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***PHYSICO-CHEMICAL PROPERTIES OF VARIOUS CLAYS FOR ISLAMIC
SAMAK***

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Physico-Chemical Properties of Various Clays For Islamic Samak

By

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CHAPTER 1

INTRODUCTION

Halal related business is a lucrative industry. It provides huge economic opportunities to the business communities, both domestically and internationally. The demand for halal food products and other Islamic consumer goods is expected to proliferate in future. Currently, the Muslim population in the world is estimated around 1.6 billion in 2010, rising to 2.2 billion by 2030 (MITI, 2006). The demand for halal products among non-Muslims has also seen an increase. The global halal market value for food is about 2.3 trillion USD per year (MATRADE, 2012). Halal products are produced not only by Muslim countries but also by non-Muslims countries. Under Islamic law, Muslims stress the importance of the food source for consumption. This is important because food intake will boost the development of human wellness and behavior (Riaz and Chaudry, 2004). Muslims are concerned about the permissibility of origin as well as the *toyyiban* aspect, which is defined as good, quality, nutritional and wholesome. In addition, the requirement of halal in Islam has a correlative impact on one's faith (*iman*) to the Almighty Allah s.w.t. At the same time, *toyyiban* aspects also meet the concern of the non-Muslims. Therefore, at present, the halal industry is growing due to demand from various consumers.

Halal food, pharmaceutical, cosmetic and personal care products are considered *najis* if they are contaminated or have direct contact with *najis*. *Najis* can be defined as dirty or disgusting. According to Islamic law, *najis* is any liquid or objects discharged from orifices of human beings or animals, such as urine, excrement, blood, vomit, pus including the sperm and ova of pigs and dogs (DSM, 2009). Dead animals or halal animals that are not slaughtered according to Islamic law are also considered *najis*. *Najis* is divided into three categories: light, medium and extreme (Riaz and Chaudry, 2004; Angkatavanich et al., 2009; DSM, 2009). According to Islamic law, *najis al-mughallazah* is an extreme *najis* derived from dogs and pigs (*khinzir*), including any liquid or discharge from their orifices, descendants and derivatives (DSM, 2009). In cleansing extreme *najis*, Islam requires proper cleaning through seven steps of washing, one of which shall be water mixed with clay, also known as *samak* in Malay or *dibagh* in Arabic (Ab. Rahman and Masran, 2008; DSM, 2008).

In order to comply with the halal requirement, plants processing food, pharmaceutical, cosmetic and personal care products must be dedicated to halal production only. Likewise, converting equipment, production lines or equipment containing extreme *najis* into halal production line requires the procedure and requirement of cleansing. Using clay water to clean an extreme *najis* in one's ordinary everyday life does not require specific requirements as long as one follows the Islamic law. However, cleansing extreme *najis* in industrial application requires some modifications of the traditional practice. It is also important to determine the concentration of

clay used in the *samak* cleansing. Cleansing for industrial application covers the equipment and devices used in the processing lines, packaging, labeling, handling, storage, transportation and distribution. Therefore, to clean the equipment contaminated with extreme *najis*, the *samak* clay must be suitable and prepared according to equipment or machinery specifications. Thus, adherence to the halal requirements and practices will meet the fundamental principle of Islamic law.

A specified clay standard for industrial application is needed to meet the halal requirement. It must comply with safety and quality of the products manufactured as well as the governing regulation and guidelines practiced in the country. Damage must also not be caused to equipment and devices involved in the processing, packaging, labeling, handling, storage, transportation and distribution of the halal products. These devices and equipment with their specific accessories are very delicate and costly. Using *samak* clay not in accordance with the industrial specification of the machine/equipment might cause damage and affect the end products. To date, there is no specific report or recent study conducted on local clay for *samak* application. Therefore, the main objectives of this study are:

1. To identify the physical, chemical and mineralogical characterization of the *samak* clay used for industrial Islamic cleansing application.
2. To evaluate the effectiveness of *samak* clay against microorganisms in dog saliva and pork.

3. To develop specifications on *samak* clay used for cleansing application in industry according to Islamic law.
4. To establish the MSDS (material safety data sheet) criteria for the best selected *samak* clay.

The physical criteria selected for this study are particle size distribution (PSD), moisture content, color and turbidity. The chemical characteristics consist of pH and cation exchange capacity (CEC) content. In addition, the mineralogical content of clay was also carried out by X-ray diffraction (XRD). All these criteria were done to determine the most suitable clay to be used in the industrial sector. However, according to the Prophet s.a.w., all types of clay can be used for *samak* purpose as long as it retains its authenticity and purity. In addition, tests like heavy metal content and microbial load are conducted to ensure the products are safe to use and last but not least, the effectiveness of clay against microorganisms found in dog saliva and pork were tested. This is to prove and strengthen claims that clay has antimicrobial properties. Indirectly, it will also reduce contamination of the product in the industrial sector. This is a bonus added value to consumers and manufactures. Hence, from this study the *samak* clay will enhance general consumers' confidence in the halal products. Abundant supplies of clay are available locally and are a cheap and safe product. Clay product that projects quality and ease of use will improve market acceptance.

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