



Improving quality and functionality of plant-based cheese analogues made with pistachio, lupin and almond using a LAB co-culture fermentation

Poster

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Growing concerns about health, environmental sustainability, and animal welfare are driving consumer demand for plant-based alternatives to traditional dairy products. Among these, cheese analogues represent a promising category, especially when formulated to offer both nutritional value and desirable sensory attributes. Fermentation with lactic acid bacteria (LAB) presents a promising approach, as LAB not only improve food safety and shelf life but also enhance texture, flavor development, and the generation of bioactive compounds such as postbiotics. LAB contribute to the production of compounds like gamma-aminobutyric acid (GABA), ornithine, and tryptophan, which are associated with physiological benefits including antihypertensive, antioxidant, and neuroprotective effects. Furthermore, the metabolic activity of LAB during fermentation can enrich the product's nutritional profile and modulate its organoleptic properties, making them essential tools in the development of functional, plant-based fermented foods.

This study aimed to evaluate the impact of a co-culture composed of *Levilactobacillus brevis* UCLM47, *Lactocaseibacillus paracasei* UCLM56, and *Leuconostoc mesenteroides* UCLM_Ln2—previously selected for their postbiotic and technological properties—on

the quality and bioactivity of plant-based cheese analogues made from pistachio, lupin, and almond, in comparison with a commercial starter culture. Physicochemical parameters (water activity, dry extract, protein content, pH, and color), free amino acid (FAA) profiles by RP-HPLC, and descriptive sensory analysis were assessed over ripening time (90 days). Both formulations showed high protein content and similar dry matter and color values. Water activity decreased during storage, with a more notable reduction in co-culture samples. The co-culture cheese analogue also exhibited a superior FAA profile, with higher concentrations of bioactive (GABA, Orn and Trp) and essential (Lys, Leu and Trp) FAA. Sensory analysis highlighted more intense cheese and nut flavors in co-culture samples, with overall better acceptability.

In conclusion, the developed cheese analogues exhibited organoleptic characteristics comparable to traditional cheeses. The use of bacterial co-cultures significantly enhanced both nutritional and sensory properties, representing a sustainable and health-conscious strategy for producing high-quality plant-based cheese alternatives.

Palabras Clave

(1) Plant-based cheese analogues, (2) Lactic acid bacteria, (3) GABA, (4) Postbiotic compounds, (5) Sensory analysis..

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