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EDITORIAL**DIETARY TRANS FATTY ACID AND SERUM LIPOPROTEINS**

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Trans fats, unsaturated fatty acids with at least one double bond in the trans configuration, are formed during the partial hydrogenation of vegetable oils, a process that converts vegetable oils into semisolid fats for use in margarines, commercial cooking, and manufacturing processes. From the perspective of the food industry, partially hydrogenated vegetable oils are attractive because of their long shelf life, their stability during deep-frying, and their semi solidity, which can be customized to enhance the palatability of baked goods and sweets.

Major sources of trans fats are deep-fried fast foods such as doughnuts and french fries, bakery products, packaged snack foods, margarines, chips and crackers. Shortenings and some margarines can be high in trans-fat. Though in recent years food manufacturers in most of the developed countries have used it less because of concerns over the health effects of trans fat, the situation in developing countries like Bangladesh may be worse due to ignorance and almost having no control over the food producers. Food manufacturers in the United States and many other countries list the trans fat content on nutrition labels.

Naturally occurring trans fats are consumed in smaller amounts (about 0.5 percent of total energy intake) in meats and dairy products from cows, sheep, and other ruminants; these trans fats are produced by the action of bacteria in the ruminant stomach. The average consumption of industrially produced trans fatty acids in the United States is 2 to 3 percent of total calories consumed.¹

The Food and Drug Administration (FDA) ruled that, effective January 1, 2006, the nutrition labels for all conventional foods and supplements must indicate the content of trans fatty acids.² The Department of Agriculture made a limited intake of trans fatty acids a key recommendation of the new food-pyramid guidelines, subsequent to the recommendations of the Dietary Guidelines Advisory Committee that the consumption of trans fatty acids be kept below 1 percent of total energy intake. The New York City Department of Health and Mental Hygiene has asked 20,000 restaurants and 14,000 food suppliers to eliminate partially hydrogenated oils from kitchens and to provide foods and food products that are free of industrially produced trans fatty acids.

Denmark has enacted, and Canada is considering, legislation to eliminate industrially produced trans fats from food supplies.³ Bills to limit or ban trans fats in restaurants or school cafeterias have been introduced in many states.

Each of these actions was prompted by evidence that consumption of trans fatty acids increases the risk of coronary heart disease (CHD). Concern about the adverse health effects of trans isomers of unsaturated fatty acids has increased since 1990 after the results of controlled dietary intervention studies.^{4,5} Results of these studies showed a detrimental effect of trans fatty acids on LDL and HDL cholesterol. Evidence that intake of trans isomers affects the rate of coronary heart disease is derived from population-based studies done in the USA.^{6,7}

Only unsaturated fats can be trans or cis fat, since only a double bond can be locked to these orientations. Saturated fatty acids are never called trans fats because they have no double bonds, and, therefore, all their bonds are freely rotatable. A double bond may exhibit one of two possible configurations: trans or cis. In trans configuration, the carbon chain extends from opposite sides of the double bond, whereas, in cis configuration, the carbon chain extends from the same side of the double bond. The trans molecule is a straighter molecule. The cis molecule is bent.

Health effects of trans fats

Concerns have been raised for several decades that consumption of trans fatty acids might have contributed to the 20th century epidemic of coronary heart disease.⁸ Metabolic studies have shown that trans fats have adverse effects on blood lipid levels--increasing LDL cholesterol while decreasing HDL cholesterol. This combined effect on the ratio of LDL to HDL cholesterol is double that of saturated fatty acids. Trans fats have also been associated with an increased risk of coronary heart disease in epidemiologic studies⁹

Based on the available metabolic studies, a 1994 report estimates that approximately 30,000 premature coronary heart disease deaths annually could be attributable to consumption of trans fatty acids. In response to these

reports, a 1995 review sponsored by the food industry concluded that the evidence was insufficient to take action and that further research was needed.¹⁰ Since that time many more metabolic studies have been conducted and additional prospective epidemiologic studies have been reported. Because of the weight of the evidence, the FDA has recently issued a proposal for including trans fatty acid content on the food label. One important issue is whether to list trans fat as a separate constituent or to combine it with saturated fat.

In a rigorous metabolic study, Mensink and Katan demonstrated that replacement of 10% of energy from oleic acid (the primary monounsaturated fat in diets) with trans 18:1 fatty acids caused a 0.34 mmol/L increase in LDL cholesterol and a 0.17 mmol/L decrease in HDL cholesterol; whereas replacement of oleic acid with saturated fat caused a similar increase in LDL cholesterol, but virtually no change in HDL cholesterol. As a result, the LDL/HDL cholesterol ratio was significantly higher on the trans (2.58) than on the saturated (2.34) or oleic (2.02) diets. These findings were soon confirmed in several investigations, including the study by Lichtenstein et al. that appears in this issue of the Journal, using lower levels of trans fatty acids and different mixtures of trans isomers.¹¹

CONCLUSIONS

On the basis of evidence from in vitro experimental studies, dietary trials, and prospective observational studies, the consumption of trans fatty acids from partially hydrogenated oils provides no apparent nutritional benefit and has considerable potential for harm. Although the elimination of partially hydrogenated oils from foods may be challenging for restaurants and food manufacturers in the United States, experience in other countries indicates that such fats can largely be replaced by cis unsaturated fats without increasing the cost or reducing the quality or availability of foods. Mono and unsaturated fats are superior to saturated fat without question. But in some cases, for the purpose of food functionality and stability, saturated fats are necessary. Thus, Palm oil could be a good substitute for trans fats by the food industry as it naturally contains 44 percent of saturated palmitic acid (it has favorable effect on serum lipoproteins). Health care providers should advise consumers about how to minimize the intake of trans fats, consumers should recognize and avoid products containing trans fats and restaurants and

food manufacturers should choose to use alternative fats in food production and preparation. These steps should help reduce the consumption of trans fatty acids, possibly resulting in substantial health benefits such as averting thousands of CHD events, yearly.

REFERENCES

1. Allison DB, Egan SK, Barraj LM, Caughman C, Infante M, Heimbach JT. Estimated intakes of trans fatty and other fatty acids in the US population. *J Am Diet Assoc* 1999;99:166-174
2. Food and Drug Administration. FDA acts to provide better information to consumers on trans fats. 2005. (Accessed March 17, 2006, at <http://www.fda.gov/oc/initiatives/transfat/>.)
3. Health Canada. Government response to the interim recommendations of the Trans Fat Task Force. 2005. (Accessed March 17, 2006, at http://www.hc-sc.gc.ca/fn-an/nutrition/gras-trans-fats/government_response_reponse_gouvernement_e.html)
4. Nestel PJ, Noakes M, Belling GB, McArthur R, Clifton PM, Abbey JM. Plasma cholesterol-lowering potential of edible-oil blends suitable for commercial use. *Am J Clin Nutr* 1992; 55: 46-50.
5. Lichtenstein AH, Ausman LM, Jalbert SM, Schaefer EJ. Effects of different forms of dietary hydrogenated fats on serum lipoprotein cholesterol levels. *N Engl J Med* 1999; 340: 1933-1940.
6. Willett WC, Stampfer MJ, Manson JE, et al. Intake of trans fatty acids and risk of coronary heart disease among women. *Lancet* 1993; 341: 581-585.
7. Ascherio A, Rimm EB, Giovannucci EL, Spiegelman D, Stampfer M, Willett WC. Dietary fat and risk of coronary heart disease in men: cohort follow up study in the United States. *BMJ* 1996; 313: 84-90.
8. Booyens J, Louwrens CC, Katzeff IE. The role of unnatural dietary trans and cis unsaturated fatty acids in the epidemiology of coronary artery disease. *Med Hypotheses* 1988; 25:175-182.
9. Willett WC, Ascherio A. Trans fatty acids: Are the effects only marginal? *Am J Public Health* 1994; 84:722-724.
10. Expert Panel on Trans Fatty Acids and Coronary Heart Disease. Trans fatty acids and coronary heart disease risk. *Am J Clin Nutr* 1995; 62:655S-708S.
11. Judd JT, Clevidence BA, Muesing RA, Wittes J, Sunkin ME, Podczasy JJ. Dietary trans fatty acids: effects of plasma lipids and lipoproteins on healthy men and women. *Am J Clin Nutr* 1994; 59:861-868.