SPECIAL GUEST EDITOR SECTION

Trans Fats: Update on Health Effects, Methodology, and Levels in Processed Foods

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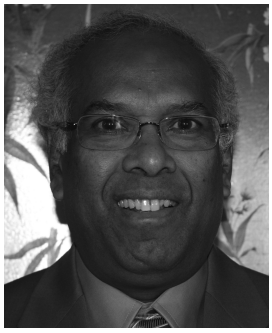

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It is now universally accepted that consumption of *trans* fatty acids (TFA) increases the risk of coronary heart disease more than any other type of fat. Therefore, regulatory and nonregulatory initiatives have been recommended and implemented in many countries, including Canada, the United States, Australia, New Zealand, and Denmark, to reduce the levels of *trans* fats in foods. The World Health Organization/Food and Agriculture Organization expert consultation on Diet, Nutrition, and the Prevention of Chronic Diseases recommended that intakes of industrially produced TFA should not exceed 1% of total energy intake.

Due to the above initiatives and consumer demand for TFA-free foods, several food manufacturers in Canada and the United States have taken action to remove or reduce the TFA contents of foods. Removing industrially produced TFA requires the replacement of partially hydrogenated oils with alternative fats such as tropical oils (palm, palm kernel, or coconut oil), butter and animal fats, or more preferably high-oleic vegetable oils. The impact of the use of TFA alternatives on the levels of TFA, saturated fat, and unsaturated fats of reformulated foods is, however, not fully known. Moreover, precise quantitative information on consumption of TFA can be challenging due to different methods used for TFA analysis and dietary estimation. Therefore, there is a need to review existing methodology and recommend accurate methods for quantitative determination of TFA in foods.

This special edition of the *Journal of AOAC INTERNATIONAL* consists of several papers presented at the 122nd AOAC Annual Meeting and Exposition (September 2008) plus other invited contributions. It provides information regarding state-of-the-art methodology for the accurate quantitative determination of TFA, consumption of TFA in developing and developed economies, and health effects of the consumption of TFA. It also explores whether the initiatives taken by the regulatory agencies and the food industry had any impact on reducing TFA and resultant improved fatty acid profiles of foods that were previously known to contain high levels of TFA.

The first paper in the series provides an authoritative review of the health effects of TFA and summarizes data on consumption of TFA (mostly in developed economies). The second paper provides new data on TFA contents of Canadian foods and estimation of intake levels of TFA for the Canadian population. The Canadian findings indicate that some manufacturers and restaurants have taken the opportunity not only to reduce the TFA content, but also to increase the content of mono- and polyunsaturated fatty acids, which may provide additional health benefits. The third paper summarizes information on levels of TFA in diets consumed in developing economies, especially in South Asian countries. The last three papers (fourth, fifth, and sixth) provide an update on methods for the determination of TFA. The fourth paper presents a comprehensive discussion of the two commonly validated methods (capillary gas chromatography and infrared spectroscopy) used for quantifying TFA for regulatory compliance. The fifth paper highlights the use of direct transmethylation of lipids in food products in TFA analysis by high-resolution gas chromatography. The last paper reports the synthesis of reference materials for the chromatographic analysis of fatty acids including TFA.

Undoubtedly, this special edition makes an important and significant contribution by providing state-of-the-art information regarding accurate and standardized methodologies for TFA analysis in foods, TFA contents of foods consumed in both the developed and developing countries, estimation of TFA consumption by different populations, and adverse effects of its consumption on multiple risk factors for chronic diseases. This special edition will provide worthwhile up-to-date information to consumers, industry, researchers, and regulators regarding methods of analysis, food composition, consumption levels, and health effects of TFA. Therefore, participation of the authors who contributed to this special edition is acknowledged with special gratitude.

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