FATTY ACIDS AND POLYUNSATURATES IN SOME COMMON MALAYSIAN COOKING OILS

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INTRODUCTION

IN PENINSULAR MALAYSIA, about 42 grams of fat are available per head per day according to a Food Balance Sheet analysis for 1970. It was also estimated that about half of this amount is provided by separated oils and fats, principally in the form of cooking oils, with the remainder coming from the unseparated fats of animal sources (Nichol, 1975).

Fat availability in Malaysia thus seems to be low, accounting for only about 18% of the daily energy requirement. However with the recent widespread availability of cooking oils, it is conceivable that the daily per capita intake may be increasing and may well exceed the national average particularly for those living in the urban sector. Thus chemical analyses of hawker foods recently gave a mean value for fat of 30 grams in a single meal (Tee *et al.*, In Press) and analysis of defence rations revealed the daily availability of fat to be as high as 138 grams (Quah, 1977).

In addition, during the last decade or so, numerous brands of cooking oils have emerged in the Malaysian Market. Consequently, it is felt necessary to know more of the fatty acid composition of these products particularly in view of the fact that the only reported study on the same subject was made more than twelve years ago (Chong and Mills, 1966).

MATERIALS AND METHODS

The oils were obtained from various supermarkets in Kuala Lumpur and the homes of friends and laboratory staff. At least three separate samples were obtained for each type of oil to allow for batch variations.

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All samples were saponified by refluxing with alcoholic potassium hydroxide for one hour. The fatty acids were precipitated with 5N sulphuric acid and extracted into petroleum ether (b.p. 40-60 C). Methyl esters of fatty acids were prepared by refluxing with boron trifluoride methanol for 3 minutes, cooled and extracted into petroleum ether. The final extract was chromatographed on a Pye Unicam Series 104 Chromatograph equipped with an area integrator and using a column containing polyethylene glycol adipate.

RESULTS AND DISCUSSION

The fatty acid composition and polyunsaturated fatty acid (PUFA) content of a variety of common Malaysian cooking oils are presented in Table I and Fig. 1 respectively.

Of the samples analysed, vegetable oils such as soyabean, corn and sunflower have the highest content of linoleic acid which accounts for these oils being marketed with the label 'rich in polyunsaturates'.

Oils such as coconut, lard and palm which are popular with the Malaysian population have a high degree of saturation. Refined palm oil, which is now widely available and comparatively cheap, has the highest content of palmitic acid and is a common component in many varieties of blended oils. Hence it is not uncommon to find in these blended oils a high palmitic acid and a comparatively low PUFA content.

Since cooking oils are the main source of dietary fat and hence PUFA in Malaysia, the use of polyunsaturated vegetable oils are prefered in order to achieve the recommended PUFA intake of about one third the total fatty acide consumed (FAO, 1977). Thus among the more affluent urban groups who are now increasingly aware of the relationship between dietary fats and coronary heart disease, these oils are gaining increasing popularity.

Table 1

The fatty acid composition of some common Malaysian cooking oils

* Type of oil	No. of samples	% Total Fatty Acids									
		Lauric C_{12}	Myristic $C_{14:0}$	Palmitic $C_{16:0}$	Palmitoleic $C_{16:1}$	Stearic $C_{18:0}$	Oleic $C_{18:1}$	Linoleic $C_{18:2}$	Linolenic $C_{18:3}$	Arachidic $C_{20:0}$	Arachidonic $C_{20:4}$
Soyabean	3	0·5	**T	11·1	–	5·9	26·3	48·6	7·5	–	–
Sunflower / Sesame	3	–	–	9·0	–	8·6	31·0	51·4	–	–	–
Corn	5		–	11·8	–	5·1	33·7	49·3	–	–	–
Soyabean / Palm	3	0·1	0·3	16·2	T	6·2	28·3	43·5	5·3	–	–
Sesame	3	–	–	9·4	–	7·9	40·7	41·3	–	0·7	–
Rice	3	0·6	0·6	20·2	–	3·3	47·2	28·1	–	–	–
Groundnut	3	T	T	18·6	–	6·3	47·8	25·9	–	1·6	–
Corn / Palm / Soyabean	3	T	0·9	30·9	0·2	6·2	44·8	16·9	–	–	–
Groundnut / Palm	5	T	1·2	33·0	0·2	6·7	44·5	13·6	–	0·7	–
Palm / Groundnut / Sesame	5	0·3	1·1	32·7	0·3	6·6	45·4	13·2	–	0·3	–
Palm	5	T	1·1	34·8	T	7·2	45·3	11·5	–	–	–
Lard	3	–	2·1	26·1	3·0	13·9	42·5	10·9	–	1·4	–
Coconut / Palm	3	35·4	23·9	15·3	–	6·5	15·3	3·6	–	–	–
Coconut	4	40·9	23·5	14·1	–	5·3	13·4	2·7	–	–	–

*As purchased **Trace.

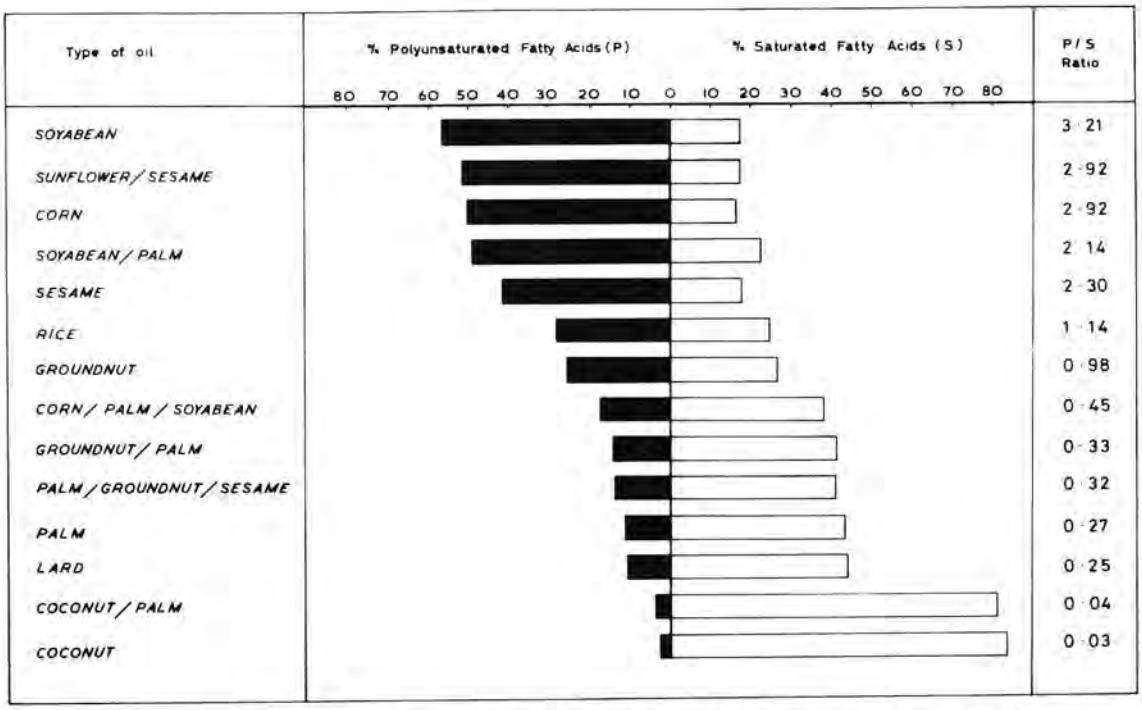

Fig. 1: The proportion of polyunsaturated and saturated fatty acids in some common Malaysian cooking oils.

Household food consumption studies in rurual, under-preveleged communities in Malaysia have revealed an inadequate daily calorie intake of which a low fat intake was contributory (Jackson, 1970; Kandiah and Lim, 1976). Consequently, from the viewpoint of satisfying energy requirements, the use of the more saturated varieties of cooking oils now widely available should be regarded as nutritionally desirable in such communities.

All varieties of blended oils examined did not declare the proportion of their component oils on their labels. One variety analysed had only about 17% PUFA when two of the three components cited were corn and soyabean oils. Another brand varied from 50% PUFA in one batch to about 35% in another. Thus the proportion of component oils in a blended oil may vary significantly from batch to batch and its fatty acid composition becomes unpredictable.

SUMMARY AND CONCLUSION

The fatty acid composition and polyunsaturated fatty acid content of some common Malaysian cooking oils were determined by technique of Gas Liquid Chromatography. PUFA the content was high in vegetable oils such as soyabean, corn and sunflower but low in coconut, lard and refined palm oils. Since cooking oils are still the main source of dietary fat in malaysia, the use of the more saturated oils with low PUFA content should not be discouraged particularly from the viewpoint of satisfying energy requirements.

The fatty acid composition of blended oils was unpredictable and may vary significantly from batch to batch. In view of such variability, oil millers should label appropriately the proportion of component oils in the blended varieties for the information of consumers.

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REFERENCES

Chong, Y.H. and Mills, G.L. (1966) The Fatty Acid Composition of Cooking Oils and Fats Used in Malaya. *Med. J. Mal.* 21, 125-127.

FAO (1977) Dietary Fats and Oils in Human Nutrition. Food and Nutrition Paper 3.

Jackson, J. (1970) WHO Assignment Report on Applied Nutrition in Malaysia. WPR/393/70 (Mimeographed).

Kandiah, N. and Lim, J.B. (1976) I.M.R. Rural Health Study No. 1, *Bulletin No. 17*, I.M.R., Kuala Lumpur.

Nichol, B.M. (1975) Report to the Federal Government of Malaysia on Food and Nutrition in Malaysia's Development Planning. *FAO, RAPE/20.*

Quah, S.L. (1977) Nutritional Adequacy of Present Normal Armed Forces Ration Scale. Defence Research Centre. *Technical Report No. 10.*

Tee, E.S., Ng, T.K.W. and Chong, Y.H. (1979) Cholesterol Content and Fatty Acid Composition of Some Malaysian Foods. In press.