

Transparent soap or glycerine soap technology for the past decades was based on tallow, coconut and castor oils as raw materials. With the expansion of the palm oil industry, coupled with comprehensive research and development (R&D) at the Malaysian Palm Oil Board (MPOB), the tallow and coconut portions of soap bases have been replaced with palm products. Palm oil is a well-known source of palmitic (C16-0) and stearic acids (C18-0) while palm kernel oil is rich in lauric (C12-0) and myristic acids (C14-0). The combination of C12-0, C14-0, C16-0 and C18-0 fatty acids contribute to efficient cleaning action, good solubility and foamability.

In the case of opaque toilet soap, the tallow and coconut portions are comparable to palm oil and palm kernel oil, respectively. For transparent/translucent soap, the tallow and coconut portions of the formulation can also be replaced by palm oil and palm kernel oil. In the Malaysian market, ratios of 80:20 and 85:15 of palm oil to palm kernel oil are used in soap formulations. These ratios give the best cleaning action, good solubility and foamability as well as other desirable soap properties.

MATERIALS AND PROCESSING

The soap slab is made from a combination of ingredients such as palm-based fatty acid, sodium hydroxide, sodium chloride, glycerine and sugar solution. The ingredients are mixed and reacted in a stainless steel reactor (*Figure 1*) and the mixture is then heated to produce a clear solution. The soap solution is poured into a mould and cooled to obtain the good properties of the soap slab, ready to serve the consumer.

PROPERTIES OF THE PALM-BASED TRANSPARENT SOAP SLAB

Typical properties of the palm-based transparent soap slab are tabulated in *Table 1* while *Table 2* compares the transparency value of the



Figure 1. Stainless steel pilot-scale soap reactor.

experimental soap slab with several commercial transparent soaps and a competitive slab. A good transparent soap should have a see-through property at normal vision, and a moisture content kept just between 12% and 20%.

In order to classify the soap as transparent, the transparency value should exceed 0.80 on a transparency scale. Soaps with a transparency value lower than 0.80 are considered as translucent, which are also high in demand. The palm-based transparent soap slab is shown in *Figure 2*.

The soap slab can be used directly or re-processed into an innovative home-made soap bar for toilet-tries or used as a decorative item. The transparency remains unchanged after re-processing.



Figure 2. Palm-based transparent soap slab.

TABLE 1. PROPERTIES OF THE PALM-BASED TRANSPARENT SOAP SLAB

Property	Value
Total fatty matter (%)	39.3
Moisture content (%)	14.4
Free acids (%)	2.0
Penetration value/(hardness) (mm)	5.3

TABLE 2. TRANSPARENCY VALUES OF THE PALM-BASED TRANSPARENT SOAP SLAB, COMMERCIAL TRANSPARENT/TRANSLUCENT SOAPS AND A COMPETITIVE SOAP SLAB

Sample	Transparency value
Experimental soap slab	0.80
Commercial soap bar X	0.30
Commercial soap bar Y	0.55
Commercial soap bar Z	0.86
Commercial soap slab	0.85

CONCLUSION

A good quality transparent soap slab can be produced from palm products. It is a totally vegetable-based formulation without the incorporation of any animal fat. The transparency value of the palm-based transparent soap slab is comparable to those of commercially available samples in the market.

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