



Palm Oil / Palm Kernel Oil Applications

# SOAP NOODLES



NATURAL

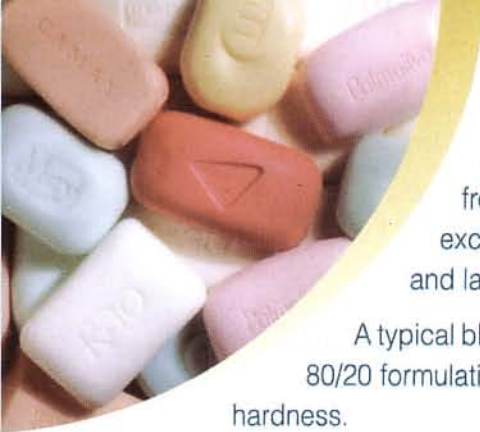
BIODEGRADABLE

CONSISTENT QUALITY

ESTABLISHED CLEAN TECHNOLOGY

ACCEPTABLE TO ALL RELIGIONS

PRODUCT SERIES  
4



**SOAP** is the sodium salt of fatty acids from oils or fats of both animal and vegetable origin. In South East Asia, soaps are primarily made from palm oil blended with either coconut oil or palm kernel oil. There are exceptions - India uses hardened rice bran oil, China, cattle and sheep tallow and lard while Australia generally uses tallow.

A typical blend would be 80% palm oil or tallow and 20% palm kernel oil or coconut. The 80/20 formulation gives about the right balance of lather, rate of wear, cleaning ability and hardness.

## MANUFACTURING PROCESS

Modern soap-making involves two steps:

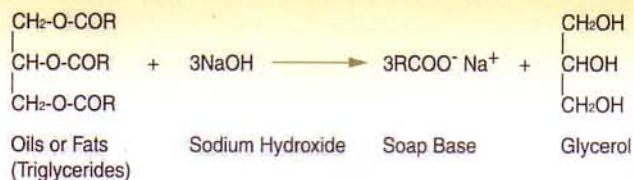
- (a) making the soap base (raw soap), and (b) processing the soap base into the finished product.

### PREPARATION OF SOAP NOODLES

There are three ways to make the soap noodles from oils and fats:

#### (i) Saponification of Oil / Fat (the fat route)

Direct saponification is the most common process used to make soap. In it, a triglyceride (oil / fat molecule) is reacted with sodium hydroxide. The reaction is:



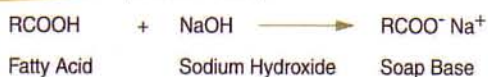
#### (ii) Neutralisation of Fatty Acids (the fatty acid route)

An oil / fat is hydrolysed (broken down by incorporating water) to its constituent fatty acids and glycerol (Step 1). The fatty acids are neutralised with sodium hydroxide (Step 2).

##### Step 1 (Hydrolysis)



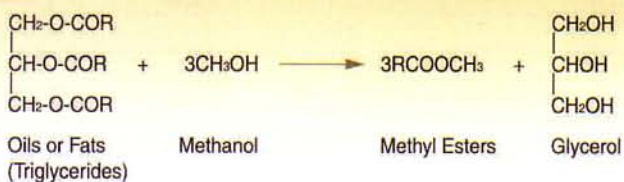
##### Step 2 (Neutralization)



#### (iii) Saponification of Fatty Methyl Esters (the methyl ester route)

An oil / fat is transesterified (a reaction between ester and alcohol) with methanol to produce methyl esters (Step 1). The methyl esters are then saponified with sodium hydroxide to produce soap with methanol as by-product (Step 2).

##### Step 1 (Transesterification)



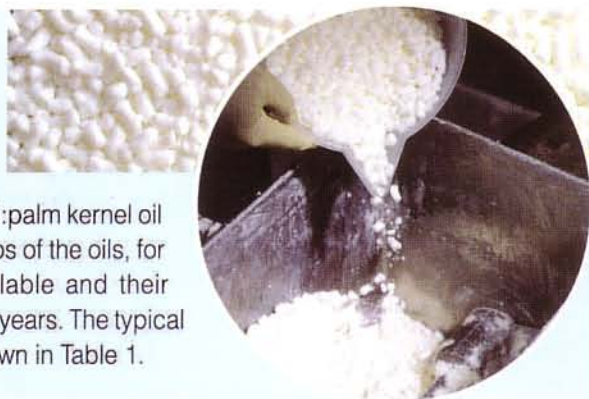
##### Step 2 (Saponification)



In all the processes, the soap base is produced as a viscous liquid, which is dried and plodded into homogenised noodles or chips. The soap noodles / chips are then processed into finished products.

# CHARACTERISTICS OF SOAP NOODLES

Malaysia is the leading producer of soap noodles from palm oil;palm kernel oil blends. The noodles are available commercially in various ratios of the oils, for example, 80:20, 70:30 and 60:40. These are readily available and their production is expected to increase substantially in the next few years. The typical characteristics of soap noodles produced in Malaysia are shown in Table 1.



## ADVANTAGES OF PALM-BASED SOAP NOODLES

- Produces a high quality white soap
- Gives a consistent composition
- Uses a well established and cleaner technology for production
- Convenient in soap manufacture
- Reliable supply

TABLE 1 : CHARACTERISTICS OF MALAYSIAN SOAP NOODLES

Product Palm Oil:Palm Kernel Oil	Total Fatty Matter (%)	Moisture (%)	Free Fatty Acids (as palmitic) (%)	Sodium Chloride (%)	Glycerol (%)	Sesquestrants	Titre (°C)
60:40	79-82	10.5-13.0	1.3-2.0	0.4-0.6	0.1-0.2	Present	38-45
60:40/SF5	81-83	10.0-11.0	3.5-4.5	0.4-0.6	0.1-0.2	Present	38-42
60:40/SF7.5	81-83	9.0-11.0	5.5-7.0	0.4-0.6	0.1-0.2	Present	38-42
70:30	79-81	10.5-12.5	1.3 max	0.4-0.6	0.1-0.2	Present	42-44
70:30/SF6	79-81	10.5-12.5	4.5-5.5	0.4-0.6	0.1-0.2	Present	42-44
75:25	79-81	10.5-12.5	1.3 max	0.4-0.6	0.1-0.2	Present	43-45
80:20	79-81	10.5-12.5	1.3 max	0.4-0.6	0.1-0.2	Present	44-47
80:20 SF5	81-82	10.0-11.0	3.5-4.5	0.4-0.6	0.1-0.2	Present	44-46
100:0	79.5-81.5	11.5-13.5	1.3 max	0.4-0.6	-	Present	48-52

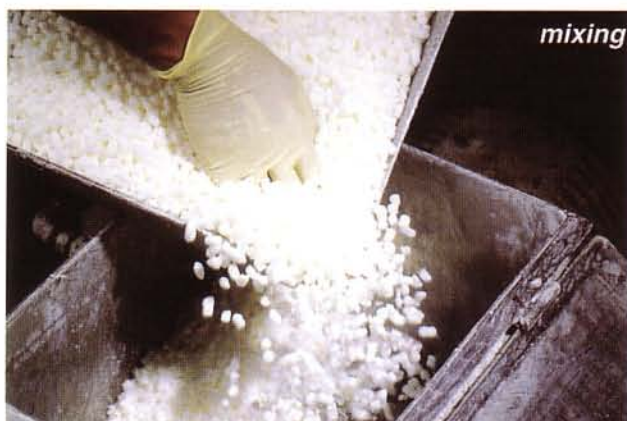
(SF = Super fatted material)

## SOAP FINISHING OPERATIONS

The soap is finished by the incorporation of additives. Various additives can be used to cater to the host of secondary requirements, e.g. fragrance, antiseptic property.

### 1 Mixing (Amalgamator)

The soap base and additive(s) in the requisite quantities are mixed in a primary blend with a scroll type mixer for four to six minutes.



## 2 Milling (Roll mill)

The mixture is passed through a series of rollers to homogenize it. A thin sheet of soap is produced.

## 3 Milling (Extrusion / plodding)

An alternative method of homogenization is to pass the mixture into a large worm screw. Under high pressure, the mixture is churned along the length of the screw and extruded through a perforated end plate. Several thin layers of soap are produced.

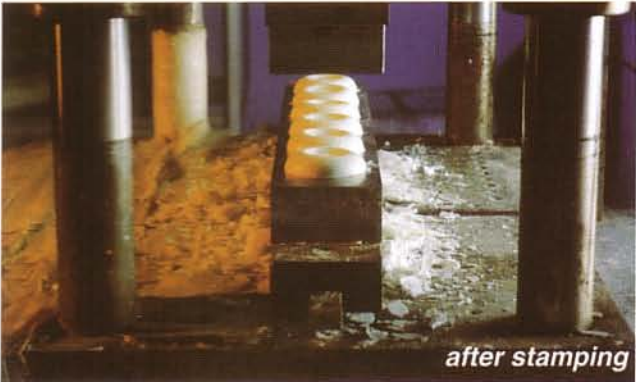


## 4 Extrusion (Plodding)

The homogenized soap is compressed by a large worm screw extruder or plodder. A single large continuous bar of soap is produced, the diameter of which is adjusted to fit the dimensions of the final product.

## 5 Pressing / stamping

The continuous bar of extruded soap is cut and stamped into the final soap bars.



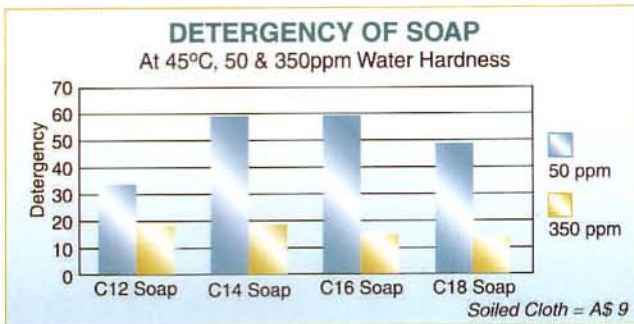
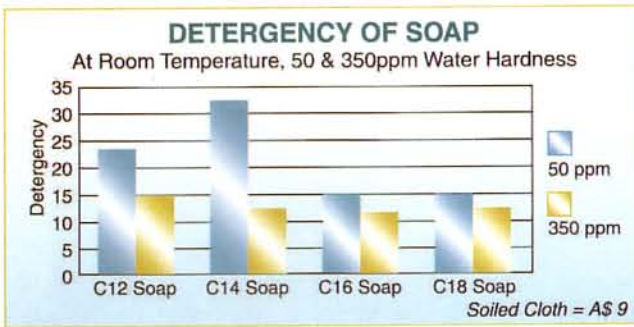
## 6 Wrapping

The soap bars are individually wrapped for the market.



# ADVANTAGES OF PALM-BASED SOAPS

- **Good detergency**



- **Good biodegradation characteristics**

Palm-based soaps biodegrade 84% in 1 day, while alkylbenzene sulfonates (LAS from petroleum-based surfactant) biodegrade only 43% in 5 days.

- **Natural**

Palm-based raw materials are of vegetable origin, which are renewable resources.

- **Acceptable to all religions**

As palm-based raw materials are of vegetable origin, they are acceptable to all religions.

## BASIC PALM-BASED SOAP FORMULATION

• Palm-based soap noodles / chips	86-96%
• Glycerol	1-6%
• Perfume	1-5%
• Colour	1-2%
• Additives	1-5%

## ADDITIVES

The addition of compounds to achieve a desired functionality and/or marketing position has become the prime focus of soap formulators. Below are several additives that give important product differentiation:

- Emollients
- Humectants / moisturisers
- Occlusive agents
- Other functionality ingredients
- Medicaments
- Anti-irritants
- Foam boosters

## SPECIALITY SOAP

### PALM-BASED SOAP WITH GOAT'S MILK

- Palm-based soap noodle
- Glycerol (humectant)
- Functionality ingredient: goat's milk
- Colour
- Perfume

## SOAP PROCESS FLOW CHART

