

PALM-BASED SURFACTANTS, DETERGENTS AND WHITE SOAPS

Hamirin Kifli and Salmiah Ahmad

A detergent is a formulation consisting of surface active agents, builders, boosters, fillers and other additives. Surface active agents, normally referred to as surfactants, are the most important active ingredients in detergents. These are chemical compounds which, when dissolved or dispersed in a liquid are preferentially absorbed at an interface, giving rise to a number of physico-chemical properties of practical interest. A molecule of surfactant contains at least one group with an affinity for highly polar surfaces to ensure maximum solubilization in water, and a group which has little affinity for water.

Basically there are four main classes of detergent:

- *Anionic Detergents* are compounds in which the detergency is vested in the anion.
- *Cationic Detergents* are compounds in which the detergency is in the cation.
- *Non-ionic Detergents* contain no ionic constituents.
- *Amphoteric Detergents* include both acidic and basic groups in the same molecule.

The manufacture of surfactants is one of the most important outlets for basic oleo-chemicals and their derivatives, although petroleum-based surfactants and detergents can also be produced. However, natural-based surfactants and detergents are biodegradable, which

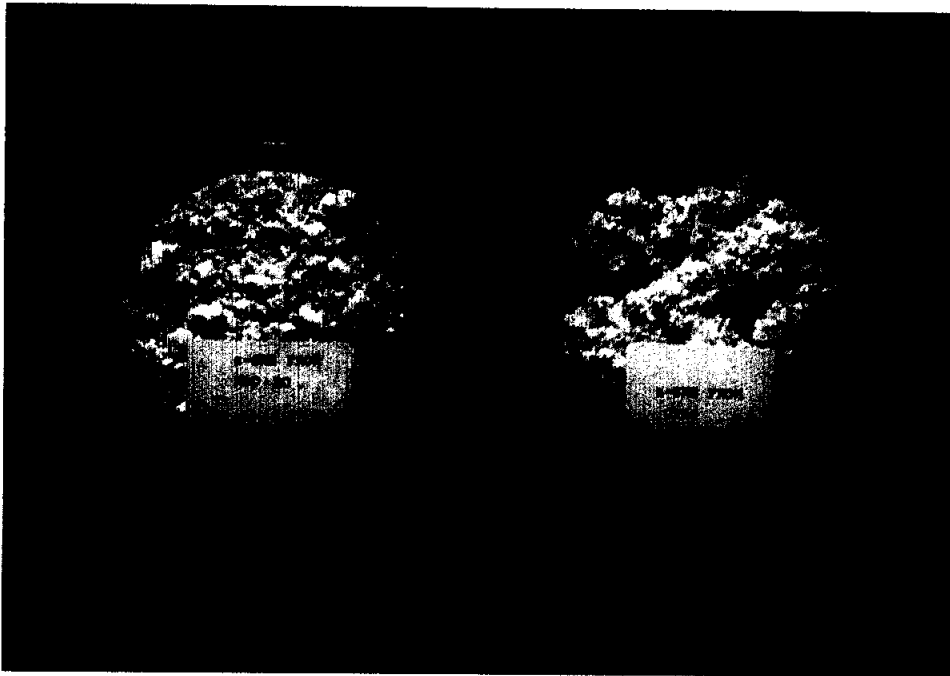


Figure 1. Alpha-sulphonated methyl esters (α -SME) made from palm oil and palm kernel oil.

gives them an advantage over petroleum-based products. One type of detergent which can be derived from palm oil, its products and palm kernel oil is alpha-sulphonated methyl esters (α -SME). A study of this potential application of palm oil, its products and palm kernel oil is being carried out in PORIM. *Figure 1* shows palm oil and palm kernel based α -SME.

The α -sulphonated methyl esters are anionic surfactants. It has been suggested that they will be a promising substitute for linear alkylbenzene sulphonates (LAS), which are petroleum-based surfactants. The α -SME have several unique properties such as better detergency than LAS in the absence of phosphates (especially in the case of C_{16} - C_{18} α -SME) and insensitivity to water hardness. It has been demonstrated that C_{16} - C_{18} tallow-based α -SME have excellent detergency on wool and α -SME can therefore offer an alternative to specialty

detergents. The product can also substitute for half of the LAS in foam-controlled heavy duty powders.

Palm oil, its products and palm kernel oil have been advocated as a good base for soaps, especially in terms of perfume retention. However, palm-based soaps tend to become slightly off-white in colour upon storage. This is not a very favourable quality, especially in a country like Japan where it is customary to give 'pure white' toilet soaps as gifts.

Attempts have been made to improve the degree of whiteness and stability upon storage of palm-based soaps. In PORIM's studies hydrogen peroxide treatment followed by acid and water washing have been found to be effective. The hydrogen peroxide treatment has been found not to produce any deleterious effects on the final products.