Investigation of Phosphate Solubilization of Eppawala Apatite with Using the Isolated Soil Microorganisms

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Sri Lanka uses tonnes of phosphorus fertilizers per year due to it is an agricultural country. Apatite: phosphorus fertilizer that has low solubility which acts as the barrier for its commercial usage. Development of an economical and environmentally friendly process for successful soil P management through enhancing soluble phosphorus of Apatite is a major concern in crop production in Sri Lanka and Phosphate Solubilizing Microorganism (PSM) focused attention in this regard. This study was conducted to screening Phosphorus solubilizing microorganisms who enhance the solubilization of the Eppawala Apatite. The soil was collected from different ecosystems and Pikovskayas Agar media was used to isolate PSM. Apatite and topsoil mixtures were treated with eight isolated PSMs namely S1, N1, B1, B2, D1, D2, D3, G1. A randomized complete block design (RCBD) was used for the experiment with 3 replicates for each treatment and apatite + topsoil mixture was used as a controller. Commercial biofertilizer was used as one of the treatments to compare the effectiveness of isolated PSMs. Treated samples were tested for the available phosphorus percentage using the 2% citric acid method for 8 weeks within a week interval. Molecular Characterization of D1 fungus strain was done due to its significantly high ($P< 0.05$) effectiveness on phosphorus solubilization of apatite. As a result, Isolated Microorganisms of Turpentine and Teak plantations were significantly more effective (3.79%- 3.47% of mean Available phosphorus content) than the controlled sample (2.19% of mean available phosphorus content) and other treated samples. D1 gives about 1.5 times increment of available phosphorus percentage to the apatite. Isolated D1 from the soil of the turpentine plantation is 100% genetically identical to *Penicillium abidjanum* CBS 246.67 fungus. Therefore, *Penicillium abidjanum*-D1 can be used to increase the amount of phosphorus present in Eppawala apatite with an economical and environmentally friendly process.

Keywords: *Eppawala Apatite, Penicillium abidjanum, Phosphate Solubilization*