

**BIOFILM-ENRICHED EPPAWALA ROCK PHOSPHATE AS A POTENTIAL FERTILIZER FOR RICE CULTIVATION: A STEP TOWARDS REDUCING CHEMICAL FERTILIZERS**

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Eppawala Rock Phosphate (ERP) has been identified as an alternative to Triple Super Phosphate (TSP). However, its application as a phosphate fertilizer is limited due to its low solubility. If the solubility can be increased, ERP can use as a phosphorous (P) fertilizer for annual crops. The National Institute of Fundamental Studies (NIFS) has developed four biofilm formulations (BF1, BF2, BF3 and BF4) with abilities to biosolubilize phosphates, of which BF3 has shown promising results. Hence, the present study was conducted to explore the potential of BF3-treated ERP as a P fertilizer in rice under field conditions. Two field trials were conducted in two consecutive cropping seasons, Yala 2018 and Maha 2018/2019. The chemical fertilizer dosage ( $CF_E$ ) recommended by the Department of Agriculture (DOA) for rice was modified by replacing TSP-P with BF3-enriched ERP-P (ERP-BF3), together with 65% reduced doses of nitrogen and potassium ( $CF_{NK}$ ). Three different rates, 65, 80 and 100% of ERP-BF3 (equivalent to TSP-P recommended by the DOA) were tested ( $CF_{NK} + 65ERP-BF3$ ,  $CF_{NK} + 80ERP-BF3$  and  $CF_{NK} + 100ERP-BF3$ ) against  $CF_E$ . The results revealed that  $CF_{NK} + 100ERP-BF3$  could produce significantly higher yields ( $p < 0.05$ ) in both cropping seasons than that of other treatments ( $CF_{NK} + 65ERP-BF3$  and  $CF_{NK} + 80 ERP-BF3$ ) and the control ( $CF_E$ ). Moreover, plant growth parameters, viz. plant shoot and root dry mass, plant height and panicle length, were also higher with  $CF_{NK} + 100ERP-BF3$  in comparison to the  $CF_E$ . Therefore, the 100 ERP-BF3 can be recommended as an alternative to TSP, with 65% of reduced doses of N and K ( $CF_{NK}$ ) for rice cultivation. These results are important to today's context, where there is a scarcity of chemical fertilizers for rice cultivation. Further studies are needed to test the use of ERP-BF3 under different soil and climatic conditions in the country before introducing it to farmers.

Financial assistance from Rajarata University of Sri Lanka (Grant No. RJT/R&PC/ 2017/FOA/R/03) is acknowledged.

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