Identifikasi dua isolat bakteri termofilik dari geiser di Cisolok Jawa Barat Indonesia dan geiser di Onikobe Miyagi Jepang = Identification of two thermophillic bacterial isolates from Cisolok geyser West Java Indonesia and Onikobe Geyser Miyagi prefecture Japan

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Abstrak

Telah dilakukan penelitian yang bertujuan memperoleh identitas dua isolat bakteri termofilik dari geiser. Isolat LC2-23 diperoleh dari serasah pada geiser di Cisolok, Jawa Barat, Indonesia, dan isolat RKB-2 diperoleh dari serasah pada geiser di Onikobe, Miyagi, Jepang.!!Identifikasi dilakukan berdasarkan gabungan data fenotipik dan genotipik. Berdasarkan karakterisasi fenotipik, isolat LC2-23 memiliki sel berbentuk batang; menghasilkan endospora; motil; gram positif; bersifat aerob dan fakultatif aerob; mampu tumbuh pada suhu 60 oC, sedangkan suhu optimum pertumbuhan 50 oC. Berdasarkan karakterisasi genotipik, data full sequence gen 16S rRNA isolat LC2-23 memiliki homologi 99,1% terhadap Brevibacillus agri. Berdasarkan data fenotipik dan genotipik, isolat LC2-23 diidentifikasi sebagai Brevibacillus agri (Family Paenibacillaceae, Order Bacillales, Class Bacilli, Phylum Firmicutes). Berdasarkan karakterisasi fenotipik, isolat RKB-2 membentuk miselium vegetatif dan aerial yang bercabang; menghasilkan spora aerial; gram positif; bersifat aerob; mampu tumbuh pada suhu 60 oC, sedangkan suhu optimum pertumbuhan 50 oC. Berdasarkan karakterisasi genotipik, data full sequence gen 16S rRNA isolat RKB-2 memiliki homologi yang rendah, yaitu 98,4% terhadap spesies terdekatnya, Thermosporothrix hazakensis (Family Thermosporotrichaceae, Order Ktedonobacteriales, Class Ktedonobacteria, Phylum Chloroflexi). Hasil analisis filogenetik menunjukkan posisi isolat RKB-2 terpisah dari T. hazakensis. Data kemotaksonomi (komposisi asam lemak) dan hasil analisis proteomik menggunakan MALDI-TOF MS mendukung perbedaan antara isolat RKB-2 dan T. hazakensis. Berdasarkan perbedaan tersebut isolat RKB-2 diidentifikasi sebagai spesies baru dari Thermosporothrix. Untuk pengajuan nama spesies baru diperlukan data hibridisasi DNA-DNA antara isolat RKB-2 dengan T. hazakensis.

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This research was aimed to identify two bacterial isolates obtained from geysers. Strain LC2-23 was isolated from litters on a geyser in Cisolok, West Java, Indonesia, and isolate RKB-2 was obtained from litters on a geyser in Onikobe, Miyagi Prefecture, Japan. Identification of bacteria was based on integrated data of phenotypic and genotypic characterizations. Based on phenotypic characterizations of isolate LC2-23: it has a rod (bacilli)-shaped cells, forms endospores; gram positive; motile; aerobic, and able to grow up to a temperature of 60 oC. Based on genotypic characterizations of isolate LC2-23: the full sequence of genes 16S rRNA shows 99.1% sequence homology to Brevibacillus agri. Based on phenotypic and genotypic data, isolate LC2-23 can be identified as Brevibacillus agri (Family Paenibacillaceae, Order Bacillales, Class Bacilli, Phylum Firmicutes). Based on phenotypic characterizations of isolate RKB-2: vegetative and branching aerial mycelia forms, gram positive, aerobic, and able to grow up to a temperature of 60 oC. Based on genotypic characterizations of isolate RKB-2: the full sequence of 16S rRNA gene of isolate RKB-2 showed low homology (98.4%) to Thermosporothrix hazakensis (Family Thermosporotrichaceae, Order Ktedonobacteriales, Class Ktedonobacteria, Phylum Chloroflexi). Phylogenetic analysis showed the

isolate RKB-2 was distinct from cluster of Thermosporothrix hazakensis and Ktedonobacteria bacterium. The genotypic and phylogenetic data, plus chemotaxonomic and proteomic analysis using MALDI-TOF MS, suggest that isolate RKB-2 represent novel species of the genus Thermosporothrix. The DNA-DNA hibridization data is needed for proposal of new species.