

BIOLEACHING-EXTRACTION OF METALS FROM MINERALS BY FUNGI BY APPLYING LEED ONE OF THE TECHNIQUE OF SEM/EDX

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Abstract:

The low energy electron diffraction (LEED) is one of the techniques of the Electron Microscopy, which dominates the field of surface study and also provides a powerful tool for studying the Bioleaching extraction of metals.

Bioleaching processes are based on the ability of micro-organism (bacteria and fungi) to transform solid compounds in soluble and extractable elements, which can be recovered. Bioleaching represents a 'clean technology' process with low cost and less energy consumption as compared to conventional methods. The bioleaching allows the cycling of metals by a process close to natural biochemical cycles reducing the demand for resources such as ores, energy or landfill space. This process has gained importance in a variety of mineral industries.

Bioleaching-extraction of metals from insoluble minerals by micro-organisms (bacteria and fungi) is an industrially important process of biotechnology.. Structure, composition and exposed surfaces of minerals play an important role in determining the rate of bioleaching process. The bacterial leaching process involves various physical and chemical interactions between the bacteria, minerals and numerous ions and precipitate in the leach liquor. This makes a very complicated system, which is still incompletely understood. In the current study, the reaction mixture is measured during bioleaching of rock phosphate by *Penicillium simplicissium* fungi.

The *Penicillium simplicissium* has been found to produce organic citrate, oxalic, gluconate acids that can serve as leaching agents for the dissolution of metals. The dissolution of insoluble phosphate by soil micro-organisms, is one of the vital microbial processes in soil. It is generally assumed that organic acid produced during formation of rock phosphate is mainly responsible for the dissolution of insoluble phosphate. For the identification and characterization of these organic acids in fermented media, the samples are analyzed with HPLC (High Performance Liquid Chromatography). Fresh and treated (bioleached) rock phosphate samples are subjected to crystal morphology studies by SEM and EDX (Energy Dispersive X-ray Microanalysis).