

**S**olid fats/shortenings are produced as substitutes for solid animal fats, especially lard. In North America, cottonseed oil was converted to shortening to replace lard in the 1890s. Soyabean oil did not become a major ingredient in shortening until the late 1930s. Now, partially hydrogenated cottonseed oil and soyabean oil have been used to produce shortenings in the USA with domestic consumption in 2004 of around 3.85 million tonnes. However, the partially hydrogenated shortenings contain *trans*-fatty acids (up to 43%) and palm-based shortenings are advantageous in being *trans*-free.

Solid fats/shortenings can be tailor-made for particular applications. The most common is multi-purpose solid cooking fat for frying. The solid cooking fat/shortening is also used in cakes, biscuits, cream fillings, pastries and bread. Frying is widely used by both the food industry and household consumers. Fats and oils have unique properties that add to the flavour and mouthfeel of food, contributing to its palatability. Although palm olein is generally regarded as a superior frying medium, some fast food restaurants in Vietnam and Cambodia prefer a solid fat, especially lard. The selection of frying medium is influenced by a number of factors, including the product to be fried, type of fryer, shelf-life requirement, flavour and eating characteristics of the product.

Shortenings are purely edible fats used in frying, cooking, baking, and as ingredients in fillings, icing and other confectionery items (Bennion and Bamford, 1988; Metzroth, 1996). Frying shortenings exert a tenderizing effect on the crust of the fried products, as well as contribute to their flavour, crispiness and pleasant eating characteristics (O'Brien, 1998). In frying, shortenings allow for quick, uniform heat transfer to form a moisture barrier (Chrysam, 1985). Shortenings are made entirely of oils and fats, either straight or in mixtures. They act as carriers for fat-soluble vitamins and provide essential fatty acids, thus also improving the quality of the food products (Osman and Nor Aini, 1999).



Figure 1.

## PRODUCT NOVELTY

The solid fat is a purely palm-based *trans*-free shortening.

### Physico-Chemical Properties of the Solid Fat

Flavour	Bland
Smoke point	220°C
Melting point	48°C
Free fatty acids	0.03%

### Frying Performance of the Palm-Based Solid Fat/Shortening

The shortening is good for frying especially for fast foods. It performed better than an imported shortening from the USA. After five days' frying, the palm oil-based shortening had total polar content (TPC) and total polymeric material (TPM) of only 11.6% and 1.46%, respectively, while the imported shortening contained 17.4% and 1.99% respectively (Figure 2).

Figure 3 shows the mean sensory scores for breaded chicken fried in the two shortenings. There was no significant difference in the sensory quality of both products.

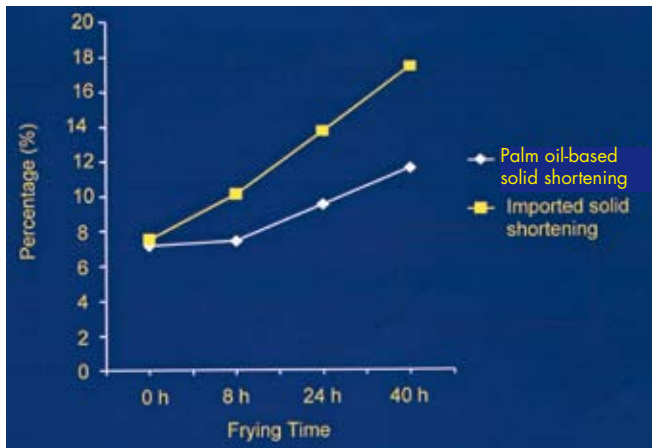


Figure 2. Total polar content of solid shortening.

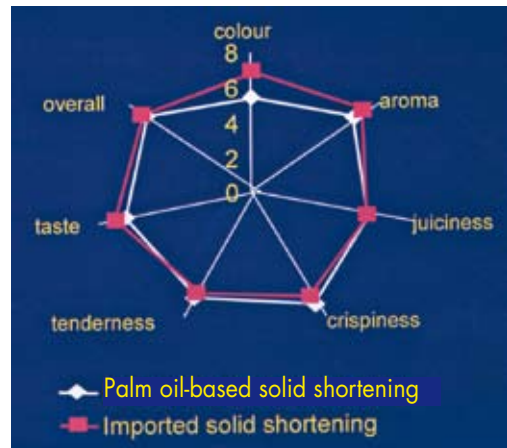


Figure 3. Mean sensory score of fried chicken on Day 5.

### INVESTMENT OPPORTUNITIES

No capital investment is needed by an existing margarine/shortening producer. The cost to produce solid shortening is around RM 2368/1000 kg.

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