

Changes in physical and chemical properties of saline soil amended with municipal solid waste compost and chemical fertilizers in a mustard–pearl millet cropping system

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Abstract

Soil salinity is a serious threat in arid and semi-arid agro-ecosystem of India, which is directly influenced the soil physical properties. Therefore, understanding the dynamic nature of salinity is key to implement suitable management practices for improving the fertility of saline soils. In this context, field experiments were conducted in saline soil, comprising five treatments of control (no amendments and chemical fertilizer), recommended dose nitrogen, phosphorus and potassium (N-P-K) fertilizers @ 60:30:30 kg ha⁻¹ (100 % RDF), rice straw compost (RSC) @ 14 Mg ha⁻¹, gypsum enriched compost (GEC) @ 14 Mg ha⁻¹, and municipal solid waste compost @ 16 Mg ha⁻¹ (MSWC) for three consecutive years (2012 to 2015). Results revealed that composts and chemical fertilizer application in saline soil had brought significant improvement in soil organic carbon (SOC), soil aggregate stability indices, soil water retention, transmission characteristics, and pore size distribution. This improvement in soil physical properties imparted into better soil physical environment and significant reduction in soil salinity (75%) was reported with application of MSWC. Multivariate analysis indicated that mean weight diameter (MWD) and retention pores (RP) were the main two soil physical properties that help to reduce soil salinity. Improved soil environment in compost amended treatments brought significantly higher grain yield of mustard and pearl millet was observed with MSWC as compared to control. Organic amendments significantly improved the soil physical environment.

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