

PALM-BASED ANIONIC SURFACTANTS

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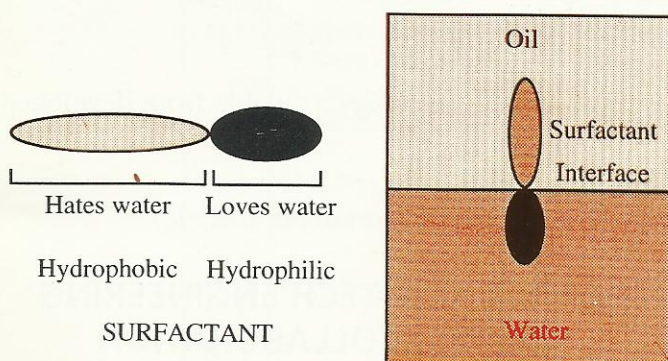
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SURFACTANTS/DETERGENTS

A surface active agent or surfactant is a molecule that has amphiphatic moieties and preferentially sits at an interface between two immiscible media when placed in them. Example:-



Surfactant at oil /water interface

The presence of the molecule at the interface reduces the surface tension and promotes the miscibility of the two media. Because the molecule is active at the interface, it is called surface active agent or in short surfactant. Reduction in the surface tension is the factor contributing towards the desired outcome. Surfactant in laymen term is also known as the active ingredient.

The majority of surfactants used worldwide is produced either from petrochemicals (chemicals derived from petroleum) or oleochemicals (chemicals derived from oils/fats) feedstocks. Examples are as in *Table 1*.

In 1996, the world produced about 9 million tonnes of surfactants. The consumption pattern in the U.S. market, indicated that anionics, nonionics and

Table 1.

SURFACTANTS	PETROCHEMICAL BASED	OLEOCHEMICAL BASED
ANIONICS	<ol style="list-style-type: none"> 1. Linear alkyl benzene sulphonates (LAS or LABS) 2. Alcohol sulphates (FAS or SLS) 3. Alcohol ether sulphonates (FAES or SLES) 4. Alpha-olefin sulphonates (AOS) 	<ol style="list-style-type: none"> 1. Sulphonated methyl ester (SME, MES or ASME) 2. Alcohol sulphates (FAS or SLS) 3. Alcohol ether sulphates (FAES or SLES) 4. Soap
CATIONICS		<ol style="list-style-type: none"> 1. Quaternary ammonium compound (Quats) 2. Esterquats
NONIONICS	<ol style="list-style-type: none"> 1. Nonyl phenol ethoxylates (NPE) 2. Alcohol ethoxylates (FAE) 	<ol style="list-style-type: none"> 1. Alcohol ethoxylates (FAE) 2. Alkyl polyglucosides (APG) 3. Alkanolamides
AMPHOTERICIS		<ol style="list-style-type: none"> 1. Amine oxides 2. Betaines

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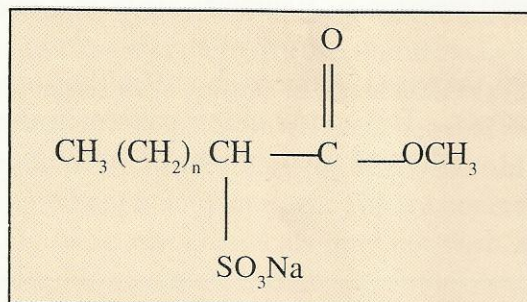


cationics, and others surfactants accounted for 75.5%, 18% and 6.5% respectively. These surfactants are used in various fields of application such as :

- a) Detergent (Liquids, powder and bar)
- b) Personal Care Products (Shower gels/creams, shampoo, toothpastes, shaving creams, *etc.*)
- c) Agro and Industrial Chemicals (Pesticides, plasticizers, deinking, processing aid, *etc.*)

Worldwide, of the total surfactants produced, about 20% are oleochemical based. About 80% of the total surfactants produced worldwide were used in detergents and LAS, FAS, FAE and FAES accounted for 80% of the surfactants used in this area. In 1996, the world consumed about 43 million tonnes of detergents and the amount of surfactants present in the detergent was of the order of 7 million tonnes. Of this, Asia, Africa and South America together consumed about 3 million tonnes of surfactants.

SULPHONATED METHYL ESTER



SME

SME is an anionic surfactant and can be used in detergents.

Advantages of SME are :-

- i) SME has good biodegradation characteristics.
- ii) SME, especially C14 and C16 have good detergency properties, better than LAS, and palm products are rich in C16 chain length.
- iii) SME is not sensitive to water hardness. It can therefore be used as additives to soap, which is highly sensitive to water hardness.

- iv) SME can be produced at a comparable or cheaper price than LAS.
- v) A variety of palm materials can be used for SME production ranging from low quality to high quality raw materials. This possibility makes SME highly versatile.

PROSPECTS FOR MALAYSIA

The prospects for Malaysia to be the producer of surfactants is good due to :-

- i) Strategic location within the Asia Pacific Region.
- ii) Ample supply of raw materials (palm-based oleochemicals).
- iii) Capital Intensive Manufacturing Industry (not labour intensive).
- iv) Machine/Technology available from developed countries.
- v) Government support under IMP-2.

PORIM-GREENTECH ENGINEERING SDN BHD COLLABORATION

Greentech Engineering Sdn Bhd (GESB) was interested to purchase a plant to produce palm based SME and on 3 March, 1994, GESB signed a MoU with PORIM to develop product formulations based on SME. As a result of this initial collaboration not only has there been a better understanding of the potential of the projects but also the insight that a financially strong partner will be required to bring this project to realization.

OBJECTIVE

To produce SME and other palm-based anionic surfactants for local as well as overseas markets. The project structure is as in *Figure 1*.

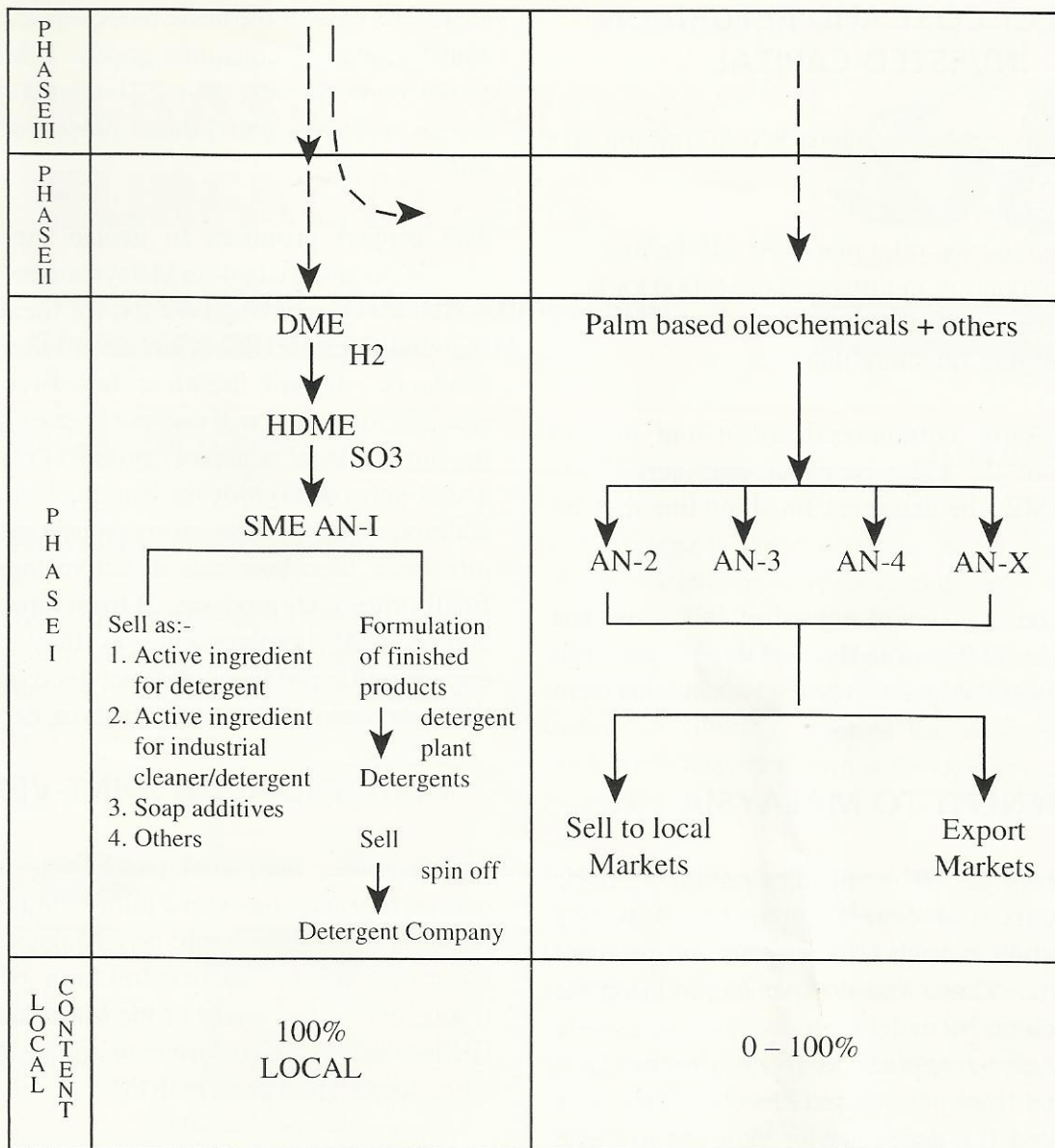


Figure 1. Project Structure.

It is planned to develop the project in three phases. Phase 1, which is crucial for the success of the project will see the erection of :-

- i) A pilot plant to produce SME for trials.
- ii) A 3-tonne/hr sulphonation unit capable of producing:-
SME (of 90% active content) from hardened and distilled methyl esters derived from palm oil and products and other palm based anionic surfactants.
- iii) A batch hardening plant for methyl esters.
Methyl esters are available from local suppliers.
- iv) A detergent finishing line.

MARKETING PLAN

- 1) Pilot plant
 - a) to get market approval of palm based anionic surfactant
 - b) SME development work
- 2) Industrial plant
 - a) Sales of 1a
 - b) Sales of SME

PROJECT COST AND RETURN ON INVESTED CAPITAL

This project is expected to cost RM 40 million and include the cost of :-

- 2 hectares of land
- Sulphonation pilot plant (20 - 40 kg/hr.)
- Sulphonation industrial plant (3000 kg/hr.)
- Hardening plant and
- Detergent finishing line

After successful commercialization and market acceptance of the palm based anionic surfactants including SME the detergent finishing line may be sold off.

The return on investment capital of this project is expected to be 25% within the first three years. The detail feasibility study of this project is available from GESB.

BENEFIT TO MALAYSIA

Currently there are ten companies producing basic oleochemicals and four companies producing consumer products such as detergents and personal care products. These four companies produced the active ingredients for their own use almost exclusively from petroleum-based products. If consumer products manufactured from palm-based oleochemicals were to be promoted, it is necessary for Malaysia to create active ingredient manufacturers. The ten companies producing basic oleochemicals may not wish to be involved in this (downstream) activity due to company policy or need for specialization. The four consumer product manufacturers may not wish to be in this (upstream) activity as it may create competition and reduce the market share they currently enjoy. A gap,

therefore, exist if the basic oleochemicals were to be transformed into consumer goods. If Malaysia were to rely on the current set-up, the transformation may not be realised. This project proposes to close this gap.

The project proposes to utilise the palm basic oleochemicals available in Malaysia to produce anionic surfactants (active ingredients) for local and foreign manufacturers to incorporate in their consumer products. It will therefore benefit oleochemical manufacturers and will also not create competition to the current local consumer products manufacturers. The country shall enjoy the benefits from 1) the value additions obtained as palm oil products are transformed into basic oleochemicals to active ingredients and finally consumer products, 2) from foreign exchange and 3) SMI involvement as they can now be encouraged to produce consumer goods incorporating the palm based anionic surfactants for export markets.

INVITATION FOR JOINT-VENTURE

GESB invites interested party to be an investor/partner for this project on a joint-venture basis. This partner preferably should be a Malaysian company interested to see full exploitation of Malaysian resources for the benefit of the Malaysian economy. GESB will be the lead partner to initiate this project in close cooperation with PORIM.

Interested party are requested to contact :-

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