

Kemampuan Isolat Bakteri dari Tanah Hutan Pendidikan Wanagama I dalam Melarutkan Kalsium di Berbagai Sumber Karbon

INTISARI

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Bakteri menjadi salah satu agen biologis dalam pelapukan batuan kapur melalui pelarutan unsur-unsur di dalam mineral. Pelarutan terjadi karena adanya reaksi antara unsur dengan asam-asam organik yang dihasilkan oleh bakteri selama proses metabolisme. Bakteri memerlukan sumber karbon untuk kelangsungan hidupnya, salah satunya adalah karbohidrat. Perbedaan sumber karbohidrat akan memengaruhi metabolit yang dihasilkan. Oleh karena itu pengujian perbedaan karbohidrat perlu dilakukan untuk mengetahui pengaruhnya terhadap pelarutan kalsium.

Isolasi sampel tanah dari hutan pendidikan Wanagama I pada tegakan gamal kedalaman 0-10 cm, 10-20 cm, 20-30 cm, dan kontrol (tanpa vegetasi) kedalaman 0-10 cm menghasilkan 21 kultur murni. Seleksi menghasilkan 12 isolat bakteri yang memiliki kemampuan melarutkan kalsium. Pengujian pelarutan kalsium dilakukan hanya pada 2 isolat bakteri, yakni isolat J dan isolat H yang memiliki pertumbuhan dan tingkat pelarutan kalsium tertinggi. Pengujian dilakukan menggunakan berbagai sumber karbon (glukosa, galaktosa, sukrosa, laktosa, dan mannitol) terhadap pertumbuhan koloni, penghasilan zona jernih dan penghasilan zona kuning. Zona jernih menunjukkan kemampuan pelarutan kalsium dan zona kuning menunjukkan penghasilan asam organik.

Pelarutan kalsium yang dilakukan oleh isolat J dan isolat H tidak jauh berbeda dilihat dari rasio diameter zona jernih dan koloninya. Pertumbuhan koloni dan penghasilan zona jernih kedua isolat paling tinggi terdapat pada media dengan sumber karbon glukosa, sedangkan penghasilan asam yang ditunjukkan oleh zona kuning paling tinggi terdapat pada media dengan sumber karbon sukrosa.

Kata kunci: bakteri pelarut kalsium, asam organik, sumber karbon, zona jernih

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The Capability of Bacteria Isolated from Wanagama I Education Forest Soil For Calcium Dissolution in Various Carbon Sources

ABSTRACT

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Bacteria is one of the biological agents in limestone weathering by dissolving elements of the minerals. The dissolution occurs because of the chemical reaction between the elements and the organic acids produced by the bacteria during the metabolism process. Bacteria require a source of carbon for survival, one of which is carbohydrates. Variations in carbohydrate sources will affect the end product of metabolism. Therefore, testing the effect of carbohydrate variations is necessary to determine the effect on calcium dissolution.

The soil samples were collected from Wanagama I Education Forest in *gamal* stand in 0-10, 10-20, and 20-30 cm depths, and control (without vegetation) with depth of 0-10 cm. Isolation of bacteria obtained 21 pure cultures. Twelve isolates of 21 pure cultures show their ability to dissolve calcium. Calcium solubilization test was performed on 2 isolates of bacteria namely isolate J and H due to their highest growth and calcium solubilizing capability. The tests were carried out using a variety of carbon sources (glucose, galactose, sucrose, lactose, and mannitol) on the colony growth, the forming of clear zone and yellow zone. The clear zone shows the capability of calcium dissolution, and the yellow zone shows the producing of organic acids.

The calcium solubilizing capability performed by isolate J and H is not much different shown by their ratio of colony and clear zone diameters. The highest colony growth and clear zones formation were found on media with glucose as carbon source, meanwhile the highest acid production shown by the yellow zone is found on media with sucrose as carbon source.

Key words: calcium-solubilizing bacteria, organic acid, carbon source, clear zone

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