Abstrak

Fachrial E, Putri RRJS, Lister INE, Anggraini S, Harmileni, Nugroho TT, Saryono. 2020. Berhasil mengidentifikasikan enzim selulase dan protease penghasil Bacillus tequilensis pada isolat UTMSA14 dari sumber air panas Sidebuk Debuk, Sumatra Utara, Indonesia. Biodiversitas 21: 4719-4725. Kebutuhan industri akan enzim mikroba yang stabil cenderung meningkat setiap tahunnya. Penelitian ini bertujuan untuk mengisolasi dan mengidentifikasi bakteri termofilik penghasil protease dan selulase yang diisolasi dari sumber air panas Sidebuk DebukSumatera Utara, Indonesia. Aktifitas protease ditentukan berdasarkan pembentukkan zona halo skim milk agar, sedangkan selulase dikonfirmasi dengan metode agar CMC. Sembilan isolate bakteri berhasil didapatkan dari sedimen dan air dan kedua aktivitas tersebut hanya terdapat pada satu isolate yaitu UTMSA 14. Isolat UTMSA 14 ini dikaterisasi secara biokimia dan morfologi. Identifikasi molekuler UTMSA 14 dilakukan dengan sekuensing 16S rRNA berdasarkan BLAST and analisis filogenetik menggunakan system MEGA X. Analisis filogenetik menunjukkan bahwa UTMSA 14 mengelompokkan Bacillus Tequilensis strain 10b (Nomor aksesi NR 104919.1). ini adalah penelitian pertama dari bakteri termofilik yang diisolasi dari sumber air panas Sidebuk Debuk yang mampu menghasilkan selulase dan protease. Penelitian lebih lanjut diperlukan untuk memurnikan dan mengkarakterisasi enzim yang dihasilkan dengan potensi untuk aplikasi di dunia industri.

Keywords: selulase, sumber air panas, protease, bakteri termofilik

Abstract

Fachrial E, Putri RRJS, Lister INE, Anggraini S, Harmileni, Nugroho TT, Saryono. 2020. Molecular identification of cellulase and protease producing Bacillus tequilensis UTMSA14 isolated from the geothermal hot spring in Lau Sidebuk Debuk, North Sumatra, Indonesia. Biodiversitas 21: 4719-4725. The industrial need for stable microbial enzymes tends to increase every year. The aim of this study was to isolate and identify the protease and cellulase producing thermophilic bacteria isolated from the geothermal spring of Lau Sidebuk Debuk, North Sumatra, Indonesia. The protease activity was determined based on the formation of halo zone on Skim Milk Agar, while cellulase was confirmed using CMC plate agar method. Nine bacterial isolates were successfully obtained from the sediments and water, and both activities were observed in only one isolate, known as UTMSA14. These isolates were characterized biochemically and morphologically. The molecular identification of UTMSA14 was done by 16S rRNA sequencing based on BLAST and phylogenetic analysis using MEGA X. Phylogenetic analysis showed that UTMSA14 clustered together with Bacillus tequilensis strain 10b (accession number NR_104919.1), which ascertained the isolate as Bacillus tequilensis strain 10b (accession number NR_104919.1). This is the first report of a thermophilic bacteria isolated from Lau Sidebuk Debuk hot springs, with the ability to produce cellulase and protease. Further research is needed to purify and characterize the resulting enzymes, with a potential for industrial applications.

Keywords: Cellulase, geothermal hot springs, protease, thermophilic bacteria