

Fermented Foods as a Modern Nutrition Trend: Health Benefits and Implications for a Healthy Diet

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ARTICLE INFO	ABSTRACT
Entered May 02, 2025 Revised May 22, 2025 Accepted May 25, 2025 Published May 26, 2025	In the last decade, fermented foods have become an important part of modern nutrition trends that emphasize gut health, immune system, and mental balance. Increasing public awareness of healthy lifestyles, coupled with strong media narratives, have driven the popularity of products such as kimchi, kefir, and miso. Fermentation not only increases nutritional value, but also produces probiotics that play a role in maintaining gut microbiota. Research has shown a significant association between fermented food consumption and a reduced risk of chronic diseases, digestive disorders, and mild mental disorders through the gut-brain axis mechanism. However, these benefits are highly dependent on the type and viability of the microorganisms contained, as well as the consistency of consumption. The lack of adequate regulation and education makes consumers vulnerable to commercial claims that are not based on scientific evidence. This study uses a qualitative approach through a literature review to synthesize empirical findings on the benefits and challenges of implementing fermented foods in a healthy diet. The results demonstrate the need for an evidence-based nutrition approach, accompanied by public policies that support the integration of fermented foods in a contextual and sustainable manner. Collaboration between researchers, governments, and communities is needed so that the potential of fermented foods can be optimized in supporting public health and sustainable food systems
Keywords: Protein Intake; Animal and Vegetable Protein; Stunting	

INTRODUCTION

In recent decades, there has been a paradigm shift in global food consumption patterns marked by increasing public awareness of the importance of a healthy and sustainable diet. Consumers now consider not only taste and price, but also the functional aspects and added health value of the food they consume. In this context, fermented foods have emerged as part of a prominent nutritional trend, especially among urban communities and the more educated younger generation. A study by Sari & Mutmainnah (2024) in their book emphasized that the increasing interest in fermented foods is driven by awareness of the importance of gut health and microbiota as key components of



overall health. Therefore, this consumption trend is not merely a lifestyle, but reflects a shift towards a more preventive and scientifically based nutritional approach.

Furthermore, the role of the food industry and social media has helped reinforce the narrative of fermented foods as modern “superfoods.” Products such as kimchi, kefir, and miso are now not only found in their cultural contexts, but have been marketed globally with strong health claims. However, while this trend is positive, care must be taken to distinguish between evidence-based information and unverified commercial promotions. As explained by Susilawati (2017), not all fermented products contain clinically beneficial probiotics, as pasteurization processes or certain production techniques can eliminate live microorganisms. Therefore, it is important for consumers and nutrition practitioners to understand the scientific context of the benefits of fermented foods so as not to get caught up in the euphoria of health trends that may not have a real impact on long-term well-being.

In addition to the function of probiotics as digestive support agents, recent research shows their association with the immune system, metabolism, and even mental health. This is supported by findings from the National Institutes of Health (NIH) and a publication by Diez-Ozaeta & Astiazaran (2022), which states that the presence of a balanced gut microbiota - which can be influenced by the consumption of fermented foods - plays an important role in regulating the body's immune response and reducing the risk of systemic inflammation. This mechanism is not only implicated in the prevention of digestive disorders such as irritable bowel syndrome (IBS), but also metabolic diseases such as obesity and type 2 diabetes. It is in this context that fermented foods play a role as a natural source that supports the concept of gut health, a new paradigm in nutrition that emphasizes the complex relationship between the digestive tract and overall health.

However, the effectiveness of probiotics in fermented foods is highly dependent on the type of microorganisms contained, their viability, and consistent consumption doses. Not all fermented products have microbial strains that have been scientifically proven to provide clinical benefits. As stated by Şanlıer et al (2019) only certain strains such as *Lactobacillus rhamnosus* GG or *Bifidobacterium animalis* have undergone clinical trials and shown real benefits. Meanwhile, many commercial products use the term “probiotics” loosely without guaranteeing microbial viability until consumption. This shows that the promotion of fermented foods as “natural medicine” needs to be balanced with science-based education and strict regulations. Therefore, in integrating fermented foods into a healthy diet, a critical, evidence-based approach (evidence-based nutrition) must be prioritized so that the expected benefits are not just discourse but can be proven physiologically.

The health implications of fermented foods do not stop at the digestive system, but extend to the neuropsychological dimension through the concept of the gut-brain axis, a two-way communication pathway between the gut and the brain. This pathway involves the enteric nervous system, the immune system, and the gut microbiota that produce bioactive compounds such as neurotransmitters (eg GABA and serotonin) that play a role in regulating mood and cognitive function. Rastogi et al (2022) explained that probiotic microorganisms consumed through fermented foods can modulate stress, anxiety, and even mild depressive symptoms, making it a complementary strategy in the psychonutrition approach. This suggests that the consumption of fermented foods is not only relevant in the context of macro and micro nutrition, but also as part of a preventive

intervention against mild mental disorders that are increasingly prevalent in modern society.

However, it should be noted that these benefits are not universal and depend on various factors such as the health status of the individual, the type of microorganism, and the quality of the fermented product consumed. Many products on the market do not specify the microbial strain or the number of active colonies at the time of consumption, which should be the minimum requirement for a health claim. In addition, the success of interventions through fermented foods is highly contextual and cannot be equated across populations. For example, a study by Voidarou et al (2020) showed that an individual's response to probiotics is personalized, depending on the composition of a person's initial microbiota. This underlines the importance of a nutritional approach based on precision health, where the consumption of fermented foods needs to be adjusted to the biological characteristics and dietary habits of the individual so that the health benefits can be optimally actualized and not just false.

Integrating fermented foods into daily diets does offer significant potential, but it cannot be separated from the contextual and structural challenges in holistic diet planning. In practice, the success of adopting fermented foods is greatly influenced by cultural, socio-economic factors, and the level of nutritional literacy of the community. For example, in some communities, traditional fermented foods such as tempeh and tape may already be part of routine consumption, while in other areas such foods are still considered foreign or even unhygienic due to a lack of understanding of the fermentation process. This is where evidence-based education plays an important role—which not only informs about the benefits, but also debunks myths that limit public acceptance of fermented foods. According to research from Rul et al (2022), the effectiveness of community-based nutrition interventions increases significantly when accompanied by an inclusive cultural approach and a down-to-earth narrative about the functional benefits of food.

Furthermore, the integration of fermented foods into a healthy diet also requires clarity in nutritional recommendations from health institutions. Currently, national dietary guidelines in many countries do not explicitly include fermented foods as a mandatory component, despite the growing scientific evidence regarding their benefits. This creates a gap between academic knowledge and public policy that should support the implementation of evidence-based diets. As stated by Leeuwendaal et al (2022), a diet high in fermented foods significantly reduces inflammatory biomarkers in the body, indicating its potential in preventing chronic diseases. However, without structured guidance from nutritional authorities, the public will continue to rely on information from the media or the food industry, which is not always accurate and tends to be commercially biased. Therefore, synergy is needed between scientific research, food policy, and public education so that fermented foods can be implemented widely, effectively, and on target in the context of a sustainable healthy diet.

METHODOLOGY

This study uses a qualitative approach with a literature review method to explore in depth about fermented foods as part of modern nutrition trends, their health benefits, and their implications for healthy diet planning. This method was chosen because it is relevant to analyze and synthesize previously published scientific findings, so that it can provide a conceptual and critical understanding of the topic being studied.

The data sources in this study were obtained from various relevant scientific publications, such as reputable international journals, academic books, reports from global health institutions (e.g. WHO and FAO), and articles in trusted databases such as PubMed, ScienceDirect, Google Scholar, and SpringerLink. The inclusion criteria in the selection of literature were articles published in the last 10 years (2015–2025), had direct relevance to the topic of fermented foods and health, and used empirical and theoretical approaches that could be academically justified. Exclusion criteria included non-scientific articles, popular opinions, or literature that did not include clear sources and methodologies.

The data analysis technique was carried out through a thematic content analysis approach, namely by identifying the main themes that emerged from various literature sources. This process involves the stages of systematic selection, classification, and interpretation of data to find the relationship between fermented food consumption, probiotic content, and its impact on digestive health, the immune system, and mental health. In addition, the analysis also includes criticism of research gaps and implementation challenges in the context of public consumption and public nutrition policy. With this approach, the study is expected to be able to present a comprehensive and theoretical synthesis as a basis for further research and the preparation of evidence-based nutrition policies.

RESULTS AND DISCUSSION

1. The Relevance of Fermented Foods in Modern Nutrition Trends

Fermented foods are now gaining significant attention in modern nutrition, as public awareness of the importance of functional foods and a healthy lifestyle increases. Fermentation is a biochemical process involving microorganisms such as lactic acid bacteria (*Lactobacillus* spp.), yeast, and fungi that naturally convert food components into more digestible and nutrient-rich forms. This process has been shown to increase the bioavailability of essential nutrients such as vitamins B12, K2, folate, and essential amino acids (Diba, 2025). In addition, fermented foods contain probiotics that contribute to the health of the gut microbiota, which in many studies has been associated with improved immunity, metabolism, and psycho-emotional balance through the gut-brain axis mechanism (Lumbessy et al., 2025).

The shift in consumption patterns, especially among millennials and Gen Z, reflects an increasing preference for natural, less processed, and plant-based foods. A study by Fuada (2021) showed that young consumers are more aware of the long-term effects of their diet on health and the environment. Fermented foods such as tempeh, miso, kimchi, and kefir meet this preference because in addition to being derived from natural ingredients, they are also produced using relatively simple and sustainable methods. For example, tempeh—a typical Indonesian fermented food—provides high vegetable protein and fiber, and contains isoflavones that have antioxidant and anticancer effects (Habibah et al., 2018).

On the other hand, the influence of social media and the food industry has accelerated the popularization of fermented foods. Information about the benefits of probiotics and “gut health” has become more accessible through digital platforms, making consumers more interested in integrating products such as kombucha and probiotic yogurt into their daily routines. The food industry has responded by offering fermented products in convenient forms, often with labels such as “probiotic-rich” or “immune-boosting.” However, scientifically, it is important to note that not all fermented products contain

active probiotics, as the pasteurization process can kill live microorganisms—a challenge that consumers seeking genuine functional benefits need to be aware of (El Sheikha, 2022).

Furthermore, fermented foods are now starting to be classified as “superfoods” in the global health narrative. This is supported by research showing that a diet high in fermented foods contributes to better gut microbiota diversity, reduced systemic inflammation, and reduced risk of metabolic syndrome (Rastogi et al., 2022). In this context, fermented foods offer not only nutritional benefits but also preventive effects against chronic diseases. This narrative encourages the global adoption of traditional foods such as Korean kimchi, Japanese natto, and Indonesian tempeh as part of future nutritional solutions.

Finally, there is an interesting dynamic between the preservation of traditional culture and the modern adoption of fermented foods. These foods, once considered part of local heritage or “folk” foods, are now being redefined as symbols of urban healthy lifestyles. While this opens up economic opportunities and cultural promotion, experts warn that it is important to maintain the authenticity of the fermentation process, as nutritional value and health benefits can differ significantly between home-made products and overly processed commercial versions. Therefore, a careful scientific approach is needed in developing and marketing fermented products so that their benefits are optimal and not driven solely by market trends.

2. Scientific Benefits of Fermented Foods for Health

Fermented foods have become a focus of attention in nutrition and microbiology due to their probiotic content that provides various health benefits. Products such as yogurt, kefir, tempeh, kimchi, and kombucha contain live microorganisms—especially lactic acid bacteria such as *Lactobacillus*, *Bifidobacterium*, and *Streptococcus thermophilus*—that act as probiotics. According to the FAO/WHO definition (2001), probiotics are live microorganisms that, when consumed in adequate amounts, confer a health benefit to the host. Research by Azzahra et al (2025) shows that the fermentation process can also increase the bioavailability of nutrients such as vitamin B12, folate, vitamin K2, and proteolytic enzymes, which are not only beneficial for digestion but also for systemic health.

In the context of digestive health, the consumption of fermented foods has consistently been shown to improve the balance of gut microbiota. A study by Derrien & van Hylckama Vlieg (2015) emphasized that a balanced gut microbiota plays an important role in metabolism, the immune system, and the gut barrier. Probiotics such as *Lactobacillus plantarum* and *Bifidobacterium bifidum* have been clinically proven to reduce symptoms of irritable bowel syndrome (IBS), as reported in a meta-analysis by Junita & Mustakim (2024). In addition, *Saccharomyces boulardii* as a probiotic from yeast has been shown to be effective in preventing antibiotic-associated diarrhea (McFarland, 2010). Fermented foods also help in regulating intestinal transit and reducing constipation, especially in the elderly population.

From an immunological aspect, microorganisms from fermented foods can interact with intestinal immune cells to regulate the immune response. Research by Putrianty & Octaria (2024) shows that probiotics increase the production of immunoglobulin A (IgA), reduce the production of pro-inflammatory cytokines such as IL-6 and TNF- α , and strengthen tight junctions between intestinal epithelial cells, which reduces the risk of leaky gut syndrome. Clinical studies by Bimo Setiarto & Widhyastuti (2022) even show

that consuming probiotics can reduce the duration and severity of upper respiratory tract infections, especially in children and the elderly.

In addition, the influence of fermented foods on mental health through the gut-brain axis is increasingly being proven by scientific studies. Research by Pratiwi et al (2022) states that gut microbiota can affect brain function through the production of neurotransmitters (such as serotonin and GABA), immunological pathways, and the enteric nervous system. A clinical trial by Putra et al (2019) showed that consuming probiotic supplements for four weeks was able to reduce symptoms of mild to moderate depression in healthy adults. This effect is believed to be related to decreased activity of the hypothalamic-pituitary-adrenal (HPA) axis, which regulates the stress response.

However, the clinical efficacy of fermented foods is highly dependent on the strain of microorganisms used, the number (colony forming unit, CFU), and viability of the microbes at consumption. For example, *Lactobacillus rhamnosus* GG and *Bifidobacterium longum* 35624 have strong clinical evidence in supporting digestive and immune health (Rahayu & Utami, 2019). WHO recommends that probiotic products contain a minimum of 10^6 to 10^9 CFU per serving to achieve their benefits. However, many commercial fermented products experience decreased microbial viability due to pasteurization or long-term storage.

On the other hand, the validity and health claims of commercial fermented products remain a challenge. A study by Bakker-Zierikzee et al (2018) showed that many products on the market do not list specific microbial strains, CFU counts, or clinical evidence, despite claiming to be “probiotics”. This is exacerbated by the lack of strict regulation in many countries regarding the use of the term “probiotics” and health benefit claims. As a result, consumers often do not get the maximum benefits because they buy products that do not meet expectations or do not meet minimum scientific standards.

Overall, fermented foods have a strong scientific basis as functional agents to improve digestive health, strengthen the immune system, and even support emotional balance and brain function. However, in order for these benefits to be obtained consistently, there needs to be public education on choosing the right fermented products, as well as support from health agencies and regulators in setting functional claims and quality standards for fermented products.

3. Implications of Fermented Food Consumption for Healthy Diet Planning and Nutrition Policy

Integrating fermented foods into a healthy and balanced daily diet is an approach that is gaining increasing attention in the world of nutrition and health. Several studies have shown that fermented foods such as tempeh, yogurt, kefir, kimchi, and miso contain live microorganisms (probiotics) that can contribute to gut health, boost immunity, and potentially reduce the risk of cardiometabolic diseases. For example, a study by Maryanto et al (2024) stated that consuming fermented foods supports gut microbiota diversity and plays a role in preventing chronic inflammation. However, the integration of these foods into the diet cannot stand alone. Balance with other food groups is still needed, because the nutritional content of fermented products is highly dependent on the type, raw materials, and production process. On the other hand, some fermented foods such as pickles or kimchi can contain high levels of sodium, which if consumed excessively can have a negative impact on blood pressure and heart health.

A major challenge in mainstreaming fermented foods into everyday consumption practices is the lack of scientifically based public education. Many people adopt

fermented food trends based on social media influences or industry claims without a deep understanding of their composition and benefits. This is reinforced by a study by Shah et al (2023) which highlights how fermented foods are often aggressively marketed even though not all products have strong clinical evidence to support their health claims. In addition, public perceptions are influenced by different cultural preferences and eating experiences, so an educational approach that is sensitive to the local context is needed. For example, Indonesians are more familiar with tempeh and tape than kefir or sauerkraut.

There is also a gap between scientific evidence and national dietary policies. Although research on the benefits of fermented foods continues to grow, many national dietary guidelines in various countries, including Indonesia, do not explicitly include fermented foods in their recommendations. This may be due to the lack of local population data and the lack of longitudinal research showing the long-term impacts of fermented food consumption on the health of the wider community. This lag in policy updates highlights the importance of supporting local research and academic advocacy to bridge the gap between science and public policy.

The precision nutrition approach is very relevant in the context of fermented food consumption. Research by Liyantifa & Afriansyah (2025) shows that individual responses to foods including fermented foods are highly dependent on the gut microbiome, genetic factors, and previous diet. This means that not all fermented foods provide the same benefits for each individual. Therefore, future nutritional recommendations must adopt the principle of individualization, as well as pay attention to socio-cultural dimensions so that dietary strategies become more inclusive and effective in the population.

In this regard, health institutions and academic institutions have a central role in developing evidence-based guidelines and maintaining neutrality from industry influence. The involvement of academics in research on traditional fermented foods such as tempeh, dadih, and cassava tape contributes to building a locally relevant database. Without strict scientific regulations and standards, the promotion of fermented products has the potential to be dominated by commercial interests. Therefore, synergy between the government, researchers, and the community is essential to ensure that fermented foods are positioned as part of a healthy diet that is sustainable, fair, and contextual.

CONCLUSION

Fermented foods are increasingly recognized in modern nutrition trends due to their functional benefits supported by strong scientific evidence. The fermentation process not only increases the content and availability of essential nutrients, but also produces probiotics that support gut health and the immune system. Regular consumption of fermented foods has been shown to be beneficial in preventing chronic diseases, improving digestion, and even maintaining mental balance through the gut-brain axis. The popularity of these foods is also driven by public awareness of a healthy lifestyle and the influence of digital media promoting probiotic products. However, their effectiveness is highly dependent on the type of microorganism, its viability, and the production method used. The lack of regulation and education makes consumers vulnerable to health claims that are not supported by scientific evidence. In diet planning, fermented foods can be an important part of a balanced diet, but must be tailored to individual needs and local cultures. Another challenge is how national nutrition policies accommodate the potential of fermented foods without being trapped by market trends alone. For this, collaboration

between researchers, governments, and communities is needed to ensure that fermented foods contribute significantly to health and food sustainability

LITERATURE

- Azzahra, D. A., Rahmasari, D., Nareswari, H. A., Weka, M. A. N., Fellithia, R., & Arini, L. D. D. (2025). Potensi Pangan Fermentasi Tempe dalam Mengatasi Kejadian Malnutrisi. *Student Scientific Creativity Journal*, 3(2), 78-83.
- Bakker-Zierikzee, A. M., van Tol, E. A. F., Kroes, H., Alles, M. S., Kok, F. J., & Bindels, J. G. (2018). Beberapa efek probiotik pada penyakit degeneratif lainnya, seperti tekanan darah tinggi, diabetes melitus, dan penyakit metabolik lainnya dapat. *Peran Probiotik di Bidang Gizi dan Kesehatan*, 127.
- Bimo Setiarto, R. H., & Widhyastuti, N. (2022). Kajian Pustaka: Probiotik dan Prebiotik Meningkatkan Imunitas untuk Mencegah Infeksi Virus Covid 19. *Jurnal Veteriner*, 23(1).
- Diba, F. (2025). MAKANAN ULTRA-PROSES, INOVASI DALAM INDUSTRI MAKANAN MODERN. *Ibnu Sina: Jurnal Kedokteran dan Kesehatan-Fakultas Kedokteran Universitas Islam Sumatera Utara*, 24(1), 191-201.
- Diez-Ozaeta, I., & Astiazaran, O. J. (2022). Fermented foods: An update on evidence-based health benefits and future perspectives. *Food Research International*, 156, 111133.
- El Sheikha, A. F. (2022). Why fermented foods are the promising food trends in the future?. *Current Research in Nutrition and Food Science Journal*, 10(3), 827-829.
- Fuada, N. (2021). Aplikasi GIS pada Bidang Gizi dan Kesehatan Masyarakat. Penerbit Adab.
- Habibah, N., Dhyana Putri, I. G. S., Karta, I. W., & Dewi, N. N. A. (2018). Analisis Kuantitatif Kadar Nitrit dalam Produk Daging Olahan di Wilayah Denpasar Dengan Metode Griess Secara Spektrofotometri. *International Journal of Natural Science and Engineering*, 2(1), 1-9.
- Junita, S., & Mustakim, A. (2024). REVIEW ARTIKEL STUDI: POTENSI PROBIOTIK BAKTERI ASAM LAKTAT DALAM MENINGKATKAN SALURAN PENCERNAAN. *Jurnal Studi Multidisipliner*, 8(11).
- Leeuwendaal, N. K., Stanton, C., O'toole, P. W., & Beresford, T. P. (2022). Fermented foods, health and the gut microbiome. *Nutrients*, 14(7), 1527.
- Liyantifa, B., & Afriansyah, A. (2025). Peran Mikrobiota Usus dalam Homeostasis Imun: Pendekatan Kritis untuk Inovasi Kesehatan di Era Society 5.0. *Jurnal Penelitian Sains*, 27, 1-8.
- Lumbessy, A. S., TP, S., Alfikri, M. R., Pato, I. U., Utami, C. R., Rahim, I. A., ... & Pi, S. (2025). MIKROBIOLOGI MAKANAN MODERN. *Azzia Karya Bersama*.
- Maryanto, H., Rahmiwati, A., Misnaniarti, M., & Idris, H. (2024). Kemungkinan Dampak Neuroprotektif dari Makanan dan Minuman Fermentasi di Usia Tua: Study Literature. *Jurnal Ilmiah Permas: Jurnal Ilmiah STIKES Kendal*, 14(2), 783-802.
- Pratiwi, B. A., Atmaja, P. D. A. P., & Hunaifi, I. (2022). Gut-Brain Connection: Peran Mikrobiota Usus dalam Mencegah Stroke. *Unram Medical Journal*, 11(1), 726-731.
- Putra, H., Jurnal, Y. D., & Sayoeti, Y. (2019). Tatalaksana medikamentosa pada penyakit saluran cerna. *Jurnal Kesehatan Andalas*, 8(2), 407-418.
- Putrianty, N. R., & Octaria, Y. C. (2024). Literatur Review: Dampak konsumsi tempe terhadap modulasi sistem imun dalam meningkatkan IgA, menurunkan IgE, dan IL-6. *Jurnal SAGO Gizi dan Kesehatan*, 5(3B), 1128-1136.

- Rahayu, I. E. S., & Utami, I. T. (2019). Probiotik Dan Gut Microbiota: Serta Manfaatnya Pada Kesehatan. Pt Kanisius.
- Rastogi, Y. R., Thakur, R., Thakur, P., Mittal, A., Chakrabarti, S., Siwal, S. S., ... & Saini, A. K. (2022). Food fermentation–Significance to public health and sustainability challenges of modern diet and food systems. *International Journal of Food Microbiology*, 371, 109666.
- Rul, F., Béra-Maillet, C., Champomier-Vergès, M. C., El-Mecherfi, K. E., Foligne, B., Michalski, M. C., ... & Savary-Auzeloux, I. (2022). Underlying evidence for the health benefits of fermented foods in humans. *Food & Function*, 13(9), 4804-4824.
- Şanlier, N., Gökcen, B. B., & Sezgin, A. C. (2019). Health benefits of fermented foods. *Critical reviews in food science and nutrition*, 59(3), 506-527.
- Sari, R. W., & Mutmainnah, N. (2024). Cegah Stunting dengan Pangan Lokal: Manfaat Ikan Cakalang dan Daun Kelor untuk Kesehatan Anak. Penerbit NEM.
- Shah, A. M., Tarfeen, N., Mohamed, H., & Song, Y. (2023). Fermented foods: their health-promoting components and potential effects on gut microbiota. *Fermentation*, 9(2), 118.
- Susilawati, S. (2017). Penyuluhan dan pelatihan pembuatan kefir susu kambing dalam rangka meningkatkan gizi masyarakat di Desa Sumber Rejo Kecamatan Jati Agung Kabupaten Lampung Selatan. *Jurnal Pengabdian Kepada Masyarakat Sakai Sambayan*, 1(3), 140-144.
- Voidarou, C., Antoniadou, M., Rozos, G., Tzora, A., Skoufos, I., Varzakas, T., ... & Bezirtzoglou, E. (2020). Fermentative foods: Microbiology, biochemistry, potential human health benefits and public health issues. *Foods*, 10(1), 69.