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[DOR: 20.1001.1.24763594.1394.19.74.9.3]

[DOI: 10.18869/acadpub.jstnar.19.74.9]

Assessing Some Chemical and Biological Quality Attributes of Soils Irrigated with Groundwater and Treated Industrial Wastewater in Greenspace of Mobarake Steel Complex

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(Received: Jan. 11-2015 ; Accepted : Oct. 18-2015)

Abstract

Mobarakeh Steel Complex has been using treated industrial wastewater for irrigation of green space to combat water shortage and prevent environmental pollution. This study was performed to assess the impact of short-, middle-, and long-term wastewater irrigation on soil quality attributes in green space of this complex. Soils were sampled from the wet bulb produced by under-tree trickles in three depths of forested lands irrigated with treated wastewater (for 2, 6 and 18 years) or groundwater. Several chemical, physical and biological characteristics of the soil samples were determined in the laboratory and compared to those of the native unirrigated soils as the controls. The results showed that pH was significantly reduced in the wastewater-irrigated soils as compared to the control. Organic matter content and cation exchange capacity significantly increased in the irrigated soils due to the incorporation of tree leaves into soil. Soil salinity also increased as the irrigation period increased because of the relatively high salinity of water and wastewater used for irrigation. Microbial basal respiration and arginine ammonification were greater in the irrigated soils in comparison to the control. In general, forestation and irrigation management have improved most of the soil quality indexes in the Mobarakeh Steel Complex green space, but some soil characteristics, such as salinity, need to be monitored and improved in future.

Keywords: Soil quality, Wastewater irrigation, Soil Chemical properties, Soil microbial activity.

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