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BIORECOVERY OF METAL IONS FROM BROWN SHALE USING ORTHOGONAL EXPERIMENTAL ARRAY DESIGN

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Abstract

Aspergillus fumigatus has been selected to bioleach the metals ion from brown shale. Process parameters like pH (5.0, 5.5, 5.8, 6.0, and 6.5), substrate concentration (2, 4, 6, 8, and 10%), pulp density (1, 5, 10, 15, and 20%), temperature (30, 35, 40, 45, 50°C) and agitation (100, 150, 200, 250, 300 rpm) were optimized according to L25 Taguchi orthogonal experimental array design that resulted in the twenty five batch bio recovery experiments. After biorecovery experiments, optimum value of pH, substrate, pulp density, temperature and agitation was detected 6.0, 5%, 10%, 45°C & 300 rpm respectively. Maximum bioleached metals analyzed by Atomic Absorption Spectrophotometry (AAS) were Al 85.00%, Mg 81.30%, Cu 68.10%, Mn 71.50%, and Ni 62.10% with an inoculum size of 3.10×10^6 spores /mL.

Key words: *Aspergillus fumigatus*, biorecovery, brown shale, process optimization

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