SEA WATER MATURATION OF HEALING CLAYS: MIOCENE SMECTITIC CLAYS FROM LISBON REGION (PORTUGAL)

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Maturation is a complex process affected by several factors, such as water temperature, light exposure and mixing procedures that determine the final mud characteristics. There have been some indications that peloid quality is also affected by granulometry, mineralogy and physico-chemistry of the raw material and geochemistry of the water. Some researches evidenced that water retention, consistency, bioadhesiveness, ease of handling, pleasant sensation while applied to the skin, cooling kinetics and exchange capacity through mud/skin interface are important features for the formulation of peloids that can be modified trough maturation with salt water.
In Portugal, treatments with natural (geological) muds are done outdoors ("in situ") in sites located near the seaside as the cases of Consolação Beach (Peniche), Meco Beach (Costa da Caparica), Parede Beach (Oeiras) e Burgau Beach (Lagos), generally mixing local clays with sea water. Our aim is to evaluate the effects of clay maturation with sea water on mineralogical and chemical composition as well as on physical and technological properties of these clays.
We have studied samples from Miocene smectitic clays outcropping south of Lisbon, forming cliffs on very popular beaches. Mineralogical composition was assessed by XRD analysis. Chemical composition was analysed by XRF. Grain size distribution was assessed using wet sieving and a X-ray grain size analyser. Properties of these clays such as: particle size distribution, cation exchange capacity, specific surface area, expandability, plasticity, viscosity, abrasivity, pH, cooling rate, specific heat and heat diffusiveness had been assessed. All samples were sieved at 63 μm before the maturation procedures. Small tanks (ca 1.3 dm3) were filled with mud and covered by a layer of sea water during the process (ratio 5:1). Tanks were kept uncovered during the experiment. Two different subsamples were submitted to maturation, one during 30 days, the other during 60 days, in a controlled room temperature (about 21ºC during the day and 18ºC at night). Only slightly geochemical and mineralogical modifications occurred probably due to the weathering of primary minerals, but significant changes on technological properties (particle size distribution, cation exchange capacity, plasticity, abrasivity and cooling rates) were detected.

Keywords: healing clays, salt water maturation, pelotherapy