MICROBIAL AIDED LEACHING OF IRON CONTAMINANT FROM EPPAWALA APATITE TO PRODUCE AN EFFECTIVE PHOSPHATE FERTILIZER

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by

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Abstract

Naturally Eppawala Rock Phosphate (ERP) contains a high concentration of iron bearing gangue mineral such as magnetite and, is suffering with the ineffective availability of phosphorous contents. Though, many of chemical and physical purification methods have been introduced, bio leaching has been identified as an effective and an ecofriendly technique for the removal of these impurities. Therefore, the present study aimed to remove the iron contaminants in ERP for the effective production of the fertilizer with high solubility. Microbial isolations were carried out using ERP soil samples obtained from Eppawala region, Sri Lanka. Pure bacterial cultures (B1, B2 and B3) were prepared on nutrient agar medium using the isolated microorganisms. ERP samples (5.000 g) with different particle sizes (500-150 μm, 150-125 μm and 125-63 μm) were mixed with 100 ml of pure bacterial broth cultures and incubated at 35 °C for 48 hours. Then, the cultures with a petite sample were kept at room temperature with continuous shaking until the AAS readings were obtained. Three replicates were maintained for each treatment. Approximately 10 ml of bacterial culture was taken out continuously from each microbial samples with three days intervals and AAS readings were obtained for the availability of ferric ion (Fe^{3+}). Out of all bacterial cultures, the highest AAS reading (3.8233 mg/l) was obtained for the bacterial isolate B2. Further, ERP sample with (150-125 μm) particle size showed the highest Fe^{3+} availability compared with the other particle sizes. Thus, it can be concluded that the bacterial isolate B2 has a positive effect on leaching iron contaminants of the ERP sample with (150-125 μm) particle size.