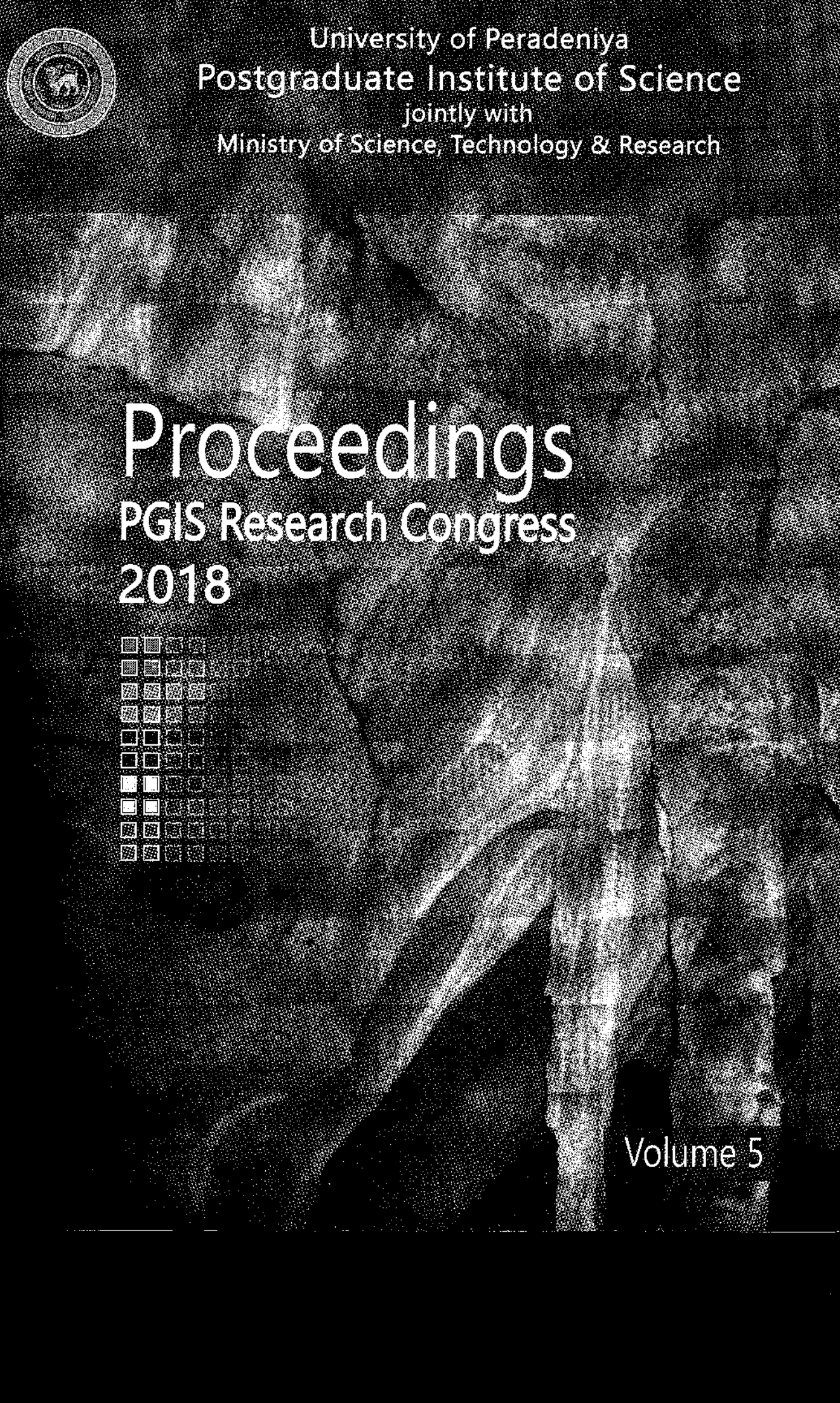

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USE OF BIOFILMS IN BIO SOLUBILIZATION OF EPPAWALA ROCK PHOSPHATE

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Eppawala Rock Phosphate (ERP) has been identified as a good alternative for Triple Super Phosphate (TSP), though its application is restricted due to low solubility. However, ERP has a greater potential to use as a P-rich fertilizer, if the biosolubility is increased. The National Institute of Fundamental Studies (NIFS) has developed biofilm formulations with the potential of solubilizing ERP. Hence, this study was designed to evaluate the efficiency of these biofilm formulations in solubilizing ERP. Two experiments were conducted (a culture broth study and a leaching tube study) under laboratory conditions in a completely randomized design (CRD) with three replicates. Data were statistically analyzed using analysis of variance (ANOVA) followed by mean separation using Tukey's test. In the broth study, four biofilm cultures developed with different bacterial and fungal strains (BF1, BF2, BF3 and BF4) were tested for their efficacy in P solubilization in liquid Low Cost Medium (LCM) containing ERP. Available and water soluble P, microbial biomass C and P, and pH of the medium were analyzed and microscopic observations were taken after two weeks of incubation. In the leaching tube experiment, the recommended dosage of chemical fertilizers for rice was used by replacing TSP with ERP together with biofilms (BF1, BF2, BF3 and BF4) separately. Solubilized P was quantified in the leachate in two-weekly intervals for three months. The broth study revealed that the BF3 solubilized P more efficiently and produced higher microbial biomass in comparison to other tested biofilms. In leachates, the highest cumulative solubilized P was recovered from BF3 too. The results conclude that the BF3 is the most efficient biofilm formulation in solubilizing ERP. Further studies are ongoing to evaluate the efficacy of BF3 in solubilizing ERP under field conditions.

Keywords: Biofilms, Eppawala Rock Phosphate, Phosphorous Solubilization, Triple Super Phosphate.