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Crystallochemical characterization of Benavila bentonites - potential raw material for dermocosmetics

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Being a smectite rich clay, bentonites are commonly used in pharmaceuticals and cosmetics. Bentonite nature, composition and structure influences several properties, such as plasticity, ion exchange capacity and adsorption capacity. For the present work, six samples from Benavila residual deposit, located in South Portugal, were studied to assess their crystallochemical features. Morphological and pseudototal chemical analysis of individual particles was assessed using a Tescan scanning electron microscope with energy dispersive spectroscopy (SEM-EDS) VEGA LMU mode. Powder samples of clay fractions were also analyzed by XRD to compute d(060) values. XRD results show smectite (mainly Ca type) absolutely predominant on clay fractions. Smectites are mainly of dioctahedral type. SEM results allowed to compute smectites structural formulas. There are significative differences between samples, pointing to different soil maturity; beidellites are predominant followed by nontronites. Grain size, morphology, mineralogical and chemical compositions are considered as adequate to use these residual deposits as raw materials for dermocosmetics as well as for other types of spa treatments.