DOI: 10.31073/onehealthjournal2025-V-04

NATURAL AND TECHNOLOGICALLY PROCESSED FATS IN HUMAN NUTRITION

Kobysh A.I.* (ORCID: 0000-0001-9372-5016), Omelchun Y.A. (ORCID: 0000-0001-8895-7250), Klochkova N.P. (ORCID: 0009-0004-2007-2105), Romanko M. Ye. (ORCID: 0000-0003-0285-5603), Shulyak S.V. (ORCID: 0000-0001-8501-1750)
State Scientific and Research Institute of Laboratory Diagnostics and Veterinary and Sanitary Expertise (SSRILDVSE), Kyiv, Ukraine, email: an.kobish@gmail.com

Abstract. *The goal of our study was to analyze and summarize the available scientific data on the functional significance of natural fats and the possible negative impact on the human body of technologically modified oils present in the modern diet. The following scientific research methods were used in the study: theoretical search, analysis and synthesis, generalisation and comparative analysis of data on the impact of natural and industrially produced fats on the activity of the human body. To search for theoretical data, scientometric databases and platforms (Web of Science, Scopus, etc.) were used. In total, we conducted a systematic review of more than 200 primary scientific sources in this field. The article presents a comparative analysis of the results of scientific studies on the role of dietary fats of various origins in ensuring human health. It notes the need for a clearer formulation at the legislative level regarding the presence of natural trans-isomers of fatty acids in natural milk and meat of ruminants, as well as clarification of the need to determine their quantity in these products. In addition, the need to improve existing methods and develop new ones that will make it possible to distinguish between natural and artificial trans fatty acids in food products is argued. Further research is justified to establish the negative impact of artificial trans fats on the human body, and studying the properties of trans fats in ruminants.*

Keywords: edible fats, industrial or natural trans fats, trans-fatty acids (TFA), classification and functions of fats, regulation of fat consumption in the diet, healthy diet, REPLACE package.

Introduction. Healthy eating is the foundation of human health and significantly reduces the risk of diseases related to the cardiovascular and endocrine systems (Visseren, 2021). At the same time, the realities of modern life lead to changes in eating behavior and the growing popularity of fast food. Among the variety of foods, there is an increasing preference for semi-finished products and ready-to-eat meals, which simultaneously stimulates the growth of their production. As a result, the share of caloric dishes in a person's diet is increasing, and their composition contains more fats and carbohydrates (Micha, 2014; Nantapo, 2015; Rippin, 2017; Gupta, 2016; Stender, 2016).

It should be noted that not all fats are harmful to human health. Those naturally present in plant and animal products are necessary for the normal functioning of the body. Fats perform not only an energy function but also protective, structural, thermoregulatory, and hormonal functions. They help in the absorption of fat-soluble vitamins and minerals. Moreover, they are essential for the functioning of all body systems, including the nervous, cardiovascular, and reproductive systems (Cannon, & Nedergaard, 2004; Virtanen et al., 2009; Sakers et al., 2022).

Despite the fact that fats play a role in the human body that is just as important as proteins and carbohydrates, the need to control the quantity and quality of fats consumed remains relevant. It is important to note that an excess of any type of fat in a person's daily diet can lead to weight gain. Therefore, it is necessary not only to avoid foods that contain harmful fats but also to consume healthy fats in moderation (Wang et al., 2016; Vekic et al., 2023).

Therefore, **the aim of this study** was to conduct a systematic analysis of theoretical data on the role of natural and technologically processed fats in ensuring proper and balanced human nutrition using scientometric databases and platforms.

Materials and methods. The work was carried out in the scientific research chemical and toxicological department of SSRILDVSE.

The object of our research was theoretical and practical scientific data on the role of natural and technologically processed fats in ensuring proper and balanced human nutrition.

The research methods used in this scientific work are theoretical search, generalization, analysis and synthesis, as well as comparative analysis of data on the impact of natural and technologically processed fats on the functioning of the human body. The source of scientific data was scientometric databases and platforms (Web of Science, Scopus, Google Scholar, etc.), which provide access to publications of scientifically substantiated test results on this topic. According to the methodology of systematic literature reviews, more than 200 scientific primary sources in this scientific direction were analyzed and evaluated.

Results and discussion. The World Health Organisation (WHO) provides recommendations on fat consumption, taking into account current scientific research data. Thus, the total share of fats in a person's daily diet should not exceed 30%. Of these, saturated fats, i.e. those containing predominantly saturated fatty acids, should not exceed 10%, and trans fats should not exceed 1%. In Ukraine, the content of trans fatty acids (TFA) in food products is regulated by Order of the Ministry of Health of Ukraine No. 1613 of 16 July 2020 and should not exceed 2 g per 100 g of fat (2%) (Replace trans fat, 2021; MoH of Ukraine, 2020).

Food products may contain both saturated and unsaturated fatty acids. A fatty acid is saturated if there are only single bonds between adjacent hydrocarbons in the chain. Each hydrocarbon is saturated with hydrogen. Typical examples are stearic and palmitic acids, which are mostly found in meat.

The sources of unsaturated fats are vegetable oils, fatty fish, nuts, and seeds. Vegetable oils are characterised by a high content of unsaturated fatty acids. Such fats have a liquid consistency at room temperature. There are monounsaturated and polyunsaturated fatty acids. They are recognised as the most beneficial lipids. Doctors believe that vegetable fats should dominate over animal fats in the human diet (Crescenzo, 2015).

Monounsaturated fatty acids (MUFA) are found in cashews, almonds, pecans, pistachios, avocados, as well as in olive, flaxseed, corn, rapeseed, sunflower, peanut, and sesame oils. Polyunsaturated fats are found in fish such as salmon, tuna, mackerel, sardines, and herring. They are also found in walnuts, sunflower seeds, pumpkin seeds, flax seeds, and sesame seeds.

Among polyunsaturated fatty acids (PUFA), essential fatty acids are distinguished, which are not synthesized in the human body and are extremely necessary for biological processes. Therefore, they must be obtained from food. Essential fatty acids include omega-3 (eicosapentaenoic, docosahexaenoic, alpha-linolenic) and omega-6 (linoleic and gamma-linolenic) acid group.

Scientific studies confirm that omega-3 fatty acids lower blood pressure and inhibit blood clotting, preventing thrombosis and sudden death from heart attack. They are also capable of reducing inflammation and, accordingly, the risk of developing certain types of cancer (Smith, 2011; Lange, 2020).

Recent trials show that saturated fats are not as harmful as previously thought. However, excessive consumption can lead to high blood cholesterol and cardiovascular disease (Jian, 2021; Ding, 2022).

Saturated fatty acids are found mainly in animal products – beef, dairy products, pork, poultry – and are also present in coconut and palm oil. They are most abundant in sausages, ham and fast food.

Although saturated fats are not dangerous to human health, they can, like trans fats, increase the level of cholesterol, which is part of low-density lipoproteins. These lipoproteins contain little protein and a lot of fat. That is why the amount of such fats must be limited (De Souza, 2015; Ruuth, 2021).

It should be noted that cholesterol is not soluble in water, so it enters the bloodstream in the form of lipoproteins, which, moving through the blood vessels, carry cholesterol throughout the body and can form cholesterol plaques. This, in turn, leads to corresponding pathologies of the organs and systems of the body (Willeit, 2020; Ikezaki, 2021).

High-density lipoproteins act as a counterbalance to them. These compounds contain a lot of protein and little fat. They normalise cholesterol levels, absorb excess cholesterol and remove

it to the gallbladder, preventing the formation of plaques (Lu, 2022; Kosmas, 2023; Eckardstein, 2023).

Artificially produced trans fats, which are unsaturated fats containing trans isomers of fatty acids, are considered particularly harmful to human health (Pyakurel, 2023; Song, 2023).

It should be noted that unsaturated fatty acids can have not only a trans but also a cis spatial configuration of the molecule. When the hydrogen atoms around the double bond are in the same plane, it is a cis isomer. If they are in two different planes, it is a trans isomer. The double bond of the cis configuration causes the molecule to bend, which makes it impossible to pack the fatty acid tightly, unlike the trans configuration, which, like saturated fatty acids, allows the molecule to lie in a line. This is why cis-isomers of fatty acids remain liquid at room temperature.

When discussing TFA formed during industrial processing, it is necessary to determine the purpose of such processing and how to prevent it.

Manufacturers partially replace natural milk fats with vegetable oils in order to reduce the cost of food products and meet market demand amid declining purchasing power. Such products are not considered dairy products, so the label must indicate that it is a milk-containing product and list the corresponding ingredients.

In order to convert liquid vegetable oils into solid fat in industrial conditions, hydrogenation and transesterification technologies are used. This process produces spreads, margarine, salomas and shortening.

During hydrogenation, hydrogen atoms are added to the unsaturated double bonds of oils, forming artificial trans fatty acids, which can account for more than 40% of the product.

It should be noted that not only palm oil is subject to hydrogenation, as is sometimes reported in the media, but also other edible oils such as sunflower, soybean, olive and rapeseed oils.

Palm oil is obtained by pressing the fruit of the oil palm. It is a common vegetable oil. According to the WHO, red palm oil is the richest vegetable source of vitamins A and E, which are powerful antioxidants that slow down ageing, prevent cell destruction and the development of cancer. In addition, it has a balanced composition of fatty acids. Among saturated fatty acids, which account for 48% of the total, palmitic acid predominates. The level of monounsaturated acids, which are mainly oleic acid, ranges from 37% to 46%, and polyunsaturated acids account for 10%. As we can see, the ratio of saturated to unsaturated fats is close to 1. By the way, palmitic acid is found not only in palm oil, but also in other vegetable and animal fats and breast milk. It is an important source of energy and a key component of the skin's lipid barrier. That is why the negative impact of this fatty acid on the human body is greatly exaggerated. It should also be noted that the relative amount of oleic acid in palm oil and olive oil is almost the same.

Palm oil acquires a semi-solid consistency at room temperature. Unlike other fats, it does not oxidise when exposed to air, so it does not require special storage conditions and has a long shelf life. During the refining process, it is separated into olein and stearin. Palm olein has a liquid consistency and never thickens. In addition, it has a high burning point, which means that when frying food in it, the beneficial components are preserved. Palm stearin, on the contrary, is solid at room temperature, which is why it is widely used in the confectionery industry.

Therefore, palm oil is likely to be harmful only if it is hydrogenated.

However, the technological process of transesterification of vegetable oils involves the production of industrially manufactured fats without changing the fatty acid composition and with virtually no artificial trans-isomers of fatty acids. This means that this technology produces a healthier product that can replace hydrogenated oil. The main thing is that the manufacturer indicates the composition of the product on the label and gives the buyer the right to choose.

It should also be noted that TFA are not only found in products containing partially hydrogenated vegetable fats. They can also be formed in small quantities during food preparation, i.e. prolonged frying at high temperatures. For example, in products such as French fries, doughnuts and other deep-fried foods (Katan, 2006).

In view of the above, the danger should be sought not in a particular oil, but in its technological processing, which results in the formation of trans fats, a high proportion of which in the human diet can be harmful to health. It is believed that regular consumption of foods containing such fat leads to an increase in blood cholesterol levels, i.e. low-density lipoproteins. This contributes to the development of cardiovascular disease, stroke, and diabetes, increasing mortality among the population (Lichtenstein, 2014; Nagpal, 2021). It is for this reason that many countries around the world have introduced strict controls on the content of TFA in relevant foods.

Currently, more than half of the world's population is covered by mandatory restrictions on industrial TFA (iTFA) content in food products (Fig. 1). To track countries' progress in achieving the WHO's priority goal of global elimination of industrially produced trans fats, a map of TFA consumption indicators around the world has been created. It shows countries with best practices and less stringent mandatory restrictions on, trans fat consumption, other additional measures to reduce industrially produced trans fat consumption, or national political commitments to eliminate trans fats. In countries with mandatory restrictions, the scorecard also shows the existence of monitoring mechanisms (WHO, 2023, 2024).

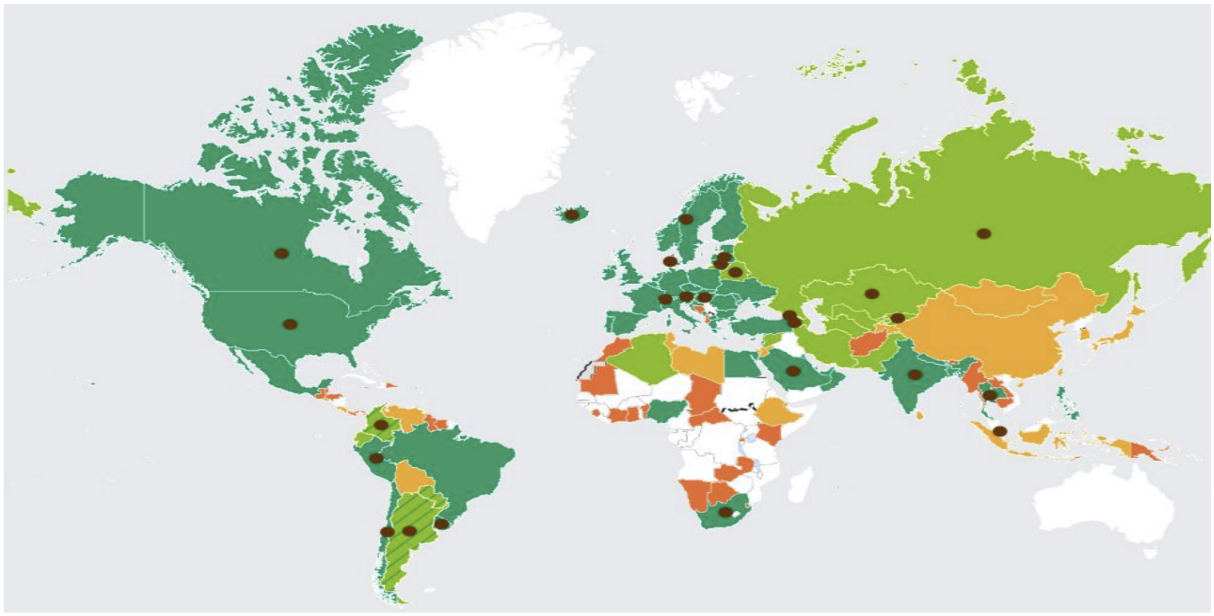

Fig. 1. Global policies and measures to eliminate TFA in food products as of December 2023, according to WHO data
(WHO 5-year milestone report on global trans fat elimination 2023, 2024)

The REPLACE package serves as a roadmap for countries to implement measures to reduce and eliminate industrially produced TFA.

REPLACE is an action plan for the global elimination of industrially produced trans fats from the global food supply. It aims to rapidly and completely eliminate artificially produced TFAs from the food supply and promote their replacement with healthy fats and oils.

This package covers strategic areas of action to align policies, legalise or adopt regulatory decisions aimed at eliminating technologically produced trans fats. It also covers the assessment and monitoring of TFA content in food products, changes in dietary fat consumption, and raising awareness among policymakers, manufacturers, suppliers, and the public about the negative health effects.

At the start of the REPLACE initiative in 2018, best practice policies for eliminating TFA in food products were in place in 11 countries, covering 6% of the world's population at that time (Fig. 2). By the end of 2023, 42 more countries had implemented best practice policies, affecting 46% of the world's population (or 3.7 billion people). Three more countries (Argentina, Paraguay and Sri Lanka), representing 1% of the world's population, have adopted best practice policies that will soon come into force, meaning that approximately 47% (or 3.8 billion people) could be covered by best practice policies by 2025. In addition to strict policies to eliminate industrially produced trans fats, some countries have less restrictive policies in place. Overall, mandatory policies cover 55% of the world's population (WHO, 2023, 2024).

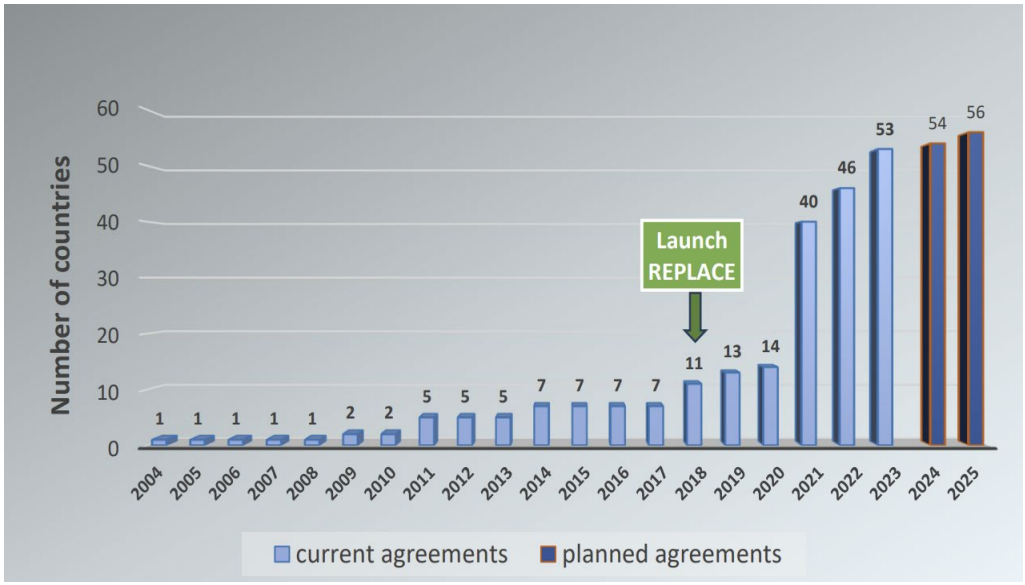

Fig. 2. Growth dynamics in the number of countries with effective best practice policies on the elimination of trans fats in food products, according to WHO data.

(WHO 5-year milestone report on global trans fat elimination, 2023, 2024)

Ukraine has also joined the WHO initiative to limit TFA in food products by introducing standards similar to those in EU countries. Despite the constant threat to human life in Ukraine due to the war, the government's policy, with the assistance of the WHO, is aimed at maintaining public health priorities.

It is also worth mentioning trans fats of natural origin. Their content in ruminant products such as milk, butter, cheese, meat and fat can be up to 6% (Stender et al., 2008).

In the body of ruminants, trans-isomers of fatty acids are formed in the multi-chambered stomach as a result of bacterial activity. There are also studies that have revealed the important cardioprotective role of TFA in ruminants. Therefore, further scientific research into the mechanisms responsible not only for the negative effects of TFAs, but also for their potential as beneficial compounds in our diet, is now important for the modulation of cardiovascular disease (Ganguly, 2015).

At present, the gas chromatography method used to quantify the total TFA content does not allow determining their origin and clearly distinguishing between natural and artificial trans fats. In this regard, new scientific developments are needed.

Conclusions. Public concern and numerous indirect scientific data on the harmfulness of trans fats need to be confirmed by more in-depth experimental studies that would make it possible to understand the biological pathways and mechanisms of industrially-produced trans fats (iTFA) action on the human body. At the same time, the problem with laboratory analysis is the inability

to differentiate between natural trans-isomers of fatty acids found in milk and meat from ruminants and those produced technologically, which complicates the assessment of their impact in terms of overall consumption. It should also be noted that natural TFAs in food products do not pose the same health risks as artificial ones. Therefore, it is important to focus control and regulatory efforts in Ukraine on industrially produced trans fats, which are associated with negative effects on human health.

REFERENCES

1. Visseren F., Mach F., Smulders Y. (2021). 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice. *European Heart Journal*. doi:10.1093/eurheartj/ehab484
2. Gupta V., Downs S.M., Ghosh-Jerath S., Lock K., Singh A. (2016). Unhealthy fat in street and snack foods in low-socioeconomic settings in India: a case study of the food environments of rural villages and an urban slum. *Journal of Nutrition Education and Behavior;* 2016 Apr; 48(4):269-279.e1.
3. Nantapo C.W.T., Muchenje V., Nkukwana T.T., Hugo A., Descalzo A., Grigioni G., Hoffman L.C. (2015). Socio-economic dynamics and innovative technologies affecting health-related lipid content in diets: Implications on global food and nutrition security. *Food Research International;* Elsevier Ltd. doi.:10.1016/j.foodres.2015.05.033
4. Rippin H., Hutchinson J., Ocke M., Jewell J., Breda J., Cade J. (2017). An exploration of socioeconomic and food characteristics of high trans fatty acid consumers in the Dutch and UK national surveys after voluntary product reformulation. *Food & Nutrition Research*; 61:1412793.
5. Stender S., Astrup A., Dyerberg J. (2016). Artificial trans fat in popular foods in 2012 and in 2014: a market basket investigation in six European countries. *BMJ Open*; 6:e010673.
6. Micha R., Khatibzadeh S., Shi P., Fahimi S., Lim S., Andrews K.G., Engell R.E., Powles J., Ezzati M., Mozaffarian D. (2014). Global, regional, and national consumption levels of dietary fats and oils in 1990 and 2010: a systematic analysis including 266 country-specific nutrition surveys. *BMJ*; 348:g2272.
7. Sakers A., De Siqueira M.K., Seale P., Villanueva C.J. (2022). Adipose-tissue plasticity in health and disease. *Cell;* Elsevier B.V. doi.:10.1016/j.cell.2021.12.016
8. Cannon B., Nedergaard J. (2004). Brown Adipose Tissue: Function and Physiological Significance. *Physiological Reviews*. doi.:10.1152/physrev.00015.2003
9. Virtanen K.A., Lidell M.E., Orava J., Heglind M., Westergren R., Niemi T., Taittonen M., Laine J., Savisto N.J., Enerbäck S., Nuutila P. (2009). Functional Brown Adipose Tissue in Healthy Adults. *New England Journal of Medicine*; *360*(15):1518–1525. doi.:10.1056/nejmoa0808949
10. Vekic J., Stefanovic A., Zeljkovic A. (2023). Obesity and Dyslipidemia: A Review of Current Evidence. *Current Obesity Reports*. Springer. doi:10.1007/s13679-023-00518-z.
11. Wang Q., Afshin A., Yakoob M.Y., Singh T., Rehm C., Khatibzadeh S., Micha R., Shi P., Mozaffarian D., Ezzati M., Fahimi S., Wirojratana P., Powles J., Elmadfa I., Rao M., Alpert W., Lim S., Engell R., Andrews K., Abott P. (2016). Impact of nonoptimal intakes of saturated, polyunsaturated, and trans fat on global burdens of coronary heart disease. *Journal of the American Heart Association*; 5:e002891.
12. Replace trans fat. (2021). An action package to eliminate industrially-produced trans-fatty acids. https://www.who.int/docs/default-source/documents/%20replace-transfats/replace-action-package.pdf
13. Nakaz MOZ Ukrainy № 1613 vid 16.07.2020 r. Pro zatverdzhennia Pravyl dodavannia vitaminiv, mineralnykh rechovyn ta deiakykh inshykh rechovyn do kharchovykh produktiv. https://zakon.rada.gov.ua/laws/show/z0891-20#Text [in Ukrainian].
14. Bourre J.M. (2005). Where to find omega-3 fatty acids and how feeding animals with diet enriched in omega-3 fatty acids to increase nutritional value of derived products for human: What is actually useful? *Journal of Nutrition, Health and Aging;* Springer-Verlag France.
15. Smith G.I., Atherton P., Reeds D.N., Mohammed B.S., Rankin D., Rennie M.J., Mittendorfer B. (2011). Dietary omega-3 fatty acid supplementation increases the rate of muscle

protein synthesis in older adults: A randomized controlled trial. *American Journal of Clinical Nutrition*; *93*(2):402–412. doi.:10.3945/ajcn.110.005611
16. Lange K.W. (2020). Omega-3 fatty acids and mental health. *Global Health Journal*. doi:10.1016/j.glohj.2020.01.004
17. Crescenzo R., Bianco F., Mazzoli A., Giacco A., Cancelliere R., di Fabio G., Iossa S. (2015). Fat quality influences the obesogenic effect of high fat diets. *Nutrients*; *7*(11):9475–9491. doi.:10.3390/nu7115480
18. Jian C., Luukkonen P., Sädevirta S., Yki-Järvinen H., Salonen A. (2021). Impact of short-term overfeeding of saturated or unsaturated fat or sugars on the gut microbiota in relation to liver fat in obese and overweight adults. *Clinical Nutrition*; *40*(1):207–216. doi.:10.1016/j.clnu.2020.05.008
19. Ding W.Y., Protty M.B., Davies I.G., Lip G.Y.H. (2022). Relationship between lipoproteins, thrombosis, and atrial fibrillation. *Cardiovascular Research*; Oxford University Press. doi.:10.1093/cvr/cvab017
20. De Souza R.J., Mente A., Maroleanu A., Cozma A., Ha V., Kishibe T., Uleryk E., Budylowski P., Schünemann H., Beyene J., Anand S. (2015). Intake of saturated and trans unsaturated fatty acids and risk of all cause mortality, cardiovascular disease, and type 2 diabetes: systematic review and meta-analysis of observational studies. *BMJ*; 351:h3978.
21. Ruuth M., Lahelma M., Luukkonen P. K., Lorey M. B., Qadri S., Sädevirta S., Hyötyläinen T., Kovanen P., Hodson L., Yki-Järvinen H., Öörni K. (2021). Overfeeding Saturated Fat Increases LDL (Low-Density Lipoprotein) Aggregation Susceptibility While Overfeeding Unsaturated Fat Decreases Proteoglycan-Binding of Lipoproteins. *Arteriosclerosis, Thrombosis, and Vascular Biology*; *41*(11):2823–2836. doi.:10.1161/ATVBAHA.120.315766
22. Willeit P., Yeang C., Moriarty P. M., Tschiderer L., Varvel S.A., McConnell J.P., Tsimikas S. (2020). Low-density lipoprotein cholesterol corrected for lipoprotein(A) cholesterol, risk thresholds, and cardiovascular events. *Journal of the American Heart Association*; *9*(23). doi.:10.1161/JAHA.119.016318
23. Ikezaki H., Lim E., Adrienne Cupples L., Liu C.T., Asztalos B.F., Schaefer E.J. (2021). Small dense low-density lipoprotein cholesterol is the most atherogenic lipoprotein parameter in the prospective framingham offspring study. *Journal of the American Heart Association*; *10*(5):1–15. doi.:10.1161/JAHA.120.019140
24. Lu Y., Cui X., Zhang L., Wang X., Xu Y., Qin Z., Liu G., Wang Q., Tian K., Lim K., Charles C., Zhang J., Tang J. (2022). The Functional Role of Lipoproteins in Atherosclerosis: Novel Directions for Diagnosis and Targeting Therapy. *Aging and Disease. International Society on Aging and Disease*. doi.:10.14336/AD.2021.0929
25. Kosmas C.E., Rodriguez Polanco S., Bousvarou M.D., Papakonstantinou E.J., Peña Genao E., Guzman E., Kostara C.E. (2023). The Triglyceride/High-Density Lipoprotein Cholesterol (TG/HDL-C) Ratio as a Risk Marker for Metabolic Syndrome and Cardiovascular Disease. *Diagnostics*. *Multidisciplinary Digital Publishing Institute (MDPI).* doi.:10.3390/diagnostics13050929
26. Eckardstein A., Nordestgaard B., Remaley A., Catapano A. (2023). High-Density Lipoprotein Revisited: Biological Functions and Clinical Relevance. *European Heart Journal*. Oxford University Press. doi:10.1093/eurheartj/ehac605.
27. Pyakurel S. (2023). Initiatives to Regulate Industrially Processed Foods. *Europasian Journal of Medical Sciences;* 5:23–25. doi:10.46405/ejms.v5i1.489
28. Song Z., Song R., Liu Y., Wu Z., Zhang X. (2023). Effects of ultra-processed foods on the microbiota-gut-brain axis: The bread-and-butter issue. *Food Research International*. doi:10.1016/j.foodres.2023.112730
29. Ganguly R., Pierce G.N. (2015). The toxicity of dietary trans fats. *Food Chem Toxicol*; 78:170-6. doi.:10.1016/j.fct.2015.02.004. Epub 2015 Feb 12. PMID: 25684416.
30. Katan M.B. (2006). Regulation of trans fats: the gap, the Polder, and McDonald's French fries. *Atherosclerosis Supplements*; 7:63-66.

31. Lichtenstein A.H. (2014). Dietary trans fatty acids and cardiovascular disease risk: past and present. *Curr Atheroscler Rep*; 16(8):433. doi.:10.1007/s11883-014-0433-1. PMID:24907053.
32. Nagpal T., Sahu J.K., Khare S.K., Bashir K., Jan K. (2021). Trans fatty acids in food: A review on dietary intake, health impact, regulations and alternatives. Journal of Food Science. doi:10.1111/1750-3841.15977.
33. Countdown to 2023: WHO 5-year milestone report on global trans fat elimination 2023. World Health Organization 2024. Users/a.kobish/Downloads/9789240089549-eng.pdf
34. Stender S., Astrup A. Dyerberg, J. (2008). Ruminant and industrially produced trans fatty acids: health aspects. *Food Nutr Res*; 52. doi.:10.3402/fnr.v52i0.1651. Epub 2008 Mar 12. PMID:19109659; PMCID:PMC2596737.

ЖИРИ ПРИРОДНІ ТА ТЕХНОЛОГІЧНО ОБРОБЛЕНІ У ХАРЧУВАННІ ЛЮДИНИ

Кобиш А. І. (ORCID: 0000-0001-9372-5016), Омельчун Ю. А. (ORCID: 0000-0001-8895-7250), Клочкова Н. П. (ORCID: 0009-0004-2007-2105), Романько М. Є. (ORCID: 0000-0003-0285-5603), Шуляк С. В. (ORCID: 0000-0001-8501-1750)
Державний науково-дослідний інститут з лабораторної діагностики та ветеринарно-санітарної експертизи (ДНДІЛДВСЕ), м. Київ, Україна, email: an.kobish@gmail.com

Резюме. *Метою наших досліджень було проаналізувати та узагальнити наявні наукові дані щодо функціонального значення природних жирів та можливого негативного впливу на організм людини технологічно видозмінених олій, присутніх у сучасному раціоні. У роботі були використані наступні наукові методи досліджень: теоретичний пошук, аналіз і синтез, узагальнення та порівняльний аналіз даних щодо впливу природних та промислово вироблених жирів на діяльність організму людини. Для пошуку теоретичних даних використані наукометричні бази даних та платформи (Web of Science, Scopus та ін.). Загалом нами проведено систематичний огляд більше 200 наукових першоджерел за напрямом досліджень. У даній статті наведено порівняльний аналіз результатів наукових досліджень щодо ролі харчових жирів різного походження у забезпеченні здоров'я людини. Зазначена необхідність в більш чітких формулюваннях щодо наявності природних транс-ізомерів жирних кислот у натуральному молоці й м'ясі жуйних тварин на законодавчому рівні та уточнення доцільності визначення їх кількості у даних продуктах. Окрім того, аргументована необхідність в удосконаленні існуючих та розробці новітніх методів, які нададуть можливість розмежовувати природні та штучні транс-жирні кислоти у продуктах харчування. Обґрунтовано проведення подальших досліджень щодо встановлення негативного впливу штучних трансжирів на діяльність організму людини, а також властивостей трансжирів жуйних тварин.*

Ключові слова: харчові жири, ізомери природні і штучні трансжири, транс-жирні кислоти, ТЖК, класифікація і функція жирів, нормування жирів у раціоні, здоров'я людини, пакет REPLACE

DOI: 10.31073/onehealthjournal2025-V-04