAGCAAGCATCCATAGTTTAGGGCTAGGACTACCAGNGTACTAATCTCTGTTTGTCTCCCTAGCTTTTCG
CGCATACGCTCAGTTGTTG

>CUP2P3D12 Uncultured Acidobacteria (Acidobacteria)

GGGAACGTATTCACCGCAGCGTTCGTGATCTGCGATTACTAGCGATTCCAGCTTCATGGATCGGGTTGCAGACTCCAATCCGAACCTGAGGCGGCTTTTTCCGATTAGC
TCCCTTCACGGGTTTGGCAGCGTTTGTACCGACCATGTAGCACGTGTGTGGCCCTGGACATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCCGGTTAT
CCGAGGCAAGTTTTCGCTAGAGTGGCCGGCATAAACCCTGGCAACTAGCGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAG
CCATGACGACCTCCGACGCGTCTTGGCGAAAGGGATGTTCCACCCCGGCTCCATGCGCTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTGAACCACAT
GCTCCACCGCTTGTGGGGCCCCGCTCAATTCCTTTGAGTTTCAGCCTTGGCAGCGTACTCCCCAGGCGGGATGCTTAACCGCTTAGCTGCGGCACGACCGGATTGGGT
ACCGATCACCAAGCATCCATAGTTTAGGGCT

>CUP2P3E02 Uncultured bacterium (Betaproteobacteria)

CCCCCTTCCGGTTAGGCAACCGGCTTCTGGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGTATTACCGTGACATGCTGATCCACGATTA
CTAGCGATTCCGACTTCATGACGTCGAGTTCGACAGCTGCAATCCGACTACGACCGGCTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCAT
TGTATGACGTGTGAGGCCCTACCATAAAGGCCATGAGGACTTGACGTATCCCCACCTTCTCCCGTTTGTACCAGGCGAGTCTACTAGAGTGCCTTTTCGTAGCAAC
TAGTGACAAGGGTTGCGCTAGTTCGCGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCCCGGCTCCCTTTCGGGCACTCCAC
TCTCTCGGGATTCGGGATGTCAGAGGTAGGTAAGGTTTTTCGCGTTGCATCAAAATTAATCCACATCATCCACCGCTTGTGGGGTCCCGTCAATTCCTTTGAGTT
TTAATCTTGGCAGCTACTCCCCAGGCGGTCGACTTCACGCGTTAGCTGCGTTACCGAGAAAATGAATCCCC

>CUP2P3E04 Uncultured bacterium (Alphaproteobacteria)

TTCGGGTAAGCAATCCCATGGTGTGACGGGCGGTGTACAGCCGGGAACGTATTACCGGCGATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCACTCGA
GTTGACAGTGTCAATCCGAACCTGAGACGACTTTTTGGGATTGGCTCGCCATCTAGTGGGTTGACAGCCCTCTGTAGTCCGCCATTGTAGCACGTGTGTAGCCACCCTGTAA
GGCCATGAGGACTTGACGTATCCCCACCTTCTCCCGGTTACCACCGCGGTCCTCATTAGAGTGCCCAACTAAATGATGGCAACTAATGGCGAGGGTTGCGCTCGTT
GCGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTTAGTCCCGAAGGGAAACCGGATCTCTCCGCGGTTCCAGGCTGTCA
AAAGGTGGTAAGGTTTGTGCGGTCGCTTCGAATTAACCCATGCTCCACCGCTTGTGGGGCCCCGCTCAATTCCTTTGAGTTTAACTTGGCAACGTACTCCCCAG
GCGAGTGTAAATGCGTT

>CUP2P3E05 Uncultured bacterium (Alphaproteobacteria)

TCCGGTAAACCAATCCATGGTGTGACGGGCGGTGTGCAAGGCCCGGGAACGTATCCGCGGATGCTGATCCGCGATTACTAGCGATTCCAACTTCATGCCCTCGAGTTGC
AGAGCAATCCGAACTCCGAACTGAGACGACTTTTAAAGGATTAACCTCTGTAGTCCGCCATTGTAGCACGTGTGTAGCCACCCTGTAAGGGCCATGAGGACTTGACGTATCC
CACCTTCTCCCGGTTAGCACCGGCAGTCCCATTAGAGTTCCCAACTGAATGATGGCAACTAATGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGA
CAGGCTGACGACGCCATGACGACCTGTGTCAGTCCCGAAGGAAAGCCACATCTCTGTGGCGGTCGGGATGTCAAAAGGTGGTAAGGTTCTGCGCGTTGC
TTGAAATTAACCAACATGCTCCAGCCCTGTGGGGCCCCGCTCAATTCCTTTGAGTTTAACTTGGCAGCCGTAACCGGATCTCCCGAGGCGGATCTCTTTCGAGTGTG
TCACCGAAATGATGATCCCGAACAAGTACGATCATCGTTTACCGGCTGGACTACCAGGATCTAATCTCTGTTTGTCTCCACCGCTTTCGAGCCTCAGCGTCAAGTA
TGAGCCAGTGTG

>CUP2P3E06 Uncultured bacterium (Acidobacteria)

GGTTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATTTACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACGGCATCGTTCTGATACGCCATTACTAGCGAT
TACCGCTTACCGCAGCGAGTTGACGCTGCGATCCGAACTGAGACGCTTTTTTGGGATTGGCTCGCCATCTAGTGGGTTGCGCTCCCGCTCCCGGGTTTGGCAGCCATGACGTATCC
GTGTGAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCAGCTTATCGCTGGCGGCTCTCTGCGAGTGTATCTTTTCGATGTGGCAACACA
GGCAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGACCCCTTGGCGAGTAACCGTGTTC
ACGATCGTTAGCCAGCGCTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTTCGAAATGAACCACATGCTCCACCGCTTGTGGGGCCCCGCTCAATTCCTTTGAGTTTCA
GCCTTGGCAGCTACTCCCCAGGCGGATACTTAACGCGTTAGCTCCGGCAGCAACCAATGAA

>CUP2P3E07 Uncultured bacterium (Acidobacteria)

GCGTCTGCTCCTTCCGGTTAGCGCAGGACTTCTAGTACAGCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACGGCGTCTGATCTGATA
GCCCATTACTAGCGATTCCGGCTTCATGACGTCGAGTTGACAGCTGCAATCCGAACCTGACGAGGTTTTTTCGATTAGCTCCCGCTCGCGGGTTGGCAACGGTTTGTGA
CCTGTGATGTAACAGCTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCAGCTTATCGCTGGCGGCTCTCCGAGGCGATCTCTTCGATGTGGCAAC
GGGAGTGGCAACTACGTCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGGCCCCCTTGGCGAGTAACCGTGTTC
GAAGGCCGATTTCTACAGCTGGTCAAGGATTTCCGAGCCAGGTAAGGTTCTTCGCGTAGCGTGAATTAACCCACATGTTCCACCGCTTGTGGGGCCCCCGTCAA
TTCCTTTGAGCTTTCAGTCTTGGCAGCCGACTCCCCAGGTGACGACTTAAACCGGTTAGCTCCGAAAGGCAAGCCATCCGAAACCGGATGCTTTCGAGGCGGTTAGGG
CTAGGACTACCAGGATCTAATCTGTTTGTCTCCCTAGCTTTCGTTCTCAGCGTCAGTAACGGTCCAGGCGCGCTTTCC

>CUP2P3E08 Uncultured Acidobacteria bacterium (Acidobacteria)

GGTTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGCGTACAAGGCCCGGGAACGTATTACGGCATCGTTCTGATACGCCATTACTAGCGG
TTCAGCTTACCGCAGCGAGTTGACGCTGCGATCCGAACTGAGACGCTTTTTTGGGATTGGCTCCCGCTCGCGGGTTTGGCAGCCATGATACGGCCATTGTAGCA
CGTGTGATGTAACAGCTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCAGCTTATCGCTGGCGGCTCTCCGAGGCGATCTCTTCGATGTGGCAAC
AGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCGACTGGGCCCCCTTGGCGAGTAACCGTGTTC
CACGATCGTTAGCCAGCGCTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTTCGAAATGAACCACATGCTCCACCGCTTGTGGGGCCCCCGTCAATTCCTTTCGAGTTC
AGCCTTGGCAGCGTACTCCCCAGGCGGATACTTAACCGGTTAGCTCCCGGTAAGGTTTTCGCGTAGCGTGAATTAACCGGTTAGCTCCAGCAACCAAGTATGATGCTTTCAGG
GTATCTAATCTGTTGCTTACCACGCTTTCGTGTCTCAGCGTCAGGATGGTCCAGAAAGCTGTCTACACCACAGGTGTTCTCCCGG

>CUP2P3E09 Uncultured bacterium (Acidobacteria)

GGCGGTGCTCCCTGCGGTTAGCGCAGGACTTCTAGTACAACCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCAGCATGCTGATCTG
CGATTACTAGGACTCCAGCTTCATGAAGTCGAGTTGACAGCTTCAATCCGAACCTGAGGCGCGGTTTTTCCGATTAGCTCCCGCTCACGGGTTTGCAGCGGTTTGTACC
GGCCATTGTAGCACGCTGTGATCCCTGGACATAAAGGCCATGAGGACTTGACGCTTCCCGGTTATCCCGGTTATCCGAGGCGGTTTCCGAGAGTGTCTCAACTAA
ATGGTAGCAACTGGAGATAAGGTTGCGCTCGTTGCGGGACTTAANCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATATAGCGGGCCATTGCTGG
AAAGGATATTTCAACCCGTTCCACTACATTTCCGAGCCAGGTAAGGTTCTTCGCGTTGCGTTCGAAATTAACC

>CUP2P3E10 Uncultured bacterium (Betaproteobacteria)

GGTTAGCCAAACGGCTTCTGGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGTGACATGCTGATCCACGATTACTGGCGAT
TCCGACTTCATGACGTCGAGTTGACAGCTGCAATCCGACTACGACCGGCTTCCAGGATTAGCTCCCCCTCGCGGGTTGGCAGCCCTTTGTACCGGCCATTGTATGAC

GTGTGAGGCCCTACCATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGGTTTGTACCCGGCAGTCTCACTAGAGTGCCCTTTCGTAGCAACTAGTGACA
 AGGGTTCCGCTCGTTGCGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTGTGCCCGGGTCCCTTTCGGGCACTCCACATCTCTGGC
 GGATTCGGGCGATGTCAAAGGTAGGTTTTTCGGCTTGATCGAATTAATCCACATCATCCACCCTTGTGCCGGTCCCGTCAATTCCTTGTAGTTTTAATCTT
 GCGACCGTACTCCCAAGCGGTGACTTACGCGTTAGCTGCGTTACCAGAAAATGAATCCCGACAACCTAGTCGACATCGTTTAGGGCGTGACT

>CUP2P3E11 Uncultured Acidobacteria bacterium (Acidobacteria)

TGGGCGCTGCTCCTTGGCGTACGTTTGGCGACTTCTATACAGCTCACTTCGTGATGTGACGGGCGGTGTGTACAAGNCCGGGAACGTATTCACGGCGTTCGATCTGATA
 GCCATTACTAGCGATTCCCGGTTTCATGACGTCGAGTTGCAGACTGCAATCCGAACCTGAGCGCGCTTTTTCCGATTAGCTCCCTTCGCGAGTTGGCAACCGTTTGTAA
 CGCGCATTTGAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTG
 CGAGTGCAACTACGTGACGGGTTGCGCTCGTTGCGGGACTTAAACCAACACCTCACGGCACGAGCTGACGACAGCCATGACGCGCTTACTCTGTCCCTTGGGG
 AAGGCCGATTTCTACAGCTGGTCAGAAGCAATTCGAGCCAGGTAAGGTTCTCCGGTAGCTGCAATTTAA

>CUP2P3E12 Uncultured forest soil bacterium (Acidobacteria)

CTTCTAGTACAACCACTTCGTGATGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATTCACGGCGTTCGTTCTGATACGCCATTACTAGCGATTCCGGCTTCATGACGT
 CGATTCCGAGACTGCAATCCGAACCTGAGCATGGTTTTTCCGATTAGCTCCCTTCGCGGGTTGACGCGGTTTGTACCATGCAATTGAACACGTGTGAGCCCTGGAC
 ATAAAGGCCGCTGCTGACTTGACGTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCTCTTAGAGTTCCCGCTTGGCGGGTGGCAACTAAGAGTAGGGGTTGCGCTC
 GTTGGCGGACTTAAACCAACACCTCACGGCACGAGCCGACGACAGCCATGACGACCTTACCAGGTGTCCTTGGGGAAAGGCGGTTTCCACCGCTGTCACCGGCA
 CTTCCGAGCCAGGTAAGGTTCTCCGGTTGCGTCAATTTGAACCAACATGTTCCACCGCTTGTGCCGGCCCCGTCATTCCTTGTAGTTTACGCTTGCAGCCGTA
 CCCAGGCGCAGGACTTACGCGTTAGCTCCGGGACGACC

>CUP2P3F01 Uncultured bacterium (Acidobacteria)

CTTTCGTGATGTGACGGGCGGTGTGTACAGCCCGGGAACGTATTCACGGCATCATTTCTGATACGCCATTACTAGCGCTTCCAGCTTATGACGCGAGTTGACGCGTGC
 AATCCGAACGTGAGAACCGTTTTTTCGATTAGCTCCCTTCGCGGGTTTGCAGCGCTTTGTACCGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGATG
 ACTTGACATCATCCCACCTTCTCCAGCTTATCGCTGGCGGTTCTCCGCGGCTTCCAGCTTCTCCGTTTAGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAA
 CCCAACATCTACGACACGAGCTGACGACAGCCATGACGACCTTACTCCGGTCCCTTGGGGAAAGTCCGTTTCCACGAATGGTCCGAAGCCGTTGACGCCAGGT
 AAGGTTCTTCCGCTTGGCTCAATTTAA

>CUP2P3F02 Uncultured alpha proteobacterium (Alphaproteobacteria)

TTACGTGGTCCGTACTCCCTTGGCGGTTAAGCACCGGCTTCGGGTAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGCATGC
 TGATCCGCGATTACTAGCATTCCGACTTCATGCTCCCGAGTTGCAGAGACCAATCCGAACCTGAGACGCGTTTTTCGAGATTAGCTCAGGCTCGACCCATGCCGCCCTC
 TGTACCGGCTTGTAGCAGCTGTAGCCAGCCATAAAGGCCATGAGGACTTGCAGCTCATCCCGCTTCTCCGGCTTGTACCGGGCAGTTTCTGACAGAGTGCC
 AGCTCAACCTGATGGCACTGAGATGGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACCTGTGTCCCGCA
 CGCAACTGAAGGACCGATTCTCCGAGCACACGGGACATGTCAAAGGGCTGGTAACTTCTCCGTTTGCAGTCAATTAACCAACATGCTCCAGCCGTTGTCGCGG
 CCCCCTCAATTCCTTTGAGTTTTAACCTTGGCGGCTACTCCCGAGCGGTGTGCTTACCAGCTTGTAGCTGCGACACCGAAGAGTAGGCTCCCCAACGTCTAGCACACA
 TCGTTTACAGCTGGACTACCAGGTTATCAATCTGTTTGTCCACCGCTTTCGCGCTCAGCTCAGATCCGGTCCAG

>CUP2P3F03 Uncultured Acidobacteria bacterium (Acidobacteria)

GGGTACAGATGCGGACTTCTAGTACACCCACTTCTGTGATTACGGGCGGTGTGTACAAGCCCGGGAACGTATCACGCTATCGTTCGTATATAGCATTACTAGCGATTCCA
 GCTTATGACAGGCGAATTCAGCCTGCAATCCGAACCTGAGGACGGTTTTTGGCGATTAGCTCCCTTCGCGGGTTGGCAGCGCTTTGTACCGCCATTGTAGCACGTGT
 GTGGCCCTGGACATAAAGGCCATGATGACTTGCAGCTCATCCCACCTTCTCCAACTTATCGCTGGCGGTTCTCCTGAGAGTGGCGCTTGGCGGATGCCAACACAGGAC
 AAGGGTTGCGCTCGTTAGGGGACTTAAACCAACATCTCACGACAGGCTTCCAGCACAGGCTGACGACAGCCATGACGACCTCCAGTCCCTTGGCGGAAACCTGTTCCAGGA
 TCTGTCCGAAGCCGTTGAGCCAGGTAAGGTTCTTCCGCTTGGCTCGAATTAACCAACATGCTCCAGCCGTTGTGCCGGGCCCCGTCATTCCTTTGAGTTTACGCT
 TGGCAGCGTACTCCCGAGCGGATCACTTAAACCGTTAGCTCCCGCACGAACCGAATGAACCGCTCACACCAAGTATGATCGTTTAGGGCGTGGACTACCAGGTTATC
 TAATCTGTTGCTACCCAGCTTTCGTGCTCAGCGTCAGTGATGGTCCAGAAAGCCGCTTACACCGCAGGTTTCTCTGATATCTACGCA

>CUP2P3F04 Uncultured bacterium (Não classificada)

CCCCTTGCGGTTGGAAATTACGACTTCTAGTACAAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGTTCGTTGATACGCGAT
 TACTAGCGATTCCGCTTTCAGTGGGCGAGTTGCAGCCAGATCTGAACCTGAGGCGGCTTTCAGGGTTTGGCTCCACCTTACGGTATTGCTTCCCGTTGTACCGACC
 ATTGTAGCACGTGTGTAGCCCTGGGACATAAAGGCCATGAGGACTTGCAGCTCATCCCACCTTCTCCCAATTATCTGAGGCGGTTCTCCTAGGTTGCTTCCCTTGGCGG
 CGAGCAACTAGGCGTAAAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTTCCAGCACAGGCTGACGACAGCCATGACGACCTCCAGTCCCTTGGCGGGTAGCG
 ACCTCATCTCCGAGGCGGTGACAGGATTCGAGTCCAGTAAGGTTCTTCCGCTTGGCTCGAATTAACCAACATGCTCCAGCCGTTGTGCCGGGCCCCGTCATTCCT
 TTGAGTTTACGCTTGGCAGCGTACTCCCGAGCGGACTTAAACCGTTAGCTCCCGCACGAACCGAATGAACCGCTCACACCAAGTATGATCGTTTAGGGCGTGGACTACCAGG
 TACCAGGTTATCAATCTGTTTGTCCCTAGCTTTCGCGCTCAG

>CUP2P3F05 Uncultured bacterium (Não classificada)

CCCCTTGCGGTTGGGCGCAACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCAGCGTGTGATCTGCCATTA
 CTAGCGATTCCAGCTTTCATGACGCGAGTTGCAGCCTGCAATCCGAACCTGAGAACGGTTTTCTGCGATTGGCTCCCGCTCGCGGGTTTGCAGCGCTTTGTACCGTCCAT
 GTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGCAGCTCATCCCACCTTCTCCAGCTTATCGCTGGCGGTTCTTCCGAGTTTCCCAACTGAATGATG
 GAAACACAGGACAAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACCTCCAGTCCCTTGGCGGGTAGCG
 ATGTTTCCACCGCGGTAACAGCGGTTGAGCCAGGTAAGGTTCTTCCGCTTGGCTCGAATTAACCAACATGCTCCAGCCGTTGTGCCGGGCCCCGTCATTCCTTT
 GAGTTTACGCTTGGCAGCTACTCCCGAGCGGACTTAAACCGTTAGCTCCCGCACGGATCAACTGAATGACCCACCAAAATGATCGTTTAGGGCGTGGACTACCAGG
 TACCAGGTTATCAATCTGTTTGTCCCTAGCTTTCGCGCTCAG

>CUP2P3F06 Uncultured bacterium (Acidobacteria)

ACTTGGGCGGCTGCTCCTTGGCGTACGACACCGACTTCTAGTACGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGCGGTT
 CTGATCCGCGATTACTAGCGATTCCAGCTTTCATGAGTTCGAGTTGCAGACTCCAATCCGAACCTGAGGCGGCTTTTTCCGATTAGCTCCCGCTCACGGGTTTGGCAGCG
 TTTGTACCAGCAATTTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGCAGCTCATCCCACCTTCTCCAGCTTATCGCTGGCGGTTCTTCCGAGTTTCCCAACTGAATGATG
 CCGGATGACCCGATGGCAACTAGGGATAAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACCTCCAGTCCCTTGGCGGGTAGCG
 CTTTAAAGGGGCGCGATGTTTCCACCGGATTCCACTGCGCTTCCAGCCAGGTAAGGTTCTTCCGCTTGGCTCGAATTAACCAACATGCTCCAGCCGTTGTGCCGGG
 CCGTCAATCCCTTTGAGTTTACGCTTGCAGCGTACTCCCGAGCGGACTTAAACCGTTAGCTCCCGCACGGATCAACTGAATGACCCACCAAAATGATCGTTTAGGGCGTGGAC
 TCGTTTAGGGCTAGGACTACCAGGTTATCAATCTGTTTGTCCCTAGCTTTCGCGCTCAGTACGGTCCAGAGACCGCTTACACCGCGGTTCTCTGATATCTACGCA

>CUP2P3F07 Uncultured bacterium (Acidobacteria)

GCGCTGCTCCTTGGCGTTGGCTTGGCGACTTCTATACAATCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTTCGTTGATACG
 CCATTACTAGCGATTCCCGCTTCATGACGTCGAGTTGCAGACTGCAATCCGAACCTGAGCAGGTTTTTCCGATTAGCTCCCGCTCACGGGATCGGACAGCTGTGTACC
 ATGCATTGTAACACGTGTGTAGCCCTAGACATAAAGGCCATGCTGACTTGCAGCTCATCCCACCTTCTCTCCGTTATCCGGAGCAGTCCCTTAGAGTTCTCCCTTGC
 GGTAGCAACTAAGGTAGGGTTGCGCTCGTTGCGGGACTTAAACCAACACCTCACGGCACGAGCTGACGACAGCCATGACGACCTCCAGTCCCTTTCGGGAA
 AGCTATTTCTAGCTCTGTCCAGTGCAGTTCAAGCCTAGTAAGGTTCTTCCGCTTGGCTCGAATTAACCAACATGTTCCACCGCTTGTGCCGGGCCCCGTCATTCCTT
 TGAGTTTACGCTTTCGACCGTACTCCCGAGCGCAGAACTTAAACCGTTAGCTCCCGGACG

>CUP2P3F08 Uncultured bacterium (Acidobacteria)

GCTTCTTGGCGTACGCGGCGGACTTCTATACAGCTCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTTCGATCTGATACGCCATTACT
 AGCGATTCCCGGCTTCATGACGTCGAGTTGCGAGCTGCAATCCGAACCTGAGCAGGTTTTTCCGATTAGCTCCCGCTCGCGGGTTGGCAACGGTTTTGTGCCCTGCATTG
 TAACAGCTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGCAGCTCATCCCACCTTCTCTCCGTTATCCGGAGCAGTCCAGTATGAGTTCCCTCTTCCGATGGCA
 ACTACGTGACGGGTTGCGCTTGGCGGACTTAAACCAACACCTCACGGCACGAGCTGACGACAGCCATGACGACCTCCACAGTGTCCCTTGGGGAAGGCGGTA
 TTTCTACAGCTTGTCAAGTGCCTTCCAGCCAGGTAAGGTTCTCCGCTGAGCTCGAATTAACCAACATGTTCCACCGCTTGTGCCGGGCCCCGTCATTCCTTTGAG

TTTCAGTCTTGGCAGCCTACTCCCCAGGTGACAGGACTTAAACCGGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCTGATCGTTTAGGGCTAGGACTAC
CAGNGTATCTAATCCGTTTGTCTCCCTAGCTTTCGTTCATTCAGCGTCAGTTGTTGGTCCAGCGCGCGCTTTCGCCACGGGTGTTCTCGCAGATATCTACGCATTTAC
CGNTACACCTGCAATTCACGCGCCCTCTCCCACTCAAGCACAGCAGTTTCGGAAGCAGTCTCTGA

>CUP2P3F09 Uncultured bacterium (Não classificada)

GATACGGCATTACTAGCGATTCCAGCTTCATGACGGCGAGTTGCAGCTTCCAACTCCGAAGTGAAGACGGTTTTTTGGGATTGGTCCCCCTCGCGGGTTGGCGACCCAT
TGTACCGTCCATTGTAGCACGTGTGTAGCCCTAGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCAGGTTATCCCTGGCGGTCTCTCGCAGTTCCA
CCGTTTAAAGTATGGCAACACAGGACAGGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACGCCATGACGACCTCGACTCCGGTCC
CTTGGCGGAAGTCCCGCTTCTGGGGATTGTCCAAAGCCGTTGAGCCTAGGTAAGTTTCTCGCGTGGCGTGAATGAACACATGCTCCACCGCTTGTGCGGGGCC
CCGTCATTCCTTTAGTTTACGCTTGGCAG

>CUP2P3F10 Uncultured bacterium (Não classificada)

GCGGAGGCCCTTACGGTGTAGCTGACGCTTCTGGTTGAGTACGTCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGCGGTGCTGATCCGC
GATTACTAGCGATTCCAACCTTCATGGAGTGCAGTTGCAGACTCCAATCCGAAGTGCAGTCCGGTTTTTGGATTAGTCCCCCTCGCGGGTTTCGCGTCCCTCTGTACCG
ACCATTGTATCAGCTGTGTCGCCCTGGATATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGTTTAAACACGGCAGTCTCCTTAGAGAGCCCAACTGAA
TGTGGCAACTAAGGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATGTCCCCACAGGGCTGACGACAGCCATGACGACCTGTCTCTCGTCTGATTGCTAC
GAAAGCCGTATCTACGGATGTCGAGGATGTCAAATCCAGGTAAGTTTCTCGCGTGGCTTGAATTAACACACATGATCCACCGCTTGTGCGGGGCCCGCTCAAT
CCTTTAGTTTTAGTCTTGGCAGCCTACTTCCAGCGGGGACTTATTGCGTTAGCGCCGGTTACGCGGGGGTCAAG

>CUP2P3F11 Uncultured bacterium (Gammaproteobacteria)

ACACACGTGGTAGCGCCCTTGGCGTCCAGGCTACTGCTTCTGGTGCAGTAACTTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCAGCAATG
CTGATCTGCGATTACTAGCGATTCCGACTTTCATGGAGTGCAGTTGCAGACTCCAATCCGACTACGACAGATTTCTGGGATTGGCTCCCGCTCGCGGTTGGCTTCCC
TCTGTATCTGCCATTGTAGCACGTGTGTAGCCCTGGCCATAAAGGCCATGATGACTTGACGTCATCCCCAACTTCTCCGGTTTTGTACCAGCGGGTCTCTTAGAGTGC
CCAACCTGAATGATGGCAACTAAGGACAAGGGTTGCGCTTCTGGCGACTTAAACCAACA

>CUP2P3F12 Uncultured bacterium (Acidobacteria)

AGTACAACCGGCTTCTGTGATGTGACGGGCGGTGTGTACAGGCCCGGGAACGTATTACCGCGCGGTGCTGATCCGCGATTACTAGCGATTCCAACCTCAAGCAGCGGAG
TTGCAGCCTGCTATCCGAAGTGCAGCCGGCTTCTCCGATTAGCTCCACCTTACGGTTTTTGCAGCGGTTGTACCGGCCATTGTAGCACGTGTGTAGCCCGACATAA
AGGCCATGCTGACTTGACGTCATCCCAACTTCTCCGGTTTTATCCCGGCGTCTGACAGAGTCCCGACTTAACTGATGGCAACAGCAGCAAGGGTTGCGCTCG
TTGCGGACTTAAACCAACATCTCACGACAGAGTGCAGCAGTGCAGCAGCTTACAGCAGCTTACAGTGTCTTTCGGAAGACCCTTTCGTAGTTTTGCTCACTCGTGTCA
AGCCTGGTAAAGTTCTTCCGCTTGGCTGCAATTAACACACATGTTCCACCGCTTGTGCGGGGCCCGTCAATTCCTTTAGTTTTACGCTTGGCAGCCTACTCCCCAG
CGGAAATGCTTAATGCGTTAGCTTCCGACCGCGAGGATCGATA

>CUP2P3G01 Uncultured soil bacterium (Acidobacteria)

CACCGCTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATACCGCAGCGTGTGATCTGCGATTACTAGCGATTCCAGCTT
CATGGAGTCGAGTTGCAGACTCCAATCCGGACTGGGATTGGCTTTTTCCGATTAGTCCCCCTCGCGGGTTTTGCAGCGGTTTTGTACCAACCATTTAGTACGCTGTGTGG
CCCTGGACATAAAGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGTTATCCGAGGCGGTTTTGCGCAGAGTCCCAACTGAATGATGGCAACTGACAAATAAGG
GTTGCGCTGTTGCGGGACTTAAACCAACATCTCACGACAGGACTGACGACAGCCATGACGACCTTCCGTAGCAGTCCCTTTCGCGGAAGGGGATATTTCTACCCCGGT
CCACTACGCTTGCAGCCAGGTAAGGTTCTTCCGCTTGGCTGCAATTAACACACATGCTCCACCGCTTGTGCGGGGCCCGTCAATTCCTTTAGTTTTACGCTTGGCA
CCGTACTCCCCAGCGGATCGTTAACCGGTTAGCTCCGGCAGCAGGATTGGGTACCTGTACACCAAGCGATCATCGTTTAGGGCTAGGACTACCAGGGTATCTAA
TCCTGTTTGTCCCTTAGCTTTCGTGCATCAGCGT

>CUP2P3G02 Bacillales bacterium Gsoil 1105 (Bacilli)

TTAGGCGGTGGCTCCGTAAGGTTACCTACCAGCTTCCGGTGTGCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGCGCATGCT
GATCCGCGATTACTAGCAATTCGGCTTTCATGACGGCGAGTTGCAGCCTGCAATCCGAAGTGCAGACGGCTTTATGAGATTCCGCTCCACCTCACGGTCTCGCATCCCTT
TGTACCGCCATTTGTAGCACGTGTGTAGCCAGGACATAAGGGGATGATGATTGACGTCATCCCCACCTTCTCCCGTTATCCGAGGCGGTTTTGCGCAGAGTCCCAACTGAATGATGGCAACTGACAAATAAGG
AACCAATAGTGGCAAGGTAAGGTTGCGCTGTTGCGGGACTTAAACCAACATCTCACGACAGGACTGACGACAGCCATGACGACAGCCATGACGACCTTACCGCGTGC
GAAGGGAAGGCTTATCTTAAGCCGGTACGCGGGATGTCAAGTCTGGTAAAGTTTCTTCCGCTTGGCTTGAATTAACACACATGCTCCACTGCTTGTGCGGGGCCCGCT
CAATTCCTTTAGTTTTAGTCTTTCGCGACTTCCCCAGCGGAGTGTAAATGCGTTAGCTTCCGCACTGAGGGTGGTACCCCAANACCGACTCATCGTTA
CGCGTGGACTACCAGGATCTAATCTGTTTGTCTCCACGCTTTCGCGCTCAGCGTTCAGAAATCGGCCAGCA

>CUP2P3G03 Uncultured bacterium (Acidobacteria)

GGTTGGCAGCGGATTTCTAGTACAGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGCGGTCTGATCGCGCATTTACTAGCGATT
CCGGCTTTCATGACGTCGAGTTGCAGACTGCAATCCGAAGTGCAGCGCTTTTTTGGCATTAGTCCCCCTCACGGGTTGCGCAGCTTGTGGCGGCATTTGTAACAG
TGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACCTCATCCCCACCTTCTTCCGTTATCCGAGGAGTCCCTCGTAGAGTTCCCCCTTGGCGGTGGCAACTACGA
GTAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACCTCACGGCAGGACTGACGACAGCCATGACGACCTTACACAGGTCCCTTTCGCGGAAGTCCCTATTTCTAA
GGAGGTTCTGTGCGGTTAAGCCAGGTAAGGTTCTTCCGCTTGGCTGCAATTAACACACAT

>CUP2P3G04 Uncultured bacterium (Acidobacteria)

GGGCGTGCCTCTTCCGGTTGGCGCGGCGACTTCTAGTACAACCACTTTCGTGATGTGACGGGCGGTGTGTACAAGNCCGGGAACGTATTACCGCGCGGTGCTGATC
CGCGATTACTAGCGATTCCAGCTTTCATGGAGTGCAGTTGCAGACTCCAATCCGANACTGAGGGATGGGCTTTTTCCGATTAGTCCCCCTCGCGGGTTTTGCGACGGTT
TGTACCATCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCCGTTATCCGAGGAGTCCCTCGTAGAGTTCCCCCTTGGCGGTGGCAACTACGA
ACTAAATGATGGCAACTGGCAATAAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGACTGACGACAGCCATGACGACCTTACACAGGTCCCTTTCGCGGAAGTCCCTATTTCTAA
CGGGGAAGGGATGNTNCCACCCCGTCCACTGCAATTCGAGCCAGGTAAGGTTCTTCCGCTTGGCTGCAATTAACACACATGCTCCANCGCTTGTGCGGGGCCCGCT
AATTCCTTTAGTTTTCA

>CUP2P3G05 Uncultured bacterium (Acidobacteria)

TCCTTGGCGGTTAGCACACTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGCGGTCTGATCCGCGATT
CTAGCGATTCCAGCTTTCATGGAGTGCAGTTGCAGACTCCAATCCGAAGTGCAGCGGCTTTTTCCGATTAGTCCCCCTCACGGGTTGCGCAGCGTTTGTACCGACCAT
TGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGTTATCCGAGGCGGTTTACTAGAGTCCCGGCTTGCAGCCGA
TGGCAACTAGGGAAGGTTGCGCTGTTGCGGGACTTAAACCAACATCTCACGACAGGACTGACGACAGCCATGACGACAGCCATGACGACCTTACACAGGTCCCTTTCGCGGAAGTCCCTATTTCTAA
GGATGTTCCACCCCGGTTCTTGCATTTCCGAGCCAGGTAAGGTTCTTCCGCTTGGCTGCAATTAACACACATGCTCCACCGCTTGTGCGGGGCCCGCTCAATTCCTT
TGAGTTTACGCTTGCAGCCTACTCCCCAGCGGATGCTTATCCGCTTAGCTCGGCGCAGCAGGATGGGTACCTGCTACACCAAGCAATCATCGTTTAGGGCTAG
GACTACCAGGATATCTAATTCCTGTTTGTCTCCGCTCAGCGTTCAGCTAGTTATGTTGTCAGTGCAGCGCTTTCGCCACAGGTGTTCTCCCGATATCTACGC

>CUP2P3G06 Uncultured beta proteobacterium (Betaproteobacteria)

ACCAGTCATGAGCTCACGTTGGTAGGCGCTCTTCCGGTTAGGCGACTGCTTCTGGTGGACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGT
TTCACCGCGACATGCTGATCCCGGATTACTAGCGATTCCGACTTTCATGATGAGTGCAGTTGCAGACTACAATCCGACTACGACCGGCTTCTGGGATTGGCTCCCCCTCG
CGGTCGCGAACCTCTGTACCGCCATTGTATGACGTTGAGGCGCTACCCATAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCTCCGGTTTTGTACCGGCGAG
TCCCATAGAGTGCAGCAACTAAATGTAGCAACTAATGGCAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGACTGACGACAGCCATGACGACCT
GTGTCAGGCTCCCTTTCGGGCACTTCAATCTCTCCGAGTTCCGACTGTCAGGGTGGTAAGGTTTTTCCGCTTGCATGCAATTAACACACATCATCCACCA
TTGTCGCGGCCCGCTCAATTCCTTTAGTTTTAATCTTCCGACCGTACTCCCGGCGGCACTTCCAGCGTTAGCTGCGTACTGAGAGATTCTCCCCAACGAC
TAGTTCGCATCGTTTAGGCGGTGACTACCAGGATCTAATCTGTTTGTCTCCCGCTTTCGTGCTGAGTGCAGTGC

>CUP2P3G07 Uncultured organism (Verrucomicrobiae)

GGCGCCTTTAAGGGGCGATTTCGGGTACAACCGGCTTCATGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACTATCACGGCGCCGTAGCTGATGCGCCATTACTAGC
 GATTCCGGCTTCATGGAGCGCAATTCGACGCTCCAATCCGAATCGGCCCGAGTTTAAATGATTTCCCTCCACCTCGCGGTATGGATCGTTCTGACTGGGCATTGTAG
 TAGCTGTGCAGCCAGGGCCATAAGGCCATACTGACTTACGGCTCGTCCACCTTCCCTCTCGTTTAGGGGAGGCAGCTGAAACAGAGTGGTGAACCTCTCGGTTCCG
 TGGCAACAGTTCACAGGGGTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTGTGCAAAATGTCTCTTTGAGACT
 CGCTGGCTTTCACCAACTTAGAGATGCATGTCAAGGCTGGTAAGGTTCTTCGCGTGTGATCGAATTGAGCCACATACTCCACCCTGTGCGGGCCCCCGTCAATTT
 TTCAGATTTAATCTTTCGACCTACTCCCAAGGCGGACGTTTAAACGCTTGGCTCCGGCGAGAAGGGTGAATCTCCANACCAACAGTGCACCGTTTACTGCC
 AGGACTACCGGGTATCTAATCCCGTTTGTCCCT

>CUP2P3G08 Uncultured bacterium (Sphingobacteria)

GACACTCTTACGGTTATCGTCTTATTGTACACCAACTTCCATGGCTTGACGGGGCGGTGTGTGCAAGGTCGGGAACTATCACCGTGGCATTGCTGATCCACGATTA
 CTAGCGATTCCAGCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAATGAGACGTTTTTGTGGGATTTGCTCACCATCGCTGGTGGCTGCCCTTTGTAACCGCCAT
 TGTAGCACGTGTGTAGCCCTGGGCATAAAGGCCATGATGATTTGACGTATCCCTCCTTCTCTGCTTACGACGGCAGTCTCTTAGAGTCCCGGCATTANCCG
 TGGCAACTAAAGATAGGGTGTGCGCTCGTTGCGGGACTTAAACCAACCTCACGGCAGAGCTGACGACAACCATGACGACCTTGTAACTGTGTATTGCTACAAAG
 ACCCTTTTCAGGATCGGTCAAATCACATTCAGCCAGGTAAGGTTCTCGCGTATCATCGAATTAAGACATGTCTCCACCCTGTGCGGAGCCCCGGCAATTCCTT
 TGAGTTTCAACCTTTCGCGCTACTTCCCAAGTGGTAACTTAAACGTTTTGCTTGGACATACTGTATGCTAATGTGCGAGTTTACATCGTTTAGGGCGTGGACT
 ACCAGGATATCTAATCTGTTTATCCCCAGCTTTCGTGCTCAGTGTCAATACACGCTTGTGAAC

>CUP2P3G09 Uncultured bacterium (Planctomycetacia)

CGGTTGGGTAGGCGGCTTCGGGCATCCCGCTCTCGTGGCTTGACGGGGCGGTGTGTACAAGGCTCAGGAACATATCACCGCTGCGTAGCTGATCAGCGGTTACTAGCGA
 TTCCAGCTTCATGAAGGCGAATTCGACGCTTCAATCCGAATGGGACAGGCTTTTTCGATTTGCTCCACCTCTCGGCTTCGCTTCGCTGTACTGCCATTGTGGCA
 CGTTTGTAGCCCTGGGCGTAAGGGCCATGAGGACTTACGCTCATCCCACTTCCCTCGGTTTGTACCGGAGTCTCACTAGAGTGCCTTTCAGAGGTTTATCCGTTAGTAAC
 TAGGAACAGGGGTTTCGCTCGTTATGGGACTTAAACCGACATCTCACGACACGAGCTGATGACAGCCATGCAACACCTGTGCTGGCTTCCAGAGGGAGTCTGTACCC
 TTTTCAGGCTTACCACAGCATGTCAAGCCAGGTAAGGTTCTGCGCGTGTGCTCGAATTAAGCAACATGTCTCCACCCTGTGTGAGCCCCCGTCAATTCCTTTGAG
 TTTTCAGCCTTCCAGCGTTAGCTGCGTTCAGGAGAAAATGAATTTCCCGACAACATGTCGACATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCTGTTTACGGCCAGGACTA
 CCGGGTATCTAATCCCGTTTGTCCCTGGCTTTCG

>CUP2P3G10 Uncultured bacterium (Betaproteobacteria)

TCTGGTGAACCCACTCCCATGGTGTGACGGGGCGGTGTGTACAAGCCCGGGAACGATATCACCGTGCATGCTGATCCACGATTACTAGCGATTCCGACTTCATGCAGTC
 GAGTTGCAGACTGCAATCCGACTACGACCGGCTTCCAGGATAGCTCCCTTCGCGGTTGGCAGCCCTTTGTACCGGCCATTGTATGACGTGTGAGGCCCCACCA
 TAAGGGCCATGAGGACTGACGTCATCCCACTTCCCTCGGTTTGTACCGGAGTCTCACTAGAGTGCCTTTCGTAAGGTTTTCGAGGTTTTCGCTTGTGCTG
 GGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCGGACCTGTGCCCCGGCTCCCTTTCGGGCACTCCACATCTCTGCGGATTCCGGGCATGTCA
 AGGTTAGTAAAGTTTTTCGCGTGTGATCGAATTAATCCACATCATCCACCCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTTAATCTTGCACCGTACTCCCGAG
 CGGCTGCATTCACGCGTTAGCTGCGTTCAGGAGAAAATGAATTTCCCGACAACATGTCGACATCGTTTAGGGCGTGGACTACCAGGGTATCTAATCTGTTTGTCCCG
 ACGCTTTCGTACATGAGCGTCAGTCTCATCCAGGGGGTGGCTTCCGCTCCGCTTTCCTCCAAATCTCT

>CUP2P3G11 Delftia tsuruhatensis (Betaproteobacteria)

GTGGTAGCGCCTCCTTGCCTTATGGTACTACTTCTGGCGAGACCGGCTCCATGGTGTGACGGGGCGGTGTGTACAAGCCCGGGAACGATTACCGCGGCATGCTG
 ATCCCGGATTACTAGCGATTCCGACTTACGCGAGTCGAGTTGCAGACTCGGACTCGGACTGAGTGGTTTTATGGGATTAGCTCCCTTCGCGGTTGGCAACCGCTTGTG
 GTACCAGCCATTGTATGACGTGTGTAGCCCCACTATAAGGGCCATGAGGACTTACGCTCATCCCACTTCCCTCGGTTTGTACCGGAGTCTCATTAGAGTGCCCA
 ACTGAATGTAGCAACTAATGACAGGGTTGCGCTCGTTGCGGGACTTAGCCCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCGCTGTGTCAGGTTCTCT
 TCGAGCAGCAACTCTCTCGAAGGTTCCCTGCCATGTCAAGGTTGGTAAAGTTTTTCGCGTGTGATCGAATTAACCACTAAACACCGTTCACACCGTTCGCGGCTCCCGT
 CAATTCCTTTGAGTTTCAACCTTGCAGCGTACTCCCGAGGGTCAACTTACGCGTTAGCTTTCGTTACTGAGAAAATAATTTCCCAACACCGATTGACATCGTTA
 GGGCGTGGACTACCAGGGTATCTAATCTGTTTGTCCCGACTTTCGTCATGAGCGTCAGTACAGGGCC

>CUP2P3G12 Uncultured soil bacterium (Acidobacteria)

GGCGCTGCCTCCTTGCCTGAGCTTGGCGACTTCTAGTACAGTCTACTTCTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGATTACCGCGGCTGATCTGATA
 CGCCATTACTAGCGATTCCGCTTTCATGCACTGAGTTGCAGACTCGAATCCCACTGAGCAGAGTTTTTTCGATTAGCTCCCTTCGCGGTTGGCAACCGGTTTGTG
 CCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTACGCTCATCCCACTTCCCTCGGTTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTT
 CGGAGTGGCAACTTACGTCAGGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCGCTCCACACTGTCCCTTGGCG
 GAAGGCGGCTTTCACACGTGTGAGTGGCTTCGAGCCAGGTAAGGTTCTCGCGTGTGATCGAATTAACCACTAAACACCGTTCACACCGTTCGCGGCTCCCGTCAA
 TTCTTTGAGTTTACGTTTGCAGCGTACTCCCGAGGTCAGGACTTAAACGCTTAGCTTTCGTTACTGAGAAAATAATTTCCCAACACCGATTGACATCGTTA
 GGGCGTGGACTACCAGGGTATCTAATCTGTTTGTCCCGACTTTCGTCATGAGCGTCAGTACAGGGCC

>CUP2P3H02 Uncultured soil bacterium (Acidobacteria)

CACCGCTGCTGCTGATGACGATTACTAGCGATTCCAGCTTCATGCACTGAGTTGCAGACTGCAATCCGAATGAGAGCGGTTTTTTGAGATTGGCTCCCGCTCGCG
 GGTTTGAACCTCATGTTGCCGCCATTGTAGTACGTTGTAGCCCTGGACATAAAGGCCATGAGGACTTACGCTCATCCCACTTCCCTCGGTTTATCCCGGAGTCCACGTAGAGTTCCCTCTT
 CCTTTAGAGTGTCTAGCTTAACTGTTGGCACTAAAGGCGGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGAC
 CTCGACTAGTGTCCCTTACGGGAAAAGCGACTTTCGCCACTGTCACTGAGCGCTTCGAGCCAGGTAAGGTTCTTCGCGTGTGCAATTAACCACTAAACACCGTTCACCG
 CTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTACGCTTTCGAGCCAGTACTCCCGAGGATACTAATGCGTTAGCTTTCGCGGACAGCGGATTCCAACTCCCGCTCAC
 ACCAAGTATCCATCGTTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGTCCCGTACTTTCGTCCTCAGCGTCAGTTTCTGTCAGTACGCGCTTCGCCA
 CCGGTTTCCCTCGATATCTACGCAATTCACCGCTACACCGAAT

>CUP2P3H03 Uncultured soil bacterium (Gammaproteobacteria)

GCCTCCTTGGCGTTAGGCTAACGGCTTCTGGAGCACTACTCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGATATCACCGCAGCATAGCTGATCTGCGAT
 TACTAGCGATTCCGACTTACGAAAGTCGAGTTGCAGACTTCCATCCGACTGGGATCGGCTTTCGCGGATTGGCTCCACCTCGCGGATTGCAACCCCTCTGTACCGACC
 ATGTAGTACGTTGTAGCCCTGGCGTAAGGGCCATGATGACTTACGCTCATCCCACTTCCCTCGGTTTGTACCGGAGTCTCCTTAGAGTTCCACCACTTACCT
 GCTGGCACTAAGGACAAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGAC

>CUP2P3H04 Uncultured Acidobacteria bacterium (Acidobacteria)

CTAGTACAACCGGCTTTCGTTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGATATCACCGCGGCTGCTGATCCCGGATTACTAGCGATTCCAACCTTACCGCAGGC
 GAGTTGCAGCTTACGATCCGAACTGAGACCGACTTTCCTCGATTAGCTCCACTTACCGGTTTTGCAACGTTTTGATCGGCCATTGTAGCAGCTGTGTAGCCCCAGACA
 TAAAGGCCATGCTGACTTACGCTCATCCCACTTCCCTCGGTTTATACCGGCACTCTGACAGAGTGGCCACCATTAAGGTGATGGCAACAGCAGACAGGGGTTGCGC
 TCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTTACGAGTGTCTTTCGGAAGTCCCTTTCGGAAGTGGTCACTCGCTCT
 TCAAGCCTGGGTAAGGTTTTCGCGTTCGCTCGAATTAACCACTTCCCTCCAGCTTTCGCGGGCCCCGTTCAATTCCTTTGAGTTTTAATCTTTCGCGAC
 CAGGCGAATGCTTAAATGCGTTAGCTTTCGCGTACAGGGATCGATACCGCTCACCAAGCAATTCATCGTTTAGGGCCAGGACTACCAGGGTATCTAATCCCGTTTGC
 TCCCTTGGCTTTCGCTCCTCAGCGTCACTTGGTCCAGGATGCGGCTTC

>CUP2P3H05 Uncultured bacterium (Alphaproteobacteria)

GTCTTCAGGTAAAGCAACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGATATCACCGCAGCGTGTGATCTGCGATTACTAGCGATTCCAACCTTCATG
 TGCTCGAGTTGCAGACCAATCCGAATGAGACCGCTTTTGTAGATTTGCGAGGGTTTTCCCATTCGCTCCCATTTGCAACCGCATTGTAGCAGCTGTGTAGCCCCAG
 CCTGTAAAGGCCATGAGGACTTACGCTCATCCCACTTCCCTCGGCTTATACCGGCACTCTGACAGAGTGGCCACCATTAAGGTGATGGCAACAGCAGACAGGGGTTG
 CGCTGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTTACGAGTGTCTTTCGGAAGTGGTCACTCGCTCT
 TCAAGCCTGGGTAAGGTTTTCGCGTTCGCTCGAATTAACCACTTCCCTCCAGCTTTCGCGGGCCCCGTTCAATTCCTTTGAGTTTTAATCTTTCGCGAC
 CGTACTCCCGAGGCGGATGCTTAAATGCGTTAGCTTTCGCGTACAGGGATCGATACCGCTCACCAAGCAATTCATCGTTTAGGGCCAGGACTACCAGGGTATCTAATCCCGTTTGC
 TTTTGTCCCGACTTTCGCACTCAGCGTCACTTGGTCCAGGATGCGGCTTC

>CUP2P3H06 Uncultured bacterium (Betaproteobacteria)
 CTTCTGGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGCGACATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGTA
 CTCGAGTTTCAGACTACAATCCGGACTACGACCGGCTTCTGGGATTGGTCCCTCCGCGGTTGGCAACCCCTCTGTACCCGCATTGTATGACGTGTGAGGGCCCTACCCA
 TAAGGGCCATGAGGACTTGACGTCATCCCACTTCTCCGGTTTGTACCCGCGAGTCCACACNTAGAGTGGCCAACTAAATGTAGCAACTAGTGGCAAGGGTTGGCT
 CCNNTTGGCGGACTTAACCAACATCTCACGACAGGAGTGCAGACAGCCATGCAGACCTGTGTCCAGGCTCCCTTTCGGGACCCTCGAATCTCTCCGAGGTTCCGT
 ACATGTCAAGGGTAGGTAAGGTTTTTCGGCTT

>CUP2P3H07 Uncultured bacterium (Não classificada)
 TCGGGTACACTAACTCAGGTGACGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGCGAGCTAGTGTCTGCGGTTACTAGCGATTCTGACTTCATGGA
 GCGGAGTTGCGAGCTCCAATCCGAAGTGAAGATGGTTAAGAGATTAGCTTGCCTCCGCGGTTCCGCGACTCGCTGTCCATCCCATTTAGTACGCTGTGTAGCCCTGG
 ACGTAAGGGCCATGCTGACTTGACGTCATCCCACTTCTCCGGCTTGTACCCGCGGTTCTCGTGTGAGAGATCTTGTGGACCAACACACGACAAGGGTTGCGCTCGT
 TCGGGGACTTAACCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGACCTGTCACTCTGTCCGGTTGCCCGGAACCTAGTCTCCTAGATGGTCAGAGGATGT
 CAAGCCAGGTAAGGTTCTTCCGCTTGGCTGCAATTAACACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTTAACCTTGGGCGGTACTCCCC
 AGGCGGGACACTTATTGTGTTAACTCGGCGACAGATGGAGTGCATACANCTACACCTAGTGTCCATCGTTTACGGCCAGGACTACCGGGGTATCTAATCCCGTTTGT
 CCCCTGGCTTTCGCTCTCAGCGTCAAGTCAAGTCCAGTATGAT

>CUP2P3H08 Uncultured Acidobacteria bacterium (Acidobacteria)
 TCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGCGTGCATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCGAT
 CGAGTTGCAGACTGCAATCCGAAGTGAAGGCGGTTTTTCCGATTAGCTCCCTCTCGCGAGTTGGCAACGGTTTGTAAACCGCATTTGTAACACGCTGTGTAGCCCTGGAC
 ATAAAGGCCATGCGGACTTGACGTCATCCCACTTCTCCGGTTATCCGGAGCAGTCCACGTTAGAGTCCCTCTTGGCAGTGGCAACTACGTGACGGGGTTGCGCTC
 GTTGGGGACTTAACCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCCCTATACTCTCTCCCTTGGCGGAAGGCGGATTTCTACAGCTGGTCAGAAGCA
 TTTCGAGCCAGGTAAGGTTCTCCGCTGAGCTGCAATTGAACACATGTTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTTCAGTCTTGGCAGCCGTACTC
 CCCAGTGCAGGACTTAACCGGTTAGCTCCGGGACGACACCCGAACGGGTGGCACCCCAAGTCTGATCGTTTGGGCTAGGACTACCAGGATATCTAATCTCTGTTTGC
 TCCCTAGCTTTCGCTCTCAGCGTCAAGTGGTCCAGCGCCGCTTTCGCCACGGG

>CUP2P3H09 Caulobacter sp. (Alphaproteobacteria)
 CCGGGAAAGCTTACCAGCGGATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCTCTCGAGTTGCAGAGAGCAATCCGAAGTGAAGCGACTTTTAGGGATTA
 GCTCCCGCTCGCGGTTTGCAGCCCTCTGTAGTCCGCTTGTAGCAGCTGTGTAGCCACCCCGTAAGGGCCATGAGGACTTGACGTCATCCCACTTCTCCGGCTT
 ACCACCGCGGTTCCCTTTAGAGTGCACGCAAACTGCTGGCAACTAAAGGCGAGGGTTGCGCTCGTTGCCGGACTTAACCAACATCTCACGACAGGAGTGCAGC
 AGCCATGCAGACCTGTGCCAGTCCCGAAGGGAAAAGTGCATCTCTGCACCGGTTCCGGGATGTCAAAGGTGGTAAGGTTCTGCGCTTGTCTCGAATTAACCA
 CATGCTC

>CUP2P3H10 Uncultured Acidobacteria (Acidobacteria)
 GCCTCCTTGGCGTTAGCAGACTTCTAGTACAATCCACTTTCGTGATGATGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGGATCGTCTGTGATACGCCAT
 TACTAGCGATTCCAGCTTCAGCGGCGAGTTGCAGCTCCGATCCGACTGACGCGCTTTTTCGCGATTGGCTCCCGCTCCGCGGTTTGCAGCGCATTTGACCGCC
 TTTGTAAGCAGCTGTAGCCCTGGACATAAAGCCATGATGACTTGACATCTCCCACTTCTCCAGCTTATCCGCTGGCGGTTCTCTGCGATGTCTATCTTTCGATG
 CGGCAACACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGAGTGCAGCAGCCATGCAGCAGCCATGCAGCAGCCCTGCAGCCGCTTTC
 TCGGTTTCCAGGATGTTAGCCCGGCTTTCAGCCAGGTAAGGTTCTTCCGCTTGCATCGAATTAACCCACATGCTCCACCGCTTGGCGGGTCCCGCTTTCGAGTTTCAACCT
 TTGAGTTTACGCTTGCAGCCGACTCCCGAGGCGGACTTAAACGCGTTAGCTCCGGCAGCAACAAATGAATGGCTCACACCAAGTATGCATCGTTTGGGCGTGG
 ACTACCAGGATCTAATCTGTTTGTACCCACGCTTTCGTTCTCAGCGTCA

>CUP2P3H11 Uncultured bacterium (Gammaproteobacteria)
 TCAGGCTACTGCTTCTGGTGCAGTAACCTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGCGCAATGCTGATCTGCGATTACTAGCGATT
 CGACTTCTGGAGTTCGAGTTGCAGACTCCAATCCGACTACGATAGATTTTCTGGGATTGGCTCCCGCTCGCGGTTGGCTTCCCTCTGTTTCTACCATTTGACGAGCT
 GTGTAGCCCTGGCCATAAAGCCATGATGACTTGACGTCATCCCACTTCTCCGGTTTGTACCCGCGGTTCTCTAGAGTGGCCAACTGAATGCTGGCAACTAAGG
 ACAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGAGTGCAGCAGCCATGCAGCAGCCATGCAGCAGCCCTGTCCAGGCTCCTTGGCGACCCCGCAATCTCTT
 TCGGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGAGTGCAGCAGCCATGCAGCAGCCATGCAGCAGCCCTACGGACACCGTATCTCTAGCGCTTTTCTG
 TGCGGCGTACTCCCGAGGCGGAGAACTTAGCGGTTAGCTACGACACTGGGAGGCTTACCCTCTCAACGCTTAGTCTCATCGTTTATGGCGTGGACTACCAGGAT
 CTAATCTGTTGCTCCCAAGCTTTCGTTGCTGAACTCGGTTGAGTGCAGGACGGAAGCCGCTTTCGCCACTGTTGTTCTCCGGTATCTACGCATTTACCGCTACAC
 CGGAAATCCCGCTTCCCTTCCGACCCATGACTATGCAATGCAATTC

>CUP2P3H12 Uncultured bacterium (Actinobacteria)
 CGGCTTCGGGTGTACGACTTTCGTGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCCGCGGTTGCTGATCCGGGATTACTAGCGACTCCGACTTCAGC
 CAGTCGAGTTGCAGACTGCGATCCGAAGTGAAGCCGCTTTTGGGATTGCTCATCTCCGGAATAGCAGCCCTTTGTACCAGGCTTTGATGATGTGTCAGCTCT
 GGGCATAAAGGGGATGATGACTTGACGTCATCCCACTTCTCCGAGTTGACCCCGGAGTCTCTACGAGTCCCGGCAATACCAGGCTGGCAACATAGGACAAAGGGT
 TCGGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGAGTGCAGCAGCCATGCAGCAGCCATGCAGCAGCCCTACGGACACCGTATCTCTAGCGCTTTTCTG
 GTAGTTCAAACAGGTAAGGTTCTTCCGCTTGCCTCGAATTAAGCCACATGCTCCGCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACGCTTGCAGGCGTAC
 TCCCCAGGCGGGCACTTAATGCGTTAGCTACGGCAGGAAACCCGTTGATCAGGTTCCAAACCTAGTGCCCAACGTTTACGGCGTGGACTACCAGGATCTAATCTCT
 TCGCTTCCCGGCTTCCCTCTCCGACCCATGACTATGCAATGCAATTC

>CUP2P4A01 Uncultured bacterium (Acidobacteria)
 TCCTTGGGTTAGCACAGGACTTCTAGTACAACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGCTGTTCTGATACGCCATTA
 CTAGCGATTCCGGCTTCATGAGTTCGAGTTCAGACTGCAATCCGAAGTGAAGGCGGTTTTCGATTAGCTCCCGCTCGCGGTTTCGCGACGGTTTGTACCATGATCA
 TGTAAACAGTGTGAGCCCTGGACATAAAGCCGCTGCTGACTTGACGTCATCCCACTTCTCCGTTATCCGGAGCAGTCTCTTAGAGTTCCCGCTTTCGGGTTGG
 CAATAAGAGTAGGGTTGCGCTCGTTGCGGGACTTAACCAACACCTCACGGCACGAGCTGACGACAGCCATGCAGCAGCCATGCAGCAGCCCTACCGGTTCCCTTTCGGGAAAGGCGG
 GTTTCCACCGCTGTTCCAGGCACTTCAGGCGGTAAGGTTCTTCCGCTTGGCTCGAATTAAGCCACATGTTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTT
 AGTTTACGCTTGCAGCCGACTTCCCGAGGCGGACTTAAACGCTTAGCTCCGGGACGACCCGCCAACCGGGCCANCCAAAGTCTGATGGTTTGGGCTAGGACT
 ACCAGGATCTAATCTGTTTCCGCTCCCTTAGTCTTCCGCTCAGTGTGCGGTTCCAGCAGCCGCTTCCGCAACGGGTTCTGTCAGATATCTACGCATTC

>CUP2P4A02 Uncultured bacterium (Acidobacteria)
 GGTAGCACACCTGCTTCTAGTACGCGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGGCTGTTCTGATCCGCGATTACTAGCGA
 TTCCAGCTTCATGGAGTTCGAGTTCAGACTTCCAACTCCGAAGTGAAGGCGGTTTTTCCGATTAGCTCCCGCTCACGGGTTTGGCAGCGTTTGTACCGACCATTTGAGCG
 CGTGTGAGCCCTGGACATAAAGCCATGAGGACTTGACGTCATCCCACTTCTCCGTTATCCGGAGCAGTTCCTACTAGAGTGGCCCGGTTGACCCGATGGCAAC
 TAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGAGTGCAGCAGCCATGCAGCAGCCATGCAGCAGCCCTTAAAGGGAAAGGATGTT
 TCCACCCCGGTTCTGCAATTCGAGCCAGGTAAGGTTCTTCCGCTTGGCTCGAATTAAGCCACATGTTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTT
 CAGCTTGCAGCCGACTTCCCGAGGCGGATGCTTATCCGCTTAGCTGCGGACAGCAGGATTGGGTACCTGCTACACCAAGCAATCCGTTTGGGCTAGGACTACC
 AAGNTATCTAATCTGTTTCCGCTCCCTTAGCTTCCGCTCAGTGTGCGGTTCCAGCAGCCGCTTCCGCAACGGGTTCTGTCAGATATCTACGCATTC

>CUP2P4A03 Uncultured bacterium (Acidobacteria)
 GGTAGCGGACGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGCTGATCTGATACGCCATTACTAGCGAT
 TCCGGCTTCAATCGAGTTCGAGTTCAGACTTCCAACTCCGAAGTGAAGGCGGTTTTTCCGATTAGCTCCCGCTCACGGGTTTGGCAGCGTTTGTACCGACCATTTGAGCG
 CGTGTGAGCCCTGGACATAAAGCCATGAGGACTTGACGTCATCCCACTTCTCCGTTATCCGGAGCAGTTCCTACTAGAGTGGCCCGGTTGACCCGATGGCAAC
 TAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGAGTGCAGCAGCCATGCAGCAGCCATGCAGCAGCCCTTAAAGGGAAAGGATGTT
 TCCACCCCGGTTCTGCAATTCGAGCCAGGTAAGGTTCTTCCGCTTGGCTCGAATTAAGCCACATGTTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTT
 CAGCTTGCAGCCGACTTCCCGAGGCGGATGCTTATCCGCTTAGCTGCGGACAGCAGGATTGGGTACCTGCTACACCAAGCAATCCGTTTGGGCTAGGACTACC
 AAGNTATCTAATCTGTTTCCGCTCCCTTAGCTTCCGCTCAGTGTGCGGTTCCAGCAGCCGCTTCCGCAACGGGTTCTGTCAGATATCTACGCATTC

C

>CUP2P4A04 Uncultured bacterium (Não classificada)

CTCACGGGCATCCTCGGGCCCTCCCTCCCTACCGGTTCCGGCAGCGACTTCGGGAGCACCAGACTCGGGTGTGTGACGGGGCGGTGAGTGCAGGCCCGGGAACGTAT
CACCAGTGTGCTGACCTGCGGTTACTAGCAACTCCGACTTCATGCAGCGGGTTCGAGCCTGCAATCCGAATGAGACCGGCTTTCCAGGATGCTTCCAGTCCGCT
GTGTTGGAACCCGTTGATACCGCCATTTAGCGTGTGTAGCCCTGGATATAAAGGGCATGCGGACTTGACGTCATCCCCACCTTCTCCGGTTTCGCCCGGCAGTC
TCCCTAGAAGATTCAACTAAGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAAACCTCACGGCAGAGCTGACGACAGCCATGCACCACCTGTGTAGAGACCTCT
TGCGAGGGGCGTGGCTTTACCAACGTTTCTCTACATGTCAAACCCAGGTAAGGTTCTTCGCGTCCGCTCGAATTAACCCACACGCTCCGCTGCTTGTGCGGGCCCC
CGCCTATTCCTTTAGTTTAACTTTCGCGGCGTAGTCCCCAGGGCGGCAACTTAATGCGTTAGCTGCGGCATGATCGGGTCAATCCGACCAAGACCTAGTTTCGCAAC
GTTTAGGGCGTGGACTACCCGGTATCTAATCCGGT

>CUP2A05. Uncultured bacterium (Acidobacteria)

ACCATCACGACATACTAGGCGCTCCCTCCCTGCGGGTGGTATGGCGACTCTAGTACAACCGGCTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATT
CACCAGCGCGTGTGATCCGCGATTACTAGCGATTCCAATTCACGAGCGGAGTTGAGCCTACGATCCGAATGAGACCGACTTTCTCCGATTAGCTCCACCTTACG
GTTTTGCAACCGTTTGTATCGGCCATTTAGCAGCTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCTCCGGTTTATCACCGGCAGTC
CTGACAGATTGCCACCATAACGTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACAGCTGACGACAGCCATGCAGCAC
CTTACGAGTGTCTTGGGAACTCCCTTTCGGAAGTGGTCACTCGCTTCAAGCCTGGGTAAAGTTCTTCGCGTTCGCTCGAATTAACCCACACGCTCCGCTGCTTGTGCGGGCCCC
GTGCGGGCCCCGTCATTCCTTTAGTTTTCAGCCTTTCGACCGTACTCCCAAGCGGAAATGCTTAATGCGTTAGCTTCGGCAGCAGAGGATCGATACCCGTCACACC
AAGCATTATCCTGTTAGGGCCAGGACTACCGGGGATCTAATCCGTTTTCGCTCCGCTCACGCGTCAAGTGTGGTCCAGGATGCCCGCTTCGCCACCG
GTGTTCTCCAGATATCTACGATTTACCGTTACACTGGAATTCGCATCCCTCTCCCAAATC

>CUP2P4A07 Uncultured bacterium (Não classificada)

TAGGCCCGCCCTTGGGGTTCAGGCTACTGCTTCTGTGACGAGTACTTCCATGGTGTGACGGGGCGGTGTTGTACAAGGCCCGGGAACGTATTACCCGAGCAATGCTGA
TACGCCATTACTAGCGATTCCGGCTTTCATGCAGTTCGAGTTGCTGACTGCTGTCGAACTGAGCAGAGTTTTTCCGATTAGCTCCCGCTCGGGGTTGTGGACGGTTTG
TGCTCCCTGTGTTGTGACAGCTGTGATCCCTGTACATATAGGCCATGCGGACTTGACGTCATCCCCAACTTCTCTCCGGTATCCGGAACAGTCCAAACAGAGTCCCTCT
CTTGGAGTAGTAACGTGTGTGCA

>CUP2P4A08 Uncultured bacterium (Acidobacteria)

GGCCTTGTCTTCTTGGGGTTCAGCGCGGCGACTTCTAGTACAACCTACTTTCGTGATGNACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTACGGGCGTTCGATCTGATA
CGCCATTACTAGCGATTCCGGCTTTCATGCAGTTCGAGTTGCAGACTGCAATCCGAATGAGCAGAGTTTTTCCGATTAGCTCCCGCTCGGGGTTGGCAACCGTTTGTG
ACTTAACCCGATCTCACGACAGAGTGCAGACAGCCATGCAGCAGCTGACTGACTATCCCACTTCTCCCGGTTATCCGGGGCGGTTTCACTAGAGTGCAGGCT
TGACTCGCTGGCAACTAGGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACAGAGCTGACGACAGCCATGCAGCACCTCCGAGCAGTCTCTTG
CGAAGAGGGATATTCTACCCCGTCCACTGCGCTTCGAGCCAGGTAAGGTTCTTCGCGTTCGCTCGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTC
AATTCCTTTAGTTTTCAGGCGGACTACCGGGGATCTAATCCGTTTTCGCTCCGCTCACGCGTCAAGTGTGGTCCAGGATGCCCGCTTCGCCACCG
AGGGTAGGACTACCAGGTTACTAATCTGTTTGTCTCCCTAGCTTTCGCGCCTCAGCGTCAAGTGTGGTCCAGTGCAGCGCTTTCGCCACAGGTG

>CUP2P4A09 Uncultured planctomycete (Planctomycetacia)

CTCCCTTTCGTTGGGTTGACGGGGCGGTGTGTACAGTACAGGAACACATTCACCGCAGTGTGCTGACCTGCGATTACTAGCGATTCCAATTCATGCAGGCGAGTTGCAGC
TGCAACTGAACTGGGGACCTTTTTTGGGATTAGCTCCCTCTCGCGAGTTTGGCTCCCTCTGTAGGTGCCATTGTAGCACGTTGCGAGCCCTGGGCATAAAGGCCAT
GAGGACTTGACGTCATCCCGCCTTCTCCGGTTTAAACCCGGCAGTCTCTCCAGAGTCCCGGCATGACCCGCTGGCAACTGGAGACAAGGGTTTCGCTCGTTATGGG
ACTTAACCCGATCTCACGACAGAGTGCAGACAGCCATGCAGCAGCTGACTGAGTGGTTCGGGACTGGATACCGTTGCGCTTACGTTTCCGAGGCTACTTCCCTACCG
CTTTCGACATCAAGCCAGGATAAGGTTCTTCGCGTACCTCGAATTAAGCCACATGCTCCACCGCTTGTGTGAGCCCGGCTCAATTCCTTTAGTTTTCAGGCTTTG
CGACATACTCCCAAGGGGGTACTTAAACATTTTGTCTTCGCGTGTGAACCCATGTCAAGTCCACAANCTAGTACCATCGTTTAGGGCCAGGACTACCAGGGTATCT
AATCCGTTTGTCTCCCTGGCTTTCGCGCCTCAGCGTCAGAAGAGTCCAGCAG

>CUP2P4A10 Uncultured bacterium (Não classificada)

CCACCGGCTCTAGTATGGTCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTACCCGAGCGTTCTGATCTGCGATTACTAGCGATTCCAGCT
TCATGAGTTCGGGTTGACAGTCCCACTGAGCGGGGCTTTTTGGGATTAGTCCCGCTCACGGGTTTGGCAGCCTTGTACCGCGCATTGTAGCACGTTGTGTA
GCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCACTTCTCCCGGTTTCCGAGGGGTTTCGCTAGAGTCCCGGCTTCCCGGTGGCAACTAACGATAAGG
GTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCAGAAGACTGACAGCATGCAGACCTCCGAGCGGCCCTTTCGCGGGGGGATGTTCCACCCATTCAGTGC

>CUP2P4A11 Uncultured Acidimicrobiaceae bacterium (Actinobacteria)

CTCCACAAGGTTGGGGCCAGGCTTTCGGGTTGTCGCGACTTTCGTGTTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCCCGCGTTCGTGATCCGGGATTA
CTAGCGACTCCGACTTTCACGCACTCGAGTTGACAGACTGCGATCCGAATGAGCAGCGGCTTTTGGGATTAGTCCCGCTCACGGGATTGGCTCCCTCCCGGAAATAGCAGCCGTTGTACCGGCCATT
GTAGCATGTGTGACGCGCTAGGCGTAAGGGGCATGATGACTTGACGTCGTTCCCACTTCTCCGAGTTGACCCCGGAGTCTCTACGATCCCGGCATTACCCGCT
GGCAACATAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACAGAGTGCAGACAGCCATGCACCACCTGTGTAAGGGCCCCGAGGACACCGTA
CTTCAACCGCTTTTCCCTACATGTCAAACCTAGGTAAGGTTCTTCGCGTTCGCTCGAATTAAGCCACATGCTCCCGCTTGTGCGGGCCCCGCTCACTTCTTTGAGT
TTCAGCTTTCGCGCGTACTCCCAAGGGGGCACTTAATGCGTTAGCTGCGGCACGGAACCGTTGAATAGGCCCCACACTAGTGCCCA

>CUP2P4B01 Uncultured bacterium (Alphaproteobacteria)

AATCCCATGGTGTGCGGGCGGTGTGTACAGGCCGGGAACGTATCCCGCGCGTGTGTATCCGCGATTACTAGCGATTCCACCTTTCATGCACCCGAGTTGCAGAGTGC
AATCTGAACTGAGACGGCTTTTCGGGATCGGCTCGGCCTCGGACCTGGGATTCGCGCTGTCACCGCCATTGTAGCACGTTGTAGCCAGGACATAAGGGCCATTGAGG
ACTTGACCTCCGACTTCCACCTTCCCTCGGTTGTCACCGGCGAGTTCTCTCAGAGTGCACCGGCTTGAAGCCGATGGCAACTGAGGAGGGGTTGCGGCTGTTCGGGACTT
AACCCAACTCTCACGACAGAGTGCAGACAGCCATGCAGCAGCTGTCGCGGAGGTTCCCTTTCGGGAAATGCCCGTTTCGAGACAGGCTCCCATGTCAAGCCCTG
GTAAGGTTTCGCGGTTGCTTCGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTAGTTTCAACCTGCGGCCGTACTCCCAAGCGGTTG
GCTTACCGGTTAGCTACGACAGTGCAGGCTATCGGCCCAACATCCAGCGCACATCTTACGGCGTGGACTACCAGGATATCTAATCCTGTTTGTCTCCCAAGCTT
TCGCGCTCAGCGTCAAGGACAGGTCGCT

>CUP2P4B02 Uncultured bacterium (Acidobacteria)

GGCCTGCCCTTTCGGGTTAGCGTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTTCGATCTGATAC
GCCATTACTAGCGATTCCGGCTTTCATGCAGTTCGAGTTGCAGACTGCAATCCGAATGAGCAGAGTTTTTCCGATTAGCTCCCGCTCGGGGTTGGCAACCGTTTGTG
CTGCAATTAACACAGTGTGTAGCGCTGGACATAAAGGCCATGCGGACTGCGGCTTTCAGGTTGACGTCATCCCACTTCCCTCCGTTATCCGGAGGCTCCACAGAGTCTCTCTTG
CGAGTAGTAACGTGTGACGGGGTTCGCTCGTTGCGGGACTTAACCCAAACCTCACGGCAGAGCTGACGACAGCCATGCAGCGCTATACTAGTGTCCCTTTCGGG
AAGCCGTAATTTCTACAGTGGTCACTAGCATTTTCGAGCCAGGTAAGGTTCCCGCGTTCGCTGCAATTAACCCACATGTTCCACCGCTTGTGCGGGCCCCGCTCAAT
TCTTTGAGTTTTCAGCTTTCGCGAGGACTTCCCAAGTGCAGGACTTAACCGGTTAGCTCCGGGACGACACCCGAGCGGTTGGCACCCCAAGTCTGATCGCTTAGGGC
TAGGACTACCAGNGTATCTAATCCTGTTTGTCTCCCTAGCTTTCGTTCTCAGCGTCAAGTGTGATCCAGCTCAGCGCTTTCGCCAGGGGTTTCTGCGAGATATCTAC
GCATTTCT

>CUP2P4B03 Uncultured soil bacterium (Acidobacteria)

TGCTTTCGCGTTCAGCAGCAGCTTCTAGTACAGCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGTTCGATCTGATACGCCATTA
TAGCGATTCCAGCTTTCATGAGTTCGAGTTGACAGCTGCAATCCGAATGAGGGCGGTTTTTTCGATTAGCTCCCGCTCACGGGTTTCGCGACGGTGTGCGCGCGCAT
GTAGCACGTTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCTCTTCGTTATCCGGGCGAGTCTCTCTAGAGT

>CUP2P4B05 Uncultured bacterium (Acidobacteria)

GGCCTGGCTTCTTAGTGTGGTGGGATTTATACAGCTCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGTTCGATCTGATACGCCATTA
CTAGCGATTCCAGCTTTCATGAGTTCGAGTTGACAGCTGCAATCCGAATGAGGGCGGTTTTTTCGATTAGCTCCCGCTCACGGGTTTCGCAACAGTCTGTGCGCGGCTTGT
TAACAGTGTGTAGCCCTGGACATAAAGGGCTGCTGACTTGACGTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCTATAAGTCTCCCTTTCGCGGTAGCAACTA

CAGTAGGGTGCCTCGTGCGGGACTTAACCAAACTCACGGACGAGCTGACGACAGCCATGACGACCTCTACTACGGTCCCTTGGGGGAAGACGATGTTCCCGGTTGG
TCCGTAGCGGTTCAAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTGA

>CUP2P4B06 Uncultured bacterium (Alphaproteobacteria)

GACCTACGTGGCGGTGCTCCTGCGGTTAGCGCGCGCTTCGGGTAACAACCTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGCGGTGCT
GATCCCGGATTACTAGCGATTCCAACCTCATGCGCTCGAGTTGCAGAGCGCAATCCGAACCTGAGACGGCTTTTCGAGATTGCTAAGGGTCGCCCTTCGCTCCCGCT
GTCACCGCCATTGTAGCAGCTGTGTAGCCAGCCTGTAAGGGCCATGAGGACTTGACGTCATCCCCACCTTCCCTCCGGCTTATCACCGGCAGTCCCGCTGGAGTGCCCA
ACTGAATGATGGCAACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACCTGTGTTCCCGGCCCGG
AAGGGGAAGATCGCAATTTCTGCAATCCGTCAGGACATGTCAAAGCTGGTAAGGTTCTGCGCGTTCGCTCGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCGG
TCAATTCCTTGTAGTTTAACTTTCGACCGTACTCCCGAGCGGGATGCTTAAAGCGTTAGCGGCCACTGAAGAGCAAGCTCCCAACGGCTAGCATCCATCGTTT
ACAGCGTGGACTACCAGGATATCTAATCTGTTTGTCCCGACGCTTTCGCGTCTCAGCGTCAGTTCCGGGCCAGTGAGCCGCTTCGCCACTGGTGTCTTTCGCAATA
TCTACGAATTCACCTTACACTCGCAATTCACCTACCT

>CUP2P4B07 Uncultured bacterium (Acidobacteria)

CGGTTGAATCACCGGTTCTATACAACGGGCTTCGTGATGTGACGGGCGGTGTGTACAATGGCCCGGGAACGTTTACCCGCTGCTTGTGATCAGCGATTACTAGCGATT
CCAGCTTTCATGGAGTCGAGTTGCGAGCTCCAATCCGAACCTGAGAGTGGTTTTTGTAGATTGGCTCCCGCTCGCGGGTTTGGCATCTTGTGCCACCCATTGTAGTACGT
GTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCGACCTTCCCTCCGGTTTTTACCAGGCAGTCCCTTTAGAGTGCCGAGCTTGACCTGTTGGCAACTAA
AGGCAGGGGTTGC

>CUP2P4B08 Uncultured bacterium (Acidobacteria)

GATTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCGCATCGTTCGTGATACGCCATTACTAGCGA
TTCAGCTTTCAGCAGCGAGTTGACGCTGCGATCCGAACCTGAGACCGGTTTTTTCGATTGGCTCCCGCTCGCGGGTTTGCAGCGCATTGTACCGGCCATTGTAGCA
CGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCGACCTTCCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTGTATCTTTCGATGTGGCAACAC
AGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACCTCGACTGGACCCCTTGGGAGTAACCGTGTTC
CAGCATCGTTAGCCAGCGCTTCGAGCCAGGTAAGTTCCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCGGTCATTCCTTTGAGTTTC
AGCCTTGCAGCCGACTCCCGAGCGGCATACTTAACCGGTTAGCTCCGGCAGCAACCAATGAATGGCTCACACCAAGTATGCATCGTTTAGGGCGTGGACTACCAGG
GTATCTAATCTGTTTGTACCCACGCTTTCGTGCTCAGCGTCAGGGATGGTCCAGAAAGCTGTCTACACCACAGGTGTTCCCTCCCGATATCTACGCATTTT

>CUP2P4B09 Uncultured bacterium (Acidobacteria)

TCATGATGATACTTGGCGGTGCTCCTTGCGGTTAGCGCACCGACTTCTAGTACACCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCCG
CGCGTGTGATCCCGGATTACTAGCGATTCCAGCTTTCATGAAGTCGAGTTGCAGACTTCAATTCGGACTGAGACCGGCTTTTCCGGTTAGCTCCCGCTCGCGGGTTT
GCGACGGTTTGTACCGCCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCATCCCGACCTTCCCTCCCGTTTATCCGGGCGAGTTTCGCG
AGAGTCCCAACTAAATGATGGCAACTGGCAATAAAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACCTATGCA
GCACCCCTTTCGGGAAGGGATATTTACCCCGGTGCATGCAATTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCGCTTGTGCGG
GCCCGCTCAATTCCTTGTAGTTTACGCTTTCGACCGTACTCCCGAGCGGATGCTTATCGCGTTAGCTTCGGCAGCAGCGGATGGGTACCCGACACCAAGCA
TCACTGTTTAGGCTAGGACTACCAAGGTATCTAATCTGTTTGCCTCC

>CUP2P4B11 Uncultured alpha proteobacterium (Alphaproteobacteria)

GCTCCTTGCGGTTAGCGCGCGTCTCGGGTAAACCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCCGCGCGGTGCTTGTATCCGCGAT
TACTAGCGATTCCAACCTCATGCGCTCGAGTTGCAGAGCGCAATCCGAACCTGAGACGGTTTTTCGAGACTTGCTAAGGGTCGCCCTTCGCTCCCGCTGTCACCGCCA
TTGTAGCAGTGTGTAGCCAGCCTGTAAGGGCCATGAGGACTTGACGTCATCCCG

>CUP2P4B12 Uncultured bacterium (Acidobacteria)

TCCTTGGGTTAGCATGCAGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCGCATCGTTCGTGATACGCCATTA
CTAGCGATTCCAGCTTTCAGCAGCGGAGTTGACGCTGCGATCCGAACCTGAGACCGGCTTTTTCGATTGGCTCCCGCTCGCGGGTTTGCAGCGCATTGTACCGGCCAT
GTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCATCCCGACCTTCCCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTGTATCTTTCGATGTG
GCAACAGGACAAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACCTCGAGCAGCCCTTGGGAGTAAC
GTGTTTCCCGCATCGTTAGCCGCGGTTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCGGTCATTCCTTT
GAGTTTACGCTTTCGACCGTACTCCCGAGCGGCATACTTAACCGGTTAGCTCCGGCAGCAACCAATGAATGGCTCACACCAAGTATGCATCGTTTAGGGCGTGGAC
TACCAGNGTATCTAATCTGTTTGTACCCACGCTTTCGTGCTCAGCGTCAGGGATGGTCCAGAAAGCTGTCTACACCACAGGTGTTCCCTCCCGTATCTACGCATTT
CA

>CUP2P4C01 Uncultured bacterium (Betaproteobacteria)

GGTTAGGCAACCGGCTTCTGGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCGGTGACATGCTGATCCAGGATTACTAGCGAT
TCCGACTTCATGACAGTCCGGTTGACAGCTGCAATCCGGACTACGACCGGCTTTCAGGATTGGCTCCCGCTCGCGGGTTGGCAGCCCTTTGTACCGGCCATTGTATGAC
GTGTAGGGCCCTACCATAAAGGCCATGAGGACTTGACGTCATCCCGACCTTCCCTCCGGTTTGTACCGGCAGTCTCACTAGAGTGCCTTTCGTAGCAACTAGTGACA
AGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACCTGTGCCCCGCTCCCTTTCGGGCACTCCACATCTCTGCA
GGATTCGGGCAATGCAAGGGTAGGTAAGGTTTTTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTTAATCTT
GCGACCGTACTCCCGAGCGGTCGACTTACCGGTTAGCTTACCGAGAAATGAATCCGCAACTAGTGCATCGTTTAGGGCGTGGACTACCAGGATATCT
AATCTGTTT

>CUP2P4C02 Uncultured bacterium (Acidobacteria)

GGCGTCTGCTCCTTGCGGTCAGCGTGACGACTTCTAGTACAGTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCGCGTGCATCTGATAC
GCCATTACTAGCGATTCCCGCTTCATGACGTCGAGTTGACAGCTGCAATCCGAACCTGAGCAGAGTTTTTTCGATTAGCTCCCGCTCGCGGGTTGGCAACGGTTTTGTC
CCTGCATTTGAACAGCTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCATCCCGACCTTCCCTCCGGTTATCCGGAGCAGTCCACGATAGCTTCCCTTTC
CGAGTGGCAACTACGTGACGGGTTGCGCTCGTTGCGGGACTTAACCAACACTCACGACAGGCTGACGACAGCCATGACGCGCTTACTCCTGCTCCTTTCGGGG
AAGCCGATTTTCTACAGCTGTCAGAAGCATTTCCGACCCAGGTAAGGTTTCCTCGCGTACGCTCGAATTAACCCACATGTTCCACCGCTTGTGCGGGCCCGGTCAT
TCCCTTGTAGTTTTCAGTCTTGCAGCGTACTCCCGAGGTCAGGACTTAACCGGTTAGCTCCGGGACGACTTCCGAACGGAAGGCCACCCCAAGTCTGATCGTTTAGGGC
TAGGACTACCAGGATATCTAATCTGTTTGTCCCTAGCTTTCGTTCCCTCAGCGTCAGTAAGGTTCCAGCGCGCCGCTTTCGCCACG

>CUP2P4C04 Uncultured actinobacterium (Actinobacteria)

TTCAGCGGCTCCCTCCCTTGTGGGTTAGGCCACGGCTTCGGGTTGCTCCTCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCGCGGCACTG
CTGATCCCGGATTACTAGCAACTCCCGCTTCATGACAGTGGGTTTCAGCTTGAATCCGAACCCGAGACCGGCTTAAAGGATTTCGCTCCACCTCGCGGATTCGCAACCC
TTGTTACCGCCCAATGACAGCTGTGTAGCCCTGGACATAAAGGGCAATGACTGACTTACGCTCATCCCGACCTTCCCTCCGGTTTGTACCGGGCGCTTCGATGAGTCC
CAACTAAATGCTGGCAACATGCGACGGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGACACCCTGTGATCTGCCC
CGAAGGGAGACCGTGTTCACCGGCTGTCAGGAACATGCTCAAGCCAGGTAAGGTTTCCTCGCGTTCGCTCGAATTAACCCACATGCTCCCGTGTGTTGCGGGCCCGG
TCAATTCCTTTGAGTTTTCAGTCTTGCAGCGTACTCCCGAGGTCAGGACTTAACCGGTTAGCTCCGGGACGACTTCCGAACGGAAGGCCACCCCAAGTCTGATCGTTTAGGGC

>CUP2P4C05 Uncultured bacterium (Betaproteobacteria)

TACCTACTTCTGGTGCACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTTTACCGCGACATGCTGATCCCGGATTACTAGCAATTCGACTT
CATGACGTGAGTTGACAGCTGCAATCCGGACTACGACCGGCTTTCGAGGATTGGCTCCACCTCGCGGTTTGGCAACCCCTGTGACCGGCCATTGTATGAGCTGTGAGG
CCCTACCATAAAGGCCATGAGGACTTACGTCATCCCGACTTCCCTCCGGTTTGTACCGGAGTCCCTTCCCTGAGTCCCTTCCGTTAGCTGAGTCCCTTCCGTTAGG
GCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACCTGTGTTACGGCTCCCTTTCGGGACACCCCGCTTTCAGCGGGCTTCCG
TACATGTCAGGGTAGGTAAGGTTATTCGCGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGGTTAATTCCTTTGAGTTTTAATCTTGCAGCGCT
ACTCCCGAGGGGCAACTTACCGGTTAGTTCGCGTACTGAGAAATCGTTCCCAACACCTAGTTGTCATCGTTTAGGGCGTGGACTACCAGGATATCTAATCTGTT

TTGCTCCCCACGCTTTTCGTGCTGAGCGTCAATCTCAGCCAGGGGGTGCCTTCGCCATCGGTGTTCCGCCACATCTCTACGCATTTACTGTACACGTGGCATTCC
 ACCCCCTCTCGCGGATTCAAGTCCCATAGTTTCCACTGCAGTTCCCAAGTTAAGTCTCGGG

>CUP2P4C06 Uncultured bacterium (Acidobacteria)

CGCTCTGCCTCCTTGCGGTCAGCGTACGACTTCTAGTACAGTCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTGCATCTGATA
 CGCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACGTAGCAGAGTTTCTCCGATTAGCTCCCCCTCGCGGGTGGCAACGGTTGTG
 CCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCAATCCACCTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTT
 G

>CUP2P4C07 Uncultured soil bacterium (Não classificada)

ACCGCGCGTCTGATCCGCGATTACTAGCGATTCCAGCTTTCATGCAGTCCGGTTGCAGACTGCAATCCGAACGTAGGCGGGCTTTTTCCGATTAGCTCCCCCTCACGGG
 TTTGCGACGGTTTGTACCGGCCATCGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGAGGACTTGACGTCAATCCACCTTCTCTCCGTTATCCGGAGCGGTTC
 GCCAGAGTGGCCAACTAAATGGTGGCACTGGAAGTAAAGGTTGCGCTCGTTGCGGACTTAACCCAAC

>CUP2P4C08 Uncultured bacterium (Acidobacteria)

GGCTGCTCCTTGCGGTCAGCGCGGCGACTTCTAGTACAACCTCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTGCATCTGATA
 GCCATTACTAGCGATTCCGGCTTCATGCAGTCGAGTTGCAGACTGCAATCCGAACGTAGCAGAGTTTTCCTCGATTAGCTCCCCCTCGCGGGTGGCAACGGTTGTGTC
 CCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCAATCCACCTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTT
 CGAGTGGCAACTACGTGCAGGGTTCGCGTCTGTGCGGGACTTAACCCAACCTCAGCGCACGAGTGCAGACAGCCATGCAGCGCTATACCTGGTGTCCCTTGGCGG
 AAGCCGATTTCTACAGCTGTCACAGCATTTCCAGCCAGGTAAGTTCCTCGCGTACGCTGCAATTAACCCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAAT
 TCCCTTGATTTTCAGCTTTCGCGGACTTCCCGAGTCACTCCCGAGTGCAGGACTTAAGGCTTACGCTGAGGACTGAGGACTTGACGTCAATCCACCTTCTCTCCGTTATCCGGAGCGGTTC
 TAGGACTACCAGGTATCTAATCCTGTTTGTCTCCCTAGCTTTCGTTCTCAGCGTCACTAGTGGTCTAGCGCGACGCTTTCGCCACGGGTTCCTGCAGATATCTAC
 GCATTT

>CUP2P4C09 Uncultured bacterium (Não classificada)

TACTTCGGCTGCTACACAGGACTTCCGGTACTCCCACTCTCATCGTTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCAGCGTGTGATCTGCCATTAC
 AGCGATTCCGGCTTTCATGAGTCCGAATTCAGAGTCCCAATCTGAACGTAGGATGTTTTAGAGATTAGCTCCCCCTCGCGGGTGGCGACCTCTGTTCCACCCATTG
 TAACAGTGTGTGCGCCAGAGCATAAAGGCCGTAAGTACTGACTTGACGTCAATCCACCTTCTCTCGTTATCCAGGAGTCTCTCTAA

>CUP2P4C10 Uncultured bacterium (Gammaproteobacteria)

GTCAGGCTACTGCTTCTGGTGCAGTAGACTTCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGCAATGCTGATCTGCGATTACTAGCGATT
 CCGACTTCAATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGATAGATTTTCGGATTGGCTCCCGCTCGCGGTTGGCTTCCCTCTGTATCTACCATTTGTAGCAGC
 TGTGTAGCCCTGGTCAATAAGGCCATGATGACTTGACGTCAATCCCACTTCTCCCGTTTGTACCGGGCGGTCTCCTTAGAGTGGCCAAATGAATGCTGGCAACTAAG
 GACAAGGGTTCGCGCTCGTTGCGGGACTTAACCCAACTCTCAGGACAGAGTGCAGCACAGCCATGTCCTCTGGGCTCCTTCCGGACCCCTAAATCTCTT
 CAGGGTTCACAGGATGCAAGACCAGGTAAGTGTCTGCGTTGATCGAATTAACCCACATGCTCCACCGTGTGTCGGGGCCCCCGTCAATCTTTGAGTTTCAAC
 TTTCCGGCGGTTTCCCGGACTTCCCGGACTTAGCGGTAGCTTACGACTGCGAGGTTACCCTCTCAACGCTAGTTCCTCATCTGTTATGGCGTGGACTACCAGGGT
 ATCTAATCCTGTTTGTCTCCCGCGCTTTCGTGCTGACGTCGGTGTGACAGGAAAGCGCTTTCGCCACTGGTGTCTCTCCGATAT

>CUP2P4C11 Uncultured Acidobacteria bacterium (Acidobacteria)

CTCCTTGCGGTTAGCTTGGCGACTTCTAGTACAGCTCACTTTCGTGATGTGAGGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACGGCGTGCATCTGATAACGCCATTAC
 TAGCGATTCCGGCTTCATGAGTCCGATTCGAGACTGCAATCCGAACGTAGGCGCGTTTTTTCGATTAGCTCCCCCTCGCGGGTGGCAACGGTTGTAAACGGCATT
 GTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTCAATCCCACTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTTGGCAGTGGC
 AACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCAGCGCACAGGCTGCAGCACAGCCATGCAGCGCTATACTCCTGTCCTTCCGGGAAGGCGGT
 ATTTCTACAGTGGTTCAGAACATTTCCAGCCAGGTAAGTTCCTCGCGTACGCTGCAATTAACCCACATGTTCCACCGCTTGTGCGGGCCCCCGTCAATCTTTGA
 GTTTCAGTCTTGCAGCGTACTCCCGAGTGCAGGACTTAACCGTTAGCTCCGGGACGACACCCGAACGGGTGGGACCAAGTCTCTGATCG

>CUP2P4C12 Bacterium Ellin5239 (Acidobacteria)

GGTGGCTCACCGACTTCTAGTGAACCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGCATTCTGATCCGGGATTACTAGCGATT
 CCAGCTTCAATGATGTCGAGTTGCAGACTCAATCCGAACGTAGGCGCGGTTTTTCCGATTAGCTCCCCCTCACGGGTTGCGACGGTTGTACCGGCCATTGTAGCAGC
 TGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCAATCCCACTTCTCTCCCGTTTCCAGGCGGGTTCACAGAGTGGCCAACTTAATGATGGCAACTGGG
 GATAAGGGTTCGCGCTCGTTGCGGGACTTAACCCAACTCAGCACAGGCTGCAGCACAGCCATGCAGCACCTATATAGCGGGCCCCCTGCGGGGAAGGAATATTTCTA
 TCCCGTCCACTACATTTCCAGCCAGGTAAGTTCCTCGCGTTGCGTCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATCTTTGAGTTTTCAGC
 CTTGCGACCGTACTCCCGAGCGGACTGCTTAACCGGTTAGCTACGGCACGGCGGATTTGGTACCCTGCACCAAGCAGTCACTGTTTAGGGCTAGGACTAC

>CUP2P4D01 Uncultured candidate (Não classificada)

TTCCGGTGCAGCAACTCAAGTGCAGTGCAGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGGTTAGCTGACCGGGGTTACTAGCGATTCCGGCTTTCAGCAGG
 CGAGTTGAGCCTGCGATCCGAACGTAGAGACGGATTTCCTCGGATTGCCCTCCTCAGAGATCGGTCCCGTTTGTCTACCGTCCATTGTACCATGTTTGTAGCCAGGA
 TTAAGGGCCATGCTGACTTGACGTCACTCCACTTCTCCGAGTTACCCCGGAGTTTCCCGAGAGTCCCGGCTTACTGCTGGCAACAGGGGATGAGGTTGCGG
 TGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGTCAATCCCACTTCTCTCCCGTTTCCAGGCGGGTTCACAGAGTGGCCAACTTAATGATGGCAACTGGG
 GATGTCAAACCTGGTAAGGTTTACGGTTAGTACGATTAACAACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATCTTTGAGTTTCAACCTTGCAGCCGTTAC
 TCCCGAGCGGATACTTACTGCGTTAGCGGGGACCCGAGGGGTCGATCCCGGACACCTAGTATCCATCGTTTAGGGCTGGGACTACCGGGGATCTAATCCCGT
 TCGTCCCGCGGTTTCGCGCTCAG

>CUP2P4D02 Elizabethkingia meningoseptica (Flavobacteria)

CGGTACCGACTTCAGGTACCCCGAGCTTCCATGGCTTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGCCATGGCTGATGCGGATTACTAGCGATT
 CAGCTTCATAGAGTTCGAGTTGCAGACTCCAATCCGAACGTAGAGCCGGCTTTCGAGATTGTCATCCTATCACTAGGTAGTGCCTCTGTACCGGCCATTGTAGCAGCTG
 TGTGGCCCAAGACGTAAGGGCGGTGATGATTTGACGTCAATCCCACTTCTCTACTTGGCTAGGACGTTCACTAGAGTCCCTCAACTTAATGTTAGCAACTAGTGA
 CAGGGGTTGCGCTCGTTGCAGGACTTAACCTAACCTCAGGCACGAGGCTGACGACAACCATGCAGCACCTTGAAAAATGTCGGAAGAGGATCTATTTCTAAATCTG
 TCAATTCCTCAATTAAGTCTTGGTAAGGTTCTCGCGTATCATCGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATCTTTGAGTTTCACTTCTGCG
 AACGTACTCCCGAGTGGATTACTTATCACTTTCGCTTAGTCTGAACTCAAAACCCAAAAACAGTAATCATCGTTTACGGCTGGGACTACCAGGGTATCTAATCCG
 TGTTCCTCCCGCTTTCGCTCCTACGCTAGCTTAAGACTTGTGACTGCTCCGCAATTTGGTGTCTAAGTAATATCT

>CUP2P4D03 Uncultured bacterium (Acidobacteria)

TGTTTGATTAGGACTTCTAGTACAATCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCATATTCTGATACGCCATTACTAGCGATT
 CCAGCTTTCAGCAGCGGAGTGCAGCTGCGGATCCGAACGTAGAGCCGGTTTTTTCGATTAGCTCCCCCTCGCGGGTTCGAGCGNCTTTGACCGCCATTGTAGCAGC
 TGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACATCAATCCCACTTCTCTCAACTTATCGCTGGCGGTCTCCTGCGAGTGTCTCCGTTTAAACGGGAGTGGCAAC
 ACAGGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCAGCACAGGCTGACGACAGCCATGCAGCACCTCAGCTCAAGTCCCTTCCGGGAAAAACCATATT
 TCTACAGTGCATCTTAAGCGTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATCTCTTTGAGTT
 TCAGCTTTCGCGACTACTCCCGAGCGGACTTAACCGGTTAGCTCCGGCACGAAACAA

>CUP2P4D04 Bacillales bacterium Gsoil 1105 (Bacilli)

TGACCCACTTAGCGCGCTGGCTCCATAAAGTACTCCCGTTCGGTGTGCAACTCCCATGGTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGAATCACCGC
 GGCATGCTGATCCGCGATTACTAGCAATTCGGCTTCATGCAGCGGAGTTGCAGCTGCAATCCGAACGTAGCAGCGGCTTTATGAGATTAGCTCCACCTCACGGTCTCG
 CATCCCTTTGACCGCCATTGTAGCAGCTGTGTAGCCAGGACATAAGGGGACTGATGATTTGACGTCAATCCCGCTTCTCCGTTTGTACCGGCGAGTCCATTTG
 GATGCTCAACTAAATGTTAGCAACACAAATGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCAGCACAGGCTGACGACACCATGCAGCACCTGACCCACTGTCACC
 GCTGCCCGAAGGGAAGGCTTATCTTAAGCGGTCAGCGGATGTCAAGTCTGGTAAGGTTCTTCGCGTTGCTTCAATTAACCCACATGCTCCACTGCTTGTGCGG

GCCCCGTC AATTCTTTGAGTTTTCAGTCTTGGCAGCCGTA TCTCCCAAGCGGAGTGCTTAATGCGTTAGCTTCGGCACTGAGGGTGGTACCCCCAACACCTAGCACT
ATCGTTTACGGCGTGACTACCAGGGTATCTAATCTGTTTGTCTCCCAAGCTTTTCGCGCTCAGCGTCAGAAATCGGCCAGCAAGGCCCTTCGCCACAGGTTCTCT
CCACATCTCTACG

>CUP2P4D05 Uncultured bacterium (Acidobacteria)
CGTCTGATCTGATACGCCATTA TACTAGCGATTCCGGCTTCATGCAGTCGAGTTGACAGCTGCAATCCGAACTGAGCAGAGTTTTTCCGATTAGCTCCCCCTCGCGGGTTG
GCAACGGTTTGTGCCCTGCATTGTAACACGTTGTAGCCCTGGACATAAAGGCCATGCGGACTGACGTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCACAC
AGAGTCTCTCTTGGCAGTAGTAACGTGTGACAGGGTTGCGCTCGTTGCGGGACTTAACCCAAACCTCACGGCAGAGCTGACGACAGCCATGACAGCGCTATACTC
ATGTCCTTGGCGGAAGGCCATTTCTACAGCTGGTCATAAGCATTTCCAGCCAGGTACAGGTTCCCTCGCGTAGCCGTCGGAATGAACACATGTTCCACCGCT
TGTGCGGGCCCCGTC AATTCTTTGAGTTTACGCTCTTGGCAGCCCGTACCTCCCAAGGTGACGAGTAAACGCTTAGCTCCGGGACGACGCCGAAACGGCGGCA

>CUP2P4D06 Uncultured bacterium (Acidobacteria)
TGAGCATACTGGACGGCTGCTCTTTCGAGTTAGCACACCGGCTTCTAGTGCAGCCACTTTCTGTGATGTGACGGGGGGTGTGTACAAGGCCGGGAACGTATTAC
CGCAGCATTCTGATCTGCGATTACTAGCATTCCAGCTTCATGGAGTGGGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTCTCCGATTACCTCTCCCTCGCGGT
TCGGGACGGTTTGTACCGACCATTTAGCACGTTGTAGCCCTGGACATAAAGGCCATGAGGACTGACGTCATCCCCACCTTCTCCCGTTATCCGGGGCGGTTTCA
CTAGAGTGCAGGCTTACCCGATGGCACTAGGGATGAGGTTGCGCTCGTTGCGGACTTAACCCAACTCTCACGACAGAGCTGACGACAGCCATGACGACCTA
TACAGCAGTCTCTTGGCAGAAAAGGATGTTCCACCCCGGCTCCTGCATTTCCAGCCAGGTAAAGTTCTTCGCGTTGCGTCGAATTGAACACATGCTCCACCGCTT
GTGCGGGCCCCGTC AATTCTTTGAGTTTACGCTTTCGAGCCGTACCTCCCAAGCGGATTGCTTATCGCGTTAGCTGCGGCAGCAGGGGATGGGTACCCGCCACACC
AAGCAATCATGTTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGTCTCCCTAGCTTTTCGCGCACAGCGTCAGAAATGGTCCAGTGCAGCGCTTTCGCCACAG
GTGTTCTCCCGATATCTACGCATTTCCAC

>CUP2P4D07 Uncultured bacterium (Acidobacteria)
ACTATACTTGGACGGTACCCCTTGGCGGTTAGCGTACGGCTTCTAGTACAGTCCACTTTCTGTGATGTGACGGGGGGTGTGTACAAGGCCGGGAACGTATTACCCGAG
CGTGTGATCTGCGATTACTAGCGATTCCAGCTTCATGGAGTGGGTTGCAGACTCCAATCCGAACTGAGGTCGGCTTTTCCGATTAGCTCCCCCTCGCGGGTTTGG
ACGGTTTGTACCGACCATTTAGCACGTTGTAGCCCTGGACATAAAGGCCATGAGGACTGACGTCATCCCCACCTTCTCCCGTTATCCGGGGCGGTTTCTCTAGA
GTGCCAGCTTGACCTGATGGCAACTAGCGATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACAGAGCTGACGACAGCCATGACGACCTCCGCGAG
CGGCCCTTGGCGGGCCGATGTTTCCACCGGATTCACCTGCGCTTCGAGCCGTAAGGTTCTTCGCGTTGCGTCGAATTGAACACATGCTCCACCGCTTGTGCGGG
CCCCGTC AATTCTTTGAGTTTACGCTTTCGAGCCGTACTCCCAAGCGGATGCTTATCGCGTTAGCTTCGGCACGTCGGGATGGGTACCCGACACACCAAGCATC
CATAGTTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGTCTCCCTAGCTTTCTGCTCCCTCAGCGTCAGTTCGATCCAGCGAGCCGCTTCGCTCGGATGTTCC
TCCGATATCTACGCA

>CUP2P4D08 Uncultured bacterium (Alphaproteobacteria)
GGTTAGCGCACCGTCTTACAGTTAAAGCCAACTCCCATGGTGTGACGGGGGGTGTGTACAAGGCCGGGAACGTATCACCGCAGCGTGTGATCTGCGATTACTAGCGAT
TCCGACTTCATGTGCTGAGTTGCAGAGCACAACTCCGAACTGAGACGGCTTTTGTAGATTGCGCAGGATCAC TCCATTGCACTCCCATTTGCACCGCCATTGTAGCAGC
TGTGTAGCCAGCCCGTAAGGGCCATGAGGACTGACGTCATCCCCACCTTCTTCGCGCTTATCACCGGACGTCCTTCCCTAGAGTCCCACTGAATGATGGCAACTAA
GGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACAGAGCTGACGACAGCCATGACGACCTGTCCTCCGTTCCAGCGAACTGAAGGGATCGATCT
CTCGTTCCCGCGACCGGGATGTC AAGGGCTGGTAAGGTTCTGCGCGTTGCTTCGAATTAACCCAACTGCTCCACCGCTTGTGCGGGCCCGCTCAATTTCTTTGAGTTT
TAATCTTGGCAGCGTACTCCCAAGCGGATGCTTAAAGCGTTAGCTGCGCCACTGACGACAAAGCTTCGCCAACGGCTAGCATCCATGTTTACGGCGTGGACTACCAG
GGTATCTAATCTGTTTGTCTCCCAAGCGTTTCGCACATCAGCGTCAGTACCGGGCCAGTGGCGGCCCTTCGCCACTGGTGTCTTTCGCAATATCTACGAATT

>CUP2P4D09 Uncultured Termite group 1 bacterium (Não classificada)
TTTTATTGCGCAGCAGCGGCA TTTCCGTTGCAATGGGCTTTCGTTGTTGTGACGGGGGGTGTGTACAAGGCCGGGAACGTATTCACCGCTGCAATTTGCTGATCAGCGATT
ACTAGCGATTCCACCTTCCAGGGGGCGAGTTGACAGCCCGGATCTGAACTGAGGCGTAATTTGAGGATTGCTCCACCTTGGCGTCTTGTCTCCCACTGTTTACGCCAT
TGTAGCACGTTGTGATGCCCTGGACATTAAGGCCATGAGGACTGACGTCATCCCCCGGTTTCCACGTTATCCCGCGCAGCTCCCGAAGAGTCTCCCTTGGCAGGT
AGCAACATCGGATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACAGAGCTGACGACAGCCATGACGACCTCGGCTAGCTCCCTTGGCGGTCGCC
AATGTTTCCATCGGACTACTACTAGTCGTTTCGAGCCAGGTAAGTT

>CUP2P4D10 Uncultured bacterium (Acidobacteria)
ACAGCTCACTTTCTGTGATGTGACGGGGGGTGTGTACAAGGCCGGGAACGTATCACGGCGTCGATCTGATACGCCATTACTAGCGATTCCGGCTTTCATGCAGTCGAGTT
GCAGACTGCAATCCGAACTGAGCAGAGT TTTTCCGATTAGCTCCCGCTCGCGGGTTGGCAACGGTTTGTGCCCTGCAATGTAACAGTGTGTAGCCCTGGACATAAAG
GCCATGCGGACTTGCATCTCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCAGTACGAGTTCCCTCTTGGAGTGGAACTACGTGACGGGGT

>CUP2P4D11 Uncultured bacterium (Acidobacteria)
CTAGTACAATCCACTTTCTGTGATGTGACGGGGGGTGTGTACAAGGCCGGGAACGTATTCACGGCAGCGTGTGATCTGCCATTACTAGCGATTCCAGCTTTCATGCAGG
CGAGTTGACAGCTTACAACTCCGAACTGAGACCGGTTTTTTGCGATTGGCTCCCGCTCGCGGGCTTGCAGCGCTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCTGGAC
ATAAAGGCCATGAGGACTT GACGTCATCCCCACCTTCTCCAGCTTATCGCTGGCGGTCTCCTGCGAGTTCCGCTTCCGGCATGGCAACACAGGACAAGGGTTGCGCT
CGTTGCGGGACTTAACCCAACTCTCACGACAGAGCTGACGACAGCCATGACGACCTCGGCTGGACCCCTTGGCGGGTAGCGATGTTTCCACCGCCGGTAACCAGC
CCTTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTCGAATTGAACACATGCTCCACCGCTTGTGCGGGCCCGCTCAATTTCTTTGAGTTTACGCTTGCAGTGTACT
GCCAGGGCGCAATTTAACCGGTTAGCTCCGGCACGGTAACTGAATACCCACACCAAAATGTGATCTGTTTAGGGCGTGGACTACCAGGGTATCTAATCTGTTTGT
GTACCCAGCTTTCTGTCTCAGCGTACGTTACGTTCCAGAGAGCCGCT

>CUP2P4D12 Uncultured bacterium (Acidobacteria)
GGGCATACTTGGCGCTGGCCTCTTTCGCGTTGGCTCGGGACTTCTAGTACAGCTCACTTTCTGTGATGTGACGGGGGGTGTGTACAAGGCCGGGAACGTATCACGGC
GTGATCTGATACGCCATTACTAGCGATTCCAGCTTCATGCAGCCGAGTTGCAGACTGCAATCCGAACTGAGCGCGGTTTTTTCCGATTAGCTCCCCCTCGCGGGTTTCG
CAACAGTCTGTGCGCGCATTTGTAACACGTTGTGAGCCCTGGACATAAAGGCCGTGCTGACTTGCAGCTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCATGTA
GAGTTCTCCCTTGGCGGTAGCAACTACTAGTAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCACGGCACAGCTGACGACAGCCATGACGACCTCTACTAC
TGTCCCTTGGCGGAAGCAGATGTTTCCACCGTTGGTCAGTAGCGGTTAAAGCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGAACACATGTTCCACCGCTTGTGCG
GGCCCCGTC AATTCTTTGAGTTTACGCTTTCGAGCCGTA TCCCAAGCGGACTTAACCGGCTTAGCTGCGGGACGACCCGCTACGCGGGCCATCCCAAGTCT
GATGTTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGTCTCCCTAGCTTTCTGTTCTCAGCGTCAGTTCGCGTCCAGCGAGCCGCTTCGCCACGGGTTCTC
TGCCGATATCTA

>CUP2P4E02 Uncultured bacterium (Acidobacteria)
CCCCGTAAGGTTGGCAGCAGATTCTAGTACAGCCACTTTCTGTGATGTGACGGGGGGTGTGTACAAGGCCGGGAACGTATTCACGGCGCGTCTGATGCGCCAT
TACTAGCGATTCCAGCTTCAATGCAGTTCAGACTGCAATCCGAACTGAGCGCGCTTTTTTTCGATTAGCTCCCCCTCACGGGTTCCGCGACGCTCTGTGCGCGC
ATTGTAACAGTGTGTGGCCCTGGACATAAAGGCCATGCTGACTGACCTCATCCCCACCTTCTCTCCGTTATCCGGAGCAGTCCCTCATAGAGTTCTCCCTTGGCGGT
AGCAACTATGAGTAAGGTTGCGCTCGTTGCGGGACTTAACCCAACTCACGGCACAGGCTGACGACAGCCGTCAGCAGCTCTACACAGGTCCTTGGCGGAAGTC
TCTGTTTCCA

>CUP2P4E03 Uncultured bacterium (Alphaproteobacteria)
TGATCTACGTTGGCGGTTCTGCGGTTAGCGCACCGCTCTTAAGGTTAAACCAATCCCATGCCGTGACGGGGGGTGTGTACAAGGCCGGGAACGTATCACCGCAGCGCTG
CTGTTCTGCGATTACTAGCGATTCCACCTTCTATGACTCGAGTTGCAGACTGCAATCCGAACTGAGCGCGCTTTTTTTCGATTAGCTCCCCCTCACGGGTTCCGCGACGCTCTGTGCGCGC
GTACCGCCATTGACGAGCTGTAGCCAGGTTGTAAGGCCATGAGGACTGACGTCATCCCCACCTTCTCCCGTTATCCGGAGCAGTCCCTCATAGAGTTCTCCCTTGGCGGT
AACTGAATGATGGCAACTAAAGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCACGACAGCA

>CUP2P4E04 Uncultured bacterium (Acidobacteria)

TTCTAGTACAACCCACTTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTTTTCACGGCGTCTGTGATACGCCATTACTAGCGATTCCGGCTTCATGCGAT
 CGAGTTGCAGACTGCATCCGAATCAGACTGAGCATGGTTTTTCCGATTAGCTCCCCCTCGCGGGTTGCGCAGCGTTTGTACCATTGATTAACACGTTGTAGCCCTGGAC
 ATAAAGCCCGTGTACTGACCTGACCTCCCACTTCCCTCCCTCCNGTTATCTCCCTGGAGCAGTCTCTTAGAGTCCCCCTTGCGGGTGCAACTAAGAGTAGGGGTTGCGC
 TCGTTGCGGGACTTAACCAACACCTCACGGCAGGCTGACGACAGCCATGACGACCTTACCCTGTCCTTGCGGGAAGCGGTTTCCACCCTGGTACCAGG
 CACTTCGAGCCAGGTAAGTTCCTCGCTTTCGCTCGAATTGAACACATGTTCCACCCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTACGCT

>CUP2P4E06 Uncultured bacterium (Acidobacteria)

GTACATACTTGGCGCTGCCTCCTTGCCTTAGCGTGGCGACTTCTAGTACAGCTCACTTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTTTACGGCGT
 CGATCTGATACGCCATTACTAGCGATTCCGGCTTCATGCACTCGAGTTGACAGCTGCAATCCGAACCTGACGAGATTTTTCCGATTAGCTCCCCCTCGCGGTTGGCA
 ACGGTTTGTGCCCTGCATTGTAACACGTTGTGACCTGGACATAAAGGCCATGCGGACTTACGCTCATCCCACTTCCCTCCGATCCGGAGCAGTCCACACAGAT
 CCTCTCTGCGATATAACTGTGTGACGGGGTTGCGCTCGTTGCGGGACTTAAACCAACACCTCACGGACTGACAAGCCATGACGCGCTATACTAGTGTCCCTTGG
 GGAAGCCGATTTCTACAGCTGGTCACTAG

>CUP2P4E07 Uncultured bacterium (Acidobacteria)

GGTTAGCGTGACGACTTCTAGTACAGCTCACTTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTTTACGGCGTGCATCTGATACGCCATTACTAGCGA
 TTCCGGCTTCATGCACTCGAGTTGACAGCTGCATCCGAACCTGACGAGATTTTTTCCGATTAGCTCCCCCTCGCGGTTGGCAACGTTTGTGCCCTGCATTGTAACA
 CGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTACGCTCATTTCCCACTTCCCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTTGTGCGAGTGGCAACTAC
 GTGACGGGTTGCGCTCGTTGCGGCTTAACCAACACCTCACGGCAGGCTGACGACAGCCGTGACGCGCTATACTCTCCCTTGCGGGAAGCGGTTTTCCT
 ACAGCTGTGACAGCATTTCGAGCCAGGTAAGTTCCTCGCTGAGCTGCAATTGAACACATGTTCCACCCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCA
 GTCTTGCAGCCGTTACCCAGGTGACGACTTAAACCGTTAGCTCCGGGACGACTTCCGAACGGAAGGCACCCCAAGTCTGATCGTTTAGGGCTAGGACTACCAGN
 TATCTAATCCCTGTTTGCCTCCCTAGCTTTCGTTCC

>CUP2P4E08 Uncultured bacterium (Não classificada)

GGCTCCGCTCCTCACGGGTTGCGCCAGCGACTTCCGGGAGCACCAGACTCGGGTGTGTGACGGCGGTGAGTGAAGGCCCGGGAAACGTTTACAGCGAGTGTGCTGACC
 TCGGTTTACTAGCAACTCCGACTTCATGCTGGCGAGTTGACGCAACAATCCGAACCTGACAGCGGTTTAAAGGATTGCCTTACGCTCGCGGTGCGGAACCCGTTGTG
 CCGGCCATTGTAGCGTGTGTGACCCCTGGACATAAAGGCCATGCGGACTTACGCTCATCCCACTTCCCTCCGGTTTGCGCCGGCAGTCCCTAGAAAAATCAACT
 AAGGACAGGGGTTGCGCTCGTTGCGGGACTTAAACCAACACCTCACGGCAGGCTGACGACAGCCATGACCCACTGTGTAGAAAACCTTTCGCGAGGGCGCTGACTT
 T

>CUP2P4E09 Uncultured bacterium (Betaproteobacteria)

ACGTGGTATCGCCTCCTTGCCTTAGGTACTTCTGGTAAAGCCACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTTTACCCGCGCATGCTGAT
 CCGGATTACTAGCGATTCCAGCTTACAGTGTGAGTTCAGACTACGATCCGACTACGATGCAATTTTCGGATTAGCTCCACCTCGCGCTTGGCAACCCCTCTGT
 ATGCACCAATTGATGACGTGTGAAGCCCTACCCATAAAGGCCATGAGGACTTACGCTCATCCCACTTCCCTCCGGTTTGTACAGCTGGCAGTCTCTTAGAGTGCCTT
 TCGTAGCAACT

>CUP2P4E10 Uncultured bacterium (Alphaproteobacteria)

TCCCGCGGTCGCGCCAGGGTTGCGCACCAGCCCTTCGGGTAAGCCAACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTTTACCCGCGCATGCTG
 ATCCGCGATTACTAGCGATTCCGACTTCATGCTTCGAGTTGACAGAGCAATCCGAACCTGACAGCGGTTTTCGATTGCGCTCCCGCTTTCGAGATTGGCGTAGGGTCCGCCATTCCCGCTCTG
 TCACCGCCATTGTAGCAGTGTGTAGCCAGCCATAAAGGCCATGAGGACTTACGCTCATCCCGCTTCCCTCCGGTTTGTACCCGGCAGTTTCTGCAAAAGTCCCGG
 CTTGCGCGATTGGCAACTGCAGATGGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACACTGTGTCGCGCCAGCC
 GAAGTCAAGGCGGCTCTCTCGGCCCAACCGGCATGTCAAGAGTTCGTTGCGGCTGCAATTAAACCAACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
 CGTCAATTCCTTTGAGTTTAACTTGCGCCGTTACTCCCAAGCGGTGTGCTTAAAGCGTTTGCGGCAGACCCGAAGGCTGCGCTCCCAACGCTTAGCACACATCG
 TTTACAGCGTGGACTACCAGGTATCTAATCCTGTTTGTCTCCC

>CUP2P4E11 Uncultured bacterium (Acidobacteria)

GGGTTAGCTGCAGACTTCTAGTACAACCCACTTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTTTACCGGTATCGTTCTGATATACCATTACTAGCGA
 TTCCAGCTTCATGACGGCGAGTTGACAGCTGCATCCGAACCTGAGAACGTTTTCGATTGCTCCCGCTCGCGGTTGGCTCCGTTTGTACCCGCCATTGTAGCA
 CGTGTGTAGCCCTGGACATAAAGGCCATGATGACTTACGCTCATCCCACTTCCCTCCAATTATCGTGGCGGTCTCCTGAGAGTGTCTCCTTGGGGATTAGCAACAC
 AGGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACCTCGACTCGACTCCCTTGCGGGATAGAAGTGTTC
 CACTCCGTTAGCAACCTCTCAGGACAGGTAAGTTCCTCGCGTTGCGGCTGCAATTAAACCAACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTT
 AGCCTTGCAGCCGTTACTCCCAAGCGGCACACTTAAACCGTTAGCTCCGGCAGAACGAAATGAATCGCTCACACCAAGTGTGATCGTTTAGGGCTGGACTACCAGG
 GTATCTAATCCTTTGTTGTTCCCAACGCTTTCGCTGCTCAGCGTCACTGCTGCTGAGTAAAGCGCTTACACCGCTGGTGTCTCCCGATATCTACGCATTACCCG
 TACACCGGAATTCGCTTACCTTCCCACTTCCAGCCCCGA

>CUP2P4F01 Uncultured bacterium (Alphaproteobacteria)

AACTCCCATGGTGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTTTACCCGACGCTGCTGATCTGCGATTACTATGCGATTCCAAGCTTCAATTGTGCTCGNAGTTG
 CAGAGCACAATCCGAACCTGACAGCGGTTTTTGTAGATTGCGCAGGGTTTCCCATTTCCGTTCCCATTTGTACCCGCCATTGTAGCAGCTGTGTAGCCAGCCTGTAAGTGG
 CCATGAGGACTTGCAGTCACTCCCACTTCTTCGCGGCTTATCACGGCAGTCCCTTAGAGTACCAACTAAATGATGGCAACTAATGGCGAGGGTTGCGCTCGTTG
 GGGACTTAAATCAACATCTCAGGACAGGCTGACGACAGCCATGACCACTGTCTCCGCTCCGCTCCGCAACCTGAGAGGCTCCATCTCTGGTCCCGCGCAACGGGAT
 TCCAAGGCTGGTAAGTTCCTGCGGTTGCTTCAATGAACCAATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTAACTTTCGACCGTACTC
 CCCAGCGGGATGCTTAAATGCGTTAGCTGCGCCACTGACGAGTAAACCCGACAAAGGCTAGCATCCATCGTTTACCGTGTGGACTACCAGGGATCTAATCCTGTTG
 TCCCAACGCTTTCCGACCTTACGGTCACTACCCGCGCTGACGCGCTTCCGCAATATCTACGA

>CUP2P4F02 Uncultured bacterium (Acidobacteria)

ACTTGGGCGGTGCGTCCCTTGCCTTTCGCGCACGACTTCTAGTACAGTCCACTTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGGACGTTTACCCGACGCTTCT
 GATCTGCGATTACTAGCGATTCCAGCTTCATGGAGTTGGGTTGCGACTCCAATCCGAACCTGAGGCGGGTTTTTCCGATTAGCTCCCCCTCGCGGTTTTCGCGAGGTT
 TGTACCGGCCATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTACGCTCATCCCACTTCCCTCGCGTTATCCGGCGCAGTTTCGCTAGAGTGGCC
 GGCTTACCCGATGGCAACTAGAGATAAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACCTCCGACGCGGCC
 TTGCGGGCGGGGATGTTCCACCCATTCCACTGCGCTTCGAGCCAGGTAAGTTCCTCGCGTTGCGTCAATGAACACATGCTCCACCGCTTGTGCGGGCCCCCG
 TCAATTCCTTTGAGTTTACGCTTGCAGCCGTTACTCCCAAGCGGGATGCTTAAACCGTTAGCTGCGGCAGATCCGATTGGGTACCAGATCACACCAAGCATCCATAGT
 TTAGGGCTAGGACTACCAGGGATCTAATCCTTTGCTCCCTAGCTTTCGCGCTCAGCGCTACGCTCAGTTGTGGT

>CUP2P4F03 Uncultured bacterium (Acidobacteria)

ACTTCTAGTACAGTCCACTTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAAACGTTTACCCGACGCTTCTGATCTGCGATTACTAGCGATTCCAGCTTTCATGG
 AGTCCGGTTGACAGCTCCAACTCCGAACCTGAGTTCGCTTTTTCGATTAGCTCCCCCTCGCGGTTTTCGACAGGTTTGTACCGACATTGTAGCAGCTGTGTAGCCCTG
 GACATAAAGGCCATGAGGACTTACGCTCATCCCACTTCCCTCGCGTTATCCGGCGCAGTTTCGCTAGAGTGGCCGGCTTACCCGATGGCAACTAGAGATAAGGGTT
 GCGCTGTTGCGGGACTTAAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACCTCCGACGCGGGCTGAGGGGCGCGATGTTTCACCGGATTCACCT
 GCGCTTCGAGCCAGGTAAGTTCCTGCGGTTGCGTCAATGAACACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTACGCTTTCGACCGTTA
 CCCCCAGCGGGATGCTTATCGCTTAGCTTCCGACAGCCGATTGGGTACCGG

>CUP2P4F04 Uncultured bacterium (Planctomycetia)

CGTCCGCGCTTACCCTTTCGCGTTGGCAGCGGATTCGATGCCCCGATTTTCGTGGCTTACGGGCGGTGTGTACAAGGCTCAGGAACACATTCACCGCAGTGTGG
 TGACCTGCGATTACTAGCGATTCCAACCTTCATGAAGCGAGTTGACGCTTCAATCTGAACTGGGGCGTCTTTTGGGATTGGCTCCCGCTCGCGGTTTGTCTCCCT
 TCTCCACGCCATTGTAGCAGCTGTGACGCGCTGGGCATAAAGGCCATGAGGACTTACGCTCATCCCGCTTCCCTCCGTTTAAACACCGGCGAGTCTCCAGAGTCCC
 CGCATGACCCGCTGCAACTGAGACAGGGGTTTCGCTCGTTACGCGACTTAAACGCAACATCTCACGACAGGCTTACGACAGCCATGACGACCTGTGGTAGGTT
 CGGACTGGATACCGTTGGGGTAAAGTTTCCGACCCCTACTTCTACCCCTTTCGGACATGTAAGCCAGGATAAGGTTCTTCGCTGAGCTCGAATTAAGCCACATGC

TCCACCCTTGTGTGAGCCCGGTCAATTCCTTTGAGTTTCAGCCTTGGCACCATACTCCCCAGGCGGGTACTTAACACTTTTGCTTCGGCAGTGAACCCATGTTAAG
TCCACTACCAGTACCACATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCC

>CUP2P4F05 Uncultured bacterium (Acidobacteria)

GCCTGCTCCTTGGCGCAGCGCGGCGACTTCTAGTACAACCTCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTCGATCTGATAC
GCCATTACTAGCCGATTCCGGCTTCATGCGAGTGCAGACTGCAACATCCGAACCTGAGCAGAGTTTTTCCGATTAGCTCCCCCTCGCGGGTTGGCAACGGTTTGTAC
CCTGCATTGTAACAGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGACGTATCCCCACTTCTCTCCGTTATCCGGAGCAGTCCACACAGAGTCTCTCTTG
CGAGTAGTAAGTGTGTCAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACCTCACGGCAGAGCTGACGACAGCCATGACAGCCGCTATACTAGTGTCCCTTGGCGG
AAGGCCGATTTCACAGCTGTGCACTAGCATTTCAGCCAGGTAAGTTCCTGCGCTAGCGTGAATTGAACACATGTTCCACCGCTTGTGCGGGCCCGGTCAAT
TCCTTTGAGTTTACGTTTGGCAGCTACTCCCAGGTGCAGGACTTAACGCGTTAGCTCCGGCAGCACCCCAACGGGTGGCACCCCAAGTCTGATCGTTTAGGG
TAGG

>CUP2P4F06 Uncultured bacterium (Actinobacteria)

GTTGCGCTCGTTGGCGGACTTAACCACTTACAGACAGGAGTGCAGACAGCCATGCACCACCTGTGACTAGCTCCGAAGGGGGACCGTATTTCTACGGTTTTCCAGT
GCATGTCAAGCCCTGAGTTAGGTTCTTCGGTTCAGCAATTAACCAACATGCTCCGCTGCTTGTGCGGGCCCGCAATTCCTTTGAGTTTTAGCCTTGGCGCGTA
CTCCCAGGCGGGGACTTAATGCGTTAGCTTCGGCAGCGGGAGTGCACACCGCCACACCTAGTGCCTCGTTTACGGCGTGGACTACCAGGGTATCTAATCCCTG
TTGCTCCCCACGCTTTCGGCTCAGCGTACAGTACCGTCCCAGAGACCGCCCTTCCGACGGGTGTTCTTCCGATATCTGCGCATTTCACCGCTACACCGGGAATTC
CACTCTCCTTCCCGACTTAGCCAAACGGTTTCCAGCCACTCTCAGGTTCCGAGGTTCCGCGCTAGCGTGAATTTCACAGCGGACCTGCTTGGCCGCTACACGCTCTTTACGCCA
ATGAATCCGGACACGCTTGCCCTTACGTAATTACCGGGCTGCTGCAGTCACTAGTCA

>CUP2P4F07 Bradyrhizobium japonicum (Alphaproteobacteria)

CTGACCTACGTGGCGGCTGCTCCCTTGGCGTTTACGCACCGTCTTCAAGTAAAGCAACTCCATGTTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGT
GGCGTGTGATCCACGATTACTAGCGATTCCAACCTCATGGGCTCGAGTTGCAGGGCCCAATCCGAACCTGAGACGGCTTTTTGAGATTGTCTAGGACTTGGCTCTCCG
TTCCATTGTACCGCCATTGTAGCAGTGTGTAGCCAGCCCGTAAGGGCCATGAGGACTTGACGTATCCCCACTTCCCTCGCGCTTATCCCGGAGTCTCCCTTA
GAGTGTCAACTAAATGGTAGCAACTAAGGACGGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACACGAGCTGACGACAGCCATGACGACCTGTGTTT
CAGGCTCCGAAGAGGGTCACTCTCTGCGACCGGCTTGGACATGTCAAGGGCTGGTAAGGTTCTGCGCGTGTGCGCAATTAACCCACATGCTCCACCGCTTGTG
GGCCCGGCTCAATTCCTTTGAGTTTTAATCTTGGCAGCCGACTCCCCAGGCGGAATGCTTAAAGCGTTAGCTGCGCCACTAGTGAAGTAAACCCACTAACCGCTGGCAT
TCATCGTTTACGGCGTGGACTACAGGGTATCTAATCCTGTTTGTCTCCCGCAGCTTTCGTGCTCAGCGCCAGTATCGGGCCAGTGAAGCCCTTCGCCACTGTTGTT
TTGCAATATCTACGAATTTACCTCTACACTCGAGTTCAATCACCTCTCCCGA

>CUP2P4F08 Uncultured soil bacterium (Não classificada)

ACTTCTAGTACAGTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCAGCGTGTGATCTGCGATTACTAGCAACTCCGGCTTCCG
CAGCGGGTTGACGCTGCGATCCGAACCTGAGACCGGCTTGGGGATTGGCTCCCGCTCGCGGTTGGCCACCCATTGCGCCGCGCATTTGAGTGTGTGTAGCCCCA
GACGTAAGGGCCGTGCTGACTTACATCATCCCCACTTCTCCGCGTTGCGCGCGGAGTCCGGCCGAGGGGACCGCGGGTTACCCAGCGCCAAACCGCCAGG
GTTGCGCTCGTT

>CUP2P4F09 Uncultured alpha proteobacterium (Alphaproteobacteria)

GACTTACGTGGTGGTACTCCCTTGGCGGTTAAGCACCAGGCTTCCGGTAAACCAACTCCATGTTGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGG
GCATGTGATCCGCGATTACTAGCGATTCCGACTTTCATGCTCCCGAGTTGCAGAGAGCAATCCGAACCTGAGACGGCTTTTTGAGATTAGCTTGGCATCGCTCGCC
GCCTCTGTACCGCCATTGTAACACGTTGTAGCCAGCCATAAGGGCCATGAGGACTTGACGTATCCCCGCTTCCCTCGCGCTTGTACCGCGGAGTTTCTGCAGA
GTGCCAGCGCTACCTGATGGCAACTGCGAGTGGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACACGAGCTGACGACAGCCATGACGACCGCTGTGTT
CCGCCAGCCGAAGTGAAGGACCGGATCTCTCCGGACCACCGGACATGTCAAGGGCTGGTAAGGTTCTTCCGCTTGGCTGCAATTAACCCACATGCTCCACCGCTTGT
GCGGGCCCGCTCAATTCCTTTGAGTTTTAATCTTGGCGCGTACTCCCGAGCGGTTGCTTACCAGCTTGTGCTGCGACACCGAAAGGCTAGGCTCCCAACGCTTAC
CACACATCGTTTACAGCGTGGACTACAGCGTATCTAATCCTGTTTGTCTCCCAAGCTTTCGCGCCTCAGCGTCAAGTCCGGTCCAGAGAGCC

>CUP2P4F10 Uncultured Acidobacteria bacterium (Acidobacteria)

ACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACGGCGTGCATCTGATACGCCATTACTAGCGATTCCGGCTTTCATGAGTCCGAGTTG
CAGACTGCAATCCGAACCTGAGCGCGCTTTTTTCCGATTAGCTCCCTCTCGCGAGTTGGCAACGGTTTGTAAACCGCATTGTAACAGTGTGTAGCCCTGGACATAAAGG
CCATGCGGACTTGCAGTATCCCCACTTCTCTCCG

>CUP2P4F11 Bacterium Ellin5239 (Acidobacteria)

TTAGCTCACCGACTTCTAGTGCACCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCCGGGAACGTATTCACCGCGGCTTCTGATCCGCGATTACTAGCGATT
CAGCTTTCATGCAAGTGCAGTGCAGACTGCAATCCGAACCTGAGGCGCGGTTTTTCCGATTAGCTCCCGCTCAGGGTTTGGCAGCGTTTGTACCGGCGATTGTAGCAGCT
GTGTAGCCCTGGACATAAAGGCCATGAGGGCTTGACGTATCCCCACTTCTCTCCGTTTATCCGAGGGCGGTTTCCACGAGTGCACCACTAAATGATGGCAACTGGG
ATAAGGGTTGCGCTCGTTGCGGGACTTAGCCCAACATCTCACGACAGAGCTGACGACAGCCATGACGACCTATACAGCAGCCCTTGGGGGAAGGAATATTTCTAC
TCCGTTCCACTGCATTTCCAGCCAGGTAAGGTTCTTCCGCTTGGCTGCAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCGCTCAATTCCTTTGAGTTTACG
TTGCGACCGTACTCCCAGGCGGACTGCTTAACGCGTTAGCTACGGCAGCGGGGATGGGTACCGCTCAGCAACAGCAGTCACTGTTTAGGGCTAGGACTGCCAGGGT
ATCTAATCCTGTTTGTCTCCCTAGCTTTCGTGATCAGCGTCAAGTATGGTCCAGTGAAGCGGCTTTCGCCACAGGTG

>CUP2P4G01 Uncultured bacterium (Acidobacteria)

CCCGGGAACGATATCACCGCGGCTGCTGATCCGCGATTACTAGCGATTCCAACCTTCGAGCAGCGAGTTGCAGCCTGCTATCCGAACCTGAGACCGACTTTCCTCCGATTA
GCTCCACTTGGGTTATCCGCGAGGTTTGTATCCGCCATTGTAGCAGCTGTGAGCCCAAGACATAAAGGCCATGCTGAGCTTGTATGTCATCCCATCTTCTCCGTTTT
ATCACCGGAGTCTCTGAGAGTCCCGAGCTTAACCTGATGGCAACAGCAAAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACAGAGCTGACGAC
AGCCATGACGACCTCTACGAGTGTCTTGGGGAAGCCCTTTCGGAGGATGCTACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCCGCTTGGCTGCAATGAACCACA
TGCTCCACCGCTTGTGCGGGCCCGCTCAATTCCTTTGAGTTTACGCTTTCAGCCCTGACCGTATCCCGGCGGAAATGCTTAAAGCGGAAATGCTTAAAGCGGAAATGAC
TACCCGCCACCAAGCATTATCGTTTAGGGCCAGGACTACCGGGTATCTAATCCGTTTGTCTCCCTGGCTTTCGCTCATCAGCGTCAAGTGTGGTCCAGGATG

>CUP2P4G02 Burkholderia tropica (Betaproteobacteria)

GGTGTGTACAAGACCCGGGAACCTATCACCGCGCATGCTGATCCCGGATTACTAGCGATTCCAGCTTACGCGAGTGCAGTTGACAGCTGCGATCCGGACTACGATCGG
TTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCTCTGTTCCGACCATGATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTGACGTATCCCGACT
TCTCTCCGGTTTGTACCGCGAGTCTCCCGGAGTGTCTTTCGCTAGCAACTGAGGGGACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACAGAGCT
GACGACAGCCATGACGACCTGTGTTACGGCTCCCTTTCGGGACCCCACTCTCAGCAGGGTTCCGTACATGTCAGGGTAGGTAAGGTTTTGCGCGTTGCATCGAA
TTAATCCACATCATCCACCGCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTAAATCTTGCAGCCGACTCCCGAGGGGCTCAACTTACCGGTTAGTACGTTACCA
AGTCAATGAAGCCCGCAACAGTGTGACATCGTTTAGGGCGGTGAGTACAGGTTATCTAATCCTGTATGCTCCCGCGGTTTCGTCATGAGCGCCAGTATTGAC

>CUP2P4G03 Uncultured Rubrobacteridae bacterium (Actinobacteria)

CATCATCGACTACTGACGGCTCCTCCCTCGCGGGTAGGCCAGCGCTTCCGGTATTGCCGACTTCTGTTGTTGACGGGGCGGTGTGTCAGGCCCGGGAACGTATCACCGC
GGCGTTGCTGATCCCGGATTACTAGCAACTCCGACTTTCATGGAGGCGAGTTTACGCTCCAACTCCGAACCGGGACCGGCTTTTTGGGATTGCTCCCGCTCGGGGTTT
GCAGCCCTTTGATCCCGGCAATGACACGTTGTAGCCCTGGACATAAGGGCTATGCTGACTTGACGTATCCCCANCTTCCCGGATTGTCACCGGCGAGTCTCCCA
TGACTCCCGGTTTACCTGCGCAACTGGGACAGGGGTTGCGCTCGTTGCGGACTTAACCCAACTCTCACGACAGAGCTGACGACAGCCATGCAACACTGTGCG
ACGAGCCCGGAAGGGTGCCTATTTCTACGACACTCCCGTGCATGTCAGCCCAAGGTAAGGTTCTTCCGCTTGGCTGCAATTAACCCACATGCTCCGCTGCTTGTGCG
GGCCCGCTCAATTCCTTTGAGTTTACGCTTGGCGGCTACTCCCGAGGGGCTTAAAGGTTAGCTTGGCAGAGGAGTGCAGAACCTCCCAANCTAGCA
CCCATCGTTTACGGCGTGGACTACAGGATCTAATCCTGTTGCTCCCGAAGCTTTCGCGCTCC

>CUP2P4G04 Uncultured bacterium (Não classificada)

CATCTGCCCTGACGGTTGGCCAACGGCTTCCAGTGTTCGGCTCCCATGGTGTGACGGGGGGTGTGTGACGGCCGGGAACGTATACCCGTGGTGTGTGACCCACGGG
 TTAAGTACCACTCCTGGCTTACGGCAGGGGAGTTGACGCTACCACTCCGAACCTGAGACGGCTTGGGGGATTGGCTCCGCTCGCAGCTTGGCAACCCATTGTACCCGGC
 CATTGTAGCGTGTGTGTCGCCCTGGACGTAGGGCCGTGCTGACTTGACGTCACTCCCACTTCTCCGGTGTGGCGGGCAGTCCGGCCCGAAAGTCCCAACGGACC
 CCAGGGGTTGCTCTCGTTAGGGGACTTAACCAATCACCTCACGGCAGGAGTGCAGACAGCCATGCAGCACCTGTGGAGCCGCGCAACGGGACAGGGCATTACCC
 CTGGTCAACTCCATGTCAAACCCAGGTAAGGTTCTTCGCGTGCATCGAATTAACCAACCGCTCCGCTGCTTGTGCGGGCCCGCTCAATTCTTTGAGTTTTAACC
 TTGGCGCCGTACTCCCCAGCGGTCCACTCATACGTTAGCTTCCGACCGAAGGGTTCGATACCTCCAAGCACCTGGTGGACATCGTTT

>CUP2P4G05 Uncultured soil bacterium (Betaproteobacteria)

ACCAGTCATGAAGCTCACGTGGTAGGCGGCTCCCTCAGTTTGCAGTGCAGGTTACCTACCTACTTCTGGTGGACCCCACTCCCATGGTGTGACGGGGGTTGTGTACAAG
 ACCCGGAAACGTATTACCCGCGCATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGTGCAGTGCAGACTGCAATCCGGACTACGACCGGCTTCTCCGGA
 TTGGCTCCCGCTCGCGGGTTGGCAACCCCTCTGTACCGGCCATTGTATGACGTGTGAAGCCCTACCCATAAGGGCCATGAGGACTTGCAGTCACTCCACCTTCTCCGG
 TTTGTACCCGGCAGTCTCCTTAGAGTGCCTTTCGCTAGCAACTAAGGACAAGGGTTCGCTCCTGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACGCC
 ATGACACCTGTGTCCAGTTCCTTTCGGGCACACCCACTCTCAGCGGGCTTCCGGACATGTCAAGGGTAGGTAAGGTTGTTCGCGTTCATCGAATTAATCCACA
 TCATCCACCGCTTGTGCGGGTCCCGCTCAATTCTTTGAGTTTTAATCTTTCGACCGTACTCCCCAGCGGATCACTTACCGGTTAGTACGGTACTGGAATAATCGCT
 TCTCCAACCACTAGTATCATCGTTTAGGGCGTGGACTACCAGCGTATCTAATCCTGTTTGTCTCCCTAGCTTTCGTCATTACGCGTCAGTTATGGTCCAGCGCGCCCTTTCGCCACGGG

>CUP2P4G06 Uncultured bacterium (Acidobacteria)

TCATGAGTCATAGCTTGGCGCTGTCTCCTTGGCGTTAGCGTGCAGCTTCTAGTACAGTCACTTTCGTTGATGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATT
 CACGGCGTGCATGATAGCCATTACTAGCGATTCCGGCTTCATGCAGTGCAGTGCAGACTGCAATCCGAACCTGAGCAGAGTTTTTTCGGATTAGCTCCCGCTCCGG
 GGTGGCAACGGTTGTACCCCTGCATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGCAGTCACTCCACCTTCTCCGTTATCCGGAGCAGTC
 CAGCTAGATTCCTCTTCCGAGTGGCAACTACGTGCAGGGGTTGCGCTTCCGGGTTTACCCCAACACTCACGGCACAGCTGACGACAGCCATGCAGCGCCTC
 CACACTTGTCCCTTTCGGGAAGTTCGATTTCTACAACTTGTCAAGTGCCTTTCGAGCCAGGTAAGGTTCTCGCTAGCGTGCAGTTGAACACATGTTCCACCGCT
 TGTGCGGGCCCGCTCAATTCTTTGAGTTTTCAGTCTTGCAGCCGACTCCCCAGGTGCAGGACTTAAACCGTTAGTCCGGGACGACACCCGAACGGGTGGCACTCCA
 AGTCTGTATCGTTTAGGGCTAGGACTACCAGCGTATCTAATCCTGTTTGTCTCCCTAGCTTTCGTCATTACGCGTCAGTTATGGTCCAGCGCGCCCTTTCGCCACGGG
 TGCTCTGCAGATACTACG

>CUP2P4G07 Uncultured bacterium (Acidobacteria)

GGTGTGATATGGCTACTTCTAGTACACCGGCTTTCGTTGATGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATACCCGCGCGTGTGTGATCCGCGATTACTAGCGA
 TTCAAACCTCAAGCAGCGGAGTTGCAGCTGCTATCCGAACCTGAGACCGGCTTCTCCGATTAGCTCCAGCTTTCGCTTTCGACGGTGTGTACCGGCCATTGTAGCA
 CGTGTGATGCCCGACAGATAAAGGCCATGCTGACTTGCAGTCACTCCCACTTCTCCGGTTTATCACCGCGAGTCTCTGCAGAGTCCCAACATAACGTGATGGCAAC
 AGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTACGAGTGTCTTTCGGGAAGCGCCCTTTCG
 GCGTGTGATTCGCTGTTCAAGCTTGGTAAGGTTCTTCGCTTTCGCTCGAATTGAACACATGCTCCACCGCTTGTGCGGGCCCGCTCAATTCTTTGAGTTTCAG
 CTTTGCAGCCGACTCCCAAGCGGAATGCTTAATGCGTTAGCTTCCGACGACAGGGATCGATACCCGTCACACCAAGCATTCATCGTTTAGGGCCAGGACTACCGGG
 GTATCTAATCCCGTTTGTCTCC

>CUP2P4G08 Alicyclobacillus pomorum (Bacilli)

GGTTACTCACCAGCTTCCGGTGTGGCAACTCTCGTGGTGTGACGGGGCGTGTGTACAAGGCCGGGAACCGATTACCCGCGCATGCTGATCCGCGATTACTAGCAA
 TTCGGCTTTCATGCAGCGGAGTTGACGCTTGCATCCGAACCTGACAGCTTTCAGGGATTTCGCTCCACTCGCGTCTCGCTTCCCGTTGACCGCCATTGTAGCA
 CGTGTGTAGCCAGGACATAAAGGGCATGATGATTTGACGCTATCCCACTTCTCCGACTTACGCGCGCAGTCACTGTGAGTCCCGCCTTACCGCGTGGTAACA
 CAGGTCAGGGTTCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTACGAGTGTCTTTCGGGAAGCGCCCTTTCG
 TGACCGGTCAGAGGGTGTGAAGCTTGAACCGGAAAGGTTCTTCGCTTTCGCTCGAATTAAACACACATGCTCCACTGCTTGTGCGGGCCCGCTCAATTCTTTGACATTC
 GTCTTTCGACCGTACTCCCCAGCGGAGTGTCTTATGGGTTTCTTCGCGACTGAGGGTGGTACCCCAANACCTAGCACTCATCGTTTACGGCGTGGACTACCAGCG
 TATCTAATCCTGTTTGTCTCCCAAGCTTTCGTCCTCAGCGTCACTGTCCAGCAAGCGCCCTTCGCGACTGTTTCTCCACATATCTACGCAATTCACC

>CUP2P4G09 Alicyclobacillus pomorum (Bacilli)

TGGGATCGTGTGCGCAATACGCTTTCGGAATTCGCTCCGTTGGCCCGCGGCTAAGCCGGGCGGACAGCAACCGCTACCTGCAATCCGTTGGTGAACCTACCAAGGTG
 GCGGTGATGGCAACGGCGCTAAGAATCCGATCCTGGCGGCAAGTTCGCGCCCTGACCCGGAACGAATGTCTCCATGAAACATGTGGGGATTTCCTCGCTTCCGCT
 TCCCGCTTCTCCGCGAGCGTTTCCATGCCTTCTTTCGAGCGCAGCGGCAACGATCTCAAGTCCGAGCACTTCGTTCCCACTGCCGTCACCAAGCTGGTATCATAGGCCA
 AGCCCCAGTCAAAGTCTCAGTACCAACGACCGCTGGTTTGGCGTGCATACCGCGAAGACCGTCCGCGCGTGGTGGACAGCATTTGCCGCGCTCATCAAGAAAGGGAAAG
 TATCCAGAAAAGTTGTGGAAATGAACCGGAAAGGTTCTTCGCTTTCGCTCCACTCCACCGGCAACAGGACCCGTCGCGGGGCGCGGCGCCGCTTGTGCCAT
 CGAGGTTGAATTCGCGCGCCGCGCCCTACGGCAGCGCCACATCAATGACTCTTATCGCGTGTCTTCCGGCGCAATGGTGCAGTCCGAGTACATCTTCGAGAGG
 ATCAATCACCAGCTTTCAGAAATCCCGTCGCGCTGATGGAAAACATCGAACCGGTGACCGCACCTGGCAACGCAAGTTGCGGGGAGATCCGAACCGGG

>CUP2P4G10 Uncultured Acidobacteria bacterium (Acidobacteria)

CGCTGCTCCTTACGGTTAGCAGAGGACTTCTAGTACAGCCCACTTTCGTTGATGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATACCCCGTCTGTTCTGATACG
 CACTTACTAGCGATTCCGGCTTCTGTCAGTTCGAGTTGCAGACTGCAGTCCAGCTAGCATGGTTTTTTCGATTAGCTCCCGCTCACGGGTTTCGCGACGGTCTGTATCA
 ATGCATGTAAACAGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGA

>CUP2P4G11 Uncultured bacterium (Acidobacteria)

GCGCTTGCACCCCTTGCGGTTTGGCGGGGACTTAGTACAGCTCACTTCTGTTGATGTGACGGGGCGTGTGTACAAGGCCGGGAACGTATACCGCGTGCATGATCCAGGAT
 CCATTAAGTACGATTCCGGCTTTCATGCAGTGCAGTTGCAGACTGCAATCCGAACCTGAGCAGANGTTTTCTCCAGATTAGTCCCGCTCGCGGGTTGGCAACGGGTTTGTG
 CCTCGATTGTAACAGGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGCAGTCACTCCCACTTCTCTCCGTTATCCGGAGCAGTCCACGTAGAGTTCCCTCTT
 GCGAGTGGCAACTACGTGCAGGGGTTGCGCTCGTTGCGGGACTTAAACCAACACTCACGGCAGGAGTGCAGACAGCCATGCAGCGCTTACTCTGTCCCTTTCGGG
 GAAGGCGGATTTCTACAGCTTGTGAGAAGCATTCGAGCCAGGTAAGGTTCTTCGCTGAGCGTCAATTAACACACATGTTCCACCGCTTGTGCGGGCCCGCTCAAT
 TT

>CUP2P4G12 Uncultured bacterium (Betaproteobacteria)

CCCCCTTGGGTTAGGCAACCGGCTTCTGGTGAACCCCACTCCCATGGTGTGACGGGGCGTGTGTACAAGACCCGGGAACGTATTACCCGTGACATGCTGATCCAGGAT
 TACTAGCGATTCCGACTTTCATGCAGTGCAGTTGCAGACTGCAATCCGAACCTGAGCAGANGTTTTCTCCAGATTAGTCCCGCTCGCGGGTTGGCAGCCCTTGTACCGGCC
 ATTGTATGACGTGTGAGGCTTACCATAAAGGGCATGAGGACTTGCAGTCACTCCCACTTCTCCGTTTGTGACCGGCAGTCTCAGTAGAGTCCCTTTCGTAGC
 AACTAGTGAACGGGTTTCGCTTTCGCGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGCACCGGCTTCCCTTTCGGGACTCCC
 ACATCTTCGCGGATTCGGGCTGTCAAGGGTAGGTAAGGTTTTCGCGTTCGATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGCTCAATTCTTTGA
 GTTAAATCTTGCAGCGTACTCCCCAGCGGTCGACTTACCGGTTAGTTCGCTTACCAGAAAATGAATCCCGCAACTAGTGCAGATCGTTTAGGGCGTGGACTA
 CCAGGATCTAATCTCT

>CUP2P4H01 Uncultured bacterium (Verrucomicrobiae)

CATGATGTGACGGGGCGTGTGTACAAGGCCGGTAACGTTTACCGCGCGCTATCTGATGCGCCATTACTAGCGATTCCGGCTTTCATGAAGCGAATTGCAGCCTTCA
 ATCCGAACCTGGGCGGAGTTTGTATAGATTTCCTCCACCTCGCGGCTTCGAGTCTGTTCTGACTGGGATTGTAGTACGTTGCGGGCCAGTTCGTTAGGGCCACTACTGA
 CTTGACGTCATCCCACTTCTCTCGTTAAGCGAGGAGTGTGAACAGAGTGTCCGAGCTCTCGCTCCGTTAGCAACAGTTACAGGGGTTGCGCTCGTGGCGGG
 ACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAAATTTGTTCTGCGACACTCCGCTGGCTTTCACCAACTTAGAGATGCATGTCAAG
 GCTGTTAAGGTTCTTCGCGTTCATCGAATAGAGCCACATACTCCACCGCTTGTGCGGGCCCGCTCAATTTCTTTGAGTTAATCTTTCGAGGCTACTCCCCAGGC
 GCGACTTGAAGCGTTGGCTCCGGCAGGAAGGGTTCGAATCTCCACACCAACGTCACCGTTCAGTCCAGGACTACCGGGTATCTAATCCCGTTTGTCTCCCG
 TGGCTTCTGTCTCAGTGCAGGAATGTCAGAGAC

>CUP2P4H02 Uncultured bacterium (Acidobacteria)

GCTTTCCTCCGATTAGTCCCTCTTGGCATATCGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGTATGTCATCCCCA
 TCTTCTCCGGTTTATCAACCGGACGCTTCCCGAGATGTGCCACCACTACAGTGTAGGCAACAGCGGAAAGGGTTGCGCTCGTTGCGGGACTTAACCCCAACATCTCAGC
 ACACAGCTGACGACAGCAGCTTCCGATGACGGCCCTTCCGGGAGCTGCTTTCCGAGGATGTCCATACCGGTTCCGAGCTGGTAAAGGTTCTTCGCGTTGGG
 TCGAATTGAACCACATGCTCCACCGTTTGTGCGGGCCCCGCTCAATTCCTTTAGTTTACGCTTTCGCGAGCTACTCCCAAGCGGAAATGCTTAATGCGTTAGCTTCGG
 CACGGCAGGGATCGATACCCGCCACACCAAGCATTTCATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGTCTCCCTGGCTTTCGCTGATCAG

>CUP2P4H03 Uncultured soil bacterium (Acidobacteria)

GCTGCCTCCTTGGCGTACGTTGGGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACGGCGTTCGATCTGATACG
 CCATTACTAGCGATTCCAGCTTTCATGCAGTCGAGTTGCAGACTGCGATCCGAACCTGAGCGCGCTTTTTTGGCATTAGCTCCCCCTCGCGGGTTCGCGACGCTGTGAGC
 GCGCATTGAACACGCTGTGTGGCCCTGGACATAAAGGCCATGCTGACTTGAACCTCATCCCACTTCTCTCCGTTATCCGGAGCAGTCTCATAGAGTTCTCCCTTGC
 GGTAGCAACTATGAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCCAACACCTCAGCGAACGAGCTGACGACAGCCATGCAGTACCTCTACACAGTCCCTCGCGGA
 AGCCCCGATTTCGCGGGTGGTCTGTGGGTTCAAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATGAACCACATGTTCCACCGTTTGTGCGGGCCCCGCTCAATT
 CCTTTGAGTTTACGCTTTCGACCGTACTCCCAAGCGCAGGACTTAACGCGTTAGTCTCCGGACTTGCCTTACAGGGCAACCCCAAGTCTGATGTT

>CUP2P4H04 Burkholderia sp. (Betaproteobacteria)

GGTTAGACTAGCCACTTCTGGCAAAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGCCGGGAACGTATTCACCGCGCATGCTGATCCGCGATTACTAGCGA
 TTCCAGCTTACGCGAGTCGAGTTGCAGACTGCGATCCGGACTACGATCCGGTTTTCTGGGATTGGCTCCACCTCGCGGCTTGGCAACCCCTGTTCCGACCATGTATGA
 CGTGTGAAGCCCTACCCATAAAGGCCATGAGGACTTGCAGTCAATCCCACTTCCCTCCGTTATCACCGGAGTCCCTTGGAGTCCCAAGTGAATGATG
 AAGGGTTGCGCTCGTTGCGGGACTTAACCCCAACATCTCAGCAGCAGGCTGACGACAGCCATGCAGCAGCTGTGTGATGGCTCCCTTTCGGGACTCCCACTCTCAGC
 GGGATTCCATCCATGTAAGGGTAGGTAAGGTTTGTGCGGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTAAATCT
 TCGCAGCGTACTCCCAAGCGGTAACCTTCCAGCGTTAGTACGTTGCCAAAGTCAATGAAGACCCGACAACAGTTCAGATCCGTTTAGGGCGTGGACTACCAGGGTATC
 TAATCTGTTTGTCTCCCAAGCTTTCGTCATGAG

>CUP2P4H05 Uncultured bacterium (Alphaproteobacteria)

GCTCCTTGGCGTTAGCGCGCGCTTCTCGGGTAAAGCCAACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCGCGTGTGATCCCGGATT
 ACTAGCGATTCCAATTTCATCGCTCGAGTTGCAGAGCGCAATCCGAACCTGAGACGGCTTTTCGAGATTGCTCAGGGTCTCCCTTCCGCTCCCGCTGTCAACCGCAT
 TGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGCAGTCTGCCACTTCCCTCCGTTATCACCGGAGTCCCTTGGAGTCCCAAGTGAATGATG
 GCAACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCCAACATCTCAGCAGCAGGCTGACGACAGCCATGCAGCAGCTGTGTCCCGGCCCCGAGGGGAAGATC
 GCATCTGCAATCCGTCAGGACATGTCAAAGCTGGTAAGGTTTGTGCGGTTGCATCGAATTAATCCACATCATCCACCGCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTAAATCT
 GAGTTTAAATCTTGCAGCGTACTCCCAAGCGGTAACCTTCCAGCGTTAGTACGTTGCCAAAGTCAATGAAGACCCGACAACAGTTCAGATCCGTTTAGGGCGTGGACTACCAGGGTATC
 TAATCTGTTTGTCTCCCAAGCTTTCGTCATGAG

>CUP2P4H07 Uncultured soil bacterium (Acidobacteria)

GCGCCTGCCTCCTTGGCGTACGTTGGGACTTCTAGTACAGCTCACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCGGGAACGTATTCACGGCGTTCGATCTGATAC
 CCATTACTAGCATTCCGGCTTTCATCGCTCGAGTTGCAGACTGCGAATCCGAACCTGAGCAGGTTTTCGAGATTGCTCAGGGTCTCCCTTCCGCTCCCGCTGTCAACCGCAT
 CTGTCAATTGTAACACGTGTGTAGCCCTGGACATAAAGGCCATGCGGACTTGCAGTCAATCCCACTTCCCTCCGTTATCCGGAGCAGTCCCTTGGAGTCCCAAGTGAATGATG
 CGAGTGGCAACTACGTGACGGGTTGCGCTCGTTGCGGGACTTAACCCCAACATCTCAGCAGCAGGCTGACGACAGCCATGCAGCAGCTGTGTCCCGGCCCCGAGGGGAAGATC
 AAGGCCGTTTCCACAGCTGTGTCAGGTGCGCTTGCAGCCAGGTAAGGTTTCTTCGCGTTGCGTCAATGAACCACATGTTCCACCGCTTGTGCGGGCCCCGCTCAATT
 TCCTTTGAGTTTTCAGTCTTTCGACCGTACTCCCAAGCGTTCAGGACTTAACGCGTTAGTCTCCGGGACGACACCCGAGGGTGGACCCCAAGTCTGATCGTTTAGGGC
 TAGGACTACCAGGGTATCTAATCTGTTTGTCTCCCTAGCTTTCGTTCTCAGCGTCAAGTTCGCGTCTCAGCGTCAAGTTCGCGGCGCGCTTTCG

>CUP2P4H08 Uncultured soil bacterium (Acidobacteria)

AGCCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGACGTATCACGGCGTTCGATCTGATACGCCATTACTAGCGATCCAGCTTTCATGCAGTTCGAGTTGCGAG
 ACTGCAATCCGAACCTGAGCGGCTTTTTTGGCATTAGCTCCCCCTCAGGGTTGCGGACGCTCTGTGGCGCGCATTTGAACACAGTGTGAGCCCTGGACATAAAGGCCA
 TGCTGACTTGCATCCCACTTCTCTCCGTTATCCGGAGCAGTCTCGTAGAGTTCCCCCTTGGCGGTAGCAACTACGAGTAAGGGTTGCGCTCGTTGCGGGAC
 TTAACCCCAACCTCAGCGCAGGCTGACGACAGCCATGCAGCAGCTTACAGCAGTCCCTTTCGCGGGAAGACCCGATTTCTCAGGTTGCTTGTGCGGTTTCAAGCC
 CGAGTAAGTTTCTTCCAGCTGTGTCAGGTTGAACACATGTTCCACCGCTTGTGCGGGCCCCGCTCAATTCTTTGAGTTTTCAGCTTTCGAGCCGCTCCCAAGCGCA
 GGACTTAACGCGTTAGTCTCCGGACTTGCCTTACAGGGCAACCCCAAGTCTGATGGTTTAGGGCTAGGACTACCAGGGTATCTAATCTGTTTGTCTCCCTAGCT
 TTCGTCCTCAGCGTCAAGTTCGTTGCTCCAGC

>CUP2P4H09 Uncultured bacterium (Não classificada)

CGGCATACATGGGCGGTGCTCCTTGGGGTTGGCGTGCAGCTTCCGGTACAGCAGGCTTCCATGGCGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGC
 GCGCTGATCCGAGTACGCGGCTTTTTTGGCATTAGCTCCCCCTCAGGGTTGCGGACGCTCTGTGGCGCGCATTTGAACACAGTGTGAGCCCTGGACATAAAGGCCA
 GACCTTTGTGCCACCATGTAGCAGCTTGTAGCCCTGGACATAAAGGCCATGATGACTTGCAGTCAATCCCACTTCTCTCAGGTTGACCCGTCGACCTCCCTTAG
 AGTGCCTCCCTTTACCGGTTGGCAACTAAGGGCGAGGGTTGCGCTCGTTGCGGGACTTAACCCCAACATCTCAGCAGCAGGCTGACGACAGCCATGCAACACCTGAACC
 CGAGTCCCGGAGGGAAGACCTGCTTTCACAGTTTGTGCGGCTTGTCTAGCCAGGTAAGGTTTCTTCGCGTTGCGTCAATGAACCACATGTTCCACCGCTTGTGCGGG
 GGGCCCCGCTCAATTCCTTTGAGTTTAACTTTCGCGGCTAGTCCCAGCGGGTACTTAATGCGTTAGCTGCGGACTCAGGGGTCATACCCGAAACCTTAGT
 ACCCATAGTTTACAGCGTGGACTACCAGGGTATCTAATCTGTTTGTCTCCCAAGCTTTCGCGTCTCAGCGTCAAGCAACGATC

>CUP2P4H10 Uncultured bacterium (Acidobacteria)

TATACTTGAAGGCTGCCCTTGGGTTGGCCACTGCTTCTAGTATGGTCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCAGCG
 TTTGATCTGCGGATTACGCGGATTCCAGCTTACGGGTTCCGCTTTCAGGCTTTCAGACTTCCAACTCCGAACCTGAGCGCGCTTTTTTCCGATTAGCTCCCCCTCAGGGTTTGGCAG
 GTTTGTACCGCCATTGTAGCAGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGCAGTCAATCCCACTTCTCTCCGTTATCCGGAGCAGTCTCGTAGAGTTCCCTTGC
 GCCCGCTTGCAGGATGGCAACTAAGGTTGCGCTCGTTGCGGGACTTAACCCCAACATCTCAGCAGCAGGCTGACGACAGCCATGCAGCAGCTCCCGCAGCG
 GCTTTCGCGGCGCGGATTTTCCACCGGATTCCACTGCGCTTTCAGCCAGGTAAGGTTTCTTCGCGTTGCGTCAATGAACCACATGTTCCACCGCTTGTGCGGG
 CCGCTCAATTCCTTTGAGTTTACGCTTTCGACCGTACTCCCAAGCGGATGCTTAACGCGTTAGTCTGCGCCAGCATCGGATTGGGTACCGATCAGCAAGCATCC
 AT

>CUP2P4H11 Uncultured bacterium (Acidobacteria)

CGCTGCCTCCTTGGGTTGGCACGGCGATTCTAGTACAGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACGGCGCGCTTCTGATGC
 GCCATTACTAGCGATTCCCGGCTTTCAGCTTTCAGGCTTTCAGACTTCCAACTCCGAACCTGAGCGCGCTTTTTTGGCATTAGCTCCCCCTCAGGGTTTGGCAG
 GCGCATTTGTAACAGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGAACCTCATCCCACTTCTCTCCGTTATCCGGAGCAGTCTCGTAGAGTTCCCTTGC
 CGGTTGGCAACTACGAGTAAGGGTTGCGCTCGTTGCGGGACTTAACCCCAACCTCAGCGCAGGCTGACGACAGCCATGCAGCAGCTTACACAGGTTCCCTTGGCGG
 AAGTCCCTATTTCTAGGGAGGGTCCCTGTGCGGTTCAAGCCCAAGGTTTCTTCGCGTTGCGTCAATGAACCACATGTTCCACCGCTTGTGCGGGCCCCGCTCAAT
 TCCTTTGAGTTTTCAGCTTTCGACCGTACTCCCAAGCGGATGCTTAACGCGTTAGTCTACGGGACTTGCCTTACAGGGCAACCCCAAGTCTGATGGTTTAGGGC
 TAGGACTACCAGGGTATCTAATCTGTTTGTCTCCCTAGCTTTCGTTCTCAGCGTCAAGTTCGCGTCTCAGCGTCAAGCAACGATC

>CUP2P4H12 Uncultured bacterium (Não classificada)

GGACGGTGGCGCTGCGGTTTCGTACAGGCTTCTAGTGCAGCCACTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCAGCGTTCGATCTGCGA
 TACTAGCATTCCAGCTTTCAGGTTGCGGTTGCAGACTTCCAACTCCGAACCTGAGCGCGCTTTTTTGGCATTAGCTCCCCCTCAGGGTTTGGCAGGTTTGTACCGAC
 CATTGTAGCAGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGCAGTCAATCCCACTTCTCTCCGTTATCCGGAGCAGTCTCGTAGAGTTCCCTTGC
 CGATGGCAACTAGAGATAAAGGGTTGCGCTCGTTGCGGGACTTAACCCCAACCTCAGCGCAGGCTGACGACAGCCATGCAGCAGCTCCCGCAGTGGCCCTTGCGGGG
 CCGATGTTTCCACCGGATTCCACTGCGCTTTCAGGCCAGGTAAGGTTTCTTCGCGTTGCGTCAATGAACCACATGTTCCACCGCTTGTGCGGGCCCCGCTCAATTCCT
 TTGAGTTTACGCTTTCGACCGTACTCCCAAGCGGATGCTTAACGCGTTAGTCTGCGCCAGCATCGGATTGGGTACCCACTACCAAGCATCCATG

ANEXO 11 – SEQUÊNCIAS DOS CLONES OBTIDOS A PARTIR DA BIBLIOTECA CAM2 E SUA CLASSIFICAÇÃO (BLAST E RDPII)

>CAM2P1A01 *Bradyrhizobium* sp. JS 15-10 (Alphaproteobacteria)
 GGGCGTAAAGGGTGCCTAGGCGGGTCTTAAAGTCAGGTGTGAAATCTGGAGCTCAACTCCAGAACTGCCTTTGATACTGAAGATCTTGTAGTTCGGGAGAGGTGAGTGG
 AACTGCGAGTGTAGAGGTGAAATTCGTAGATATTCGCAAGAACACCCAGTGGCGAAGGCGGCTCACTGGCCCGATACTGACGCTGAGGCACGAAAGCGTGGGGAGCAAC
 AGGATTAGATACCCTGGTAGTCCACGCCGTAACCATGAAATGCCAGCCGTTAGTGGGTTTACTCACTAGTGGCGCAGCTAACCGTTTAAAGCATTCCGCTGGGGAGTAC
 GGTCCGAAGATTAAAGCTCAAAGGAATTGACGGGGGCCGCGCAAGCGGTGGAGCATGTGGTTTAAATTCGACGCAAC

>CAM2P1A03 Uncultured forest soil bacterium (Acidobacteria)
 GGGCGTAAAGGGTGCAGGCGGTGTGGCAAGTCGGAAGTAAATCTCTGGGCTTACTCAGAGGCTGCTCCGAACTGCCGTGCTCGAGTGCAGAGAGGCAAGTGGAA
 TTGGGGGTGTAGCGGTGAAATGCGTAGATATCCCGAGGAACATCCGAGGCGAAAGCGGCTTGTGGATCGCAACTGACGCTGAGGGACGAAAGCTAGGGGAGCAACAG
 GATTAGATACCCTGGTAGTCCTAGCCCTAAACCATCAGGACTTGGGGTTTGGCCCTGTACGGGGCAAGTCCCGGAGCTAACCGGTTAAGTCTGCGCCTGGGGAGTACGG
 TCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAAGCGGTGGAACATGTGGTTCAATTGACGCAACGCGGAAGAACCTTACCTGGGCTTGAACCGCACAGG
 ATCATTCTGAAACAGGAACCTCCCGCAAGGACCTGTGTAGAGGTGCTGCATGGCTGTCTGAGTCTGCTGCGGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAA
 CCCTTACTCGTAGTTGCCACCCGCAAGGGGAACTCTACGAGGACTGCTCCGGATAACGGAGAGGAAGGTGGGGATGAGGTCAAAGTCAAGTCAAGTGGCCTTTATGTCCAGGG
 CTACACACGTGTAC

>CAM2P1A04 Uncultured bacterium (Acidobacteria)
 CGGGCGGTGCTCGAACTCCCGTGTGAGGAGGGAAGTGGAAATCCCGGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTCGCGCAAGGGCGG
 CTCTCTGGACCACTAAGCTGACGCTGACGCGCAAGAGCTAGGGAAGCAACAGGATTAGATACCCTGGTAGTCTAGCCCTAAACCGTTGAGCACTGGGTGTTCCCTTAC
 CGGGCAGTGCAGGCTAACGCATTAAGTGTCCGCTGGGGAGTACGGTGCAGGCTGAAACTCAAAGGAATTGACGGGGGCCGCAAGCGGTGGAGCATGTGGT
 TCAATTGACGCAACGCGAAGAACCTTACCTGGACTCGAAATCTAGTGCACAGTCTCAGAGATGAGATCTTCCCGCAAGGGACGGCTGGATAGGTGCTGCATGGCTGTC
 TCAGCTCGTGTGCTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCTCATTCTTAGTTGCTCGCCGAAAGGGAAGCATCTAAGAAAACCGCTCGGATAACG
 GGGAGGAAGGTGGGGATGACGTCAAGTCTCATGGCCTTTATGCCAGTGAACACACGCTGCTACAATGGC

>CAM2P1A05 Uncultured bacterium (Acidobacteria)
 GTGAAACTCTGGGCTCAACAGAGCCTGCATCTAAACTGGCGGCTAGAGTCTGGAGGGGTAGCGGAATTCCTGGTGTAGCGGTGAAATGCGTAGATATCAGGAG
 GAACCCGCTGGCGAAGGGCGCTACCTGGACAGAACTGACGCTGAGGCGCAAGAGCTAGGGGAGCAACAGGATTAGATACCCTGGTAGTCTAGCCCTAAACGATGG
 ATACTTGGTGTGACTGGGATTGAATCCAGTCTGTCGCGAAGCTAACGCATTAAGTATCCCGCTGGGGAGTACGGTCCGCAAGGCTGAAACTCAAAGGAATTGACGGGGC
 CCGCACAAAGCGTGGAGTATGTGGTTAATTCGACGCAACGCAAGAACCTTACCTGGCTCGAACGGCTAGTGACAGGTGGCGAAAGTCCGCTTTCCCGCAAGGGACA
 CTAGTCCAGGTGCTGCATGGCTGCTGACGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGCTTTAGTTGCCACAGGTTAAGCTGAGCA
 CTCTAAAGGGACTGCGGTTGAAAAACCGGAGGAAAG

>CAM2P1A06 Uncultured bacterium (Actinobacteria)
 TTGGCGTAAGAGCTCGCAGGCGGTTTGAATAAGTCCGGTGTGAAACCTCCAGGCTCAACCTGGAGCCGCCACTCGATACTGTCTAGCTAGAATTCGGTAGGGGACCAC
 GGAATTCCTGGTGTAGCGGTGAAATGCGCAGATATCAGGAGGAACACCAGCAGCGAAGCGGTGGTCTGGGCCGACATTGACGCTGAGGAGCGAAAGCGTGGGGAGCGA
 ACAGGATTAGATACCCTGGTAGTCCACGCCGTAACCGTGGGCACTAGGTGTGGGGACTATCAACCGTTTCCGTGCCGAGCTAACGCATTAAGTCCCGCCCTGGGG
 AGTACGGCCGCAAGGCTAAACTCAAAGGAATTGACGGGGGCCGCAACGCGCGGAGCATGTGGCTTAATTGAGGCAACGCGGAAGAACCTTACCTGGGTTTGACAT
 GTAGGAAAAACCGTAGAGATACGGTGTCTTCCGGGCTTACACAGTGGT

>CAM2P1A08 Uncultured bacterium (Betaproteobacteria)
 GGGCGTAAAGCGTGCAGGCGGTTTGTAGCCAGATGTGAAATCCCGGCTTAACTGGGAACCTGCATTTGGGACTGCAAGGCTTGTAGTACGGCAGAGGGGGTAGAAT
 TCCTGGTGTAGCAGTGAATGCGTAGATATCAGGAGGAATACCGATGGCGAAGGCGAGCCCTGGGTCGATACGACGCTCATGCAGAAAGCGTGGGGAGCAACAGG
 ATTAGATACCCTGGTAGTCCACGCCCTAAACGATGTCAACTAGTGTGGGGACTTACCTCCCTTAGTAAACGAGCTAACCGGTGAAAGTTGACCGCTGGGGAGTACG
 GTCGCAAGATTAAACTCAAAGGAATTGACGGGGGCCGCAACGCGGTGGATGATGTGGATTAAATTCGATGCAACGCAAAAAACCTTACCTACCTTGCATGCCAGG
 AAGTCCGCTGAGAGGTGGATGTGCTCGAAAGAACCTGGACACAGGTGCTGCATGGCTGTCTGACGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCA
 ACCCTTGCATTAGTTGCTACATTCAGTTGGG

>CAM2P1A09 Uncultured bacterium (Alphaproteobacteria)
 AGTTAGAGGTGAAAGCCCGGGCTCACTCCGAAATTCGCTTTAAGACTGCATCGCTAGAAATTTGGAGAGGTAAGTGGAAATCCGAGTGTAGAGGTGAAATTCGTACA
 TATTCGGAAGAACACAGTGGCGAAGGCGACTTACTGGACACATATGACGCTGAGGTGGCGAAGCGTGGGGAGCAACAGGATTCCACATACCCTGGTAGTCCACGCC
 GTAAACGATGATGACTAGCTGTCTGGGCGCTTACGCTTACGTTGCGCGCAGCTAACCGGTTAAGTCACTCCGCTGGGGAGTACGGCCGCAAGGTTAAACTCAAAGCAT
 TGACGGGGCGCAAGGCTAAACTCAAAGGAATTGACGGGGGCCGCAACGCGGTGGAGCATGTGGTTAATTCGAAGCAACGCGGAGAACCTTACCAGGCTTCCAGAGATGGATTCCTCC
 CTACGGGCGCTGGACTCAGGTGCTGCAATGCTGTGCTGACGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTCGTCTTTATTTGGCGTAAAGG
 CGGTGT

>CAM2P1B01 Uncultured bacterium (Acidobacteria)
 GGCGTAAAGGGCGGTAGCGGTGCGGAAGTCACTGTGAAATCTCTGGCTCAACTGGGAGCTTGACGGGAAACTGCCGTGCTGGAGTGTGGGAGAGGTGCGTGGAACT
 CCGGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAGCGGCGCACTGGACCAACTGACGCTGAGGCGCGAAAGCTAGGGGAGCAACAGGAT
 TAGATACCCTGGTAGTCCAGCCCTAAACCATGGATGCTTGGTGTGATGGGTACCAATCCCATCGTCCGCGAGCTAACCGGTTAAGCATCCCGCTGGGGAGTACGGT
 CGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCGCAACGCGGTGGAGCATGTGGTTTAAATTCGACGCAACGCGGAAGAACCTTACCTGGGCTCGAAGCGCGGTGGA
 CCGGGTGGAAACATCCCTTCCCGCAAGGACCGCTGCGGAGGTGCTGCATGGCTGTCTGACGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCT
 TATCGTTAGTTGCCATCGGGTCAAGCCGGGCACTTACGCAAACTGCTCGGATAACGGGGAGGAAGGTGGGGATGACGT

>CAM2P1B02 *Agrobacterium rhizogenes* (Alphaproteobacteria)
 TACTGGGCGTAAAGCGCAGTGGCGGTTGCAAGTCAAGTCAAGTGTGAAAGCCCGGAGCTCAACTCCGGAAGTGCCTTGAAGTGTAGTACTAGAATCTTGGAGAGGGCGG
 GTGAAATCCGAGTGTAGAGTTCGTAAGATTCGGAAGAACACAGTGGCGAAGCGGCGCTGGACAAAGTATTGACGCTGAGGTGCGAAAGCGTGGGGAGC
 AAACAGGATTAGATACCCTGGTAGTCCACGCCGTAACCATGATAACTAGTGTCCGGGCACATGGTGTGGTGGGCGCAGCTAACGCATTAAGTTATCCGCTGGGG
 AGTACGGTGCAGATTAAGTCAAAGGAATTGACGGGGGCCGCAACGCGGTGGAGCATGTGGTTTAAATTCGACGCAACGCGGAAGAACCTTACCAGCGTTTGGACAT
 CCTCATCGGATTTCCAGAGATGGATTTCTTCAAGTTCGGCTGGATGAGTGACAGGTGCTGCATGGCTGTGCTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCA
 CGAGCGCAACCCCTGCTCTTAGTTGCCATCATTAAGTTGGGCACTTAAGGAAACCGCGGTGATAAGCCGGAGGAAGGTGGGGATGACGT

>CAM2P1B03 Uncultured bacterium (Acidobacteria)
 GGGCGTAAAGGGTGCCTAGGCGGTTTGGCAAGTCTTATGTGAAATCTATGGGCTCACTCATAGTCTGCATGAGAACTGCCGGGCTGGAGTGTGGGAGAGGTGAGTGG
 AATTCGGGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAGCGGCTCACTGGACATAACTGACGCTGATGCAGAAAGCTAGGGGAGCAAC
 AGGATTAGATACCCTGGTAGTCCAGCCCTAAACCATGACTGCTTGGTGTGAGGTTACCCAAATCCCGCGTGCCTAGCTTAACGAGCTTAAGCAGTCCCGCTGGGGAGT
 ACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCGCAACGCGGTGGAGCATGTGGTTTAAATTCGACGCAACGCGGAAGAACCTTACCTGTGCTCGAAATGCA
 GTGGACTGGAGTAAAGATATTCCTTCCCGCAAGGGGCGGCTGTATAGGTGCTGCATGGCTGTCTGAGTCTGCTGAGATGTTGGGTTAAGTCCCGCAACGAGCG
 CAACCCCTTATCCCGAGTGGCCATTAAGTTGGGCACTCTGGTGAACCGCCTCGGATAACGGGGAGGAACGTTGGGATGACGTCAAAGTCTCATGGCCTTTATGTCT

>CAM2P1B04 Uncultured bacterium (Actinobacteria)
 GTCAGCTGTGAAAACCTCGAGGCTCAACCTCGAGACGTCGGTTGAAACCGTTTGGCTAGAGTCCGGAAGAGGAGAGTGGAAATCCCGGTGTAGCGGTGAAATGCGCAGAT
 ATCGGGAAGAACACCCGTCAGGAGCGCTCTCTGGACGGTACTGACGCTCAGACGCGAAAGCGTGGGGAGCGAACAGGATTAGATACCCCTGGTAGTCCAAGCCGTA
 AACGACGGGCACCTAGGTGTGGCGGTATCGACTCCCGCTGTGCCGAAGCTTACGCATTAAGTGCCTCCCGCTGGGGAGTACGGCCGAAGGCTAAAACCTCAAAGGAATTG
 ACGGGGCCCCGTACAAGCCAGCGGAGCATGTGGTTTAATTCGACGCAACCGCAAGAACCCTTACCAGTGTGACATGCATGGAACCCGTAGAAAATACGGTCCCCCTT
 CGGGCTAGTGTGCAGGTGGTGCATGGCTGTCTGCTGCTGCTGAGATGTTGGGTTAC

>CAM2P1B05 Uncultured Acidobacteria bacterium (Acidobacteria)
 CTAAGTCATACGTAATCCCTCGGCTTAACGGGGAACCTGCTGATGATGGATTGCGGAGAGGGATGCGGAATCCAGGTGTAGCGGTGAAATGCGGTA
 GATATCTGGAGAACACCCGGTGGCGAAGGCGGCATCTGGACCATACTGACGCTGAGTGAGCGAAAGCCAGTGGAGCAAACGGGATTAGATACCCCGGTAGTCTGGC
 CCTAAACGATGAATGCTTGGTGTGGCGGTATCGATCCCTGCCGTGCCGAAGCTAACGCATTAAGCATTCCGCTGGGGAGTACGGTCCGAAGGCTGAAACTCAAAGGA
 ATTGACGGGGCCCCGACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACCGCAAGAACCCTTACCAGGCTTGAACAGCGAGTGACACACTCCGAAAGGAGTCTTCC
 GCAAGGACACTCGTAGAGTGTGCATGGCTGTCTGCTGAGGCTGTCTGAGATGTAGGTTAAGTCCCGCAACGAGCGCAACCCTTGTCTTCTGTTGCCATCACGTTA
 TGGTGGGCACTCGAAGAGACTCCCGGTGATAAACCCGAGGAAGGTGGGGATGACGTCGAAGTCAGCATGGCCTTATGTCTGGGGTACACACGTGTCTACA

>CAM2P1B08 Uncultured bacterium (Não classificada)
 GGCGGTATCGTAAGTACTTTGTGAAATCCCTTCTCAATGTAGGAATGCTTGGTATACTGCGATGCTTGAGGCAAGTGGGGTGTGGAACTCTAGGTGGAGCGGT
 GAAATGCGTAGATATCTAGAGGAACCCAGTGGCGAAAGCGGAGCCTGGGCTGTCTGACGCTGAGACGCGAAAGCGTGGGTAGCAAACCTGGGATTAGATACCCCGG
 TAGTCCACCGCTTAAACGATGCGCACTAGGTATGCTGACTGCTGACGCTCCGGCGAGCCGAAACAAAAGCCTTAAAGTGCCTCCCGTGGGGAGTACGGCCGCAAGGCTAAA
 ACTCAAAGGAATTGACGGGGCTCACACAAGCGGTGGATGATGTGGCTCAATTCGAAGCAACCGCAAGAACCCTTACCAGGCTTGGATGCTAGGATTAGTCTGTGAA
 AGCAGAGTGACACGGCTTCCCGTGGAACTAGCACAGGTGCTGCATGGCTGTCTGACGCTGCTGCTGTAAGTGTCCGGTTAAGTCCCTTAAACGAGCGAAAGCCTTGTCTG
 CTAG

>CAM2P1B09 Uncultured bacterium (Não classificada)
 CTTTGTAGTCGGAGGTGAATCCCATGGTCACATGGACACGCTTCGAAACTGTGAAGCTTGAGGCTGGGAGAGGAAATCGGAATCCCTGGTGTAGCGGTGAAATGCGTAG
 ATATCAGGAGAACACCCGGTGGCGAAGGCGGATTTCTGGACCAGTCTGACACTGATGAGCGAAAGCCAGGGAGCAACAGGATTAGATACCCCTGGTAGTCTGGCTG
 TAAACGATGGGCACTAGGTGTGGAGGATCGACCCCTCCGTCGCGCAAGTTAACGCATTAAGTCCCGCTGGGGAGTA

>CAM2P1B10 Uncultured bacterium (Acidobacteria)
 GGTGTAAGGGTACAGCGGTGTGGCAAGTTGGGAGTGAATCTCTGGGCTCAACTCAGAGGCTGCTTCCAAAACCTGCTGTGCTTGTAGTGTGGGAGTGGCGCGTGAAT
 TGCAGGTGTAGCGGTGAAATGCGTAGATATCTGCAGGAACACCCGTGGCGAAAGCGCGCGCTGGACCATAACTGACGCTGAATGACGAAAGCTAGGGGAGCAACAGG
 ATTAGATACCCCTGGTAGTCTAGCCCTAAACGATCAGGACTTGGGCTGTCCCGCTTCCGGGCTGCTCCCGGAGCTAACCGCTTAAAGTCTGCACCTGGGGAGTACGGT
 CGCAAGACTGAAACTCAAAGGAATTGACGGGGCCCCGACAAGCGGTGGAAACATGTGGTTCAATTCGACGCTACGCGAGGAACCTTACCTGGGCTCGAAATGCTTAGGA
 CCAGCTGTAGAAATACGGCTTCCCGCAAGGGACCTGAGTATAGGCGCTGCATGGCTGTCTGCTGACGCTGCTGCGGTGAGGTGATAGGTTAAGTCCCGCAACGAGCGCAAT
 CCTGACACAGATTACTACTCGAAGAGAGGACTCTGTGTGGACTGCTCCGGATAACGGAGAGAACTGGGGATGACGTCGAAGTCCGATGGCCTTACGTCACGGGC
 TACACA

>CAM2P1B12 Uncultured bacterium (Acidobacteria)
 GGTAAAGTACCTGTGAAACCTCCGGGCTCAACTCGGAGCCTGCAGGCGAAACTGCCGTGCTGGAGTGTGGGAGAGGTGCGTGAATCCCGGTGTAGCGGTGAAATGCG
 TAGATATCCGGAGAACACCTGTGGCGAAGCGGCCACTGGACCAAGCTGACGCTGAGCGCGGAAAGCTAGGGGAGCAACAGGATTAGATACCCCTGGTAGTCTGCTAG
 CCTTAAACGATGATTTCTGGTGTAGCAGGTACCCAACTCTGCTGTGCGCAGCTAACCGGTTAAGCAATCCGCTGGGGAGTACGGTCCGAAAGCTGAAACTCAAAGG
 AATTGACGGGGCCCCGACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACCGCAAGAACCCTTACCTGGGCTCGAAGCGCAGTGGACCGGGGTAGA

>CAM2P1C02 Uncultured beta proteobacterium (Betaproteobacteria)
 GGGCGTAAGCGTGCAGCGGTCCGCAAGTGCCTGTGAAAGCCGAGCTTACTTGGGAACCTGCAGTGGAAACTATGGGACTTGAATCCGGCAGAGGGGGGTGGAATGCC
 ACGTGTAGCAGTGAATGCGTAGAGATGTGGCGGAACACCCGATGGCGAAGGCGAGCCCTTGGGCTGAGATTGACGCTCAGGCACGAAAGCGTGGGGAGCAACAGGATT
 AGATACCCCTGGTAGTCCACGCCCTAAACGATGACAACCTAGGTGTTGGGGAAGCGATTTCTCAGTACCGCAGCTAACCGGTGAAGTTGTCCGCC

>CAM2P1C03 Uncultured bacterium (Acidobacteria)
 GGGTGTAAAGGGTTCGACGCGGTGTGGCAAGTTCGGGAGTGAATTTCTGGGCTCAACTCAGAGACTGCTTCCGAAACTGCTGTGCTGGAGTGTGGGAGAGGCGCGTGG
 AATTGACGAGTGTAGCGGTGAAATGCGTAGATATCTGCAGGAACACCCGTGGCGAAAGCGCGCGCTGGACCATACTGACGCTGAGGAACGAAAGCTAGGGGAGCAAC
 AGGATTAGATACCCCTGGTAGTCTAGCCCTAAACGATCAGGACTTGGGGTGGCCACCGCTTGGGCTGCTGCTCCGGAGCTAACCGCTTAAAGTCTGCACCTGGGGAGTAC
 GGTCCGAAAGACTGAAACTCAAAGGAATTGACGGGGCCCCGACAAGCGGTGGAAACATGTGGTTCAATTCGACGCTACGCGAGGAACCTTACCTGGGCTCGAAGCGCAC
 TGACCAGCTGTGAAACACCGCTTCCCGCAAGGGACAGGTGTGGAGCGCTGCATGGCTGTCTGCTGACGCTGCTGCGGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGC
 AACCCCTGCACGTAGTTGCCACTCGCAAGAGGGAACCTTACGTTGGACTGCTCCGGATAACGGAGAGGAAGGTGGGGATGACGTCGAAGTCCGATGGCCTTATATGTC

>CAM2P1C06 Uncultured beta proteobacteria (Betaproteobacteria)
 GGGCGTAAGCGTGCAGCGGTTCGCTTGTGTCGGCGGTGAAAGCCCGGGCTTAACTGGGAATGGCCGTTGAAACTGGCGAAGTGGGAGAGGGGGGTGGA
 ATCCGCGTGTAGCAGTGAATGCGTAGAGATGCGGAGGAACACCCGATGGCGAAGCGAGCCCTGGGCTAACACTGACGCTCAGGCACGAAAGCGTGGGGAGCAAAACA
 GGATTAGATACCCCTGGTAGTCCACGCCCTAAACGATGTCAACTGGTGTGGGGAAGCGATTCCAGTACCGTAGCTAACCGGTGAAGTTGACCGCTGGGGAGTACG
 GCCGCAAGGTAAAACCTCAAAGGAATTGACGGGGACCCGACAAGCGGTGGATGATGGATTAAATTCGATGCAACGCGAACAACTTACCTACCCCTGACATGTCCGA
 AAGCCCGTGTAGAGGTGGTGTGCCGAAAGGAATCGGAACACAGGTGCTGCATGGCTGTC

>CAM2P1C08 Uncultured forest soil bacterium (Acidobacteria)
 GGCGGTGTGACAAAGTTCGGTGTGAAATCTCTGGGCTTACTCAGAGGCTGCTGCCGAAACTGTTGTGCTAGAGTGTGAGAGAGGCGAGTGAATACGGGTGTAGCGGTG
 AAATGCGTAGATATCCGTAGGAACATCCGAGGCGAAAGCGGCTGCTGATCACAACCTGACGCTGAGGGACGAAAGCTAGGGGAGCAACAGGATTAGATACCCCTGGT
 GTCTAGCCCTAAACCATCAGGACTTGGGGTTTCCCTGTACGGGGCAAGTCCCGGAGCTAACCGCTTAAAGTCTGCGCTGGGGAGTACGGTCCGAAGGCTGAAACTC
 AAAGGAATTGACGGGGCCCCGACAAGCGGTGGAACATGTGGTTCAATTCGACGCAACCGCAAGAACCCTTACCTGGGCTTGAACCGCACAGGACCCCTCCGAGAAATCG
 GGGCTTCCCGCAAGGACCTGTGTAGAGTGTGCATGGCTGTCTGCTGACGCTGCTGCGGTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCA

>CAM2P1C10 Uncultured bacterium (Acidobacteria)
 TTAAGTTAGATGTGAAACCTCTGGGCTCACCAGAGTGCATCTAACTGGCGAGCTAGAGTCTGGAGGGGTACGGAATCCTGGTGTACGGTGAATGCGTAGATTTCAG
 GAGGAACACCCGTGGCGAAGGCGGCTACCTGGACGAAACTGACGCTGAGGACGAAAGCTAGGGGAGCAACAGGATTAGATACCCCTGGTAGTCTAGCCCTAAACGA
 TGGATACTTGGTGTACCGGGTTGAATCCGCTCGGCGAAGCTAACCGCTTAAAGTATCCCGCTGGGGAGTACGGTCCGCAAGGCTGAAACTCAAAGGAATTGACGGG
 GCGCCGACAAGCGGTGGAGTATGTGGTTAATTCGACGCAACCGCAAGAACCCTTACCTGGGCTCGAACGGCTAGTGA

>CAM2P1C11 Uncultured bacterium (Não classificada)
 GTTGTAAAGGCTCCGCTACTGGATATGTCAATGAAACTGGGCGCTAGAGGTTGAGAGAGAGAAGTGAATCCCGGAGTACGGGTAAAATGCGTGGATCTCGGGA
 GGAACACCAATGGCGAAGGCGAGTCTTGGCTCATCTGACATTGAGGACGAAAGCGTGGGGAGCAACAGGATTAGATACCCCTGGTAGTCCACCGCTTAAACGATA
 ATCACTAGATGTTGGTTCCGCTTAGCTGGATCAGTGTCTGAGCTAACCGGTTAAGTATTCGCTGGGGAGTATGGTCCGAAGGCTAAAACCTAAAAGAAATGACGGG
 GTCCGCAAGCGGTGGAACATGTGGTTAATTCGACACTACGCGAAGAACCTTACCTAGGCTGACATGTACTTACAGCTGCGAATAATGTTCTTTGGGTTTCGG
 CTCAAACAGGTACACAGGTGCTGCAT

>CAM2P1C12 Uncultured bacterium (Betaproteobacteria)
 GGGCGTAAAGCGTGCAGCGGCTTTCGCAAGACAGATGTGAAACTCCCGGGCTTACCTGGGAACCTGATTGTGACTGCATGGCTGGAGTGGCGAGAGGGGGATGGA
 ATTCCGCTGTAGCAGTGAATGCGTAGATATGCGGAGGAGCACCGATGGCGAAGGCAATCCCTGGGCTGCACTGACGCTCATGCACGAAAGCGTGGGGAGCAAAACA

GGATTAGATACCTGGTAGTCCACGCCCTAAACGATGTCAACTGGTGTGGACGGCTTGCTGTTTCAGTAAACGAAGCTAACCGGTGAAAGTTGACCGCTGGGGAGTACG
GCCGCAAGGTTGAAACTCAAAGGAAATTGACGGGGACCCGCACAAAGCGGTGGATGATGTGGTTAATTCGATGCAACGCGAAAAACCTTACCTACCTTGACATGCCAGG
AATCCCGCAGAGATGTGGAGTGTCTGAAAGAGAACCCTGGACACAGGTGCTGCATGGCCGTGCTCAGCTCGTGTGAGATGTTGGTTAAGTCCCGCAACGA

>CAM2P1D01 Uncultured bacterium (Não classificada)

ATTGTAAGTCCGTGTTGAAAGACTCGGCTCAACTGAGGGACCGGCTCGGATACATAATCTTGGAGCAATCAGAGGGTGTGGAATTCGCCGTGATAGCGGTGAAATGC
GTAGATATCGGGAGGAACACCACTGGCGAAGGGCATCACCTGGGGTGTCTGACGCTGAGGAGCGAAAGCTAGGGGAGCAAACGGGATTAGATACCCCGGTAGTCTTA
GCCGTAACCGATGGATACAGGTGATGTGGTATCGACTCCATATGTGCCGTAGTTAACACAGTAAGTATCCCGCTGGGGAGTACGGCCGCAAGGTTAAAACCTCAAAG
GAATTTGACGGGGCCCGCACAAGCGGTGGAGCATGTAGTTAATTCGACGCAACCGCGAAGAACCTTACCAGGCTTGACATCCCTTGAAAGCCGAGAAATGCGGTTTC
CGTAGCAATACGGCAAGGTGACAGGTGCTGCATGGCTGTCGTCAGCTCGTCCGTGAGGTGTTGGTTAAGTCCCGCAACGAGCGCAACCTCGTGTGTTGGTTCG
CAAGGATCTCTCAAAAAGACCGCCGTGAGAAGCCAGAGGAAGGTGGGGATGACGTCAAAGTCAG

>CAM2P1D02 Uncultured bacterium (Acidobacteria)

GGGCGTAAGAGTGCCTAGGCGGTGCTCTAAGTTCGGTGTGAAATCTCCCGGCTCACTGGGAGGGTGCGCCGAAACTGGAGTGTGCAACGTGGGAGAGGAAAGCGGAA
TTCTGGTGTAGCGGTGAAATGCGTAGATATCAGGAGGAACACCTGCGGTGTAGACGGCTTCTGGACCATTTGTTGACGCTGAGACGAAAGCGTGGGTAGCAAACAG
GATTAGATACCTGGTAGTCCACGCCCTAAACGATGCATACTTGGTGTCCGGCATTGAGTTGGTTCGGTGCAGGAGCTAACGCGTTAAGTATGCCGTCTGGGGAGTACGG
TCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGGCCGCACAAGCGGTGGAGCATGTGGTTAATTCGACGCAACCGCGAAGAACCTTACCTGGGCTCGAACGGCTTCAG
ACCGGTGATAGAAATATCCGCTTCCCGCAAGGGACTGGAGTCGAGGTGCTGCATGGCTGTCGTCAGCTCGTGTGAGATGTTGGTTAAGTCCCGCAACGAGCGCA
ACCTTGTCTGTGTTGCTAATCCGCA

>CAM2P1D03 Mesorhizobium sp. CCBAU 25282 (Alphaproteobacteria)

GGGCGTAAGCGCACGTAGGCGGATATAAGTTCAGGGGTGAAATCCCGGGCTCAACCGGAACTGCGCTTTGATACTGGGTATCTGGAGTCCGGAAGAGGTGAGTGAAT
TCCGAGTGTAGAGGTGAAATTCGTAGATATTCGGAGGAACACCACTGGCGAAGGGCGCTCACTGGTCCGGTACTGACGCTGAGGTGCGAAGCGTGGGGAGCAAACAGG
ATTAGATACCTGGTAGTCCACGCCCTAAACGATGGAAGCTAGCCGTTGGCAAGTTACTTGGTGGCGAGCTAACGCATTAAAGTTCGCCGTGGGAGTACGGTC
GCAAGATTAAAACCTCAAAGGAATTGACGGGGGGCCGCACAAGCGGTGGAGCATGTGGTTAATTCGAAGCAACGCGCAGAACCTTACCAGCCCTTGACATCCCGGTCCG
GGTTCCAGAAATGGATACCTTCAGTTCCGGTGGACCGGTGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTGAGATGTTGGTTAAGTCCCGCAACGAGCGCAA
CCCTGCCCTTAAGTTCGCATCATTTCCAGTTGGGCACTTAAGGGACTGCGCGTGTATAGCGAGGAAAGGTGGGGATGACGTCGCAAGTCTCATGCGCTTACGGGCTG
GGCTACACAGTGTACAATGGTGGTGCAGTGGGACGCGAGACCGGAGGTCGAGCTAATCTCCAAAAGCCATC

>CAM2P1D05 Uncultured Myxococcales bacterium (Deltaproteobacteria)

CGCGTGTACGGCGCTTTCGAAGTTCGGGTGTGAAATCCCTCAGTCAACTGAGGAAGTGCGCCGAAACTGCAGAGCTTGTAGTACCGGAGAGGATGGCGGAATTCGGAA
GTAGAGGTGAAATTCGTAGATATTCGGAGGAACACCGGTGGCGAAGGGCGCTCACTGGCAGGATGACGCTGAGACCGAAGCGTGGGGAGCAAACAGGATTAGAT
ACCGTGGTAGTCCACGCCCTAAACGATGGAAGCTAGGTGTCGGGTGTTGCAACCGGTCGCTAGTTCGCGCTAGTAAAGTTCGCCGTGGGAGTACGGCCGAA
GGCTAAAACCTCAAAGGAATTGACGGGGGGCCGCACAAGCGGTGGAGCATGTGGTTAATTCGACGCAACCGCGCAGAACCTTACCTGGTCTTGACATCTCGGAATCTGC
CAGAGATGGCGGAGTCCCGCAAGGAAACCGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTGAGATGTTGGTTAAGTCCCGCAACGAGCGCAAGCCCT
GCTTTAGTTCACGACAGGTGATCTTAGAGGGACTGCGCGTGTAAAACCGGAGGAAAGGTGGGGATGACGT

>CAM2P1D06 Uncultured crenarchaeote (Thermoprotei)

AAGCATCGCAGCGGTTTACAAGTCTCCGTTAAATCCAACTGCTTACAGATGGGCCGCGGAGGATACTATAAGACTAGGAGGCAGGAGAGGCAAGCGGTACTCAGTGG
GTAGGGGTAAAATCCGTTGATCCATTGAAGACCACCACTGGCGAAGGGCGCTTCCGAGAATGCGCTCGACGGTGGAGGATGAAAAGCTGGGGAGCAAACCGGATTAGAT
ACCGGGTAGTCCACGCCCTAAACGATGCAAGTTCGGTGTAGTGTAAAGTTCGACGCAACCGCGCAGGAAATCCGTTAAGTTCGCCGTGGGAGTACGGTC
GCAAGACTGAAACTTAAAGGAATTGGCGGGGGAGCACCAAGGGGTGAAATCCTGCGGTTCAATTTGGAGTCAACCGCGGGAATCTTACCAGGGGGCAGCAGAGTGA
GGTCAAGCTGAAGACTTTACTAGACAAGCTGAGCAGGAGTGTGCGATGGCTGTCGCCAGCTTCTGTCGGTGTGAGGTGCTGTTAAGTTCAGGTAACGAGCGAGACCCCT
GCTTCTAGTTGCTACTTTTATTCTTCGGAGT

>CAM2P1D08 Uncultured bacterium (Acidobacteria)

GTCGTAGTGAATCTCCGGCTCACTCGGAGTCTGCATCAGAACTGCCATGCTTGTAGTGTGGGAGAGGTGAGTGAATTCGCCGTGATAGCGGTGAAATGCGTAGATA
TCGGGAGGAACACCTGTGGCGAAAGCGGCTCACTGGACCAACTGACGCTGATGCGGAAAGCTAGGGGAGCAAACAGGATTAGATACCTGGTAGTCTTAGCCCTAA
ACGATGATCGTTGGTGTGATAGGTACCAATCCTATCGTCCGAGGCTAACCGGCTTAAAGCGATCCCGCTGGGGAGTACGGTTCGCAAGGCTGAAACTCAAAGGAATTGA
CGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACCGCAAGAACCTTACCTGGGCTCGAAATGTAGTGGACCGGGGTGGAAACATCCCTTTTCGCAA
GAACCGCTATATAGGTGCTGCATGGCTGTCGTCAGCTCGTGTGAGATGTTGGTTAAGTCCCGCAACGAGCGCAACCTTATTGCCAGTTCGCATCGGGTTATGCCG
GGCACTCTGGCGAA

>CAM2P1D10 Burkholderia sp. HSL-4 (Betaproteobacteria)

AGCGTGCAGCGCGGTTCCGTAAGACCGATGTGAAATCCCGGGCTTAACTGGGAATGCATTGGTGACTGGCGGGCTAGAGTATGGCAGAGGGGGTGAATTCAC
GTGTAGCAGTGAATGCGTAGAGATGTGGAGGAATCCGATGGCGAAGGAGCCCTGGGCCAATACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACAGGATTAG
ATACCTGGTAGTCCACGCCCTAAACGATGTCAACTAGTTGTCGGTCTTCATTGACTTGGTAACGTAGCTAACCGGTGAAGTTGACCGCTGGGGAGTACGGTCCGAA
GATTAACCTCAAAGGAATTGACGGGGGGCCGCACAAGCGGTGGATGATGTGGATTACTTCGATGCAACGCGAAAAACCTTACCTACCTTGACATGTACGGAACTTGC
TGAGAGGTGAGGTGCGCGAAGGGAGCCGTAACACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTGAGATGTTGGTTAAGTCCCGCAACGAGCGCAACCTTGT
CCCTAGTTGCTACGCAAGAGCAC

>CAM2P1D11 Aquabacterium sp. P-113 (Betaproteobacteria)

GGGCGTAAGCGTGCAGCGGTGATCGACAGATGTGAAATCCCGGGCTCAACTGGGAATGCATTGTGACTGCATTGCTGGAGTGCGCCAGAGGGGGATGGAAT
CCGCGTGTAGCAGTGAATGCGTAGATATGCGGAGGAACACCGATGGCGAAGGCAATCCCGTGGCCCTGCACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACAGG
TTAGATACCTGAGTGTCCACGCCCTAAACGATGTCAACTGGTGTGGTGAAGTGTGTTAAGTTCGATGCAACGCGAAAAACCTTACCTACCTTGACATGTACGGAACTTGC
GCAAGTTGAAACTCAAAGGAATTGACGGGGGGCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAAC

>CAM2P1E01 Uncultured Acidobacteria bacterium (Não classificada)

GGCGTAAAGGGCGCGTAGCTTCGGTAACTGACTGTGAAACTCTGGCTCAACTCAGAGCCTGATCGAAACTGCCGTGCTAGAGTGTGGGAGAGGTGCTGGAATCCC
GGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAGCGGCTCACTGGACAAACTGACGCTGAGCGCGAAAGCTAGGGAGCAAACAGGATTA
GATACCTGGTAGTCCACGCCCTAAACGATGATGTGGTGTGTCGGTATCGAATCCCGACGTGCCAAGCTAACCGGATAAGTATCCCGCTGGGGAGTACGGTCCG
CAAGGCTGAAACTCAAAGGAATTGACGGGGGGCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAAC
CGAAGAACCTTACCT

>CAM2P1E02 Uncultured bacterium (Acidobacteria)

GGGTGTAAGGGTGTAGGCGGTGTCAGTTCGGAGTGAATTTCTGGGCTTAACTCAGAGACTGCTTCCGAAACTGCTGTGCTCGAGTGTGGGAGAGGCGGTGGAA
TTGACGGTGTAGCGGTGAAATGCGTAGATATTCGAGGAACACCCGTGGCGAAGCGGCGCTGGACCTACTGACGCTGAGGAACGAAAGCTAGGGAGCAAACAG
ATTAGATACCTGGTAGTCTAGCCCTAAACCATCAGGACTTGGGGTGCCTCCGTTCCGAAGTTCGTCGCGGAGCTAACCGCTTAAAGTCTGACCTGGGGAGTACCG
TCGCAAGACTGAAACTCAAAGGAATTGACGGGGGGCCGCACAAGCGGTGGAACTGTTGGTTCAATTCGACGCTACCGGAGGAACTTACCTGGGCTGAAATGCTTCTG
ACCAGCTGTAGAAATACGGCCTTCCCGCAAGGACAGGAGTATAGCGCTGCATGGCTGTCGTCAGCTCGTGCAGTGTGGTTAAGTCCCGCAACGAGCGCAA
CCCCTGCAGTGTGCCACTCGCAAGGGAACTCTACGTGGACTGCTCCGGATAACGGAGAGGAAGGTGGGGATGACGTCAGTCCGCATGGCCTTTATGT

>CAM2P1E05 Uncultured Holophaga sp. ((Acidobacteria)

GCTTCTAAGTCGAACTGAAATCCCGGCTCAACCGGAACTGCGTCCGATACCTGGAAGGCTTGAATCCGGGAGAGGGATGCGGAATTCAGGTGTAGCGGTGAAATG
CGTAGATATCTGGAGGAACACCGGTGGCGAAGCGGCATCTGGACCGGATTGACGCTGAGGCGGAAAGCCAGTGGAGCAAACGGGATTAGATACCCCGGTAGTCTC

>CAM2P1H08 Uncultured bacterium (Deltaproteobacteria)
 GCGCGTTCGTTAAGTCAGATGTGAAAGCCCGGGCTCAACTCGGGAAAGTGCATTTGAAACTGGCGAGCTTGAGTATGGAAGAGGATCGCGGAATTCCTGGTGTAGAGGT
 GAAATTCGTAGATATCGGGAGAACACCAGTGGCGAAGGCGCGATCTGGGCAATACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAACAGGATTAGATACCTCGGT
 AGTCCACGCCGTAACGATGGATGTAGATGTGCGGGGATTGACCCCTGCGGTGTGCGAGCTAACGCATTAAGCATCCCGCTGGGGAGTACGGCCGCAAGGTTAAAA
 CTCAAAAGGAATTGACGGGGCCCGCACAAGCGGTGGAGCATGTGGTTAATTCGACGCAACGCGCAGAACTTACCTGGGTTAAATCCAACGGAAACCTGCAGAGATGT
 GAGGGTGCCTTCGGGGAATCGTTGAGACGGTGTGCATGGCTGTCGTGAGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGTCGTTAGTT
 GCTAACAGTTAGGCTGAGCACTTAACGAGACCCCGGTGTTAAACCGGAGGAGGTGGGGATGACGTCAGTCAAGTCTCATGGCCCTTATGCCAGTGTACACAGTGT
 ACAATGGCCGGTACA

>CAM2P1H09 Uncultured bacterium (Verrucomicrobiae)
 CGGTTCCGTAAGTCGGGTGTAATCTCGGGGCTTACTCGAAACTGCATTTCGATACTGCGGTGCTTGAGGACTGGAGAGGAGACTGGAATTTACGGTGTAGCGGTGAA
 ATGCGTAGATATCGTAAGGAAGACCAGTGGCGAAGGCGGGTCTCTGGACAGTTCCTGACGCTGAGGCACGAAGTTCAGGGAGCAACCGGATTAGATACCCCGGTAGT
 CCTGACAGTAAACCGGTGCACGTTTGGTGTGGGAGGATTCGACCCCTTCTGCGCCGGAGCTAACGCGTTAAACGTTGCCGCTGGGGAGTACGGTCGCAAGATTAAACTC
 AAAGAAATTGACGGGGCCCGCACAAGCGGTGGAGTATGTGGCTCAATTCGATGCAACGCGAAGAACCTTACCAGGCTTGACATGCATCTCTAAGTTGGTGAAGCCA
 GCGAGTCCCGCAAGGCAAAATTTGCACAGGTGTGCATGGCTGTCGTCAGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGTGAATGTTG
 CCACGAGCCGTGAGGCTCGAGCACTCTGTTACAGCTGCCCCGCTTAACGGGGAGGAGGTGGGGACGACGTCAGTCAAGTCAAGTATGGCCCTTACGGCTGGGCTGCACAC
 GTAC

>CAM2P1H10 Uncultured bacterium (Actinobacteria)
 GCAGGTGACGCTGTGAAAACCTCAAGGCTCAACCTTGAGACGTCGCGTTGAAAACCGTATGGCTAGAGTCCGGAGGAGGAGTGAATTCCTGGTGTAGCGGTGAAATGCGC
 AGATATCGGGAGAACACCCATGGCGAAGGCAGCTCTCTGGGACGGTACTGACGCTGAGACGCGAAAGCGTGGGGAGCGAACAGGATTAGATACCCCTGGTGTAGTCCACGC
 CGTAAACGATGGAACTAGGTGTGGCGGGTGTGACTCCCGCTGTGCCAAGCTAACGCATTAAGTTCCCGCTGGGGAGTACGGACGCAAGGCTAAAACCTCAAAGGA
 ATTGACGGGGCCCGCACAAGCAGCGGAGCATGTGGTTAATTCGACGCAACGCGAAGAACCTTACCAGTGTGACATGCATTTGGAAAACCGTGGAAACACGGTCCCC
 CTTCCGGGGTAAATGCACAGGTGTGATGGCTGTCGTCAGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAATCCCTGTTCCATGTTGCCAGCGCGTA
 ATGGCGGGGACTCATGGAAGACTGCGCGGTGACAAAGCGTAAACAGGTAGAGCTCTCAGTCAGTCAAAGGGCG

>CAM2P1H11 Uncultured bacterium (Sphingobacteria)
 TCAGTGGTGAATCTCTGGGACTTACCCGAACTGCCATTGATATATGCTTGAATATCGTGGAGGTCAGCGGAATGTGTCATGTAGCGGTGAAATGCTTAGATA
 TGACATAGAACCAAAATTCGAAAGGAGCTGGCTACCCGAATATTGACACTGATGACGAAAGCGTGGGGATCAAAACAGGATTAGATACCTGGTGTAGTCCACGCCCTAA
 ACGATGGATACTCGACATACGCATATCTGTGTGTGTCGAGCGAAAGCATTAAAGTATCCCACTGGGAAGTACGATCGCAAGATTGAAACTCAAAGGAATTGGCGGG
 GTCCGCACAAGCGGTGGAGCATGTGGTTAATTCGATGATACGCGAGGAACCTTACC

>CAM2P2A01 Uncultured bacterium (Alphaproteobacteria)
 GGGCGTAAAGGGTGCAGGCGGCTTTAAGTCAAGGTGTAATCTGGAACTCAACTCCAGAAGTGCCTTTGATACTGAAGATCTTGTAGTTCGGGAGAGGTGAGTGG
 AACTGCGAGTGTAGAGGTGAAATTCGTAGATATTCGCAAGAACACCAAGTGGCGAAGCGGCTCACTGGCCGATACTGACGCTGAGGCACGAAAGCGTGGGGAGCAAAAC
 AGGATTAGATACCCCTGGTGTAGTCCACGCCCTAAACGATGAATGCCAGCGCTTAGTGGGTTTACTCACTAGTGGCGCAGCTAACGCTTTAAGCATTCCCGCTGGGGAGTAC
 GGTCCGAAGATTAAAGCTCAAAGGAATTGACGGGGCCCGCACAAGCGGTGGAGCATGTGGTTAATTCGACGCAAC

>CAM2P2A03 Uncultured forest soil bacterium (Acidobacteria)
 GGGCGTAAAGGGTGCAGGCGGTGTGGCAAGTCAAATCTCTGGGCTTACTCAGAGGCTGTCTCGAAACTGCCGTGCTCGAGTGCAGAGAGGCAAGTGGAA
 TTGCGGGTGTAGCGGTGAAATGCGTAGATATCCCGAGGAACATCCGAGGCGAAAGCGGCTGTGATCGCAACTGACGCTGAGGGACGAAAGCTAGGGGAGCAAAACAG
 GATTAGATACCCCTGGTGTAGTCCAGCCCTAAACCATCAGGACTTGGGGTTGGCCCTGTACGGGGCAAGTCCCGGAGCTAACGCGTTAAGTCCCTGGCCCTGGGGAGTACGG
 TCGAAAGGCTGAAACTCAAAGGAATTGACGGGGCCCGCACAAGCGGTGGAGCATGTGGTTAATTCGACGCAACGCGAAGAACCTTACCTGGGCTTGAACCGCACAGG
 ATCATTCTGAAACAGGAACTTCCCGCAAGGGACCTGTGTAGAGGTGTGCATGGCTGTCGTGAGCTCGTGGCGTGGGTTAAGTCCCGCAACGAGCGCAA
 CCCTTACTCGTAGTTGCCACCCGCAAGGGGAACTTACGAGGACTGCTCCGGATAACGGAGAGGAAGTGGGGATGAGTCAAGTCAAGTCAAGTGCCTTTATGTCCAGGG
 CTACACAGTGTTACA

>CAM2P2A04 Uncultured bacterium (Acidobacteria)
 CCGGGCGGTGCGTCAAACTGCGGTGCTCGAGTGTGGGAGAGGGAAGTGGAAATCCCGGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACTGCGGCGAAGGGCG
 CTTCTGGACCATAACTGACGCTGAGGGCGCAAGCTAGGGAAGCAACAGGATTAGATACCCCTGGTGTAGTCTTACGCCCTAAACGTTGAGCACTGGGTGTGCCCTTAC
 CGGGCAGTCCGCAAGCTAACGCATTAAGTGTCCCGCTGGGGAGTACGGTCCGCAAGGCTGAAACTCAAAGGAATTGACGGGGCCCGCACAAGCGGTGGAGCATGTGGT
 TCAATTCGACGCAACCGCAAGAACCTTACCTGGACTCGAAATCTAGTGTGACAGTCTCAGAGATGAGATCTTCCGCAAGGAGCGGCTGGATAGGTGCTGCATGGTGC
 GTCAGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTATTCTTAGTTGCTCGCCGAAAGGGAAGCATCTAAGAAAACCGCTCGGATAACG
 GGGAGGAAGTGGGGATGACGTCAGTCAAGTCTCATGGCCCTTATGCCAGTGAACACACGCTGCTACAATGGC

>CAM2P2A05 Uncultured bacterium (Acidobacteria)
 GTGAAAACCTGCGGCTCAACAGAGGCTGATCTAAAACCTGGCGGGTGTAGAGTCTGGAGGGGTGAGCGGAATTCCTGGTGTAGCGGTGAAATGCGTAGATATCAGGAG
 GAACCCCGTGGCTGCGAAGCTTACCTGGACGAACTGACGCTGAGGCGCAAGGCTAGGGAGCAAAACAGGATTAGATACCCCTGGTGTAGTCTTACGCCCTAAACGATGG
 ATACTTGGTGTGACTGGGATTGAATCCAGTCTGCGCAAGCTAACGCATTAAGTATCCCGCTGGGAGTACGGTCCGCAAGGCTGAAACTCAAAGGAATTGACGGGGC
 CCGCACAAGCGGTGGAGTATGTGGTTAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAACGGCTAGTACAGGTTGGCGAAAGTCCGCTTTCCCGCAAGGGACA
 CTAGTCCAGGTGCTGATGCTGCTGAGTGTGCTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGCCCTTAGTTAGTCCACAGGTTAAGCTGAGCA
 CTCTAAAGGACTGCGGTGAAAACCGGAGGAAG

>CAM2P2A06 Uncultured bacterium (Actinobacteria)
 TTGGGCGTAAGAGCTCGCAGGCGGTTTGATAAGTCCGGTGTGAAACCTCCAGGCTCAACCTGGAGCCGCCACTCGATACTGTGACTAGAAATTCGGTAGGGGACCAC
 GGAATTCCTGGTGTAGCGGTGAAATGCGCAGATATCAGGAGGAACACCAGCAGCGAAGCGGTGGTCTGGGCCGACATTGACGCTGAGGAGCGAAAGCGTGGGGAGCGA
 ACAGGATTAGATACCCCTGGTGTAGTCCACGCCGTAACGCTTGGGCACTAGGTGTGGGGACTTATCAACGTTTCCGTGCCGAGCTAACGCATTAAGTCCCGCCCTGGGG
 AGTACGGCCGCAAGGCTAAACTCAAAGGAATTGACGGGGCCCGCACAAGCGCGGAGCATGTGGTTAATTCGAGGCAACGCGAAGAACCTTACCTGGGTTTGCAT
 GTAGGGAAGCCGTAGAGATACGGTGTCTTCCGGGCTTACACAGGTGGT

>CAM2P2A08 Uncultured bacterium (Betaproteobacteria)
 GGGCGTAAAGCGTGGCAGGCGGTTTGTAGCCAGATGTGAAATCCCGGGCTTAACTGGGAAGTGCATTTGGGACTGCAAGGCTTGTAGTACGGCAGAGGGGGTGAAT
 CTTGGTGTAGCAGTGAATGCGTAGATATCAGGAGGAATACCGATGGCGAAGGCAAGCCCGTGGGTCGATACTGACGCTCATGCACGAAAGCGTGGGGAGCAAAACAGG
 ATTAGATACCCCTGGTGTAGTCCACGCCCTAAACGATGTCAACTAGTGTGGGGGACTTACCTCCCTTAGTAAACGAGCTAACCGGTGAAAGTTGACCGCTGGGGAGTACG
 GTCGCAAGATTAAACTCAAAGGAATTGACGGGGCCCGCACAAGCGGTGGATGATGTGGATTAATTCGATGCAACGCGAAAAACCTTACCTACCCCTGACATGCCAGG
 AAGTCCCGTGAAGGTTGCTGCTCGAAAAGAACTGGACACAGGTGCTGATGGCTGAGTCAAGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCA
 ACCCTTGCCATTAGTTGCTACATTCAGTTGG

>CAM2P2A09 Uncultured bacterium (Alphaproteobacteria)
 AGTTAGAGGTGAAAGCCCGGGGCTCACTCCGGAATTTGCTTTAAGACTGACGCTGAGTGGGAGGTTAAGTGGAAATTCAGGATGTAGAGGTGAAATTCGTACA
 TATTCCGAAGAACACCAAGTGGGCTTACTGGACACATTTAGCAGTGGGTGGCGAAGCGTGGGGAGCAAAACAGGATTCCACATACCCCTGGTGTAGTCCACGCC
 GTAACGATGATGACTAGCTGTCTGGGGCCTTAGCGTTACAGTGTGGCGACGCTAACCGGTTAAGTCACTCCCGCTGGGGAGTACGGCCCGCAAGGTTAAACTCAAAGACAT
 TGACGGGGCCCTGCACAAGCGGTGGAGCATGTGGTTAATTCGAAGCAACGCGCAGAACCTTACCAGCGCTGACATGCCAGGACGGTTCCAGAGATGGATTCCCTCC
 CTTACGGGGCCTGGACTCAGGTGCTGCAATGCTGCTGAGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGCTCTTTA

>CAM2P2B01. Uncultured soil bacterium (Acidobacteria)
 GGCCTAAGGGCGCTAGCGGTGCGGAAGTCACTGTGAAATCTCTGGCTCAACTGGGAGCTTGCAGGCGAAACTGCCGTGTGGAGTGTGGAGAGGTCGCTGGAATC
 CCGGTGATCCGGTGAATCGCTAGATATCGGGAGAACACCTGTGGCGAAAGCGGCGACTGGACCACAACCTGACGCTGAGGCGCGAAAGCTAGGGGAGCAAAACAGGAT
 TAGATACCCTGGTAGTCTAGCCCTAAACCATGGATGCTTGGTGTGATGGGTACCCAATCCCATCGTCCCGCAGCTAACCGCTTAAGCATCCCGCTGGGGAGTACGGT
 CGCAAGGCTGAAACTCAAAGGAATTGACGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTTCGACGCAACCGCAAGAACCTTACCTGGGCTCGAAGCGCAGTGGAA
 CCGGGTGGAAACATCCCTTTCGCAAGGACCGCTGCGGAGGTGCTGCATGGCTGTCTGCTCAGCTCGTGTGCTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCT
 TATCGTTAGTTGCCATCGGGTCAAGCCGGGCACTTACGCAAACTGCTCGGATAACGGGGAGGAAGTGGGGATGACGT

>CAM2P2B02. Agrobacterium rhizogenes (Alphaproteobacteria)
 TACTGGGCGTAAAGCGCAGCTAGCGGTACATCAAGTCAGGTGTGAAAGCCCGGAGCTCAACTCCGGAAGTGCCTTGAAGTACTAGTACTAGAACTTGGAGAGGCGG
 GTGGAATCCCGAGTGTAGAGGTGAAATTCGTAGATATTCGGAAGAACACCGAGTGGCGAAGGCGGCGCTGAGCAAGTATTGACGCTGAGGTGCGAAAGCGTGGGGAGC
 AAACAGGATTAGATACCCTGGTAGTCCACGCCGTAACGATGATAACTAGCTGTCCGGGCACATGGTGCTTGGGTGGCGCAGTAAACGATTAAGTTATCCCGCTGGGG
 AGTACGGTGCAGATTAAGTCAAAGGAATTGACGGGGCCGTCACAAGCGGTGGAGCATGTGGTTCAATTGCAAGCAACCGCGCAGAACCTTACCAGCGTTCGACAT
 CCTATCGCGATTTCCAGAGATGAAATTTCTTCAAGTTCGGCTGGATGAGTACAGGTGCTGCATGGCTGTCTGCTCAGCTCGTGTGCTGAGATGTTGGGTTAAGTCCCGCAA
 CGAGCGCAACCCCTCGTCTTAGTTGCCATCATTAAAGTTGGGCACTTAAGGAACCCCGGCTGATAAGCCGGAGGAAGGTGG

>CAM2P2B03 Uncultured bacterium (Acidobacteria)
 GGGCGTAAAGGGTGCCTAGCGGGTTTGGCAAGTCTTATGTGAAATCTATGGGCTCACTCATAGTCTGCATGAGAACTGCCGGGCTGGAGTGTGGAGAGGTTGAGTGG
 AATTCGGGTGTAGCGGTGAAATTCGTAGATATTCGGGAGGAACACCTGTGGCGAAAGCGGCTCACTGGACCATAACTGACGCTGATGCACGAAAGCTAGGGGAGCAAA
 AGGATTAGATACCCTGGTAGTCTAGCCCTAAACCATGACTGCTTGGTGTGACGGGTACCCAATCCCGCGTGCCTGAGTAAACGCTTAAAGCAGTCCCGCTGGGGAGT
 ACGTGCAGAGGCTGAAACTCAAAGGAATTGACGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAAATTCGACGCAACCGCAAGAACCTTACCTGTGCTGAAATGCA
 GTGGACTGGAGTAGAAATATTCCTTCCCGCAAGGGCCGCTGTATAGGTGCTGCATGGCTGTCTGCTCAGCTCGTGTGCTGAGATGTTGGGTTAAGTCCCGCAACGAGCG
 CAACCTTATCCCGAGTTGCCATCATTAGTTGGGCACTCTGGTGAACCCGCTCGGATAACGGGGAGGAACGTTGGGGATGACGTCAGTCCCTCATGGCCTTTATGTC

>CAM2P2B04 Uncultured bacterium (Actinobacteria)
 GTCAGCTGTGAAACTCGAGGCTCAACCTCGAGACGTCGGTTGAAACCGTTTGGCTAGAGTCCGGAAGAGGAGTGGAAATCCCGGTGTAGCGGTGAAATGCGCAGAT
 ATCGGGAAGAACACCGGTGGCGAAGGCGGCTCTCTGGGACGGTACTGACGCTCAGACGCGAAAGCGTGGGGAGCGAACAGGATTAGATACCCTGGTAGTCCAAAGCCGTA
 AACGACGGGCCTAGGTGTGGCGGGTATCGACTCCCGCTGTGCGGAAGCTTACGCAATTAAGTGCCTCCCGCTGGGGAGTACGGCCGCAAGGCTAAACTCAAAGGAATTG
 ACGGGGCGCGTACAAGCCAGCGGAGCATGTGGTTTAAATTCGACGCAACCGCAAGAACCTTACCAGTGTGACATGCATGGAACCCGTAGAAATACGGTCCCGCTT
 CCGGGCTAGTGTGCGAGTGGTGCATGGCTGTCTGCTGAGATGTTGGGTTA

>CAM2P2B05 Uncultured Acidobacteria bacterium (Acidobacteria)
 CTAAGTCATACGTGAAATCCCTCGGTTAACGGGAACTCGCTGTGATACTGGATGGCTTGGTTCGGGAGAGGGATGCGGAATCCAGGTGTAGCGGTGAAATGCGGTA
 GATATCTGGAGGAACACCGGTGGCGAAGGCGGATCCTGGACCGATGACTGACGCTGAGTGAGCGAAAGCCAGTGGAGCAAACGGGATTAGATACCCTGGTAGTCTCGGC
 CCTAAACGATGAATGCTTGGTGGCGGGTATCGATCCCTGCCGCAAGCTAACGCAATTAAGCATTCGCGCTGGGAGTACGGTCCGCAAGGCTGAAACTCAAAGGA
 ATTGACCGGGCCCGCACAAAGCGGTGGAGCATGTGGTTTAAATTCGACGCAACCGCAAGAACCTTACCAGGCTTGAACCGCGAGTGCACACACTCCGAAAGGAGTCTTCC
 GCAAGGACACTCGTAGAGTGTGCTGATGGCTGTCTGCTCAGCCGCTGTCTGAGATGTTAGGTTAAGTCCCGCAACGAGCGCAACCCCTTGTCTTCTGTTGCCATCACGTTA
 TGGTGGCACTCTGAAGAGACTCCCGGTGATAAACCGGAGGAAGTGGGGATGACGTCAGTCAAGTCAAGTGGCCTTTATGCTGGGGCTACACAGTGTCTACA

>CAM2P2B08 Uncultured bacterium (Não classificada)
 GGCCTATCGTAACTCTTGTGAAATCCCTTCTCAATGTAGGAATTCCTGGTATACTGCGATGCTTGGGAGGAGTGGGGTGTGGAACTCTAGTGGAGCGGT
 GAAATGCGTAGATATCTAGAGGAACGCCAGTGGCGAAAGCGGAGCACTGGGCTGTCTGACGCTGAGACGCGAAAGCGTGGGTAGCAAACTGGGATTAGATACCCTGG
 TAGTCCAGCGCGTAAACGATGCGCACTAGGTATGCCTGACTCTGACGCTCGCGGAGCCGAAACAAAAGCGTTAAGTGCAGCCGCTGGGGAGTACGGGCGCAAGGCTAAA
 ACTCAAAGGAATTGACCGGGGCTCACACAAGCGGTGGATGATGTGGCTCAATTCGAAGCAACCGCAAGAACCTTACCAGGCTTGGGAGTGTAGGATTAGTCTGTGAA
 AGCAGAGTACACGGCTTCCCGTGGAACTAGCACAGGTGCTGCATGGCTGTCTGCTCAGCTCGTGTGAGTGTGGGTTAAGTCCCGCAACGAGCGCAACCCCTTGTCTTCTGTTGCCATCACGTTA
 TGGTGGCACTCTGAAGAGACTCCCGGTGATAAACCGGAGGAAGTGGGGATGACGTCAGTCAAGTCAAGTGGCCTTTATGCTGGGGCTACACAGTGTCTACA

>CAM2P2B09 Uncultured bacterium (Não classificada)
 CTTTGTAGTCCGAGGTTGAAATCCCATGGTCACTGACGACCGCTTCGAAACTGTGAACTTGGAGCTGGGAGAGGAAATCGGAATCCTGGTGTAGCGGTGAAATGCGTAG
 ATATCAGGAGGAACACCGGTGGCGAAGGCGGATTTCTGACCAAGTTCCTGACCACTGTGACACTGATGAGCGAAAGCCAGGGGAGCAAAACAGGATTAGATACCCTGGTAGTCTGGCTG
 TAAACGATGGGCACTAGGTGTGGGAGGATCGACCCCTCCGTCGCCAGTTAACGCATTAAGTGCCTCCCGCTGGGGAGTA

>CAM2P2B10 Uncultured bacterium (Acidobacteria)
 GGTGTAAGGGTACAGCGGCTGTGGCAAGTGGGAGTGAATCTCTGGGCTCAACTCAGAGGCTGCTTCCAAAAGTGTGCTTGGTGTGGAGTGGCGCGTGGAAAT
 TGCAGGTGTAGCGGTGAAATTCGTAGATATCTGCAGGAACACCCGTGGCGAAAGCGGCGGCTGGACCATAACTGACGCTGAAATGACGAAAGCTAGGGGAGCAAAACAGG
 ATTAGATACCCTGGTAGTCTAGCCCTAAACGATCAGGACTTGGGGTGTGCCCGTTCGGGCGTCTCCCGGAGCTAACCGCTTAAAGTCTGACCTGGGGAGTACGGT
 CGCAAGACTGAAACTCAAAGGAATTGACGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCTACCGAGGAACCTTACCTGGCTCGAAATGCTTAGGA
 CCAGCTGTAGAAATACGGCCCTCCCGCAAGGGACCTGAGTATAGGCGCTGCATGGCTGTCTGCTCAGCTCGTGGCTGAGGTTGAGGGTTAAGTCCCGCAACGAGCGCAAT
 CCTGACACAGTACTACTCGCAAGAGAGGACTCTGTGTGGACTGCTCCGGATAACGGAGAGGAAGCTGGGGATGACGTCAGTCCGATGGCCTTACGTCACAGGCG
 TACACA

>CAM2P2B12 Uncultured bacterium (Acidobacteria)
 GGTAAAGTCACTGTGAAACTCCGGGCTCAACTCGGAGCCTGCAGGCGAAACTGCCGTGCTGGAGTGTGGGAGAGGTCGCTGGAATCCCGGTGTAGCGGTGAAATGCG
 TAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCGCACTGGACCAGCTGACGCTGAGGCGCGAAAGCTAGGGGAGCAAAACAGGATTAGATACCCTGGTAGTCTAG
 CCTAAACGATGATTTGCTTGGTGTAGCAGGTACCCAATCCTGCTGTCCGCACTAACCGGTTAAGCAATCCCGCTGGGGATACGGTTCGCAAGGCTGAAACTCAAAGG
 AATTGACGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACCGCAAGAACCTTACCTGGCTCGAAGCGCAGTGGACCGGGGTAGA

>CAM2P2C02 Uncultured bacterium (Betaproteobacteria)
 GGGCGTAAAGCGTGCCTAGCGGTCCGCAAGTGCCTGTGAAAGCCGAGCTTACTTGGGAACTGCAGTGGAAACTATGGGACTTGAATCCGGCAGAGGGGGTGGAAATGCC
 ACGTGTAGCAGTGAATTCGTAGAGATGTGGCGGAACACCGATGGCGAAGGCGAGCCCTGGGCTGAGATTGACGCTCAGGCACGAAAGCGTGGGGAGCAAAACAGGATT
 AGATACCCTGGTAGTCCACCGCTAAACGATGACAACTAGGTGTTGGGGAAGCGATTTCTCAGTACCAGCTAACCGGTAAGTCCGAGCTAACCGGTAAGTTGTCCGCC

>CAM2P2C03 Uncultured soil bacterium (Acidobacteria)
 GGGTGTAAAGGGTTCGACGCGGTTGGCAAGTGGTGTGAAATTTCTGGGCTCAACTCAGAGACTGCTTCCGAAACTGCTGTGCTGGAGTGTGGGAGAGGCGCGTGG
 AATTGACGGTGTAGCGGTGAAATTCGTAGATATCTGCAGGAACACCCGTGGCGAAAGCGGCGGCTGGACCATACTGACGCTGAGGAACGAAAGCTAGGGGAGCAAA
 AGGATTAGATACCCTGGTAGTCTAGCCCTAAACGATCAGGACTTGGGGTGGCCCGCTTCCGGTGTCTCCCGGAGCTAACCGCTTAAAGTCTGACCTGGGGAGTAC
 GCTCGCAAGACTGAAACTCAAAGGAATTGACGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCTACCGAGGAACCTTACCTGGCTCGAAATGCTTAGGA
 TGACCAGCTGTGAAACACGGCCCTCCCGCAAGGGACAGGTGTGGAGGCGCTGCATGGCTGTCTGCTCAGCTCGTGGCTGAGGTTGAGGGTTAAGTCCCGCAACGAGCGC
 AACCCCTGCACGTAGTTGCCACTCGCAAGAGGAACTTACGTTGGACTGCTCCGGATAACGGAGAGGAAGTGGGGATGACGTCAGTCCGATGGCCTTTATGTC

>CAM2P2C06 Uncultured beta proteobacterium (Betaproteobacteria)
 GGGCGTAAAGCGTGCAGCGGTTCTGTTGTGCGGCTGAAAGCCCGGCTTAACTGGGAACTGGCCGTTGAAACTGGCGAACTGGAGTGTGGCAGAGGGGGTGGAA
 ATTCCGCTGTAGCAGTGAATTCGTAGAGATCGGGAGGAACACCGATGGCGAAGGCGAGCCCTGGGCTAACACTGACGCTCAGGCACGAAAGCGTGGGGAGCAAAACA
 GGGATTAGATACCCTGGTAGTCCAGCCCTAAACGATGTCAACTGGTGTGGGGAAGCGATTTCCAGTACCCTAGCTAACCGCTGAAAGTGTACCGCTGGGGAGTACG
 GCCCAAGGTTAAACTCAAAGGAATTGACGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCTACCGGAGGAACCTTACCTGGCTCGAAGCGCAAC
 AAGCCCGTGTAGAGGTTGGTGTGCCGAAAGGAATCGGAACACAGGTGCTGCATGGCTGT

>CAM2P2C08 Uncultured forest soil bacterium (Acidobacteria)
GGCGGTGTGACAAAGTCGGTAGTGAATCTCTGGGCTTACTCAGAGGCTGTGCGGAAACTGTTGTGTAGAGTGTGAGAGAGGGGAGTGAATACGGGTGTAGCGGTG
AAATGCGTAGATATCCGTAGGAACATCCGAGGCGAAAGCGGCTCGTGGATCACAACCTGACGCTGAGGGACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCGTGGTA
GTCCAGCCCTAAACCATCAGGACTTGGGGTTTGGCCCTGTACGGGGCAAGTCCCGGAGCTAACGCGTTAAGTCTGCGCCTGGGGAGTACGGTCGCAAGGCTGAAACTC
AAAGGAATTGACGGGGGCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCAACGGAAGAACCTTACCTGGGCTTGAACCGCACAGGACCACCCGAGAAATCG
GGGCTTCCCGCAAGGACCTGTGTAGAGGTGCTGCATGGCTGTCTGACGCTCGTCCGCTGAGGTGTTGGTTAAGTCCCGCAACGAGCGCAA

>CAM2P2C10 Uncultured bacterium (Acidobacteria)
TTAAGTTAGATGTGAAAACCTCTGGGCTCACCAGAGCTGCATCTAACTGGCGAGCTAGAGTCTGGAGGGGTACGGAATCTGGTGTACGGTGAATGCGTAGATTCAG
GAGGAACACCGGTGGCGAAGCGGCTACCTGGACAGAACTGACGCTGAGGACGAAAGCTAGGGGAGCAAACAGGATTAGATACCCGTGGTAGTCTAGCCCTAAACGA
TGGATACTTGGTGTACCGGGTGAATCCCGCTCGTCCGAAAGCTAACGCATTAAGTATCCCGCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGACGGG
GGCCCGCACAGCGGTGGAGTATGTGGTTAATTCGACGCAACGGAAGAACCTTACCTGGGCTCGAACGGCTAGTGA

>CAM2P2C11 Uncultured bacterium (Não classificada)
GTTGTTAAGGCTCCGGCTACTGGATATTGCAATGAAAACCTGGGCGCTAGAGGGTGTGAGAGAGAGAAGTGGAAATCCCGGAGTAGCGGTAAATGCGTGGATCTCGGA
GGAACACCAATGGCGAAGGCAGCTTCTTGGCTCATTCTGACATTGAGGACGAAAGCGTGGGGAGCAAACAGGATTAGATACCCGTGGTAGTCCACGCGGTAAACGATA
ATCATTAGATGTTGGTTCCGCTAGTGGATCAGTCTGTAGCTAACGCGTAAAGTGAATCCCGTGGGGAGTATGGTCCGAAAGCTGAAACTGAAAGAAATGACGGGG
GTCCGACAAAGCGGTGGAACATGTGGTTAATTCGACACTACGCGAGAAACCTTACCTAGGCTGACATGTACTTGACAGCTGCAGAAATATGTTCTTTGGGTTCCG
CTCAACAGGTACAAGGTGCTGCAT

>CAM2P2C12 Uncultured bacterium (Betaproteobacteria)
GGGCGTAAAGCGTGGCAGGCGGCTTTCGCAAGACAGATGTGAAATCCCGGGCTTACCTGGGAACTGCATTGTGACTGCATGGTGGAGTGGCGGAGAGGGGGATGGA
ATCCCGCTGTAGCAGTGAATCCGTAGATATCGGAGGAGCACCGATGGCGAAGCAATCCCGTGGGCTGCACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACA
GGATTAGATACCCGTGGTAGTCCACGCGCTAAACGATGTCAACTGGTGTGGAGCGGCTGCTGTTAGTAAACGAAAGCTAACGCGTGAAGTTGACCGCTGGGGAGTACG
GCCGCAAGGTTGAAACTCAAAGGAATTGACGGGGACCCGACAAAGCGGTGGATGTGTGGTTAATTCGATGCAACGCGAAAAACCTTACCTACCCCTGCATGCCAGG
AATCCCGCAGAGATGTGGAGTCTCGAAAGAGAACTGGACACAGGTGCTGCATGGCCGCTCGTACGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACCGA

>CAM2P2D01 Uncultured bacterium (Não classificada)
ATTGTAAGTCCGTGTTGAAAGACTCGGCTCAACTGAGGACCGGCTCGGATACTACAATCTTGGAGCAATCAGAGGGTGTGGAATCCCGGTGTAGCGGTGAAATGC
GTAGATATCGGAGGAAACACCGTGGCGAAGGCGATCACCTGGGGTGTCTGACGCTGAGGAGCGAAAGCTAGGGGAGCAAACGGGATTAGATACCCCGTAGTCTCA
CCGTAACCGATGGATACTAGGTGTATGTGATCGACTCCATATGTGCCGTAGTTAACACAGTAAGTATCCCGCTGGGGAGTACGGCCGCAAGGTTAAACTCAAAG
GAATGACGGGGGCCCGCACAAAGCGGTGGAGCATGTAGTTAATTCGACGCAACGCGAAGAACCTTACCGAGGCTTGACATCCCTGAAACCGCTGAAAGATGCGGTTT
CGTAGCAATACGGCAAGGTGACAGGTGCTGCATGGCTGTCTGACGCTCGTCCGCTGAGGTGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTCGTTTGTGTGGTCCG
CAAGGATCTCTCAAAAAGACCCCGGTGAGAAGCCAGAGGAAGTGGGGATGACGTTCAAGTCAG

>CAM2P2D02 Uncultured bacterium (Acidobacteria)
GGGCGTAAAGTGGTAGGCGGTGCTTAAAGTTCGGTGTGAAATCTCCCGGCTCAGTGGAGGGTGGCGGAAACTGGAGTGTGCAACGTTGGGAGAGGAAAGCGGAA
TTCCCTGGTGTAGCGGTGAAATGCGTAGATATCAGGAGGAACACCTCGGCTGTAGACGGCTTTCTGGACCATTGTTGACGCTGAGACACGAAAGCGTGGGGAGCAAACAG
GATTAGATACCCGTGGTAGTCCACGCGCTAAACGATGCATGTTGGTGTGCGGCAATTCGTTGGTCCGCTGAGGCTAACGCGTTAAGTATGCGGCTGGGGAGTACGG
TCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAAGCGGTGGAGCATGTGGTTAATTCGAAAGCAACGCGCAGAACCTTACCGAGCCCTGACATCCCGGTCCG
ACCGGTGATAGAAATATCGCCTTTCGCGCAAGGAGCTGGAGTGGAGGTGCTGCATGGCTGTCTGACGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCA
ACCCCTGTCTGTGTTGCTAATCCGCA

>CAM2P2D03 Mesorhizobium sp. WSM3875 (Alphaproteobacteria)
GGGCGTAAAGCGCAGTAGGCGGATATTAAGTCAAGGGTGAATCCCGGGGCTCAACCCGGAACCTGCTTTGATACTGGGTCTGGAGTCCGGAAGAGGTGAGTGAAT
TCCGATGTAGAGGTGAAATTCGTAGATATTCGAGGAAACACCGTGGCGAAGGCGGCTCAGTGGTCCGCTGAGGCTGAGGTGGGAAAGCGTGGGGAGCAAACAGG
ATTAGATACCCGTGGTAGTCCACGCGCTAAACGATGGAAGCTAGCCGTTGGCAAGTACTTGTGCGTGGCGCAGCTAACGCATTAAGTCTCCCGCTGGGGAGTACGGT
GCAAGATTAACACTCAAAGGAATTGACGGGGGCCCGCACAAAGCGGTGGAGCATGTGGTTAATTCGAAAGCAACGCGCAGAACCTTACCGAGCCCTGACATCCCGGTCCG
GGTTTCCAGAAATGGATACCTTCAGTTCCGCTGGAGTGGAGTGTGCTGATGGCTGTCTGACGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAA
CCCTCGCCCTTAGTTGCCATCATTCAGTTGGGCACTTAAGGGGACTGCCGTTGATAAGCCGAGAGGAAGTGGGGATGACGTTCAAGTCTCATGCCCTTACGGGCTG
GGTACACACGCTGCTACAATGTTGGTGTGACAGTGGGAGCGAGACCGGAGGTCGAGTAACTCCAAAAGCCATC

>CAM2P2D05 Uncultured Myxococcales bacterium (Deltaproteobacteria)
CGCGTGTAGCGGCTTTCGCAAGTCCGGTGTGAAATCCCTCAGTCAACTGAGGAAGTGGCGCCGAAACTGCAGAGCTTGGTACCGGAGAGGATGGCGGAAATCCCGAA
GTAGAGGTGAAATTCGTAGATATTCGGGAGGAACACCGGTGGCGAAGGCGGCTCAGTGGTCCGCTGAGGCTGAGGCTGAGGAGGAAAGCGTGGGGAGCAAACAGGATTAGAT
ACCCGTGGTAGTCCACGCGTAAACGATGAGAAGTGGTGTGTTGACCCCGCGGTGCCGTAGCTAACGCATTAAGTCTCCCGCTGGGAAGTACGGCCGCAA
GGCTAAACACTCAAAGGAATTGACGGGGGCCCGCACAAAGCGGTGGAGCATGTGGTTAATTCGAGCAACGCGCAGAACCTTACCTGGTCTTGCATCCCGAATCTGC
CAGAGATGGCGGAGTCCCGCAAGGAAACCGAGAGACAGTGTGCTGATGGCTGTCTGACGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTC
GCCTTAGTTGCCACGCAAGTGGATCTTAGAGGACTGCCGTTGTTAAACCGGAGGAAGTGGGGATGACGT

>CAM2P2D06 Uncultured crenarchaeote (Thermoprotei)
AAGCATCGCAGCGGTTTACAAGTCTCCGTTAAATCCAACCTGCTTACAGATGGGCCGCGGAGGATACTATAAGACTAGGAGGAGGAGGCAAGCGGTACTCAGTGG
GTAGGGGTAAAAATCCGTTGATCCATTGAAGACACCAAGTGGCGAAGGCGGCTTCCGAGAATGCGCTCGACGCTGAGGAGTGAAGCTGGGGAGCAAACCGGATTAGAT
ACCCGGGTAGTCCAGCCTGTAACAGATGCAGACTCGGTGATGGACTAGTTAATGCTAGTCCAGTCCCGCAGGGAATCCGTTAAGTCTGCCGCTGGGTAGTACGGTC
GCAAGACTGAAACTTAAAGGAATTGCGGGGGAGCACCAAAAGGGTGAATCTGCGGTTCAATTTGGAGTCAACGCGGGAATCTTACCGGGGCGCAGCAGAGTGA
GGTCAAGCTGAAGACTTACTAGACAAGCTGACGAGGAGTGTGCGATGGCTGTCCGAGCTTCTGTCGCTGAGGTGCTGTTAAGTCAAGTAAAGCAGGAGACCCCT
GCTTCTAGTTGCTACTTATTATTCTCGGAGT

>CAM2P2D08 Uncultured bacterium (Acidobacteria)
GTCTGATGTGAAATCTCCGGGCTCACTCGGAGTCTGCATCAGAACTGCCATGCTTGAAGTGTGGGAGAGGTGAGTGAATCCCGGTGTAGCGGTGAAATGCGTAGATA
TCGGGAGGAACACCTGTGGCGAAGGCGGCTCACTGGACCAACAACCTGACGCTGATGCGCGAAGCTAGGGGAGCAAACAGGATTAGATACCCGTGGTAGTCTTAGCCCTAA
ACGATGATCGTGGTGTGATAGGTACCAATCTATCGTCCGAGGACTAACGCGTTAAGCGATCCCGCTGGGGAGTACGGTCGCAAGGCTGAAACTCAAAGGAATTGA
GAGGCGCCGACAAAGCGGTGGAGCATGTGGTTAATTCGACGCAACGCGAAGAACCTTACCTGGGCTCGAAATGTAGTGGACCGGGGTGGAAACCTTTTCGCAA
GAACCGCTATATAGGTGCTGCATGGCTGTCTGACGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTTATTGCCAGTTGCCATCGGGTATGCG
GGCATCTGGCGAA

>CAM2P2D10 Burkholderia sp. NGR195A (Betaproteobacteria)
AGCGTCCGAGGCGGTTCCGTAAGACCGATGTGAAATCCCGGGCTTAACTGGGAACTGCATTGGTACTGGCGGCTAGAGTATGGCAGAGGGGGTGAATTCAC
GTGTAGCAGTGAATGCGTAGAGATGTGAGGAATACCGATGGCGAAGGAGGAGCCCTGGGCCAATACTGACGCTCATGCACGAAAGCGTGGGGAGCAAACAGGATTAG
ATACCCGTGGTAGTCCACGCGCTAAACGATGTCAACTAGTTGTGCGGCTTTCATGACTTGGTACGCTAGCTAACGCGTGAAGTTGACCGCTGGGGAGTACGGTCCGAA
GATTAACACTCAAAGGAATTGACGGGGGCCCGCACAAAGCGGTGGATGATGTGATTACTTCTGATGCAACGCGGAAACCTTACCTACCCCTGACATGTCGGAACCTTG
CTGAGAGGTGAGGGTCCCGCAAGGAGCGGTAAACAGGTCGATGGCTGTCTGACGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTTG
TCCTGTTGCTACGCAAGAGCAC

>CAM2P2D11 Uncultured bacterium (Betaproteobacteria)

GGGCGTAAAGCGTGGCGACGGTGTGACGACAGATGTGAAATCCCCGGGCTCAACTGGGAACTGCATTTTGTACTGCATTGCTGGAGTGGCGCAGAGGGGGATGGAATT
CCGCGGTAGCAGTAAATGCGTAGATATGCGGAGGAACCCGATGGCGAAGCAATCCCTGGGCTGCACTGACGCTCATGCACGAAAGCGTGGGGAGCAAAACAGGA
TTAGATACCCTGGTATGTCACCGTAAACGATGTCAACTGGTTGTTGGACGGCTTGTCTGTCAGTAACGAAGCTAACCGGTGAAGTTGACCGCTGGGGAGTACGGCC
GCAAGTTGAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATGTGGTTAATTCGATGCAACGCGAAAAACCTTACCTACCCTTGACATGCCGGGAAT
CCTG

>CAM2P2E01 Uncultured acidobacteria bacterium (Acidobacteria)
GGCGTAAAGGGCGGTAGCGTTCGGTAAGTCACTGTGAAACTCTGGGCTCAACTCAGAGCCTGCATGCGAAACTGCCGTGCTAGAGTGTGGGAGAGGTCGTGGAATCCC
GGTGTAGCGGTGAAATGCGTAGATATCGGGAGGAACACCTGTGGCGAAAGCGGCTCCTGACGACAAAACCTGACGCTGAGGCGGAAAGCTAGGGGAGCAAAACAGGATTA
GATACCCTGGTAGCTTAGCCCTAAACGATGATTGCTTGGTGTGTCGGGTATCGAATCCCGACGTGCCGAAGCTAACCGGATAAGTATCCGCTGGGGAGTACGGTCCG
CAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACGCGAAGAACTTACCT

>CAM2P2E02 Uncultured bacterium 9(Acidobacteria)
GGGTGTAAGGGTCTAGGCGGTGGCAAGTGGGAGTGAATTTCTGGGCTTAACTCAGAGACTGCTTCCGAAACTGCTGTGCTCGAGTGTGGGAGAGGCGCGTGGAA
TTGACGGTGTAGCGGTGAAATGCGTAGATATCTGCAGGAACACCCGTTGGCGAAGCGGCGCGCTGGACCACTACTGACGCTGAGGAACGAAAGCTAGGGGAGCAAAACAG
GATTAGATACCCTGGTAGTCTAGCCCTAAACATCAGGACTTGGGGTGCCTCCGTTCCGGAAGTCTCCCGGAGCTAACGCGTTAAGTCTGACCTGGGGAGTACGG
TCGCAAGACTGAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAACATGTGGTTCAATTCGACGCTACCGGAGGAACCTTACCTGGGCTCGAAATGCTTCTG
ACCAGCTGTAGAAATGCGTCCCGCAAGGACAGGATATAGCGCTGCACTGGCTGCTGTCAGCTCGTGGCGTGAAGTGTGGGTAAAGTCCCGCAACGCGCAACGCGCAA
CCCTGCACGTAGTTGCCACTCGCAAGGGAACCTACGTGACTGCTCCGATAACGAGAGGAAGGTGGGGATGACGTCAGTCCGCATGGCCTTTATGT

>CAM2P2E05 Uncultured Holophaga sp. (Acidobacteria)
GCTTCTAAGTTCGAACTGAAATCCCCGGGCTCAACCGGGAACCTGCGTCCGATACTGGAAGGCTTGAATCCGGGAGAGGGATGCGGAATTCAGGTTAGCGGTGAAATG
CGTAGATATCTGGAGGAACACCGGTGGCGAAGCGGCATCCTGGACCGGCATTGACGCTGAGGCGGAAAGCCAGTGGAGCAAACGGGATTAGATACCCCGGTAGTCTCT
GGCCCTAAACGATGAATGCTTGGTGTGGCGGGTATCGATCCCTGGCGTCCGAAAGCTAACGCATTAAGCATTCGCTGGGAGTACGGTCCGAAAGGCTGAAACTCAA
GGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACCGGAAGAACCTTACCAGGCTTGAAGTGCAGGAGTACAACTACGAAAGTAGGCT
TCCGCAAGGACGCTCGTAGAGGTGCTGATGGCTGTGCTGAGTGTGCTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCTTGTCTTCTGTTGCCATCGGG
TTATGCCGGGCACTCTGAAGAGACTGCCGTTGACAAACCGGAGGAAGGTGGGGATGACGTCAGTCCAGTGGCCTTTATGTCTGGGGCCACACAGTGTACAATGGC
CGGTACAAACCGTCCGCA

>CAM2P2E06 Uncultured bacterium (Acidobacteria)
GGCGTAAAGAGTGTAGGTGGTTCGCAAGTTTGTGCTGAAATCTCCCGGCTTAACTGGGAGGTTGCGTGGGAAACTGGAATGCTTGGAGTGGGAGAGGAAAGCGGA
ATTCCTGGTGTAGCGGTGAAATGCGTAGATATCAGGAGGAACACCCGTTGCTAGCAGCTTCTGGACCTTCTGACACTGACGACGAAAGCGTGGGTAGCAAAAC
GGATTAGCTACCTGTTAGTCCAGCCCTAAACGATGCACTACTGGTGTGAGCACTTCAATTTGGTTCGTCGCGGAGTAAACCGCTTAAAGTATGCCCTGGGGAGTACG
GTCGCAATGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTCAATTCGACGCAACCGGAAGAACCTTACCTGGGCTCGAACGGCTATG
GATCGACCGTAGAAATAGGTTTCCCGCAAGGACTGTAGTCCAGGTTGCTGATGGCTGTGCTCA

>CAM2P2E10 Uncultured bacterium KF/GS-JG36-31 (Acidobacteria)
CGGTGTGGCAAGTTCGTAAGTCTCTGGGCTTAACTCAGAGGCTGCTGCCGAAACTGCTGTGCTGAGTGCAGAGAGGCGAGTGAATTCAGGTTAGCGGTGAA
AATGCGTAGATATCTGCAGGAACATCCGAGGCGAAAGCGGCTCGTGGATCGCAACTGACGCTGAGGGAGCGAAAGCTAGGGGAGCAAAACAGGATTAGATACCTGGTAGT
CCTAGCCCTAAACGATCAGGACTGGGCGTGGGCCCTGTACGGGGCTCGTGGCGTAGCTAACCGGTTAAGTCTGCGCTGGGGAGTACGGTCCGAAAGGCTGAAACTCAA
AGGAATTGACGGGGGCCCGTACAAGCGGTGGAACATGTGGTTCAATTCGACGCAACCGGAAGAACCTTACCTGGGCTTGAACCGCACAGGACCATTTTGAAACAGAG
ACTTCCCGCAAGGACCTGTGTAGAGGTGCTGATGGCTGTGCTGAGTGTGCTGAGGTTGCGGGTTAAGTCCCGCAA

>CAM2P2F02 Uncultured bacterium (Betaproteobacteria)
TACTGGGCGTAAGCGTGGCGAGGCGGTTTTGCAAGACAGATGTGAAATCCCCGGGCTAACCTGGGAACTGCATTGTGACTGCATGGCTGGAGTGGCGCAGAGGGGGAT
GGAATTCGCGGTGTAGCAGTGAATGCGTAGATATGCGGAGGAACACCCGATGGCGAAGGCAAGCTCCCTGGGCTGTACTGACGCTCATGCACGAAAGCGTGGGGAGCAA
ACAGGATTAGATACCCTGGTAGTCCACGCCATAAACGATGTCAACTGGTTGTTGGAGCGGTTGCTGTTAGTAAACGAAAGCTAACCGGTGAAGTTGACCCGCTGGGGAGT
ACGGCCGCAAGGTTGATACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGATGATGTGGTTAAT

>CAM2P2F04 Uncultured bacterium (Gammaproteobacteria)
CTGGGCGTAAAGCGTGGTAAAGCGTAAAGCGGCTCAACTGGGAAATGCATTGAGACTGCTCTGCTAGGTTGCGGAAGAGGGAAGCGG
AATTTCCCGTGTAGCGGTGAAATGCGTAGATATCGGAAGGAACACCAAGTGGCGAAGCGGCTTCTGGTCCAGCACCAGCTTACGACGAAAGCGTGGGGAGCAAA
AGGATTAGATACCCTGGTAGTCCACGCCATAAACGATGAGAATGACGTTGAGAGGTAAGCCTCGCAGTGTGCTAGCTAACCGGCTAAGTTTCCGCTGGGGAGTA
CGGCCGCAAGGTTGA

>CAM2P2F05 Uncultured bacterium (Alphaproteobacteria)
CCGGGCTCACTCCGGATGCTTTAAGACTGCATCGTGAATTTGGGAGAGGTAAGTGAATCCGAGTGTAGAGGTGAAATCGTAGATATTCGGAAGAACACCAAGTGGC
GAAGCGCACTTACTGGACATATTGACGCTGAGTGCAGGCGTGGGGAGCAAAACAGGATAGATACCCCGGTAGTCCACGCGGTAACGATGATGACTAGCTGTCTGG
CGCTTAGCGTTCCAGTGGCGCAGTAAACGCGTAAAGTCACTCCGCTGGGGAGTACGGCCGCAAGGTTAAACTCGAAGAAATGACGGGGGCTGCACAAGCGGTGGA
GCATGTGGTTAATTCGAAGCAACGCGCAGAACCTTACCAGCGTTTGCATGCCAGGACGGTTTCCAGAGATGGATCCCTTCCCTTACGGGACCTGGACACAGGTGCTG
CATGGCTGTGCTGAGTGTGCTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCTCGTCTTTAGTTGCCACCATTTAAGTTGGGCACCTCAAAGAAACTGCGG
GTGATAAGCGGAGGAAGGTGGGATGACGTCAGTCAAGTCCATGGCCCTTACGCGCTGGGCTACACAGTGTCAATAGT

>CAM2P2F06 Uncultured bacterium (Verrucomicrobiae)
TTGGGCGTAAAGGGTGTAGGTGGCGCGCTAAGTCCGGGCTGTGAAATTTCCGAGCTTACTCCGAAACTGCATTTCGATACTGGCGTCTTGGAGACTGGAGAGGAGACT
GGAATTTACGGTGTAGCAGTGAATGCGTAGATATCGTAAGGAAGACCAAGTGGCGAAGGCGGGTCTCTGGACAGTTCCTGACACTGAGACACGAAAGCGGAGGAGCAA
ACGGGATTAGATACCCCGGTAGTCTGGCAGTAAACGGTGCACGTTTGGTGTGGGAGGATTCGACCCCTTCTGCGCCGAGGCAACCGGTTAAACGTTGCCGCTGGGGA
GTACCGTCCCAAGATTAAACTCAAGAAATTTGACGGG

>CAM2P2F08 Uncultured Holophaga sp. (Acidobacteria)
GGGAACTGCGTCCGATACTGGAAGGCTTGAATCCGGGAGAGGATGCGGAATCCAGGTGTAGCGGTGAAATGCGTAATATCTGGAGGAACCCGGGGCGAAGGCGGCATC
TGGACCGGCATGACGCTGAGGCGGCAAGGCGAGGAGCAACCGGATTAATACCCTGGTAGTCTTGGCCCTAAACGATGAATGCTTGGTGTGGCGGGTATCGATCCC
TGCCGTGCCGAAGCTAACGATTAGCATTCCGCTGGGAGTACGGTGCAGGCTGAAACTCAAAGGAATGACGGGGGCCGACAAGCGGGGAGCATGTGGTCAATTCGA
CGCAACGCGAAGAACCTTACCAGGCTTGAACCTGCGAGTGACATCCTACGAAAGTAGGCTTCCGCAAGGACACTCTGAGAGGTGCTGCATGGCTGTGCTGAGTGTG
CTGAGATGT

>CAM2P2F10 Uncultured bacterium (Sphingobacteria)
TAAGTCAAGTGGTAAATCTCCGGGCTTAAACCGGAAACTCCGCTGTGATCATCTGTCTTGAATGCCGTGGAGGTGAGCGGAATATGTCATGTAGCGGTGAAATGCTTA
GATATGACATAGAACACCGATTGCGAAGGCGAGTCTGACACGGTTATTGACGCTGAGGACGAAAGCGTGGGGATCAAACAGGATTAGATACCCTGGTAGTCCACGCC
CTAAACGATGATCACTGCACATCAGCGATACACTGTTGGTGTCTGAGCGAAAGCATTAAAGTGTATCCACCTGGGAAAGTACGACCGCAAGGTTGAAACCCCAAGGAAATGA
CGGGGTCGCGCAACGCGGTGGAGCATGTGGTTAATTCGATGATACGCGGAAACCTTACCTGGGCTAGAATGTCCCGGACAGGTTGGTGAAGACTACCCTGTAGCA
ATACGCGGGTAAAGTGTGATGGCTGCTGCTGAGTGTGCTGAGTGTGGTAAAGTCCCGCAACGAGCGCAATCCCATCACTAGTGGCATCAGGTAAGT
CTGGGAACTCTAGTAAACTGCCGCTGTAAGACGCGAGGAGGAGGATGATGTCAGTCACTATGGCCTTTATGCG

>CAM2P2F11 Uncultured bacterium (Anaerolineae)
CTGGGCGTAAAGCGGTGACGCGGTTCCGTAAGTTGGGCGTGAATCTCCTGGCTTACTAGGAGAGGTCGTTCAATACTACCAGGCTAGAGAGTGGTAGAGGAAGT

>CAM2P2H04 Uncultured bacterium

CTGCAGGCGAACTGCGTGTGGAGTGTGGGAGAGGTGCGTGGAAATCCCGGTGTACGGTGAATGCGTAGATATCGGGAGGAAACCTGTGGCGAAAGCGGCGCACTGG
 ACACAACTGACCGTGTAGTGGAACTGCGGGAGCAAAACAGGATTAGATACCTCGGTAGTCCCTTAGCCCTAAACGATGGATGCTTGGTGTGGGTACCCAATCCCGC
 CGTGCCGAAGCTAACCGGATAAGCATCCCGCTGGGGAGTACGGTCGAAGGCTGAAACTCAAAGGAATTGACGGGGGCCGCAAGCGGTGGAGCATGTGGTTCAAT
 TCGACGCAACCGGAAGAACCTTACCTGGGCTCGAAGCGCAGTGGACCGGGGTAGAAATATCCCTTTCCGCAAGGACCGCTGCGGAGGTGCTGCATGGCTGTCTCAGCT
 CGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTTATCCCTAGTTGCCATCGGGTCAAGCCGGGCACTTAGTGAACCCGCCCCGATAAC

>CAM2P2H05 Uncultured bacterium (Alphaproteobacteria)

TGAAATCCTGGAGCTCACTCCGAACTGCCCTTGATACTGAGGAGCTTGAGTCCGGGAGAGGTGAGTGGAACTGCGAGTGTAGAGGTGAAATTCGTAGATATTCGCAAG
 AACACCAGTGGCGAAGCGGCTCACTGGCCCGTACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAAACAGGATTAGATACCTGGTAGTCCACGCCGTAACAGATGGA
 TGCTAGCCGTTGTGGGTTTACTCGTCACTGGGCGAGTAAACGATTAAGCATCCCGCTGGGGAGTACGGTCGCAAGATTAAACTCAAAGGAATTGACGGGGGCCG
 CACAAGCGGTGGAGCATGTGGTTCAATTGGAAGCAACCGCGCAAGACCTTACAGCCTTTGACATCCCGGTGCGGGGACCAGAGATGGAGCCCTTTCAGTTCCGGTGGAC
 CGGAGACAGGTGCTGCATGGCTGCTGCTCAGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTCGCCCTTAGTTGCCATCATTAGTTGGGCACT
 CTAAGGGGACTGCGGTTGATAAGCCCGGAGGAAGGTGGGGATGACGTCAGTCCCTCATGCCCCCTTACAGGCTGGGTACACACGCTGTACAATGGCGGTGACAATGGGA
 CGCAATGGGG

>CAM2P2H06 Uncultured bacterium (Verrucomicrobiae)

GTGAAATTTCCGAGCTTACTCCGAACTGCATTCTGACTGGCGTGTGGAGACTGGAGAGGAGACTGGAATTTACGGTGTAGCATTGAAATGCGTACATATCGTAAG
 GAAGACAGTGGCGAGGGGGGCTCTCGACAGTGCCTGACACTGATGACACGAAGGCCAGGGGAGCAAAACGGGATTAGATACCCCGTAGTCCCTGGCAGTAAACCGGT
 CACGTTTGGTGTGGGAGGATTCGACCCCTTCTGCGCCGAGCAACCGCTTAAACGTTGCCCTGGGGAGTACGGTCGAAGATTAAACTCAAAGAAATTGACGGGGG
 CCGCACAAGCGGTGGAGTATGGGCTCATTTCGATGCGACGGGAAGCACTTACAGGCTTTGACATCGCATCTTAAGTTGGTGAAGCCAGCGGATTCGAAAGAGA
 CAATTTGACAGGTGCTGCATGGCTGCTGCTCAGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAAACCTGTGAACGTGTTGCCACGGAACCGAGAGGT
 TCCAGCACTCTGTTACAGCTGACTCGCTTAAACGAGGAGGAAGGTGGGGACGAGCTCAAGTCAAGTATGGCCCTTAC

>CAM2P2H08 Uncultured bacterium (Deltaproteobacteria)

GGCGTTTCGTTAAGTCAGATGTGAAAGCCCGGGCTCACTCCGGGAAGTGCATTTGAACTGGCGAGCTTGTAGTATGGAAGAGGATCGCGGAATCCCGGTGTAGAGGT
 GAAATTCGTAGATATCGGAGGAAACACCAAGTGGCGGATCTGGCCAATACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAAACAGGATTAGATACCTCGGT
 AGTCCACGCGGTAACAGATGGATGCTAGATGTCGCGGGTATTGACCCCTGCGGTGTGCGAGCTAACGCATTAAAGCATCCCGCTGGGGAGTACGGCCGAAGGTTAAAA
 CTCAAAGGAATTGACGGGGGCCGCAAGCGGTGGAGCATGTGGTTAATTGACGCAACCGCGCAAGACCTTACCTGGGTTAAATCAAACGGAACCCCTGCAGAGATGT
 GAGGGTCCCTTCGGGAAATCGTTGAGACGGTGTGCATGGCTGCTGCTCAGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGTGAACTGTTG
 GCTAACAGTTAGGCTGAGCACTTAACGAGACCGCGGTGTTAAACCGGAGGAAGGTGGGGATGACGTCAGTCCCTCATGCCCCCTTATGCCAGTGTACACACGCTGT
 ACAATGGCCGTTACA

>CAM2P2H09 Uncultured bacterium (Verrucomicrobiae)

CGGTTCCGTTAAGTCGGGTGTGAAATCTCGGGCTTACTCCGAACTGCATTCGATACTGCGGTGCTTGGAGACTGGAGAGGAGACTGGAATTTACGGTGTAGCGGTGAA
 ATGCGTAGATATCGTAAAGGAAGACCAAGTGGCGAAGCGGGTCTCTGGACAGTTCCTGACGCTGAGGACGAAAGGTGAGGGAGCAAAACGGGATTAGATACCCCGTAGT
 CCTGACAGTAAACCGGTGACGCTTGGTGTGGGAGGATTCGACCCCTTCTGCGCCGAGCTAACCGCTTAAACGTTGCCCTGGGGAGTACGGTCGAAGATTAAACTCAA
 AAAGAAATTGACGGGGGCCGCAAGCGGTGGAGTATGTGGCTCAATTCGATGCAACCGCAAGAACTTACCAGGCTTGCATGCACTCTTAAGTTGGTGAAGGCCA
 GCGAGTCCCGCAAGGACAATTTGACAGGTGCTGCATGGCTGCTGCTCAGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTGTGAACTGTTG
 CCACCGAGCGGTGAGGCTCGAGCACTCTGTTACAGCTGCCCCGCTTAAACGGGAGGAAGGTGGGGACGAGCTCAAGTCAAGTATGGCCCTTACGGCCCTGGGCTGCACAC
 GTAC

>CAM2P2H10 Uncultured bacterium (Actinobacteria)

GCAGGTCAGCTGTGAAACTCAAGGCTCAACCTTGAGACGTCCGGTGAACCCGATGGCTAGAGTCCGGAGGAGGAGTGAATTTCCCGGTGTAGCGGTGAAATGCGC
 AGATATCGGGAAGAACACCCATGGCGAAGGACGCTCTCTGGGACGCTACTGACGCTGAGACGCGAAAGCGTGGGGAGCGAACAGGATTAGATACCCCTGGTAGTCCACGC
 CGTAAACGATGGAACATAGGTGTGGCGGGTGTGCATCCCGCTGTGCGCAAGCTAACGCATTAAAGTCCCGCCCTGGGGAGTACGGACGCAAGGCTAAACTCAAAGGA
 ATTGACGGGGGCCGCAAGCAAGCGGAGCATGTGGTTAATTGACGCAACCGCGAAGAACTTACCAGTGTGATGCACTTTGAAACCCCTGGAAACACCGGTCCCC
 CTTCCGGGCTAATGCACAGGTGGTGCATGGCTGCTGCTCAGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAATCCCTGTTCCATGTTGCCAGCGGTA
 ATGGCGGGGACTCATGGAAGACTGCGGTTGACAAAGCGTAACAAGGTAGAGCTCTCAGTCAAGTCAAAGGGC

>CAM2P2H11 Uncultured bacterium (Sphingobacteria)

TCAGTGGTGAATTCCTGGGACTTACCCGGAACTGCCATTGATACATATGCTTGAATATCGTGGAGGTCAGCGGAATGTGTCATGTAGCGGTGAAATGCTTAGATA
 TGACATAGAACCAATTCGGAAGGAGCTGGCTACCCGAATATTGACACTGATGACGAAAGCGTGGGGATCAAAACAGGATTAGATACCTGGTAGTCCACGCCCTAA
 ACGATGGATACTCGACATACCGATATACGTGTGCTGAGCGAAGCAATTAAGTATCCACCTGGGAAGTACGATCGCAAGATTGAAACTCAAAGGAATTGGCGGG
 GGTCCGCACAAGCGGTGGAGCATGTGGTTAATTTCATGATAGCGAGGAACCTTACC

>CAM2P03A02 Uncultured Rubrobacteridae (Actinobacteria)

TATGAGTCCCGACGAACTGCTGGCACATAGGACAGGGTTCGCGTCTGTTGCGGGAGCTAACCAATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACT
 ATGCCCGAAGGGGGACCGTATTCTACGGTTTTCAGTGCATGTCAAGCCGAGTAAAGTTCCTTCGCGTTCGATGAAATTAACACATGCTCCGCTGCTTGTGCGGG
 CCCCCTCAATTCCTTGTAGTTTACGCTTTCGCGGCTACTCCCCAGGCGGCACTTAAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGGCC
 ATCGTTTACGGCGTGGACTACAGGGTATCTAATCCTGTTGCTCCCGCGCTTTCGCGTCTCAGCGTCAAGTCCCGTCCAGAGAGCGCCCTTCGCGACGGGTGTTCTT
 CCGGATATCTGGCATTTCACCGCTACACCGGGAATTCACCTCTCTCTTCGCGACTTAGCCAAACCGGTTTCAACCGACGCTCTCGAGTTGAGGCTTTCAGTTTCA
 GCTGACCTGAATGGCCGCTACACGCTCTTACGCCCAATAAATCCGGACAACGCTTGCCTTACGATTTACCGCGGCTGCTGGCACTCAGTCACTA

>CAM2P03A03 Uncultured Rubrobacteridae bacterium (Actinobacteria)

TTGGCTCGTTGGGGACGTAACCCAACTCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCGAAGGGGGACCGTATTTCTACGGTTTTC
 GTGCAATGCAAGCCCTGGTAAGGTTCTTCGCGTTCGCTCGAATTAACACATGCTCCGCTGCTTGTGCGGGCCCCCGTCAATTCCTTGTAGTTTGTAGCCTTTCGCGCG
 TACTCCCGAAGGGGGGCACTTAAATGCGTTAGCTTCGCGACAGCGGGAGTGCATACCCGCCACACCTAGTGCCTATCGTTTACGGCGTGGACTACAGGGGATCTAATCC
 GTTTCGCTCCCGACGCTTTCGCGTCTCAGCGTCAAGTCCCGAGAGCGCCCTTTCGCGACGGGTTGCTTTCGCGATATCTGCGCATTTACCGCTACACCGGGAAT
 TCCACTCTCTCTTCGCGACTCTAGCCAAACGGTTTCAACCGACGCTCTCGAGTTGAGGCTTTTTCAGCTGACCTGAATGGCCGCTTACACGCTCTTTACGGC
 CAATAAATCCGGACAACGCTTCCCGCTTACCGCGGCTGCTGGCACTCAGTCACTA

>CAM2P03A04 Unidentified eubacterium from the Amazon (Não classificada)

CATACTTAGCACTGTCCCTTGGCGGTTACACGGTATTTCTAGTACAGCCAGCTTTTCGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTAATTCACGGGCAT
 GCTGATCCCGGATTAAGTACGATTCGACTTTCATGACGGCGAGTTGCGAGCTACAATCCGAACGAGACCGGCTTTTTCGATAGTCCCGCTTCGCGGGCTTCGCGAGC
 GTTTGTACCGCCATTTGACACGTTGTAGCCCTGGACATAAAGGCCATGCTGACTGACGCTACCCACCTTCTCCGGTTTGTACACCGGCGAGTCTTCCAGAGTG
 CCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACACCGATGACAGCACTCTCGAGATG
 CCGTTGCGGGAGTTCGACTTTCGCGGATGTCATCTGCACTTCGAGCCAGGTAAGGTTCTTCGCGTTCGCTCGAATTTGAACACATGCTCCACCGCTTGTGCGGGCC
 CCGTCAATTCCTTGTAGTTTACGCTTTCGCGACGCTACTCCCCAGCGGAATGCTTAAACCGGTTAACTGCGGCACGGCA

>CAM2P03A05 Uncultured bacterium (Acidobacteria)

ACCTCCCTTGGGGTGGTTCGGGCACTTCTAGTACCACTTCTGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGTAATTCACCGCAACATTTGATTTGC
 GATTACTAGCGATTCCAACCTCATGAAGTCGAGTTGACAGACTTCAATCCGAACGAGACCGGTTTTTTCGATTAGTCCCTCTTACGAGATTGCGACGTTTTGTACCGG
 CCATTTGACAGCGTGTGAGCCATAAGCAAAAAGGCCATGATGACTGACATCCCACTTCTCCGTTTTTCAACAGCAGCTTGTATAGAGTTCTCAACTTAAT
 GTTAGCAACTCAATAGGGGTTGCGCTGTTGCGGGACTTAAACCAACTCTCACGACACGAGCTGACGACACCGATGACAGCACTTTGTTGGGTTGGGTTCCCGAG
 ACTCTTGGCGTTACCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTCGCTCGAATTAACACACATGCTCCACCGCTTGTGCGGGTCCCGTCAATTC

CTTTGAGTTTCACACTTGCCTGC

>CAM2P03A06 Uncultured soil bacterium (Não classificada)

TGTACAAGGCCCGGAAACGTATCACCGGGCGTGTGATCCGCGATTACTAACGATTCACACTTATGCAGCGGAGTTGCAGCCTACAATCCGAAGTGCAGCGGCTTTCTCCGATTAGCTCGACCTTACGGTTTTGCGACGGTTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTCCTCCGTTTATACCGCGAGTCTCTGCAGAGTTGCCACCATAACGTGATGGCAACAGCAGACAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACAA GCTGACGACAGCCATGCAGCAGCTCTACGAGTGTCTTGGCGAAGGCAACTTTCGTCGCTGGTCACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCCGCTTGCCTCGAAT TGAACCACATGCTCC

>CAM2P03A07 Uncultured soil bacterium (Não classificada)

GTGATGTGACGGGGCGTGTGATAATGGCCCCGGAACGTATCACCGGGCGTGTGATCCGCGATTACTAACGATTCACACTTATGCAGCGGAGTTGCAGCCTACAATC CGAAGTGCAGCGGCTTTCTCCGATTAGCTCGACCTTACGGTTTTGCGACGGTTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCCAGACATAAAGGCCATGCTGACTT GACGTCATCCCCACCTTCTCCGTTTTATCACCGCGAGTCTCTGCAGAGTCCCACCATAACGTGATGGCAACAGCAGACAGGGTTGCGCTCGTTGCGGGACTTAACC CAACATCTCACGACACAAAGTGCAGCAGCCATGCAGCAGCTCTACGAGTGTCTTGGCGAAGTGAACCTTTCGTCGCTTGGTCACTCGCTGTTCAAGCCTGGGTAAGG TTCTTCCGCTTTGCGTGAATTTGAACCACATGCTCCACCGCTTGTG

>CAM2P03A09 Uncultured bacterium (Acidobacteria)

AGTACAACCTACTTTTCGTGATGTGGACGGGGCGTGTGATAAAGACCGGGAACGTATTACCGCAACATTCTGATTTGCGATTACTAGCGATTCCAACCTCATGAAGTCCG AGTTGACAGACTTCAATCCGAAGTGCAGCGGTTTTGCGGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCTAAGCATA AAGGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGTCTTGTATAGAGTTTCAACTTAATGTTAGCAACTATCAATATGGGTTGCGCTCGT TCGGGACTTAACCCAACATCTCACGACAGGCTGCAGCAGCCATGCAGCAGCTTGTCTTGGGTCGTTTTCCAGACTTGGCGTTACCCAAGATTCC

>CAM2P03A10 Uncultured Rubrobacteridae (Não classificada)

ACTGCACACTAGCCCCGAAGGGGGAGTATTTTACGGTTTTCCAGTGCATGTCAAGCCCTGGTAAGTGTCTTCCGCTTGCCTGCAATTAACCCACATGCTCCGCTGCT TGTGCGGGCCCCGTTCAATTCCTTTGAGTTTTAGCCTTGGCGGCGTACTCCCCAGCGGGGCACTTAATGCGTTAGCTTCCGACAGCGGGAGTCGATACCGGCCACAC CTAGTGCCCATCGTTTTACCGGTTGGACTACCAGTGTATCTAATCCTGTTCCGCTCCCCACGCTTTCCGCTCTCAGCGTCAGTACCTGTCCCAGAGAGCCGCTTCCGCCAC GGGTGTCTTCCGATATCTTCCGCTTACCTGTACCGGGAACTTCCACTCTCCTCTCCGACTTAGCAACAGGTTTTCAACCTTACGCTCTCGAGGTTGAGCC TCGAGTTTTACATGCTTGAATTTGGCTGTACACGCTCTTACGCCAATAAATCCGGACAACGCTTGGCCCCCTACGTATT

>CAM2P03A11 Uncultured Acidobacteria bacterium (Não classificada)

GTGATTTAGTACAGCAGCTTCGTGATGTGACGGGGCGTGTGATAAGGCCCGGAAACGTATCACCGGGCATGCTGATCCGCGATTACTAGCGATTCCGACTTTCATGCAG GCGAGTTGCAGCCTACAATCCGAAGTGCAGCGGTTTTTCTGATTAGCTCCCCCTCCGCGGCTCCGACGTTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCTGG ACATAAAGGCCATGCTGACTTGCAGTATCCCCACCTTCTCCGTTTTGTCACCGGCAGTCTCTCCAGAGTGCCAGCTTACCTGATGGCAACAGGAGACAAGGGTT GCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGCAGCTGACGACAGCCATGCAGCAGCTCTGCAGATGCCCTTGGGGAGTCGACTTTCGCCGATTGTCATCTG CACTTCGAGCCAGGTAAGGTTCTTCCGCTTTCGCTCGAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGTTCAATTCCTTTGAGTTTACGCTTGCAGCCGTA CTTCCCGAG

>CAM2P03B01 Unidentified eubacterium (Não classificada)

GACATACTTAGCACTGTCCCTTTCGCGGTTACACGGTGTATTCTAGTACAGCCAGCTTTCGTGATGTGACGGGGCGTGTGATAAAGGCCCGGAAACGTATTACCGCGGG ACCTGTTGATCCCGGATTACTAGCGATTCCGACTTTCATGCAGGGCGAGTTGCAGCCTACAATCCGAAGTGCAGCGGTTTTTCCGATTAGCTCCCTCCGCGGGCTCCGG CATGCTGATCCCGGATTACTAGCGATTCCGACTTTCATGCAGGGCGAGTTGCAGCCTACAATCCGAAGTGCAGCGGTTTTTCCGATTAGCTCCCTCCGCGGGCTCCGG GCGCTCGTTGCGGGACTTAACCCAACATCTCACGACAGCAGCTGACGACAGCCATGCAGCAGCTCTGCAGATGCCCTTGGGGAGTCGACTTTCGCCGATTGTCATCTG CACTTCGAGCCAGGTAAGGTTCTTCCGCTTTCGCTCGAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGTTCAATTCCTTTGAGTTTACGCTTGCAGCCGTA CTTCCCGAG

>CAM2P03B02 Uncultured soil bacterium (Não classificada)

TGTCCTTTCGCGGTTACACGGTGTATTCTAGTACAGCCAGCTTTCGTGATGTGACGGGGCGTGTGATAAAGGCCCGGAAACGTATCACCGGGCATGCTGATCCGCGA TTACTAGCGATTCCGACTTTCATGCAGGGGAGTTGCAGCCTACAATCCGAAGTGCAGCGGTTTTTCCGATTAGCTCCCTCCGCGGGCTCCGACGTTTTGTACCGGC CATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGCAGTCTATCCCCACCTTCTCCGTTTTGTCACCGGCAGTCTCTCCAGAGTGCCAGCTTAC CAGTGCACAACAGGAGACAAGGGTTGCGCTCGTTGCCGACTTAACCCAACATCTCACGACAGCAGCTGCAGCAGCCATGCAGCAGCTTGTGAGGATGCCCTTGCGGAG TCGACTTTCGCCGATTGTCATCTGCAGCTTTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTCGAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGTTCAATTCCT TTGAGTTTACGCTTTCGACCGTACTCCCCAGGCGAATGCTTAACCGGTTAAGTGCAGGACCGGAGGATCGATA

>CAM2P03B03 Uncultured Rubrobacteridae (Actinobacteria)

TTGCGCTCGTTGCGGGACGTAACCCAATCTCACGACAGGCTGACGACAGCCATGCACCCTGCACACTAGCCCCGAAGGGGGACCGTATTCTACGGTTTTCCAG TGCATGTCAAGCCCTGGTAAGTTCTTCCGCTTTCGCTCGAATTAACCCAACATGCTCCGCTGTTGTGCGGGCCCCGTTCAATTCCTTTGAGTTTTAGCCTTCCGCGGCT ACTCCCCAGGGGGCACTTAATGCGTTAGCTTCCGACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCTGGACTACCAGGATCTAATCCT GTTCGCTCCCCAGCTTTCGCGTCTCAGCGTACGCTCCAGAGAGCGGCTTCCGCCAGGGTGTCTTCCCGATATCTGCGGATTTACCGCTTACCGGGGAATT CCACTCTCCTTCCGACTTACGCAACCGGTTTCAACCGAGCTCTCAGGTTGAGGTTTTACAGCTGACCTGAATGGCCNCTACAGCTCTTTACGCC AATAAATCCGGACAACGCTTGCCTTACGATTACCGCGGCTGCTGGCACTCAGTCACTA

>CAM2P03B04 Unidentified eubacterium (Não classificada)

GTTCCTTTCGCGGTTACACGGTGTATTCTAGTACAGCAGCTTTCGTGATGTGACGGGGCGTGTGATAAAGGCCCGGAAACGTATCACCGGGCATGCTGATCCGCGATTACTAG CGATTCCGACTTTCATGCAGGGAGTTGCAGCCTACAATCCGAAGTGCAGCGGTTTTTCCGATTAGCTCCCTCCGCGGGCTCCGACGTTTTGTACCGGCCATTG TAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGCAGTCTATCCCCACCTTCTCCGTTTTGTCACCGGCAGTCTCTCCAGAGTGCCAGCTTACCTGATG GCAACAGGAGACAAGGGTTGCGCTCGTTGCCGACTTAACCCAACATCTCACGACAGCAGCTGCAGCAGCCATGCAGCAGCTCTGCAGATGCCCTTGCGGGAGTCGAC TTTCCGCGATTGTCATCTGCAGCTTTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTCGAATTA

>CAM2P03B05 Uncultured soil bacterium (Não classificada)

GCTCCCTCCCTTTCGCGGTTGGTGTGGCGACTTCTAGTACAACCTGGCTTCCGTGATGTGACGGGGCGTGTGATAAAGGCCCGGAAACGTATTACCGGGCGTGTGATC CGCGATTACTAACGATTCACACTTATGCAGGGGAGTTGCAGCCTACAATCTGAACTGAGACCGGCTTTCTCCGATTAGCTCGACCTTACGGTTTTGCGACGGTTTTGT ACCCGCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGCAGTCTATCCCCACCTTCTCCGTTTTGTCACCTGGCAGTCTCTCCAGAGTGCCAGCTTT ACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCCGACTTAACCCAACATCTCACGACAGCAGCTGACGACAGCCATGCAGCAGCTCTGCAGATGCCCTTGC GGAGGCAACTTTCGCTCGTGTGACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCCGCTTGCCTTCCCTTGAACCACATGCTCCACCGCTTGTGCGGGCCCCGCTCA ATTCCTTTGACTTTCACCTT

>CAM2P03B07 Unidentified eubacterium from the Amazon (Não classificada)

ATTACTAGCGATTCCGACTTTCATGCAGGGAGTTGCAGCCTACAATCCGAAGTGCAGCGGCTTTTCCGATTAGCTCCCTCCGCGGGCTCCGACGTTTTGTACCTG GCCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGCAGTCTATCCCCACCTTCTCCGTTTTGTCACCTGGCAGTCTCTCCAGAGTGCCAGCTTT ACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCCGACTTAACCCAACATCTCACGACAGCAGCTGACGACAGCCATGCAGCAGCTCTGCAGATGCCCTTGC GG GAGTCGACTTTCGCCGATTGTCATCTGCAGCTTTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTCGAATTAACCACATGCTCC

> CAM2P03B08 Uncultured soil bacterium (Não classificada)

TTGCGGGTTAACACGGTGTATTCTAGTACAGCCAGCTTTCGTGATGTGACGGGGCGTGTGATAAAGGCCCGGAAACGTATTACCGGGCATGCTGATCCGCGATTAC TAGCGATTCCGACTTTCATGCAGGGAGTTGCAGCCTACAATCCGAAGTGCAGCGGTTTTTCCGATTAGCTCCCTCCGCGGGCTCCGACGTTTTGTACGGCCATTG TAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGCAGTCTATCCCCACCTTCTCCGTTTTGTCACCTGGCAGTCTCTCCAGAGTGCCAGCTTTACCTGAT GGCAACAGGAGACAAGGGTTGCGCTCGTTGCCGACTTAACCCAACATCTCACGACAGCAGCTGACGACAGCCATGCAGCAGCTCTGCAGATGCCCTTGCGGGAGTCG ACTTTCCGCGATTGTCATCTGCAGCTTTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTCGAATTAACCACATGCTCCAACCTGCTTGTGCGGGCCCCGTTCAATTCCTTTG AGTT

>CAM2P03B10 Bacterium Ellin6099 (Acidobacteria)
CGGAAACGATACACGCAACATTCGATTTGCGATTACTAGCGATTCCAACCTCATGAAGTCGAGTTGCAGACTTCAATCCGAAGTACGACCGGTTTTTTCGCGATTAGCTC
CCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTTAGCAGCTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCA
ACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCAT
GCAGCACCTTGTGTTGGGCTGTTCCAGACTCTTGGCGTTACCAAGATTCCCTCACACTTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCCAATTAACACACATG
CTCCACCGCTTGTGCGGGTCCCGTCAATCTCTTTAGATTACACTTGCCTGCGTACTCCCGAGCGGAATACTAAAAACG

>CAM2P03B11 Uncultured Rubrobacteridae (Actinobacteria)
CGACGAATCGTGGCACATAGGACAGGGTTGCGCTCGTTGCGGGACGTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGA
AGGGGACCTGTATTTTACGGTTTTCCAGTGCATGTCAAGCCCTGGTAAGGTTCTTCCGCGTTGCGTCAATTAACCAACATGCTCCGCTGCTTGTGCGGGCCCCGTC
ATTCCTTTAGATTTTAGCCTTGCAGCGTACTCCCGAGCGGGGCACTTAATGCGTTAGCTTCGCGACAGCGGGAGTCGATACCCGCGCACACTAGTGCCCATCGTTTA
CGGCGTGGACTACAGGGTATCTAATCTGTTGCTCCCGCTTTCGCGCTCAGCGTACGCTCCAGAGAGCGCCCTTCGCGACGGGTGTTCTTCCCGATAT
CTGCGCATTTACCGCTACACCGGGAATTCACCTCTCTCTTCCGACTCTAGCCAAACGGTTTCAACCGACGCTCTCGAGGTTGAGCTCGACTTTTTCACAGCTGACCT
GAATGGCCCGCTACACGCTCTTTACGCCAATAAATCCGGACACGCTTGGCCGCTACGATTACCGCGCTGCTGGCACTCAGTACGATACCGCTATCGCCGCTCC
GATTC

>CAM2P03B12 Unidentified eubacterium (Não classificada)
TCCCTTTCGCGGTACACGGTATTCTAGTACAGCCAGCTTTCGTGATGTGAGCGGGGCGGGGGGTACAAGGCCCGGGAACGATACACCGCGGCATGCTGATCCGCGATT
ACTAGCGATTCCGACTTCATGACGGCGAGTTGCGACCTACAATCCGAAGTACGAGCCGCTTTTTCCGATTAGCTCCCGCTCGCGGGCTCGCGACGGTTTGTACCGGCCA
TTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGAGCTCATCCCCACTTCCCGGTTTGTACCGCGAGCTCTCCAGAGTCCGAGCCTTTACCTG
ATGGCAACAGGAGACAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTCTGACAGTCCCGTTGCGGGAGTC
GACTTTCGCGGATTGTCATCTGCACCTTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTCGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTTCT
TTGAGTTTACGCTTTCGACCGTACTCCCGAGCGGAATGCTTAACCGGTTAATGCGGACGCGGAGGGATCGATAACCC

>CAM2P03C01 Uncultured bacterium (Acidobacteria)
GGTACTACTCCCTTTCGCGGTTGCTCCGCGCCATCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGATTTACCGCAACATTTCTGAT
TTGCGATTACTAGCGATTCCAACCTCATGAAGTCGAGTTGCGACTTCAATCCGAAGTACGACCGGTTTTTTCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTA
CCGGCATTGTAGCAGCTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACTTCTCCGTTTTATCAACAGCAGCTTTGATAGAGTTCTCAACT
TAATGTTAGCAACTATCAATAGGGGTTCCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTTTGTTTGGGCTCGGTTTC
CCAGACTCTTGGCGTTACCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCCGCTTGCCTCGAATTAACCCACATGCTCCACCGCTTGTGCGGGTCCCGTCA
ATTCCTTTGAGTTTACACTTGCCTGCTACTCCCGAGCGGAATACTAAAAAGTTAGCAGCGGCACCCGGAGCTATAGAGACTCCAGACCAAGTATTATCATCGTTT
AAGCCAGGACTACCGGGTATCTAATCCGTTTGTCTCCCTGGCTTTCGCGCT

>CAM2P03C02 unclassified_Rubrobacteraceae (Actinobacteria)
ATGCACACCTGACACTAGCCCCGAAGGGGACCGTATTCTACGGTTTTTCCAGTGCATGTCAAGCCCTGGTAAGGTTCTTCCGCGTTGCGTCAATTAACCCACATGC
TCCGCTGCTTGTGCGGGCCCCGTCATTTCTTTGAGTTTTAGCCTTGCAGGCTACTCCCGAGCGGGGCACTTAATGCGTTAGCTTCGCGACAGCGGGAGTCGATAC
CCCTCACACTAGTGCAGCTCGTTTACGTTGCGTGGACTACCAGGGTATCTAATCCCTTCCGCTTCCGCTTCCGCTTCCGCTTCCGCTTCCGCTTCCGCTTCCGCT
CTTCCGACCGGTTGTTCTTCCGATATCTTCCGATTTACCGCTACACCGGGAATTCACCTCTCTTCCGACTCTAGCCAAACGGTTTTCAACCTGACGCT

>CAM2P03C04 Uncultured bacterium (Acidobacteria)
GCATTTCTAGTACAACCTACTTTCGTGATGTGACGGGTTGGTGTGTACAAGACCCGGGAACGATTTACCGCAACATTTCTGATTTGCGATTACTAGCGATTCCAACCTCA
TGAAGTCGAGTTGCGAGACTTCAATCCGAAGTACGACCGGTTTTTTCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTTGTACTGGCCATTGACGACTGTGTGATG
CCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGCTTTGATAGAGTTCTCAACTTAATGTTAGCAACTATCAATAG

>CAM2P03C05 Bacterium Ellin6099 (Acidobacteria)
TACTCCCTTTCGCGGTTGGTCCGCGCACTTCTAGTAAACCTACTTTCGTGATGTGATGGGCGGTGTGTACAAGACCCGGGAACGATTTACCTGCAACATTTCTGATTGCG
ATTACTAGCGATTCCAACCTCATGAAGTCGAGTTGCGACTTCAATCCGAAGTACGACCGGTTTTTTCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCTGG
CCATTTGACAGCTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACTTCTCCGTTTTATCAACAGCAGCTTTGATAGAGTTCTCAACTTAAT
GTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACTGCCATGCGACACTTGTGTTGGGCTCGGTTCCCG
ACTCTTGGTGTATCCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCCGCTTGCCTCGAATTAACCCACATGCTCCACCGCTTGTGCGGGTCCCGTCAATTC
CTTTGAGTTTACACTTGCCTTCTACTCCCGAGCGGAATACTAAAAAGTTA

>CAM2P03C06 Unidentified eubacterium from the Amazon (Não classificada)
CCTACAACTCCGAAGTACGACCGGCTTTTTCCGATTAGCTCCCGCTCGCGGGCTCGCGACGGTTTTTACCGGCCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCA
TGCTACTTGCAGCTCATCCCCACTTCCCTCCGTTTTTGCACCGGAGTCTCTCCAGAGTCCCGCTTACCTGATGGCAACAGGAGACAGGGTTGCGCTCGTTGCGG
GACTTAACCCAACATCTCACGACAGGCTGACGACGCTGACGACCTCTGCATGCCCCGCGGGAGTGCATTTCCGCGATTGTCATCTGCACCTTCGAGC

>CAM2P03C07 Uncultured bacterium (Deltaproteobacteria)
GTGTTGTACAAGGCCGGGAACGATTTACCCCTGCTGATCAGGGATTACTAGCGATTCCGACTTCAAGAGTCGAGTTGCGACTCTTATCTTACTGAGGTC
GTTTTTTGCGATTAGCTCCCTCTTACGAGTTGCGACGCTTTGTGTGACCATTTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGATGACTTGACGCTATCCCCA
CCTTCTCCGACTTGAATATCGCGGCTCTCATAGAGTTCCCGGACTGACCCCTGGTAACATGATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCAGC
ACAGAGCTGACGACAGCCATGCGACCTAATGCGTTCTCCGAGAGCANCCGATACTTCTACCAGGTTGCGACACTTCTAGCCAGGTAAGGTTCTTCCGCT
TGGCTCGAATTAACCCACATGCTCC

>CAM2P03C10 Uncultured soil bacterium (Não classificada)
TCTAGTACAACCGGCTTCCGTTGATTGACGGCGGTGTGTACAAGGCCGGGAACGATTTACCGCGGCTGCTGATCCGCGATTACTAACGATTCCAACCTTCATGCAGGG
AGTTGACGCTACAATCCGAAGTACGACCGGCTTTCGCGATTAGCTCAGCTTACGGTTTTTTCGCGACGGTTTTGATCCGCGCATTTGACGACGTTGTAGCCCCAAGA
CATAAAGGCCATGCTGACTTGACGCTATCCCCACTTCTCCGTTTTATCACTTGGCAGTCTCTGCAGAGTCCCGCCATAACGTTGATGGCAACAGCAGACAAGGGTTG
CGCTCGTTGCGGGACTTAACCCAACATCTCACGACACAAGCTGACGACAGCCATGACGACCTCTACGAGTGTCTTGGGAAAGGCAACTTTCGCTCGCTGCTACTCGC
GTTTTCAAGCCTGGGTAAGGTTCTTCCGCTTGCCTCGAATTAACCCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTTCCGTTTGTAGTTTACCGCTTGCAGCGTACT
CCCCAGCGGGAATGCTTAATG

>CAM2P03C12 Uncultured bacterium (Acidobacteria)
GGGCGGTGTGTACAAGACCGGGAACGATTTACCGCAACATTTCTGATTGCGATTACTAGCGATTCCAACCTTCATGAAGTCGAGTTGCGACTTCAATCCGAAGTACGAG
CGTTTTTTCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCC
ACCTTCCCGTTTTTATCAACAGCAGTCTTGTAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGAC
ACGAGCTGACGACAGCCATGCGACCTTGTGTTGGGCTGTTTCCCGACTCTTGGCGTTACCAAGATTCCCTCACATTCTAGCTAGGTAAGGTTCTTCCGCTTGT
CGTCAATTAACCCACATGCTCCACCGCTTGTGCGGGTCCCGTCAATTTGAGTTTACACTTGCCTGCGTACTCCCGAGCGGAATACTAAAAAGCTTAGCGAC
GGCACCGGAGCTATAGAGACTCCAGACCAAGTATTAC

>CAM2P03D01 Uncultured bacterium (Acidobacteria)
TAAATCATACCGTGGTACTTCCCTTTCGCGGTTGGTCCGCGCCATCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCCGGGAACGATTTAC
CGCAACTCTGATTTGCGATTACTAGCATTCCAACCTCATGAAGTCGAGTTGCGACTTCAATCCGAAGTACGACCGGTTTTTTCGATTAGCTCCCTCTTACGAGAT
TGCAGCTTTTGTACCGCTTGTAGCAGCTGTGAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACTTCCCGTTTTATCAACAGCAGCTTTGA
TAGAGTTCTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTTGT

TTGGGCTGGTTCCAGACTCTGGGGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAACCACATGCTCCACCGTTGT
GCGGGTCCCGTCAATTCCTTTGAGTTTCACACTTGCCTGCGTACTCCCGAGCGGAA

>CAM2P03D02 Uncultured bacterium (Acidobacteria)
TACTGTGGTACCTACTCCCTTGC GGTTGGTCTGGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGCAACA
TTCTGATTTGCGATTACTAGCGATTCCAACCTCATGAAGTCGAGTTGCAGACTTCAATCCGAACCTGAGACCGGTTTTTTCGATTAGCTCCCTCTTACGAGATTGCGACG
TTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGTCTTGATAGAGTT
CTCAACTTAATGTTAGCACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGACCTTGTTTGGGTC
TGGTTTCCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAACCACATGCTCCACCGCTTGTGGGGTC
CCCGTCAATTCCTTTGAGTTTCACACTTGCCTGCGTACTCCCGAGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAG

>CAM2P03D03 Uncultured bacterium (Acidobacteria)
CTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCGGGAACGTATTACCAGCAACTTCTGATTGCGATTACTAGCGATTCCAACCTCATGAAGTCGAGTTGCGAC
ACTTCAATCCGAACCTGAGACCGGTTTTTTCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCAT
GATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGTCTTGATAGACTTCTCAACTTAATGTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGAC
TTAACCACATCTCAG

>CAM2P03D04 Uncultured bacterium (Não classificada)
GTGGGCTGGCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCGTGGGAACGTATTACCTGCAACATCTGATTGCGATTACTAGCGA
TTCCAACCTCATGAAGTCGAGTTGCAGACTTCAATCTGAACTGAGACCTGGTTTTTTCGATTAGCTCCCTCTTACGAGATTGCGACGTTTGTGTACTGGCCATTGTA
GCACTGTGTAGCCCTAAGCATAAAGTCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTAGCA
ACTATCAATAG

>CAM2P03D06 Uncultured Rubrobacteridae (Actinobacteria)
CCATGCAACCTGACACTAGCCCGAAGGGGACTGTATTCTACGGTTTTCCAGTGCATGTCAAGCCTGGTAAGGTTCTTCTGCGTTGCGTCGAATTAACCAC
ATGCTCCGCTGCTTGTGGGCCCCGCTCAATTCCTTTGAGTTTTAGCCTTGCCTGCTGACTCCCCAGCGGGGCACTTAATGCGTTAGCTTCGGCACAGCTGGGAGTC
GATACCTGCCACACCTAGTGCCCATCTGTTTACTGGCTGTGGACTACAGTGATCTAATCTGTTCTGCTCCCATGCTTTTCGCTGTCTCAGCTGTCAGTACCTGTC
CCAGAGAGCTGCTTCTGCACGGGTTCTTCCCGATATCTTGGCATTTCACCTGCTACACTGTGGAATTCACCTCTCTCTTCCGGACTCTAGCCAAATGGTTTT
A

>CAM2P03D08 Uncultured bacterium (Acidobacteria)
GGTACTACTCCCTTGC GGTTGGTCCGGCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCGGGAACGTATACCAGCAACTTCTGATT
GCGATTACTAGCGATTCCAACCTCATGAAGTCGAGTTGCAGACTTCAATCCGAACCTGAGACCGGTTTTTTCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACC
GGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTA
ATTGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTG

>CAM2P03D10 Uncultured bacterium (Não classificada)
CATTCTAGTACAACCTACTTTCGTGATGTGTTGGGCTGGTGTGTACAAGACCTGGGAACGTATCACCTGCAACATCTGATTGCGATTACTAGCGATTCCAACCTTCA
GAAGTCGAGTTGCGACTTCAATCCGAACCTGAGACCTGGTTTTTTCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCTGGCATTGTAGCACTGTGTAGCC
CTAAGCATAAATGGCATGATGACTTGACATCATCCCCATCTTCTCCGTTTTATCAACATGCACTTCTGATAGAGTTCTCAACTTAA

>CAM2P03D11 Unidentified eubacterium from the Amazon (Não classificada)
CATGCTGATCCTGTGATTACTAGCGATTCCGACTTTCATGCAGGCGAGTTGCAGCTACAATCCGAACCTGAGACCGGTTTTTTCGATTAGCTCCCGCTCGCGGCTCGCGAC
GGTTGATCTGCGATTACTAGCGATTCCAACTTCAATGAAGTCGAGTTGCAGACTTCAATCCGAACCTGAGACCGGTTTTTTCGATTAGCTCCCGCTGTCACCGGAGTCTCCAGAGTG
CCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGAT
GCCCTTGGGGAGTGCAGTTTCCCGGATTGTCTATCTTGCACCTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAACCACATGCTCCACCGCTTGTGGGGCC
CCGTCAATTCCT

>CAM2P03D12 Uncultured Rubrobacteridae (Actinobacteria)
AGGACAGGGTTGCGCTCGTTGCGGGGCGTAACCAACATCTCACGACACGAGCTGACGACAGCATGCACCACCTGCACACTAGCCCGAAGGGGACCGTATTTACGG
TTTTCCAGTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAACCACATGCTCCGCTGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTTAGCCTT
CGGGCCGTTACTCCCCAGCGGGGCACTTAATGCGTTAGCTTCGGCACAGGGGAGTCGATACCCGCCACACCTAGTCCCATCGTTTTACGGCGTGGACTACCCAGGGTAT
CTAATCTGTTGCGTCCCGCTTTCGCGTCTCAGCGTCAGTCCGAGAGCCCGGCTTTCGCCACGGGTTGTTCTCCCGATATCTCCGCACTTTCACCGGTACAC
CGGGAATTCACCTCTCTCTTCCGGACTCTAGCCAAACGGTTTTCAACCGAGCTTCGAGTTGAGCCTCGAGTTTTCACAGCTGACCTGAATGGCCGCTACACGCTCT
TTACGCCCAATAAATCCGGACAACGCTTGCCTTACGTAATCCCGGTTGCTGGCACTCAGTCAGTCATACGGTAT

>CAM2P03E01 Uncultured bacterium (Acidobacteria)
TCATACGTTGATCTACTCCCTTGC GGTTGGTCCGGCCATTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTACAAGACCGGGAACGTATACCAGCAAC
ATTTGATTGCGATTACTAGCGATTCCAACCTCATGAAGTCGAGTTGCAGACTTCAATCCGAACCTGAGACCGGTTTTTTCGATTAGCTCCCTCTTACGAGATTGCGAC
GTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGTCTTGATAGAGT
TCTCAACTTAATGTTAGCACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTGGGT
CTGGTTCCAGACTCTTGGCGTTACCCAAGATTCCCTCACATTCTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCGAATTAACCACATGCTCCACCGCTTGTGGGGT
CCCCGTTAATTCCTTTGAGTTTCACACTTGCCTGCTACTCCCGAGCGGAATACTAAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGTATT
CATCGTTAAGGCCAGGACTACCGGGTATCTAATCCCGTTTGTATCCCTGGCTT

>CAM2P03E02 Uncultured soil bacterium (Não classificada)
ACGACATACTTAGCGCTCCCTCCCTTGC GGTTGGTGTGGGCACTTCTAGTACAACCGGCTTCCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATACC
GCGGGTGCCTGATCCCGATTACTAACGATTCCAACCTCATGAGGCGAGTTGCAGCTTCAATCCGAACCTGAGACCGGTTTTTTCGATTAGCTCGACCTTACGGTTT
TGCAGCGTTTGTACCGCCATTGTAGCACGTGTGTAGCCCGAGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCTCCGTTTTATCCCGGAGTCTCTG
CAGAGTGCCACCATAACTGATGGCAACAGCAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACAAGCTGACGACAGCCATGCATCACTCT
ACGAGTGTCTTGGCGAAGGCAACTTTCGTC

>CAM2P03E03 Uncultured actinobacterium (Não classificada)
CACATAGGACAGGGTTGCGCTCGTTGCGGGAGTAACACATCTCACGAACGAGCTGACGAAGCATGCACACTGCACACTAGCCCGAAGGGGAGCTATTTCTACGGTT
TTCCAGTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCGAATTAACCACATGCTCCGCTGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTTAGCCTTGC
TGGCTACTCCCAGCGGGGCACTTAATGCTTAGCTTCCGACAGCGGGAGTGCATACCCGTCACACCTAGTCCCATCGTTTACGGCGTGGACTACCGGGTATCT
AATCTGTTGCGCTCCCGCAGCTTTCGCTCTC

>CAM2P03E04 Uncultured bacterium (Acidobacteria)
CACTTCTAGTACAACCTACTTTCGTGATGTGATGGTGGTGTGTACAAGACCGGGAACGTATTACGCAACATCTGATTGCGATTACTAGCGATTCCAACCTTCA
AAGTCGAGTTGAGACTTCAATCCGAACCTGAGACCGGTTTTTTCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCTGGCCATTGTAGCACGTGTGTAGCCCT
AAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACATGCACTTCTGATAGAGTTCTCAACTTA

>CAM2P03E06 Uncultured actinobacterium (Actinobacteria)
CGTTGCGGACGTAACCAACTCTCACGACAGCTGACGACAGCATGCACACTAGCCCGAAGGGGACTGTATTCTACGGTTTTCCAGTGCATGTCAA
GCCCTGGTAAGGTTCTTCGCTGTGCGTCGAATTAACCACATGCTCCGCTGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTTAGCCTTGTGGGTTACTCCCGAC

GCGGGGCACCTAATGCGTTAGCTTCTGGCACAGCGGGAGTCGATACCCGTCACACCTAGTGCCCATCGTTTACTGGCGTTGGACTACCAGTGTATCTAATCCTGTTCGC
TCCCCACTGCTTCTCGCTCAGCGTCAGTACCGTCCCAGAGAGCTGCTTCGCCACGGGTGTTCTTCCCGATATCTTGCGCATTTACCAGCTACACCGGGAATTC
CTCTCTCTCCGGACTCT

>CAM2P03F01 Uncultured bacterium (Acidobacteria)
TCATAATCATACGTGGTACCTACCTCCCTGCGGGTGGTCCGGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGGCGGTGTGTACAAGACCCGGGAACGTATT
CACCGCAACATTCTGATTTCGGATTACTAGCGATTCCAACCTCATGAAGTCGAGTTGCAGACTTCAATCCGAACCTGAGACCGGTTTTTTCGGATTAGCTCCCTCTTACGA
GATTGCGACGTTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCTAAGCATAAAGGCCATGTAGACTTGCATCATCCCCANCTTCCCTCCGTTTTATCAACAGCAGTCT
TGATAGAGTTCTCAACTAATGTGTAGCAACTATCAATAGGGGTTGCCCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTT
GTTTTGGTCTGGTTCCAGACTCTTGGCGTTANCCAAGATTCCCTCACATTTAGCCTAGGTAAGGTTCTTCCGTTGCGTCAATTAAANACATGTCCAAACGCT
TGTGCGGGTCCCGTCAATTCCTTTGAGTTTCACTTGCCTGCGTACTCCCAGGCGGAATACTAAAAACGTTAGCGACGGGACCCGGAGCTAT

>CAM2P03F03 Unidentified eubacterium from the Amazon (Não classificada)
TGTCCCTTGGCGGTTACACGGTATTCTAGTACAGCCAGCTTTCGTGATGTGATGGGCGGTGTGTACAAGGCCGGGAACGTATTCACGGCGCATGCTGATCCGCGAT
TACTAGCGATTCCGACTTCATGCAGCGAGTTGCAGCCTACAATCCGAACCTGAGACCGGTTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCAGCGGTTTTGTACCGGCC
ATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGTGACTTACGCTCATCCCCACCTTCCCTCCGTTTTGTACCGGGCAGTCTCTCCAGAGTGGCCAGCTTTACCT
GATGGCAACAGGAGACAAGGGTTCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGCAGATGCCCTTGGCGGAGT
CGATTTTCCCGGATTGCTCATTCGCACTTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTCGAATTGAANACATGTCTCCACCCTTGTGCGGGCCCCCGTCAATTCCTTT
GAGTTTACGCTTGCAGCGTACTCCCAGGCGGAATGCTTAACCGGTTAA

>CAM2P03F04 Uncultured soil bacterium (Não classificada)
ATACTTAGCGCCTCTCCCTTGGCGGTTGGTGTGGCGCTTCTAGTACAACCTGGCTTCTGTGATGTGACTGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCG
GCGTGTGATCCGCGATTACTAACGATTCCAACCTCATGCAGGCGAGTTGCAGCCTACAATCCGAACCTGAGACCGGTTTTTCCGATTAGCTCGACCTTACGGTTTTGC
GACGGTTTTGATCCGGCATTGTAGCAGCTGTGTAGCCCAAGACATAAAGGCCATGTGACTTGCATCATCCCCACCTTCCCTCCGTTTTATCAACAGCAGTCTCTCGAG
AGTGGCCACATAACGTTGATGGCAACAGCAGACAAGGGTTCGCTCGTTGCGGGACTTAACCCAAACATCTCACGACACAGCTGACGACAGCCATGCAGCACCTTACG
AGTGTCTTGGCGAAGGCAACTTTCGCTGCTGGTACTCGCTGTTCAAGCCTGGGTAAGGTTCTTCCGCTTGCCTCGAATTGAACCACATGTCTCCACCCTTGTGCGGG
CCCCGTCAATTCCTTT

> CAM2P03F09 Uncultured bacterium
GTAATACTCCCTTGGCGGTTGGTCCGGCCTTCTAGTACAACCTACTTTCGTGATGTGCGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAACATTCTGATTG
CGATTACTAGCGATTCCAACCTCATGAAGTCGAGTTGCAGACTTCAATCCGAACCTGAGACCGGTTTTTTCGGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCG
GCCATTGTAGCAGCTGTGTAGCCCTAAGCATAAAGGCCATGTGACTTGCATCATCCCCACCTTCCCTCCGTTTTATCAACAGCAGTCTTGTATAGATTCTCAACTTAA
TGTTAGCAACTTCAATAAGGGGTTGCGCTCGTTTGGGGACTTAACCCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTTGGGCTGTGTTTT
CCAGACTCTTGGCGTTACCAAGATTCCCTCACATTTAGCCTAGGTAAGGTTCTTCCGCTTGCCTCGAATTAAACCACATGTCTCCACCCTTGTGCGGGTCCCCGTCA
ATTCCTTTGAGTTTCACTTGCCTGCGTACTCCCAGGCGGAATACTAAAAACGTT

>CAM2P03F10 Uncultured bacterium (Acidobacteria)
GTAATACTCCCTTGGCGGTTGGTCCGGCCTTCTAGTACAACCTACTTTCGTGATGTGCGGGCGGTGTGTACAAGACCCGGGAACGTATTCACCGCAACATTCTGATTG
CGATTACTAGCGATTCCAACCTCATGAAGTCGAGTTGCAGACTTCAATCCGAACCTGAGACCGGTTTTTTCGGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCG
GCCATTGTAGCAGCTGTGTAGCCCTAAGCATAAAGGCCATGTGACTTGCATCATCCCCACCTTCCCTCCGTTTTATCAACAGCAGTCTTGTATAGATTCTCAACTTAA
TGTTAGCAACTTCAATAAGGGGTTGCGCTCGTTTGGGGACTTAACCCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTTTGGGCTGTGTTTTCC
AGACTTGGCGTTACCAAGATTCCCTCACATTTAGCCTAGGTAAGGTTCTTCCGCTTGCCTCGAATTAAACCACATGTCTCCACCCTTGTGCGGGTCCCCGTCAAT
TCCTTTGAGTTTCACTTGCCTGCGTACTCCCAGTCCGAATACTAAAAACGTT

>CAM2P03F11 Unidentified eubacterium from the Amazon (Não classificada)
TGTCCCTTGGCGGTTACACTGGTATTCTAGTACAGCAGCTTCGTGATGTGACGGTGGTGTGTACAAGGCCGGGAACGTATTCACGCGCATGCTGATCCGCGAT
TACTAGCGATTCCGACTTCATGCAGCGAGTTGCAGCCTACAATCCGAACCTGAGACCGGTTTTTTCGGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCT
GGCCATTGTAGCAGCTGTGTAGCCCTGGAACATAAAGTGCATGTGACTTGCATCATCCCCACCTTCCCTCCGTTTTGTACCGGGCAGTCTCTCCAGAGTGGCCAGCTT
TACCTGATGGCAACAGGAGACAAGGGTTCGCTCGTTTGGGGACTTAACCCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGCAGATGCCCTTGC
GGGAGTCGACTTTCGCGGATTGCATCTGCCTTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTCGAATTGAACCACATGTCTCCACCCTTGTGCGGGTCCCCGTCAAT

>CAM2P03F12 Uncultured soil bacterium (Não classificada)
AAGGCATGCTGATTGACGTCATCCCCACTTCCCTCCGTTTTGTACGGAGTCTCTCAAGTGCCAGTTTACTGATGGCAACAGGAGACAAGGGTTCGCTCGTTGCGGGA
CTTAACCCAAACATCTCACGACAGAGCTGACGACAGCCATGCAGCACCTTGCAGATGCGGTTGCGGGAGTGCATTTCCGCGATTGTGCATCTGCACCTGAGCCAG
GTAAGGTTCTTCCGCTTGCCTCGAATTTGAACCACATGTCTCCACCCTTGTGCGGGCCCCGTCAATTCCTTTGAGTTTACGCTTGCAGCCTTCCAGCCGTTACTCCCAGGCGGA
TGCTTAACGCGTTAACTGCGGCACGGCAGGGATC

>CAM2P03G02 Uncultured actinobacterium (Actinobacteria)
CGTTGCGGGACGTAAACCAATCTCACGACAGAGCTGACGAAGCATGCACCTGCACACTAGCCCCGAAGGGGGACCGTATTCTACGGTTTTCCAGTGCATGTCAA
CCCTGGTAAGGTTCTTCCGCTTCCGCTCGAATTAACCCACATGTCTCCGCTTGTGCGGGCCCCGTCAATTCCTTTGAGTTTTAGCCTTGCGGCCGTACTCCCAGG
CGGGGCACTTAATGCGTTAGCTTCCGACAGCGGGAGTCGATACCCGCCACACCTAGTGCCATCGTTTACGGCTGGACTACAGGGTATCTAATCCTGTTCCGCTCCC
CAGCTTTCGCGTCTCAGCGTCACTCCCTCCAGAGCCCTGCCTTCCGCCAGGGTGTCTTCCCGATATCTGCGCATTTACCAGCTACACCGGGAATTCACCTCTCC
TCTTCCGACTCTAGCCAAACGGTTTCAACCCAGCTTCCAGGTTGAGCCTCGAGTTTTTACAGCTGACCTGAAT

>CAM2P03G03 Unidentified eubacterium from the Amazon (Não classificada)
CGATTCGACTTTCATGCAGCGAGTTGCAGCCTACAATCCGAACCTGAGACCGGTTTTTCCGATTAGCTCCCTCTCGCGGGCTCGCAGCGGTTTTGTACCGGCCATTGTA
GCAGTGTGTAGCCCTGGACATAAAGGCCATGTGACTTGCAGCTCATCCCCACCTTCCCTCCGTTTTGTACCGGGCAGTCTCTCCAGAGTGGCCAGCTTTACCTGATGGC
AACAGGAGACAAGGGTTCGCTGCTTGGGGACTTAACCCAAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGCAGATGCCCTTGGCGGGAGTCGACTT
TCGCGGATTGTGCATCTGCATCTCGAGCCAGGTAAGGTTCTTCCGCTTGCCTCGAATTTGAACCACATGTCTCCACCCTTGTGCGGGCCCCGTCAATTCCTTTGAGTT
TCAGCCTTGTGACTACTCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCGATAC

>CAM2P03G06 Uncultured soil bacterium (Não classificada)
CGGAACTGATCACGCGCGTGTGATCCGCGATTACTAACGATTCCAACCTCATGCAGGCGAGTTGCAGCCTACAATCCGAACCTGAGACCGGTTTTTCCGATTAGC
TCGACTTACGGTTTTTGGCAGGTTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCAAGACATAAAGGCCATGTGACTTGCAGCTCATCCCCACTTCCCTCCGTTTTAT
CACCGCAGTCTCTCGAGATTGCCACCATAACGTTGATGGCAACAGCAGCAAGGGTTCGCGCTGTTGCGGGACTTAACCCAAATATCTCACGACACAAGGTTGACGACAG
CCATGCAGCACCTTACGAGTGTCTTGCAGGAAGGCAACTTTCGCTGCTGGTCACTCGCTGTTCAAGCCTGGTAAAGGTTCTTCCGCTT

>CAM2P03G07 Uncultured actinobacterium (Actinobacteria)
CTGGCACATAGGACAGGGTTCGCTCGTTGCGGGACGTACCAATCTCACACTGACAGCAGCTGACGAAGCATGCACACCTGCACACTAGCCCCGAAGGGGGACTGATTTCT
ACGGTTTTCCATGTGATGCTACCGCTTGGTAAGGTTCTTCCGCTTGCCTCGAATTTAGCCTTCCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTTTA
GCCTTGTGCTGACTTCCCAGGCGGGGCACTTAATTCGTTAGCTTCCGCAACAGCGGGAGTCGATACCCCTGCCACACCTAGTGCCCATCGTTTACGGCTGTGGACTAC
CAGGGTATCTAATCCTGTTCCGCTCCCATGCTTTCGCTCTCAGCGTCACTACCGTCCCAGAGATCTGCTTCCGCCAGGGTGTCTTCCCGATATCTGCGCATTTCA
CCGTACACCGGGAATTCACCTCTCTTCCGGACTCTAGCCAAACGGTTTTCAACCTGACGCTCTCGAGTTGAGCCTCG

>CAM2P03G09 Uncultured soil bacterium (Não classificada)
 ACATACTTAGGGCTCCTCCCTTGGCGGGTTGGTGTGGGATTCTAGTACAACCGCTTCCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGGGCGGT
 GCTGATCCGCGATTACTAACGATTCCAACCTCATGCAGGCGAGTTGCAGCCTACAATCCGAACAGACCTGGCTTTCTCCGATTAGCTCGACCTACGGTTTTGCGGAC
 GGTTTGTACTGGCCATTGTAGCACGTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGCAGTCATCCCCACCTTCTCCGGTTTATCACCTGGCAGTCTCTGCAGA
 GTTGCCACCATAACGTGATGGCAACAGCAGACAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACAAGCTGACGACGCCATGCAGCACCTTACGA
 GTGCTTGGCGAAGGCAACTTTCGTGCTGGTCACTCGTGTTCAGCCTGGGTAAGGTTCTTCGCGTTGCGTGAATTTGAACCACATGCTCCACCGCTTGTGCGTT
 CCCCCGTAATTCCTTTGAGTTTCAGCCTT

>CAM2P03G10 Unidentified eubacterium from the Amazon (Não classificada)
 GACATACTTAGCACTGTCCCTTGGCGGGTTACACGGTGATTCTAGTACAGCCAGCTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGG
 CATGCTTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACAGACCTGAGACCGGCTTTTCCGATTAGCTCCCCCTCGCGGGCTCGC
 GACGGTTTGTACTGGCATTGTAGCACGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGCAGTCATCCCCACCTTCTCCGGTTTGTACCGGCGACTCTCTCCAG
 AGTGCCACGCTTACCTGATGGCAACAGGAGACAAGGTTTGGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGC
 AGATGCCCTTGGCGGAGTCGACTTTCGCGGATTGTATCTGCACCTTCAGGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTTGAACCACATGCTCCATCTGCTTGTGGG
 GCGCCCGTCAATTCCTTTGAGTTTCAGCCTTGCAGCCTACTCCCGAG

>CAM2P03G11 Uncultured bacterium (Acidobacteria)
 CGTGTGTGACGGCGGTGTGTACAAGCCCGGGAACGTATCACCGCAACATTTGATTGCGATTACTAGCGATCCAACCTCATGAAGTCGAGTTGAGACTTCAATCC
 GAAGTGCAGCCGGTTTTTGGCATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACTGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTG
 ACATCATCCCCACTTCCCTGATTTCACAACAGCAGCTTGTATAGAGTTCTCAACTTAATCCGAACATCAATAGGGGTTTCCAGCTTACCCGGGAATTCACCTCTCTCT
 TCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTNTGGGCTGGTTTCCAGACTTTCGCGTTACCCAAGATTCCCTCACATTTAGCTTACGCTAA

>CAM2P03G12 Uncultured Rubrobacteridae bacterium
 CTGGTAAGGTTCTTCGCGTTGCGTCGAATTAACCCACATGCTCCGCTGCTTGTGCGGGCCCGTCAATTCCTTTGAGTTTTAGCCTTGGCGCGTACTCCCCAGCGGGG
 GCATTAATGCTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCTGTTGCTCCCCACG
 CTTTCGCGCTCAGCGTCACTCTGCTCCAGAGAGCCGCTTCCGACAGGGTGTCTTCCGATATCTGCGCATTTACCGCTACCCGGGAATTCACCTCTCTCTCT
 CCGGACTCTAGCCAAACGGTTTCAACCGAGCTCTCGAGTTGAGCCTCGAGTTTTCACAGCTGACCTGAATGGCGGCTACACGCTCTTACGCCAATAAATCCGGAC
 AACGCTTGGCCCTACGTATTACCGTGGCTGCTGGCACTCAGTCAGTCA

>CAM2P03H01 Unidentified eubacterium from the Amazon (Não classificada)
 GACATACTTAGCACTGTCCCTTGGCGGGTTACACGGTGATTCTAGTACAGCCAGCTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCGG
 ATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACAGACCTGAGACCGGCTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGA
 CGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGCAGTCATCCCCACCTTCTCCGGTTTGTACCGGCGAGTCTCTCCAGAG
 TGCCACGCTTTACTGTAGGCAACAGGAGACAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGA
 TGCCCTTGGCGGAGTCGACTTTCGCGGATTGTATCTGCACCTTCAGCCAGGTAAGGTTTCTTCGCGTTGCGTGAATTTGAACCACATGCTCCACCGCTTGTGCGGGG
 CCGCTCAATTCCTTTGACTTTCAGCCTTGCAGCCGTAATCCCCAGGCGAATGCTTAAACCGGTTAACTGCGGCACGGCAGGGATCGATACCCGACAACCAAGCATTCA
 CGTTTAGGGCCAGGACTACCAGGGTATCTAATCCCGTTTGGCTCCCTGGCTTTCGTTTATTAGTGTGAGAAACAGTCCA

>CAM2P03H02 Unidentified eubacterium from the Amazon (Não classificada)
 GACATACTTAGCACTGTCCCTTGGCGGGTTACACGGTGATTCTAGTACAGCCAGCTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATCACCGCGG
 ATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACAGACCTGAGACCGGCTTTTCCGATTAGCTCCCCCTCGCGGGCTCGCGA
 CGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGCAGTCATCCCCACCTTCTCCGGTTTGTACCGGCGAGTCTCTCCAGAG
 TGCCACGCTTTACTGTAGGCAACAGGAGACAAGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGA
 TGCCCTTGGCGGAGTCGACTTTCGCGGATTGTATCTGCACCTTCAGCCAGGTAAGGTTTCTTCGCGTTGCGTGAATTTGAACCACATGCTCCACCGCTTGTGCGGGG
 CCGCTCAATTCCTTTGACTTTCAGCCTTGCAGCCGTAATCCCCAGGCGAATGCTTAAACCGGTTAACTGCGGCACGGCAGGGATCGATACCCGACAACCAAGCATTCA
 CGTTTAGGGCCAGGACTACCAGGGTATCTAATCCCGTTTGGCTCCCTGGCTTTCGTTTATTAGTGTGAGAAACAGTCCA

>CAM2P03H03 Uncultured soil bacterium (Não classificada)
 TACAATCCGAACAGACCGGCTTTTCCGATTAGCTCCCTTGGCGGGCTCGCGACGGTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATG
 CTGACTTGCAGTCATCCCACTTCTCCGCTTGTACCGGCGAGTCTCTCAGAGTGCAGCTTACCTGATGGCAACAGGAGACAAGGGTTTGGCGCTGTTGCGGG
 ACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGGCGGAGTCGACTTTCGCGGATTGTATCTGCACCTTCGAGCCAG
 GTAAGGTTCTTCGCGTTGCGTCGAATTTGAACCACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTACGCTTGCAGCCGTAATCCCCAGGCGGAAT
 GCTTAACGGGTTAAC

>CAM2P03H05 Uncultured bacterium (Acidobacteria)
 CACTTCTAGTACAACCTACTTTCGTGATGTGACGGCGGTGTGTACAAGCCCGGGAACGTATCACCGCAACATTTGATTGCGATTACTAGCGATTCCAACCTCATGA
 AGTCGAGTTGCAGACTTCAATCCGAACAGACCGGTTTTTGGCATTAGCTCCCTCTTACGAGATTGCGAGTTTTGTACTGGCATTGTAGCACGTGTGTAGCCCTAA
 GCATAAAGGCCATGATGACTTGACATCATCCCACTTCTCCGTTTTATCAACAGCAGTCTGTATAGAGTTCTCAACTTAATGTTAGCAACTAATAGGGGTTGGG
 CTCGTTTGGCGGACTTCCCACTTCAACAGCAGCTGACGACAGCCATGCAGCACCTTGTGTTGGGCTTGGTTTCCAGACTTTCGCGGATTCCCAAGATTCC
 CTCACATTTAGCTAGCTAAGGTTCTTCGCGTTGCGTGAATTTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGCTCAATTCCTTTGAGTTTACACTTGCCTGCG
 TACTCCCCAGGCGGAATACTAAAA

>CAM2P03H07 Uncultured bacterium (Actinobacteria)
 CACATAGGACAGGTGTTGCGCTCGTTGGCGGACGTAACCCAAATCTCACGACAGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGAGGGGGACCGTATT
 TCTACGGTTTTTCCAGTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTGAATTTAAACCACATGCTCCGCTGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTT
 TAGCCTTGGCGGCGTACTCCCCAGGCGGGCACTTAATGCGTTAGCTTTCGCGACAGCGGGAGTCGATACCCGCGCACACCTAGTGCCCATCGTTTACGGCGTGGACTACC
 AGGGTATCTAATCCTGTTGCTCCCCAGCTTTCGCGTCTCAGCGTCAGTACCGTCCAGAGAGCCGCTTCCGACCGGTTGTTCTCCGATATCTGCGCATTTCACC
 TGCTACACCGGAATTCCTTCCGACTTCCCTTCCGACTTACGCAACCGTTTTCAACCGACTCTCGAGGTTTTCGCGCTGAGTTTTCACAGCTGACCTGAATGGGCTGCT
 ACAGCTCTTTACGCCAATAAATCCGGACAACGCTTGCCTTACGATTAC

>CAM2P03H08 Unidentified eubacterium from the Amazon (Não classificada)
 CATACTTAGCACTGTCCCTTGGCGGGTTACACTGGTGATTCTAGTACAGCCAGCTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCTGGGAACGTATTACCTGCGG
 ATGCTGATCCGCGATTACTAGCGATTCCGACTTCATGCAGGCGAGTTGCAGCCTACAATCCGAACAGACCTGGCTTTTCTCCGATTAGCTCCCCCTCGCGGGCTCGC
 GACTGGTTTTGTACTGGCATTGTAGCACGTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGCAGTCATCCCCACCTTCTCCGGTTTGTACCTGGCAGTCTC
 TCCAGAGTCCCACTTACCTTGTAGGCAACATGAGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCAC
 CTCTGCAGATCCCTTGGCGGAGTCGACTTTCGCGGATTGTATCTGCACCTTCAGGCCAGGTAAGGTTCTTCGCGTTGCGTGAATTTGAACCACATGCTCCACCGCT
 TGTGCGGGCCCCGCTCAATTCCTTTGAGTTTTCAGCCTT

>CAM2P03H09 Bacterium Ellin6099 (Acidobacteria)
 TCCCTTGGCGGGTTGGTCCCGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGCGGTGTGTACAAGGCCCGGGAACGTATTACCGCAACATTTGATTGCGGAT
 TACTAGCGATTCCAACCTCATGAACTGAGTTGCAGACTTCAATCCGAACAGACCTGAGACCGGTTTTTGGCATTAGCTCCCTCTTACGAGATTGGCAGGTTTTGTACCGGCCA
 TTGTAGCACGCTGTAGCCCTAAGCATAAAGGCCATGATGACTTGCAGTATCCCCACTTCTCCGTTTTATCAACAGCAGTCTGTATAGAGTTCTCAACTTAATGTT
 AGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTGTTGGGTTGCGTTTCCAGACT
 CTTGGCGTTACCCAAGATTCCCTCACATTTAGCCTAGGTAAGGTTCTTCGCGTTGCGTGAATTTAAACCACATGCTCCACCGCTTGTGCGGGTCCCCGCTCAATTCCTT
 TGAGTTTACACTTGCCTGCTACTCCCCAAGCGGAATACTAAAAACGT

>CAM2P03H10 Uncultured Rubrobacteridae (Actinobacteria)
TTGCGCTCGTTGCGGGACGTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTCTACGGTTTTCCAG
TGCATGTCAAGCCCTGGTAAGTTCTTCGCGTTGCGTCAAAATAAACACATGCTCCGCTGCTTGTGCGGGCCCCGTCAAATCCCTTTAGTTTTAGCCTTTCGGNCGT
ACTCCCCAGGGGGGCCTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCT
GTTGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCGCGCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTACCAGCTACACCGGGAATT
CCACTCTCCTTTCGGGACTCTAGCCAAACGGTTTCAACCTGACGTCTCGAGTTGAGCCTCGAGTTTTCACAGCTGACCTGAATGGCCGCTACACGCTCTTACGCC
CAATAAATCCGGACAACGCTT
>CAM2P03H11 Uncultured bacterium (Acidobacteria)
AGCGATTCCAACCTTCATGAAGTCGAGTTGAGACTTCAATCCGAACCTGACCCGGTTTTTGCATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTA
GCACGTGTGTAGCCCTAAGCATAAAGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCAA
CTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTGTTGGTCTGGTTTCCAGACTCTTGG
CGTTACCCAAGATTCCCTCACATTTAGCCTAGGTAAGTTCTTCGCGTTGCGTCAAAATAAACACATGCTCCACCGCTTGTGCGGGTCCCGCTCAATCTTTGAGT
TTCACACTTGCCTGCTACTCCCAGGGGAATACTAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGGTAT

>CAM2P4A02 Uncultured bacterium (Actinobacteria)
CTCACGACACGAGCTGACGACGATGCCACTGCACACTACCCCGAAGGGGGACCGTATTCTACGGTTTTCCAGTGCATGTCAAGCCCTGGTAAGTTCTTCGCGTTG
CGTCAATAAACACACATGCTCCGCTGCTTGTGCGGGCCCCGTCAAATTCCTTTAGATTAGCCTTGCAGCGTACTCCCAGGGCGGGCCTTAATGCGTTAGCTTCGGC
ACAGCGGGAGTCGATACCCGCCACACTAGTGCCATCGTTTACGGCGTGGACTACAGGGTATCTAATCTGTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTAC
CGTCCAGAGAGCCGCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTACCAGCTACACCGGGAATCCACTCTCCTTTCGGGACTCTAGCCAAACGGTTTCA
ACCGAGTCTCGAGTTGAGTTTTCACAGCTGACCTGAATGGCCGCTACACGCTTTCACGCCAATAAATCCGGACAACGCTTGCSCCTACGTATTACC
GCGGCTGCTGCGACTCAGTCAGTCA

>CAM2P4A04 Bacterium Ellin (Acidobacteria)
CTCCCTTGGCGGTTGGTCCGGCCATTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTGACAGCCGGGAACGTTATCCCGCAACATTCGATTGCGATTACT
AGCGATTCCAACCTTCATGAAGTCGAGTTGACACTTCAATCCGAACCTGAGACCCGGTTTTTGCATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGT
AGCACGTTGTAGCCCTAAGCATAAAGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGTCTTGATAGAGTTCTCAACTTAATGTTAGCA
ACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTGTTGGGTCTGGTTTCCAGACTCTTG
CGGTTACCAAGATTCCCTCACATTTAGCCTAGGTAAGTTCTTCGCGTTGCGTCAAAATAAACACATGCTCCACCGCTTGTGCGGGTCCCGCTCAATTCCTTTGAG
TTTACACTTGCCTGCTACTCCCAGGGGAATACTAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGTATTATCGTTAAGGCCAGGAC
TACCGGGTATCTAATCCCGTTT

>CAM2P4A05 Uncultured Acidobacteria bacterium (Não classificada)
CTGACATACCTAGCCCTGCGGGTTACACGGTGATTTCTAGTACAGCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTTATCCCGCGGCA
TGCTGATCCGCGATTACTAGCATTCCGACTTCATGCAGCGAGTTGACGCTTCAATCCGAAGTACAGCCGCTTTTTCTGATTAGCTCCCTCGCGGGCTCCGCA
CGGTTTTGATCCGCGATTGTAGCAGTGTGTAGCCCTGGACATAAACAGCCATGCTGACTTGACGTCATCCCACCTTCTCCGTTTTGTCAGTTTGCATCCGCTTCTCCGTTGCTTCCA
GAGTGCCAGCT

>CAM2P4A06 Uncultured bacterium (Actinobacteria)
TTGCGCTCGTTGCGGGACGTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTCTACGGTTTTCCAG
TGCATGTCAAGCCCTGGTAAGTTCTTCGCGTTGCGTCAAAATAAACACATGCTCCGCTGCTTGTGCGGGCCCCGTCAAATCCCTTTAGTTTTAGCCTTTCGGGCGGT
ACTCCCCAGGGGGGCCTTAATGCGTTAGCTTCGGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGGCGTGGACTACCAGGGTATCTAATCCT
GTTGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCGCGCTTCGCCACGGGTGTTCTTCCCGATATCTGCGCATTTACCAGCTACACCGGGAATT
CCACTCTCCTTTCGGGACTCTAGCCAAACGGTTTCAACCGAGCTTCGAGTTGAGCCTCGAGTTTTCACAGCTGACCTGAATGGCCGCTACACGCTCTTACGCC
AATAAATCCGGACAACGCTTGCSCCTACGTATTACCAGCGGCTGCTGCGACTCAGTCAGTCA

>CAM2P4A07 Uncultured soil bacterium (Não classificada)
CACGGTATTTCTAGTACAGCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTTATCCCGCGCATGCTGATCCGCGATTACTAGCGATTCCGACT
TCATGCAGCGAGTTGCAGCCTACAATCCGAACCTGAGACCCGGTTTTTCCGATTAGCTCCCTTCGCGGGCTCCGCGACGTTTGTACCGGCCATTGTAGCACGTTGTGA
CGTGTGACCCCTGGACATAAAGCCATGCTGACTTGACGTCATCCCACCTTCTCCGTTTTGTCACCGGCGAGTCTTCCAGAGTGCACAGCTTACCTGATGGCAACAGGAGACA
AGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCAGGAGTCGACTTTCGCGGATTGT
CATCTGCATTCGAGCCAGTAAAGTTCTTCGCGTTGCGTCAAAATAAACACATGCTCCACCGCTTGTGCGGGCCCCGTCAAATTCCTTTGAGTTTACGCTTTCGGA
CGTACTCCCAGGGCGGAATGCTTAAACGGTTAACTGCGGCACGGCAGGATCTGATACCGGCACACCAAGCATTATCGTTTAGGGCCAGGACTACCAGGGTATCTAA
TCCCGTTTGTCTCCCTGCG

>CAM2P4A08 Unidentified eubacterium (Acidobacteria)
GGGTTAACACCGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTTATCCCGCGCATGCTGATCCGCGATTACTAGCGA
TTCCGACTTCATGCAGCGGAGTTGCAGCCTACAATCCGAACCTGAGACCCGGTTTTTCCGATTAGCTCCCTTCGCGGGCTCCGACGTTTGTACCGGCCATTGTAGCA
CGTGTGACCCCTGGACATAAAGCCATGCTGACTTGACGTCATCCCACCTTCTCCGTTTTGTCACCGGCGAGTCTTCCAGAGTGCACAGCTTACCTGATGGCAAC
AGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGATGCCCTTGCAGGAGTCGACTTTCG
CCGATTGTCATCTGCATTCGAGCCAGTAAAGTTCTTCGCGTTGCGTCAAAATAAACACATGCTCCACCGCTTGTGCGGGCCCCGTCAAATTCCTTTGAGTTTACG
CCTTGGCAGCCGTAACAGCCGGAATGCTTAAACGGTTAACTGCGGCACGGCAGGATCTGATACCGGCACACCAAGCATTATCGTTTAGGGCCAGGACTACCAGGG
GTATCTAATCCGTTTGTCTCCCTGGCTTTCGTTTACTAGTGTGAGAAACAGTCCAGAACGCCCTTCCGACCCGGT

>CAM2P4A09 Bacterium Ellin (Acidobacteria)
ACTTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGCAAGACCCGGGAACGTTATCCCGCAACATTTCTGATTGCGGATTACTAGCGATTCCAACCTTCATGA
AGTCGAGTTGACAGCTTCAATCCGAACCTGAGACCCGGTTTTTGCATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCACGTTGTAGCCCTAA
GCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGCTTGTATAGAGTTTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCG
CTGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTGTTGGTCTGGTTTCCAGACTCTTGGGTTACCAAGATTCCCT
CACATTTAGCTAGGTAAGTTCTTCGCGTTGCGTCAAAATAAACACATGCTCCACCGCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTACACTTGCCTGCGTGA
TCCCCAGCCGGAATACTAAAACGTTAGCGACGGCACCCGGAGCTATAGAGACTCCAGACACCAAGTATTATCGTTTAAAGGCCAGGACTACCAGGGTATCTAATCCC
GTTTGTCCCTGGCTTTCGCGCTGTC

>CAM2P4A10 Uncultured soil bacterium (Acidobacteria)
TAGGCGCTCCCTCCCTTGGCGGTTGGTGTGCGGACTTCTAGTACAACCGGCTTCCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTTATCCCGCGCGTGC
TGATCCGCGATTACTAACGATTCCAACCTTCATGCAGGGAGTTGCAGCCTACAATCCGAACCTGAGACCCGGTTTTCTCCGATTAGCTCGACCTTACGGTTTTGCGACGCT
TTGTACCGGCCATTGTAGCACGCTGTGTAGCCAGACATAAAGCCATGCTGACTTGACGTCATCCCCACCTTCTCCGTTTTATCAACAGCAGCTTGTATAGAGTTTCAACTTAATGTTAGCAACTATCAATAGGGGTTGCG
CACCATAACGATGATGCAACAGCAGAGGAGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACAGCTGACGACAGCCATGCAGCACCTTACAGAGTGT
CTTGGGAAGGCAACTTTCGCTGCTGCTCCTGTTCAAGCCTGGTAAGTTCTTCGCGTTGCGTCAAAATAAACACATGCTCCACCGCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTACACTTGCCTGCGTGA
TCAATTCCTTTGAGTTTACGCTTTCGCGGACTCCCCAGGGGAATGCTTAAAGCGTTAGCTTCCGACAGCAGGGATCGATACCGCTCACACCAAGCATTATCGTT
TAAAGGCCAGGACTACCAGGGTATCTAATCCCGTTTGTCTCCCTGGTTTTGCT

>CAM2P4A11 Unidentified eubacterium (Não classificada)
GACATACTTAGCAGCTTCCCTCGCGGTTACACGGTGATTTCTAGTACAACCGGCTTCCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGTTATCCCGCGGCA
ATGCTGATCCCGGATTACTAGCATTCCGACTTCATGCAGCGAGTTGACGCTTCAATCCGAACCTGAGACCCGGTTTTTCCGATTAGCTCCCTCGCGGGCTCCGCA
CGGTTTTGATCCGCGCATTTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCACCTTCTCCGTTTTGTCACCGGCGAGTCTTCCAGAG

TGCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTCTGCAGA
TGCCCTTGGCGGAGTCGACTTTCGCGGATTTGTCATCTGCACTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGCTGCAATTGAACACATGCTCCACCGCTTGTGCGGGC
CCGTCGAATTCCTTTGAGTTTACGCTTTCGACCGCTACTCCCCAGGCGGAATGCTTAAACGCTTAACTGCG

>CAM2P4A12 Uncultured bacterium (Acidobacteria)

GGGTTAGCTCGGCGACTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGATTACCAGCGGCGTGTGATCCGCGATTACTAGCG
ATTCCAACCTCCATGCAGGCGAGTTGCAGCTGCAATCCGAACCTGAGACCGGCTTTCCTCGATTAGCTCCACCTTACGGCATCGCGACGGTTTGTACCGGCCATTGTAGC
ACGTGTGATAGCCCCAGACATAAAGGCCATGCTGACTTGCAGTATCCCCACCTTCTCCGGTTTATACCAGGAGTCTCCTCAGAGTGCAGCAGCATAACCTGATGGCAA
CAGAGGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTTACAGAGTCCCTTTCGCGGAGCCGGCTTTC
GCCGATGTGACTCGCTGTTCAAGCCTGGTAAGGTTCTTCGCGTTGCGTCAATTGAACACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTCA
GCCTTGCAGCCGTACTCCCCAGGCGGAATGCTTAAATGCGTTAGCTTGGGACAGCGAGGATCGATACCCGCCACCAAGCATTATCGTTTAGGGCTAGGACTACCGG
GGTATCTAATCCCGTTTG

>CAM2P4B03 Bacterium Ellin (Acidobacteria)

GGGTTGGTCCGGCATTCTAGTACAACCTACTTTCGTGATGTGACGGGCGGTGTGTCAAGACCGGGAACGATTACCAGCAACATTCTGATTTGCGATTACTAGCGATT
CCAACCTCATGAAGTCGAGTTGCAGACTTCAATCCGAACCTGAGACCGGTTTTCGCGATTAGCTCCCTTTCAGAGATTGCGACGTTTTGTACCGGCCATTGTAGCAGCT
GTGTAGCCCTAAGCATAAAGGCCATGATGACTTGCATCATCCCCACCTTCTCCGTTTTATCAACAGCAGTCTTGATAGAGTCTCAACTTAATGTTAGCAACTATCA
ATAGGGGTTGCGCTGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCGACCTTGTTTGGGCTGTTTCCAGACTCTTGGCGTTAC
CCAAGATTCCCTCACATTTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCAATTAAACACATGCTCCACCGCTTGTGCGGGTCCCGTCAATTCCTTTGAGTTTCA
CTTGCCTGCGTACTCCCCAGGCGGAATCAAAAACGTTAGCGACGGCACCCGAGGATAGAGACTCCAGACCAAGTATTATCGTTAAGGCCAGGACTACCGGG
GTATCTAATCCCGTTTGTCCCTGGCTTTCGCGCTGTGACGCTCAGTGTCCG

>CAM2P4B05 Uncultured bacterium (Actinobacteria)

TTGCGCTCGTTGCGGGACGTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCA
GTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCAATTAAACACATGCTCCGCTGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTGTAGCCTTGGCGGCG
TACTCCCCAGCGGGGCACTTAAATGCGTTAGCTTCCGACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGCGTGGACTACCAGGATATCTAATCCT
GTTCCGTTCCCGCTTTCGCGTCTCAGCGTCAGTACCCGAGAGAGCCGCTTCCGCCAGGGTGTCTTCCCGATATCTGCGCATTTCCACCGTACACCCGGGAATT
CCACTCTCCTTTCGCGACTTACGCAACCGGTTTCAACCGAGCTCTCGAGGTTGAGCCTCGAGTTTTCACAGCTGACCTGAATGGCGCCTACACGCTCTTTAGCC
AATAAATCCGGACAACGCTTGCCTTACGATTACCAGCGGCTGTGGCACTCAGTCAGTA

>CAM2P4B06 Uncultured bacterium (Actinobacteria)

TATGATCCCCGACCGAATCGCTGGCACATAGGACAGGTTGCGCTCGTTGCGGGACGTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCAC
ACTAGCCCCGAAGGGGACCGTATTTCTACGGTTTTCCAGTGTGATCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCAATTAAACACATGCTCCGCTGCTTGTGCG
GGCCCCGTCATTCCTTTGAGTTTGTAGCCTTGGCGGCTACTCCCCAGGCGGGGCACTTAAATGCGTTAGCTTTCGCGACAGCGGGAGTCGATACCCGCCACACCTAGTG
CCATCGTTTACGCGGTGACTACCAGGATCTAATCCTGTTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCTTTCGCCACGGGTGT
CTTCCCGATATCTGCGCATTTTACCCTACACCG

>CAM2P4B08 Uncultured bacterium (Actinobacteria)

TTGCGCTCGTTGCGGGACGTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCCGAAGGGGGACCGTATTTCTACGGTTTTCCAG
TGCAATGCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCAATTAAACACATGCTCCGCTGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTGTAGCCTTGGCGGCGT
ACTCCCCAGCAGCTTAAATGCGTTAGCTTTCGCGCACAGCGGGAGTCGATACCCGCCACACCTAGTGCCCATCGTTTACGCGGTGGACTACCAGGATATCTAATCCT
GTTCCGTTCCCGCTTTCGCGTCTCAGCGTCAGTACCGTCCCAGAGAGCCGCTTTCGCCACGGGTGTCTTCCCGATATCTGCGCATTTACCCTACACCGGGAATT
CCACTCTCCTCTTC

>CAM2P4B09 Unidentified eubacterium (Acidobacteria)

GACATACTTAGCACTGTCCCTTTCGCGGTTTACACGGTGTATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGATATCACCGCGG
ATGCTGATCCCGGATTACTAGCGATTCCGACTTTCATGACGGCGAGTTGACGCTTACAATCCGAACCTGAGACCGGCTTTTCCGATTAGCTCCCTCGCGGCTTCGCGA
CGGTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGCAGTCAATCCCCACCTTCTCCGGTTTTGTACCGGGCAGTCTCTCCAGAG
TGCCAGCTTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTCTGCAGA
TGCCCTTTCGCGGAGTCGACTTTCGCGGATTTGTCATCTGCACTTTCGAGCCGAGTAAAGGTTCTTCGCGTTGCGTCAATTGAACACATGCTCCACCGCTTGTGCGGGC
CCCGTCAATTCCTTTGAGTTTACGCTTTCGCGGCTACTCCCCAGGCGGAATGCTTAAACGCTTAACTGCGGCACGGGAGGATCGATACCCGCCACCAAGCATTCA
TCGTTTAGGGCCAGGACTACCAGGATCTAATCCCGTTTGTCCCTGGGCTTTCGTTATTTCAGTGTGAGAAACAGTCCAGAACCGCGGCTTTCGCCACCGGTTTCCT
CCAGATATC

>CAM2P4B10 Uncultured bacterium (Acidobacteria)

CGACATACTTAGCGCCTCCCTCCCTGCGGGTTGGTGTGGCGACTTCTAGTACAACCGGCTTCCGTGATGTGACGGGCGGTGTGTACAAGGCCCGGGAACGATATCACCG
CGGCGTGTGATCCGCGATTACTAACGATTTCAACTTTCATGACGGCGAGTTGACGCTTACAATCCGAACCTGAGACCGGCTTTCCTCGATTAGCTCGACCTTACGGTTTT
GCGACGGTTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCCAGACATAAAGGCCATGCTGACTTGCAGTCAATCCCCACCTTCTCCGGTTTTATACCAGGAGTCTCTGC
AGAGTCCCAACATAACGCTGATGGCAACAGCAGCAAGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACAGCCATGACGACCTCTGCAGA
CGAGTGTCTTTCGGAAGGCAACTTTCGTCGCTGCTCACTCGCTGTTCAAGCCTGGTAAGGTTCTTCGCGTTGCGTCAATTGAACACATGCTCCACCGCTTGTGCG
GGCCCCGTCATTCCTTTGAGTTTACGCTTTCGCGGCTACTCCCCAGGCGGAATGCTTAAATGCGTTAGCTTTCGCGCACGACAGGATCGATACCCGTCACACCAAGCA
TTCATCGTTTAAAGGGCCAGGACTACCAGGATCTAATCCCGTTTGTCCCTGGGCTTTCGTTATTCAGTGTGAGAAACAGTCCAGAACCGCGGCTTTCGCCACCGGTT
TTCTCCAGATAT

>CAM2P4C01 Uncultured bacterium (Actinobacteria)

CGCTGGCAACATGGAACAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGCACCACCTGTGCATTAGCCCCGAAGGGGA
CCGTGTTTTCCACGGTTTTCCAATGATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCAATTAAACACATGCTCCGCTGCTTGTGCGGGCCCCGTCATTCCTT
TGAGTTTTAGCCTTTCGCGGCTACTCCCCAGGCGGGGAACCTTAAATGCGTTAGCTTTCGCGCACAGCGGGAGTCGACACCCGCCACACCTAGTCCCATCGTTTACGGCGTG
GACTACCAGGATCTAATCCTGTTTCGCTCCCGGCTTTCGCGTCTCAGCGTCAAGCTCCAGAGAGCTGCCTTCGCGATTGGGTGTTCTTCCCGATATCTGCGCA
TTTCAACCGCTACACCGGGAATCCACTCTCCTTTCGCGACTTCCGCTACGCTTACCGCTACAGGTTCAACCGAGCTCTCAAGTTGAGCCTTGAGTTTTACAGCTGACCTGCACGGC
CGCTTACAGCCTTTTACGCCCAATAAATCCGGACAACGCTTGCCTCCCTAGCTATTACCAGCGGCTGCTGGCACTCAGTCAGTCA

>CAM2P4C02 Uncultured Acidobacteria bacterium (Acidobacteria)

CACCTTTCGTGATGTGACGGGCGGTGTGTACAGCCCGGGAACGATTTACCGCGGCTTCTGATCCGCGATTACTAGCGATTCCAGCTTATGCACTGAGTGTGACAGC
TGCAATCCGAACCTGAGGCGGGCTTTTTCCGATTAGCTCCCGCTTCGCGGTTTGCAGCGGTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATG
AGGACTTGCAGTCAATCCACCTTCTCCCGTTATCCGAGGCGGTTTACCAGAGTCCCAACTAAATGATGGCAACTGGGGATAAGGTTGCGCTCGTTGCGGGACT
TAAACCAACATCTCACGACAGGAGCTGACGACAGCCATGACGACAGCTTACAGCAGCCCTTTCGCGGGAAGGAAATATTTCTACCGGTTCCCATCGTTTACGGCGTG
GTAAGGTTCTTCGCGTTGCGTCAATTAAACACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTTTGAGTTTACGCTTTCGCGACCGTACTCCCCAGGCGGAT
GCTTATCGCGTTAGCTGCGGCACGGCGGATTGGTACCCTCACACCAATCGATCATCGTTTAGGGTGGGACTACCAGGATCTAATTCGTTTGTCTCCCCA

>CAM2P4C04 Uncultured bacterium (Acidobacteria)

GCGATTACTAGCGATTCCAACCTCATGAAGTCGAGTTGCAGACTTCAATCCGAACCTGAGACCGGTTTTTTCGATTAGCTCCCTTACAGAGATTGCGACGTTTTGTAC
GGCATTGTAGCAGCTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGCATCATCCCCACCTTCTCCGTTTTATCAACAGCAGTCTTGATAGAGTCTCAACTTA
ATGTTAGCAACTATCAATAGGGTTGCGCTCGTTGCGGGACTTAAACCAACATCTCACGACACGAGCTGACGACAGCCATGACGACCTTGTGTTGGGCTGCGTTTCC
AGACTTTCGCGTTTACCAAGATTCCCTCACATTTAGCTAGGTAAGGTTCTTCGCGTTGCGTCAATTAAACAGATGCTCCACCGGTTGTGCGGGTCCCGTCAAT
TCCTTTGAGTTTACACTTTCGCTGCGTACTCCCCAGGCGGAATACTAAAAACG

>CAM2P4C06 Unidentified eubacterium (Não classificada)
ACATACTTAGCATGTCCCTTTCGGGGTACACGGGATTCTAGTACAGCCAGCTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTACCAGCGGC
ATGCTGATCCGGGATTACTAGCGATTCCGACTTCATGACGGCGAGTTGCAGCCTACAATCCGAAGTACAGCCGGCTTTTCCGATTAGCTCCCTCGGGGCTCGGA
CGGTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGACGTCATCCCCACCTTCTCCGGTTTGTACCCGGCAGTCTCTCCAGAG
TGCCAGCTTTACCTGATGGCAACAGGAGACAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCTGCAGA
TGCCCTTGGCGGAGTCGACTTTCGCCGATTGTGATCTGCACTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTGAACCACATGCTCCACCGCTTGTGCGGGCC
CCCGTCAATTCTCTTTGAGTTTACGCTTTCGACCGTACTCCCCAGCGGAATGCTTAAACGCTTAACTGCGGCACGGCAGGGATCGATACCC

>CAM2P4C07 Uncultured organism clone (Verrucomicrobiae)
CATACTTCGGCGCTTAAAGGGCGACTTCGGGTACAAACGGCTTTCATGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGCGCGTAGCTGATGCGCC
ATTACTAGCGATTCCGGCTTCATGGAGGCAATTGCAGCCTCCGATCCGAAGTGGGCCAGTTTTAAAGATTTCCTCCACCTCGCGGTCTCGGATCATTCTGACTGGG
CATTGTAGTACGTGTGACGCCAGGCCGTAAGGGCCATACTGACTTGACGTCATCCCCACCTTCTCTCGTTTAAAGCGAGCGAGTGAACAGAGTGTGGAACCTCT
CGGTTCCGTTGGCAACAGTTACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAAATTTGTCTCT
TGAAGACTCGCTTCCACCAACTAGAGATGCAATGCAAGGCTCAAGGCTCGTCAAGGCTCGTTCGCGTTGCAATGAGCCACATACTCCACCGCTTGTGCGGGCCCCG
TCAATTTCTTTGAGTTTAACTTTCGACCGTACTCCCCAGCGGCAGTTTAAACGTTTAACTCCGG

>CAM2P4C08 Uncultured crenarchaeote (Thermoprotei)
CGATGAAGCGACGGCGGTGTGTGCAAGGAGCAGGACGATCACTGCGCGATGATGACACGGGATTACTAGGGATTCCATATTATGAGGACGAGTTTACGCCCTCAA
TCATAACTGTGGTAAGTTTTTCGGGATTGCTCCTCCTTTCGAAATCGAAACCTATTGACTTACCATTGACGCCCGCGTGTGGCCCGAGGGTTTCGGGGCATACTGACC
TGCCGATAGCCCTTCCCTCCCTCCCTTACGCGCCTTAGCGCGGCAGTCCTTCTAATTAAGGCCATGACTACTCCGAAGAATAAAGTAGCAACTAGAAGCAGGGGTCTCGCTCGTTACC
TGACTTAAACAGGACACTCACGGCAGAGCTGGCGAGCGGCATGCACCTCCTCTCAGCTTGTCTAGTAAAGCTTACGCTTACCTTCTGCTGTGCGCCCCGGTA
AGATTTCCCGGCTTGCAGTTCGAAACCGCAGGCTTACCCCTTGTGGTGTCTCCCGCCAATTCCTTTAAGTTTTCAGTCTTGGCAGCGTACTACCAGGGCGCAGAC
TTAAGCGGCTTCCGCGGACTGAGACTAGCATGCAAGGCTCAAGGCTCGATCGTTTACAGCTGGGACTACCCGGGATATCAATCCGGTTGTCTCCCCAGC
TTTCATCCCTACCGCTGAGCGGATTCTGGCAAGCGCCTTCGCCACTGTTGTTG

>CAM2P4C09 Bacterium Ellin (Acidobacteria)
CATAATCATACTGGTAACTACTCCCTTTCGGGGTGGTCCGGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGGCGGTGTGTACAAGACCCGGGAACGTATCAC
CGCAACATTTCTGATTTCGGGATTACTAGCGATTCCAACCTCATGAAGTCGAGTTGCAGACTTCAATCCGAAGTACAGCCGGTTTTTCGGGATTAGCTCCCTCTACGAGAT
TGCCGATTTTGTACCGCCATTGTAGCAGCTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGCTTTGA
TAGAGTTCTCAACTTAATGTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGT
TTGGGTTGGTTTCCAGACTTTCGGGTTACCAAGATTCCCTCACATTTAGCTTAGGTAAGGTTCTTCGCGTTGCGTCAATTAAACCACATGCTCCACCGCTTGT
GCGGGTCCCGTCAATTTCTTTGAGTTTACACTTTCGCTGACTCCCCAGCGGAATACTAAAAACGTTAGCGACGGCACCAGGAGCTATAGAGACTCCAGACACCA
AGTATTCTCGTTTAAAGGCCAGGACTACCGGGTATCTAATT

>CAM2P4C12 Bacterium Ellin (Acidobacteria)
GGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGGCGGTGTGTACAAGACCCGGGAACGTATCACCCCAACATTTCTGATTTGCGATTACTAGCGATTCCA
GAGTCGAGTTGCAGACTTCAATCCGAAGTACGAGCCGGTTTTTGGGATTAGCTCCCTCTCTGATGAGATTGCGACGTTTTGTACCGGCCATTGTAGCAGCTGTGAGCC
TAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGCTTGTATAGAGTTCTCAACTTAATGTAGCAACTATCAATAGGGGTT
CGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTGGGTTGGTTTCCAGACTCTTGGCGTTACCCAAGATT
CTCACATTTCTAGCTAGGTTAGTTCGCGTTGCGTCAATGCAATTAACCCACATGCTTCCACCGCTTGTGCGGGTTCGAGTTTCAATCTTTGAGTTTCAACTTTCGCTG
GTACTCCCCAGCGGAATACTAAAAACGTTAGCGACGGCACCAGGAGCTATAGAGACTCCAGACACCAAGTATTCTATC

>CAM2P4D01 Uncultured bacterium (Verrucomicrobiae)
GCGCTTTTAAAGGGCGACTCGGGTACAACCGGCTTCATGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATCACGGCGCGGTAGCTGATGCGCCATTACTAGCGA
TTCCGGCTTCATGGAGGCAATTGCAGCCTCCGATCCGAAGTGGGCCAGTTTTAAAGATTTCCTCCACCTCGCGGTCTCGGATCATTCTGACTGGGCATTGTAGTAC
GTGTCGAGCCAGCGGTAGGGCCATACTGACTTGACGTCATCCCCACCTTCTCCGTTTTATCAACAGCAGCAGCTGAAACAGAGCTTGTATAGAGTTCTCAACTTA
CAACAGTTACAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAAATTTGCTCTTTTCGAGACTCGC
TGCTTTACCAACTTAGAGATGCAATGCAAGGCTTGGTAAGGTTCTTCGCGTTGCAATGAGCCACATACTCCACCGCTTGTGCGGGCCCCGTCATTTCTTT
GAGTTTAACTTTCGACCGTACTCCCCAGCGGCACTTAAACGTTTAACTTCCCGCGCAGAAGGGTTCGAATCTCCCAACCAACGTTGACCCGTTTACTGCCAGG
ACTACCGGGTATCTAATCCCGTTTGTCTCCCTGCGCTTCGTTCTCAGTGT

>CAM2P4D04 Bacterium Ellin (Acidobacteria)
GGTACTACTCCCTTTCGGGGTGGTCCGGCCATTCTAGTACAACCTACTTTCGTGATGTGACGGGGCGGTGTGTACAAGACCCGGGAACGTATCACCCCAACATTTCTGATT
GCGATTACTAGCGATTCCAACCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAAGTACAGCCGGTTTTTTCGATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTAGCC
GGCCATTGTAGCAGCTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGCTTGTATAGAGTTCTCAACTTA
ATGTTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGTTTGGGTTGGTTTCCC
AGACTCTGGCGTTACCCAAGATTCCCTCACATTTAGCTTAGGTAAGGTTCTTCGCGTTGCGTCAATTAAACCACATGCTCCACCGCTTGTGCGGGTCCCGGTCAT
TCTTTGAGTTTTCGACCGTACTCCCCAGCGGAATACTAAAAACGTTAGCGACGGCACCAGGAGCTATAGAGACTCCAGACACCAAGTATTCTCGTTTAA
GGCCAGGACTACCGGGTATCTAATCCCG

>CAM2P4D06 Bacterium Ellin (Acidobacteria)
ATAATCATACTGGTACTACTCCCTTTCGGGGTGGTCCGGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGGCGGTGTGTACAAGACCCGGGAACGTATTACC
CAACATTTCTGATTTCGGGATTACTAGCGATTCCAACCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAAGTACAGCCGGTTTTTTCGATTAGCTCCCTCTTACGAGATTG
CGACGTTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGCTTGTGATA
GAGTTCTCAACTTAATGTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGT
GGGTTGGTTTCCAGACTTTCGGGTTACCCAAGATTCCCTCACATTTAGCTTAGGTAAGGTTCTTCGCGTTGCGTCAATTAAACCACATGCTCCACCGCTTGTGCG
GGTCCCGGTCATTTCTTTGAGTTTCAACTTTCGCTGCGTACTCCCCAGCGGAATACTAAAAACGTTAGCGACGGCACCAGGAGCTATAGAGACTCCAGACACCAAG
TATTCTCGTTTAAAGGCCAGGACTACCGGGTATCTAATCCCGTTTGTCTCC

>CAM2P4D07 Uncultured bacterium (Deltaproteobacteria)
CTCCTTAAAGACTGCCTCCCTCGGGGTACGACGCTTTCGGAGCACTGACTTCCATGGTGTGACGGGGCGGTGTGTAAGCCCGGGAACGTATTACCCCAACCTGCTG
ATTGGGATTACTAGCGATTCCAACCTTCATGAAGTCGAGTTGCAGACTTCAATCTGAAGTACAGCCGGTTTTTGGGATTGGCTAGCTTTCGAGATCGCGACCCCTTT
GTACCGGTTAGCAGCTGTGTAGCCCTGGGCATAAGGCCATGAGGACTTGACGTCATCCCCACCTTCCGTTTTAAACCCGGCAGTCTCGTTAGAGTGTCTG
GCCAACCGTTAGCAACTAACGACAAGGGTTGCGCTCGTTGCGGGACT

>CAM2P4D09 Bacterium Ellin (Acidobacteria)
TCATAATCATACTGGTACTACTCCCTTTCGGGGTGGTCCGGCCACTTCTAGTACAACCTACTTTCGTGATGTGACGGGGCGGTGTGTACAAGACCCGGGAACGTATTACC
AACATTTGATTTGCGGATTACTAGCGATTCCAACCTTCATGAAGTCGAGTTGCAGACTTCAATCCGAAGTACAGCCGGTTTTTTCGATTAGCTCCCTCTTACGAGATTG
GACGTTTTGTACCGGCCATTGTAGCAGCTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGACATCATCCCCACCTTCTCCGTTTTATCAACAGCAGCTTGTGATA
GTTCTCAACTTAATGTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGT
GTCGTTTTCCAGACTTTCGGGTTACCCAAGATTCCCTCACATTTAGCTTAGGTAAGGTTCTTCGCGTTGCGTCAATTAAACCACATGCTCCACCGCTTGTGCG
GTCCCGTCAATTTCTTTGAGTTTCAACTTTCGCTGCGTACTCCCCAGCGGAATACTAAAAACGTTAGCGACGGCACCAGGAGCTATAGAGACTCCAGACACCAAGTA
TTCATCGTTTTAAAGGCCAGGACTACCGGGTATCTAATCCCGTTTGTCTCCCTGGCTTTCGCGCTGT

>CAM2P4D10 Uncultured Acidobacterium (Acidobacteria)

ATACGTGGTAGATGCCCTCTGGCAGTTAGCCTCCTATTCTAGTACACCTACTTTCGTGATGTGACGGGGCGGTGTGTACAAGACCGGGAACGTATCACCGCGCCGTTCT
 GATGCCGATTACTAGCAGTTCCAACTTCATGGAGTGCAGTTGCAGACTCCAATCCGAACCTGAGACCGGTTTTTGGCATTAGTCCCTCTTACGAGATCGCGACGTTTTT
 GTACCGGCCATTGTACAGCTGTGTAGCCCTGAACATAAAGGCCATGATGACTTGCATCGTCCCACTTCCCTCCGTTTTATCAACGGCAGTCACTCCAGAGTTCCCA
 ACCTAATAATGGCAACTGAAGTTAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCGGT
 TTCCCGGACTGATGGTGTACCCAACTTCCCTCACATTTAGTCCAGGTAAGTTCTTTCGCGTTGCGTCGAATTAACCACATGCTCCACCGCTTGTGCGGGTCCCG
 TCAATTCCTTTGAGTTTCACTCTTTCGAGGCTACTCCCAAGCGGAATACTAAAACGTTAGGACAGCCGAGCACTATAAACTCCAGACACCAAGTATTATCATCG
 TTTAGGGCCAGGACTACCGGGTATCTAATCCGTTTGTCCCTGGGCTTTCGCGCTCAGCGTCAGTGTAGCCAGCAACCCGCTTC

>CAM2P4D11 Bacterium Ellin (Acidobacteria)

ATGTGACGGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGCAACATTTGATTGCGATTACTAGCGATTCCAACCTTATGAAGTCGAGTTGCAGACTTCAATCCG
 AACTGAGACCGGTTTTTGGCATTAGCTCCCTCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATAAAGGCCATGATGACTTGAC
 ATCATCCCACTTCCCTCCGTTTTATCAACAGCAGCTTGTATAGAGTTCTCAACTTAATGTAGCAACTATCAATAGGGGTTGCGCTCGTTGCGGGACTTAACCAACA
 TCTCACGACAGGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCGGTTCACGACTCTTGGCGTTACCCAAGATTCCCTCACATTTAGCTAGGTAAGGTTT
 TTCGCGTTGCGTCGAATTAACCACATGCTCCACCGCTTGTGCGGGTCCCGCTCAATTCCTTTGAGTTTACACATTGCGTGCCTACTCCCAAGCGGAATACTAAAAC
 GTTAGCGACGGCACCGGAGCTATAGAGACTCCAGACACCAAGTATTATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCGTTTGTCCCTGGCTTTCGCGCTG
 TCAGCTCAGTGTGC

>CAM2P4D12 Uncultured bacterium (Deltaproteobacteria)

CTCCCGAAGGGTTGGCTCAGCGACTTCTGGTACACCGCTTTCGTGGTGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATCACCGGAGCGTGTGATCTCCGAT
 TACTAGCGATTCCAGCTTACAGCCGGGAGTTGACGCGGACCATCCGAACCTAGGATCAGGTTTTTGTAGATTGGCAACCTCTTGCAGGGGAGCGACCCATTGTCCTGACC
 ATTTAGTACCGTGTGTAGCGATTAGGACATAAAGGCCATGAGGACTTGCAGCTTCCATCCCACTTCCCTCCCGTTTACCGGGGAGTCCCTCAGAGTGCCTGATACCC
 GGTAGCAACAAGGGGAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTGTGACAGGCCATGAGCAGGCTTCCG
 GTGACTTTCATCACCAGTCCGTTGATGTCAAACCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGTCATTCCTT
 TGAGTTTCAGCCTTGGCAGCTACTCCCAAG

>CAM2P4E01 Uncultured Acidobacteria bacterium (Acidobacteria)

GGTACATGCCCTCTTGGCAGTTAGCCTGCTACTTCTAGTACAACCTACTTTCGTGATGTGACGGGGCGGTGTGTACAAGACCGGGAACGTATTCACCGCAACATGCTG
 ATTTGGCATTACTAGCGATTCCAACCTTATGGAGTCGAGTTGCAGACTCCAATCCGAACCTGAGACCGGTTTTTGGCATTAGCTTCCCTTACGGGATCGCGACGTTTTG
 TACCGGCCATTGTAGCAGTGTGTAGCCATAAGCATAAAGGCCATGATGACTTGCATCTCCCACTTCCCTCCGTTTTATCAACAGCAGTCTCGGTAGAGTTCCCAA
 TTAATGATGGCAACTACCGATAGGACTTGGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTGTGTCAGGCCCCGAAAGGAA
 TCCAGACGATCGGTTTACCTTCTTCCCTCACATTTAGCCTAGGTAAGTTCTTTCGCGTTGCGTCGAATTAACCACATGCTCCACCGCTTGTGCGGGTCCCGCT
 CAATTCCTTTGAGTTTCACTCTTGCAGCGTACTCCCAAGCGGAATACTAAAACGTTAGGACGGCACCGGAGCACTAATACTCCAGACACCAAGTATTATCATCGT
 TTAGGGCCAGGACTACCGGGTATCTAATCCGTTTGTCCCTGGCTTTCGCGCTCAGCGTCAAGTGTGCGGCCAGCAACCCGCTTTCACCTCAGGTTCTTCTCGA
 TATCTACGACTT

>CAM2P4E02 Uncultured soil bacterium (Acidobacteria)

ACAACCGGCTCCGCTGATGTGACGGGGCGGTGTGTACAGGCCGGGAACGTATCACCGCGGCTGTGATCCGCGATTACTAACGATTCCAACCTTATGCAGGCGAGTTG
 CAGCCTTACAATCCGAACCTGAGACCGGTTTTCTCCGATTAGCTCGACCTTACGTTTTTGGCAGCGTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATA
 CCATGTGACTTGCAGTTCATCCCACTTCCCTCCGTTTTATCACCGGCGTCTCTGAGAGTGCACCATAACGTTGATGGCAACAGCAGACAAGGTTGCGCTCGTTG
 CGGACTTAACCAACATCTCACGACACAGCTGACGACAGCCATGCAGCACCTTACAGAGTTCCTTGCAGGAGGCAACTTTGCTGCGTGGTCACTCGCTGTCAAGC
 CTGGGTAAGTTCTTCCGCTTCCGTCGAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTGCAGCCTTCCCAAGGCTCCCGG
 GAATGCTTAATGCGTTAGCTTCCGACAGCAGGATGCATACCCGTCACACCAAGCATTATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGTCCCT
 GGCTTTCGCTTATCAGTGTCAAGTTAGGTT

>CAM2P4E03 Bacterium Ellin (Acidobacteria)

TCTAGTACAACCTACTTTCGTGATGTGACGGGGCGGTGTGTACAGGCCGGGAACGTATTCACCGCAACATTTGATTGCGATTACTAGCGATTCCAACCTTATGAAGTGC
 AGTTGCAGACTTCCAATCCGAACCTGAGACCGGTTTTTGGCATTAGCTCCCTTCTACGAGATTGGCAGCTTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATA
 AAGGCCATGATGACTTGCATATCCCACTTCCCTCCGTTTTATCAACAGCAGTCTTGTAGAGTTCTCAACTTAATGTAGCAACTATCAATAGGGGTTGCGCTCGT
 TCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTTGTTTTGGGTCGGTTCCTCCAGACTTTCGCGGTTACCCAAGATTCCCTCACAT
 CTAGCCTAGGTAAGTTCTTCCGCTTCCGTCGAATTAACCACATGCTCCACCGCTTGTGCGGGTCCCGCTCAATTCCTTTGAGTTTGCAGCCTTCCCAAGGCTCCCG
 CAGCGGAATACTAAAACGTTAGGACGGCACCGGAGCTATAGAGACTCCAGACACCAAGTATTATCGTTTAGGGCCAGGACTACCGGGGTATCTAATCCCGTTTGT
 CTCCTT

>CAM2P4E04 Uncultured Acidobacteriales bacterium (Acidobacteria)

CTCCTTGGCGTTAGCACACCGCTTCTAGTACGGGCCACTTTCGTGATGTGACGGGGCGGTGTGTACAAGGCCGGGAACGTATTCACCGCGGCTTGTATCCGCGATT
 TAGCGATTCCAGCTTCAATCCGAACCTGAGACCGGTTTTTGGCATTAGCTCCCTTCTACGAGATTGGCAGCTTTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTAAGCATA
 TGAGCACGTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGCAGTCACTCCCACTTCCCTCCTCGTTATCCGAGGAGTTTCACTAGAGTGCCTGGCTTACCCGGA
 TGGCAACTAGGATAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACGGAGCTGACGACAGCCATGCAGCACCTCCGAGCAGTTCTTGCAGAAAGGG
 ATGTTTCCACCCCGGTTCCAGTGGCTTCCAGCCAGGTAAGTTCTTCCGCTTGCCTCAGGTCGAATTAACCAACATGCTCCACCGCTTGTG

>CAM2P4E05 Uncultured bacterium (Alphaproteobacteria)

CCCTTGGCGTTAGCGCACCGCTTCTCAGGTAAGGCCAACTCCATCGTGTGACGGGGCGGTGTGTACAGGCCGGGAACGTATTCACCGCAGCGTGTGATCTGCGATTACT
 AGCGATTCCAACATACATGCTCGATTGCGAGCACAATCCGAACCTGAGACCGGTTTTTGGCATTAGCTCCCTTCTACGAGATTGGCAGGTTTTCCCATTTGCTCCCATTTGTCACCGCCATTGT
 AGCAGTGTGTAGCCAGCCTGTAAGGGCCATGAGGACTTGCAGTCACTCCCACTTCCCTCCGCGTTATCACCGGCGAGTCCCTTAGAGTGCCTCACTAAATGATGGC
 AACTATGGCGGAGGTTGCGCTTTCGCGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTGCTCCGTTCCGCGCAACTGAAAGGCT
 CCATCTCTGGTCCCGGACCGGATGTCAAAGGCTGTAAGGTTCTTCCGCTTGCCTCGAATTAACCACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTT
 GAGTTTTAATCTGCGACCGTACTCCCAAGCGGGATGCTTAATGCGTTAGCTGCGCCACTGACGAGTAAACCCGACAACGGCTAGCATCCATCGTTTACGGCGTGGAC
 T

>CAM2P4E08 Uncultured crenarchaeote (Thermoprotei)

ATATGCAAAATCGCACCTCGCTTAAACCAACTTCGATGAAGCGACGGGCGGTGTGTGACAGCAGGAGTATCACTGCGCGATGATGACANCGGATTACTAGGGAT
 TCCATATTCATAGGACGAGTTTTCAGCCCTCAATCATAACTGTGGTAAGTTTGGCGATTGCTCTCTTTCGAAATCGGAACCTATTGTACTTACCATTGACGCGCCGG
 TGTGGCCGAGGTTTCCGGGCATACCTGACCTGCCCCCTTCTCCCGCTTACGGGGCGGAGTCTTCAATTAGCCCTTACTCCGAAGAATAAAGTA
 GCAACTAGAAAGGAGGTTTCCGCTTACCTGACTTAACAGGACACTTCCAGGACAGCTGCGGACCGCCATGCAGCACCTTCCAGCTTGTCTAGTAAAGTCTTCAG
 CTGACCTTCACTTCTGCTGCGCCCCGGTAAGATTCCCGGCGTTGACTCCAATTGAACCGCAGGCTTACCCCTTGTGGTGC

>CAM2P4E09 Uncultured bacterium (Deltaproteobacteria)

ATTTCTGGAGCAACTGACTCCCATGTTGTGACGGGGCGGTGTACAAGGCCGGGAACGTATTCACCCCTGCCTGCTGATCAGGATTACTAGCGATTCCAACCTCATGA
 AGTCGAGTTGCAGACTTCAACTGAACTGAGGCGGTTTTTGGGATTGGCTTGCCTCGTGGTTTGGCAGCCCTTTGTACCGGCCATTGTAGCACGTGTGTAGCCCTG
 GGCATAAAGGCCATGAGGACTGACGTCATCCCACTTCCCTCCGTTTTAACACCCGCGTCTCGTTAGAGTGCCTCCGCGGAGCCGCTGGCAACTAACGACAAGGGTTG
 CGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTGACATCCAATTCCTTTCGCGGACATCCACATCTCTGCGGACTT
 CGGAGGTTCAAACCCAGTAAAGTTCTTCCGTTCCGTCGAATTAACCACATGCTTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTGAGTTTACGCTTTCGCGG
 GTACTCCCAAGCGGAGTGTCTAACCGTTAGCTACGACGCTTCCGGGTTCAATACGAAACATCTAGCACTCATGTTTACGGCGTGGACTACCGGTTATCTAAT
 CTGTTTGTCTCCCAAGC

>CAM2P4E10 Uncultured Xiphinematobacteriaceae (Verrucomicrobiae)

GGTACAACGGCTTCATGATGTGACGGGGCGGTGTGACAAGGCCGGGAACTATCAGGGCCGCTAGCTGATGCGCCATTACTAGCGATTCCGGCTTCATGGAGCGA
 ATTGCAGCCTCCGATCCGAACCTGGGGCCAGTTTAAAGGATTTCCCTCCACCTCCGGCTCCGGATCATTCTGTACTGGGCATTGTAGTACGTGTGACGCCAGCCGCTAA
 GGGCCATACTACTGACTTGCATCCCACTTCCCACCTTCTCCTCGTTTAAAGCGAGGAGCTGAAACAGAGTGTGGAACCTCTCGGTTCCGTTCCGACAGGCTTACAGGGGTTGC
 GCTCGTTGCGGGACTTAACCAACATCTCAGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAATTTGCTCTTTTCGAGACTCGCTGGCTTACCAACTTAGAG
 ATGCATGTCAAGGCTTGAAGTCTTTCGCGTTGCATCGAATTGAGCCACATACTCCACCCTGTGTCGGGCCCGCTCAATTTCTTTAGTTTTAATCTTTCGACCG
 TACTCCCAGGGCGCACGTTTAACTGTTTAACTCCCGCGCAGAAGGGTGAATCTCCACACCAAACTGCACCCTTTACTGCCAGGACTACCGGGGTATCTAATCC
 CG

>CAM2P4E11 Uncultured organism (unclassified_Bacteria)
 AGAGCGACGGGCGATATGTACATAAATTTAGAGTTTGTGTCACATATTTAAACTATTTAAATTTACTCTTAAATCCAACTTTACACACATTTCTTGTGCTATTACGTAATT
 TTTATTTATGTAATACATATCTCTTTAATAAAATTAATCTTGTATTGACTTAAATAAGCTTAACTTGCTAGAAAAACTATATAATTTAATTCCTTAGACAAACGATATA
 TAGATAAAATCAAGAATTGTAAGGTGTAGTATCTATTATGTAATATATTCCTCTAATAAAATAAATACCGCAAAATCTTTAAGTTTTAAATTTACTACTTTAGTAA
 TAGATAGTTTTCATAGCTGGGTATCTAATCCAGGCTTTAGTTAATTTTTTAAATTTTAAATTTTAAATTTAGTAAATTTAAACCAAATAAAGAATTTTACTTTTAAATAATTAGGAA
 TTAATGTTTTAATAATTACAAAAAATAAATTTTACAAAACTGTGTAACCGCGGGGCTGGCAGTCTAGTCAGTCA

>CAM2P4E12 Uncultured soil bacterium (Alphaproteobacteria)
 CCTTCGGGTGAAACCACTCCCATGGTGTGACGGGGCGGTGTGACAAGGCCTGGGAACGTTATCCAGCGGGCGTGTGATCCGCGATTACTAGCGATTCCGCTTCATG
 CTCTCGAGTTGCAGAGAACAATCCGAACCTGAGACGGCTTTTGGGATTTGCTCCTCCTCGAGTTTGCTCAGTCTCGCGAGTTTGCTGCCCTTTGTACCGCCATTGTAGCACGTGTGAGCCAG
 CGGTAAGGGCCATGAGGACTTGACGTATCCCCACCTTCTCCTCGGTTTACACCGGAGTTTCTTTAGAGTGCACAACTAAATGTTAGCAACTAAAGACGAGGGTTGC
 GCTCGTTGCGGGACTTAACCAACATCTCAGACACGAGCTGACGACAGCCATGCAGCACCTGTGTCAGGTCGCCGTAAGGGAAGGAATCCATCTCTGAAAACCGTCTC
 GGCATGTCAAACGCTGGTAAAGTTTTCGCGCTTGCATTCGAATTAACCACATGCTCCACCCTGTGTCAGGCCCCCGTCAATTTCTTTGAGTTTTAACTTTCGCGCGGT
 ACTCCCAGGGGATGACTTAACGCGTTAGTCTC

>CAM2P4F01 Uncultured soil bacterium (Acidobacteria)
 GCGCTGCTCCCTTACGGGTTGGCGGACGACTTCTAGTACAACCACTTTCGATGATGTGACGGGGCGGTGTGACAGACCGGGAACGATACCCGCGGATGTGATCTGC
 GATTACTAGCGATTCCAGCTTTCATGGAGTGCAGTTCGAGACTCCAATCCGAACCTGAGACAGGCTTTTTCGGATTGGCTCCCTTTCGAGTTTTCGACGCTTTGTACTT
 GCCATTGTAGCACGTTGTAGCCCTGGACATAAAGGCCATGAGGACTTGAGCTCATCCCANCTTCTCCGTTTTGTCAACGGGAGTCAATAGAGTGCAGGGCCGAA
 CCGCTGGCAACTATTGTAAGGTTGCGCTCGTTCGCGGACTTAAACCAACATCTCAGACACGAGCTGACGACAGCCATGCAGCACCTTGCATCTGCCTGGTTTTAC
 CCAGAGGGCGTATCTACCGCGTTCAGAGGCACTTAGCCAGGTAAGGTTCTTCGCTTGCCTGCAATTAACACCATGCTCCACCCTTGTGCGGGTCCCCGCTCA
 ATTCCTTTGAGTTTTAGTTCGCAAGCTACTCCCAGGCAATGCTTAAAGCCTTAGCGACGGGACCCGAGGACTAT

>CAM2P4F02 Bacillales bacterium (Bacilli)
 TCCTCGAAAGGTTACCTACCGACTTTGGGTTTGAACCTCCCGTGGTGTGACGGGGCGGTGTGACAGGCCGGGAACGAATTCACGCGGATGCTGATCCGCGATTAC
 TAGCAATTCGGGCTTATCAGCGCGAGTGTGACGCTTCCAATCCGAACCTACGACAGGCTTTATGAGATTGGCTCCACCTCCGCGTTTCGATCCCTTTGTACCGCCATT
 GTAGCACGTGTGAGCCCAAGACATAAGGGCATGATGATTTGAGCTATCCCCGCCCTCCTCCGTTTTGTACCGGCAGTCCATTTGTGAGTGCACCACTGAATGATG
 CAACACAACGTAAAGGTTGCGCTCGTTCGGGACTTAAACCAACATCTCAGACACGAGCTGACGACAAACCATGACCCACTGTCACCACTGCCCCGAGGAACTCT
 ATCTCTAGAGGATCAGCGGGATGCAAGTCTTGGTAAGGTTCTTCGCGTTGCTTCGAATTAACACCATGCTCCACTGCTTTGTGCGGGCCCCGCTCAATTCCTTTGAG
 TTTGACTTTCGCGACCGTACTCCCAGGGGAGTCTAATGCGTTAGCTTCGGCACTGAGGGTGTGACCCCAACACCTGTCACCCCGGATGCTTTACGCGGTGGACTAC
 CAGGGTATCTAATCTGTTTGTCCCCACGCTTTCGCGCTCAGCGTACAGAAATCGGCCAGCAAGGGCGCTTCCACAGGTTGATCTCCCA

>CAM2P4F03 Uncultured organism (unclassified_Bacteria)
 ACATATTTAAACTATTAATTTACTCTTAAATCCAACTTTACACACATTTCTTGTGCTATTACGTAATTTTTATTTATGTAATACATATCTCTTTAATAAAATTAATCT
 TGATTTGACTTAAATAAGCTTAACTTGTAGAAAAACTATATAAATTAATTCCTTAGACAACGATATAAGATAAAATCAAGAATTTGTAAGGTGTAGTATCTATTATG
 TAATATATTCCTTAATAAAATAAATTTACCAGCAAACTTTAAGTTTTAATTTTAACTTTAGTAAATAGATAGTTTTTCACTAGCTGGGTATCTAATCCAGGCTTTAG
 TTAATTTTTTAAATTTTAAATTTTAAATTTTAAATTTTAAATTTTAAATTTTAAATTTTAAATTTTAAATTTTAAATTTTAAATTTTAAATTTTAAATTTTAAATTT
 ACTGTGTAACCGCGGGGCTGGCAGTCTAGTCAGTCA

>CAM2P4F04 uncultured bacterium (Deltaproteobacteria)
 TGTGACGGGGCGGTGTGACAGCGGGGAACGATTTACCGCGGGCTTCTGATCCGCGATTACTAGCGATTCCGACTTACCGGAGTGCAGTTCGAGACTCCGATCCGAACT
 GGGATCCGTTTTCTGGGATTTAGCTTACGCTCAGCTTCCGAGCCCATTTGACAGCCCATTTGACAGCAGTGTGAGCCCAAGACATAAAGGCCATGAGGACTTACGCTC
 ATCCCCACCTTCTCCGCTTGACACCGGAGTCCCTCTAGAGTGCACCACTGAATGCTGGCAACTAAAGGAGGGGTTGCGCTCGTTCGCGGACTTAACCAACATCT
 CACGACAGGCTGACGACAGCCATGCAGCACCTGCTCAGCGCTCCCTTCCGGGCACTCCACATCTTGCAGGATTCGCTGGATGTCAGTCTGGTAAGGTTCTGC
 CGGTTGCTCGAATTAACACCATGCTCCACCCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTTAGCTTTCGCGCCGTTACTCCCAGCGGAGTCTATTGCGTT
 AGCGTCTCAGGCGAGGGTCAAAACC

>CAM2P4F05 Uncultured bacterium (Acidobacteria)
 CTTGGACGGTATCCCTTTCGCGTTAATTACGGCTTCTAGTACAACCTGGCTTTCGATGATGTGACGGGGCGGTGTGACAGGCCGGGAACGATTCACCGCTGCTTGTGA
 TCAGCGATTACTAGCGATTCCAGCTTTCATGAGTTCGAGTTCGAGACTGCAATCCGAACCTGAGAACCGGTTTTTGGATTTAGCTCCCTTCCGCGGTTTGAACCTATTG
 TACCACCATTTCTGAGTACGTTAGCTTACGCTCAGCTTCCAGCCATTAAGGCCATGAGGACTTACCCACCTTCCCGTTTTTCACCGGAGTCCGATTTAGAGTCTCAG
 CTTAACCTGGTGGCAACTAAAGGAGGGGTTGCGCTCGTTCGCGGACTTAAACCAACATCTCAGACACGAGCTGACGACAGCCATGCAGCACCTCGACTAGTGTCCCT
 TCGGGAAAAGGCACTTTCGCCACCTGTCAGTACGCGTTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACACATGCTCCACCCTTGTGCGGGCCCCG
 TCAATTCCTTTGAGTTTTAGCCTTTCGACCGTATCCCCAGGGGATACTTAAATGCGTTAGCTTCGCG

>CAM2P4F08 Unidentified soil bacteria (Acidobacteria)
 GGGCGGTGTGTAACGGGCCGGGAACGATACCCGCGGCGTGTGATCCGCGATTACTAGCGATTCCAACCTTCATGCAGGCGAGTGCAGCCTGCAATCCGAACCTGAGA
 CCGGCTTTCTCCGATTAGCTCCCTTTCGCGATTCGCGAGATTCGCGAGCGGTTTGTACCGGCACTTGTAGCAGTGTGTAGCCCAAGACATAAAGGCCATGCTGACTTGCAGTCTCC
 CCACCTTCTCCGTTTTATCCCGGAGTCTCCCGAGAGTGCACCAATAACGTTGAGGCAACAGCGGCAAGGGTTGCGCTCGTTCGCGGACTTAACCAACATCTCA
 CGACAGGCTGACGACAGCCATGCAACCTGCAATCCGCGCTTTCGCGGAGCCGCGCTTTCGCGGATTCGAATGCCCTTTCGAGCCTGGGTAAGGTTCTTCGCGTTG
 CGTCAATTTGAACCATGCTCCACCCTTGTGCGGGCCCCGTCGAATTCCTTTGAGTTTTAGCCTTTCGAGCCTTTCGACCGTACTCCCCAGCGGAATGTTAATGCGTTAGCTTC
 GGCAGGCGAGGATCGATACCCGCCACCAACATTCATCGTTTAGGGCTAGGACTACCGGGTA

>CAM2P4F09 Uncultured bacterium (Deltaproteobacteria)
 CTTGCTCCCTCCGCGTGGTTCGCGGCACTTCTGGGAAACCGATCCATGGTGTGACGGGGCGGTGTGACAGCCGGGAACGATTCACCGCGGATGCTGATCCGCGAT
 TACTAGCATTCCAACCTTCATGACGTCAGTTGACAGCTGCAATCCGAACCTGAGGACCATTTTCTGGGATTGGCTCCGATCACTACTTCCGCTCCCTCTGTAGGGTCC
 ATTGTAGCAGTGTGTAGCCCTGAGCATAAAGGCCATGAGGACTTACGCTCATCCACCTTCCCGACTTCACGTCGGCGGTTCCGATAGAGTGTCTGCGGCAAGCAG
 CTAGCAACTATCCGAGGGGTTGCGCTCGTTCGCGGACTTAAACCAACATCTCAGACACGAGCTGACGACAGCCATGCAGCACCTGCACACCAGCCGGAAGGAAAG
 TACATCTTCGACCGGCTGATGCGCTTCGAACCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACACCATGCTCCACCCTTGTGCGGGCCCCGTCGAATTCCTTT
 GAGTTTTAATCTTGCAGCCTACTCCCAGGGGAGTGTAACTGTTAATTCGACACCGGAGGTCGAATCCCGCGAGCTTACTACTCATGCTTACAGCGTGG
 ACTACCAGGGTATCTAATCTGTTTGTACCCAGGCTTTCGCGTCTCAGCGTCAATTTGCTC

>CAM2P4F10 Uncultured bacterium (Acidobacteria)
 GTTTGGCGGACGACTTCTAGTACAACCACTTTCGTGATGTGACGACGNGTGTGACAAGACCGGGAACTATCCGCGAGATGCTGATCTGCGATTACTAGCGAT
 TCCAGCTTCCATGGAGTGCAGTTGACAGTCCCAATCCGAACCTGAGACCGGGTTTTTGGGATTGGCTCCCTCTCGCGAGTTTGCAGCGCTTTGTACCGGCCATTGTAGCAC
 GTGTGAGCCCTGGACATAAAGGCCATGAGGACTTGCAGTTCATCCCACTTCCCTCGTTTTGTTCAACCGGAGTCTCAATAGAGTGTCTCGGCCGAAACCGCTAGCAACTA
 TGATAAAGGTTGCGCTCGTTCGCGGACTTAAACCAACATCTCAGACACGAGCTGACGACAGCCATGCAGCACCTTGCACCTTGCCTTCCGCTTCCCTAGGTTTTCCCTAGGAGCCGTA
 TCTCTACGGCTGTGACAGGACTTCTAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACACCATGCTCCACCCTTGTGCGGGTCCCGTCAATCCCTTTGAGTT

TCAGTCTTGGCACCCTACTCCCAGGCGGGTACTTAAACCGGTTAGCTGCGGCACCCGGAGACTATAAAAATCCAAGACACCAAGCATCCATCGTTTAAAGGCCAGGACT
ACCGGGGATCTAATCCCGTTCCGCTCCCTGGCTTTCGCGCATCAGCGTCAGTGTCC

>CAM2P4F11 Uncultured Rubrobacteridae (Actinobacteria)
TTGCGCTCGTTGCGGGACTTAACCCAACTCTCACGACACGAGCTGACGACAGCCATGCACCACCTGCACACTGGCCCCGAAGGGGGACCGTATTCTACGGTTTTCCA
GTGCATGTCAAGCCCTGGTAAGGTTCTTCGCGTTGCGTCAATTAACACACATGCTCCCGTGTGTCGCGGCCCGCTCAATTCCTTTAGTTTTAGCCTTGCGGCCG
TACTCCCCAGGCGGGTACTTAATGCGTTAGCTTCCGACAGCGGGAGTGCACACCCGCCACACTAGTACCCATCGTTTACGGCGTGACTACCAGGGTATCTAATCC
GTTCGCTCCCCACGCTTTCGCGTCTCAGCGTCACTACCGTCCCAGAGAGCCGCTTTCGCGCAGGGTGTCTTCCCGATATCTGCGCATTTACCCGCTACACCGGGAAT
TCCACTCTCCTTTCGCGGACTTAGCCATACGTTTCAACCCAGCTTTCGAGGTTGAGCTCGAGTTTTCACAGCTGACCTGTATGGCCGCTACACGCTCTTTACGCC
CAATAAATCCGGACAACGCTTGCCTTACGTATTACCGCGCTGCTGGCACTCAGTCAGTCA

>CAM2P4F12 Bacterium Ellin6099 (Acidobacteria)
CACTTCTAGTACACCTACTTTCGTGATGTGACGGGCGGTGTACAAGACCCGGGAACGATTACCAGCAACATTCTGATTTCGGATTACTAGCGATTCCAACCTTCAT
GAAGTCGAGTTGCAGACTTAATCCGAACCTGAGACCGGTTTTTTCGATTAGCTCCCTTACGAGATTGCGACGTTTTGTACCGGCCATTGTAGCACGTTGTAGCCNC
TAAGNCATAAAGGCCATGACTGACATCCTCCGCTTTCCTCGTTTTATCAACAGCAGCTTGTATAGATTCTCAACTTAATGTTAGCAACTATCAATAGGGGT
TGCCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGACGACCTTGTTCGCGTCTGGTTCCAGACTTTGGCGTTACCCAAGATT
CCCTACATTTAGCCTAGGTAAGGTTCTTCGCGTTGCGTCAATTAACACACATGCTCCACCGCTTGTGCGGGTCCCC

>CAM2P4G01 Uncultured soil bacterium (Acidobacteria)
GGAACCTCTCCCTTGGCGGTTGATATGGCTACTTCTAGTACAACCGGCTTTCGTGATGTGACGGGCGGTGTGTACAAGGCCGGGAACGATACCAGCGGGTGTGTA
TCCGCGATTACTAGCGATTCCAACCTCAAGCAGGCGAGTTGCAGCGCTGCTATCCGAACCTGAGACCGGCTTCTCCGATTAGCTCCAGCTTGCCTTTTGCAGCGGTTG
TACCGGCCATTGTAGCACGTTGTAGCCCCAGACATAAAGGCCATGCTGACTGACGTCATCCCACTTCTCCGTTTTATACCGGCAGTCTCTGCGAGATGCCAC
CATAACGTCGATGGCAACAGCAGACAAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTTACGAGTGTCTCT
GCGGAAGCCGCTTTCGCGGCTTGTCACTCGCTGTTCAAGCCTGGGTAAGGTTTCGCGTTGCGCTGCAATTAACACACATGCTCCACCGCTTGTGCGGGCCCCGTA
ATTCTTTAGTTTACGCTTGCAGCGTGTCCAGCGGAAATGCTTAATGCGTTAGCTTCCGACGACAGGGATCGATAACCGCTCACACCAAGCATTATCGTTTAA
GGCCAGGACTACCAGGGTATCTAATCCCGTTTGTCCCTGGCTTTCGCTACTCAGCGTCAGTAATGGTCCAGGAT

>CAM2P4G02 Bacterium Ellin6067 (Betaproteobacteria)
CCTCCTTGCCTTAGGCGACCGGCTTCTGGTGAACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGACCCGGGAACGATTACCAGCGACATGCTGATCCGCGATT
ACTAGCGATTCCGACTTCAATGCACTCGAGTTGTAGACTGCAATCCGACTACGACCGGCTTAAAGGGATTGGCTTACTCCGCGGCTTAGCGAGCCCTCTGTAGCGGCC
ATTGATTAACGTTGAGCCCTACCCATAAAGGCCATGAGGACTTACGCTCATCCCACTTCTCCGTTTTGTCACCGGCAGTCTCATTAGAGTGCACCACTGAATGT
AGCACTAATGACAAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTGTGTTCCGTTCCCTTTCGCGACA
CGCACTCCACCCAGGCTTCCGACATGTCAGGGTAAAGGTTTTTCGCGTTGCGCTGCAATTAATCCACATAAATCCACCGCTTGTGCGGGTCCCGCTCAATTCCTT
TGAGTTTAACTTTCGCGGCTACTCCCCAGGCGGTCGACTTCCAGCGTTAGCTTCTGTTACTGAGAGTGTCAAACCCCAACAACAGTGCACATCGTTTAGGGCGTGG
GCTACCAGGGTATCTAATCCTGTTGCTCCCAAGCTTTCGTCATGAGCGTCAGTGTACGCCAGAGACTGCCTTCCGCATCGTGTTCCTCTGATATCTACG

>CAM2P4G03 Uncultured bacterium (Gemmatimonadetes)
GGTTCGACACGGACTTCGGGCGCTGCCACTTCCATGGCTGACGGGCGGTGTGTACAAGGCCGGGAACGATTACCAGCGCAATACTGATCCGCGATTACTAGC
GATTCCAGCTTTCATGCGCTCGGTTGCGACGACAAATCCGAACCTGAGGCGGGTTTTGGGATTGCCTCGGCATTGCTGCCTCGGCCCCCTCTGTCCAGCCATTGTAGC
ACGTTGTAGCCCTAGACATAAAGGCCATGACTGACTTGCAGCTGCTCCCACTTCTCCGTTTTGCGACCGGCAGTCTTCTAGAGTCCCGCCATTACGCGCTGGCAA
ATAAGAACAGGGTTCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTGTGCGGAACTCCGAAGAGGGGCTCTCGCT
TCTGAGAGCTTACTCGCGCATGTCAGGCTAGGTAAGGTTCTTCGCGTTGCGTCAATTAACACACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTAGGTT
TCAACCTTGCCTGCTACTCCCCAGGCGGGTACTTCTGCGTTAGCGCGGCACCCAGAGGGTTCGCTCCCGGACCTAGTACCATCGTTTACGGCGTGGACTAA
CAGGGTATCTAATCCTGTTGCTCCCAAGCTGTGCGGCA

>CAM2P4G05 Acidobacteriaceae bacterium (Acidobacteria)
GGTATGCGACCGACTTCTAGTCAACCCACTTTCGTGATGTGACGGGCGGTGTGTCAGGCCGGGAACGATTACCAGCGACATGCTGATCTGCGATTACTAGCGATT
CAGCTTTCATGGAGTCGAGTTGCAGACTCCAATCCGAACCTGAGGCGGGTTTTCCGATTAGCTCCCGCTCACGGGTTTGCAGCGGTTTGTACCGGCCATTGTAGCACGT
GTGTAGCCCTGGACATAAAGGCCATGAGGACTTGCAGCTCATCCCACTTCTCCCGTTTTGCGACCGGCTTTCGCGCAGGTTGCTCAACTAAATGGTAGCACTGGAG
ATAAGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTATAGCGGCTATATAGGGGCTATTTGCTAGACCGGATTTCTGCT
CGGATTCCACTACATTTGAGCCAGGTAAGGTTCTTCGCGTTGCGTCAATTAACACACATGCTCCACCGCTTGTGCGGGCCCCGCTCAATTCCTTTAGTCTCAGCC
TTGCGACCGTACTCCCCAGGCGGATTGCTTATCGCGTTAGCTTCCGCGACAGAGATTGGGTACTGTACACCAAGCAATCATCGTTTAGGGTAGGACTACCAGGGT
ATCTAATCCTGTTGCTCCCTAGCTTTCGCGCTCAGCGTCAGTTATGGTCCAGTCCG

>CAM2P4G06 Uncultured soil bacterium (unclassified_Bacteria)
GACATACTTAGGACTTCTCCCTTACGGGTTACGCGGCACTTCTATACAGCAGCTTTCGTGATGTGACGGGCGGTTTACAAGGCCGGGAACGATTACCAGCGCGGCTGC
TGATCCGCGATTACTAGCGATTCCAACCTTATGACGGCGAGTTGCAGCCTACAATCCGAACCTGAGACCGGCTTTCGCGATTAGCTCCCTCAGAGATCGCGACGGT
TTGTACCGGCCATTGTAGCACGTTGTGCGCCAGACATAAAGGCCATGCTGACTTGCAGCTCATCCCACTTCTCCGTTTTGTCACCGGCAGTCTCTCAGAGTGGC
CGCATAAACCGATGGCAACAGAGAACAGGGTTGCGCTGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTCGATAGCTGCC
CTTGGCGGAGCTACTTTCGTAGGATGTCAGCTA

>CAM2P4G07 Uncultured bacterium (unclassified_Bacteria)
GGCTTCTATGCACCCTTCGTGATGTGACGGGCGGTGTGCAAGCCGGGAACGATACCAGCGGGTCTGATCCGATTACTAGCATTCCAGCTTTCATGAGTGCAGTTGC
AGACTGCAATCCGAACCTGAGGCGGGTCTTCTCCGATTAGCTCCCGCTTTCGCGGGTTTTGCGACGGGTTTTGTCACCGCCATTGTAGCACGTTGTTNCCCTGGACATAAAGGCC
ATGAGGACTGACGTCATCCCACTTCTCCCGTTTTATCCGAGGCGGTTCTGCGAGAGTCCCAACTAAATGGTGGCAACTGGAAGTAAAGGTTGCGCTCGTTGCGGGAC
TTAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTATACATCGGCTCCTTGGCGGGAAGGATATTCTACCGCGCTCAATGCATTTTCAGGCCA
GGTAAGGTTCTTCGCGTTGCGTCAATTA

>CAM2P4G11 Unidentified eubacterium from the Amazon (unclassified_Bacteria)
CATACTAGCGCTGTCCTTTCGCGGTTACGCGGCGGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTTGTACAAGGCCGGGAACGATACCAGCGGCA
GCTGATCCGCGATTACTAGCGATTCCGACTTTCAGCGGAGTTGCGAGCCTACAATCCGAACCTGAGACCGGCTTTCGCGATTAGCTCCCGCTCAGAGATCGCGACGGT
GGTTTGTACCGGCCATTGTAGCACGTTGTAGCCCTGGACATAAAGGCCATGCTGACTTGCAGCTCATCCCACTTCTCCGTTTTGTCACCGGCAGTCTCTCAGAGT
GCCCGGCAATCCCGATGGCAACAGGAAACAAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACAGGCTGACGACAGCCATGCAGCACCTTGCAGAT
GTCTTTCGCGAAATGACTTTCGCGGAGTGTCACTGCACTTTCGAGGAGGTAAGGTTCTTCGCGCTGCGTCAATTAACACACATGCTCCACCGCTTGTGCGGGCCCC
CGTCAATTCCTTTAGTTTTCAGCCTTGCAGCGTACTCCCCAGGCGGAATGCTTAAACCGGTTAACTACGGCACGGCAGGGATC

>CAM2P4G12 Uncultured crenarchaeote (Thermoprotei)
AAACCAACTTCGATGAGGACGGGCGGTGTGTGCAAGGAGCAGGAGCTATACCAGCGGATGATGACACCGGATTACTAGGGATTCCATATTCATGAGACGAGTTTC
AGCCTCAATCAACTGTGGTAAGTTTTGCGGATTGCTTCTTTCGAAATCCGAACCTATGTAATACCATTGCAGCCCGGCTGTGGCCGAGGGTTTTGCGGGC
ATACTGACCTGCGCTGCTCCCTTCTCCGCTTTCGCGGCGGAGTCTTCTAATTAGCCCTTTACTCCGAAGAATAAAGTAGCAACTAGAAGCAGGGGTTCTCG
CTCGTTACCTGACTTAACAGGACACCTCAGGCGACAGGCTGCGGACGGCCATGCACCTCTCAGCTGTCTAGTAAAGTCTTCAGCTTGCATCTCACTCTGCTGTCG
CCCCGGTAAGATTCCGCGGTTGACTCAATTAACCCGAGGCTTACCCTTGTGGTGTCCCGCAATTCCTTAAAGTTTCAGCTTTCGCGGCTACTACCCAG
GCGGACAGCTTAAACGGCTTCCCTGCGGCACTGGACTAGCATTAAGCTAGTCCATACCAGGAGTGTGATCGTTTACAGTGGGACTACCAGGGTATCTAATCCGGTTG
TCCCCAGCTTTCATCCCTACCGTGCAGCGCAT

>CAM2P4H01 Uncultured bacterium (Acidobacteria)

AAGGTGCTCCTTGGCGTAGCACACTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATCACCGCGGGTTCGTATCCGCGA
TTACTAGCATTCCAGCTTATCGAGTTCAGTTCGAGACTCCAACTCCGAAGTACGGCCGCTTTCCTGATTAGCTCCCCCTCACGGGTTTGCAGCGTTTGTACCCGAC
CATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGAGGACTTGACGCTCATCCCCACTTTCCTCCTGTTATCCGAGGCGATTTCACATAGAGTGCCTGGCTTGACC
CGATGGCAACTAGGGATAAAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTATGCAGCAGCTTTAAAGGGG
AAGGGATGTTCCACCCCGTCTCCTGCATTTGCAGCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAACACACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTC
CTTTGAGTTTGCAGCTTGCAGCCGACTCCCAAGGCGGATTTGCTTATCGGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTAGGGC
TAGGACTACCAGGTTATCTAATCTGTTGTCTCCCTAGCTTTCGCGCTCAGCGTCAGTTATGGTCCAGTGCAGCGCTTTCG

>CAM2P4H02 Uncultured bacterium (Alphaproteobacteria)

TCCTTGGCGTTAGCGCACCGTCTTCGGGTAAAACCACTCCATGCGGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATCACCGCAGCTGCTGTTCTGCGATTA
CTAGCGATTCCACCTTATGCACCCGAGTTGCAGAGTGAATCTGAAGTGGGACGGTTTTTGGGATTAGCTGACTCTCCGAGCTCGCTCCCACTGTCCACCCGCTT
GTAGCACGTTGTAGCCAGGGTGTAAAGGCCATGATGACTTGACTTCATCCCACTTCCCTCCGGCTTCCGCGGCGGTCCCTCTAGAGTGCCCAACTGAATGATGG
CAACTAAAGGGGAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTCTCTGCGCCCCTTGGCGGGAAAACC
CATTTCGTAGTGCAGCAGGATGTCAAACCTTGGTAAGGTTCTGCGCGTTGCGTCGAATTAACACACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAG
TTCACACTTTCGGGGCTTCCAGGCGGATGCTTAATGCGTTAGCTGCGGCTGACGAGCAAGCTGCCCAACCGGCTAGCATCCATCGTTTACGGCGTGGACTAC
CAGGTTATCTAATCTGTTGATCCCACTGTGCGGCTGAGCGTCAGTAACGG

>CAM2P4H03 Uncultured Acidobacterium (Acidobacteria)

GCTGTACTTGGAAAGGCTGCTCCTGCGGTAGCACACTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATCACCGCGGC
GTTCTGATCCCGATTACTAGCGATTCCAGCTTCTATGGAGTTCGAGTTCGAGACTCCAACTCCGAAGTACGGGCGGTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCAG
CGTTTGTAGCACGCTGTGATGACCCGCTGTGAGCCCTGGACATAAAGGCCATGAGGACTTGAGCTCATCCCACTTCCCTCCGGCTTACCCGCGAGTCCCTGAGTGCCCAACTGAAT
TGCCCGGCTTACCCGATGGCAACTAGGGATAAAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGACGC
AGCCTTTAAAGGGGAAGGATGTTCCACCCCGTCCACTGCGCTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTGGACCACATGCTCCACCGCTTGTGCGG
GCCCGCTCAATTCCTTTGAGTTTACGCTTGCAGCCGACTCCCAAGGCGGATTTGCTCATCGGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAA
TCATCGTTTAGGGCTAGGACTACCAGGTTATCTAATCTGTTTGTCTCCCTAGCTTTCGCGCTCAGCGTCAGTTATGG

>CAM2P4H04 Uncultured alpha proteobacterium (Alphaproteobacteria)

GCTGTACTTGGAAAGGCTGCTCCTGCGGTAGCACACTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATCACCGCGGC
GTTCTGATCCCGATTACTAGCGATTCCAGCTTCTATGGAGTTCGAGTTCGAGACTCCAACTCCGAAGTACGGGCGGTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCAG
CGTTTGTAGCACGCTGTGATGACCCGCTGTGAGCCCTGGACATAAAGGCCATGAGGACTTGAGCTCATCCCACTTCCCTCCGGCTTACCCGCGAGTCCCTGAGTGCCCAACTGAAT
TGCCCGGCTTACCCGATGGCAACTAGGGATAAAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGACGC
GATGGCAACTAAGGGGAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGTTCCCGGCCCGAAGGGAA
GATGCACTCTGCAATCCGTCAGACATGTCAAAAGCTGTAAGGTTCTGCGGTTGCTTCGAATTAACCAACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTC
CTTTGAGTTTAACTCTTGCAGCCGACTCCCAAGGCGGATGCTTAAAGCGTTAGCTGCGCCACTGAAGAGCAAGCTCCCAACCGGCTAGCATCCATCGTTTACAGCGT
GGACTACCAGGTTATCTAATCTGTTTGTCTCCCACTGCTTTCGCGCTCAGCGTCAGTTATGG

>CAM2P4H05 Uncultured bacterium (Acidobacteria)

TCTTGGCGTTAGCACACTGCTTCTAGTACGGCCACTTTCGTGATGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATCACCGCGGCTGCTGATCCGCGATTACTAGC
GATTCCAGCTTACTAGGAGTTCGAGTTCGAGACTCCAACTCCGAAGTACGGGCGGTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCAGCGGTTTGTACCCGACTTGTAG
CACGTTGTAGCCCTGGACATAAAGGCCATGAGGACTTGAGCTCATCCCACTTCCCTCCTATTATCTAGAGGAGTTTACTAGAGTGCCCGGCTTGCAGCCGATGGCA
ACTAGGATAAAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGAGCGGCTTTTAAAGGGGCGCCGATG
TTTTCCACCGGATTTCCAGCTTCCAGCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAACCAACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGT
TTCAGCCTTGCAGCCGACTCCCAAGGCGGATTTGCTTATCGGTTAGCTGCGGCACAGCAGGATTGGGTACCTGCTACACCAAGCAATCATCGTTTAGGGCTAGGACTA
CC

>CAM2P4H07 Unidentified eubacterium from the Amazon (Acidobacteria)

CACTGTCCCGTTGGCGGTTACACCGTGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATCACCGCGGCTGCTGATCCG
CGGATTACTAGCGATTCCGACTTCTATGACGGCGAGTTGCAGCCATCCAACTCCGAAGTACGGGCGGTTTTTCCGATTAGCTCCCCCTCACGGGTTTGCAGCGGTTTGTAG
CGGCCATTGTAGCAGCTGTGTAGCCCTGGACATAAAGGCCATGCTGACTTGAGCTCATCCCACTTCCCTCCGGTTTTGTCAGCGGCGAGTCTCTCCAGAGTCCCAGCTT
GACCTGATGGCAACAGGAGACAAGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTCCGAGCCGCTTTCGCG
GGAGTCGACTTTCGCGGATTTGTCATCTGCACTTCGAGCCAGGTAAGGTTCTTCGCGTTGCGTCGAATTAACCAACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTC
CCTTTGAGTTTACGCTTGCAGCCGACTCCCAAGGCGGATGCTTAAACGCTTAACTGCGGCACGGCAGGATCGATACCCGGCACACCAAGCATTATCGTTTAGGG
CCAGGACTACCAGGTTATCTAATCCCGTTTGTCTCCCTGCTTTCGTTATTCTAGTGTAGAAAC

>CAM2P4H09 Uncultured Rubrobacteridae bacterium (Actinobacteria)

TTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACAGCTGACGACAGCCATGCACCACCTGCACACTAGCCCGAAGGGGGACCGTATTCTACGGTTTTTCCAG
TGCATGTCAAGCCCTGGTAAGTTCTTCGCGTTGCTCGAATTAACCAACATGCTCCGCTGCTTGTGCGGGCCCGCTCAATTCCTTTGAGTTTTAGCCTTTCGGCCGT
ACTCCCAAGGCGGGCCTTAATGCGTTAGCTTTCGCGCACAGCGGAGTGCATACCCGCCACACTAGTGCCCATCGTTTACGGCGTGGACTACCAGGTTATCTAATCCT
GTTCCGCTCCCAAGCTTTCGCGTCTCAGCGTACGACTCCAGAGAGGCGGCTTCCGACAGGGTGTCTTCCCGATATCTGCGCATTTACCGCTACACCGGGAATT
CACTCTCCTTTCGCGGACTTAGCCATACGCTTCAACCGAGCTTCCGAGTTGAGCCTGAGTTTTACAGCTGACCTGTAAGGCGGCTACAGCCTTTTACGCTGGC
AATAAACCCGGACAACGCTTCCCGCTACGATTACCAGCGGCTGCTGGCACTCAGTC

>CAM2P4H10 Uncultured crenarchaeote (Thermoprotei)

CGATATGCCAAATCGCACCCTCGCTTAAACAACCTTCGATGAAGCGACGGGCGGTGTGTGCAAGGAGCAGGACGTATCACCGCGGATGATGACAGCGATTACTAGG
GATTCATATTCATAGGACGAGTTTCAGCCCTCAATCATAACTGTGGTAAGTTTTGCGGATTGCCCTCCTCTTTCGAAATCGGAACCTATGTACTTACCATTGCAGC
CCGCGTGTGGCCCGAGGTTTCGGGGCATACTGACCTGCGGTAGCCCGCTCCTTCCCTCCGCTTACGGCGGCGAGCTTCTAATTAGCCCTTACTCCGAAAGAAATAA
AAGTAGCAACTAGAAGCAGGGTCTCGCTCGTTACCTGACTTAACAGGACACTCACGGCAGAGCTGGCGACGGCCATGCACCTCCTCTCAGCTTGTCTAGTAAAGTC
TTCAGCTTACCTTACTCTGCTGTCGCCCCGGTAAGATTCCCGGCTTGACTCCAATTAACCGCAGGCTTACCCCTTGTGGTGTCCCCCGCAATTCCTTTAAG
TTTACGTTTCCGACCGTACTACCCAGGCGGACACTTAACGGCTTCCCTGCGCACTGACACTAGCATTAAGTAGTCCATCACCGAGTCTGCATCGTTTACAGCTGGG
ACTACCAGGTTATCTAATCCGGTTTTGTTCCCGGCTTTCATCCCTACCGTCCGAG

>CAM2P4H11 Uncultured organism (Verrucomicrobiae)

CATCATACTCACTTTCGCGCTTAAAGGGGCGACTTCGGGTACAACCGCTTCATGATGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATCACGGCGCGGTAGCT
GATGCGCCATTACTAGCATTCCGGCTTCATGGAGGCGAATTGCAGCTCCGATCCGAAGTGGGCGGTTTTAAGGATTTCCCTCCACTCGCGGCTCGGATCATTCT
GTACTGGCATTGTAGTACGTTGCGAGCCAGCCGTAAGGGCCATACTGACTTGCAGCTCATCCCACTTCCCTCCTTCCGAAATCGGAACCTATGTACTTACCATTGCAGC
GAACCTCTCGGTTCCGTTGCAACAGTTACAGGGGTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTGTGCAAA
TGTCTCTTCGAGACTCGCTGCTTTCACCAACTTAGAGATGATGCAAGGCTGGTAAGGTTCTTCGCTTGCATCGAATTAAGCCACTTACCCGCTTGTGCG
GCCCGCTCAATTTCTTTGAGTTTTTAACTTTCGAGCCGACTCCCAAGGCGGACGTTTTAACGTTTAACTCCGGCGGAGAGGGGTCGAATCTCCCAACCAAAAGC
TGCACCGTTTACTGCGAGGACTACCAGGTTATCTAATCCCGTTTGTCTCCCTGCGCTTCTGCTCAGTGTGAGGAACTGTCAGAGACCCGCTTGCAGCTGGTCTT
CCTTACGATATCTACGATTTACTGCTACACCGTAAATTCAGTCTCT

>CAM2P4H12 uncultured bacterium (Acidobacteria)

CGGATTTCTAGTACAGCCAGCTTTCGTGATGTGACGGGCGGTGTGTACAAGCCCGGGAACGTATCACCGCGGATGCTGATCCGCGATTACTAGCATTCAACTTCA
TGCAGGCGAGTTGCAGCCTGCAATCCGAAGTACAGCCGCTTTCCTCGATTAGCTCCCCCTCGCGGCTCGGACGTTTGTACCGGCGATTTGTAGCACGTGTGTAGCC
CTGGACATAAAGGCCATGCTGACTGACGTCATCCCACTTCCCTCCGGTTTGTACCGGCGAGTCTTCTCAGAGTGCCAGCTTAACTGATGGCAACAGAGAACAAGG
GTTGCGCTCGTTGCGGGACTTAACCAACATCTCACGACACGAGCTGACGACAGCCATGCAGCACCTTGCAGATGTCCTTGGGAAAGTCCGCTTTCACCGATGGTCAT

CTGCACTTCGAGCCCAGGTAAGGTTCTTCGCGTTGCGTTCGAATTGAACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCCTTTGAGTTTCAGCCTTGCGAAG
TACTCCCAGGCGGAATGCTTAACGCGTTAACTGCGGCACGGCAGGGATCGATACCG