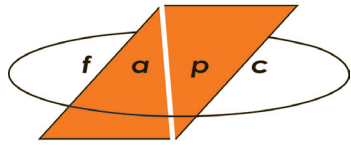


Food & Agricultural Products Center



FLASH!!

OKLAHOMA STATE UNIVERSITY™

August 18, 2004

Trans Fat Content to Appear on Nutritional Labels

STILLWATER, Okla.—The nutritional attributes of *trans* fatty acids has been the subject of concern among food scientist, nutritionists and consumers.

“Recent events have prompted the Food & Agricultural Products Center’s efforts to optimize methods for determining *trans* fat in foods and provide accurate nutritional labeling concerning fat types,” said Guadalupe Davila El-Rassi, analytical chemist for the FAPC.

A National Cattlemen’s Beef Association article, *Nutrient Facts/Trans Fatty Acids*, reported that there are two basic categories of *trans* fatty acids: "naturally occurring" and "man made." The main structural differences between these two categories are position and number of double bonds. These differences result in very different health effects.

The man-made *trans* fats are produced during partial hydrogenation of vegetable oils. Partial hydrogenation, a process that solidifies or semi-solidifies fatty acids, increases the shelf life and flavor stability of these fats. It also reconfigures some double bonds where the hydrogen is placed on a different side of the chain.

Low amounts of *trans* fatty acids occur naturally in animal products such as beef, lamb and dairy products, stated in the NCBA article.

The most prominent fatty acids are vaccenic acid (VA 18:1, *trans* 11) and two conjugated linolenic acids (18:2, *cis* 9-*trans* 11 and 18:2, *trans* 10-*cis* 12). Unlike the man-made

trans fatty acids, conjugated linolenic acids appear to present beneficial health effects.

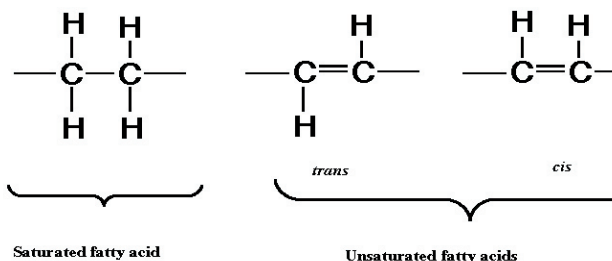
According to the article, *Determination of Total Trans Fatty Acid in Food*, *trans* fat, such as saturated fat, raises the serum level of low-density lipoprotein cholesterol, LDL-C or “bad” cholesterol, increasing the risk of developing coronary heart disease.

“As a result of these alarming findings of suspected adverse health effects of *trans* fatty acids, the food industry is trying to develop new hydrogenation techniques without the development of man-made *trans* fats,” El-Rassi said. “In addition, a requirement has emerged from the Food and Drug Administration’s *trans* fatty acid final rule, which will go into effect on Jan. 1, 2006.”

Silliker Inc., testing laboratories serving the food processing, retail, foodservice, pharmaceutical and cosmetic industries, reported that the changing of the Nutritional Fact panel is one of the requirements listed in the new *trans* fats FDA ruling.

The panel must specify the contents of *trans* fat in grams on a separate line below saturated fat. This requirement has emerged from the recent finding of the adverse health effects of *trans* fatty acids. Three examples for listing *trans* fats are:

- The nutritional facts panel for all food and dietary supplements, unless exempt, must include *trans* fat content on a separate line below saturated fat.
- Labels must declare *trans* fat content in grams, rounded to the nearest 0.5 gram below 5 grams and rounded to the nearest 1 gram above 5 grams.
- Products containing less than 0.5 gram of total fat per serving and do not make fat, fatty acid or cholesterol claims are exempt from declaring *trans* fat on a separate line in the nutrition facts panel. However, products must include the statement, “Not a significant



Saturated fatty acid
Unsaturated fatty acids
Carbon-Carbon bonds in saturated and unsaturated fatty acids.

-more-

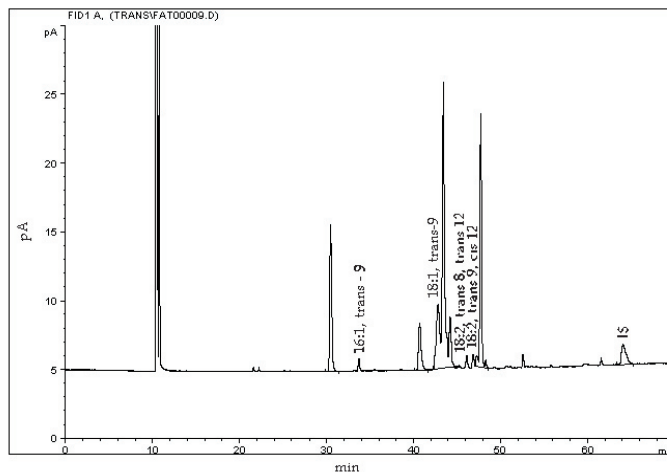
source of *trans* fat,” at the bottom of the nutrition facts panel.

The ability to identify and quantitate *trans* fatty acids has improved dramatically over the past decade. This has prompted the FDA to include *trans* fat as one of the core nutrients. *Trans* fats will be deemed misbranded if the nutrient content of composite samples exceeds 120 percent of the label value, according to Silliker.

“The FAPC is committed in providing entrepreneurs with dependable technical assistance in analytical chemistry,” El-Rassi said. “The FAPC has recently established a gas chromatography method to determine *trans* fatty acids in food products.”

The determination of *trans* fatty acids content is normally carried out by either infrared spectroscopy or capillary gas chromatography. The FAPC analyzes samples by gas chromatography because it offers better sensitivity and can separate the different *trans* fatty acids isomers present in polyunsaturated fats. This method could be applied to a wide array of sample matrices.

Fat extraction and methylation from processed food samples are performed according to the Official Method of Analysis of the Association of Official and Analytical Chemists. Most of the *trans* fatty acids consumed in American diets come from processed snacks such as chips, cookies, vegetable shortening and commercial baked goods as well as fried foods.



This figure represents the chromatogram obtained from fatty acids methyl esters (FAME) prepared from breaded chicken breast. Amount of trans fatty acids present in the sample was 30 mg/g.

The methods involved include fat extraction, methylation and gas chromatography analysis. The procedure begins with food preparation. The prepared food samples are thawed and finely ground and homogenized in a Cuisinart mini-prep plus food processor. Thawed dough aliquots are then taken at different sample locations, and products are analyzed within 48 hours of homogenization.

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