



Questions & Answers

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Trans Fatty Acids: Questions & Answers

With annexed scientific references

What are trans fatty acids?

Trans fatty acids (TFAs) are unsaturated fatty acids which can be found in food, either as industrial TFAs in some processed vegetable oils or as naturally occurring TFAs in meat and dairy.

Natural TFAs are also known as “**ruminant TFAs**” because they are **naturally produced in the gut (rumen) of cows**. This is why small amounts of ruminant TFAs can be found in animal products such as milk and meat. On average milk fat is composed of 65-70% saturated fatty acids and 30-35% unsaturated fatty acids. Natural TFAs represent only 4-6% of total milk fat, meaning less than 0.1 g of TFA in 100 ml of full fat milk (*Gebauer et al., 2011*).

Industrial TFAs are formed during the **hardening process of vegetable oils** (partial hydrogenation at high temperatures) used to increase shelf-life of some foods. Industrial TFAs can be found mainly in margarines, spreads, processed baked goods, fast foods and snack foods. Partially hydrogenated fat may contain up to 60% industrial TFA (*Stender et al., 2008*).

How much natural TFA do we actually eat?

Levels of natural TFAs found in dairy are **as low as 0.03 g in 100 g low fat yoghurt** (Table 1). The literature shows that consumption of ruminant TFAs from natural sources such as dairy, meat and butter is **below 2 g/day in the average European diet** (Figure 1; *Gebauer et al., 2011, Craig-Schmidt, 2006*). Contribution of ruminant TFAs to the overall energy intake is therefore minimal and is also **below the maximum level for total TFA intake of 1% of energy set by WHO** (*WHO, 2003*). **The amount of natural TFA consumed in our usual diet is therefore not of any health concern.**

Dairy products	Total fat (g/100 g)	TFA (g/100 g)	TFA (g/serving)
Cheese, cheddar (28 g, 1 oz)	36.4	0.87	0.24
Milk, whole (244 g, 1 cup)	3.10	0.09	0.21
Yogurt, plain, low-fat (255 g, 1 cup)	1.16	0.03	0.06

Table 1. Amounts of TFA in some dairy products (*Gebauer et al. 2011*)

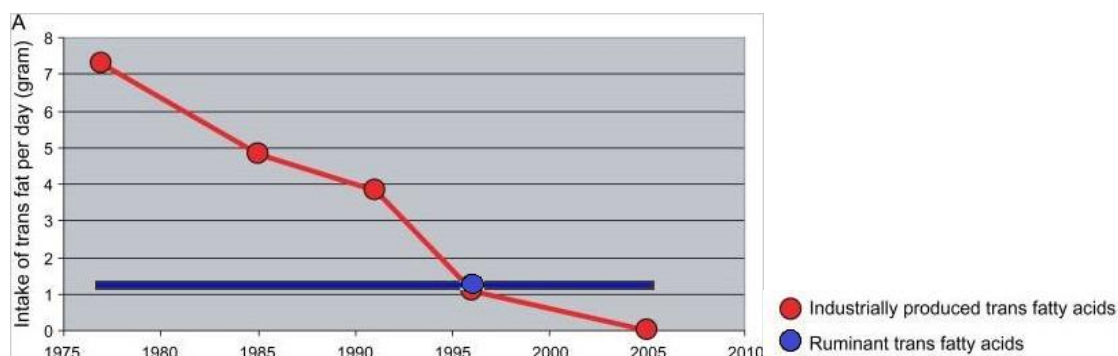


Figure 1: The average intake of industrially produced and ruminant TFAs in Denmark from 1978 to 2005 (*Stender et al, 2008*)



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Are there negative health effects of TFAs?

TFAs have been found to affect the blood lipid profile by increasing the LDL (“bad”) cholesterol levels and decreasing the HDL (“good”) cholesterol levels which has been linked with an increased risk of cardiovascular disease (CVD). Research suggests that **TFAs from industrially produced and natural sources have different effects on CVD risk factors** - the HDL cholesterol-lowering property of TFAs seems to be specific to industrial sources (*Chardigny et al., 2008*). Scientific studies show that **natural TFAs do not influence negatively blood lipids** or other cardiovascular risk markers (*Kuhnt et al., 2015; Gayet-Boyer et al., 2014*). In addition, the amounts of natural TFAs consumed with milk and dairy products as part of a balanced diet are too low to pose any risk to health (*Motard-Bélanger et al., 2008, Stender et al., 2006a*). The latest systematic review and meta-analysis of observational studies found that ruminant TFAs were not associated with coronary heart disease (CHD) and CHD mortality (*de Souza et al., 2015*).

Are there any possible health benefits of specific ruminant TFAs?

There is ongoing research studying the potential **positive role of specific ruminant TFAs** that is adding to the growing evidence of health benefits related to milk and dairy products.

Science indicates that consumption of natural TFAs found in milk and dairy, in particular conjugated linoleic acid (CLA) and its predecessor vaccenic acid (VA), may be linked to numerous beneficial health effects such as **improved blood lipid profiles and decreased cholesterol absorption** (*Chardigny et al., 2008; Gayet-Boyer et al., 2014; Kuhnt et al., 2015*). CLA has also been associated to **reduction of body fat mass** in overweight and obese subjects (*Blankson et al., 2000*). Another ruminant-specific TFA, trans-palmitoleic acid, has been found to substantially **reduce the risk of type 2 diabetes** (*Mozaffarian et al., 2010; de Souza et al., 2015*). It is important to note that trans-palmitoleic acid is not produced by the human body and can be introduced to the diet exclusively with dairy products. **Potential anti-cancer properties** of ruminant CLA have been shown in animal studies (*Corl et al., 2003; Lock et al., 2004, Parodi et al., 2003*) - the human research is still ongoing.

How can we technically differentiate between industrial and natural TFAs?

As industrial and natural TFAs are of different origin, their acid composition is different. For example, rumenic acid, vaccenic acid and butyric acid can be found exclusively in animal fat and not in industrial TFAs in vegetable oils (*Lock et al., 2005*).



The amount of natural and industrial TFA in foods can therefore be calculated based on product recipes and ingredients declared on the labels (*Stender et al., 2008*). For example, for a cake produced using both butter and vegetable oil, the amounts of industrial and ruminant TFAs are calculated based on the different TFA content of these ingredients. If only butter is used, the cake will only contain ruminant TFAs and no industrial TFAs.



This easily made distinction is a regular practice in food production and has been acknowledged by the national legislations on trans fatty acids, e.g. in **Denmark where TFAs of natural origin have been explicitly excluded from mandatory labelling** (*Stender et al., 2006b*). Also the new US measure clearly targets industrial TFAs in hydrogenated oils which shows that distinction between industrial and natural TFAs is technologically possible (*US FDA, 2015*).



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What are the existing policies on TFAs?

Over the years, food manufacturers in the EU and US have been gradually reducing industrial TFAs in processed foods. Some countries have introduced legal measures aiming at reducing the intake of industrial TFAs (*L'Abbé et al, 2009; Mozaffarian et al., 2006*).

As a leading example in Europe, **Denmark** introduced a national law in 2003 which restricts industrial TFA content in foods to a maximum of 2% of the total fat content. The Danish law clearly excluded naturally occurring ruminant TFAs. This is also the case in Norway (law introduced in 2014) and Latvia (law under preparation) where the legislators focus the measures on industrial TFAs.

The **US** law allows TFA-free labels for products containing less than 0.5 g of TFA, considering that ruminant TFA are natural and irremovable. In June 2015 the US FDA concluded that *"Partially Hydrogenated Oils (PHOs) are not Generally Recognized as Safe (GRAS)"*. The new measures ordered the industry to remove PHOs from processed products within 3 years, given that PHOs are the primary dietary source of artificial trans fat in processed foods. The US FDA also clearly acknowledged that *"TFAs occur naturally in small amounts in meat and dairy products"* and by that the status of the ruminant TFAs remains unchanged.

At **EU level**, the Food Information to Consumers Regulation (EU) No 1169/2011¹ foresees publication of the European Commission report which would explore different policy options on TFAs.

Why should any TFA labelling or legal threshold exempt naturally occurring TFAs in milk and dairy?

Potential introduction of **TFA labelling** may be justified by giving the consumer informed choice of the product. In case of highly processed foods such labelling may indeed help the consumer to choose between the products high or low in industrial TFA. Some manufacturers might be also encouraged to reduce the industrial TFAs levels in order to be able to use a "TFA-free" label.

Contrary to highly processed foods, products naturally containing some amounts of ruminant TFAs, such as milk and dairy products, have no possibility of reformulation, as ruminant TFAs are an integral part of milk fat. Naturally occurring, ruminant TFAs should be therefore always exempted from any TFA labelling or legal thresholds requirements. Moreover, labelling of naturally occurring, ruminant TFAs would not only confuse and unnecessarily worry the consumer but may also lead to a **competitive disadvantage for dairy products which would not be able to claim they are "TFA-free"** - contrary to processed foods where reformulation of TFAs levels is possible.

The principle behind the **legal limits** of the TFA content in products is to reduce the intake of industrial TFAs by the consumers. This is line with the measures taken by the US authorities in 2015 which clearly target products containing PHOs where the technological change is possible.

Could labelling of natural TFAs negatively influence public health?

Labelling of naturally occurring, ruminant TFAs might result in discouraging consumers from eating dairy products which play an important role in a balanced and healthy diet. Lower consumption of milk and dairy foods would have a negative impact on public health, including a reduced intake of essential nutrients such as high quality protein, vitamins and minerals, e.g. calcium. **Any measures or legislation in the context of labelling of natural TFAs would be therefore redundant and should be discouraged as negatively affecting consumption of dairy products and public health.**

Status: 3 December 2015

¹ [Regulation \(EU\) No 1169/2011](#), Article 30 (7): "By 13 December 2014, the Commission, taking into account scientific evidence and experience acquired in Member States, shall submit a report on the presence of trans fats in foods and in the overall diet of the Union population. The aim of the report shall be to assess the impact of appropriate means that could enable consumers to make healthier food and overall dietary choices or that could promote the provision of healthier food options to consumers, including, among others, the provision of information on trans fats to consumers or restrictions on their use. The Commission shall accompany this report with a legislative proposal, if appropriate."



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ANNEX – Scientific and legislative references

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