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2025 IFT-NPD/EFFoST Nonthermal Processing Workshop

非热加工技术助力可持续发展

Sustainable Innovations in Nonthermal Processing

会议摘要

BOOK OF ABSTRACTST

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Comparative Effect of Fermentation With High-Pressure Processing and Integration Process on the Attributes of Jackfruit Straw

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Jackfruit straw (*Artocarpus heterophyllus* Lam.), a byproduct, is rich in phenolics and flavonoids and possesses a considerable antioxidant potential that remains underutilised around the globe. Due to its perishability and microbial vulnerability, it has limited direct use that demands a certain technological process for its commercial utilization. Nonthermal processes such as high-pressure processing (HPP) and fermentation, can enhance its nutritional profile and improve microbial safety. In this context, this study investigates how fermentation and HPP at 300, 500, and 600 MPa, individually and in combination effect phytonutrients, antioxidants, and colour stability of Jackfruit straw. For the study, Jackfruit straw, preconditioned by control, fermentation in brine, or minimal processing were subjected to HPP at 300, 500, and 600 MPa for 5 min, followed by storage at 4°C for 60 days, and subjected to analysis including phenolic, flavonoids, antioxidant, reducing power and colour attribute (L^*, a^*, b^*). Results indicated that fermentation markedly increased phenolic content, but greater stability was estimated in fermented +HPP at 600 MPa, which, at day 60, retained 77% more TPC and 78% higher TFC than the control. Antioxidant activity was also best preserved in fermented + HPP treated samples at 600 MPa, showing a significant 66% improvement ($p < 0.05$) over the control and 20% more than fermented alone, whereas untreated samples lost greater than 60% activity at storage termination. Furthermore, the highest reducing power was observed in samples subjected to HPP at 600 MPa and fermentation. Moreover, HPP treated groups demonstrated better colour stability with minimal browning compared to control groups. Fermentation combined with HPP, especially at 500 MPa for 5 min, maximized phenolic, flavonoid, antioxidant, and visual quality of jackfruit straw. This is a viable strategy for upcycling jackfruit by-products into stable, functional, and consumer-appealing food ingredients, contributing to a sustainable food system.


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