

## Beneficial Effects of Lactic Acid Bacteria from Traditional Fermented Foods and Beverages: Concept of Microbiology and Control of Infectious Diseases

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The food fermentation is one of the oldest biotechnological processes in which the growth and metabolic activities of microorganisms are used to preserve the foods [1,2]. Several traditional fermented foods such as fermented cereals (e.g. boza, dosa, idli, kisra, koko, ogi, pito, selroti, sourdough, togwa, tarhana, uji, etc.), fermented vegetables (e.g. ekung, goyang, gundruk, herring, hom-dong, jiang-gua, jiang-sun, khalpi, kimchi, mesu, pao cai, sauerkraut, soibum, soidon, sinki, sunki, etc.), fermented soybeans and other legumes (e.g. bekang, dawadawa, dhokla, douchi, doenjang, furu, kanjang, kawal, kinema, meju, miso, natto, sufu, tempe, etc.), fermented roots/tubers (e.g. chikwangu, fufu, gari, lafun, tape, tapai ubi, etc.), fermented milk products (e.g. airag, cheese, dahi, kefir, koumiss, yogurt, etc.), fermented and preserved meat products (e.g. alheira, androlla, arjia, kargyong, nem-chua, pastirma, pepperoni, salchichon, sucuk, suka ko masu, etc.), fermented, dried and smoked fish products (e.g. balao-balao, belacan, bakasang, budu, gnuchi, gulbi, hentak, jeotkal, kusaya, ngari, nuoc mam, patis, shidal, sidra, sukuti, surstromming, tungtap, etc.) and alcoholic beverages (e.g., bantu, pito, tchoukoutou, etc.) are the main courses of diet worldwide [3,4]. However, lactic acid bacteria (LAB) belonging to genera such as *Leuconostoc*, *Lactobacillus* and *Streptococcus*, are generally recognized as safe (GRAS), by the Food and Drug Administration (FDA) [5] and contributing to the fermentation processes have been associated with many health benefits [6]. During fermentation, these LAB reduced risk of contamination when enriched with antimicrobial end products, such as organic acids, ethanol, and bacteriocins [7,8]. The fermented food is beneficial for health due to its high vitamins and minerals content and its antioxidant properties [9], produce biologically active peptides with enzymes (e.g., proteinase and peptidase), exopolysaccharides and remove some non-nutrients [2-4,7]. The fibre and exopolysaccharide content in fermented foods exhibit anti-constipation and prebiotic properties, bioactive peptides (e.g. conjugated linoleic acids) have anti-oxidant, anti-microbial, anti-allergenic, cholesterol reduction, anti-obesity and blood pressure lowering effects, bacteriocins show anti-microbial effects, sphingolipids have anti-carcinogenic and anti-microbial properties, and bioactive compounds (e.g. organic acids, diacetyl, antibiotic, etc.) have anti-inflammatory, anti-fungal, anti-aging, anti-atherosclerotic/fibrolytic effects and immune and skin health promotion [3,6]. However, fundamental and applied research is required to establish a relationship between the fermented food environment and bacterial (LAB) functionality.

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