PALM OIL - A SATURATED FAT - A CASE OF INCIDENTAL OR TACTICAL CLASSIFICATION*

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ABSTRACT

*This work was based on my original paper titled "The Technical Characteristics of Palm Oil", rewritten and revised after helpful comments made by Professor W P T James, Director of Rowett Research Institute, United Kingdom and Chairman of the European Advisory Group on Palm Oil. The new title was given to suit the new objectives and problems presented in this paper. The remaining errors and other shortcoming are mine alone.

1.0 INTRODUCTION

Over the past 20 years, the global pattern of production and exports of palm oil has changed dramatically. In the 1970s there were 19 palm oil producing countries with total production of 2.4 million tonnes. In 1990 this number rose to 38 countries and 10.6 million tonnes were produced (Oil World, 1991). In the same year the dominance of African producer and exporter (Nigeria) was replaced by Asian producers namely Malaysia, Indonesia, Papua New Guinea and the Solomon Islands.

Between 1982 and 1990, the production of palm oil grew at the annual rate of 5%, which was the highest relative to other oils and fats (Hashim, 1994). By the year 1990 palm oil accounted for 11% share out of 80 million tonnes of total global production of 17 oils and fats (or second after soya bean oil with 21%). In the same year 7.6 million tonnes or 32% of the total world-wide exports of all oils and fats was from palm oil. This amount was the largest of the overall share amongst the 17 oils and fats exported. Soybean oil (13.6%) was a distant second to that of palm oil, followed by sunflower (1%), rapeseed oil (9%) and coconut oil, respectively (Hashim, 1994). Within the same period more than hundreds of countries had imported palm oil. In addition, palm oil exports expanded at an annual rate of 9.1%, the highest annual rate of export growth compared with soybean oil; its main competitor which grew by less than 1% (see Hashim, 1994).

On the consumption side, between 1982 and 1990 the average per capita consumption of palm oil in all regions (with the exception of USSR) world-wide grew at the average annual rate by 9.7%. This annual increase was the fastest ever registered as against other major oils and fats (soy bean, palm kernel, sunflower, rapeseed and olive oils and tallow). However in terms of the average per capita intake soybean was the highest and well above palm oil.

1.1 Market Competition Between Major Oils and Fats

The growth in production and exports of palm oil has been relatively rapid as against other oils and fats. Palm oil seems to be widely accepted by consumers world-wide as a major source of oils and fats. It has made inroads in markets which were largely soybean and canola oils. Major oils and fats producers (the EC, Canada and in particular, the US) felt that they pushed to defend their markets against the encroachments of palm oil.

The affected producers developed and deployed new marketing strategy principally to garner their lost market shares through domestic market intervention via production, processing and marketing. Surplus oils and fats were disposed through export subsidies and food aid programmes. Some resorted to price undercutting and discounts to penetrate new markets. Other used discrediting tactics including those articles and advertisements disseminated through publications and electronic medias. Most were found deliberately accusing palm oil as deleterious. These materials were written based on a very narrow perspective devoid of concrete scientific evidence; extrapolated from old theory and tuned in apromotional tone. Surprising that the timing of all these written articles and advertisements were published at the peak of "food phobia" or emergence of health conciousness amongst consumers in the West. Any new information and basic findings on dietary fats were simply extrapolated to suit writers' ends although the original authors may not have implicated the findings on any particulr group oils and fats.

For example palm oil was simply grouped under lauric oil. It was classified as saturated fats (i.e. in similar group as animal fats) and simply labelled as tropical grease. Perhaps all these were done deliberately; not incidental but tactical. It is said not incidental in the sense that the grouping, labelling and classification were done without exhaustive scientific investigation but based on more generalisation of facts which were vague and questionable. It seems tactical because all those grouping, labelling and classification were done deliberately; (1) to coincide with rapid exports growth and demand increased for palm oil in the 1980s (2) growing health conciousness amongst consumers in the West, (3) declined market share for soybean oil in the US and the EC, and (4) implemented with perceived plans directed to a design goal (i.e. trade and economics) aimed at making gains from those considered as

competitors (mainly palm oil). By grouping palm oil as lauric oil (in the same group as palm kernel and coconut) perhaps the negative proponents of palm oil were deliberately trying to build a perpetual image such that palm oil can be perceived as a tropical oil or grease acclaimed as deleterious in the mind of the consumers. Labelling palm oil as saturated fats may be intended to persuade the target audience to conceive palm oil as saturated animal fats. In other words, the opponents of palm oil were tying to building a common generic image for both palm oil and saturated animal fats so that consumers accepted the fact that palm oil is utterly resemblant of lauric and animal fats. In addition, very few of these disclosed a balance analysis on palm oil based on the true physiological and nutritional characteristics which are either positive or negative. Perhaps all these efforts were parts of their grand design to discredit; i.e. aimed at dampening the rapid acceptance of palm oil by international consumers which seems threatening the well being of other oils and fats producers.

1.3 Previous Studies and Objectives

Several studies have shown perverse effects on the negative campaigns on palm oil. The labelling of palm oil as lauric, saturated fats and deleterious by the American Soybean Association (ASA), American Heart Saver Association (AHSA) and Phil Sokolof, has caused the import of palm oil by the US to decline by 41% (Jamal et al. 1993). In fact the subsequent adverse campaigns on the consumption of saturated fats (tropical oils; in particular palm oil) managed to persuade Keebler, Pepperidge Farm, Sunshine Biscuits and Kelloggs to substitute palm oil with less saturated fats in response to negative perception of palm oil used in their products (bushena and Perloff, 1989; Jamal et al. 1993).

This paper seeks to examine some of the basic technical, physiological and nutritional criteria used in the grouping, labelling and classification of palm oil as such. Based on the exploration and critical analyses of published research materials it is hoped that the truth about palm oil could be exposed. Attempts are made to compare the evidence and other plausible scientific arguments to nullify and qualify some of the fictitious claims forwarded by the proponents of the palm oil competitors, which may not be incidental but purely tactical.

1.4 Technical Characteristics of Palm oil

1.4.1 Grouping of palm oil as lauric oil

Palm oil is widely use as an edible oil. Moll (1987) groups palm oil in the same category as coconut and palm kernel oils and terms palm oil as "lauric" oil. Goh (1991) indicated that the fatty acid composition of palm oil is 40 per cent

palmitic acid (C16:0) and 4.2 per cent stearic acids (saturated fatty acids, SFA); 39.2 and 0.1 per cent oleic and palmitoleic acids (C18:1 and C16:1 both are mono-unsaturated fatty acids, MUFA) and 10.3 per cent poly-unsaturated acids (linoleic acid, C18:2) or PUFA and a trace amount of lauric acid (0.2%; C12:0). On the other hand the fatty acids composition of coconut oil is 36.8 per cent lauric (C12:0), 16 per cent myristic (C14:0) and palmitic acids which are SFA (Gunstone, 1986; Tony et al. 1991). Therefore, classification of palm oil as lauric by Moll (1987) is over-simplified. Perhaps Moll (1987) tried to ignore the fact that the main fatty acids composition of palm oil is not at all lauric (less than 0.2% in palm oil).

1.4.2 The Classification of Palm Oil

The present classification of dietary fats as saturated fatty acid (SFA), mono-unsaturated fatty acid (MUFA) and poly-unsaturated fatty acid (PUFA), and the labelling of saturates as harmful, mono-unsaturates as "neutral" and poly-unsaturates as beneficial in coronary heart problem by some researchers is an over-simplification (Chong, 1988). Saturated fat is considered as oil that possesses hypercholestromic properties and its consumption is assumed to increase a person's risk to coronary heart disease. Palm oil is labelled as saturated fat, but Gurr (1991) concluded, from many recent studies, that consumption of palm oil helps to reduce blood cholesterol as might be suggested by its relatively high content of saturated fatty acids. Nor does it promote, but rather inhibits arterial thrombosis (Honstra et al. 1986). The presence of palmitic acid (C16:0) in palm oil is regarded as less hypercholestromic than that of saturated fatty acids with carbon numbers ranging between 12 and 14 of which palm oil only has a trace amount (Horlick and Craig, 1957; Hegsted et al. 1965). In addition, the presence of poly-unsaturated fatty acids, mainly linoleic acids (C18:2) within the safe limit, i.e. between 10 to 13 per cent in palm oil helps to reduce blood cholesterol (Mattson and Grundy, 1966; Tan, 1988). This argument is supported by other findings (Sundram et al. 1987; Krist-Estherton, 1984; Sugono, 1987) which have shown that feeding palm oil to animals give plasma cholesterol values comparable to or lower than those in animals fed with corn, soy bean, safflower or olive oils. Studies on Benedictine nuns in France have also demonstrated that blood cholesterol levels were significantly lower during five months' feeding on palm oil compared to one fed with peanut and milk fat (Baudet et al. 1984).

Palm oil which also contain 43 per cent Monounsaturated fatty acid (MUFA). MUFA is considered neutral and helps to lower blood cholestrol. Some oils with high MUFA are found to have reduced plasma cholesterol in animal after the trial

period (Sirtori et al. 1986; Mattson and Grundy, 1985), and some MUFA (monoenoic, erucic and eicosenoid) in some vegetable oils are found to have caused lipid deposits and neurotic lesions in the heart muscles of the experimental animals (FAO, 1977). The problem is believed to be associated with excessive amount of erucic acid in edible oils (Bunting, 1988). But Olive oils is listed as oil that contains the least saturated fatty acids, but the highest MUFA content (79%) amongst all vegetable oil types (Gunstone, 1986). Liquid olive oil which is the main oil consumed in the Mediterranean region is a widely-acclaimed health diet. Therefore a deducation could be made that the consumption of palm oil as those consumed in that region perhaps has as good health effects as olive.

The other major constituent of palm oil is polyunsaturates (10.3% PUFA). Although clearly hypolipidemic and antithrombotic, much attention has been paid recently to the possible harmful effects of poly-unsaturated fatty acids (C18:2). Up to now, there is no evidence that PUFA actsdirectly as carcinogens. But PUFA may act as potentiators by stimulating in the bile sterols which are converted into carcinogens by microorganisms inhabiting the colon by damping down the body immune defences (Gurr, 1983 quoted by Gurr, 1991). Excessive intake of PUFA itself may be equally hazardous owing to their ability to suppress immunity and promote tumourigenesis (Gammal et al. 1967; King et al 1978; Shepherd et al 1978; Vessby et al 1980; Vega et al 1982), unless there is adequate protection by Vitamin E and C. Palm oil, with 10.3% PUFA content may play a protective role by acting as free radical scavengers (Gurr, 1991).

1.4.3 Palm Oil is not Trans Fatty Acids

A specific quality of palm oil is that it has a high solid glycerine content which gives a desirable consistency without hydrogenation. It is very resistant to oxidation and therefore has a long shelf-life. By contrast, oils and fats derived from soybeans, rapeseed and sunflowers are hardened by a process called hydrogenation to produce fats that have firmness and plasticity. Hydrogenated vegetable oils such as soybean and rapeseed contain significant proportions of isometric mono-unsaturated acid (MUFA) with trans double bonds (Wahle, 1989). Trans MUFA have recently been found to elevate blood cholesterol in men (Mensink et al. 1990) and have deleterious effects on essential fatty acid metabolism and thrombin induced platelet aggregation in animals (Wahle, 1989; Holman, 1985; Peacock et al. 1989).

Partially hydrogenated soy bean oil contains between 22 and 60 per cent trans-isomer fatty acid (Applewhite, 1981).

By contrast, palm oil and its fractions do not contain any trans-fatty acid isomers. By hydrogenation, the essential properties of unsaturates in soy bean and sunflower oils are changed to trans-fatty acids. Gurr (1991) argued that trans fatty acids do not pose any metabolic disorder if consumed in diets of people in the UK and Germany (7 gm/day), but some individuals may consume diets containing trans in sufficient quantities to be potentially harmful (British Nutrition Foundation, 1987, quoted by Gurr, 1991).

1.5 Nutritional and Physiological Properties of Palm Oil

One of the major attributes of palm oil which is almost considered taboo by the negative progenitor of palm oil is it contains the highest known concentration of beta-carotene; carrot, with 5-10 per cent of this compound, is a distant second. Also, palm oil is particularly rich in vitamin A and related compounds, the carotenoids and in vitamin E (Gurr, 1991). Wong et al (1988) and Jacobsberg (1974) reported that Malaysian crude palm oil contains between 500-700 ppm of carotenoids, about 90 per cent of which are predominated by the alpa-and beta-carotenes in a ratio of about 1:1.5. Other components are -carotenes, lycopene and xanthophylls are also present in palm oil. Beta-carotene is a useful source in both neutralised (at low temperature) and unbleached palm oil, and therefore is responsible for the prevention of Vitamin A deficiency. This compound is found to have a suppressive effect on the growth of tumour (Ibrahim, 1994).

Another nutritional and physiological property of palm oil is the presence of tocopherols which have antioxidant properties. These tocopherols are physiologically important because of their vitamin E activity and anti-thrombotic effect (Goh, 1991). Tocopherols are grouped into: a saturated side chain, tocols; with an unsaturated chain, tocotrienols. Tocopherols, in particular the tocotrienols, are found abundantly in palm oil. Wong et al. (1988) report the contents of total tocopherols (saturated tocols and unsaturated tocotrienols) in crude and refined deodorised and bleached (RDB) palm oil, palm olein and stearin as 794, 563, 643 and 261 ppm respectively. This is contrary to the belief that processing crude palm oil may have lost these two important nutritional and physiological properities. Gurr (1991) and Goh (1991) supply the evidence that tocopherols are not totally lost through processing, but tocopherols were found more concentrated in the palm olein than stearin fraction (Goh, 1991).

Although oils such as soybean and corn oils contain somewhat higher level of tocols (Carpenter, 1979), palm oil contains probably the highest ratio of tocols to poly-unsaturated fatty acids (1:1.5) found in any oil, which is believed to be so important for prevention of heart disease (Witting et al. 1980). On average, palm oil contains 9, 97 and 98% respectively more tocotrienol content in palm oil is unusually high compared with other common vegetable oils (Gapor

et al. 1983). Tocols which are powerful nutritional antioxidants help to reduce cellular damage by freeing radicals arising from the body's normal oxidative energy metabolism, toxic chemicals and pollutants. These radicals have been implicated in ageing, chronic degenerative diseases and cancer. The presence of a significant amount of tocotrienols (the unsaturated tocopherols) in crude and processed palm oil seems unique (Goh, 1991; Gunstone et al. 1986).

1.6 Is Palm Oil Deleterious?

Perhaps the best description of the various effects of the fatty acids i.e. saturated (SFA), mono-unsaturated (MUFA) and poly-unsaturated (PUFA) is described by Hayes and Khosla (1992). In human studies, Hayes and Khosla have concluded that (C14:0) appears to be the principal saturated fatty acid that raises plasma cholesterol, whereas linoleic acid (C18:2) lowers it. Oleic acid (C18:1) appears neutral. The effect of C16:0 may vary, especially among normocholesterolemic subjects whose diets contain less than 300 mg/day of cholesterol, and palmitic acid (C16:0) appears to be without effect on cholesterol. However, in hypercholesterolemic subjects (>225 mg/dl) and with diets containing >400 mg/day cholesterol, the intake of C16:0 may expand or increase the cholesterol plasma pool.

Palm oil contains SFA (palmitic acid), MUFA (mainly oleic) and PUFA (linoleic), and vitamins A and E. The almost balanced composition of the three main fatty acids in palm oil plus essential vitamins, and the effects of different types of fat described in the preceding paragraph, it is perhaps difficult to argue that palm oil is the oil that is responsible for cardiavascular diseases and cancer, as suggested by some studies.

1.7 Conclusion and General Remarks

The results of the above discussion do not support the views that palm oil is lauric oil and the saturated component of palm oil behaves the same way as saturated animal fats (see ASA, 1986 and AHSA, 1986 and Buschena and Perloff, 1989). Palm oil is not identical to saturated fats present in coconut and palm kernal oils either, since lauric (C:12) and myristic (C:14) are not at all palmitic acid (C:16) which is the major constituents of palm oil (SFA). Myristic and lauric acids are in fact progenitors of bad low density cholesterol (LDL). Therefore all earlier premises and extrapolations from the old theory that concludeall saturated fats raised blood cholesterol and increased the chances of coronary diseases are totally absurd and misleading. The mechanism for cholesterol-raising leading the heart diseases does not rest upon the intake of one group of fatty acid but depends on many factors. For example, the presence of mono-unsaturated fatty acid and Vitamins A and E demonstrate the positive effects on health. In fact in reality no one fat is taken independent of the other, but likely in a mixture of SFA, MUFA and

PUFA together with other minor constituents like Vitamins A, E and C. The only difference is the proportion of each group of SFA, MUFA and PUFA together with its minor constituents which are either high or low, or balance in its compostion.

Fat is a necessary component of the diet, but the current enthusiasm to reduce the intake of fat, labelling it as vegetable and animal fats; saturated, mono-unsaturated and poly-unsaturated oils and fats by mass media without appreciating its complex nature is an act of over-simplicifation. The distinctly commercial overtones, particularly as to tropical oils by some special interest groups in the US, does not benefit consumers themselves. By claiming that poly-unsaturated fatty acids are healthy dietary fats, these interest groups tend to deceive the consumers about the poly-unsaturated used in foods that are in trans-forms which can be termed as saturated. In fact since 1971 more than 20 studies have concluded that poly-unsaturated oils especially used in margarine and cooking oil increase cancer risk (see Groves, 1994). Professor Raymond Kearrey of Sydney University has stated "vegetable oils which are rich in linoleic acid are potent promoter of tumour growth" (quoted by Groves, 1994). Further studies by two independent researchers in the US and Canada confirmed that eating linoleic rich diets increased the chances of breast cancer (Groves, 1994). In Australia, for example linoleic acid is suspected as a contributory factor to malignant melanoma. Since soy bean oil contais more than 40% poly-unsaturated fatty acid especially in trans-form, perhaps it is more deleterious than that of palm oil which contain 10.3%. But surprisingly none of these information is highlighted especially in time of the "food phobia".

It is sceptical to see that while in most advertisements the "truth" about poly-unsatuated fatty acid and more in resemblance of or worst of than saturates of palm oil; largely found in soybean oil is left out. On the other hand the negative aspects of saturated fats of palm oil are being blown out of proportion and placed on the limelight on packaging and labelling. The reality is that the Committee on Medical Aspects of Health Policy in the UK has made a recommendation that trans-fatty acid should be regarded as being equivalent to saturated fatty acids. The Canadian Food Regulation Authority requires that labels be used on special dietary food detailing both saturated and trans-fatty acids to remove the ambiguity whereby fats containing a high proportion of trans-fatty acids are legitimately described as poly-unsaturated, although their physical and metabolic properties resemble that of saturated fats.

There is a general consensus that the fat consumption, particularly that of saturated fat should be reduced. Therefore modification of dietary fats is necessary. However, certainly there is no consensus about whether the whole population should receive the same advice, because the bodily requirement of dietary fats differs. Therefore, paying attention to reduce fat intake by totally eliminating any one group of fats would not help the consumers,

instead it upsets the very balanced nature of dietary fats in any individual. If it is known that all fats are essential for healthy bodily functions, any recommendations that suggest the elimination of one type of fats, to be totally replaced with another in the diet, is unjustified.

Finally from the above discussion and exploration of the established facts tnat consumption of palm oil may not be as deleterious as being propagated by the negative proponents of palm oil. It seems certain that the so called "nutritionists and specialists" had not done the grouping, labelling and the classification of palm oil into lauric, saturated fats and harmful oil incidentally but motivated by tactical instinct, i.e. for trade and economic dominance. Incidental may be if no scientific evidences are found. But some of the reliable researches and scientific evidences are there since the 1970s and later in 1980s (as pointed by Groves, 1994) why has palm oil made as a scape-goat. It is not harmful to expose the deleterious effects of any groups of dietary fats derived from any oils and fats, provided a balanced approach is used. However, if information is deceiving and lop-sided on one particular oil or one particular group fatty acid then such practice doesnot contribute much help to the consumers.

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