Palm oil in human nutrition

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The thinking about how fats affect human health has been dominated by interest in **fatty acid patterns**, particularly their saturation and unsaturation, and how these characteristics, in turn, determine serum lipoprotein composition and concentration with respect to the pathogenesis of macrovascular or coronary heart disease (CHD). As with most fields of science, we are driven by what we can measure. The field of dietary fatty acid quality was facilitated by a progression of methodologies beginning with iodine values (for unsaturation or double bends), moving on to more analytic chromatographic methods like GLC (gas liquid chromatography) and HPLC (high pressure liquid chromatography) coupled to mass spectrometry for compound identification. With time, double bond configuration, *cis* or *trans*, also became of health, as well as industrial, interest and the adverse effects of *trans* fatty acids were identified. Within this historical development, there was already an increasing sophistication in the way in which the dominantly saturated palm oils were perceived, from concern about CHD risk on the basis of saturation, to appreciation of more neutrality in effect because of chain length[1], to possible advantage through lack of *trans* content[2] to differential effects of different *trans* isomers[3].

A new paradigm has begun which has to do with the **phytochemicals** in fats and oils. Not only are these the isomers of fat soluble vitamins, like the tocotrienols as well as the tocopherols in the case of vitamin E, and a range of carotenoids, additional to α and β-carotene, in the case of vitamin A, with altogether novel functions, but there are isoflavones and a range of polyphenols with their own human physiological and pathophysiological effects. In the case of palm oil, the tocotrienols have led the way, initially with conflicting evidence about their effects on lipid metabolism through HMGCoA reductase inhibition[4], then their synergistic anti-tumour properties, with polyphenols (flavonoids)[5] and their location in skin, protecting against actinic damage[6].

The changing view of fats and oils inevitably stimulates a quest in the market place for less refined products of which **red palm oil** is a traditional and emergent example with newer processing technologies which avoid carotenoid destruction (by controlled chemical and temperature treatments followed by molecular distillation). Red palm oil is now commercially available, but questions of acceptability of colour remain, especially among Chinese where oil of this colour has been used in religious ceremony. At the same time, there is renewed interest in the most **unrefined** of **fats and oils**, at source, in seeds, grains or nuts. We can expect there to be a new dietary emphasis on the mix of unrefined fats and oils, nutritious oleochemicals, some produced by biotechnology, others by fractionation, and of seeds, nuts and wholegrains as fat sources. Often, guidance will come from traditional food cultures.

The emphasis on **a variety of fats and oils**, their sources and their products, will also generate a more ecologically sound approach to this area of food and health. As the palm oil production, refining and processing industry grows, the environmental implications will be of greater interest. There is already evidence, at least, that waste management and recycling are becoming highly successful. The story of how active research and debate will relentlessly change perceptions of preferred ways of eating for health is as fascinating for dietary fat as for any area of human nutrition.

References

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