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# THE ROLE OF NANOSIZED MINERAL PARTICLES AND THEIR SURFACE PROPERTIES ON FORMATION OF MICROAGGREGATES IN SOILS FORMED IN DIFFERENT PEDOENVIRONMENTS

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The submicron-sized inorganic particles, omnipresent solids in natural environments, comprise the majority of reactive surfaces, responsible for transport, sequestration and removal of contaminants [1,2]. The surface properties of these mineral particles in natural environments are under significant influence of organic and inorganic coatings. These associations mostly result in formation of organo-mineral aggregates, thus modifying the surface reactivity, stability, behaviour and availability of mineral surfaces [3].

The presented research investigates the role of nano-sized mineral particles and their surface properties on the formation of microaggregates in soils formed in different pedoenvironments. For this investigation, Cambisols from the Mljet Island and the Kuti Lake, and a Cretaceous paleosol from Istria, all developed on hard limestones, were sampled and analysed in detail. Cambisols were formed in an oxidative pedogenic environment and contain both goethite and haematite while the paleosol was formed in a reductive pedogenic environment and contains pyrite. The main mineral phases comprising the clay fraction of Cambisols are kaolinite and illitic material, while in the paleosol clay fraction illitic material and illite/smectite mixed-layer minerals prevail.

This study is based on a detailed mineral characterization of the submicron- and the nano-sized mineral fractions of these soil samples, investigation of their surface properties and complex interactions with organic matter and iron mineral phases. Soil samples were treated with sodium hypochlorite to remove the organic matter and the submicron-sized fractions were collected by gravitational settling and the size range was confirmed by dynamic light scattering. Samples were mineralogically (XRD) and morphologically (FE-SEM) characterized, their physico-chemical properties (specific surface area, SSA and cation exchange capacity, CEC) determined. As such, this study contributes to a better understanding of the process governing the formation of nanostructured soil microaggregates worldwide.

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