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In This Issue...

ROLE OF PALM AND LAURIC OILS IN EUROPE

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The Role of Palm and Lauric Oils Within the Oils and Fats Complex in Europe

Europe continues to hold a great potential for Malaysian palm oil. Positive developments include the shift of demand from liquid oils towards harder fats and growth in the industrial food uses of oils. Palm oil's market share will however be determined by its price.

The European market for palm and lauric oils is a complex one and far from uniform. Firstly, from the geographical perspective, the market in Eastern Europe is very different from that in Western Europe.

Secondly, the degree of processing which has been applied to imports has to be factored in. Europe imports large quantities of both crude and processed products and the tariff structure favours crude imports.

Thirdly, there is a substantial trade in oil palm products between the member states of the European Union (EU). Having established itself as the pre-eminent European import port for vegetable oils, Rotterdam is the European point of entry for a large volume of oil destined for other countries. The Netherlands which appears in EU statistics as the single largest importer of palm oil, re-exports a lot of it to other countries.

Fourthly, there is a trade-off at the heart of the role of palm oil in Europe. In certain important applications such as spreads, the growing consumption of rapeseed oil (in partially hydrogenated form) tends to be associated with an increased demand for palm oil which is valued for its palmitic fat content. In other instances, palm oil frequently competes directly with other oils.

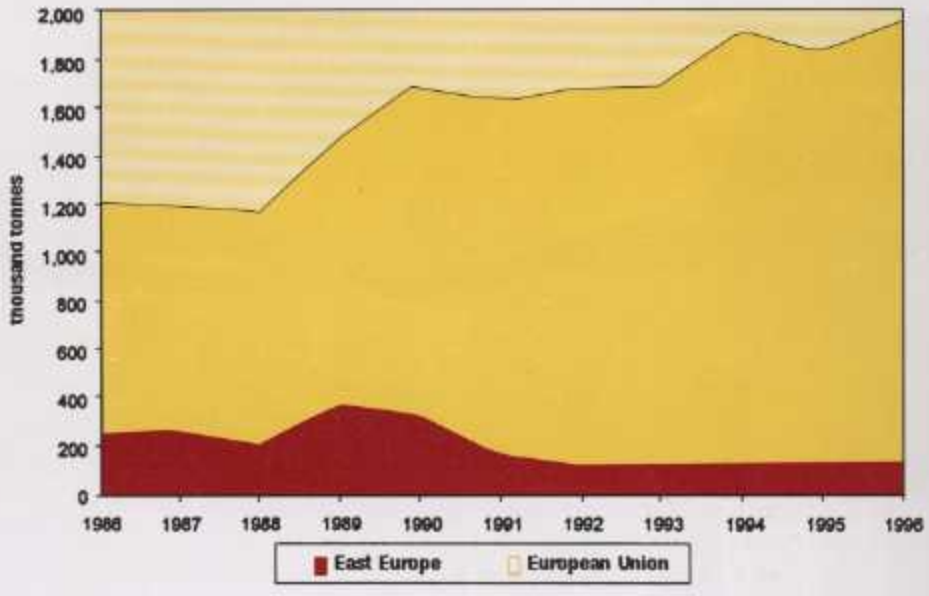
IMPORTS OF PALM AND PALM KERNEL OILS INTO EUROPE

Figures 1 and 2 show that the EU is by far the most important market in Europe. Demand from Eastern Europe has collapsed since the late 1980s in the wake of the severe fall in oil and fat consumption in the former Communist bloc. The figures, which take no account of the growth of indirect imports in the form of oleochemicals, specialty fats or by-products such as palm fatty acid distillates, show impressive increases in palm oil imports in the late 1980s.

EUROPEAN UNION

The important EU market is considered to be led by the Netherlands even though a lot of the oil which is imported through Rotterdam is destined for other countries. The dismantling of internal border controls within the EU makes it difficult to obtain a completely reliable breakdown of the flows of oil between the EU member states. *Figure 3* depicts the net import figures of palm oil into EU member states derived from official statistics.

Figure 1. **Regional Composition of European Palm Oil Imports**



By James Fry
LMC International, England

Extract of paper presented at 9th Annual Palm & Lauric Oils Price Outlook Forum 1998/99 in Kuala Lumpur, Malaysia on March 7, 1998.

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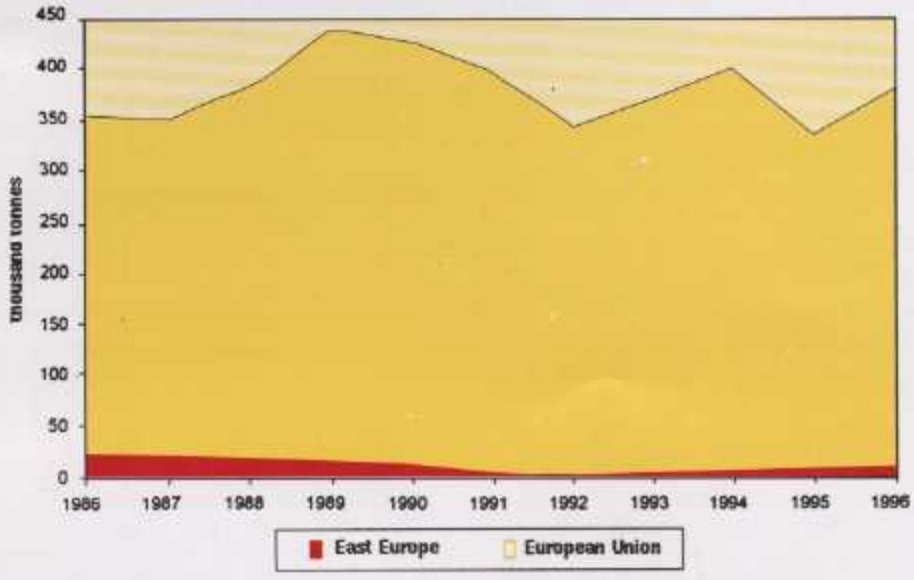
Figure 2. **Regional Composition of European Palm Kernel Oil Imports**



In 1996, the Netherlands was the largest gross importer of palm oil from outside the EU with almost 450,000 tonnes. When its net exports to other states are deducted, its disappearance dropped to approximately 250,000 tonnes. The figures for UK and Germany were just over and under 400,000 tonnes respectively. Italy was the fourth largest consumer absorbing 200,000 tonnes. No other country imported over 100,000 tonnes.

Palm Kernel Oil

Germany was both the largest gross and net importer of palm kernel oil with 140,000 tonnes and 130,000 tonnes respectively. The Netherlands retained only half of its gross imports of over 90,000 tonnes.

Prospects for Further Growth

Figure 4 shows how the year-to-year movement around the trend in palm oil's share of the entire EU vegetable oil sector has reacted to variations in the ratio of the crude palm oil (CPO) price in Rotterdam to the crude soyabean oil (SBO) price in the same location. What stands out is the volatility of the price ratio which varied between a low of 65 percent and a high of over 100 percent when palm oil stood at a premium to soya. The second feature is the rising trend in palm oil's market share from 11 per cent in 1986 to over 16 percent in 1996, and the subsequent tailing off of this growth.

Figure 3. **Imports of Palm Oil by Origin into the EU, by Member State, 1996**

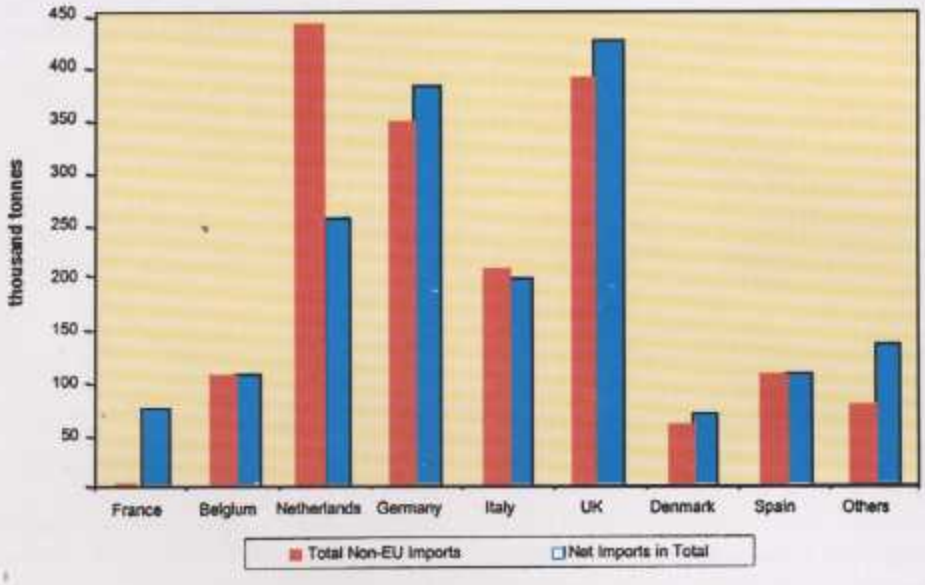
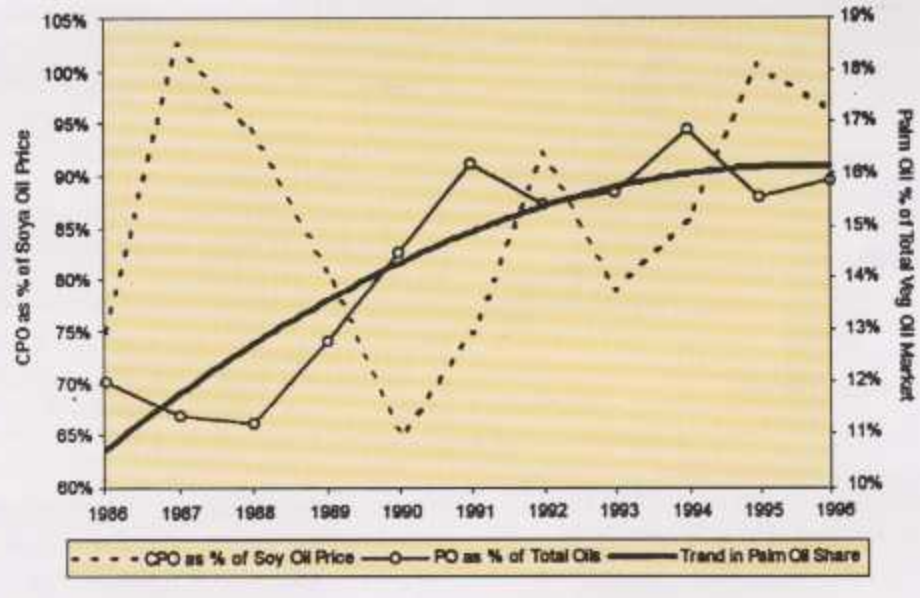


Figure 4. **EU Palm Oil Market Share of Total Vegetable Oil Sector in Relation to CPO/Soyabean Oil Price Ratio**



The third feature is the striking inverse relationship between the price ratio and palm oil's market share. Its market share has been rising and falling in an inverse relationship to its price. Interestingly, the rise in market share occurs a year after the period of the largest palm oil discount and similarly, its market share also falls with the greatest force after a year's delay.

When the CPO price in *Figure 4* is substituted with the price of RBD palm olein, the conclusions are very similar (*Figure 5*). The only difference of significance is that the price ratio for olein in relation to crude soyabean oil has tended to average around 100 percent,

as against 85-90 percent for CPO. On the basis of the curves, the following conclusions are apparent.

If the average European RBD palm olein price is close to parity with crude soyabean oil, and crude palm oil's price is at a 10-15 percent discount, palm oil's share of the EU vegetable oil sector should rise to 16.5-17 percent by 2000.

Palm oil's share has been higher than this in 1994, immediately after a year in which its price was unusually low compared to soyabean oil. With these price-sensitive applications, demand was boosted.

Figure 6 compares palm oil's share with all oils and fats including animal fats and fish oils. One major difference with *Figure 5* is that while palm oil's share of the vegetable oil sector is tending to level off, its share of the entire oils and fats sector is still rising significantly. The movement away from fish oil in margarine and from animal fats in frying has left gaps that palm oil is ideally suited to fill.

In products such as spreads, rapeseed oil is frequently used jointly with palm oil. Adding rapeseed oil's market share as a further curve (*Figure 7*), enables the determination of a complementary or substitution relationship with palm oil. As both the market shares do move in parallel with one another, the effect of complementarity is outweighed by the effect of substitution between these two oils.

Figure 8 shows the share of palm kernel oil in the EU lauric oil market. Users of lauric oils switch between palm kernel and coconut oils, which are very close substitutes, as their Rotterdam price ratio fluctuates.

Each one percent change in the ratio of the crude palm kernel oil (PKO) price to the crude coconut oil (CCO) price causes a one percent change in the PKO share of the combined PKO and CCO sales, in the opposite direction. Over the past decade, the PKO price, on balance, has tended to rise slightly faster than that of CCO. Consequently, PKO's share of lauric oils has fallen in the EU.

The movement away from fish oil in margarine and from animal fats in frying has left gaps that palm oil is ideally suited to fill.

While this may be surprising, given the rapid increase in PKO production worldwide, it is explained by the large and growing share of PKO production being processed into oleochemicals or specialty fats at origin. Exports of PKO to Europe are increasing indirectly in such value-added products.

Figure 5. **EU Palm Oil Market Share of Total Vegetable Oil Sector in Relation to RBD Palm Olein/Soyabean Oil Price Ratio**

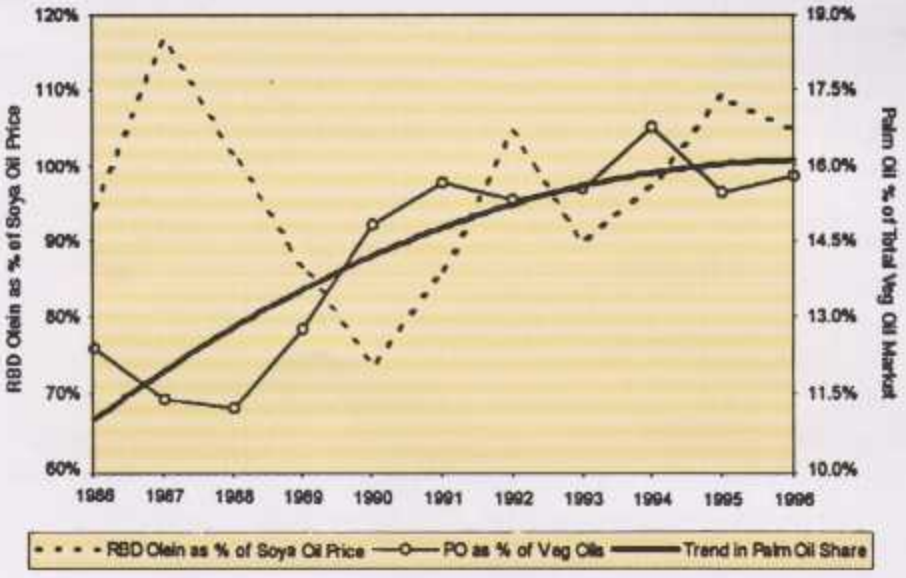
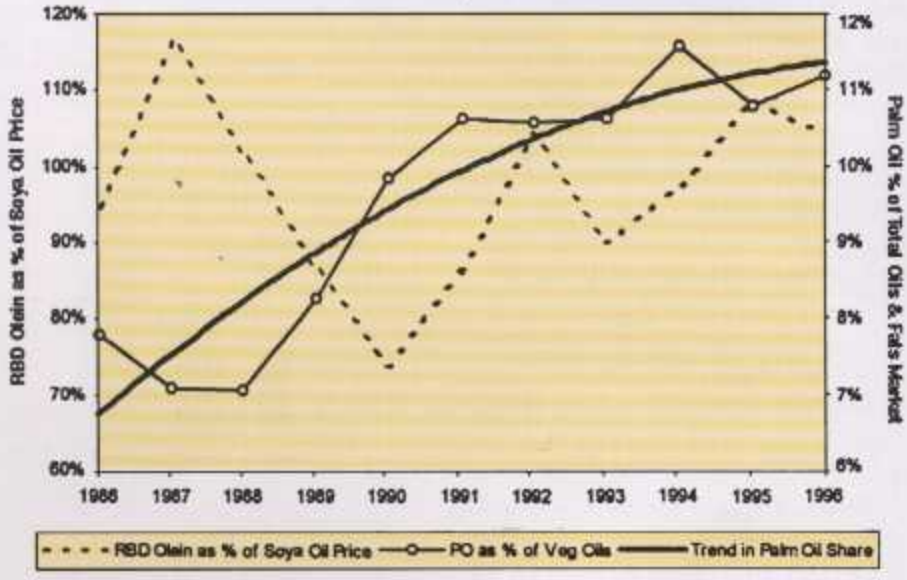


Figure 6. **EU Palm Oil Market Share of Total Oils & Fats Sector in Relation to RBD Palm Olein/Soyabean Oil Price Ratio**



EASTERN EUROPE

The slump in imports in Eastern Europe has been confined primarily to the former Soviet Union, the major outlet for palm oil in the region. Almost 350,000 tonnes of Soviet sales has been lost in 1989 and from 1992 to 1996. The loss was compensated by the doubling of sales to the other countries in the region.

PKO sales to East Europe are very much smaller, and have traced out a good recovery after the virtual disappearance of imports in 1993.

Where Eastern Europe is concerned there is a clear inverse relationship between price ratio and palm oil's mar-

ket share. There is again an indication that market share reacts with a slight lag to price movements. While the trend of palm oil's share has been downwards, the situation has improved since 1994.

Despite palm oil's higher price in that year compared to soyabean oil, its share was very stable at about 1.9 percent of the overall market. This holds out the prospect that palm oil's underlying trend, which will manifest itself once its price competitiveness is resumed, is now upwards (*Figure 9*).

The lauric oil relationship however does not behave as one might predict. The market share of PKO gives little indication of its price competitiveness being related systematically to CCO. After the sharp decline of its share in the early 1990s, it has regained and exceeded the levels of a decade ago.

As the industrial food uses of oils are the growth segments in the European market, the underlying upward trend of palm oil's market share will not be reversed.

CONCLUSION

Price has played and will continue to play a major role in determining the trend in the market share of palm oil. Provided palm oil prices do not become uncompetitive for long periods, palm oil is far from saturating the potential market. As one moves from Southern to Northern Europe, the demand for oils shifts increasingly away from liquid oils for household use, towards harder fats. In these applications, palm oil competes very effectively with partially hydrogenated locally produced oils.

As the industrial food uses of oils are the growth segments in the European market, as in the rest of the world, there is no reason to suppose that the underlying upward trend of palm oil's market share will be reversed.

Figure 7. **EU Palm Oil Market Share of Total Vegetable Oil Sector in Relation to Rapeseed Oil Share and the RBD Palm Olein/Soyabean Oil Price Ratio**

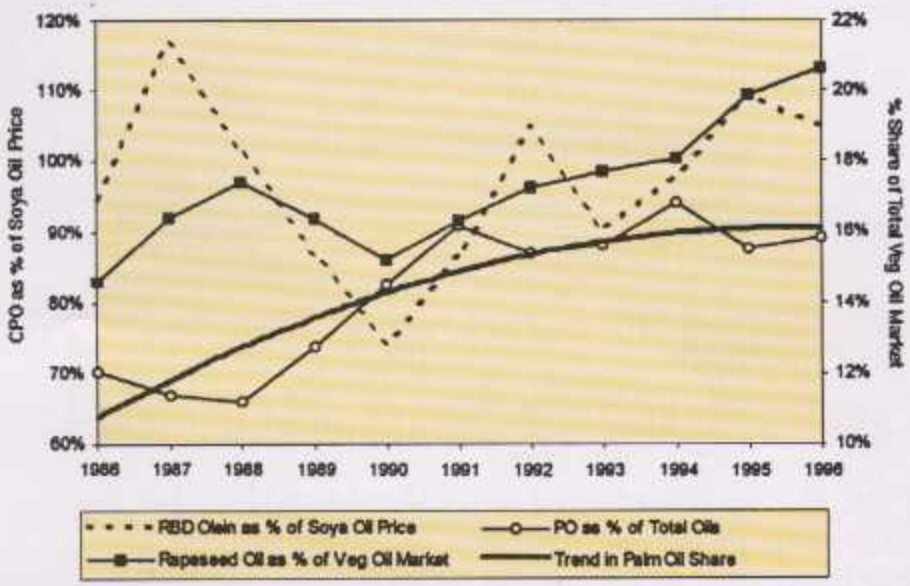


Figure 8. **EU Palm Kernel Oil Market Share of Total Lauric Oil Sector in Relation to PKO/Coconut Oil Price Ratio**

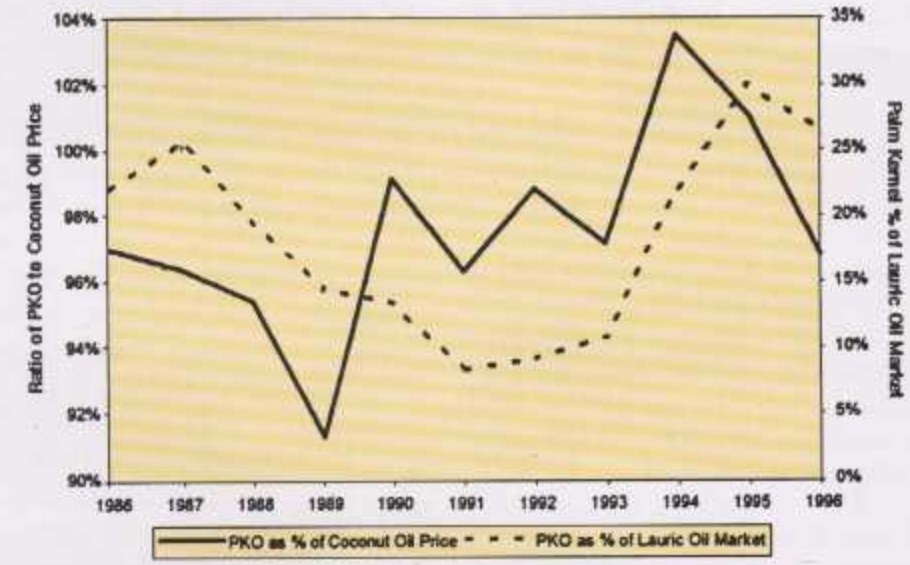
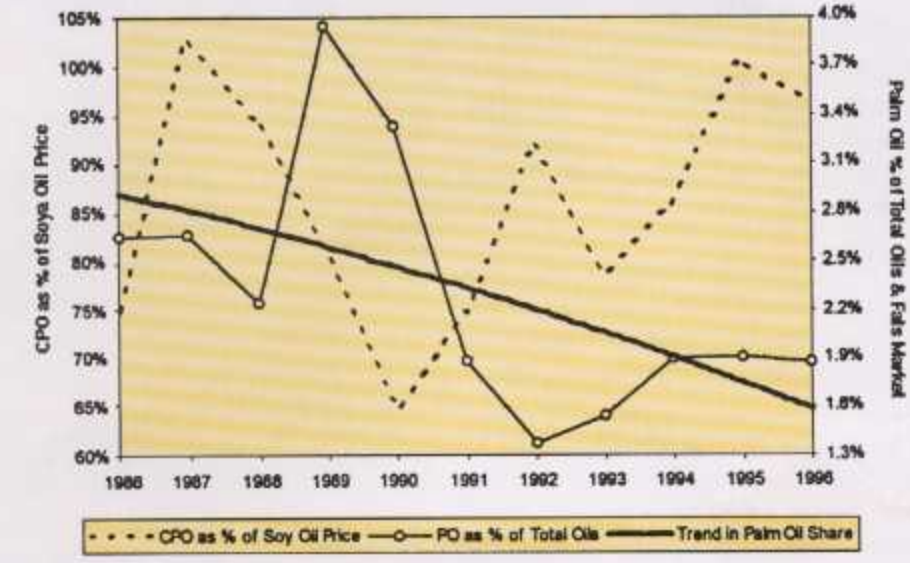


Figure 9. **East European Palm Oil Market Share of Total Oils & Fats Sector in Relation to the CPO/Soyabean Oil Price Ratio**



Research Highlights

PORIM Develops Palm Oil-based Pourable Margarine

PORIM has developed a pourable margarine by blending palm oil products with liquid oils. Performance tests on the margarines were based on their pourability, viscosity, spreadability and emulsion stability at various temperatures. At 23°C the pourable margarine has performance characteristics comparable to those of a commercial product.

Margarine is conventionally used as an ingredient in cakes, fried products and icing. Also consumed with bread, margarine is usually packed in cartons, cans, tubs or packets. As these forms of packaging may occasionally prove inconvenient to the users, the ability to squeeze or pour margarine directly into the food products provides a more convenient alternative.

A pourable margarine – a margarine in fluid form – provides such an alternative. It can be poured out from its container. Like conventional margarine, pourable margarine contains 80 percent fat. However, its formulation differs from conventional margarine by having a higher amount of liquid oil. It is the oils and fats which influence the behaviour of the margarine.

Palm oil and its fractions are commonly used as components in conventional margarine, and in industrial and household table margarines in particular. Palm olein, the liquid fraction of palm oil, has proven to be a suitable ingredient for the formulation of pourable margarine. Its favourable physico-chemical characteristics produce the desired consistency required for a pourable margarine when processed in a correct manner.

This article is based on PORIM's TT No. 50 issue (June 1998) by Miskandar Mat Sahri and Mohd Suria Affandi Yusof

INGREDIENTS

To maintain fluidity and prevent emulsion break, a pourable margarine has to have a higher amount of liquid oil with its solid fat content below a defined level. Ingredients which can be used in formulations to produce such a product are palm oil, palm olein, soyabean oil, sunflower oil, palm kernel olein, palm kernel oil, emulsifiers, water, salt, skim milk, stabilisers, vitamins, antioxidants, antimould agents, colouring agents and flavouring agents.

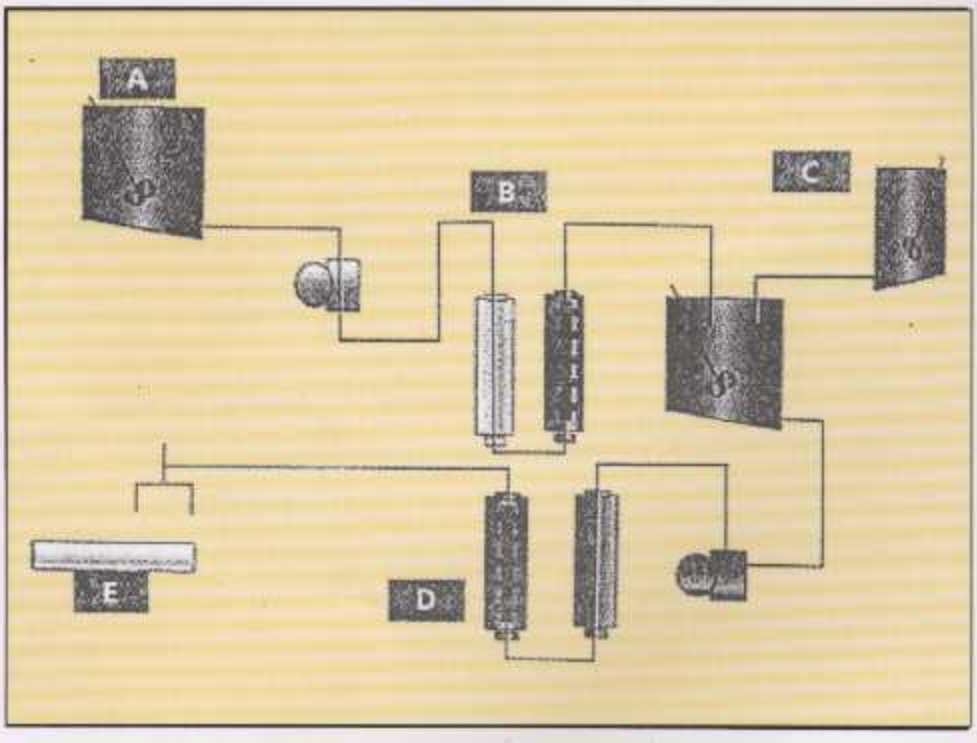
THE PROCESS (*Figure 1*)

After a fat blend and fat soluble ingredients are mixed thoroughly (A), the oil/fat phase is fed into the scrape surface heat exchanger for rapid chilling (B). The aqueous phase is added and mixed thoroughly into the oil/fat phase (C). The emulsion is then fed into the pin worker units (D), packed (E), tempered and packaged for shipment.

ECONOMIC FEASIBILITY

Pourable margarine can be produced by using a basic margarine making unit. To be modified for producing pourable margarine, a 1500 kg/hour capacity plant requires an investment of RM400,000. With the enhancement, the same plant will be able to increase its production capacity to 1800 to 2000 kg/hour.

Figure 1. **Flow Chart for Processing Pourable Margarine**



Fabric Softening Agents – A Gentle, Economical and Safer Future for Fabric Treatment

Softeners in the market do not possess all the desired characteristics. As a result, the search for more compatible high-performance softeners is still on. In a competitive environment, surfactants and cationic softening agents which are gentle, economical and environment-friendly will have a competitive edge. As a vegetable-based product, and with a content of saturated fatty acids similar to tallow, palm oil has the potential to become the most widely used raw material in the fabric softener industry.

Based on an article by Zainab Idris which appeared in Palm Oil Developments No. 25

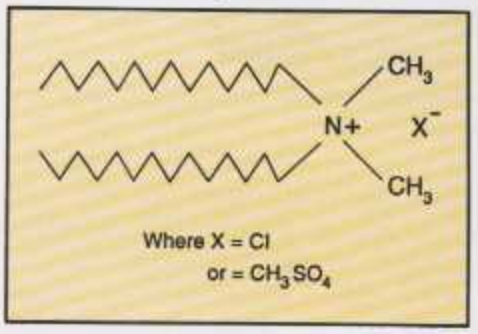
The use of fabric softeners is accepted in all modern domestic fabric washing procedures. The fabric softening agents widely used now are nitrogen-containing cationic compounds. These molecules are unique as they contain a positively charged nitrogen atom and at least one long chain hydrophobic alkyl group derived from animal fats or vegetable oils containing 16-18 carbon atoms.

The existence of positively charged nitrogen atoms leads to a marked difference in the nature of the surface active properties compared to the anionic and nonionic compounds. The positively charged nitrogen atom enables the molecule to be absorbed onto negatively charged surfaces, making it substantive. Also, positively charged fabric softening agents possess antistatic properties. The effect is to neutralise electrostatic changes on modern synthetic fibres which cause garments to cling during wear. The charged fabrics also attract dirt particles which soil them.

The substantivity allows cationic softening agents to be widely used in fabric treatment as well as in other products which are dependent on the structure of cationic materials. These include hair care products, biocides/ fungicides/ disinfectants, foaming and wetting agents, household cleansing products, mineral processing agents, organophilic clays, mixing and anticaking agents and corrosion inhibitors.

In the fabric softener industry, the oldest and most widely used cationic surfactant is dialkyl dimethyl ammonium chloride (*Figure 1*) derived from tallow-based fatty acids. However, to satisfy consumer demand and stringent environmental regulations, there is constant search for newer and better fabric softeners.

Figure 1. **The Structure of Two Common Types of Dialkyl Dimethyl Quaternary Ammonium Compounds**



The ideal softener is expected to possess the following characteristics:

- Good rewetting properties
- Stable and highly-active
- Easy-to-pour
- No effect on fabric colour
- Compatibility with other surfactants
- Ecologically-friendly

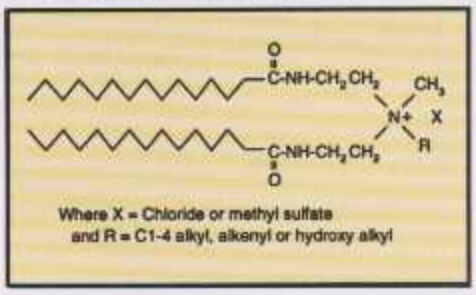
None of the softening agents in the market at present have all these features. Each of the agents, while having a unique quality, lacks in the other characteristics.

The various types of softening agents in the market are:

Dialkyl Dimethyl Quaternary Ammonium Compounds (DADQAC)

The first household fabric softener introduced in the market, DADQAC only imparts superior softening in hot water. Conventionally, these alkyl radicals are derived from tallow, hydrogenated tallow and palm oil products. Softeners based on DADQAC are normally added during the final rinse and sold in aqueous form at a concentration of four to six percent.

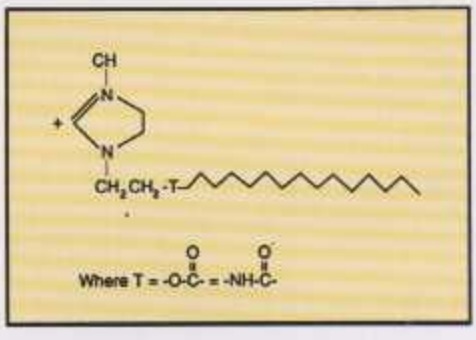
Figure 2. **General Structure of Diamidoamine Quaternaries**



Diamidoamine Quaternaries (DAAQ) (*Figure 2*)

These are the next major group of softeners available. Derived from tallow or hydrogenated tallow, they are both cheap and easy to formulate. With their good rewetting characteristics and liquid form at room temperature, DAAQ are the products of choice in a cold water system. Unfortunately they do not perform well.

Figure 3. **Two Types of Fatty Imidazoline Quaternaries**



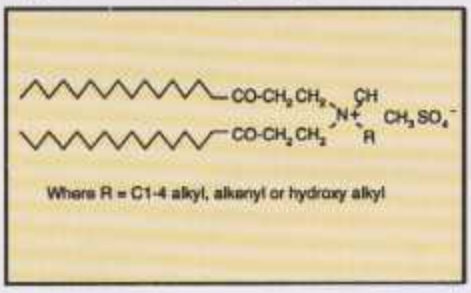
Fatty Imidazolinium Quaternaries (FIQ) (*Figure 3*)

These were developed to improve the performance of DADQAC and DAAQ. FIQ softening agents are best used for controlling static charge on synthetic fibres or synthetic fibres mixed with cotton.

Diesterquats Quaternaries (DEQ)

Concerns about DADQAC's poor biodegradability during sewage treatment led to the development of DEQ, a new class of softening agents. Similar to DADQAC, DEQ's (*Figure 4*) unique difference is that it contains at least one ester group between the long alkyl chain and the cationic nitrogen core. The ester group provides a potential breaking point for the molecule to form fatty acids which then break down into carbon dioxide and a remaining cationic fragment.

Figure 4. **Diesterquats Quaternaries**



DEQ's other advantage is its ease in formulating stable concentrated products containing 25 percent active ingredient and even superconcentrates with 50 percent active ingredient. This reduces the packaging required. DEQ's drawback is that it can hydrolyse during prolonged storage. To improve its stability, the pH of the final product is maintained between 2-3.5 by adding a suitable pH buffer.

OTHER CRITERIA IN CHOOSING SOFTENER INGREDIENTS

As none of the materials used in softeners are perfect in performance, the best formula is a blend of two or more ingredients to give synergistic benefits. In summary, the materials exhibit superior softening performance but fail to fulfil the requirements for static control. This shortcoming can often be overcome by blending with FIQ.

Another important factor besides the nature of the agent, is the source of the alkyl chain. Tallow based products are known to perform best and are more cost effective. They contain highly saturated fatty acids which are often required to minimise colouration and odour. However, unsaturated fatty acids are also important when cost, handling ease and highly concentrate formulations are concerned.

As per demand, the trend is now towards vegetable-based products, particularly palm oil. Such products offer various advantages. Palm oil is available in abundance as a raw material. More importantly, their abundance would ensure a regular and continuous supply of raw material in the future. Having almost an equivalent amount of saturated fatty acids as tallow (*Table 1*), palm oil has the potential to become the most widely used raw material in the fabric softener industry.

Table 1. **Fatty Acid Composition of Palm Oil, Palm Stearin and Tallow**

Carbon No.	Palm oil	Palm stearin	Tallow
C6	–	–	–
C8	–	–	–
C10	–	–	–
C12	0.2	0.3	–
C14	1.1	1.3	2.5
C16	44.0	55.0	26.6
C18	4.5	5.1	21.8
C18:1	39.2	29.5	42.8
C18:2	10.1	7.4	2.3
IV	53.3	35.5	25.48

A range of fabric softeners available to the consumer

India – Maintaining Palm Oil's Lead Position

Palm oil is the main edible oil imported into India. Price remains the determining factor on the import balance of palm oil compared to the other oils.

Oil World statistics indicate that India has the largest harvested area for oilseeds i.e. 36.64 million hectares. However, India's oilseed yields average 0.66 tonne/ha compared to the world average of 1.44 tonnes/ha.

India ranks third in the world in terms of oilseeds production and fifth in terms of oils and fats production.

India, therefore, ranks third in the world in terms of oilseed production and fifth in terms of total oils and fats production. India's main oilseeds, i.e. groundnut, rape/mustard, soyabean and sunflowerseed account for about 90 percent of the country's oilseed production.

India's oils and fats production has not been able to keep pace with the relatively large demand for oils and fats in the country. Estimates indicate that while the oils and fats output grew at about two percent per annum over the past four years (1993-1997), consumption has grown at some seven percent per annum.

Based on these trends, India is expected to require about nine million tonnes of oils and fats for this oil year (Nov. 97/Oct. 98) while production is estimated at about 7.1 million tonnes. While the import requirements to meet the expected shortfall should be about two million tonnes, actual imports are expected to be around 1.6 million tonnes only.

Price will be the main factor determining the balance between palm olein and other oils.

The Indian authorities have embarked on several measures to achieve self-sufficiency in oilseeds and edible oils production. However, these measures have met with only limited success mainly due to the low profitability of oilseed cultivation in India. India therefore remains a net importer of edible oils.

While import requirements to meet the shortfall are approximately 2 million tonnes, actual imports are estimated to be 1.7 million.

Table 1. **India: Imports of Oils & Fats (thousand tonnes)**

	January – December				
Oil/Fat	1993	1994	1995	1996	1997
Soyabean	78.8	65.5	178.7	53.6	81.6
Cottonseed	–	–	41.1	31.7	25.4
Sunflower	–	–	86.9	144.7	412.4
Rapeseed	26.5	24.9	23.1	19.1	23.0
Palm	150.5	407.8	863.1	1,253.9	1,465.3
Other Vegetable *	18.8	10.2	6.4	9.5	35.8
Butter	1.3	2.7	2.8	–	2.1
Tallow & Grease	0.5	0.5	2.5	0.9	2.4
Total	276.4	511.6	1,204.6	1,513.4	2,025.0

Source: Oil World Annual, 1998
(*) Other vegetable oils include groundnut oil, palm kernel oil, coconut oil and linseed oil

This article is based on a TAS Country Study by Nagendran Balasundram

In Brief

Agreement to Market *Trans* Free Pourable Margarine

As part of its continuous efforts to increase the use of palm oil-based food, PORIM has developed a *trans* free pourable margarine. This margarine is squeezed out from flexible packaging instead of being scooped from carton packages and spread out.

On August 28, PORIM and a private company, Wise Innovations Sdn Bhd (WI), signed an agreement for WI to produce and market the margarine in Malaysia and abroad. Under the agreement, PORIM will transfer technology to WI for the purpose of commercialising the product.

WI expects to have the margarine on Malaysian shelves by mid-1999, said its Executive Director, Askiah Adam.

She added: "WI will also undertake substantial marketing efforts to educate the public on the new way of taking margarine."

The agreement between PORIM and WI involves continuous research by PORIM on the product's shelf life and taste formulation, while WI acquires the exclusive rights to undertake market assessment and production of the margarine.

"WI plans to invest about RM20 million in the first year of operation during which it would acquire imported production and packaging machinery," said Askiah. Large expenditure would also be incurred in marketing the product.

In its first year of sales, WI hopes to capture five percent of the local premium margarine market which is worth RM230 million annually. Overseas markets targeted are China and the Middle East.

Codex Committee Unable to Agree on Labelling for Genetically Modified Foods

The Codex Committee on Food Labelling could not reach agreement on what, if any, labelling to be required on food products produced through biotechnology.

The Committee at its meeting in Ottawa, Canada on May 26-29, however, did make progress on other issues such as organic products and foods that can cause hypersensitivity.

The debate on the labelling of genetically modified products generally pit the United States against the rest of the world. Brazil is one of the few delegations to have come out strongly in favour of the position advocated by the United States and Canada, that labelling be only restricted to products in which biotechnology had made significant compositional changes.

The Brazilian delegation argued there is no need to label biotech foods if they are essentially the same as conventional foods and contain no health hazards. The delegation stressed the importance of modified foods, emphasising that biotechnology offers the potential to produce more and better food for the world without extensive reliance on chemicals at the production and processing stages. The Brazilian delegation however emphasised that novel foods, whether produced by biotechnology or not, should be labelled.

The Codex Committee agreed that the issue of labelling novel foods needed to be discussed further.

Contributed by T.Thiagarajan

Opposition to Genetically Modified Foods in the US

While the current primary concern of the United States agri-food industry is to get the European Union to approve its genetically modified foods (GMF), it finds itself facing challenges at home.

Food Chemical News says that a combination of consumer groups, scientists and religious leaders has taken legal action against the Food and Drug Administration (FDA). They are demanding safety testing and mandatory labelling for all GMF. Specifically mentioned in the lawsuit are 36 different GMF including soyabean, corn, potato and tomato which are sold in the US without any labelling.

Recent estimates show that about 18 percent of the US soyabean harvest in 1997 was genetically modified.

Contributed by T.P. Pantzaris and Mohd. Jaaffar Ahmad

Palm Oil Industry's Zero-Waste Concept a Reality, Says PORIM

PORIM's special publication "Oil Palm and the Environment" says that the zero-waste concept in the palm oil industry is a reality.

The palm oil industry's commitment for a cleaner environment has led to the industry being eco-friendly from the plantation to refinery, it says.

The report attributed the eco-friendly nature of the industry to co-operation between the public and private sectors.

For example, the achievement in controlling Palm Oil Mill Effluent (POME) bears testimony to the seriousness of both the public and private sectors to make the palm oil industry greener.

From an initial oxygen demand (BOD) of 25,000 ppm in untreated POME, the load was reduced to 5,000 ppm in the

first generation of equipment, and down to 100 ppm at present.

The report says that the bold steps taken in dealing with mill by-products have paid dividends in two main ways. Firstly, the country's waterways were made cleaner, and secondly, various by-products had resulted from the treatment of wastes.

For instance, POME in its raw or treated form contains high levels of plant nutrients. Studies have shown that its application to oil palm is beneficial with tremendous savings in fertiliser costs.

The anaerobic digestion of POME also produces a valuable product – biogas. Tremendous savings in fuel can be obtained if the biogas is harnessed for heat and electricity generation.

With regard to refinery effluents (PORE), the report said that their treatment has reached a stage where the BOD can be brought down to as low as 50 ppm before final discharge.

Utilising agricultural waste materials to generate energy

Agriculture and wood based industries have been urged to convert their waste materials into energy.

"Waste materials produced can be used to generate 10 percent of Malaysia's total energy needs," said Mr Lu of Malaysia's Standards Institute, SIRIM.

"With the use of efficient technology, the figure can be even higher," he added.

Lu said the national demand for energy can also be reduced if agriculture and wood based industries use their residue or waste materials such as padi husk, bark or wood shavings to produce power for their own needs.

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