# PERFOMANCE OF BIOFILM-ENRICHED EPPAWALA ROCK PHOSPHATE AS AN ALTERNATIVE FOR TRIPLE SUPER PHOSPHATE IN RICE CULTIVATION

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Eppawala Rock Phosphates (ERP) has a greater potential to be used as an alternate for Triple Super Phosphate (TSP) if phosphorous (P) biosolubility is increased. A certain biofilm (BF3) has been identified as the most efficient P biosolubilizer for ERP. Thus, this study was designed to test the potential of biofilm-enriched ERP to replace the TSP in rice cultivation. Two experiments were conducted; soil leaching tube and pot experiments under controlled conditions. A modified chemical fertilizer ($CF_M$) mixture was developed by replacing TSP from ERP in the existing chemical fertilizer ($CF_E$) mixture for rice recommended by the Department of Agriculture (DOA). However, nitrogen (N) and potassium (K), levels were maintained according to DOA recommendation. Eleven treatments were used with all possible combinations of $CF_E$ and $CF_M$ at rates of 50% or 100% alone or together with the BF3. Soil alone was used as the control. Treatment of 50% $CF_M$ + BF3 was denoted as biofilm-enriched ERP. The experiments were conducted in a Completely Randomized Design (CRD) with three replicates. Biofilm enriched ERP showed no added advantage over the $CF_E$, with lower cumulative solubilized P in leachates. At the end of the pot experiment; biofilm-enriched ERP showed significantly ($p<0.05$) higher P retention in soil and significantly ($p<0.05$) lower grain yield comparison to the $CF_E$. However, biofilm-enriched ERP showed no any significant ($p>0.05$) difference in plant P uptake. The overall results conclude that the biofilm-enriched ERP performed poorly in comparison to the DOA recommended TSP dosage. Thus, further studies are required to enhance the performance of biofilm-enriched ERP to use as an alternate for TSP in rice cultivation.

***Keywords***: Biofilm, Eppawala rock phosphate, Rice cultivation, Triple super phosphate