

Chemical and Mineralogical Properties of Soils from an Arid Region of Misurata-Libya: Treated Wastewater Irrigation Impacts

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Abstract : This research explores the impacts of irrigation by treated wastewater (TWW) on the mineralogical and chemical attributes of sandy calcareous soils in the Southern region of Misurata. Soil samples obtained from three horizons (A, B, and C) of six TWW-irrigated pedons (29years) and six other pedons from nearby non-irrigated areas (dry-control). The results demonstrated that the TWW-irrigated pedons had significantly higher salinity (EC), sodium adsorption ratio (SAR), exchangeable sodium percentage (ESP), cation exchange capacity (CEC), available phosphor (AP), total nitrogen (TN), and organic matter (OM) relative to the control pedons. Nonetheless, all the values of interest ($EC < 4000 \mu\text{s/cm}$, $SAR < 13$, $\text{pH} < 8.5$ and $ESP < 15$) remained lower than the thresholds, showing no issues with sodicity or salinity. Irrigated pedons contained significantly higher amounts of total clay and showed an altered distribution of particle sizes and minerals identified (quartz, calcite, microcline, albite, anorthite, and dolomite) within the profile. The observed results included the occurrence of Margarite, Anorthite, Chabazite, and Tridymite minerals after the application of TWW in small quantities that are not enough to influence soil genesis and classification. 0,51 cm.

Keywords : treated wastewater, sandy calcareous soils, soil mineralogy, and chemistry

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