

Trans: Fat in Modern Diet

K Silambu Selvi¹, DY Athina Deepa Prasanna²

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Abstract

Trans fatty acids are unsaturated fatty acids with minimal of one non-conjugated double bond in the trans-configuration. Industrially produced trans-fatty acids (TFA) and ruminant TFAs are the major sources in modern junk foods. Evidence from experimental studies, dietary trials, and prospective observational studies in which TFAs are measured by biomarkers or dietary records consistently shows that intake of TFAs can increase low-density lipoprotein levels and decrease high-density lipoprotein cholesterol levels which is an associative factor in coronary heart disease. Denmark by banning the sale of food items with TFA has brought down the number of deaths due to coronary heart disease by nearly 50% over a period of 20 years. Creating Public awareness about the adverse effects of TFA on human health will be extremely important in this modern world. Nutrition education and awareness towards food labeling and sale of low TFA food items would help the reinforcement of traditional diets to the younger population over processed foods.

Keywords: Trans fatty acids; Coronary heart disease; Low density lipoproteins; Processed foods.

Introduction

Replacement of traditional diets with pre-packed, processed and ready-to-eat energy dense foods with low nutritional quality reflects the increase in consumption of sugar and hydrogenated fats. Trans fatty acids are produced either by hydrogenation of unsaturated oils or by bio-hydrogenation in the stomach of ruminant animals. Industrially produced TFAs and ruminant TFAs are the major sources of trans fats (T-fat) in foods. TFAs are commonly

thought to be of industrially produced trans-fats. However, TFAs are found naturally in foods as well. These are commonly known as ruminant trans-fats.¹ Daily food ingredients such as vanaspati and margarine have high contents of TFA. These foods are usually prepared in partially hydrogenated vegetable oils that are the predominant sources of trans-fat in diets globally. The invention of fat hydrogenation leading to trans fat was considered as a major technical breakthrough. Food industry enthusiastically accepted the mass production of a convenient form of artificially modified fat which has a long shelf-life. As vegetable oil is prone to oxygen-induced rancidity, hydrogenated fat in the form of margarine was promoted because the solid fat is easier to store for a prolonged period. Because, margarines did not contain cholesterol, over the decades, enormous amounts of hydrogenated fat were fed to the world populations, claiming one side of the health benefit. People were led to believe that margarine is healthier than butter. But, critical research, documented the health risk of hydrogenated fat and now it has become the need

Author Affiliation: ¹Assistant Professor, ²Research Scholar, SRM Institute of Science and Technology, SRM Nagar, Kattankulathur, Chennai, Tamil Nadu 603203, India.

Corresponding Author: DY Athina Deepa Prasanna, Research Scholar, SRM Institute of Science and Technology, SRM Nagar, Kattankulathur, Chennai, Tamil Nadu 603203, India.

E-mail: selvivalavan@gmail.com

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of the hour to save thousands of lives at risk of developing non-communicable diseases.

Global Scenario

Excessive TFA intake is a health threat in high-income countries as well as in middle and low income countries. In developed countries like United States and Canada the dietary intakes of TFAs were more than twice the WHO-recommended limit of 1% of energy intake per day. In India, the recent survey data from National Sample Survey Organization and

National Nutrition Monitoring Bureau indicates an increase in fat intakes from Partially Hydrogenated Vegetables Oils for fat intake reported as 47.9 g per capita per day in urban areas in the year 2009–10 as compared to 42.0 g in the year 1993–94 on national average. The Global Burden of Diseases Nutrition and Chronic Diseases Expert Group and application of the Pareto principle on the available data, states that 15 countries account for approximately 80% of the total number of Coronary heart disease deaths attributable to high intake of TFAs globally.² (Fig. 1)

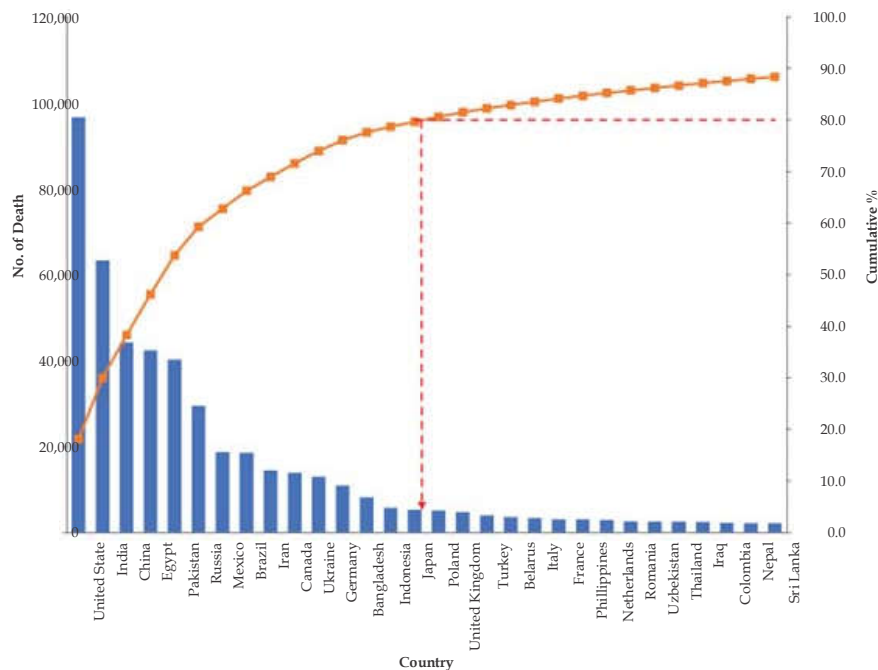


Fig. 1: Global Scenario

Fats and Trans-Fats

Reducing the amount of total fat intake to less than 30% of total energy intake helps to prevent unhealthy weight gain in adult population.³ Also, the risk of developing Non Communicable Diseases is lowered by:

- reducing saturated fats to less than 10% of total energy intake in a day;
- reducing *trans*-fats to less than 1% of total energy intake in a day ; and
- replacing both saturated fats and *trans*-fats with unsaturated fats – in particular, polyunsaturated fats

Trans-fats and processed foods

A major change in nutritional understanding of fat came when the health risk of T-fat is made known.

In 2015, the US-Food and Drug Administration finalized its decision that T-fat is not safe and set a three-yeartime limit for complete removal of T-fat from all processed foods. It initiated steps in US towards mandatory food labelling which declares a statement on T-fat that- ' product contains no trans-fat'. Additionally, removing T-fat in products like pie crust, brownies, peanut butter and microwave popcorn also adds health benefits. The ban on T-fat has to mean absolutely *zero trans-fat*. Margarine, vanaspati ghee, bakery and frying fats and vegetable shortenings are obtained through industrial hydrogenation which contains significant amounts of TFA. In USA it is estimated to be 2–3 energy percent, while in Middle East and South Asia, it could be as high as 7 energy percent. In South Asian countries, vanaspati is the major source of TFA. In India, vanaspati usually contains as high as 40–50% TFA.⁴

Dietary approach to reduce trans-fat intake

The consumption of trans-fat could be reduced to a minimum level by:

1. Substitution of vanaspathi, butter, lard and ghee with natural plant oils rich in polyunsaturated fats, such as soybean, canola (rapeseed), corn, safflower and sunflower oils.
2. Edible oil should contain minimal amount of TFA to at least WHO recommended levels (<4%).
3. Frying has been found to result into the formation of TFA. Therefore deep-fried food items are likely to contain high contents of TFA. And hence forth, the adoption of gentle-frying, steaming or boiling of food will reduce TFA formation in food items. This would be an effective process of preparing healthy foods in our homes.
4. Repeated use of cooking oil leads to increased TFA contents in the oil. As the hydrogenated vegetable oils are high in TFA and these would further increase the TFA content in the used oil after repeated frying. Therefore, repeated use of heated oil should be avoided to reduce the ill effects.
5. Limit the consumption of fried, baked foods, pre-packaged snacks and foods like doughnuts, cakes, pies, cookies, biscuits and wafers which contains industrially-produced *trans*-fats.⁵
6. Recent research has indicated that high intake of dairy saturated fat is associated with decreased risk of CVD. Therefore the use of saturated fat from dairy sources instead of TFA containing oils is an healthy option.⁶
7. Consumers' awareness and education about the adverse effects of TFA is the most important initiative to avoid TFA rich food items.

WHO in elimination of Trans-fats

The World Health Organization project for elimination of industrially produced trans-fatty acids from the global food supply by 2023 through launching the REPLACE (review, promote, legislate, assess, create, enforce) on May 2018. Its action is to provide a strategic guidance for all countries to take

action toward the goal of elimination of industrially produced trans-fats by 2023. The Health Assembly approved the 13th General Programme of Work, which will guide the work of WHO in 2019–2023.⁷ It has the goal of reduction of salt/sodium intake and elimination of industrially-produced trans-fats from the food supply.

Conclusion

Food industry has to adapt the dramatic change in removing T-fat from their production lines. Scientific evidence is firmly stating the best interest of public health by removing the T-fat from the processed foods. Studies also show that reducing the intake of TFA from 6 gm to 1 gm per day helps to decrease the number of deaths due to coronary diseases. Awareness about the ill effects of T-fat will create public alert in terms of bringing back the traditional foods in modern diet.

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