Functional Innovation in Bakery Products: Nutritional Reformulation and Ingredient Valorization for Healthier Snacking

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Abstract

In response to the growing demand for healthier and functional snacks, this study explores innovative approaches to reformulate traditional bakery products using nutrient-dense and lower glycemic index ingredients. The objective is to enhance nutritional value without compromising technological properties or consumer acceptance. In our previous work, we developed and validated two prototypes: wheat bread enriched with Matricaria chamomilla (chamomile) extract [1], and gluten-free ice cream cones formulated with carrot powder and Ziziphus lotus syrup [2]. These products showed improved antioxidant activity, protein and fiber content, and were positively received in sensory evaluations. The focus of this poster is a novel formulation: a savory multigrain braided snack (treccine), developed using a mixture of spelt, oat, and rice flours, aiming to improve glycemic response and increase fiber content. As a key innovation, inulin derived from the green extraction of artichoke bracts and stems was used as a functional ingredient, contributing both prebiotic benefits and favorable technological properties such as improved texture and moisture retention. The inulin was obtained via ultrasound-assisted maceration and membrane filtration, within the UFRAT (Urban Food Recovery and Transformations) project framework. Nutritional analysis was conducted using standard AOAC methods, while technological and sensory attributes (color, pH, hardness, crispness, acceptability) were assessed through instrumental testing and consumer panels. Results indicated that the savory treccine formulation offered a balanced combination of nutritional enhancement and consumer-acceptable texture and flavor. This study supports the integration of sustainable plant-derived ingredients in traditional bakery formats, showing how targeted reformulation can align with both health and environmental goals through valorization of local biodiversity and agri-food by-products.

Keywords

Functional bakery, inulin, low glycemic index, sensory quality, green extraction, food reformulation.