# Solubility Enhancement of Eppawala Rock Phosphate Through Bioleaching

T.C. Senevirathna

MINERAL RESOURCES AND TECHNOLOGY DEGREE PROGRAM

2014

# Abstract

Plants acquire phosphorus from soil solution as phosphate anion. It is the least mobile element in plant and soil contrary to other macronutrients. It precipitates in soil as orthophosphate or is adsorbed by Fe and Al oxides through legend exchange. Microorganisms have been active in the formation and decomposition of minerals in the earth's crust since soon after life on earth began. Phosphorus solubilizing bacteria play role in phosphorus nutrition by enhancing its availability to plants through release from inorganic and organic soil P pools by solubilization and mineralization. Principal mechanism in soil for mineral phosphate solubilization is lowering of soil pH by microbial production of organic acids and mineralization of organic P by acid phosphatases.

In the present study two bacteria strains isolated from Eppawala Rock Phosphate (ERP) deposit and apply them for the ERP and HERP. The test of the relative efficiency of isolated strains is carried out by selecting the microorganisms which are capable of producing a halo/clear zone on PVK agar plate due to the production of organic acids into the surrounding medium. Out of four fungi and four bacteria two were selected as Phosphate Solubilizing Microorganisms (PSM). They were named as B1 and B2.

According to the UV spectrophotometer results, B2 bacteria perform on HERP than B1 bacteria. B1 did not show any significant P solubilizing ability on ERP. But the B2 showed significant P content increment on ERP. When the P solubilizing abilities were compared between ERP and HERP, B1 was the best candidate in the HERP containing PVK medium whereas the performance of B2 was the best in ERP containing PVK medium. pH changing is almost similar in all the test samples. This result supports that the organic acid production by the secretion of microorganisms not the only reason for the P solubilization. It is influence with several other mechanisms like, the presence of interference by metal complexes in apatite to the process or growth of the organisms by impurities.

Both CE controller sample and CH Controller samples P solubilizing rate is considerably lower than the other samples. That emphasis the microorganisms are directly contribute to increase the P solubilizing rate.