

Trans Fatty Acids : Harmful Effects on Human Health

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India is undergoing rapid dietary transition. High economic growth has resulted in a burgeoning middle-class having greater access to commercially available foods, including fried and baked food items. Most of these foods contain high amounts of Trans Fatty Acids (TFAs), particularly if cooked in *vanaspati* (partially hydrogenated vegetable oils) which is often preferred for its low cost and longer shelf life. TFAs can adversely affect cholesterol levels, predispose the individual to diabetes, coronary heart disease and may also affect many of his body organs.

Trans fatty acids or Trans fats are the most harmful type of fats which can have much more adverse effects on our body than any other dietary constituent. These fats are largely produced artificially but a small amount also occurs naturally thus in our diet, these may be present as Artificial TFAs and/ or Natural TFAs. Artificial TFAs are formed when hydrogen is made to react with the oil to produce fats resembling pure *ghee*/butter. In our diet the major sources of artificial TFAs are the partially hydrogenated vegetable oils (PHVO)/*vanaspati*/margarine while the natural TFAs are present in meats and dairy products, though in small amounts.

TFAs pose a higher risk of heart disease than saturated fats. While saturated fats raise total cholesterol levels, TFAs not only raise total cholesterol levels but also reduce the good cholesterol (HDL), which helps to protect us against heart disease.

Trans fats consumption increases the risk of developing heart disease and stroke. It is also associated with a higher risk of developing obesity, type 2 diabetes, heart disease, metabolic syndrome, insulin resistance, infertility, certain types of cancers and can also lead to compromised fetal development causing harm to the yet to be born baby.

Despite their harmful effect the reason why food manufacturers frequently use them because TFA containing oils can be preserved longer, they give the food the desired shape and texture and can easily substitute '*Pure ghee*'. Further, these are comparatively far lower in cost and thus add to profit/saving.

The most common dietary source of Trans fats is the partially hydrogenated vegetable fat commonly known as '*Vanaspati Ghee*'/Margarine. Since partially hydrogenated vegetable fat (*Vanaspati*/Margarine) is rather high in TFA, all food items prepared, baked or fried by using *Vanaspati*/Margarine contain TFA. These include: Cakes and Pastries; Patty, Rusk; Fried Aloo Chaat , AlooTikki (prepared in '*Vanaspati*'), Sweets (Mithai) (prepared in '*Vanaspati*'), Cookies / biscuits, French fries, Potato chips, Bhatara, Samosa, Parantha, etc.

Strategies to limit Trans Fat intake through food is by avoiding use of "*VanaspatiGhee*" or margarine in kitchen, heating the oil for very long time or re-using the same oil for frying. So also avoiding the use of ready to use (instant)

mixes for preparing foods as they have a greater chance of having Trans fats and checking the Nutrition Facts label on packaged food items for their TFA content if indicated.

If a label says “0” trans fat, it can still contain 0.5 grams trans fats per serving or less.

While some developing countries have laid down norms for TFA content of food, India has yet to pass/implement the regulation regarding the TFA containing fats or the TFA content of commercially prepared food items. Therefore, the responsibility lies with the consumers to safeguard their interest.

Harmful Effects of Trans Fats on Human Health

Studies across the world indicate that:

- TFA raise the VLDL, LDL-c, Triglyceride, Lp (a) lipoprotein and Free fatty acid levels on the other hand it lowers the LDL-c particle size and HDL-c levels. All these contribute to raising the risk of heart diseases.
- Intake of partially hydrogenated vegetable oils contributes to the risk of myocardial infarction
- TFA promotes systemic inflammation which increases the C-reactive protein leading to thickening of the arteries (atherosclerosis), diabetes, and sudden death due to heart failure.
- TFA causes endothelial dysfunction (by increasing circulating bio-markers including soluble inter cellular adhesion molecule1, soluble vascular-cell adhesion molecule1 and E-selectin) which is a key step in the development of atherosclerosis
- *TFA have been found to increase insulin resistance and seem to have a unique cardio-metabolic imprint that is linked to insulin-resistance and metabolic-syndrome pathways.*
- *Consumption of trans-unsaturated fatty acids has shown to increase the risk for ovulatory infertility.*
- *TFA compromises fetal growth and development.*
- *Dietary TFA can also lead to neurodegenerative diseases and cognitive decline in later life.*

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