

Nutrition and Health: Why is it Still Ticking Against Palm Oil?

Kalyana Sundram* and Yusof Basiron*

INTRODUCTION

As ardent readers of the free press (including trade magazines), we normally place a lot of trust on the accuracy of the print media. The traditional and long line of journalistic etiquette that has been established, sometimes at the expense of blood spilt on the sidewalks, we assume will be upheld with the vigour and valour of the shining knights in armour of a previous era. In short, truth should always prevail. This glorification of professional journalism no doubt is subject to untoward pressures and often suffers severe muddles especially in the political arena. This we can almost understand and forgive. But why pick on a food commodity - palm oil - whose only purpose of existence is to provide a wholesome food source to the world's masses?

At the height of the American Soyabean Oil Association's adverse campaign against tropical oils, a large number of reports carried biased and damaging reports against palm oil and its nutritional attributes. Looking back on that episode, one can almost forgive our competitors since palm oil itself lacked sufficient and convincing data to stage a proper counter attack and to take the battle to an offensive stage. Thus was born the masterly strategy at the Palm Oil Research Institute of Malaysia [PORIM, currently Malaysian Palm Oil Board (MPOB)] that demanded an accelerated research programme aimed at examining various aspects of palm oil and its health effects in humans, using established nutrition research facilities from all corners of the globe. This research programme was an energetic effort by PORIM (MPOB) and to date, a total of 148 different studies have been

commissioned and mostly completed. Not a single study yielded results that reflected the journalistic injustice (about palm oil) that was so blatantly bantered during that period. A consolation to us is that the same proponents who questioned palm oil and its health virtues are embroiled in a public health controversy of their own - against hydrogenated fats already proven to be far more health damaging than the tropical oils they wanted to malign.

HYDROGENATED FATS - THE CULPRITS OF THE NEW MILLENNIUM?

Hydrogenated soft oils have been traditionally used in margarine formulations. Despite the presence of *trans*-fatty acids in such formulations, they continue to be projected as preferred superior solid fat formulations in comparison to natural saturates. However, the mounting evidence demonstrating the adverse effects of *trans*-fatty

acids not only on coronary heart disease risk, but also on a number of other metabolic indicators such as diabetes and cancer has required manufacturers to seek non-hydrogenated solid fat products. We have been in the forefront advocating the neutrality of palm oil on cholesterol metabolism. Despite the evidence from a number of well design studies published in peer-reviewed journals, palm oil continues to be alienated especially in the United States.

An Alternate Process to Hydrogenation?

The North American manufacturers are predictably looking at opportunities to continue the use of locally available soyabean oil in their solid fat formulations. The most obvious outlet appears to be to adopt a processing route that fully hydrogenates soyabean oil into a hard stock by converting all the 18-carbon fatty acids into the saturated stearic acid. This may then be chemically interesterified with liquid oil to a required melting point and used in solid fat formulations while technically also qualifying for a *trans*-free label.

This approach has been vastly facilitated by a few human studies that have shown that stearic acid enrichment in the diet does not adversely impact plasma cholesterol levels. These studies have indeed gained much credence especially among the North American scientific committee to the extent

* Malaysian Palm Oil Board,
P.O. Box 10620, 50720 Kuala Lumpur,
Malaysia.

that stearic acid is currently viewed as a neutral fatty acid. The same acceptance has yet to be accorded to saturated palmitic acid. However, newer studies examining thrombotic risk in addition to cholesterol elevations have demonstrated that stearic acid could increase certain thrombotic parameters relative to palmitic acid. Acceptance of palm oil and its components as a natural hard stock for solid fats will actually hinge on our ability to prove its neutrality relative to a fully hydrogenated soyabean hard stock.

Palm Oil and Current Dietary Recommendations

One would have assumed that the accumulation of a large volume of data showing many positive attributes about palm oil and its health benefits would dull the senses of the anti-palm oil lobby. Indeed, we have been giving credit to the scientific community, which has approached the subject with an open mind through peer-reviewed scientific publications in a number of reputed biomedical journals. The message appears to be sinking in, albeit slowly. Today, it is not uncommon to find the positive virtues of palm oil being debated at scientific forums openly and critically - the net result of such debates is a growing awareness that for most of the world's population palm oil readily meets established criteria of a wholesome nutritious edible oil.

Just when we thought that the tempo of scientific scrutiny was overcoming common misguided tabloid journalism, we have been greeted by a rather rude shock, delivered by no less an authority than an expert consultation group of the WHO and FAO (joint WHO/FAO expert consultation: diet, nutrition and the prevention of chronic diseases, 2002). The draft report of this expert committee has made specific recommendations with respect to fat consumption and its impact on cardiovascular disease (CVD). Included in these recommendations are goals to

reduce fat intake to no more than 30 energy percent (en%) throughout the world, of which the saturated fatty acid content should not exceed 7 en%. Upper limits for the intake of polyunsaturated (6 en%-10 en%) and trans (< 1 en%) are also recommended while the remaining should be contributed by monounsaturated fatty acids. This, it is hoped would lead to reductions in mortality from CVD. MPOB recognizes the need to initiate such dietary goals aimed at reducing mortality from CVD.

However, a rather disappointing aspect of this report which is worrying to the palm oil industry is the lack of transparency attributed to those recommendations related to palm oil consumption: the expert committee has taken upon themselves to identify palm oil as an important edible oil whose current composition is recommended for modification. The recommendations were however arrived at without any reference to the large volume of published literature specifically evaluating palm oil effects on CVD in humans and other model systems. MPOB (formerly PORIM) had initiated a research programme focusing its efforts on understanding palm oil for its effects on CVD, cancer and the physiological roles of the fat-soluble minor components (tocopherols, tocotrienols, carotenoids, phytosterols) present in the oil. This research programme was undertaken as a global initiative funded entirely by MPOB. The research programme, especially those related to CVD were undertaken in populations in both the developed and developing nations. Human studies were further supplemented by animal and cell culture studies to help elucidate the underlying mechanisms of these observed effects. Researched findings have been published in peer-reviewed journals at the discretion of the researchers and without undue interference from MPOB. We are now concerned that despite such a large scale effort resulting in the

generation of substantial scientific publications, the WHO/FAO expert committee has chosen to ignore these publications.

Effects of Palmitic Acid on Coronary Vascular Disease (CVD)

In line with the bulk of available literature, we agree with the recommendations of the expert committee that saturated fatty acids increase risk for heart disease and that their consumption should be regulated, especially in populations consuming excess fat calories. In addition, it is noted that this report shows that the saturated fatty acids have varying degrees of influence on increasing blood lipids with myristic acid being the most potent cholesterol raising saturated fatty acid.

The effect of palmitic acid has been determined to be less potent than that of myristic and lauric acids and its abundant occurrence in food supply has been highlighted. In a number of studies that used palm oil as a natural source of palmitic acid, it was reported that the cholesterol raising effects of palmitic acid were negated by a sufficient availability of linoleic acid in the diet (4 en% - 7 en%). Furthermore, human studies conducted at the current levels of fat intake (~30 en%) clearly demonstrated a cholesterol elevating potential of dietary fats high in lauric and myristic acid combinations (occurring naturally in palm kernel oil, coconut oil and dairy fat) relative to palmitic rich vegetable oils/fats especially palm oil. Currently, stearic acid is assumed to have neutral effects on CVD and this has been highlighted in this report. The evidence for palmitic acid-based diets derived chiefly from palm oil-based studies has been ignored in totality.

Palm Oil as a Component of a Low Fat Diet (30 en%)

The liquid fraction of palm oil (palm olein) has a higher content of monounsaturated oleic acid and

lower content of palmitic acid and used extensively as cooking and frying oil in many parts of the world today. The oleic acid content of palm olein (liquid fraction of palm oil) is approximately 47%. One of the research strategies at MPOB has been to examine if this level of oleic acid compares with higher levels similar to those present in olive, canola and rapeseed oil. A number of human clinical trials were undertaken in different populations while adhering to a low fat regime. In all such studies, the cholesterolaemic effects of palm olein were equated with that of the recommended monounsaturated oils tested (including olive, canola and rapeseed). Yet another graphic demonstration was the study that formulated an American Heart Association Step-1 recommended dietary oil blend maximizing palm olein in its composition and which resulted in improved TC/HDL-cholesterol ratios. In arriving at specific recommendations pertaining to palm oil, these important studies already published in peer-reviewed journals have been ignored by the experts.

ALTERING THE FATTY ACID COMPOSITION OF PALM OIL - DOES CURRENT EVIDENCE SUPPORT THE RECOMMENDATION?

Based on prevailing fat consumption trends, most countries can be broadly classified as solid fat or liquid oil markets. The experiences of the edible oils industry have shown that it is rather difficult to change the oils and fats consumption patterns of any given population and realistically these must be considered long-term goals. Even when there is strong evidence for the benefits of reducing fat intake to 30 en% from current high levels in European and North American populations, the advice is not heeded readily because of existing food and culinary habits.

Solid fats remain the mainstay in many populations and have mostly been manufactured by

hydrogenating vegetable oils into hard fats. Our current knowledge about the adverse effects of hydrogenated fats containing *trans*-fatty acids is well entrenched. This will impose demands on the oils and fats trade to replace hydrogenated fats with naturally occurring semi-solid fats such as palm oil to deliver the texture, consistency and performance characteristics to products including margarine, shortenings, bakery and frying fats. Any attempt to alter existing fatty acid composition of palm oil must address this issue; otherwise a liquid palm oil will in turn require additional processing such as hydrogenation or interesterification to meet product functionalities.

The tools to alter the fatty acid composition of palm oil are available at MPOB, but there is reluctance since the preferred edible oil fatty acid composition is not truly defined, even by the WHO/FAO expert committee. For example, research at MPOB has shown that it would be possible to increase oleic acid at the expense of palmitic acid while the linoleic acid level could be maximally altered at about 15% of the oil composition. An ideal olive-type palm oil may be the designer oil of the future. However, limitations associated with fatty acid impacts on nutrition are making this progress difficult. Coupled to the above, the number of human studies that have reported no significant differences between palm olein and monounsaturated edible oils for effects on cholesterol metabolism makes any decision aimed at altering the fatty acid composition of palm oil a tricky affair.

CONCLUSION

Currently, palm oil is a major edible oil commodity in more than 132 countries worldwide and in many of these developing economies where palm oil is featured, fat consumption is well below recommended levels of intake. Indeed in these populations, there is a recognized need to increase fat

intake and palm oil is among the preferred sources of dietary fats. A number of human clinical trials undertaken in these developing countries which evaluated palm oil effects at low fat (30 en%) intakes clearly showed a neutral effect for palm oil with respect to plasma and lipoprotein cholesterol. It appears that quantity of fat consumed may be as important a determinant as the quality of fat consumed. Yet at high levels of fat intakes as apparent in the developed economies, tweezing out this difference has proven difficult. This may explain in part the adverse publicity that palm oil continues to attract based on its higher level of saturation. In the coming years, it could prove crucial to design human studies that specifically test many of the gaps that remain in our understanding of dietary fats, fatty acids and cholesterol metabolism paying particular emphasis of how palm oil can be fitted into these equations while imparting health benefits.

REFERENCES

- KALYANA SUNDRAM and CHANDRASEKHARAN, N (2000). Nutritional properties of palm oil and its components. *Advances in Oil Palm Research* (Yusof Basiron; Jalani, B S and Chan, K W eds.). Volume II, Chapter 27. MPOB, Bangi. p. 1061-1090.
- KHOSLA, P and KALYANA SUNDRAM (1996). Effect of dietary fatty acid composition on plasma cholesterol. *Progress in Lipid Research*, 35: 93-132.
- SAMBANTHAMURTHI, R; KALYANA SUNDRAM and TAN, Y A (2000). Chemistry and biochemistry of palm oil. *Progress in Lipid Research*, 39: 507-558.
- WHO/FAO (2002). Joint WHO/FAO expert consultation on diet, nutrition and the prevention of chronic diseases. Draft report of the expert committee, 2002.