

Coronary risk: *trans*- and saturated fatty acids

Gerhard Jahreis

Friedrich Schiller University of Jena, Germany

Abstract

There is a high content of *trans* fatty acids (FA) in solid fats (margarine) produced by partial hydrogenation of oils. Foods processed using such fats, like baked goods (biscuits, cake) fried fast food and other prepared foods could also be rich in *trans* FA. This group of FA as well as saturated FA are naturally found in products originating from ruminants. Estimates of *trans* FA intake during recent decades have varied between 3 and 13 g/day in USA and between 2 and 17 g/day in Europe.

By the early 1990s, it had become apparent that the consumption of *trans* FA had some adverse effects on cholesterol metabolism in clinical studies and was associated with an increased risk of coronary heart disease (CHD) in epidemiology investigations. *Trans* fatty acids increase LDL cholesterol to levels similar to those produced by saturated fatty acids and also decrease HDL cholesterol levels. The effect of *trans* fatty acid on the ratio of LDL/HDL cholesterol is approximately double that of saturated fatty acids in processed fats. During the 90s, the reduction of *trans* FA content of margarines was realised by increasing the amount of saturated and *cis*-unsaturated FA.

The mean *trans* FA intake decreased and now amounts to 2.40 ± 1.53 g/day for men and 1.98 ± 1.49 g/day for women ($0.87 \pm 0.48\%$ and $0.95 \pm 0.55\%$ of energy, respectively) in Europe (TRANSFAIR 2000).

Partial hydrogenation of fat results in a range of C18:1 isomers, among which the $\Delta 9$ (elaidic acid) and $\Delta 10$ isomers are most prominent. In milk fat, the $\Delta 11$ isomer (*trans* vaccenic acid) is the dominant *trans* FA.

The Nurse's Health Study has already showed that the *trans* FA intake itself is not aetiologically related to CHD. No association was found between animal *trans* FA intake and CHD risk. It is imperative to differentiate between the specific metabolic effects of *trans* FA isomers and saturated FA.

At the moment, the physiological impact of *trans* vaccenic acid is being investigated to understand the individual effects of this *trans* FA compared with other *trans* FA and saturated FA.