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Variation of Soil Microbial Growth and Enzyme Activities by Application of Treated Distillery Effluent in Maize Crop Grown Under Sandy Loam Soils

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ABSTRACT

A field experiment was conducted to investigate the soil microbial growth and enzymatic activity of Treated Distillery Effluent (TDE) and Bio-compost (BC) applied in sandy loam soils grown with Maize crop (*Zea mays*). Under split plot design with five main plots with addition of organics *viz*., No organics; application of TDE @ 0.5 lakh litres ha^{-1}; TDE @ 1.0 lakh litres ha^{-1}; Bio compost @ 5 t ha^{-1} and FYM @ 12.5 t ha^{-1} + biofertilizers. In addition, five subplot treatments *viz*., addition of inorganic fertilizers at different levels of recommended dose of NP fertilizers (0 %, 50 %, 75 % and 100 %) compared with 100 per cent recommended dose of NPK @ 150 :75: 75 of kg N, P_2O_5 and K_2O ha^{-1}. Application of TDE 1.0 lakh litres ha^{-1} resulted higher bacterial, fungal and actinomycetes population over control at all stages of crop growth. Indeed, the soil bacterial population recorded the highest value of 20.1 and 19.3 $x10^6$ CFU g^{-1} of soil with the application of TDE @ 1.0 lakh litres ha^{-1} compared to control at post-harvest stage. There was an increase in the soil fungal population to the tune of 30.3 per cent over control at post-harvest stage. Furthermore, application of TDE @ 1.0 lakh litres ha^{-1} recorded the highest soil actinomycetes population at all stages of crop growth. The soil enzyme activities as phosphatase, dehydrogenase and urease recorded the highest values of 12.8 µg p-nitrophenol g^{-1} soil hr^{-1}; 2.96 µg TPF g^{-1} soil hr^{-1} and 5.16 µg NH_4-N g^{-1} soil hr^{-1} respectively with the application of TDE @ 1.0 lakh litres ha^{-1}. The soil microbial population and enzyme activities increased with the application of distillery effluent over control. Hence, it was observed that, Soil microbial activity had a direct impact on the plant nutrient availability as well as other favorable properties associated with soil productivity.