

DIETS OF ROMANIANS AND POPULATIONS FROM NEIGHBORING COUNTRIES COMPARED TO THE EAT-LANCET DIET

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Abstract: In light of the global challenges related to food security, environmental sustainability, and public health, the article explores and compares the eating habits of the population from Romania and neighboring countries with the principles promoted by EAT-Lancet diet, the "planet-diet". Through comparative analysis, the article identifies significant similarities and differences in food consumption, highlighting potential health and environmental benefits, as well as challenges and barriers to adopting a sustainable diet. It is highlighted that Romanians deviate most significantly from the recommendations of the EAT-Lancet diet, underlining the urgent need to re-evaluate and adjust Romanian eating habits towards more sustainable and healthy models.

Key words: Romanians' diet, Hungarians' diet, Serbians' diet, Bulgarians' diet, Ukrainian' diet, Moldavians' diet, EAT-Lancet diet.

INTRODUCTION

The diets of the population in Romania and neighboring countries have specificities influenced by culinary traditions, food availability and socio-economic factors. These diets reflect a mix of traditional eating habits and modern influences, sometimes having significant implications for public health and environmental sustainability.

Although there are regional and cultural variations, these diets also share notable similarities, such as a preference for pork and dairy products, and moderate consumption of fruits and legumes. Adjusting these diets to align dietary intake with public health and sustainability recommendations could help improve population health and protect the environment. [4-7,14,21]

The EAT-Lancet report, published for the first time in 2019, is the result of a collaboration between EAT, a non-profit organization dedicated to transforming the global food system, and The Lancet, a leading medical journal. This comprehensive document provides a detailed set of dietary and food production recommendations designed to address global challenges related to human health and environmental sustainability. The main goal of the report is to define a diet that promotes optimal health and reduces the risk of chronic diseases such as obesity, diabetes, cardiovascular disease and cancer, and to establish a sustainable food system that minimizes negative environmental impacts, including carbon emissions, greenhouse gases, biodiversity loss, excessive water use and soil degradation. [1,2]

The diet proposed by EAT-Lancet, known as the "healthy reference diet", is designed to be flexible and globally applicable. This includes a daily consumption of at least 500 grams of fruits and vegetables, 232 grams of whole grains, and about 75 grams of plant protein from sources such as legumes and nuts. The maximum limit for red meat is 14 grams per day, and for fish, 28 grams per day. Egg consumption is limited to a maximum of 13 grams per day, and dairy products are recommended in quantities of up to 250 grams per day. Healthy fats, from unsaturated vegetable oils, should be consumed in moderation, and sugar is limited to 31 grams per day. [16,19]

The report emphasizes the importance of a predominant consumption of plant-based foods, such as fruits, vegetables, legumes and nuts, and recommends reducing the consumption of animal-based foods. Proteins from sustainable sources such as legumes and nuts are preferred over red and processed meat. Unsaturated fats, such as those found in vegetable oils, are touted for their cardiovascular health benefits, and consumption of saturated and trans fats is limited. It is also recommended to drastically reduce the consumption of added sugars and processed foods high in salt, sugar and unhealthy fats to prevent obesity and other metabolic diseases. [24-26]

Current food systems contribute significantly to climate change, biodiversity loss and pollution of water and soil resources. Implementing a diet based on the EAT-Lancet principles could reduce greenhouse gas emissions linked to food production by up to 80%, while conserving water resources and protecting biodiversity. Reducing the use of land for intensive agriculture and grazing would help preserve natural habitats and protect endangered species.[16,19,24-26]

MATERIALS AND METHODS

This study was conducted using a comprehensive approach that involved collecting, researching, and analyzing external data from internationally recognized secondary and tertiary sources. These include prestigious databases and organizations such as Our World in Data at Oxford University in the UK, the Food and Agriculture Organization (FAO) in Rome, Italy, and the World Health Organization (WHO) in Geneva, Switzerland. These entities provide updated and verified data that reflects the current state of food consumption and nutritional practices globally.

Relevant scientific publications in the field of nutrition and food sustainability were accessed and analyzed using major international scientific databases, including Scopus, Web of Science, PubMed, ScienceDirect, and Google Scholar. These platforms allowed us to identify the literature and extract studies that discuss the technical and public health aspects of food consumption.

The steps of the applied methodology was:

Data identification and selection. We filtered and selected data based on their relevance to the study's themes of interest, such as consumption of different food categories (cereals, vegetables, fruits, dairy products, meat, etc.), public health impact, and sustainability the environment.

Quantitative and qualitative analysis. Quantitative data were analyzed to determine the volumes of food consumption, broken down by category (cereals, roots, vegetables, fruits, dairy products, red meat, poultry, eggs, fish, legumes, nuts, oils and sugar). In parallel, we carried out a qualitative analysis of the impact of these food practices on public health and environmental sustainability.

Information synthesis. Integrating and comparing data from various sources to obtain a complete and multifaceted picture of the subject being studied.

Using these research materials and methods, our study aims to provide a broad and scientifically based perspective on the dynamics of food consumption in Romania and neighboring countries, compared to the EAT-Lancet dietary recommendations. This approach allows us to understand not only the scale and complexity of dietary habits, but also to identify possible solutions and sustainable alternatives that could improve public health and help protect the environment.

RESEARCH RESULTS

Romania has a cereals consumption of 462 grams per day, which significantly exceeds the EAT-Lancet recommendation of 232 grams. This high level of consumption

can be attributed to Romanian food traditions, which often include grains in various forms, such as bread, polenta and various bakery products. [4-7,14,21] High consumption of grains may also be influenced by their accessibility, with grains often being cheaper and more readily available compared to other food groups. Compared to other neighboring countries, Romania ranks first in terms of cereal consumption. Ukraine, for example, consumes 439 grams per day, reflecting a similar preference for grains, while Serbia and Moldova consume 398 grams and 373 grams per day, respectively. Hungary and Bulgaria, with 319 grams and 354 grams per day, are below Romania's level, but still above the EAT-Lancet recommendation. These regional differences may be related to economic, cultural factors and the local availability of cereals, highlighting the importance of this food group in the diet of Eastern European populations. [16,20,24,25]

As for roots and tubers, consumption in Romania is 271 grams per day, considerably exceeding the EAT-Lancet recommendation of 50 grams. This high consumption can be attributed to the presence of potatoes, carrots and other root vegetables in many traditional Romanian dishes, such as soups, stews and vegetable dishes. Ukraine has an even higher consumption of 360 grams per day, reflecting a similar reliance on these foods, perhaps due to their central role in Ukrainian cuisine, such as borscht and other thick soups. [12,13,15] In Moldova and Hungary, consumption is 125 grams and 128 grams per day, respectively, which shows a moderate preference for roots and tubers, although significantly higher than international recommendations. Serbia, with a consumption of 104 grams per day, and Bulgaria, with 74 grams per day, are closer to these recommendations, but still above them. [3,16] These differences can be explained by cultural, economic and agricultural variations, with each country having distinct access to and preferences for certain types of food. (Figure 1)

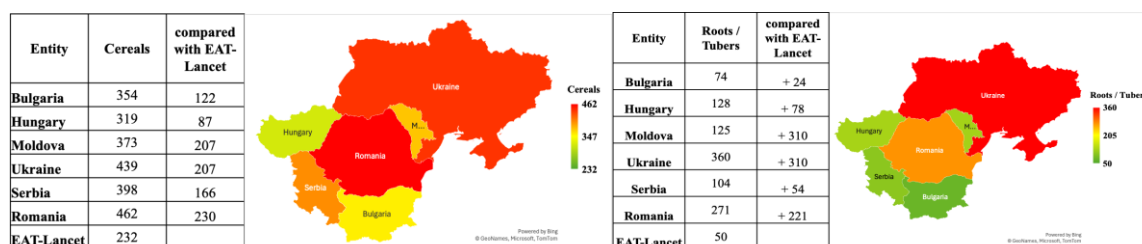


Figure 1. Cereals, root and tubers consumption in Romania and neighboring countries

Source: own calculation, based on [16]

The consumption of vegetables in Romania reaches 538 grams per day, a value considerably higher than the EAT-Lancet recommendation of 300 grams. This high consumption can be attributed to the diversity of vegetables available and Romanian culinary traditions that include a wide variety of vegetable-based dishes such as salads, zacusca, pots and soups. [4-7,14,21] In Ukraine, consumption is 442 grams per day, also reflecting a diet rich in vegetables, which are essential in soups, salads and other traditional dishes. Serbia, with 302 grams per day, is close to the EAT-Lancet recommendations, suggesting a balanced diet. On the other hand, Moldova, with 206 grams per day, and Hungary, with 238 grams per day, as well as Bulgaria, with 247 grams per day, have a consumption below the EAT-Lancet recommendations, which could indicate a need for promotion of vegetable consumption to improve public health. [3,13,16] Regional differences in vegetable consumption may be influenced by factors such as seasonal availability, affordability and local dietary habits.

For fruit, Romania has a consumption of 242 grams per day, slightly above the EAT-Lancet recommendation of 200 grams, which suggests that the Romanian population

attaches considerable importance to the inclusion of fruit in the daily diet. This may be the result of a rich variety of fruits available in the market, both from local production and imports. Fruits are frequently present in the diet of Romanians, either eaten fresh or in the form of natural juices, compotes or traditional desserts. [4-7,14,20,21] Serbia, with a very similar consumption of 244 grams per day, shows a similar trend, perhaps reflecting a favorable climate for growing fruits and a culinary tradition that capitalizes on these products. In contrast, Ukraine, with 138 grams per day, Moldova, with 110 grams, Hungary, with 129 grams and Bulgaria, with 159 grams, have fruit consumption below the recommended level, which could indicate a more limited access to fresh fruit or cultural differences in food preferences. (Figure 2)

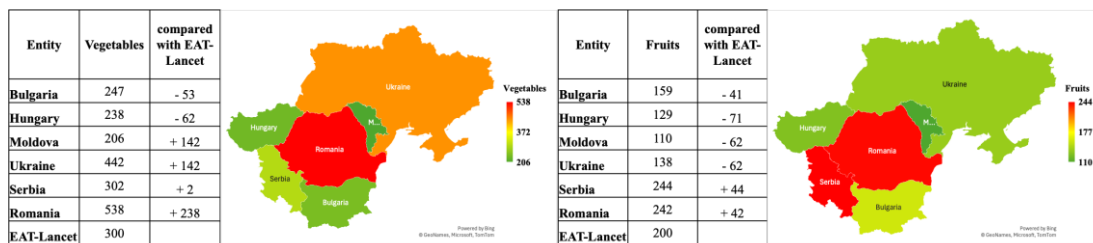


Figure 2. Vegetable and fruit consumption in Romania and neighboring countries

Source: own calculation, based on [16]

The consumption of milk and equivalents in Romania reaches 655 grams per day, almost triple the EAT-Lancet recommendation of 250 grams, highlighting a strong preference for dairy products in the daily diet of Romanians. This high level of consumption can be attributed to food traditions that include a variety of dairy products, such as milk, yogurt, cheese and cream, frequently used in local cuisine. Milk and milk products are often valued for their nutritional value, providing calcium, protein and other essential nutrients. In comparison, Hungary consumes 523 grams per day, Serbia 474 grams, Bulgaria 462 grams, Ukraine 400 grams and Moldova 352 grams, all these values also being above the EAT-Lancet recommendations, but below the level of consumption in Romania. These data suggest that also in these countries milk and milk products play a significant role in the diet, but to a more moderate extent than in Romania. Differences in consumption of milk and milk equivalents may be influenced by factors such as cultural traditions, availability of dairy products, taste preferences and perceptions of their health benefits.

For red meat, Romania records a consumption of 121 grams per day, well above the EAT-Lancet recommendation of 14 grams, indicating a strong preference for this type of meat in the daily diet. This high level of consumption can be associated with traditional culinary habits, where red meat is frequently used in various dishes, from steaks and barbecues, to stews and festive dishes. The high consumption of red meat may be influenced by its perception as a main source of protein and iron, which are essential for health. In comparison, Serbia consumes 118 grams per day, Hungary 148 grams, Bulgaria 97 grams, Ukraine 65 grams and Moldova 60 grams, all these values also being above the EAT-Lancet recommendations, but below the level of consumption in Romania, with the exception of Hungary which has an even higher consumption. These regional differences can be attributed not only to food traditions, but also to the availability and accessibility of red meat, as well as cultural preferences. (Figure 3)

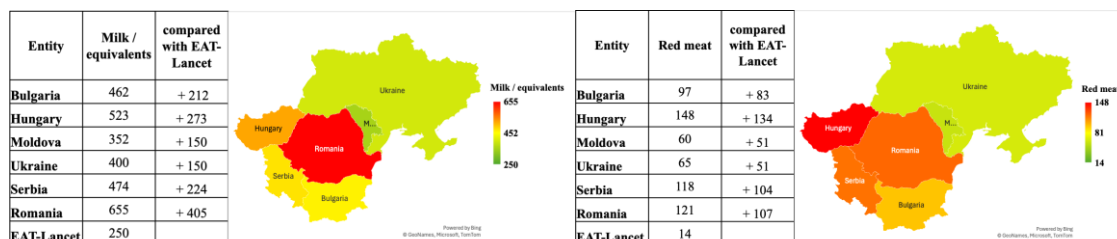


Figure 3. Consumption of milk and equivalents and red meat in Romania and neighboring countries

Source: own calculation, based on [16]

The consumption of poultry meat in Romania is 53 grams per day, exceeding the EAT-Lancet recommendation of 29 grams. This preference for poultry can be attributed to its perception as a healthier and lower-fat option compared to red meat, being frequently included in various traditional and modern dishes, from soups and stews to steaks and barbecues. In Ukraine, consumption is 62 grams per day, and in Hungary, even higher, at 69 grams per day, both countries reflecting a similar trend of preference for poultry meat. Bulgaria, with 60 grams per day, follows the same line, while Moldova, with 44 grams per day, has a moderate consumption, but still above the recommendations. Serbia is close to the EAT-Lancet recommendations, with a consumption of 28 grams per day. These regional variations may be influenced by poultry meat availability, affordable prices, and health campaigns promoting poultry meat as an important source of high-quality protein.

Egg consumption in Romania is 39 grams per day, significantly higher than the EAT-Lancet recommendation of 13 grams, reflecting an obvious preference for this versatile food in the daily diet of Romanians. Eggs are a staple ingredient in many traditional and modern dishes, from omelets and salads to cakes and other desserts, and are prized for their high nutritional value, including high-quality protein, essential vitamins and minerals. In Ukraine, egg consumption is 40 grams per day, similar to that in Romania, indicating a common trend in the region. Hungary, with 37 grams per day, aligns with this preference, while Serbia, Bulgaria and Moldova consume less, with 26 grams, 24 grams and 22 grams per day, respectively. Regional differences in egg consumption may be influenced by cultural, economic factors and the availability of local products. (Figure 4)

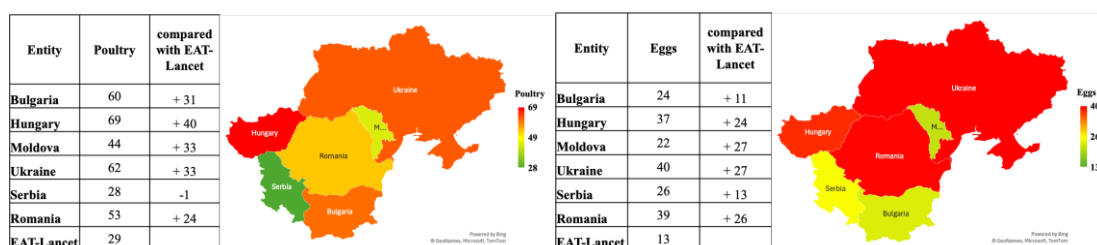


Figure 4. Poultry meat and egg consumption in Romania and neighboring countries

Source: own calculation, based on [16]

For fish and seafood, consumption in Romania is 16 grams per day, below the EAT-Lancet recommendation of 28 grams. This relatively low value reflects a lower preference for these foods in the diet of Romanians, compared to other protein sources. Consumption of fish and seafood may be influenced by factors such as limited availability, higher prices, and perhaps a culinary tradition that does not emphasize these products, except in specific regions such as coastal ones. In contrast, Ukraine and Moldova have a consumption of 32 grams per day, exceeding the recommendation and indicating better integration of these foods into the daily diet, possibly due to easier access to fresh sources

of fish and seafood. Bulgaria, at 19 grams per day, and Serbia and Hungary, at 17 grams per day each, are also below the EAT-Lancet recommendations, reflecting a regional trend of low fish consumption.

The consumption of legumes in Romania is only 6 grams per day, far below the EAT-Lancet recommendation of 75 grams, indicating a limited presence of this food group in the daily diet. Legumes, which include beans, lentils, chickpeas, and peas, are recognized for their nutritional benefits, being rich sources of protein, fiber, vitamins, and minerals, and playing an important role in preventing chronic disease. However, the low consumption in Romania can be explained by culinary traditions favoring other protein sources, such as meat and dairy, or perhaps due to a less favorable perception towards the preparation and consumption of legumes. Bulgaria has a similar consumption of 6 grams per day, while Serbia consumes 7 grams, Hungary 8 grams, Ukraine 5 grams and Moldova only 2 grams, all of which are significantly below nutritional recommendations. This regional trend of low legume consumption may be influenced by cultural, economic and accessibility factors. (Figure 5)

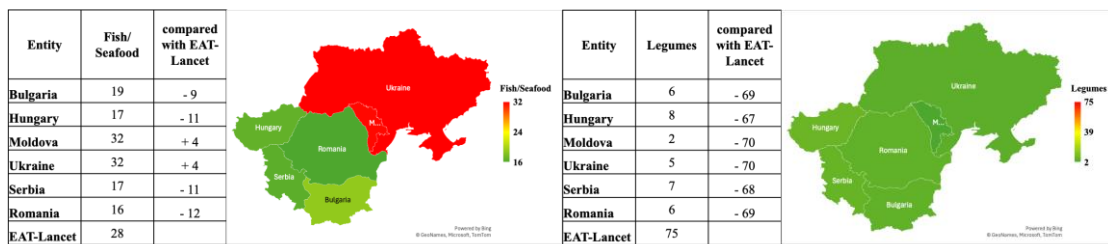


Figure 5. Consumption of fish and seafood and legumes in Romania and neighboring countries

Source: own calculation, based on [16]

For nuts, consumption in Romania is only 6 grams per day, significantly lower than the EAT-Lancet recommendation of 50 grams. Nuts, which include almonds, walnuts, hazelnuts, and other oilseeds, are known for their nutritional benefits, being rich in healthy fats, protein, fiber, vitamins, and antioxidants. They contribute to cardiovascular health, improve brain function and help maintain a healthy body weight. The low consumption in Romania suggests a limited integration of nuts into the daily diet, possibly due to higher prices, cultural perceptions or lack of knowledge about their benefits. Serbia, with a consumption of 5 grams per day, Ukraine with 4 grams, Bulgaria with 3 grams, and Moldova and Hungary with only 1 gram per day, reflects a similar regional trend of insufficient nut consumption. This trend may be related to economic factors, availability and dietary habits favoring other sources of fat and protein.

Regarding the consumption of oils (added fats), Romania records a consumption of 62 grams per day, slightly above the EAT-Lancet recommendation of 52 grams. This moderate consumption suggests a diet where oils are frequently used for cooking and in salads, reflecting traditional and modern culinary habits. Vegetable oils, such as sunflower, canola and olive, are important sources of healthy fats, essential for the absorption of fat-soluble vitamins and for the optimal functioning of the body. In Hungary, the consumption is 75 grams per day, the highest among the mentioned countries, indicating an intensive use of oils in cooking. Moldova and Ukraine consume 40 grams and 39 grams, respectively, per day, values below the EAT-Lancet recommendations, suggesting a lower use of these fats. Bulgaria, with 38 grams per day, and Serbia, with 29 grams per day, also have consumption below recommendations, which could reflect different culinary preferences or varying accessibility to different types of oils. (Figure 6)

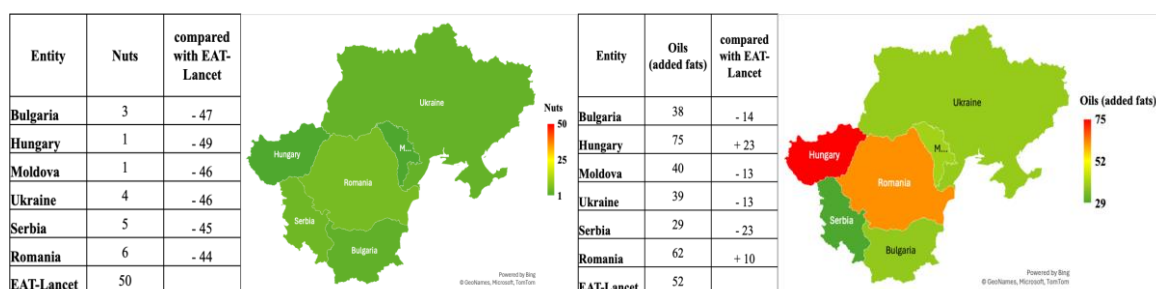


Figure 6. Consumption of nuts and oils (added fats) in Romania and neighboring countries

Source: own calculation, based on [16]

For sugar, consumption in Romania is 70 grams per day, more than double the EAT-Lancet recommendation of 31 grams. This high value reflects a strong preference for sweet foods and drinks in the daily diet, influenced by eating habits that include traditional desserts, sweetened juices and pastries. Excessive sugar consumption is of public health concern because it is associated with an increased risk of obesity, type 2 diabetes, and cardiovascular disease. In Ukraine, sugar consumption is even higher, reaching 107 grams per day, which highlights a similar, perhaps even more serious, problem with dietary preferences for sugar. Moldova, with a consumption of 58 grams per day, and Hungary, with 52 grams per day, are below Romania's level, but still above the EAT-Lancet recommendations. Bulgaria and Serbia, with 71 grams and 81 grams per day respectively, also face excessive sugar consumption. (Figure 7)

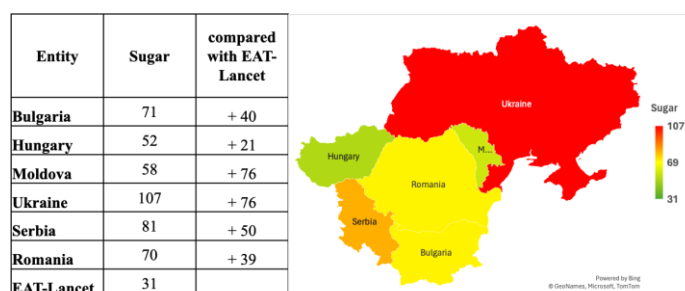


Figure 7. Sugar consumption in Romania and neighboring countries

Source: own calculation, based on [16]

The EAT-Lancet recommendations suggest a total consumption of 1,324 grams per day, much lower compared to the consumption in Romania and neighboring countries. These recommendations promote an optimal and sustainable nutritional balance, emphasizing a moderate and diversified consumption that includes all food groups in appropriate proportions. (Figure 8)

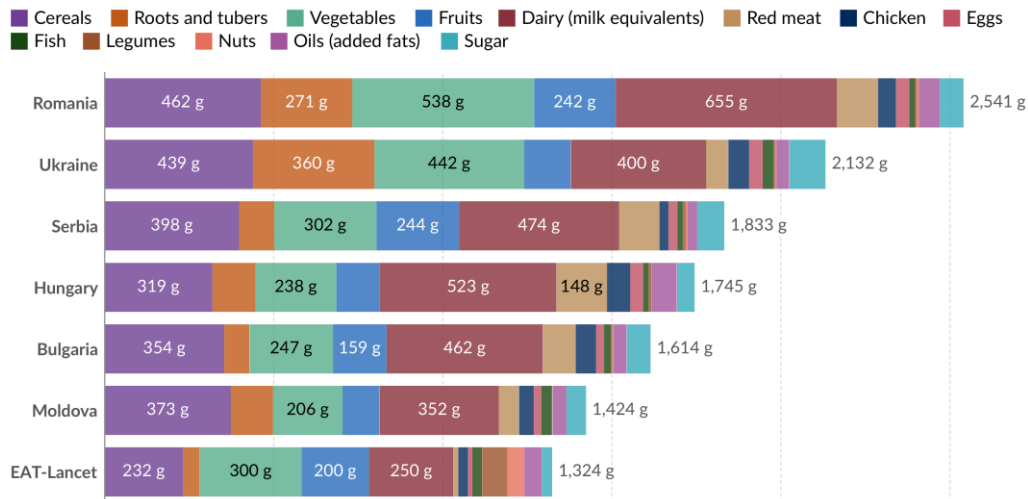


Figure 8. Average daily per capita supply of different food groups, compared to the EAT-Lancet diet [16]

Romania has a total consumption of 2,541 grams per day, which reflects a high level in all food categories, including cereals, roots and tubers, vegetables, fruits, dairy products, red meat, poultry, eggs, fish, legumes, nuts, oils and sugar. This significantly higher total consumption than recommended by EAT-Lancet emphasizes a diet that is extremely rich and diverse, but with the potential to provide excessive caloric and nutritional intake, which may have public health implications.

In Ukraine, the total consumption is 2,132 grams per day. Although this level is lower than the one in Romania, it remains above the EAT-Lancet recommendations, indicating high consumption in various food categories, with a special emphasis on vegetables and root vegetables. This suggests a varied diet, but may require adjustments to reduce excessive intake and better align consumption with optimal nutritional guidelines.

Serbia consumes a total of 1,833 grams per day, below the level of Romania and Ukraine, but still above the EAT-Lancet recommendations. [3,13,16] This consumption shows a relative balance, but with a high intake of dairy products and red meat, reflecting local food preferences and culinary traditions. Dietary adjustments could help achieve a healthier and more sustainable nutritional balance.

In Hungary, the total consumption is 1,745 grams per day, lower than that of Romania and Ukraine, but still above the EAT-Lancet recommendations. Notable consumption of dairy products and red meat suggests a diet rich in animal protein, which, although nutritious, may benefit from diversification to include more plant protein sources and balance caloric intake.[16,17]

Bulgaria has a total consumption of 1,614 grams per day. This is below the Hungarian level, but above the EAT-Lancet recommendations, showing a relatively balanced consumption, but with a high share of cereals and dairy products. [16,18] This indicates a traditional diet that may require adjustments to reduce excessive intake and promote a more varied and healthy diet.

Moldova consumes a total of 1,424 grams per day, being the lowest among neighboring countries, but still above the EAT-Lancet recommendations. This consumption reflects a more moderate intake in most food categories, suggesting a more balanced diet, but which can be optimized to further improve nutritional quality.[16]

CONCLUSIONS

The comparative analysis of the diets of consumers in Romania and neighboring countries, with the recommendations of EAT-Lancet highlights the trends of excessive food consumption in Romania and neighboring countries, emphasizing the need to adjust diets to align food consumption with the public health and sustainability recommendations of EAT-Lancet. [9,22] Adjusting consumption to recommended values could help improve population health and reduce risks associated with chronic diseases, while promoting a healthier and more balanced lifestyle. [16,19,24-26]

Roots and tubers remain an essential element in Eastern European diets, reflecting not only culinary traditions but also the adaptability of these crops to local soil and climate conditions. Promoting vegetable-rich diets is crucial to public health, as vegetables are important sources of vitamins, minerals and fiber, helping to prevent chronic disease and maintain optimal health. Insufficient fruit consumption may have public health implications, as fruit is an essential source of vitamins, antioxidants and fiber, helping to prevent chronic disease and maintain a healthy immune system. [9-11] Therefore, promoting fruit consumption should be a priority for public health policies, especially in regions where consumption is below nutritional recommendations.

Dairy products, although beneficial for bone health and muscle development, should be consumed in moderation to avoid excessive saturated fat and calorie intake. This high consumption trend in Romania and neighboring countries suggests the need for nutritional education strategies to encourage balanced consumption and maximize the health benefits of dairy products. Red meat consumption, while providing important nutritional benefits, should be moderated to reduce the increased risks of cardiovascular disease and other health problems. Promoting protein alternatives and encouraging a moderate consumption of red meat, in line with international recommendations, can ensure a balanced and healthy diet. [23,25-27]

Poultry is considered to be beneficial for health due to its high protein content and low saturated fat content, but it is essential that it is eaten in balance with other sources of protein to ensure a varied and nutritious diet. Promoting a balanced consumption of poultry meat, along with other types of protein, can improve public health and prevent diet-related health problems. Eggs, recognized for their nutritional benefits, should be consumed in moderation to avoid problems related to cholesterol intake. Promoting moderate egg consumption, according to nutritional recommendations, can help maintain cardiovascular health and ensure an adequate balance between various sources of protein in the diet.

Fish and seafood are excellent sources of omega-3 fatty acids, high-quality protein and other essential nutrients, contributing to cardiovascular and cognitive health. Encouraging fish and seafood consumption through educational campaigns and affordability measures could have significant public health benefits. Diversification of protein sources in the diet is crucial for a balanced and complete nutrition, reducing the risk of chronic diseases and improving the overall health of the population. Promoting the benefits of legumes and integrating them into the daily diet through educational campaigns and nutrition programs could help diversify the diet and improve public health. Increasing the consumption of legumes can help reduce the risk of cardiovascular disease, diabetes and other chronic conditions, while providing a sustainable and affordable source of protein, especially in the context of increasing concerns about food security and environmental sustainability.

To improve public health, it is beneficial to promote the consumption of nuts through educational campaigns that emphasize their benefits and provide practical suggestions for including them in the diet. Increasing the consumption of nuts can have a

significant positive impact on the health of the population, contributing to the prevention of chronic diseases and improving the quality of life. Oils are essential to a balanced diet, but should be consumed in moderation, paying attention to the type of oil used. Oils high in monounsaturated and polyunsaturated fats are beneficial for cardiovascular health. Educating the population about the benefits and risks associated with fat consumption can help promote healthier eating practices and reduce the incidence of diet-related chronic diseases.

The research findings underscore the need for public health interventions to reduce sugar consumption by educating the public about the risks associated with high sugar consumption and promoting healthy alternatives. Policies that limit the sugar content of processed foods and beverages, as well as encouraging fruit and vegetable consumption, can significantly contribute to improving population health and reducing the incidence of chronic diseases associated with excessive sugar consumption.

At the same time, the EAT-Lancet report represents an important step towards achieving a global food system that supports both human health and environmental sustainability. [8,9] By adopting a balanced and sustainable diet, societies can help improve global health and protect the planet for future generations. It is essential that governments, organizations and individuals work together to implement these recommendations, ensuring that the benefits of a healthy and sustainable diet are accessible to all.

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