

Intisari

Logam berat seperti kromium (Cr) dan arsen (As) banyak digunakan dalam industri penyamakan kulit. Keberadaan kromium heksavalen (Cr^{6+}) dan arsen trivalen (As^{3+}) dapat menimbulkan dampak negatif apabila terlepas ke lingkungan karena memiliki toksisitas lebih tinggi dibandingkan valensi lainnya. Penelitian sebelumnya menunjukkan bahwa isolat bakteri *Bacillus subtilis*, *Bacillus pumilus*, *Bacillus megaterium*, dan *Sphingobium* sp. yang diisolasi dari limbah penyamakan kulit memiliki ketahanan terhadap kromium heksavalen (Cr^{6+}) dan memiliki kemampuan untuk mereduksi konsentrasi Cr terlarut. Penelitian ini dilakukan untuk mengetahui ketahanan keempat isolat bakteri tersebut terhadap arsen trivalen (As^{3+}) serta dampak ketahanan tersebut terhadap perubahan kelarutan As dalam medium pertumbuhan. Pengujian dilakukan menggunakan beberapa metode meliputi (1) uji toleransi keempat isolat bakteri terhadap arsen (As), (2) uji kemampuan perubahan kelarutan As dalam medium pertumbuhan, dan (3) uji mekanisme perubahan kelarutan As dengan 3 perlakuan yaitu pelet, supernatan dipanaskan dan supernatan tidak dipanaskan. Hasil pengujian menunjukkan bahwa keempat isolat bakteri tahan terhadap As^{3+} hingga konsentrasi 30 ppm. Selanjutnya, pengujian kedua dan ketiga memberikan hasil bahwa *Bacillus* spp. and *Sphingobium* sp. hanya memiliki ketahanan terhadap As^{3+} dan tidak memiliki kemampuan untuk mengubah kelarutan As.

Kata Kunci : *Bacillus subtilis*, *Bacillus pumilus*, *Bacillus megaterium*, *Sphingobium* sp., logam arsen (As)

Abstract

Heavy metals such as chromium (Cr) and arsenic (As) are extensively used in leather tanning industries. These metals potentially damage the environment due to the presence of hexavalent chromium (Cr^{6+}) and trivalent of arsenic (As^{3+}) which have higher toxicity than the other valent states. Previous research showed that *Bacillus subtilis*, *Bacillus pumilus*, *Bacillus megaterium*, and *Sphingobium* sp., which were isolated from leather tanning waste were tolerant to hexavalent chromium (Cr^{6+}) and able to reduce soluble Cr concentration in the solution. This study was conducted to determine the resistance of four bacteria to trivalent arsenic (As^{3+}) and the impact of the these bacteria resistance to alter arsenic solubility in growth medium. This research was carried out using several methods for both bacteria which consist of; (1) assessment of bacterial tolerance to arsenic (As) test, (2) the ability to alter arsenic solubility in growth medium, and (3) the mechanism of As solubility transformation test using 3 treatments, namely pellet, heated supernatant, and unheated supernatant. The first test showed that both isolates demonstrated As^{3+} resistance up to 30 ppm. Furthermore, the second and third test showed that both *Bacillus* spp. and *Sphingobium* sp. had no ability to alter the solubility of arsenic.

Keywords : *Bacillus subtilis*, *Bacillus pumilus*, *Bacillus megaterium*, *Sphingobium* sp., arsenic metal (As)

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