

EVALUATION OF BLEACHING CLAYS FOR REFINING OF OILS

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Malaysia produces 15.9 million tonnes of palm oil, of which 90% is fully refined. Palm oil is refined by a physical process in three stages - degumming, bleaching and deodorization. There are a variety of clays suitable for bleaching, with montmorillonites the most commonly used. Palm oil, as other vegetable oils, contains many minor components, such as phospholipids and other phosphorus compounds, metals, such as copper and iron, pigments, such as carotenoids and chlorophylls, gummy substances and oxidative degradation products of lipids. As the minor components differ in their polarity, acidity and sizes of molecules, the clay would have to be optimized for good bleaching.

In our earlier project on bleaching earths and other adsorbents in the palm oil industry, we characterized the most commonly used earths in the Malaysian palm oil industry. But new materials are being introduced all the time and using the best clay for refining different quality crude oils would allow considerable cost savings. Moreover, companies producing bleaching clays may want to produce different clays for different oils.

Bleaching is by far the most expensive process in refining. This is due to high cost of the bleaching clay (*Figure 1*), the oil-in-earth losses and disposal costs of the spent clay. Over the years, the bleaching process has been improved. Initially, the aim of bleaching was just to remove the colour compounds (carotene, chlorophyll) by adsorption on a suitable material. Today, due to the growing interest in physical refining, bleaching has become a more involved process because it is also to remove the residual phospholipids, soaps and heavy metals, such as iron and copper, and oxidation products, such as peroxides. Removal of these minor impurities is very important since they have a direct effect on the organoleptic quality and oxidative stability of the deodorized product. Thus, selecting the most suitable adsorbent is



Figure 1. Bleaching clay.

crucial to the production of a stable product. Some of the important properties of clays and adsorbents are their surface area, pore size, acidity, moisture content, surface active sites and particle size - parameters which will affect their adsorption, filterability and oil retention properties. Finer clays will have greater adsorption but will also retain more oil and slow down the filtration.

CONSULTANCY

Consultancy includes:

- performance testing of adsorbent in refining of crude palm oil/other vegetable oils;
- evaluation of surface area, pore size, pore volume, pH, acidity;
- stability test of refined oil; and
- particle size distribution of bleaching clay.

FACILITIES

Facilities provided:

- surface analyser;
- electron microscope; and
- refining pilot plant.

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Figure 2. Crude and refined palm oil.



Figure 3. Surface analyser.



Figure 4. Refining pilot plant.

COST

Cost of evaluation/earth /crude oil – RM 6500.

EXPECTED BENEFITS

Reducing the cost of refining through selection of effective bleaching clays.

For more information kindly contact:

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