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AGGREGATE STABILITY, TOTAL AND PARTICULATE ORGANIC MATTER AS AFFECTED BY CULTIVATION OF UNDISTURBED SOIL IN AN ARID REGION

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INTRODUCTION: Data regarding aggregate stability, total and particulate organic matter of undisturbed and the marginal croplands in arid regions of Iran is scarce. This study explores the value of aggregate stability, total and particulate organic matter as measures when converting undisturbed to (alfalfa) and (olive).

METHODS AND MATERIALS: The study area locates in Ghom province, Iran. Three land uses including an undisturbed and two adjacent cropland soils situated side by side were selected for this study. In three land uses, soil samples were taken from 0–30 and 30–60 cm depths. Soil samples were air-dried, and for different purposes passed through 2 and 4 mm sieves before laboratory analysis. The soil organic matter was determined using the wet oxidation and loss on ignition method, respectively. The size distribution of soil aggregates for determination of aggregate stability was measured by wet sieving (Cambardella and Elliot 1993).

RESULTS AND CONCLUSIONS: The results showed that the soil organic matter in both depths of croplands was significant higher than that of undisturbed soils. These results are agreed with the findings of Li et al. (2009). The undisturbed soils contained organic matter of 11.28 and 6.16 g kg^{-1} at 0–30 and 30–60 cm depths, respectively. The average soil organic matter concentration was increased by 20 and 116% under cultivation at 0–30 and 30–60 cm depths, respectively. Across both depths, the particulate organic matter content was greater in cropland (6.06–8.19 g/kg) than in the undisturbed soils (2.85–4.25 g/kg). However, in three land uses, the amounts of particulate organic matter were significantly greater in 0–30 cm compared to 30–60 cm depth. The cultivation of undisturbed soils increased the aggregate stability value. Since a vast region of Iran is arid with very low soil organic matter, cultivation and irrigation could help increasing soil quality in this region.

Keywords: undisturbed soils, cropland, particulate organic matter (POC), aggregate stability