



Association of soil organic matter to mineral phases: colloidal behaviour and effect on metal retention

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The interaction between organic matter and mixed mineral phases of soil can affect the surface properties that govern the colloidal behaviour of soil particles and their adsorption capacity. The association of metal oxides with silicates seems to imply mainly the formation of coating films of poorly ordered material. The interaction of the resulting clay-metal systems with organic matter produces new surfaces with specific properties. This interaction promotes the permanence in soils of less ordered oxides, affects the particle reactive surface area and charge, then equilibrium between dispersion and aggregation of particles, and finally their ability to interact with metal cations. While the capacity of organic acids of low molecular weight in changing the colloidal behaviour and adsorption capacity of the mineral phases towards metals has been largely investigated, the studies on the effects of humic materials are not extended to cover the wide complex and quite heterogeneous mixture of compounds, ranging from the dissolved forms (DOM) to the more humified and condensed ones (humins). This work will present the association of phyllosilicates with iron oxides, their interaction with all fractions constituting soil organic matter and the main influences on surface properties, such as electrical charge, surface area, size, porosity and colloidal behaviour. Special emphasis to the effects of DOM compared to fulvic, humic acids, and humin will be given. Moreover, the interaction of these mixed systems with metal cations will be evaluated.