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Improvement of Sand Dune Properties with Organic Waste Application for Sand Dune Fixation

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Abstract

Low organic matter content, low water holding capacity and low nutrients retention are the major problems in the soils of the dune in desertified area. These unfavourable conditions make sand dune fixation programme unsustainable. Application of organic waste as a fertiliser source not only improves sandy soil fertility, it also improves the physical and chemical properties of the dunes and provides effective methods for disposal of wastes. Sand dune fixation experiment was conducted in 2009 by planting seedlings of *Salvadora persica* L. in Elrawakeeb Dry Land Station located West of Omdurman between latitudes 15°2'–15°36' North longitudes 32°0'–32°10' East. The seedlings were treated with following treatments: chicken manure (CH), chicken manure combined with sawdust (CH + SW), sawdust combined with inorganic fertiliser (SW+IF), sewage sludge (SS), sewage sludge combined with sawdust (SS+SW), sawdust alone (SW) and control (C). Each treatment was assigned to a plot of 2 m × 2 m and arranged in a randomised complete block design with 4 replicates. Soil properties were determined from soil samples (0–20 cm) collected from the fixed sand dune in the second year after application. Results showed that application of organic wastes, increased significantly ($p < 0.001$) soil organic carbon by 224 %, available P by 139.9 %, total nitrogen by 142.9 % and mineral nitrogen 83.5 %. On other hand, incorporation of organic waste had resulted in decrease soil pH by 5.6 %. The results showed that application of organic wastes in dune soil could be a useful practice in sustaining fertility of dune soils and improved sand dune fixation.

Keywords: Desertification, organic wastes, *Salvadora persica*, sand dune, soil property