2026 Volume: 02 Issue: 07 www.ijrpa.com ISSN 2456-9995 Research Article

International Journal Research Publication Analysis

Page: 01-07

"ANALYSIS OF TRANSFAT CONTENTINFRYING OIL SUSED BY SELECTED STREETFOOD VENDORS AND THEIR POTENTIAL PUBLIC HEALTH IMPLICATIONS"

Vallapu Pooja*[1], P. Divya Roopa[2]

[1]M.Sc. Nutrition and Dietetics, Department of Nutrition, Kasturba Gandhi Degree & PG College for Women, Affiliated to Osmania University, Secunderabad, Telangana, India.

[2]Assistant Professor, Department of Nutrition, Kasturba Gandhi Degree & PG College for Women, Affiliated to Osmania University, Secunderabad, Telangana, India.

Article Received: 23 May 2026
Article Revised: 12 June 2026
Published on: 01 July 2026

***Corresponding Author: Vallapu Pooja**
M.Sc. Nutrition and Dietetics, Department of Nutrition, Kasturba Gandhi Degree & PG College for Women, Affiliated to Osmania University, Secunderabad, Telangana, India.

DOI: https://doi-doi.org/101555/ijrpa.4217

ABSTRACT

Trans fatty acids (TFAs) are harmful fats formed during industrial processing and repeated heating of edible oils. The increasing consumption of fried street foods has raised concerns regarding trans fat exposure and its impact on public health. The present study aimed to estimate the trans fat content in frying oils used by selected street food vendors and assess its public health implications. Oil samples were collected from domestic sources, tiffin centers, and street food stalls. The samples were analyzed using Gas Chromatography with Flame Ionization Detection (GC–FID) to determine their trans fatty acid content.

The results showed considerable variation in trans fat levels based on the type of oil, duration of use, and cooking practices. Fresh oils contained relatively low levels of trans fats, whereas oilssubjectedtorepeatedheatinganddeepfryingexhibitedsignificantlyhigherconcentrations. Oils used for preparing fried foods such as chips, jalebi, and mirchi bajji showed comparatively elevated transfat content. Based on these findings, a health a wareness program was conducted

To educate participants about transfats, their formation, health risks, and preventive measures. The study concludes that repeated heating and reuse of oils contribute to increased transfat formation, emphasizing the need for public awareness and healthier cooking practices to reduce associated health risks.

KEYWORDS: Transfat, frying oil, street food vendors, GC–FID, public health, repeated heating, awareness.

INTRODUCTION

Lipids are one of the three major macronutrients required for energy production, structural integrity of cell membranes and regulation of numerous physiological functions. Along with carbohydrates and proteins, dietary fats provide essential fatty acids and facilitate theabsorptionoffat-solublevitaminsA,D, E and K. Furthermore, fats contribute to hormone synthesis, energy storage and maintenance of metabolic processes [1].

Lipidscompriseadiversegroupoforganic compounds that are insoluble in water but soluble in organic solvents and perform important biological functions such as energy storage, membrane structure and cellularsignalling[2]Fattyacidsarethe basic components of lipids and are classified according to chain length and degree of saturation into saturated fatty acids (SFA), monounsaturated fatty acids (MUFA) and polyunsaturated fatty acids (PUFA) [3].

Based on their chemical structure, fatty acids are classified according to chain length and degree of saturation. Saturated fatty acids contain no double bonds, where as unsaturated fatty acids contain one or more double bonds and are further categorized into monounsaturated fatty acids (MUFA), polyunsaturated fattyacids (PUFA), and trans fatty acids [4].

Trans fatty acids (TFAs) are unsaturated fatty acids containing one or more non-conjugated double bonds in the trans configuration[5].Unlikenaturallyoccurring

cis fatty acids, trans fatty acids possess a straighter structure and exhibit physical properties similar to saturated fats. TFAs may occur naturally in ruminant products such as milk andmeat ormaybe produced industrially through partial hydrogenation of vegetable oils, high-temperature refining,andrepeatedfryingprocesses[6][7].

Deepfryingisoneofthemostwidelyused cooking methods throughout the world. Continuous exposure of oils to high temperaturesinthepresenceofoxygenand moisture causes hydrolysis, oxidation, polymerization and isomerization reactions, resulting in deterioration of oil quality and increased formation of trans fatty acids and oxidative products [8] Repeated heating and reuse of oils, which are common practices among street food vendors and households, further accelerate these changes and increase the concentration of trans isomers [9] These chemical changes lead to deterioration in sensory quality and nutritional value, producingcompoundssuchasaldehydes,

ketones, free radicals, and polymerized lipids that may adversely affect [10].

Oxidation is considered one of the major deteriorative processes occurring during deep frying and proceeds through free radical mechanisms involving initiation, propagation and termination reactions [11]

Consumption of trans fats has been associated with elevated low-density lipoproteincholesterol(LDL-C),decreased high-densitylipoproteincholesterol(HDL-C), systemic inflammation and endothelial dysfunction, thereby increasing the risk of cardiovasculardiseases[12]Inaddition,high intake of TFAs has been linked with obesity, insulin resistance, type 2 diabetes mellitus and certain cancers (Menaa et al., 2013).[13]

Consideringthedetrimentaleffectsoftrans fats on public health, international organizations have established strict recommendations regarding their intake. The World Health Organization (WHO) recommendsthattransfatconsumption shouldcontributelessthan1%oftotaldaily energyintake.InIndia,theFoodSafetyand Standards Authority of India (FSSAI) has limited industrial trans fatty acids in fats, oils,andfoodproductstonotmorethan2% by mass of total fat from January 2022 onward[14],[15].

MATERIALS AND METHODS

Research Design

The present study was designed as a descriptive laboratory-based analytical study to estimate the trans fat content in frying oils used by selected street food vendors. The study involved the collection of oil samples from different sources followed by laboratory analysis using standard analytical methods.

Study Area

The study was conducted in selected areas of Hyderabad, Telangana. Oil samples were collected from local street food vendors and household sources where fried foods are commonly prepared and consumed.

Sample Size

A total of five oil samples were included in the study. The samples consisted of one-time used household oil and repeatedly used frying oils collected from street food vendors.

Sampling Technique

A convenience sampling technique was adopted to collect oil samples based on accessibility

and availability from selected street food vendors.

Inclusion Criteria

- Edible oils used for frying and cooking.
- One-time used household oil and repeatedlyusedfryingoilsfromstreet food vendors.
- Oils commonly used for public food preparation.

Exclusion Criteria

- Non-edibleoils.
- Oils contaminated with foreign substances.
- Industrialornon-food-gradeoils.

Data Collection Tools

Clean,dry,airtightcontainerswereusedfor sample collection and storage. All samples were appropriately labeled for identification.GasChromatography–Flame IonizationDetection(GC–FID)wasusedas theanalyticalmethodtodeterminetransfat content.

Data Collection Procedure

Oil samples were collected from selected street vendors in clean and labeled containers.tha samples includedfrying oils fromchipsshopoil,mirchibhajishopoil ,jalibishopoil,tiffincenteroilandonetime usedhome oil.The collectedsampleswere given to an accredited laboratory for trans fatanalysis.thetransfatcontentwasassessd by gas chromatography – Flame ionization detection (GC-FID) method following standard procedures. The results obtained from the laboratory reports were recorded andusedfurtheranalysisandinterpretation. **Intervention**

Following the laboratory analysis, an awarenessinterventionwasconductedto educate participants about trans fats, their formation during repeated heating of oils, associatedhealthrisks,andpreventive measures to reduce trans fat consumption

RESULT AND DISCUSSION ESTIMATION OF TRANS FAT CONTENT IN OILS USED BY STREET FOOD VENDORS

The determination of trans fatty acid content in edible oils was carried out through laboratory analysis. Oil samples collectedfrom selectedstreet food vendors wereanalyzedtoquantifythelevelsoftrans fats present. This evaluation provided insight into the degree of oil deterioration brought on by frequent heating and extended use during food

preparation.

LABORATORY ANALYSIS REPORT OF TRANSFAT CONTENT INFRYING OILS

Thetransfatlevelsinoilsamplesobtainedfromselectedsourceswasanalyzedusingthe Gas Chromatography (GC-FID) method and compared with WHO/FSSAI limits (<2.0%)

S.NO	SAMPLE	PARAMETER	UNIT	TEST METHOD	RESULT	LIMITS
1	home oil(singleuse)	Trans fat	g/100g	Gas Chromatography (GC-FID)	0.1	<2.0
2	Tiffincenter oil	Trans fat	g/100g	Gas Chromatography (GC-FID)	0.6	<2.0
3	Chipsoil	Trans fat	g/100g	Gas Chromatography (GC-FID)	**2.2**	<2.0
4	Jalebi oil	Trans fat	g/100g	Gas Chromatography (GC-FID)	**1.4**	<2.0
5	Mirchibajjioil	Trans fat	g/100g	Gas Chromatography (GC-FID)	**1.5**	<2.0

Homeoil(single-use)

The trans fat level was determined to be 0.1%, which is significantly below the allowable threshold, suggesting high oil quality and safe consumption.

Tiffincenteroil

The transfat level was recorded at 0.6%, whichremainswithintheacceptablerange, albeit slightly elevated compared to fresh oil, likely due to moderate reuse.

Chipsoil

The transfat level was measured at 2.2%, surpassing the advised limit. This reflects excessivereuseandrepeatedheatingofthe oil during the deep frying process.

Jalebioil

Thetransfatcontentwasfoundtobe1.4%, which exceeds the WHO recommended limit (<1%), indicating frequent heating and reuse of oil.

Mirchibajjioil

Thetransfatcontentwasfoundtobe1.5%, which also exceeds the WHO recommended limit (<1%), suggesting repeated use and improper oil handling practices.

ACKNOWLEDGEMENT

The authors express their sincere gratitude to the Management, Principal, and Department of Nutrition and Dietetics, Kasturba Gandhi Degree and PG College for Women, Hyderabad, for providing guidance, encouragement, and facilities to carry out the study successfully. The authors are alsothankful toall the students who willingly participated in the research and provided valuable information for the completion of the study.

CONCLUSION

The current research determined that the levels of transfats fluctuate based on the type of oil and the cooking methods employed by street food vendors. Oils that have undergone repeated heating and deep frying exhibited a greater formation of trans fats in comparison to fresh or minimally utilized oils.Certain samples were identified as exceeding the recommended safety thresholds, which suggests unsafe practices in oil usage.This underscores the potential public health risks linked to the regular consumption of street foods prepared with reused oils.Given that high trans fat consumption is associated with cardiovascular diseases and various metabolicdisorders,itiscrucialtomonitor frying oils effectively and to implement safe cooking practices.

REFERENCES

1. Espinosa-Salas, S., & Gonzalez-Arias, M. (2023, September 21). *Nutrition: micronutrient intake, imbalances, and interventions*. StatPearls - NCBI Bookshelf. https://www.ncbi.nlm.nih.gov/sites/books/NBK597352/
2. Fahy,E.,Cotter,D.,Sud,M.,&Subramaniam,S.(2011).Lipidclassification,structuresand tools. *Biochimica Et Biophysica Acta (BBA) - Molecular and Cell Biology of Lipids*, *1811*(11), 637–647. https://doi.org/10.1016/j.bbalip.2011.06.009
3. Burdge,G.C.,&Calder,P.C.(2014).Introductiontofattyacidsandlipids.WorldReviewof Nutrition and Dietetics, 112, 1–16. https://doi.org/10.1159/000365423
4. Brainlipidsinsynapticfunctionandneurologicaldisease.(2015).In*ElseviereBooks*. https://doi.org/10.1016/c2013-0-09847-7
5. Kuhnt,K.,Baehr,M.,Rohrer,C.,&Jahreis,G.(2011).Transfattyacidisomersandthetrans-9/trans-11 index in fat containing foods. *European Journal of Lipid Science and Technology*, *113*(10), 1281–1292. https://doi.org/10.1002/ejlt.201100037
6. Stender,S.,Astrup,A.,& Dyerberg,J.(2008).Ruminantandindustriallyproducedtransfatty acids: health aspects. *Food & Nutrition Research*, *52*(1), 1651.

https://doi.org/10.3402/fnr.v52i0.1651

7. Bhardwaj,S.,Passi,S.J.,&Misra,A.(2011).Overviewoftransfattyacids:Biochemistryand healtheffects. *Diabetes & Metabolic Syndrome ClinicalResearch & Reviews*, *5*(3), 161–164. https://doi.org/10.1016/j.dsx.2012.03.002
8. Choe,E.,&Min,D.(2007).ChemistryofDeep-Fatfryingoils.*JournalofFoodScience*,*72*(5), R77-86. https://doi.org/10.1111/j.1750-3841.2007.00352.x
9. Bhardwaj,S.,Passi,S.J.,Misra,A.,Pant,K.K.,Anwar,K.,Pandey,R.,&Kardam,V.(2016). Effectofheating/reheatingoffats/oils,asusedbyAsianIndians,ontransfattyacidformation.
10. *FoodChemistry*, *212*, 663–670. https://doi.org/10.1016/j.foodchem.2016.06.021 DeAlzaa,F.,Guillaume,C.,Ravetti,L.,&ModernOlivesLaboratoryServices.(2018).
11. Evaluation of Chemical and Physical Changes in Different Commercial Oils during Heating. In Modern Olives Laboratory Services, *Acta Scientific Nutritional Health*. https://www.melhorsaude.org/wp-content/uploads/2020/05/ASNH-02-0083.pdf
12. Nayak, P. K., Dash, U., Rayaguru, K., & Krishnan, K. R. (2015). Physio-Chemical changes duringrepeatedfryingofcookedoil:areview.*JournalofFoodBiochemistry*,*40*(3),371–390. https://doi.org/10.1111/jfbc.12215
13. Micha,R.,&Mozaffarian,D.(2008).Transfattyacids:Effectsoncardiometabolichealthand implicationsforpolicy.*ProstaglandinsLeukotrienesandEssentialFattyAcids*,*79*(3–5),147–152.https://doi.org/10.1016/j.plefa.2008.09.008
14. Menaa,F.,Menaa,A.,Menaa,B.,&Tréton,J.(2012).Trans-fattyacids,dangerousbondsfor health? A background review paper of their use, consumption, health implications and regulation in France. *European Journal of Nutrition*, *52*(4), 1289–1302. https://doi.org/10.1007/s00394-012-0484-4
15. Anitha,L.,Mandlik,P.,Raju,S.K.,Purnanand,D.,Durga,K.L.J.,Naidu,S.,...&Ahmed, N. M. (2016). Estimation of free fatty acids, peroxide value and trans fatty acids in reheated and reused oils of deep fat fried street foods. Research Journal of Science and IT Management, 5(11), 1-9. https://www.academia.edu/download/107606386/index.pdf
16. Fssai.gov.in.https://www.fssai.gov.in/upload/advisories/2022/01/61f381c576d16SOP_Cooki ng_Oil_28_01_2022https://www.fssai.gov.in/upload/advisories/2022/01/61f381c576d16SOP_Cooking_Oil_28_0 1_2022.pdf