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Factors affecting the genesis and distribution of palygorskite in Tertiary parent materials and soils of Darab, Fars Province

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Abstract: Having specific properties, clay minerals including palygorskite have considerable influence on soil physico-chemical characteristics as well as the stage of soil development. The objectives of current study were to determine the distribution, origin and formation conditions of palygorskite in the Tertiary sediments and associated soils in Darab, Fars Province. Based on the field observations and geological maps, six rock and soil samples from different Tertiary epochs were selected. The clay size samples were investigated by X-ray diffraction (XRD) and scanning electron microscopy (SEM). Based on clay mineralogy of parent materials and soils as well as quantity and morphology of clay minerals, three origins were distinguished for palygorskite including inherited, pedogenic and detrital. Using principal component analysis (PCA), smectite, gypsum, EC, illite, soluble Ca and Mg and soluble Mg/Ca ratio were identified as the most important factors affecting the distribution and genesis of palygorskite in the studied soils which in turn show the pedogenic and *in situ* formation of palygorskite from soil solution under high evaporation.

Keywords: *Clay minerals; palygorskite; Tertiary; parent materials; principal component analysis.*

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