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In This Issue...

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Hand and Body Lotion From Medium Chain Triglycerides

By

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Oil palm fruits

he success achieved in a resource based industry, such as the oil palm industry, is an important factor contributing towards Malaysia's march towards the industrial world. The oil palm was first introduced into Malaysia in 1870 (Jaaffar, 1994). The first commercial planting of oil palm was started in 1917 and by 1960, oil palm plantations were a common scenery in Malaysia. Since then, the industry has experienced one success after another. Starting from the plantation activities in 1960's, the industry evolved into milling, refining, food processing and currently oleochemicals. To ensure the continuous growth of the industry, a future strategy for the oil palm industry involves the development of higher income, zero waste and value addition products (PORIM's strategic plan, 1995).

This paper presents recent progress of the oleochemical industry in Malaysia and highlights one of the R&D activities undertaken at the Palm Oil Research Institute of Malaysia (PORIM) in an attempt to promote down-stream processing of oleochemicals with respect to value addition.

Palm Oil and Palm Kernel Oil

Crude palm oil and palm kernel oil are two different types of oils/fats which can be extracted from the fruit of the oil palm (*Elaeis guineensis*). Semi solid at room temperature, these crude oils/fats can be fractionated into solid and liquid fractions. They are known as crude stearin and olein respectively. The crude palm oil, palm kernel oil, stearin and olein can also be processed, through physical and chemical refining, to yield either refined, bleached and deodorized (RBD)or neutralized, bleached and deodorized (NBD) palm oil, palm kernel oil, stearins or oleins respectively. Combination of these processes lead to various types of palm oil and palm kernel oil products (PPKOP hereafter).

The fatty acid compositions (FAC) of palm oil, palm kernel oil, and their fractions are given in *Table 1*. Values for tallow, coconut oil and soya bean oil are also given for comparison. The similarities in FAC between palm oil and palm stearin to tallow and palm kernel oil and palm kernel olein to coconut oil are evident.

Oleochemical Industry in Malaysia

Chemicals derived from oils/fats are known as oleochemicals. The developed countries such as USA, Europe and Japan have been the principal regions for the production of oleochemicals and derivatives. The traditional raw materials used for the production of these oleochemicals have been tallow, for 16 and 18 hydrocarbon chain lengths and coconut oil, for 12 and 14 hydrocarbon chain lengths (C16, C18, C12 and C14 hereafter).

Oleochemicals are used in various fields of applications and these four hydrocarbon species are normally required for specialized functions. While C16 and C18 products can be derived from tallow, and are produced adequately by the developed countries such as USA and Europe, they however, need to rely on the Philippines' coconut oil for the supply of C12 and C14. However, unpredictable weather could not ensure constant and/or enough supply of lauric oils (C12 and C14) and hence new sources need to be found. Malaysia has since received the greatest attention due to its palm kernel oil; a lauric oil produced as a "by-product" of the palm oil industry.

Although the first oleochemical company was started by a local firm in 1979, it was not long before the developed countries realised the full potential of what Malaysia has to offer. Many multinational companies (MNC) decided to relocate their production plants close to the source of raw materials and within less than ten years, the oleochemical industry mushroomed in Malaysia.

Joint ventures between the MNC and local PPKOP producers became a natural phenomenon. This practice, not only ensured a constant supply of raw materials (especially lauric oils) but also exploited the benefits to be gained due to economy of scale, access to capital investment, latest technologies and captive markets.

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Table 1. The Fatty Acid Composition of Selected Oils/Fats

Fatty Acid	Weight Percentage							
	Palm Oil	Palm Stearin	Tallow	Palm Kernel Oil	Palm Kernel Olein	Coconut Oil	Palm Olein	Soya bean Oil
C6	-	-	-	0.3	0.4	0.2	-	-
C8	-	-	-	4.4	5.4	8.0	-	-
C10	-	-	-	3.7	3.9	7.0	-	-
C12	0.2	0.3	-	48.3	41.5	48.2	0.2	-
C14	1.1	1.3	2.5	15.6	11.8	18.0	1.0	-
C16	44.0	55.0	26.6	7.8	8.4	8.5	39.8	6.5
C18	4.5	5.1	21.8	2.0	2.4	2.3	4.4	4.2
C18:1	39.2	29.5	42.8	15.1	22.8	5.7	42.5	28.0
C18:2	10.1	7.4	2.3	2.7	3.3	2.1	11.2	52.6
Others	0.8	0.7	4.0	0.1	0.1	-	0.9	8.0
I.V.	53.3	35.5	35-48	17.8	25.5	9.5	58.4	133
SAP. V	196	199	195	245	-	256	198	192

Table 2. Oleochemicals & Soap Production in Malaysia VS - Industrial Master Plan Targets (IMP) (X 1000 Metric Tonnes)

Oleochemicals	1990	1994	1995 IMP	2000 IMP
Fatty Acids	135	523	462	560
Fatty methyl ester	63	208	50	70
Fatty esters	10	25	30	40
Fatty alcohols	30	115	168	350
Fatty nitrogen compounds	-	10	30	60
Glycerol	24	80[a]	67	120
Metallic soap	-	5	-	-
TOTAL	262	886*	807	1200
WORLD	4417	-	5264	6098
Soap noodles	-	160	-	235

[a] approximate

* Total for 1994 does not include 80 000 tonnes of Glycerol

Note :
1. The actual capacity for 1994 had already exceeded the target for 1995 by the IMP.
2. Many oleochemicals companies are putting up facilities to produce soap noodles and these could be a potential area for specialization.

Consequently, the capacities for the production of basic oleochemicals such as fatty acids, fatty methyl ester, other fatty alkyl esters, fatty alcohols, nitrogen compounds and glycerol rose from 260 000 tonnes in 1990 (Yusof *et al.*, 1992) to 886 000 tonnes in 1994. The capacity for 1994 exceeded the target set by the country's Industrial Master Plan of 807 000 tonnes for 1995. Product specialization such as soap noodles, which was not focussed in Industrial Master Plan has also been successfully attempted (*Table* 2).

Basic oleochemicals are normally processed into downstream products before they are used in various applications. *Table* 3 indicates that currently about 90% of the basic oleochemicals produced in Malaysia are exported to the countries outside the ASEAN region for downstream processing. Some of these are reexported to Malaysia in the form of finished products which fetch high added values.

Malaysia and Asia Pacific Region

In the developed countries, the demand for basic

Table 3. Intra ASEAN Oleochemicals Trade in 1991 In Basic Oleochemicals (US$ X 1000)

From	To Indonesia	Malaysia	Philippines	Singapore	Thailand	Total Export to ASEAN	Overall Export Total	% Export to ASEAN (-Singapore)
a. Indonesia	XXX	1828	308	7463	918	10516	29173	10.5
b. Malaysia	1260	XXX	5348	8281	3234	18123	77869	12.6
c. Philippines	1520	652	XXX	2184	564	4920	51570	5.3
d. Singapore	0	1061	33	XXX	87	1181	f	0
e. Thailand	0	0	17	1	XXX	19	189	9.5
Total Imports :	2780	3541	5706	17929	4803	34759	158801	0

a. Export data reported in US$
b. 1 US$ = RM 2.76
e. 1 US$ = baht 25.5
d. Singapore acts primarily as a transhipment port
f. Singapore data are uncertain

Source : ESCAP
Oleochemicals in the ESCAP Region, Production, Market Structure and Trade Potential

oleochemicals is expected to be stagnant in the future (Economic and Social Commission for Asia and the Pacific, 1994). This is not so however for the Asia Pacific region which supports a population of 2.8 billion (Blum, 1994) with Malaysia in the heart of it. Some of the countries in this region have strong GDP growth (*Table 4*). Malaysia is strategically located to further exploit the market expansion expected in this region owing to the country's sustained economic growth, political stability, and the availability of semi-skilled to skilled labour. The common usage and understanding of the English language by the population at large is also an important contributory factor towards the success of the industry's joint ventures.

Table 4. ASEAN Country Economic Indicators, 1996 (US$)

Country	GDP/ Capita	Current GDP (US $bn)	GDP Growth
Japan	21,350	2,668	2.5
Hong Kong	23,080	140	4,2
Singapore	21,493	66	9.1
Taiwan	13,235	279	6.0
Korea	10,534	468	6.8
Malaysia	8,763	171	9.3
Thailand	6,870	408	8.5
Indonesia	3,690	709	8.1
China, norm	2,660	3,172	9.8

Source : Asiaweek, May 10,1996

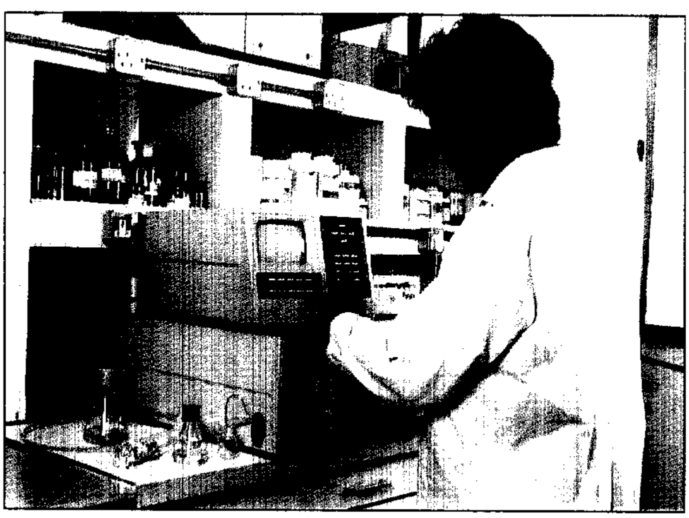
R & D Activities in PORIM

Palm Oil Research Institute of Malaysia (PORIM) is a statutory body established by the Malaysian Government to support the growth and wellbeing of the oil palm industry through research, development and services. Realising the advantage of the enourmous market potential and the high value addition that can be obtained by going into downstream activities, PORIM stepped up its R&D activities in the downstream processing of basic oleochemicals. An Advanced Oleochemical Technology Center (AOTC) was recently established in PORIM to further develop the downstream processing of oleochemicals.

As cosmetic accounts for the second largest consumption of oleochemicals after detergents, this article shall now illustrate the type of R&D activities taking place in AOTC, PORIM, in the cosmetics area.

Palm Kernel Oil Based Oleochemicals and Medium Chain Fatty Acids

The oleochemical industry in Malaysia has had a phenomenal growth rate due to several factors which include the availability of raw materials especially the lauric palm kernel oil. Lauric oils are needed for the supply of C12 and C14 fatty chain lengths which when converted into surfactants exhibit notable properties such as good foaming, good detergency and mildness. These are important properties to be taken into consideration when C12 and C14 are applied in several applications such as detergent, personal care products and cosmetics.



PORIM's research activities

Besides having some fatty acids of longer than C14, palm kernel oil, palm kernel olein and coconut oil also contain significant amounts of medium chain length fatty acids such as caproic (C6), caprylic (C8) and capric (C10). The amounts of both C8 and C10 present in palm kernel oil, palm kernel olein and coconut oil are 8.1%, 9.3% and 15% respectively (*Table 1*).

In the above-mentioned applications, medium chain fatty acids tend to cause skin and eye irritation due to their volatility. Oleochemical producers therefore, normally "stripped off" these medium chain fatty acids from the C12 and C14 fractions. Thus medium chain fatty acids were once considered as by-product of the oleochemical industry.

In 1993, the Malaysian Oleochemical Manufacturers consumed about 376 000 tonnes of palm kernel oil (Business Times, 1994). This implies that about 25 000 tonnes of medium chain fatty acids are produced as by-product for that year. The economic gain for the oleochemicals industry could certainly be increased if there is a commercial demand for these medium chain fatty acids.

Glycerol is another by-product of the oleochemical industry and it accounts for about 10% of the total oleochemicals produced worldwide. Medium chain fatty acids and glycerol can be reesterified together to form Medium Chain Triglycerides (MCT) (Trimmermann, 1991).

Medium chain triglycerides were first introduced in 1950 for the treatment of disorders in lipids absorptions. Since then many nutritional studies have been conducted in order to understand the differences in the metabolism pathways of MCT in contrast to the Long Chain Triglycerides (LCT) (Bach et al., 1990; Brand, 1990; Babayan, 1968; Babayan, 1991). The advantages of MCT in relation to food industry have also been thoroughly discussed and these have led to the development of interesting food products from MCT (Trimmermann, 1991).

Medium Chain Triglycerides in Hand and Body Lotion

The application of MCT is not restricted only to the food industry. Potential applications in the technical fields, such as mineral oil substitute for cosmetics applications, have also been identified (Trimmermann, 1991). Due to the abundance of raw materials and potential value addition to be gained, it was natural for PORIM to carry out further development work in this area.

Several hand and body lotion formulations utilizing products derived from palm based oleochemicals, including MCT were developed (*Figure 1*). The specification for MCT is given in *Table 5*. Lotions based on MCT were favoured by sensory panels. Further refinement in the formulations were carried out and finally a formula (*Table 6*) containing 97.7% PPKOP based products, including MCT, was established and handed over to Liasari Sdn.Bhd. (Liasari SB), a local cosmetics company. Liasari SB incorporated a locally produced perfume and the formulation was commercialized as Pure Palm Moisture Hand Cream.

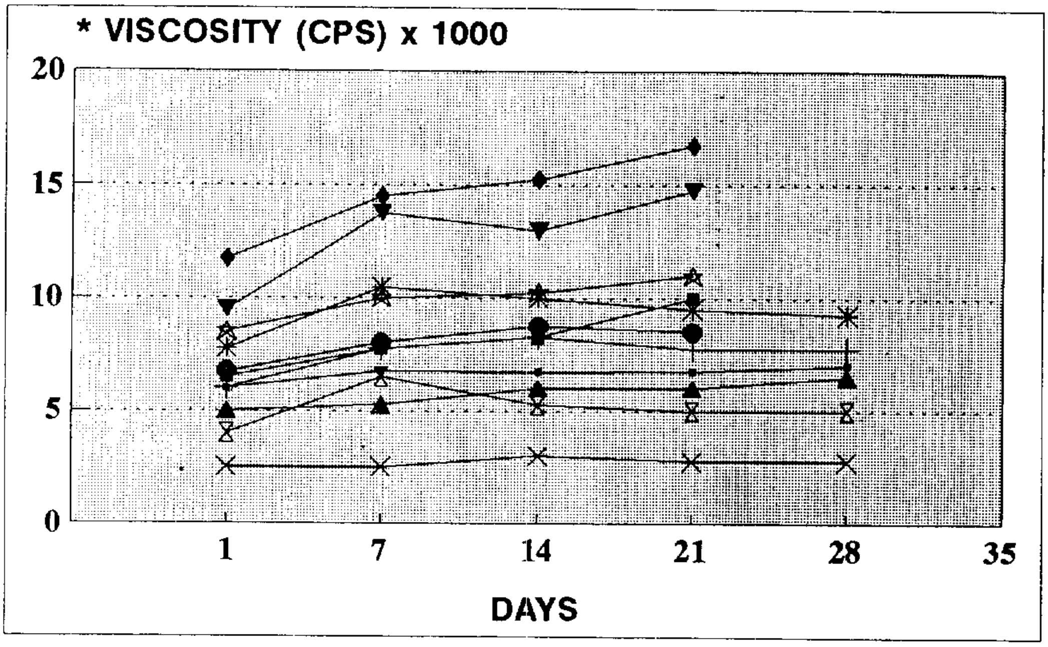
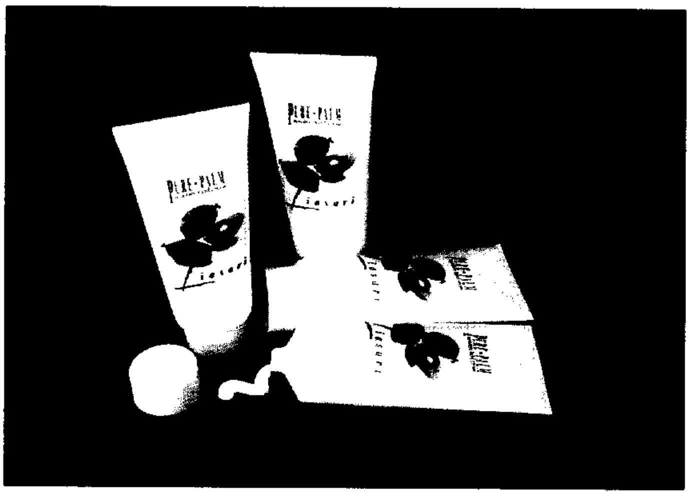


Figure 1. Viscosity of various hand and body lotions



Hand/Body Lotion

Pure palm moisture hand cream was found to be non-greasy and not heavy on the skin. It has excellent spreadability and rub-in properties. Currently the product is being sold at a price of 14 Malaysian Ringgit per 100 g, in contrast to the price of palm oil which is 14 Malaysian Ringgit per 10 kg. The experience of Liasari SB indicated that beauty care products derived from PPKOP based oleochemicals received favourable response from consumers in relation to their in-use as well

● TURN TO PAGE SEVEN

Table 5. Specifications for Glycerol Tricaprylate/ Tricaprate

Acid Value mg KOH/g (max)	0.1
Saponification Value mg KOH/g (max)	325 - 345
Iodine Value g 1/100g (max)	0.5
Hydroxyl Value mg KOH/g (max)	5
Moisture (%) max	0.15
Colour APHA (max)	50
Peroxide Value m eg/kg (max)	0.2

Table 6. Hand and Body Lotion Based on MCT

Ingredients

Phase A (Oil Phase)

1. Isopropyl palmitate
2. Stearic acid
3. Glycerol monostearate (Non-SE)
4. Propyl paraben
5. Triethanolamine
6. Medium Chain Triglycerides

Phase B (Water Phase)

7. Glycerol
8. Methyl paraben
9. Water
10. Perfume

RESEARCH HIGHLIGHTS

Accelerated Stability Values of Oils and their Significance

Contributed by
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All edible oils and fats are subject to autoxidation and their resistance to this reaction is one of the major considerations affecting their use in foods. But measuring their stability in a meaningful way is rather complicated because the oil producers and buyers have the necessity to use accelerated tests. These are usually conducted at relatively high temperatures, while the oil users and food manufacturers are most interested in stability at room temperature of about 20°-25°. For years there have been, and still are, debates among scientists on whether stability values measured at different temperatures can be interconverted.

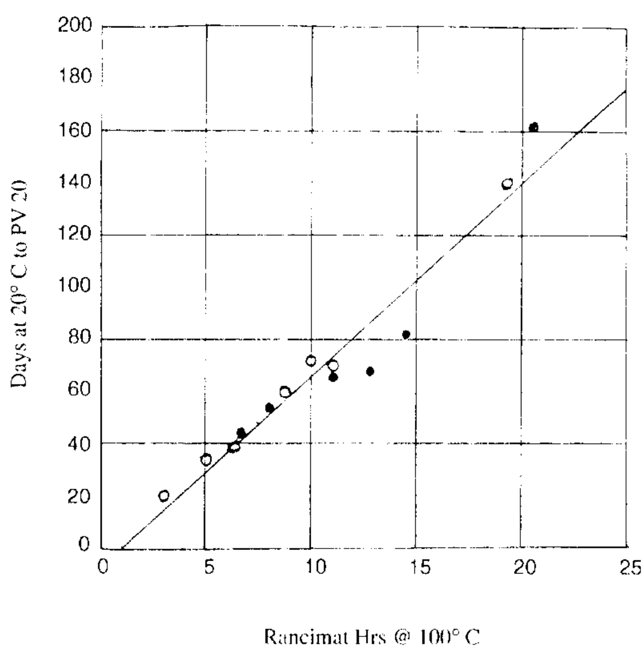
Recently, an interesting paper has been published by researchers Gordon and Mursi of the University of Reading, England, which throws some light on this matter. Fifteen samples of refined edible vegetable oils were stored in the dark at 20°C and the days required to reach PV=20 were recorded. The same oils were also tested for their Rancimat value which is the number of hours at 100°C before the oil reaches the end of its induction period. The oils tested were: refined olive oil, rapeseed, soyabean, corn, sunflower, rapeseed with various added antioxidants and rapeseed with added trace metals (iron and copper).

The results are shown in *Figure 2*, and it is seen that all oils fitted a straight line quite well with a high degree of correlation (r = 0.966), except for the two samples containing BHT which showed much higher stability at room temperature than would be predicted from Rancimat value. These two samples have not been included in our graph or used in our calculations. For those mathematically inclined, we have calculated the equation of the line to be as follows.

$D_{20} = 7.40R_{100} - 7.9$
$r^2 = 0.933$ (n = 13), SE = 10.3

where D_{20} is the days at 20°C to reach PV = 20 and R_{100} is the Rancimat value in hours at 100°C

Rather unfortunately perhaps, the researchers have only included oils produced in the EU and so they left out palm oil. But we know from other works that RBD palm oil gives a Rancimat value of about 50 hours which would correspond to 362 days at 20°C. To show that point on our graph we would have to make it twice as big. As we have been saying all along, palm oil is very stable.



● Pure Oils
○ Oils + addivites (antioxidants & trace metals)

Source: University of Reading, Berkshire, England

Figure 2. Rancimat period v. storage at 20°C various RBD vegetable oils

New Oil Source Identified

Contributed by
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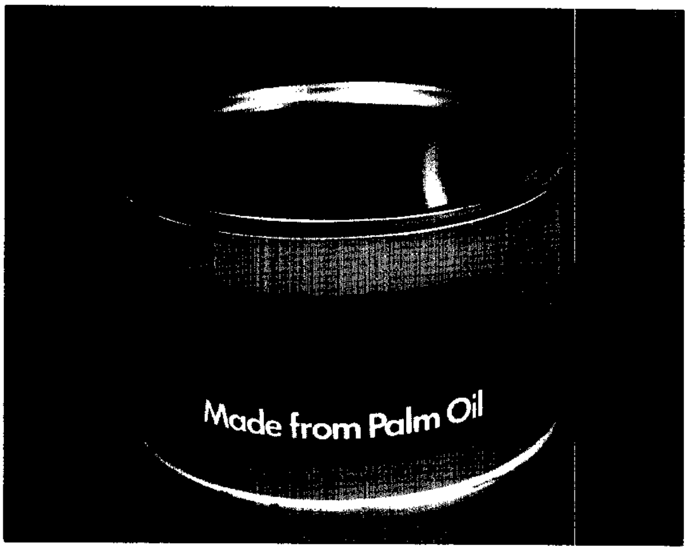
The research wing of the Vanaspati Manufacturers' Association (VMA) has identified a variety of wild apricot as a source of oil. It was reported that the apricot which grows in the hills of Himalchal Pradesh contains oil of high medicinal and commercial value. Apricot oil is used widely in the Indian traditional medicine such as Ayuverdics, Siddha and drugless therapy. It is also widely used in cosmetics and pharmaceutical products.

VMA Oilseed Research and Development Institute has proposed to the Ministry of Agriculture that a thorough survey be under-taken to assess and develop the rich oil source. It was estimated that the Kinnaur district of Himalchal Pradesh alone can generate an income of Rs 1000 crore per year. The oil sells at US$20 per litre in the international market.



Vanaspati

According to the National Oilseeds and Vegetable Oils Development Board, it is estimated that Kinnaur, Spiti and Pangi areas of Himalchal Pradesh have 160 000 hectares of wastelands where wild apricot can grow. The plant which is locally known as chulli can produce about 1.2 tonnes of oil per hectare per year.

A farmer can earn a net income of Rs 36 000 per hectare at the local price of Rs 300 per kg of apricot oil.

FROM PAGE FIVE

as after use performance (Low, 1994).

CONCLUSION

The success of the oil palm industry in Malaysia, which is resource based, needs no further elaboration. It is PORIM's obligation to ensure the continued growth of the industry through R&D. Current R&D activities are aimed towards the generation of high income, zero waste and value addition products. Downstream activities of oleochemicals is an area that can offer high value addition and this area is being thoroughly developed in PORIM. A cosmetic product recently developed by PORIM and commercialized by a local company confirmed that palm based beauty care products command a high value and excellent consumer satisfaction.

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Article Review

Specialty Fats of Vegetable Origin

by
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This article reviews some specialty oils of vegetable origin. These oils are generally from minor crops and need to be carefully extracted and refined. Generally these oils are available only in limited amounts and many come from uncommon sources. Some of these fats and oils have distinctive flavours which contribute in a way to their "exoticness" and need to undergo specific refining procedures to retain these characteristic flavours.

The fatty acid composition of some of these oils have been investigated and are as shown in *Table 7*. Generally, all these oils are rich in oleic (18:1) and linoleic (18:2) acids and contain some palmitic and to a lesser extent, stearic acid. These oils can be categorised into three groups, i.e.

Table 7. Fatty Acid Composition of Some Specialty and Other Minor Oils

	16:0	18:0	18:1	18:2	Other
Almond	7	2	61	30	
Apricot	5	1	60	32	2
Avocado	12	1	71	14	2
Cashew	11	9	60	17	3
Cherry	6	2	35	45	12 (α-elst, 10)[c]
Grapeseed	7	4	16	72	1
Hazelnut[a]	7	2	69	21	1
Linola	6	4	16	72	2(18:3)
Macadamia	8	2	56	3	31(16:1, 22)
Nectarine	6	-	66	27	1
Passion fruit	9	2	13	75	1
Peach	8	-	59	33	-
Pecan	6	2	67	22	3
Pistachio	9	2	69	18	2
Plum	6	1	62	30	1
Pumpkin	11	6	47	34	2
Safflower[b]	6	2	74	16	2
Sesame	10	6	40	43	1
Sunflower[b]	4	5	81	8	2
Walnut	8	3	18	58	13(18:3, 8)
Wheatgerm	13	2	19	60	6(18:3, 5)

[a] also called filberts
[b] these figures refer to the oleic-rich varieties, more usually they are linoleic-rich oils. Also called saffola and sunola respectively.
[c] α- oleostearic acid *9c11t13t-18:3*

- Oils containing > 60% oleic acid, such as oils from almonds, apricot, avocado, cashews, hazelnuts, macadamia, nectarine, peach, plum, pecan, pistachio and high-oleic-safflower (saffola) and high-oleic sunflower (sunola, sun oil);
- Oils containing > 60% linoleic acid, such as rapeseed, linola and passion fruit oil, and
- Oils with significant levels of both oleic and linoleic acid. The relative proportions of these fatty acids may vary according to geographical location and growth conditions.

The author has further commented on some of these oils as follows:

Avocado Oil

The oil is obtained from the fleshy mesocarp that yields 15%–30% oil by drying, pressing and solvent-extraction or centrifugation. The oil that contains 70% oleic acid is used in the cosmetic industry and in the food industry as basting oil or to produce salad dressings or mayonnaise.

Cherry and Apricot Kernel Oil

The Advisory Committee on Novel Foods and Processing of the United Kingdom has found both these oils acceptable for human consumption. Potential uses are as specialty fats for salad dressing, baking and shallow-frying. Cherry kernel oil contains 10% of α-oleostearic acid, an isomer of α-linoleic acid with conjugated triene unsaturation *(9c11t3t-18:3)*.

Linola Oil

Linola oil is obtained from a genetically modified variety of flaxseeds that produce oils low in α-linoleic acid (2%) and high in linoleic acid (72%) that differs the normal flaxseed that produces linseed oil high in α-linoleic acid (55%–60%).

Genetically Altered Rapeseed Oil

The original rapeseed that

Table 8. Component Acids of GLA Oils

	16:0	18:0	18:1	18:2	γ-18:3	Others
Evening primrose	6-10	1-3	6-12	65-75	8-12	–
Borage	9-13	3-5	15-17	37-41	19-25	20:1(4.5), 22:1(2.5), 24:1(1.5)
Blackcurrant	6-7	1-2	9-10	47-49	15-19	α-18:3 (12-14), 18:4(3-4)

yielded oil high in erucic acid (about 50%) has been modified genetically to produce oil high in oleic and linoleic acids containing less than 2% erucic acid. Field trials are being conducted to produce rapeseeds containing lauric and stearic oils.

Oils Rich in Gamma-Linoleic Acid (GLA)

GLA is an isomer of α-linoleic acid and belongs to the n-series of polyunsaturated acids. It is an intermediate in the bio-conversion of lineoleic acid to arachidonic acid and is a valuable dietary supplement. GLA has been claimed to be beneficial in the treatment of multiple sclerosis, arthritis, atopic eczema, PMS and other afflictions. Though GLA is available in a variety of vegetable oils, its commercial exploitation is restricted to evening primrose, borage and blackcurrant (the FAC of the GLA from these sources are shown in *Table 8*). GLA is used as a dietary supplement and in cosmetics.

Table 9. Oil Content of Some New Crops

Crop name	Major fatty acid (%)	Oil content (%)
African daisy	dimorphecolic (64)	20
Cape marigold	dimorphecolic (72)	28
Coriander	petroselinic (72)	–
Crambe	erucic (56)	35
Cuphea spp	8:0 or 10:0 or 12:0 or 14:0	–
Euphorbia lagascae	vernolic (60)	48
Honesty	erucic (42), nervonic (25)	32
Lesquerella	lesquerolic (54)	37
Marigold	calendic (58)	19
Meadow foam	20:1(62), 22:1(18), 22:2(18)	22
Spurge	oleic (80-90)	–

Source : Malaysian Oil Science and Technology, July 1994, Vol. 3 No. 2

New Crops

Serious attempts are apparently being undertaken in Europe and North America to develop new crops for their oil content (*Table 9*). The potential uses would mainly be for non-food uses. However, those high in lauric oils could substitute palm kernel oil in food uses. Similarly, the high oleic oils too could be used for both food and non-food production activities.

The Market Potential for Olive Oil: Palm Olein Blends

Contributed by
T.P. Pantzaris & B.A. Elias, PORIM Europe

The talking point among oil traders in the EU this year has been the price of olive oil, which in the last 12 months has risen to *f*3 250 (1) from *f*2 300 per tonne (from US$3519 to US $4973) and is expected to double again in the next 12 months.

Olive oil has many points of similarity with palm olein (especially the double fractionated grade), both being fruit oils and having oleic acid as their major fatty acid (*Table 10*). In fact, the whole of their fatty acid composition is uncannily similar, the only difference being that palm olein contains three times more palmitic acid than olive oil more. As regards to cholesterol-raising effects, the latest studies in the USA and Europe have shown that palmitic acid behaves similarly to oleic acid and palm oil similarly to olive oil. Both oils are highly resistant to oxidation and we see no reason why double fractionated palm olein should not be blended with olive oil to give an excellent table oil at much lower cost. Palm olein will also provide some tocotrienols which are not found in olive oil.

Table 10. Fatty Acid Composition of Palm Olein and Olive Oil (wt%)

Double Fractionated Palm Olein	Palm Olein[1]	Olive Oil[2]
12:0 + 14:0	1.4	-
16:0	33.7	11.5
18:0	3.6	2.3
18:1	47.0	76.9
18:2	13.8	8.3
18:3	0.3	0.6
20:0	0.2	-

Source : [1]PORIM [2]USA

The present shortage of olive oil is because the Mediterranean region has been going through one of its worse droughts in this century, according to the figures released recently (January '96) by the olive oil producers association in Spain (Asoliva). Both Asoliva and the Spanish agricultural union (Asaja) are demanding a subsidy from the European Union as a matter of urgency to stop a further price rise and to discourage the European users from switching to cheaper oils.

Juan Vicente Gomez Moya, the director of Asoliva said he expected exports to be almost halved and many farmers said their harvest will be only one tenth of normal. To make things worse, there is also a bad harvest in Italy and Greece, the other two main European producers.

The present EU subsidy on olive oil is *f*1.37 per kg (US $2096 per tonne) but producers say this is not enough and the system is open to abuse because some countries are claiming to produce more olive oil than is feasible. By contrast, the Spanish government is reported to be surprisingly unconcerned. A spokesman from the Spanish Ministry of Agriculture has been quoted as saying "The Spanish market needs about 200 000 tonnes and we have 150 000 tonnes in reserve. Any shortfall in non-producing EU countries can be made up by imports from Tunisia and Turkey". But we shall not be surprised if some enterprising company in the EU starts marketing blends of olive oil and palm olein. As long as the component oils are declared on the label, there is no legal barrier in the EU.

Source: The Times, UK

(Currency calculations have been based on *f*1 = US$1.53 = ESP 188.7),
[1]Naked ex tank UK

Netherlands to Reduce the Content of *Trans*-Fatty Acids in Margarine

Contributed by
J.R. Santhiapillai, PORIM Europe

Margarine manufacturers in The Netherlands will list *trans* fatty acid content of their products on the labels, according to a commentary by Martijn B. Katan in the November 11th, 1995 issue of *The Lancet*.

In addition, he noted the *trans* content of margarine and spreads will be reduced to less than 5% and, in fact, may drop below 1% within next year.

"As a result of the changes in the composition of food fats now under way, the average Dutchman will be eating 4 grams less of *trans* fatty acids per day than he or she did 10-15 years ago", Katan wrote.

Meanwhile Corrine C. Bayard and Robert L. Wolff, in an article in the December issue of the *Journal of the American Oil Chemists' Society*, noted that the average French tub marga-rine contains only 3.8% *trans* fatty acids, compared to a 13% level four years ago. In their survey, four of the twelve tub margarines contained no *trans* isomers, they said.

Malaysian Export of Hydrogenated Palm Products

Contributed by
Mohamed Razali Mahidin, PORIM

Malaysia exported about 50 000 tonnes of hydrogenated palm oil products (HPOP) annually. *Table 12* below indicates that the trend is increasing. The HPOP are hard stock semi-processed raw materials needed by many industries to make products like margarines, ghees, chocolate, and other specialty fats as well as for soap.

Table 12. Malaysian Export of Hydrogenated Palm Oil Products

Products	Quantity (tonnes)		
	1993	1994	1995
RBDHPO	4445	1429	2055
HPFA	1255	736	1580
$RBDHPO_L$	1132	3191	1113
HPO_L	1155	4909	1443
$RBDHPO_S$	701	854	982
HPO	1004	-	1358
HPO_S	722	1378	1400
RBDHPKO	7118	5133	5340
RBDHPKOL	10712	11766	14974
NBDHPKO	8474	9739	13041
$NBDHPKO_L$	-	19	1014
$NBHPKO_S$	3001	2403	1824
HPKO	612	741	405
HPK_S	812	382	179
$NBHPKO_S$	62	210	788
$NBHKO_L$	19	44	19
$HPKO_L$	219	2382	211
HFA	-	-	200
TOTAL	42117	46646	49466

Source : PORLA

Note :

RBD = Refined Deodorized and Bleached
NBD = Neutralized Deodorized and Bleached
H = Hydrogenated
PO = Palm Oil
POL = Palm Olein
POs = Palm Stearin
PKO = Palm Kernel Oil
PKOL = Palm Kernel Olein
PKOS = Palm Kernel Stearin
NB = Neutralised and Bleached
PFA = Palm Fatty Acids
PKFA = Palm Kernel Fatty Acids

Two well known companies that produce hydrogen gas in Malaysia are Malaysian Oxygen Sdn Bhd (MOX) and Industrial Oxygen Industry Sdn Bhd (IOI). Most palm oil processors obtain their hydrogen for these two companies. The hydrogen is produced by splitting of natural gas which is now in abundance supply and is more economical than water or ammonia splitting process.

New Tallow Refinery in the UK

Contributed by
T.P. Pantzaris and B.A. Elias, PORIM Europe

Oils and Fats International **reports that a new oil refinery for edible tallow came on stream in Doncaster recently, aiming to supply the full range of animal fat products including frying oils to the food industry.**

The refinery is owned by Nortech Foods, a subsidiary of Prosper de Mulder and was built by Europe Crown Limited of Hull. It is reported to have a capacity of 1000 tonnes per week, employing a continuous physical process and computer controlled systems and it is the only edible oil refinery in the U.K., dedicated exclusively to animal fats.