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Microbial solubilization of metals from electronic waste (E-waste)

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It is believed that biotechnology is one of the most promising technologies in metallurgical processing. For many years, bioleaching has been used for the solubilization of metals from ores. Bioleaching is useful for treating ores with low concentrations of metals; it is also simple and cheap to operate. It has been successfully applied toward the leaching of metals from ores, though it has not yet been commercially applied toward the recovery of metals from printed circuit boards (PCB). Several authors have recently published studies on the bioleaching of metals from electronic waste. The aim of the study was to formulate microbial consortium for solubilization of metals from waste PCB and evaluate its efficacy. For this purpose, a microbial consortium from bauxite and pyrite ore samples was obtained using a simple 'top down' approach. Essentially, printed circuit boards (PCB) were obtained and used as representative samples of e-waste. Various concentrations (1–5%) of PCB powder were subjected to bioleaching, and the effects on metal solubilization, changes in pH and concentration of ferrous iron produced were assessed. It was observed that a maximum of 96.93% Cu and 93.33% Zn was solubilized by microbial consortium from 10 g/L of PCB powder, whereas only 10.26% Ni was solubilized from 30 g/L of PCB powder. For lead, only 0.58% solubilization was achieved from 20 g/L of PCB powder. An analysis of the precipitate formed during bioleaching using scanning electron microscopy with energy dispersive X-ray analysis revealed the presence of Tin (59.96%), Cu (23.97%), Pb (9.30%) and Fe (5.92%).

Biography

Dr. A.M.Deshmukh is a president of Microbiologist Society, India. He has organised many conferences abroad and in India. He has written ten books and produced 16 Ph.D. students. He has visited about 15 various countries. His main area of research is Actinomycetes.

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