

From Plate to Microbiota: Traditional Foods as an Unexplored Gut Health Treasure

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ABSTRACT

Traditional foods are progressively being reconsidered within the context of gut health. This is because many of them naturally combine dietary fibre, polyphenols, bioactive compounds, resistant starch and growth of beneficial microorganisms in fermented foods. These components create a complex relationship between food, microbial metabolism and host physiology. As poor diet is the major factor for contributing to diseases, understanding multidirectional interrelationship between food and the gut microbiota is essential for public health viewpoint. This article explores how traditional foods influence the gut microbiome reminding us that healthier health may begin with healthier gut.

INTRODUCTION:

Our diet accomplishes much more than simply satisfy hunger. In addition to giving our bodies essential nutrients, every meal interacts with large community of microbes that reside inside our digestive tract. Interactions between diet and microorganisms can influence immune, nervous and cardiometabolic process (Sanz *et al.*, 2025).

This is especially pertinent today as poor eating habits are linked to an increase in occurrence of metabolic diseases. Diet rich in refined carbohydrate, saturated fats, high sugar and salt processed food may differ significantly from traditional dietary foods based on whole and minimally processed foods items. Dietary fibre and resistant starch

in traditional foods serve as a substrate for microbial fermentation and contribute to the production of short chain fatty acids. Additionally, traditional fermented foods introduce food associated microbes and fermented metabolites. However, it should not be interpreted as a proof that every traditional food has prebiotic and probiotic properties that leads to clinical benefit. This is because responses vary on food processing, food composition, microbial strains, diet and individual microbiota. Research evidences have increasingly suggested that composition and activity of microorganism are largely influenced by food we eat (Delzenne *et al.*, 2025). Fascinatingly, many traditional food customs developed long before the term gut microbiome existed in modern nutrition science. According to Ayurveda, every meal should contain a balance of six major flavour consisting of sweet, salty, sour, bitter, pungent, astringent (Chopra *et al.*, 2022). This variety of flavours indicate that the plate is full of essential bioactive compounds influencing human health. Soaking, fermentation, sprouting, cooking, natural preservation techniques and processes were commonly used to enhance the taste, digestibility, shelf life of foods. Currently, researchers are exploring whether some of these traditional customs may influence microorganisms inhabiting in our gut. This has led to an interesting link between traditional food and modern microbiome research.

The gut: a concealed ecosystem within us

The gastrointestinal tract in humans is a home to trillions of microorganisms. These gut microorganisms interact continuously with the food we eat. Certain types of dietary fibre, resistant starch present in food escape the digestion process. In the small intestine the microorganisms produce metabolites including short chain fatty acids. Short chain fatty acids can influence intestinal barrier function, immune response and various metabolic

processes in our body. The gut microbiota is a vigorous community composed of living microorganisms that can alter in response to diet and disease (Shondelmyer *et al.*, 2018).

Traditional food and its relationship with gut microbiome

The geographical and cultural diversity of India has generated expectational range of traditional fermented foods. The northeastern region of India is a home to variety of ethnic fermented foods. Traditional fermented foods prepared from soyabeans, bamboo shoots, local rice varieties, indigenous fish, and local vegetables represent varied indigenous practices (Mipun *et al.*, 2026). Recent studies have highlighted the need to scientifically characterize microbial ecology, metabolites, nutritional profile and safety. Traditional food practices also change the nutritional and functional characteristics. Soaking may reduce antinutritional factors present in food, sprouting may modify the carbohydrate characteristics, cooking and cooling may influence digestibility, fermentation can alter carbohydrate and protein to produce organic acids. Thus, foods made from say raw ingredient may communicate differently with gut depending on how they are processed. Shondelmyer *et al.* (2018) suggested that traditional Indian Thali may support gut microbial diversity through their combined contribution. It proposed that fermented foods as a source of probiotic, pulses such as dal as a source of prebiotic, and vegetables, spices as a source of varied phytochemicals. Therefore, traditional foods offer an unusual opportunity for innovative microbiome research.

Bridging traditional knowledge with modern science

The heightened interest in gut microbiome should not mean that every traditional food needs to be converted to commercial food as superfood. Beyond their potential health

benefits, traditional foods have cultural, nutritional, environmental and social value. But scientific validation is required as some fermented traditional food may contain beneficial microorganisms whereas others may have adverse safety concerns. Recent researches therefore emphasis on importance of proper scientific validation, characterization, safety assessment beside investigation of the health benefits (Obayomi *et al.*, 2025). Therefore, the future motive should not replace traditional food practices with modern technologies rather using modern science to preserve, understand, accountably improve by validating them.

The modern techniques to scientifically validate and characterize the foods include:

- 16s RNA sequencing (required for bacterial community profiling)
- Shotgun metagenomics (deeper microbial characterization)
- Metabolomics (required to identify microbial and food derived metabolites)
- Metatranscriptomics (required to investigate microbial activity)
- In vitro fermentation models (examine interactions between food and gut microorganism)
- Human intervention studies (to examine whether microbiome changes interpret into measurable health outcomes)

Gut microbiome and cardiometabolic health

Studies to observe relation of gut microbiome with obesity, diabetes and cardiovascular diseases has been increasingly studied in recent years. The role of dietary fibre is particularly applicable because microbial fermentation can produce metabolites involved

in communication between gut and host tissues (Delzenne *et al.*, 2025). However, health effects of one single traditional food should not be considered to prevent diabetes, obesity and cardiovascular diseases. This is because health outcomes are influenced by the overall dietary pattern, physical activity and many other variables. Even the response of consuming dietary fibre may be different for different individual in their gut microbial composition and metabolic capacity (Delzenne *et al.*, 2025). Thus, the potential of traditional foods lies more in their contribution to diverse and minimally processed food pattern rather than a single food acting independently.

CONCLUSION

Traditional diet offers more than cultural heritage. They represent a varied source of dietary fibres, phytochemicals and fermented components that may interact with gut microbiome for better health. Modern researches are focusing on gut microbiota to understand and reveal food-microbe connections. The food on our plate may shape the microbe ecosystem within us. Therefore, making traditional diets as an essential starting point and reducing dependence on highly processed unhealthy foods is a need of the hour for understanding the future gut health.

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