

Thesis Title	Factor affecting zinc uptake by <i>Penicillium</i> sp. PT1
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Abstract

Zinc uptake by dead cells and living cells of *Penicillium* sp. PT1 in zinc solution 40-800 mg/L, at initial pH of solution 4.54 was investigated. For both cell types, zinc was accumulated rapidly within 5 minutes and then entered equilibrium. Comparison of zinc uptake by dead cells and living cells of *Penicillium* sp. PT1 was also studied.

At an initial zinc concentration of 40 mg /L, living cells accumulated 2.70 mg Zn²⁺/g dry weight while dead cells accumulated 1.50 mg Zn²⁺/g dry weight. At an initial zinc concentration of 800 mg/L, living cells again accumulated more zinc than dead cells, 16 mg and 10 mg Zn²⁺/g dry weight, respectively.

Study on the biosorption of zinc by dead cells of *Penicillium* sp. PT1 showed that the pH in solution decreased from 4.54 to 3.67 at an initial zinc concentration of 40 mg/L, and from 4.55 to 3.64 at 800 mg Zn²⁺/L. For living cells, the pH of the zinc solution decreased from 4.54 to 3.23 at an initial zinc concentration of 40 mg/L and from 4.54 to 3.28 at 800 mg Zn²⁺/L.

Stationary phase of *Penicillium* sp. PT1 strain before and after treatment with zinc solution was studied by Transmission electron microscope (TEM) and X-ray fluorescence spectroscopy (XRFS). Electrodense granules inside the cells and the phosphorus peak were found by using TEM and XRFS, respectively. Polyphosphate was found within the cell by using 10% trichloroacetic acid.

According to the results, factors that affected on zinc uptake were initial zinc concentration, cell concentration, phosphorus and sucrose concentrations in the zinc solution.

Phase of cell growth did not affect zinc accumulation because there was no difference in zinc uptake during both log and stationary phases.

Keywords : Zinc / *Penicillium* sp. / Polyphosphate / sucrose / Transmission electron microscope / trichloroacetic acid