F.18. FERMENTED PSEUDOCEREALS AS A PROMISING MATRIX FOR FUNCTIONAL PLANT-BASED DAIRY ALTERNATIVES

OXANA RADU*, EUGENIA COVALIOV, TATIANA CAPCANARI

Technical University of Moldova, 168, Stefan cel Mare bd, Chisinau, Republic of Moldova
email: oxana.radu@sa.utm.md

Abstract. The growing demand for plant-based foods has intensified research into sustainable and nutritionally enhanced alternatives to traditional dairy products. Fermented pseudocereals represent a particularly promising substrate due to their balanced amino acid profile, absence of gluten, and high content of bioactive compounds. Recent scientific evidence highlights that fermentation significantly improves protein digestibility, reduces antinutritional factors, and enhances the bioavailability of minerals and phenolic compounds, thus increasing the functional value of plant-based matrices.

This study evaluates the potential of selected pseudocereals and legumes – specifically amaranth (*Amaranthus spp.*), green buckwheat *(Fagopyrum esculentum*), and beans (*Phaseolus vulgaris*) – as raw materials for the development of fermented functional foods. Comparative analysis shows that amaranth has a high protein content (17-20%) and a favorable lysine profile. Green buckwheat is characterized by its high levels of flavonoids, especially rutin, which contribute to its strong antioxidant capacity. Beans provide additional protein (21-24%) and dietary fiber, and their fermentation reduces oligosaccharides and improves sensory acceptability. Fermentation also results in measurable improvements in physicochemical and nutritional properties across all matrices, including decreases in pH, increased soluble protein fractions, and enhanced antioxidant activity.

The fermentation process was conducted using a mixed culture of lactic acid bacteria, including *Lactobacillus plantarum* and *Lactobacillus casei*, applied at a target level of approximately 10^7 CFU/g of substrate. The inoculation strategy and bacterial reactivation protocol were optimized to ensure effective fermentation and metabolic activity. The use of a bacterial consortium enabled synergistic effects, including improved acidification kinetics and flavor development.

The results demonstrate that fermented pseudocereal-based matrices have significant potential for formulating plant-based dairy alternatives, such as yogurt-type products, fermented beverages, and spreadable analogues. These products combine enhanced nutritional value with desirable sensory properties, supporting their application in functional food development and contributing to sustainable dietary transitions.

Keywords: bioactive compounds, lactic fermentation, protein digestibility, pseudograins, non-dairy alternatives.

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