Title: Advancing Cold Brew Coffee through Probiotic Integration

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Abstract:

The global coffee industry, a cornerstone of economic and cultural life, faces evolving consumer demands for a holistic experience that integrates taste, health benefits, and convenience. This paradigm shift necessitates innovative approaches to product development, particularly in ensuring both consumer satisfaction and stringent food safety and quality standards. This study introduces instant cold brew coffee in powder form as a significant technological advancement. This format not only preserves the sensory quality of fresh coffee but also substantially improves product stability and shelf life, directly addressing key aspects of food quality. Furthermore, it inherently mitigates microbial risk, simplifies logistics, and reduces supply chain costs—all critical for enhancing food safety and efficiency. Driven by increasing consumer awareness of gut health, we explored the integration of lactic acid bacteria (LAB) into this innovative coffee product. The research meticulously investigated the stress adaptation characteristics of five LAB strains under various sublethal conditions. Notably, *Lactobacillus casei* exhibited superior resilience to heat and cold stress, while *Lactobacillus acidophilus* demonstrated stronger tolerance to acidic environments and bile salts. To simulate industrial drying processes and optimize for food processing and engineering, probiotic strains underwent additional thermal challenges, revealing that acid adaptation significantly enhanced the heat tolerance of *L. acidophilus* TISTR 1338. A novel encapsulation method, utilizing rice bran-derived prebiotics, pectin, and resistant starch via crosslinking and freeze-drying, was developed to enhance probiotic viability under harsh processing conditions and throughout storage. This technological innovation achieved the highest encapsulation efficiency, ensuring that the encapsulated probiotics retained a viable count of 5 log CFU/g after in vitro digestion meeting the established threshold for functional food applications. Ultimately, this innovation enables the development of synbiotic cold brew coffee that delivers tangible health benefits while setting new benchmarks for modern food safety and quality standards. By transforming a perishable beverage into a stable, safe, and functional powdered product, this research marks a significant advancement in functional beverage technology and probiotic delivery systems, benefiting both producers and consumers alike through technological innovation and a strong commitment to quality.

Biography:

I am Assistant Professor Dr. Patimakorn Klaiprasitti, and I earned my Ph.D. in Food Technology from Khon Kaen University, Thailand. My doctoral research focused on biofilm formation and disinfection of Listeria spp. on food contact surfaces—an essential aspect of food safety and the prevention of microbial contamination in the food industry.

I have gained international experience through study and research abroad, which has enriched my expertise and helped me stay up-to-date in the field of food technology.
I have presented and published my work at various international platforms. My research has addressed the survival of Listeria under different conditions, the prevalence of foodborne pathogens in ready-to-eat foods, and the antimicrobial properties of rice bran peptides and fish by-products. I have also contributed to studies on microbiological safety in traditional fermented foods.
Recent projects include developing antimicrobial packaging films, synbiotic products using rice bran, and evaluating microbial contamination in fermented fish containers.
My research interests lie in food safety, food technology, and food product development. I focus on natural antimicrobials, probiotics for meat preservation, shelf-life extension for coffee products, and enhancing cold-pressed coconut oil extraction using probiotics. I am committed to advancing research for safer and more sustainable food systems.

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- Session/Track Name: Session 1(Food Processing Innovations), Session 16 (Food Microbiology), Session 24(Food Product Development)
- Category (Oral/ Poster/ E-poster / Workshop): Oral Presentation

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Notes or Comments: