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Short Communication

Comparative Study of Probiotics in Two Traditional Chinese Fermented Foods

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DESCRIPTION

Fermentation is an effective method for food preservation that not only enhances flavors but also provides numerous health benefits. Lactic Acid Bacteria (LAB) play a crucial role in this process, making them essential to the food industry. LAB facilitate various chemical transformations in foods, improving digestibility and promoting health. For instance, LAB fermentation converts lactose into lactic acid, breaks down proteins into peptides and free amino acids and degrades lipids into free fatty acids in yogurt, making milk more nutritious and easier to digest. Due to these health benefits and the metabolites produced by LAB, they are increasingly used as probiotics [1-3].

Probiotics are defined as live microorganisms that, when administered in adequate amounts, confer health benefits on the host and they are widely recognized as functional foods or dietary supplements [4]. Most probiotics belong to LAB, which include various genera of gram-positive bacteria such as *Lactobacillus*, *Leuconostoc*, *Bifidobacterium*, *Streptococcus* and *Weisella*. Some of these microorganisms can colonize the gut and offer multiple health benefits, including improving gut microbiota balance, inhibiting harmful bacteria, enhancing immune function, lowering serum cholesterol levels and reducing oxidative stress. Oxidative stress occurs when there is an imbalance between oxidant production and antioxidant defenses, potentially harming living organisms [3]. Elevated levels of Reactive Oxygen Species (ROS) can damage proteins, nucleic acids, lipids, membranes and organelles, linking it to aging and various diseases. Certain strains of *Lactobacillus acidophilus*, *L. fermentum*, *Lactococcus lactis*, *Levilactobacillus brevis* and *Lacticaseibacillus casei* have demonstrated strong antioxidant activities both *in vitro* and *in vivo*, either directly or through their bio-products. Thus, utilizing probiotics to enhance the intestinal environment, modulate the immune system and mitigate oxidative damage presents a promising approach [5].

Numerous functional probiotic strains have been reported from fermented foods. For example, *Lacticaseibacillus casei zhang*, isolated from Chinese fermented sour milk, exhibits immunomodulatory effects, anti-inflammatory and antioxidant properties and the ability to alleviate kidney injury in healthy adults and the elderly. *Lactiplantibacillus plantarum* Y15, sourced from yak yogurt, has shown cholesterol-lowering effects and reduced pro-inflammatory cytokines in hypercholesterolemic and diabetic mice [5]. Additionally, *Lactiplantibacillus plantarum* H6, isolated from chili sauce, has been found to lower serum cholesterol and optimize the intestinal microbial community by increasing the abundance of bile salt hydrolase bacteria. Given the potential of probiotics in managing chronic diseases and promoting health, there is a continuous need to search for novel functional probiotic strains from natural fermented food sources [6-8].

Despite China's long history of producing and consuming a diverse array of fermented foods, there remains significant potential to explore the associated microbiota, particularly functional probiotics. Fermented Mung Bean Juice (FMJ) is a by-product of mung bean starch production. The traditional process involves soaking mung beans for 8-24 h until the skins can be easily removed, then grinding them into a slurry with water [7]. A starter culture from a previous fermentation is added and the mixture ferments for 8-20 h in a large vat. The starch settles at the bottom, while the liquid and emulsion on top form the FMJ, with some of this emulsion retained for future batches [9,10].

FMJ varies regionally in China for instance, it is known as "Douzhir" in Beijing and "Mung-bean Fenjiang" in Henan province. This fermented product contains a sour liquid and residual solids rich in microbiota, which are used in popular local dishes such as boiled Douzhir, Fenjiang porridge (made with millet, soybeans, peanuts, Chinese cabbage and lard) and Mung-bean Jiangshui noodles (boiled FMJ with fine noodles and various condiments). These dishes are widely consumed in northern China. Fermentation enhances the flavor and nutritional profile of mung beans, with free amino acids produced during fermentation boosting their antioxidant and antidiabetic properties in model mice. Additionally, fermented mung bean products have shown potential for chemoprophylaxis, lipid reduction, anti-stress, hepatoprotective and anti-inflammatory effects, further enhancing their health benefits. However, information on probiotics derived from FMJ remains limited.

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CONCLUSION

In conclusion, our investigation into fermented mung bean juice products, specifically Douzhir from Beijing and Fenjiang from Henan, highlights the rich potential of traditional fermented foods as sources of novel probiotic strains. Given their long history of safe consumption and recognized health benefits, these FMJ variants not only contribute to local culinary traditions but also possess significant probiotic and antioxidant properties. The unique production methods and regional variations provide a fascinating avenue for further exploration of their microbiota. By isolating lactic acid bacteria and assessing their probiotic potential, our study contributes to a growing body of evidence supporting the health benefits of probiotics derived from natural fermented foods. Ultimately, this research could pave the way for future discoveries of functional probiotics that may improve human health and wellness. Further studies will be essential to fully understand the mechanisms of action and therapeutic potential of these promising microbial strains.

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