Developments in the Pricing of Palm Kernel Oil

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INTRODUCTION

Palm kernel oil (PKO) has a chemical composition and physical properties similar to those of coconut oil (CNO), and in most applications the two lauric oils are highly substitutable. The traditionally close price movements between them reflect their similar markets. However, the changing pattern of supply and applications has introduced a new price relationship between coconut oil and palm kernel oil.

During most of the 1970s, palm kernel oil was sold at a premium to coconut oil in the world market., Subsequently, towards the end of the 1970s and during the 1980s, the price relationship was reversed, and palm kernel oil was sold at an average discount of US$ 24 per tonne to coconut oil. With the exception of 1981, palm kernel oil has been cheaper than coconut oil since 1979 (*Table 1* and *Figure 1*) reflecting, perhaps, the rapid expansion in supply of the former during this period.

BASIS FOR PAST PRICE RELATIONSHIPS

Traditionally, manufacturers of specialty fats in both Europe and the USA have been prepared to pay more for PKO as a valued raw material in comparison to coconut oil. In contrast, most oleochemical manufacturers tend to place a higher value on CNO, and the growing demand from that direction may have altered the balance in the price pattern of the two lauric oils.

While confectionery production in the industrialized countries has been on a good positive trend, for a very long time oversupply of cocoa butter and its consequent low price, coupled with rising incomes in West Europe, the USA and South East Asia, have led to an increase in its consumption at the expense of its substitutes. Furthe - more, the numbers of specialty fat manufacturers has increased, leading to stiffer competition and overall price reduction.

Even though coconut and palm kernel oils are very similar to each other, there are, on closer scrutiny, interesting differences (*Table 2*). Coconut oil contains about 10 % more shorter-chain fatty acids (C6 to C14) which fetch a higher price, and yield a little more glycerine during the fat splitting processes. These factors make coconut oil more valuable to oleochemical and soap manufacturers, and buyers in Europe often use this as an argument for expecting a discount for palm kernel oil for their oleochemical requirements.

To the oleochemical and soap manufacturers, low FFA is usually of little interest. In Europe, the standard PKO contract is based on 5.5% free fatty acid with a price adjustment for each FFA point above or below that value. But palm kernel oil delivered from Malaysia is usually of better quality, with 3% FFA or less, so importers have to pay a premium, and this is construed as an additional charge which the buyers insist must be discounted in the purchase price. Otherwise, they argue, PKO could be more expensive than coconut oil.

In the edible sector, on the other hand, PKO is more versatile than coconut oil, giving a wider range of products when subjected to hydrogenation and fractionation processes. The wider range of physical properties of these products makes them more useful to food manufacturers, especially to those making confectionery specialty fats. On hydrogenation, the slip melting point of CNO goes from 24 °C to 34 °C while that of PKO goes from 28 °C to 42 °C, giving a much wider useful range. Also, on fractionation CNO gives a relatively small yield of stearin with a melting point of about 30 °C which is only suitable for very few applications, while PKO gives a higher yield of stearin of melting point up to 32 °C, which can be further hydro-

TABLE 1. AVERAGE ANNUAL PRICES OF PALM, COCONUT AND PALM KERNEL (In US$/Tonne, CIF Rotterdam)

Year	Palm oil	Coconut oil	Palm Kernel oil	PKO - CNO
1970	258	346	336	-10
1971	254	299	294	-5
1972	211	215	224	9
1973	390	513	493	-20
1974	691	998	1046	48
1975	420	394	409	15
1976	405	418	433	15
1977	530	578	609	31
1978	600	683	703	20
1979	654	985	968	-17
1980	586	674	667	-5
1981	571	570	588	18
1982	445	464	458	-6
1983	502	730	709	-21
1984	729	1155	1037	-118
1985	501	590	551	-39
1986	257	297	288	-9
1987	343	442	426	-16
1988	437	565	539	-26
1989	350	517	472	-45

Source: *Oil World*

TABLE 2 . FATTY ACID COMPOSITION RANGES FOR CNO AND PKO (%) COMPARED WITH PO

(For CNO and PKO some figures have been rounded and values below 0.5% are omitted)

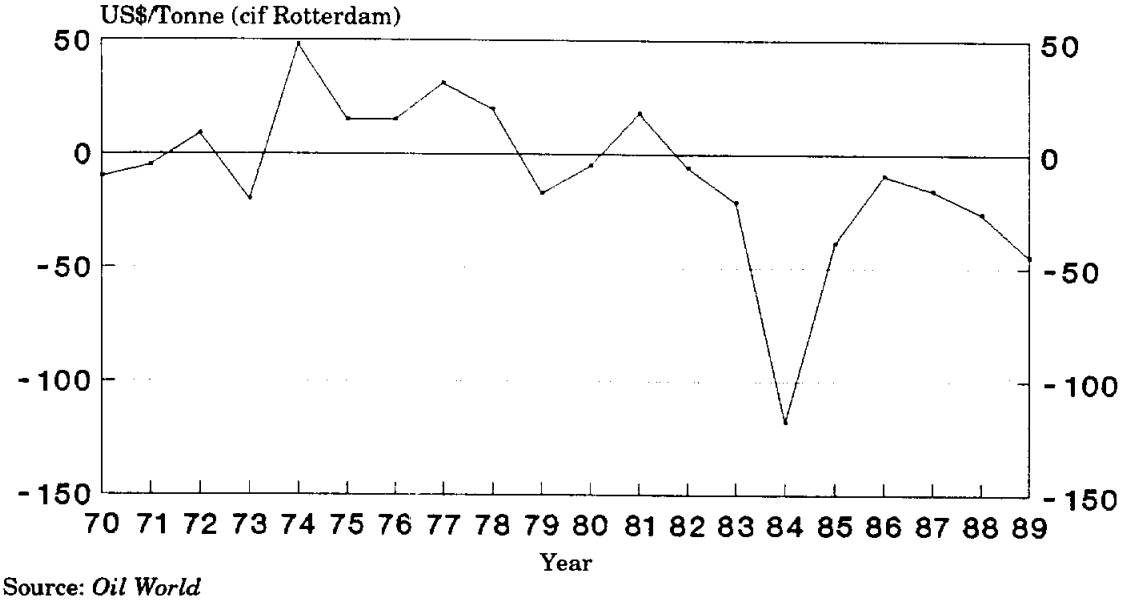
Fatty Acid	CNO	PKO	PO
6:0	0-1	0-1	-
8:0	7-10	3-5	-
10:0	6-8	3-5	-
12:0	46-50	44-51	0.2
14:0	17-19	15-17	1.1
16:0	8-10	7-10	44.0
18:0	2-3	2-3	4.5
20:0	-	-	0.4
Total Saturated (average)	92	82	50.2
16:1	-	-	0.1
18:1	5-7	12-19	39.2
18:2	1-2	1-2	10.1
18:3	0.5	0.5	0.4
Total Unsaturated (average)	8	18	49.8

Source : *PORIM Technology*, No. 3, 1981.

TABLE 3. MALAYSIA'S EXPORT OF CRUDE AND REFINED PALM KERNEL OIL (Tonnes)

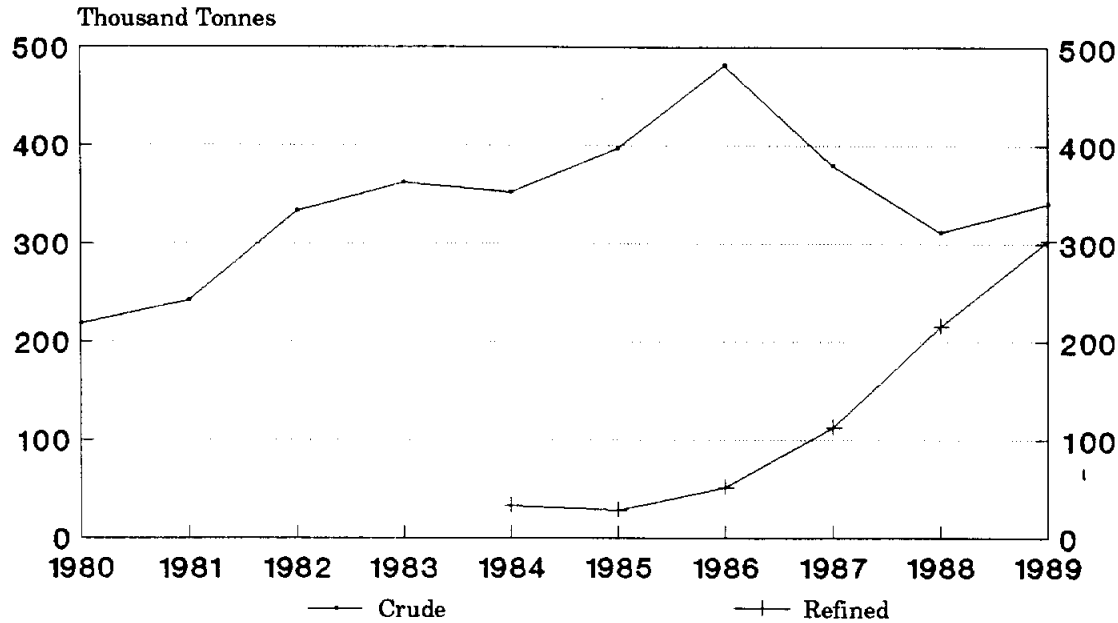
Year	Crude PKO	RBD PKO	RBD PK Olein	RBD PK Stearin	Others*	Total Refined	TOTAL
1980	218 397	0	0	0	0	0	218 937
1981	242 176	0	0	0	0	0	242 176
1982	333 437	0	0	0	0	0	333 437
1983	361 858	0	0	0	0	0	361 858
1984	352 500	20 847	2 904	4 228	4 639	32 618	385 118
1985	397 024	16 574	4 867	931	5 351	27 723	424 747
1986	481 523	34 068	11 538	4 172	2 125	51 903	533 426
1987	379 434	94 836	7 327	6 406	3 909	112 478	491 912
1988	312 239	183 165	12 010	7 361	12 773	215 309	527 548
1989	340 556	255 190	20 866	14 584	12 844	303 484	644 040

*Other processed palm kernel oil.
Source: *MEOMA Monthly Bulletins* (various issues)



Source: *Oil World*

Figure 1. Price Difference between Palm Kernel Oil and Coconut Oil (PKO-CNO)



Source: MEOMA Monthly Bulletins

Figure 2. Exports of Crude and Refined Palm Kernel Oil

genated to 36 °C, making it suitable for a whole range of substitute chocolate products, sugar confectionery, biscuit creams, coffee creamers, imitation whipping creams, *etc.*

Other importers look at the PKO market from a slightly different viewpoint. The Chinese buying specification is based on maximum FFA of 3.5 % as opposed to 5.5 % for the importers in Europe. Buyers from China require the PKO to be of high quality and they are prepared to pay a premium above the usual market price, to compensate the sellers who would normally get a rebate on low FFA oil exported to Europe.

More recently, the purchasing pattern has changed further as more refined palm kernel oil is exported from Malaysia. Exports of refined PKO are given a duty exemption of 5% compared with that on crude oil. Refined palm kernel oil is normally accorded a small premium. Because of the export duty discount and the higher quality standards in respect of FFA, colour, PV and contaminants, the Chinese and Japanese buyers find it more attractive to import refined PKO as it is far superior for making high quality soaps. This apparently is the main reason for the growth in exports of refined PKO from Malaysia at the expense of crude PKO (*Table 3* and *Figure 2*).

OPPORTUNITIES TO BE EXPLOITED

The consistent discount for palm kernel oil relative to coconut oil over an extended period is presenting users of lauric oils with new opportunities to increase profitability by maximizing their use of palm kernel oil. For while one can truthfully say that PKO can replace CNO in all its applications including oleochemicals and soaps, the converse cannot possibly be said for CNO. On balance, one would have expected PKO to be selling at a premium or at least to break even. The consistent, continuous discount over the last nine years could possibly be a market imperfection with implications of opportunities wasted by lauric oil users.

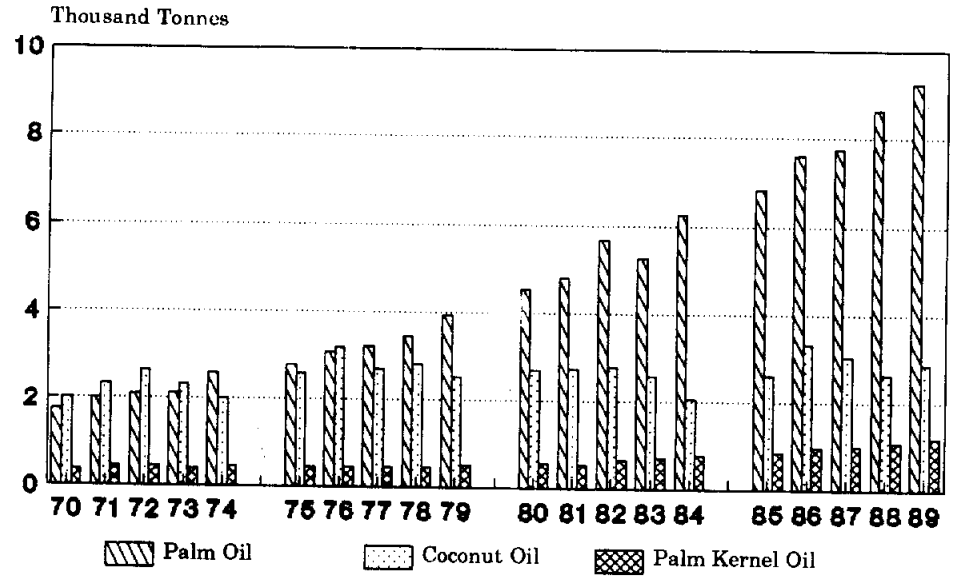
Another explanation could be the fact that the production of CNO is stationary while that of PKO is rising steeply (*Figures 3a* and *3b*). The production figures average over 5–year periods, (in '000 tonnes) are as follows :-

	1978-1982	1983-1987	change
CNO	2718	2729	+0.4%
PKO	545	862	+58.2%

Another important factor accounting for the disparity between PKO and coconut oil prices is related to the practice of European refiners of charging about US$38 per tonne more for refining PKO than for refining CNO. This means that in the last ten years when crude PKO was averaging a discount of US$24 per tonne, the ultimate consumer was probably paying a premium of US$14. One reason suggested for the higher refining charge was that the higher average FFA of 3-5% for PKO against 1-2% for CNO, makes PKO cost more to refine (PKO from non Malaysian sources may have a higher FFA). A higher charge for refining PKO in Europe may also indicate a strong demand for the oil, to the extent that buyers are willing to pay for a higher refining charge.

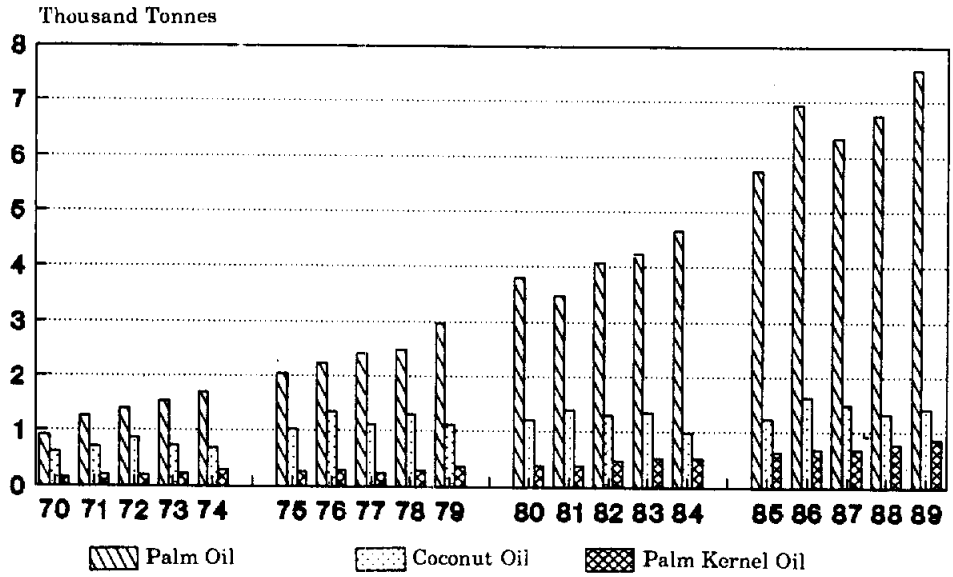
By comparison, refined PKO from Malaysia is often offered at a premium of only US$10 over crude PKO, due to more efficient refining combined with duty exemptions, but unfortunately the EEC also imposes a higher duty on the import of processed oils, and the benefit of competitively-priced refined PKO from Malaysia is nullified as far as the EEC buyers are concerned, leading to yet another loss of opportunity. Perhaps the EEC oleochemical users will find it more cost-effective to import PKO fatty acids rather than PKO, as this is now the most popular form of export to other destinations from the Malaysian oleochemical manufacturers.

Traditional conservatism may also be blamed for the price disparity experienced by PKO. Many users have switched successfully to PKO by taking advantage of the ready availability of the refined form which offers higher quality at a very small



Source: *Oil World*

Figure 3a. World Production of Palm, Coconut and Palm Kernel Oils



Source: *Oil World*

Figure 3b. World Exports of Palm, Coconut and Palm Kernel Oils

premium. However, many users may be unaware of the technical acceptance of PKO as a substitute for CNO in various products. As an illustration, it has been reported that in 1983, when PKO was selling at US$ 35 per tonne below CNO, the manager of a medium sized soap factory in the EEC was asked why he was using CNO when PKO was available at a good discount. His answer, which echoes that of many other users, was that CNO was only 25 % of the formulation and contributed only a small fraction of the total cost. The costs of perfume, packaging, advertising, *etc.* were many times higher. But he should have realized that a profit of US$17 000 on just one purchase of 500 tonnes of lauric oil would make a good impression on anyone's bank account.

The following year the same manufacturer was contacted and this time the discount for PKO was US$110 per tonne. When asked if he was going to try PKO, the reply was, 'Yes indeed, the price of CNO is ridiculous.' Later it was learnt that he really had tested PKO and did not notice any difference in his soap: he has remained with PKO ever since.

Another illustration of the lack of awareness was when a chief chemist of a government soap factory in a country in Africa was asked why he was using expensive CNO when PKO was virtually identical in composition and selling at a good discount so that his country would save foreign exchange. 'Oh, no,' he replied, 'PKO is completely different from CNO'. He went to his office and came back showing the fatty acid composition of *palm oil* to prove his point (*Table 2*).

FUTURE PRICE TRENDS

On the whole, PKO has been recognized as a suitable alternative to coconut oil in virtually all edible applications, and better in some of them. In oleochemical production, however, PKO's lower level of short chain fatty acids is viewed as a disadvantage by some manufacturers. Nevertheless, in the manufacture of soap, this property of PKO is a possible advantage as it reduces the tendency to skin irritation attributed to the short chain fatty acids.

In specialty fat applications, palm kernel oil offers flexibility as its higher level of unsaturated fatty acids (higher IV) enables manufacturers to hydrogenate to varying requirements for the melting points and solid content profiles to suit the end product.

Palm kernel oil is equally suitable for use in food products such as in margarine, ice-cream and spray oil in biscuit production. Many manufacturers are not aware of the interchangeability of PKO and coconut oil in these applications and so they cannot take advantage of the economies offered by PKO.

Some buyers are affected by national import tariffs and this affects their ability to take advantage of the increasing supply of attractively-priced refined PKO.

The future price relationship between PKO and CNO will obviously depend to some extent on how the above factors evolve, and no doubt from time to time the price relationship will be affected by short term supply-and-demand situations. But the far greater growth rate in the production of PKO forecast by oil experts in the field will ensure that PKO continues to offer attractive price discounts during the foreseeable future.

CONCLUSION

The Malaysian oleochemical sector is projected to expand its capacity from 150 000 tonnes in 1984/85 to 700 000 tonnes by the year 2000. Palm oil and palm kernel oil are the major raw materials for the oleochemical industry, with PKO being the preferred product. Projected annual Malaysian PKO production by the year 2000 is about 800 000 tonnes, and the supply of PKO may become tight as the expanding oleochemical manufacturing sector in Malaysia may tend to use up most of the expected local supply.

In the meantime, PKO, being at discount to CNO, deserves a closer scrutiny as its ability to be used as an alternative to CNO has probably been underestimated.