The Ability of Immobilized Bacillus S1 Cells on Alginate Matrices in Mercury Reduction

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Abstract

Mercury (Hg\(^{2+}\)) is a heavy metal with the highest toxicity in living cells that did not provide any profit functions biologically. Isolated Bacillus S1, collection of Microbiology and Biotechnology laboratory of Biology ITS, is a mercury resistant bacteria that can reduce Hg\(^{2+}\) to Hg\(^0\) with high mercury reductase activity and high mercury reducing efficiency. Reducing efficiency of HgCl\(_2\) of the isolated Bacillus S1 needs to be improved with cells immobilization process on Ca-alginat matrices 1%, 2%, 3%, 4%, and 5% on beads shape. Immobilized cells cultured with batch reactor system on NB-HgCl\(_2\) 3,899 ppm medium and incubated at room temperature on rotary shaker until 24 hours. The bead is moved to a new culture medium up to four times of transfers with the same treatment. Final concentration of HgCl\(_2\) observe with ICP-AES. The result obtained that the immobilization of cells can enhance the ability of Bacillus S1 to reduces HgCl\(_2\) up to 100% on 1% and 2% alginat immobilization. The best matrices that used is on 2% alginate matrices that have 100% HgCl\(_2\) reducing efficiency on every transfer of cultures with a low cell concentration outside the matrices.

Key word : Cell Immobilization, Alginate Matrices, Mercury Reduction, Bacillus S1.