



Contents lists available at ScienceDirect

Applied Clay Science

journal homepage: www.elsevier.com/locate/clay

Research paper

Study of traditional Tunisian medina clays used in therapeutic and cosmetic mud-packs

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ARTICLE INFO

Article history:

Received 19 March 2014

Received in revised form 24 July 2014

Accepted 29 July 2014

Available online xxx

Keywords:

Traditional cosmetic clays

Home-made mud-packs

Cooling rates

Specific heats

ABSTRACT

The present study was carried out to access the suitability of eleven clay samples (green and brown) from five Tunisian medina markets, traditionally used in home-made mud-packs. The mineralogical composition was determined from X-ray powder diffraction and X-ray fluorescence data. Scanning electron microscopy coupled with energy-dispersive X-ray microanalysis was also carried out, as well as thermogravimetric analysis of raw clay samples. To determine the performance of the samples in mud-pack thermotherapy, cooling kinetics of clay pastes were fitted to obtain the corresponding specific heats. According to their mineralogical composition, the studied medina clay samples were mainly composed by illite and kaolinite, with exception of two Mg smectite-rich samples and other two calcite-rich samples. The presence of relatively high amounts of crystalline silica (quartz) in some of the samples advises against their not controlled manipulation, even if there are no quantitative limits (widely approved) of crystalline silica content above which the usage of commercial clays can be prohibited. The cooling rates and specific heats of the studied pastes were adequate to their use in the preparation of hot mud-packs, able to transfer heat to the skin during a period of at least 15 min after application.

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1. Introduction

The beneficial effects of minerals and rocks on human health have been studied and exploited in traditional therapeutics over the last two millennia (De Vos, 2010), being nowadays a capital objective of medical geology research (Gomes and Silva, 2007). Clays are used with curative and/or preventive purposes in different pharmaceutical and medicinal products (López-Galindo and Viseras, 2004). To be used as raw pharmaceutical ingredients, clays must comply with both quality and performance tests (López-Galindo et al., 2007). Many semisolid health care products include clays as dispersing and anticaking agents, because of their high surface areas and colloidal dimensions (Viseras et al., 2007). Clays are also used as ingredients of traditional medicines (Carretero et al., 2006) and besides other natural products are currently employed in several indigenous Euro-Mediterranean therapies, as for example the preparation of therapeutic mud-packs (Espejo-Antúnez

et al., 2013; Gomes et al., 2013; Karakaya et al., 2010; Morganti et al., 2001; Pozo et al., 2013; Quintela et al., 2012; Veniale et al., 2004). In the Maghreb countries, mud-packs are prepared in domestic setting by using tap water and clays commercialized in medina stores. Two varieties of clays (green and brown) can be found in the medina markets. Green medina clay mud-packs are applied onto the skin with therapeutic and cosmetic purposes, whereas mud-packs prepared with brown clays are mainly used as hair cosmetics. Taking into account that these home-prepared mud-packs are present in almost all Maghrebian houses, the number of potential users in Tunisia could overcome, being cautious, about 2.5 millions. However, no information about the mineralogy, chemistry and technical characteristics of these materials is provided by the sellers, even if these substances probably vary widely in composition, texture and crystallinity, with significant effects on their properties.

With these premises, the aim of this work was to characterize samples of green and brown clays from different Tunisian medina stores in order to determine their suitability in the preparation of therapeutic and/or cosmetic mud-packs. The characterization was limited to clay physical properties; even if it is well known that the eventual benefits of clay pastes application could be attributed not only to some clay physical properties but also to some clay chemical properties. It was not possible

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to study the possible chemical effects because of the random effect associated with the non-controlled chemistry of the different tap waters used in the preparation of mud-packs with the studied samples. Sanitary

control of clay mud-packs, in terms of public health as well as the possible biological activity associated to microbiota and related natural organic compounds, is also an aspect that could certainly complement this work.

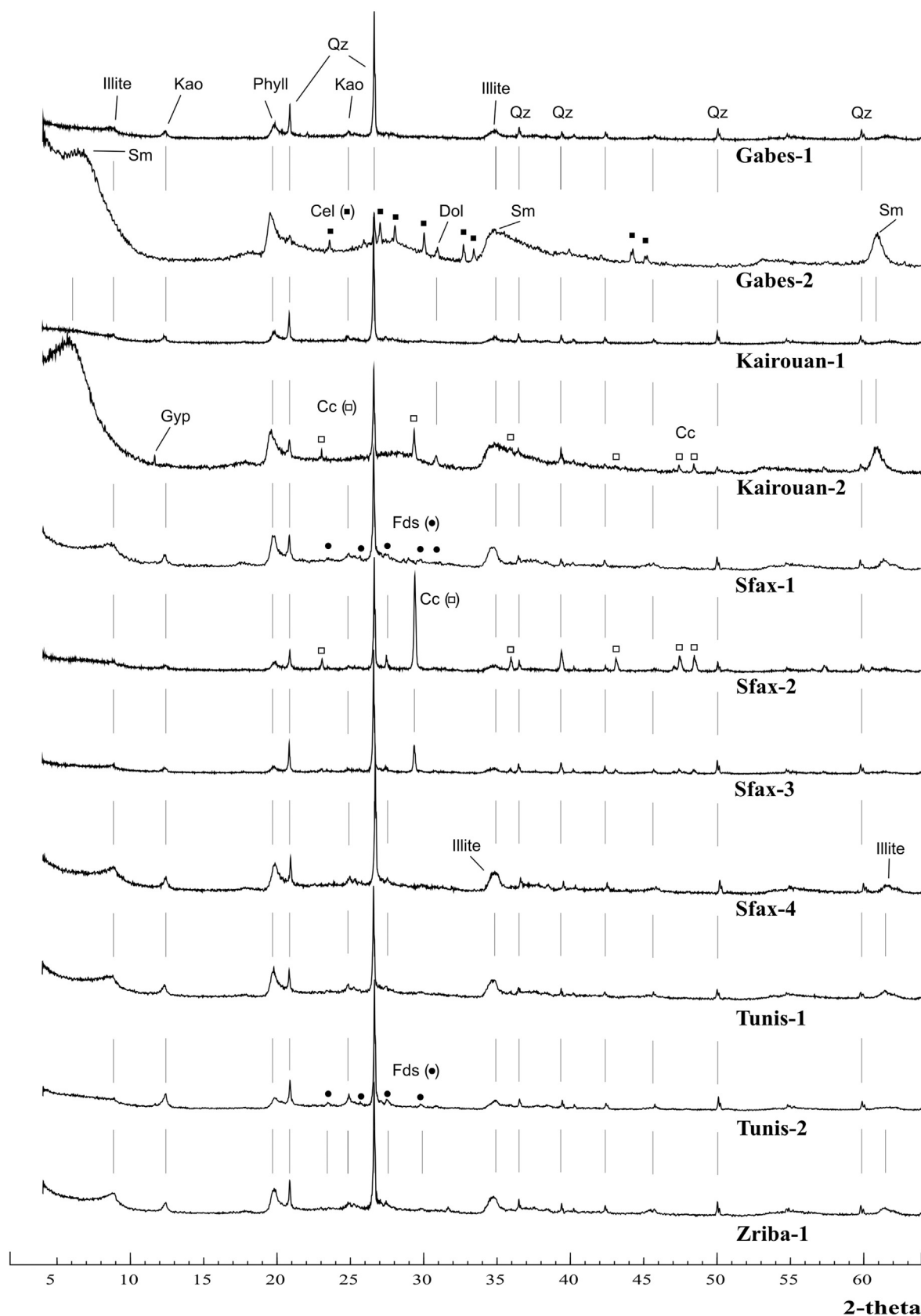


Fig. 1. XRPD patterns of the studied bulk samples.

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