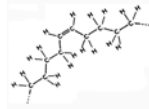




TRANS FATTY ACIDS



I. INTRODUCTION

I.1. General Information

Saturated fatty acids do not contain any double bonds or other functional groups along the chain. The term "saturated" refers to hydrogen, in that all carbons (apart from the carboxylic acid [-COOH] group) contain as many hydrogen's as possible. Saturated fatty acids form straight chains and, as a result, can be packed together very tightly, allowing living organisms to store chemical energy very densely. **Unsaturated fatty acids** have one or more double bonds. A **cis** configuration means that the two carbons are on the same side of the double bond. The more double bonds the chain has in the *cis* configuration, the less flexibility it has. The **trans** form has the two parts of the chain almost linear. The trans fatty acids (**TFA**) are therefore rather similar in conformation and behaviour to the saturated fatty acids.

I.2. Origin

TFA's are characteristically produced during **industrial hydrogenation** of unsaturated fatty acids of plant oils and during **deodorization** (a necessary step in refining).

Some **TFA's** are **formed naturally** in the rumen of ruminants by partial hydrogenation by bacteria after ingestion of unsaturated fats.

Small amounts of TFA are also present in poultry and pork fat, **derived from feed**.

TFA can also be formed during **heating or frying** of oils at high temperatures.

In ruminant fat trans 18:1 dominate (18:1t, n-7 is the major isomer: trans vaccenic acid), but trans 14:1 and 16:1 as well as trans isomers of 18:2 and 18:3 also occur. In milk and ruminant fat conjugated isomers of linoleic acid (CLA) which may contain one or two trans double bonds, are found.

In partially hydrogenated vegetable oils 18:1 trans isomers (18:1t, n-9 and 18:1t, n-7) dominate but small amounts of other trans monoene and polyene isomers are also found.

Partially hydrogenated fish oils also contain 20:1 and 22:1 trans isomers.

At the present time, there is no method which permits to distinguish naturally occurring TFA from those produced industrially.

I.3. Health risk and intake

TFA's increase the **risk of coronary heart disease**. Recommendations are made by the WHO, FSA, EFSA that manufacturers should reduce the levels of TFA arising from hydrogenation.

Reduction in TFA can be affected by modifying the conditions during the hydrogenation process.

In the TRANSFAIR study for 1995-96, the mean daily intakes of TFA for 14 different countries were estimated. Intake was lowest in the Mediterranean countries.

Isomers of 18:1 (oleic acid) contributed 54-82% of the total TFA. Major sources of TFA were edible fats and ruminant fat, with bakery products and French fries as additional contributing foods in some countries. The contribution of TFA from ruminant fat ranged from about 30 to 80% of total TFA, corresponding to 0.3-0.8% of energy.

I.4. Legislation

In July 2003, the FDA published a final rule in the Federal Register that amended its regulations on food labeling to require that trans fatty acids be declared in the nutrition label of conventional foods and dietary supplements. This rule is in effect since 1 January 2006.

The Danish food authorities adopted legislation which introduced with effect from 1 January 2003, a limit on the level of TFA in the product as sold to the final consumer. Apart from this **no legislation exists in the EU** or in the USA limiting the level of TFA in food.

Information Statement, Trans Fatty Acids, Institute of Food Science and Technology Trust Fund, IFST, London, UK, 2004

Opinion of NDA Panel related to the presence of trans fatty acids in foods and the effect on human health of the consumption of trans fatty acids, Last updated: 31 January 2007, Publication Date: 30 August 2004, Adopted on 8 July 2004. (Request N° EFSA-Q-2003-022)

*Transvetzuren in het Belgische voedingspatroon, W. De Greyt, nutrinews juni 1999, www.nice-info.be
http://en.wikipedia.org/wiki/Fatty_acid*

II. ANALYSIS

Our lab has an **accredited method** (ISO 17025) for the determination of the **fatty acid profile of food/feed**. Trans fatty acids and omega fatty acids are included.

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