

ENHANCING NUTRIENT SOLUBILIZATION OF COMPOST USING MICROBIAL BIOFILMS

S. Sharanga, J.P.H.U. Jayaneththi and D.M.S.H. Dissanayaka

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

Compost is an organic fertilizer that improves soil fertility. The nutrient solubilization of compost can be catalyzed by adding microbial biofilms (MB) as ameliorators. These MBs would be more effective when it's enriched (MB-ERP) with the Eppawala rock phosphate (ERP) prior addition to the compost. This study aimed to enhance the nutrient solubilization via available N, available P, and exchangeable K of compost using MB-ERP. Laboratory tray experiment was conducted with four treatments, with three replicates. The commercially available compost was used for the experiment. Two MBs (BFBF1 and BFBF2), which have been identified as effective P solubilizers, were selected from previous studies. The two MBs were sprayed separately into ERP to form MB-ERP (BFBF1-ERP, BFBF2-ERP) by following the recommended procedures. Then these MBs enriched ERP were added into trays with a uniform layer (50 kg) of compost. The effect of added ERP was also tested on nutrient solubilization of compost, and a control was maintained without any MB. Available N, P and exchangeable K of compost were measured in ten days intervals for two months. Data were analysed using ANOVA procedure followed by mean separation using Tukey's HSD test. Results revealed that BFBF1-ERP was significantly higher ($p < 0.05$) in releasing cumulative available N ($0.861 \pm 0.017\%$) and available P ($0.336 \pm 0.004\%$) compared to other tested MB (BFBF2-ERP). However, a significantly higher ($p < 0.05$) solubilization of exchangeable K ($0.221 \pm 0.002\%$) was recorded in control. The results concluded that the BFBF1-ERP is the most efficient MB formulation for solubilizing of available N and P in compost. However, the K release was not sufficient with the BFBF1-ERP. Thus, further studies should be conducted to increase the K release by incorporating K-rich amendments into this biofilm-mediated compost.

Keywords: Compost, Eppawala rock phosphates, Microbial biofilms, Nutrient solubilization