Kemampuan Selulolitik Isolat Actinobacteria-like dari serasah di kawasan sumber air panas Gunung Galunggung, Jawa Barat = Cellulose-Degrading Ability of Actinobacteria-like isolates from litter in the Mount Galunggung Hot Spring, West Java

Arni Setianingsih, author

Abstrak

Kelompok Actinobacteria berfilamen merupakan bakteri Gram positif yang beberapa anggotanya diketahui memiliki kemampuan mendegradasi selulosa dengan menghasilkan selulase. Penelitian ini bertujuan untuk mengetahui kemampuan tumbuh isolat Actinobacteria-like GL1-2, GL1-9, dan GL1-12 pada variasi media agar (ISP 1, ISP 2, ISP 3, dan modified Bennett's) dan suhu (25, 30, 35, 40, 45, 50, dan 55°C), serta mengetahui kemampuan selulolitiknya pada substrat 1% CMC di berbagai suhu (30, 35, 40, 45, 50, dan 55°C). Kemampuan selulolitik diuji dengan menginokulasi biakan pada medium agar minimal (Mm) dengan penambahan 1% CMC, kemudian diinkubasi pada berbagai suhu selama 3, 7, dan 14 hari. Kemampuan selulolitik diamati dengan terbentuknya zona bening di sekitar koloni setelah ditetesi 0,1% Congo red dan dibilas dengan larutan NaCl 1 M. Isolat GL1-2 dan GL1-9 menunjukkan pertumbuhan miselium substrat dalam jumlah banyak pada semua medium yang diuji, namun sporulasi penuh hanya teramati pada medium ISP 1 agar dan MBA. Isolat GL1-12 menunjukkan pertumbuhan miselium substrat yang baik kecuali pada medium ISP 2 agar, namun sporulasi hanya teramati pada medium ISP 3 agar. Suhu pertumbuhan isolat GL1-2 dan GL1-9 berkisar antara 30--55°C, sedangkan GL1-12 berkisar antara 35--55°C. Hasil uji kemampuan selulolitik menunjukkan bahwa isolat GL1-2 dan GL1- 9 memiliki kemampuan mendegradasi 1% CMC pada suhu 30, 35, 40, 45, 50, dan 55°C. Isolat GL1-12 memiliki kemampuan selulolitik pada suhu 40, 45, 50, dan 55°C. Hasil penelitian menunjukkan bahwa ketiga isolat Actinobacteria-like dari serasah di kawasan sumber air panas gunung Galunggung memiliki potensi menghasilkan enzim selulase di berbagai suhu yang diuji.

.....Members of Gram-positive filamentous Actinobacteria are some recognized for their ability to degrade cellulose by producing cellulase. This study aimed to determine the growth ability of three Actinobacteria-like isolates (designated isolates GL1-2, GL1- 9, and GL1-12) obtained from litter samples of mount Galunggung hot spring, Tasikmalaya, West Java, on various agar media (ISP 1, ISP 2, ISP 3, and modified Bennett's) and temperatures (25, 30, 35, 40, 45, 50, 55°C), along with their cellulolytic ability on 1% carboxymethyl cellulose (CMC) as substrate. Cellulolytic ability was tested by inoculating the cultures on minimal (Mm) agar plates with the addition of 1% CMC, and incubated at various temperatures (30, 35, 40, 45, 50, and 55°C) for 3, 7, and 14-days. Cellulolytic ability was observed as formation of clear zone surrounding the colonies after being flooded with 0.1% Congo red and rinsed with 1 M NaCl solution. The results showed that isolates GL1-2 and GL1-9 have abundant substrate mycelia formation on all media tested, while optimal sporulation was only observed on ISP 1 agar and MBA. Isolate GL1-12 showed good growth of substrate mycelia except on ISP 2 agar, however sporulation was poorly observed only on ISP 3 agar. Growth temperatures of isolates GL1-2 and GL1-9 were ranging from 30 to 55°C, while GL1- 12 was ranging from 35 to 55°C. Isolates GL1-2 and GL1-9 have the ability to degrade 1% CMC at 30, 35, 40, 45, 50, and 55°C. Isolate GL1-12 has celulolytic ability at temperatures of 40, 45, 50, and 55°C. This study

revealed that Actinobacteria-like isolates obtained from litter samples of mount Galunggung hot spring, Tasikmalaya are potential cellulase-producers on various tested temperatures.