

A REVIEW ON: EXPLORING ACTION FRAMEWORKS TO ERADICATE INDUSTRIAL TRANS-FAT AND INDIA'S OPTIMISTIC PATH

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Abstract

Unsaturated fats known as trans fats have been connected to a number of health issues, including cardiovascular disease. They can also be made through the hydrogenation of vegetable oils and are present in many processed and fried meals. By 2023, industrial trans fats should no longer be present in the world's food supply, according to the World Health Organisation (WHO), which launched the REPLACE policy framework in 2018.

By 2022, trans fats should no longer be present in food, according to the Food Safety and Standards Authority of India (FSSAI). In order to inform consumers about the health concerns connected with trans fats, the FSSAI has established limitations on the amount of trans fats that are permitted in edible oils and fats encouraged the use of better cooking oils, and started public awareness campaigns.

Keywords – Fats, Trans fat, Replace Policy, FSSAI, Food safety, India

Introduction

A considerable fraction of deaths globally is brought on by cardiovascular disease (CVD), a grave global health issue [1]. According to the World Health Organization (WHO), CVDs reported for about 32% of all deaths globally in 2019, which translates to 17.9 million deaths [2]. Furthermore, a substantial number of these deaths were premature, meaning they occurred in people who were younger than 70 years old [3].

One of the key risk influences for CVD is an unhealthy diet, predominantly one that is high in saturated and trans fats [4,5]. Trans fats are specifically injurious as they raise levels of "bad" cholesterol (LDL) and reduction levels of "good" cholesterol (HDL), thus increasing the risk of coronary heart disease (CHD) [6,7]. This is why WHO introduced the REPLACE framework in 2018, which goals to remove industrial trans fats from the global food supply by 2023 [8].

1. Basic of fats and fatty acids

1.1 Fats -

Fats are an important macronutrient that plays many vital roles in the body, including providing energy, insulating and protecting organs, and helping with the absorption of fat-soluble vitamins [9,10]. There are different categories of fats, including saturated fats, unsaturated fats, and trans fats, each with unique chemical structures and health effects[11,12].

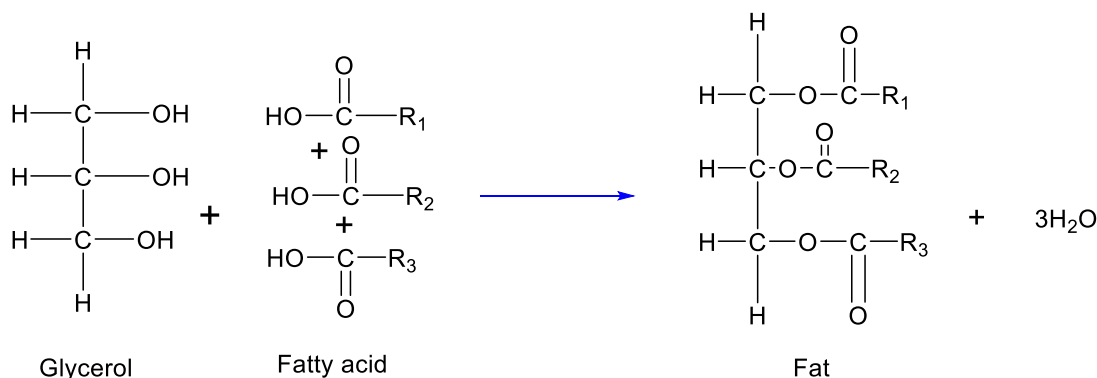


Figure 1. Synthesis of fatty acid

1.2 Fatty acids

Fatty acids are the building blocks of fats and play important roles in many physiological processes in the body [13]. Fatty acids are recognized based on the number of carbon atoms and the number of double bonds present in the molecular chain[14]. For example, linoleic acid C18:2 (where 18 is a carbon atom and 2 is the number of double bonds.) omega-6 or n-6 if measured from the methyl side.

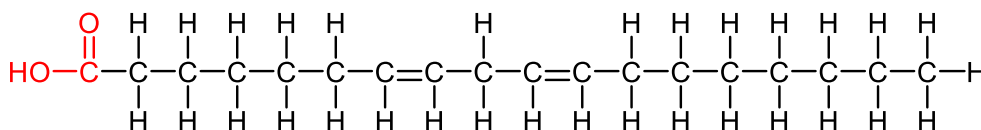


Figure 2. Structure of Linoleic acid

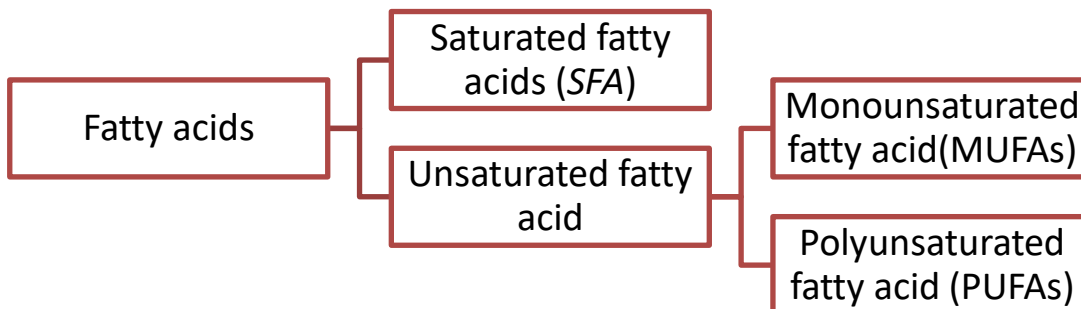


Figure 3. Classification of fatty acids

Fatty acids are divided into two groups: saturated fatty acids and unsaturated fatty acids[14]. Unsaturated fatty acids are again subdivided into monounsaturated fatty acids (*MUFAs*) and polyunsaturated fatty acids (*PUFAs*).[14]

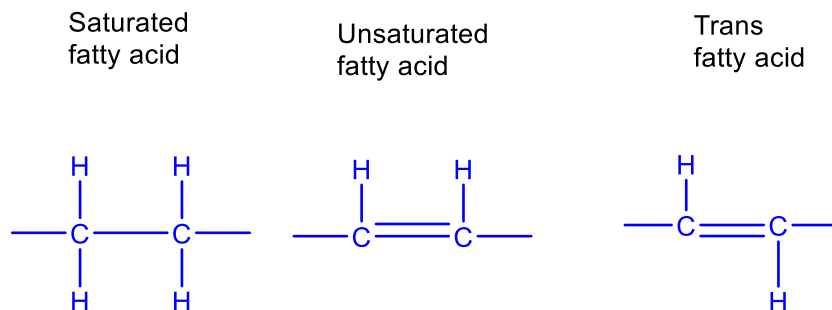


Figure 4. Types of fatty acids

1.2.1 Saturated fatty acids

Saturated fatty acids are a type of fat that is solid at room temperature and are typically found in animal products like meat, dairy, and eggs, as well as some plant-based sources like coconut oil and palm oil [15]. They are called saturated because they have no double bonds between the carbon atoms in their molecular structure and are fully saturated with hydrogen atoms. Saturated fatty acids have been linked to an increased risk of heart disease, stroke, and other health problems. This is because they can raise levels of LDL cholesterol, also known as "bad" cholesterol, in the blood. SFA gives solubility, texture, and resistance to oxidation [16].ex palmitic acids c16:0

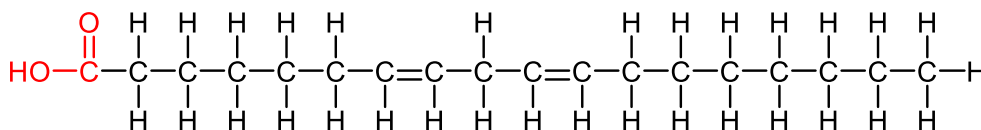


Figure 5. Structure of Palmitic acid c16:0

1.2.2 Unsaturated fatty acids

Unsaturated fatty acids are a type of fat that contains one or more double bonds between the carbon atoms in their molecular structure. They are typically found in plant-based sources such as nuts, seeds, and vegetable oils, as well as in fatty fish. Unsaturated fatty acids are divided into monounsaturated fatty acids (MUFA) and polyunsaturated fatty acids (PUFA).[14]

1.2.2.1 Monounsaturated fatty acids (MUFA) – This acid contains one carbon-carbon double in its molecular structure. It shows good resistance to oxidation [14]. Source- cotton seeds, sunflower.[14]

1.2.2.2 Polyunsaturated fatty acids (PUFA) – this acid contains two or more carbon-carbon double in its molecular structure. They easily undergo oxidation. linoleic (n-6) and Alfa linolenic (n-3) acids are essential PUFA found only in plants. They increase insulin sensitivity, increase peripheral glucose utilization and decrease adiposity and hence anti-atherogenic [14]. source- Groundnut, corn, soya bean.

1.3. Trans fat (Industrial trans fat)

Trans fat is a type of unsaturated fat that is created when liquid oils are turned into solid fats through a process called hydrogenation [17]. This process involves adding hydrogen atoms to the unsaturated fatty acid molecules, which can make them more stable and less likely to spoil. By partial hydrogenation process, unsaturated double bonds are converted into partly saturated bonds and partly to trans unsaturated bonds, which increase the melting point, so this fatty acid is converted into a semi-solid or solid fat at room temp, in this process PUFA is converted into MUFA. TFA so the partial hydrogenation process increases oxidation resistance [14,17].

2.0 WHO on the elimination of Industrial trans fat-

As we know intake of trans fat increases the risk of heart attack and death from coronary heart disease. WHO identified the elimination of TFA as the priority target in its 13 general

programs of work (GPW13) in 2018 and call for the removal of industrial TFA from the Global food industry by 2023. WHO introduced the REPLACE framework which delivers a road map to the nation.[2,18]

REPLACE provides six strategic actions to ensure the prompt, complete, and sustained elimination of industrially-produced trans fats from the food supply:[2]

Review dietary sources of industrially-produced trans fats and the landscape for required policy change.[2]

Promote the replacement of industrially-produced trans fats with healthier fats and oils.

Legislate or enact regulatory actions to eliminate industrially-produced trans fats [2].

Assess and monitor trans fats content in the food supply and changes in trans fat consumption in the population [2].

Create awareness of the negative health impact of trans fats among policymakers, producers, suppliers, and the public [2].

Enforce compliance with policies and regulations [2]

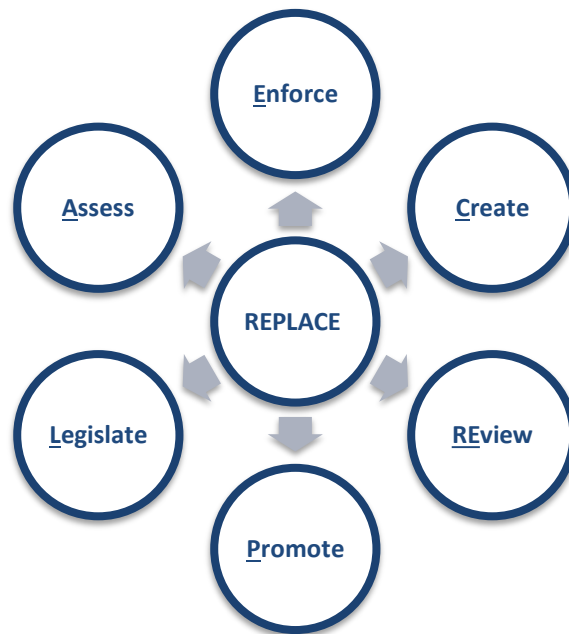


Figure 6. Replace Policy

The countries are responding to this, according to WHO Report on Global Trans Fat Elimination 2021 mandatory TFA limits or bans on partially hydrogenated oils are presently in effect in 57 countries and India is one of them [2]

3.0 India's Approach to REPLACE policy

In 2018, India called for action to make the country TFA-free by 2022, a year ahead of the WHO the global target of 2023, by implementing best-practice TFA policies and creating awareness among the stakeholders [2,19]. To eliminate industrially produced TFA in oils and foods, the **Food Safety and Standards Authority of India (FSSAI)**– the national food regulator adopted a 360-degree approach [2]. Apart from developing policies and regulations, FSSAI is actively working towards capacity-building for laboratories and food businesses and increasing awareness among consumers to approach this multisectoral challenge [20].

3.1 Legislate and Enforce- To align with the global target set by the WHO, a movement called **India@75: Freedom from Trans Fats by 2022** was launched by FSSAI on 1 June 2018, to eliminate TFA from India by the 75th year of the country's independence [20]. Based on stakeholder consultations, a consensus was developed to reduce TFA in all oils and fats (including vanaspati, bakery shortenings, and margarine) to less than 2% in a phased manner: to not more than 3% from 1 January 2021 and not more than 2% from 1 January 2022 [19,21].

In response to advocacy by consumer support organizations, FSSAI further extended the TFA restriction to all food products containing oils and fats [22]. This was gazetted as the Food Safety and Standards (Prohibition and Restriction on Sales) Second Amendment Regulations, 2021, and was notified to the World Trade Organization [23].

In 2020, FSSAI notified the Food Products Standards and Food Additives Tenth Amendment Regulations, 2020, limiting TFA to not more than 3% in edible oils and fats from January 2021 and not more than 2% from January 2022 [19].

Labeling of TFA is mandatory- The Food Safety and Standards (Packaging and Labelling) Regulations, 2011 require that packages of food in which oils, fats, and fat emulsions are used as ingredients, and packages of edible oils and fats shall declare the amount of TFA and SFA on the label [24].

In 2020, FSSAI notified the Food Safety and Standards (Labelling and Display) Regulations, 2020, Making it mandatory for food manufacturers to declare the TFA content on nutrition labels [24].



Figure 7. Labelling of TFA

TFA-free claim -FSSAI notified the Food Safety and Standards (Advertising and Claims) Regulations, 2018. These regulations specified that a TFA-free claim should be made only if the food contains less than 0.2 g of TFA per 100 g or 100 mL (from 19 November 2018) and if edible oils or fats contain less than 1 g of TFA per 100 g or 100 mL (from 28 June 2019). To encourage food establishments to use healthier oils and fats, FSSAI issued an advisory on 22 July 2019 notifying that food establishments that comply with the above regulation can display the “Trans Fat Free” logo in their outlets and on their food products [24].



Figure 8. Trans Fat Free logo

In 2021, the Food Safety and Standards (Prohibition and Restrictions on Sales) Second Amendment Regulations, 2021 was gazetted to limit the TFA content in all food items in which edible oils and fats are used as an ingredient to not more than 2% by mass of the total oils and fats present in the product, from 1 January 2022 [19]

3.2 Reviews and Assess and monitor trans fats content in the food supply and changes in trans fat consumption FSSAI continuously conducted PAN-India Survey on different Food categories[25].

Trans- fat Survey- In 2021 Fssai collected samples from 419 cities/districts across 34 States/UTs, In all, 6,245 samples of packaged products were collected on a random basis to ensure diversity and sampling of local packaged foods from different strata of food market The trans-fat content was determined based on the sum of trans fatty acid (TFA) isomers, i.e. Elaidate and Linoelaidioate, and calculated in terms of fat content in the processed food samples in selected NABL accredited testing laboratories [26].

Edible oil survey 2020 -Fssai regularly conducted an edible oil survey to make ensure Total polar compounds (TPC) are below 25% in used edible oil. In an edible oil survey in 2020 3370 samples were analyzed for TPC count make ensure producers make compliance with the policy [27].

3.3 Promote- Replacement of industrially-produced trans fats with healthier fats and oils. FSSAI has launched a mass media campaign “Heart Attack Rewind”- a 30-second Public Service Announcement (PSA) to create awareness about the harmful effects of trans fat [28] by,

1. Reducing acceptability of industrially produced (IP) trans fat in foods.
2. Building public support for government action to eliminate IP trans fat.
3. Leading consumers to the FSSAI website to seek more information about trans fat under the Eat Right India campaign [29].

ELIMINATE TRANS FATS

WHAT ARE TRANS FATS?
Industrially produced trans fat are harmful fats formed when liquid oils are converted into solid fats by a chemical process called hydrogenation. Trans fat leads to blockage of arteries, resulting in heart attack and other cardiovascular diseases.

WHERE ARE TRANS FATS FOUND?

- **Fats/oils:** Vanaspati, Margarine, Bakery shortenings.
- **Bakery products:** Biscuit, fan, rusk, cake etc.
- **Fried foods:** Bhatara, poori, pakora, bhujiya, fried savoury mixtures (namkeens), jalebi, imarti, boondi laddu, etc.
- **Re-heated oils:** Some trans fats are also formed when the same cooking oil is used for repeated frying.

WHY ARE TRANS FATS BAD?

- 1 Industrial trans fats are worst fats and estimated to cause more than 540,000 death worldwide each year.
- 2 Industrial trans fats have no health benefits.
- 3 Consumption of Industrial trans fats leads to cardiovascular diseases and other related disorders.

Figure 9. Eat Right India Campaign

Challenges and opportunities -In developing countries like India where SMEs and FBOs were in the unorganized sector enforcement of policy is quite difficult compare to developing countries, so requires more promotional/ mass campaigns for awareness. SMEs and FBOs need additional technical and financial support to develop their skill and reformulation their product, in India, the cost of the product is a major hurdle in research and development investment, so new techniques should be developed to eliminate TFA in cost effective way.

Conclusion

Trans fats have been a significant concern in the Indian diet due to their extensive use in the food industry and dairy foods. The FSSAI's approach towards reducing and eliminating

trans fats from the Indian food supply has been comprehensive and multi-pronged. The FSSAI has been actively monitoring the food industry to ensure compliance with the limits on trans fats and other food safety regulations. The FSSAI has been working towards creating a healthier food environment in India by promoting the use of healthier oils and fats, raising awareness among consumers, and collaborating with industry stakeholders to reduce trans fats in the food supply.

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