Trans fatty acids (TFA) in Europe and Poland particular

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TFA - main sources in the diet

Industrial

Natural
### Sources of TFA

**Partially hydrogenated fat** (TFA > 60%)

**Fully hydrogenated fat** (TFA = 0%)

<table>
<thead>
<tr>
<th>Types of fat</th>
<th>TFA (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef fat</td>
<td>2.8-9.5</td>
</tr>
<tr>
<td>Mutton fat</td>
<td>4.3-9.2</td>
</tr>
<tr>
<td>Veal fat</td>
<td>1.5-3.3</td>
</tr>
<tr>
<td>Venison fat</td>
<td>&lt; 2</td>
</tr>
<tr>
<td>Fat from sheep, goat, cow milk</td>
<td>3.0 - 5.0</td>
</tr>
</tbody>
</table>

Isomeric distribution of C18 trans in cow milk fat and shortening (natural and industrial TFA)

Vaccenic acid

Elaidinonic acid

TFA - definition

- According to the Codex Alimentarius, TFA is defined as ‘all the geometrical isomers of monounsaturated and polyunsaturated fatty acids having non-conjugated, interrupted by at least one methylene group, carbon – carbon double bonds in the trans-configuration, which excludes all isomers in the family of conjugated linoleic acid (CLA)’. The definition, however, excludes those conjugated TFAs present naturally in animal fats and their products which include CLA  [Codex Alimentarius 2006]

- According to EFSA, for instance: TFA – all trans isomers regardless of their origin  [EFSA 2010]
Estimated daily intake

TFA intake in Europe as reported by TRANSFAIR study

Policy (public, private, public-private, mandatory TFA labeling or voluntary food reformulation) to reduce TFA levels in foodstuffs

<table>
<thead>
<tr>
<th>Country</th>
<th>Public</th>
<th>Private</th>
<th>Public-Private</th>
<th>Mandatory</th>
<th>Voluntary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Denmark</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Estonia</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
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<tr>
<td>Finland</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Greece</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Hungary</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Iceland</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Latvia</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Malta</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Netherlands</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Norway</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Sweden</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

[Raport of European Commission, 2015]
# Estimated daily intake

## TFA consumption/intake across Europe

<table>
<thead>
<tr>
<th>Country</th>
<th>Agency/Author</th>
<th>TFA intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>Austrian Nutrition report [2008]</td>
<td>0.97±1.3 g/day</td>
</tr>
<tr>
<td>Denmark</td>
<td>Danish National Surveys of Diet and Physical Activity [2005-2008]</td>
<td>0.01-0.03 g/day</td>
</tr>
<tr>
<td>Finland</td>
<td>The National FINDIET 2012 Survey</td>
<td>0.8-1.1 g/day</td>
</tr>
<tr>
<td>Germany</td>
<td>Bundesinstitut für Risikobewertung [2012]</td>
<td>1.6 g/day</td>
</tr>
<tr>
<td>Hungary</td>
<td>Hungarian National Diet and Nutritional Status Survey [2009]</td>
<td>6.8 g/day</td>
</tr>
<tr>
<td>Iceland</td>
<td>National Dietary Survey, Directorate of Health in Iceland and Icelandic Food</td>
<td>1.8 g/day</td>
</tr>
<tr>
<td></td>
<td>and Veterinary Authority [2010/11]</td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>National Food Consumption Survey [2011]</td>
<td>1.5 g/day</td>
</tr>
<tr>
<td>Norway</td>
<td>Household Consumption Survey [2007-2009]</td>
<td>1.5 g/day</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>National Diet and Nutritional Survey [2014]</td>
<td>&gt;2 g/day</td>
</tr>
<tr>
<td>Sweden</td>
<td>National Food Agency, Market Basket Survey [2012]</td>
<td>1.7 g/day</td>
</tr>
<tr>
<td>Poland</td>
<td>[2009/10]</td>
<td>~2.5 g/day, ~1 E%</td>
</tr>
</tbody>
</table>

[Report of European Commission, 2015]
Estimated daily intake of TFA - changes

Denmark

Poland

The most popular products with higher TFA content

- Cakes, biscuits, filled wafers and microwaved popcorn, > 15% of fat in the product
- Products containing partially hydrogenated fat
Amounts of industrially produced artificial trans fat (I-TF) in 100 g of prepackaged biscuits/cakes/wafers (2012-2013)

N - number of products. The number in parentheses is the number of foods that fulfilled the inclusion criteria. x(SD) is the mean value of I-TF% of total fat in the products

[Stender et al. 2016/ based on EC report]
Industrial TFA (I-TF)

Amounts of industrially produced artificial I-TF in 100 g of biscuits/cakes/wafers from 3 supermarkets from 5 capitals in Eastern Europe in 2006 and 2013.

\[\bar{x}(SD) - \text{mean value of I-TF\% of total fat.}\]

[Stender et al. 2016/ based on EC report]
Max. TFA content in food products

## Content of TFA (mean and range) in fats and in products analysed in 2010

<table>
<thead>
<tr>
<th>Kind of product</th>
<th>n</th>
<th>Content of TFA (g TFA/100g FA)</th>
<th>Content of TFA (g TFA/100g product)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-crust biscuits</td>
<td>31</td>
<td>3.2 (0.3–24.8)</td>
<td>0.78</td>
</tr>
<tr>
<td>Biscuits</td>
<td>29</td>
<td>0.3 (0.1–1.0)</td>
<td>0.06</td>
</tr>
<tr>
<td>Crackers</td>
<td>11</td>
<td>0.4 (0.2–0.6)</td>
<td>0.10</td>
</tr>
<tr>
<td>Wafers with filling</td>
<td>25</td>
<td>6.0 (0.4–11.2)</td>
<td>1.94</td>
</tr>
<tr>
<td>French pastry cookies</td>
<td>9</td>
<td>2.4 (1.1–3.2)</td>
<td>0.63</td>
</tr>
<tr>
<td>Bars, filled chocolates</td>
<td>39</td>
<td>1.3 (0.2–2.1)</td>
<td>0.33</td>
</tr>
<tr>
<td>Crisps</td>
<td>24</td>
<td>1.1 (0.2–2.6)</td>
<td>0.33</td>
</tr>
<tr>
<td>Fries</td>
<td>9</td>
<td>6.2 (0.8–14.9)</td>
<td>0.89</td>
</tr>
</tbody>
</table>


## Content of TFA (mean and range) in products analysed with partially hydrogenated fats, in 2015

<table>
<thead>
<tr>
<th>Kind of product</th>
<th>n</th>
<th>Content of TFA (g TFA/100g FA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pastry</td>
<td>24</td>
<td>3.34 (0.3–14.0)</td>
</tr>
</tbody>
</table>

[Onacik-Gür S., Żbikowska A. Int. Conference on the “Quality and safety in food production chain” 2016]
Availability of products containing industrial TFA has also been on the decline. Hydrogenated fats were declared in approximately 30% of commercially available pastry products in 2013, whereas partially hydrogenated fats were present in 15% of such products in 2015.

At present, hydrogenated fats occur most commonly not in short cakes but in the range of filled wafer cakes.
Are there any subgroups in the population at high risk?

Percentage of pastry and confectionery consumers across age groups – in Poland.
Are there any subgroups in the population at high risk?

Frequency of confectionery consumption by adults

Frequency of confectionery consumption by children

TNS OBOP polls show around 80% consumers choose packaged biscuits in Poland. It can be said, therefore, popularity of these products continues to be very high.
Are their any subgroups in the population at high risk?

Most often consumed pastry and confectionery products

A single consumption of pastry and confectionery products

In general, children consume these products more often than adults do, although in lower quantities

[Own research]
Are their any subgroups in the population at high risk?

Although, given the varied diet, TFA consumption in Poland is not a risk to consumers (products of natural origin provided (in 2010) 0.5 g/person of TFA per day, and those of industrial origin about 1.5 g.), it is reasonable to continue monitoring TFA content in food in order to maintain the tendency to reduction. It is particularly important in countries where TFA removal from products is slow.

Risks associated with TFA cannot be ruled out in the case of consumers with excessive TFA products in their diet.

In addition, food consumers and manufacturers should be educated to make the right choices.

Final conclusion:

TFA content in foods still needs to be controlled, especially in Eastern Europe.

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EFSA 2010. www.efsa.eu.int


Onacik-Gür S., Żbikowska A. 2016. Trans fatty acids content in selected cookies from the Polish market. 7-th International Conference on the “Quality and safety in food production chain” Wrocław 23-24 June 2016, s. 73.


Stender S., Astrup A., Dyerberg J. 2016. Tracing artificial trans fat in popular foods in Europe: a market basket investigation, http://bmjopen.bmj.com/ on September 19, 2016 - Published by group.bmj.com

Thank you for your attention

Prof. Anna Żbikowska