

Research Article

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Clay mineralogy and geochemistry of some black, red and red laterite soils in semi arid tropical region of Tamil Nadu

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Summary

The X-ray diffraction pattern of soil clay fraction of one red soil pedon from Maize Research Station, Vagarai of Dindigul district, one black soil pedon from Cotton Research Station, Veppanthatai (Perambalur district) and one red laterite soil from Dryland Agricultural Research Station, Chettinad of Sivaganga district of Tamil Nadu was carried out to distinguish the distribution of clay minerals by using X-ray diffraction method and the mineral composition was assessed semiquantitatively. The black soil pedon revealed the dominance of smectite in association with small quantities of illite and kaolinite. The red soil pedon clay fraction was “mixed” with smectite, illite and kaolinite type of clay minerals. The dominant clay mineral was kaolinite with small quantities of illite in red laterite soils pedon. The chemical composition of soils exhibited the siliceous nature with broad and large silica/sesquioxides and silica/alumina ratios. The wider ratios of $\text{SiO}_2/\text{R}_2\text{O}_3$ and $\text{SiO}_2/\text{Al}_2\text{O}_3$ (4.64 to 5.61 and 5.75 to 6.94) were found in the black soils pedon followed by red soils pedon (4.55 to 5.01 and 7.78 to 9.64), respectively where smectite and illite were the dominant clay minerals. The narrow silica/sesquioxides and silica/alumina ratios (2.23 to 2.56 and 4.13 to 5.37) were found in red laterite soils where Kaolinite was dominant clay mineral in semi arid tropical region of Tamil Nadu.

Key words : Black soils, Red soils, Red laterite soils, Clay mineral, X-ray diffraction, Elemental composition

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