

REPLACING TRIPLE SUPER PHOSPHATE FROM BIOFILM ENRICHED *EPPAWALA* ROCK PHOSPHATE IN RICE CULTIVATION

G.D.C. Pradeep, J.P.H.U. Jayaneththi, and D.M.S. Duminda

*Department of Agricultural Engineering and Soil Science,
Faculty of Agriculture, Rajarata University of Sri Lanka, Anuradhapura,
Sri Lanka.*

Combined application of biofilmed biofertilizer recommended for rice (Biofilm-R) and *Eppawala* Rock Phosphate (ERP) has a greater potential to be used as an alternative to Triple Super Phosphate (TSP). Hence, this study was mainly focused to evaluate the TSP replacing potential of Biofilm-R-enriched ERP in rice cultivation, using a soil leaching tube experiment under laboratory condition. A modified chemical fertilizer (CF_M) mixture was developed by replacing TSP in the rice fertilizer recommendation (CF_E) of the Department of Agriculture (DoA) from Biofilm-R - enriched ERP. However, nitrogen (N) and potassium (K) levels were maintained according to the DoA recommendation. Six treatments were used with CF_E and CF_M at the different rates (65%, 85% and 100%) of Biofilm-R- enriched ERP. Soil alone was used as the control. The experiment was arranged in a completely randomized design with three replicates. Soil pH, available N and P, organic matter (OM) and microbial biomass C were measured before and after the experiment. In every two weeks, solubilized P was recovered by leaching for three months. Initial soil showed an optimum pH (7.27) and also had sufficient amounts of available N (77 mgkg^{-1}), available P (14.38 mgkg^{-1}) and exchangeable K (107 mgkg^{-1}) for rice plant growth. However, OM (1.14%) and microbial biomass C (2.68 mgg^{-1}) were very low. In leachates, 100% ERP coupled Biofilm-R recorded significantly ($p < 0.05$) higher solubilized P compared to other treatments. Overall, biofilms applied treatments recorded higher microbial biomass at the end. Results conclude that 100% ERP coupled with Biofilm-R in the CF_M performed better than the DOA recommended TSP dosage. Therefore, Biofilm-R enriched 100% ERP can be proposed as an alternative to TSP in rice cultivation. However, further studies are needed to evaluate the effectiveness of this Biofilm-R enriched 100% ERP under field conditions.

Keywords: Biofilms, *Eppawala* rock phosphate, Triple super phosphate