



Effect of Soil Drainage on Magnetic Susceptibility and Iron Compounds of Soils of Fars Province, Southern Iran

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Soil drainage condition has significant effects on chemical properties of soil particularly on type and the extent of iron oxides. Soil magnetic susceptibility (χ) has appropriate relationship with drainage condition. Eight soil profiles in four regions of Fars province with aquic and non-aquic soil moisture regimes were studied in order to determine the effect of drainage condition on χ . Aquic soils had distinctly lower χ than non-aquic soils (19.9 vs. 32.5). Magnetic susceptibility of surface horizons was greater than that of the sub-surface horizons in most of the soils (31 vs. 19.6). This is probably a result of pedogenic formation of ferrimagnetic minerals in soil surface. Aquic and non-aquic soil lost 41 and 64 percent of their χ after CBD extraction, reflecting differences in the source of χ . Sequential heating of soil samples to 550 °C resulted in more enhancement of χ in aquic soils compared with non-aquic soils, (451% vs. 155%) which was attributed to the conversion of canted antiferromagnetic minerals to ferromagnetic minerals. The χ decreased when heated from 550 to 700 °C (about 100% in both soil groups).

Keywords: magnetism, drainage condition, iron oxide, heat treatment.