UNIVERSITY OF LIFE SCIENCES ”KING MIHAI I” FROM TIMISOARA
”YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH IN APPLIED LIFE SCIENCES”

05-06 November 2026



Development of the HACCP plan for an innovative yogurt enriched with malt and brewer's yeast

Andrei – Dorin Mărginean[1], Elisabeta Condoroș[1], Răzvan Buiu[1], Delia-Gabriela Dumbrava[1], Viorica-Mirela Popa[1*]

Faculty of Food Engineering, University of Life Sciences ”King Mihai I” from Timișoara, Calea Aradului 119A, 300645, Romania

**Corresponding author, e-mail: mirelapopa@usvt.ro*



Abstract: *The development of fermented dairy products with added functional ingredients requires careful risk assessment, as the introduction of additional raw materials can alter the hazard profile of the production process. This paper presents the development of a HACCP (Hazard Analysis and Critical Control Points) plan for an innovative yogurt enriched with malt and brewer's yeast, aimed at ensuring food safety throughout the entire manufacturing chain. The study began with a description of the product, its intended use, and a process flow diagram, which includes the receipt of milk and ingredients, standardization, the addition of malt and brewer's yeast, pasteurization, homogenization, inoculation with a starter culture, fermentation, cooling, packaging, and storage. Biological hazards (Salmonella, Listeria monocytogenes, Escherichia coli, and contaminating yeasts and molds), chemical hazards (antibiotic residues, mycotoxins, pesticides, and residues of detergents and disinfectants), and physical hazards (foreign bodies) were identified and evaluated, with special attention given to risks associated with the malt and brewer's yeast. Following the risk assessment, critical control points, critical limits, a monitoring system, corrective actions, and verification and documentation procedures were established. Prerequisite hygiene programs, traceability, and supplier control were also integrated. The results highlight that the stages of pasteurization, heat treatment of the added ingredients, and cold-chain storage play an essential role in risk control. The proposed plan serves as a practical tool for producing a functional yogurt that is safe and compliant with current legislative requirements.*

• Material and method

Whole goat milk was used as the main raw material for yogurt production, supplemented with malt, honey, and inactive brewer's yeast as functional ingredients. The experimental yogurt samples were produced under controlled laboratory conditions following a standard fermented dairy process. Subsequently, a HACCP-based risk assessment was performed to identify and evaluate potential biological, chemical, and physical hazards associated with the product and its manufacturing process.



• Results and discussions

- Following the HACCP analysis of the technological process for producing fermented goat milk yogurt, critical control points (CCPs) were identified along the production flow—from the receipt of raw materials through to fermentation and packaging. This highlights that the technological process entails both biological and chemical risks, distributed throughout the entire production flow.
- To support the decision-making process for establishing these Critical Control Points (CCPs), the identified risks were ranked according to their level of severity:

Table 1. Severity Level of Critical Control Points (CCPs)

No.	Process Step	CCP	Hazard Type	Severity
1	Milk reception	1B + 1C	Biological + Chemical	High
2	Centrifugal cleaning	2B	Biological	Medium
3	Standardization	3C	Chemical	Medium
4	Homogenization	4B	Biological	Medium
5	Pasteurization	5B + 5C	Biological + Chemical	High
6	Cooling	6B	Biological	Medium
7	Inoculation with starter culture	7B	Biological	Medium
8	Addition of ingredients (malt and brewer's yeast)	8B + 8C	Biological + Chemical	High
9	Packaging	9B	Biological	Medium
10	Fermentation	10B	Biological	Medium

Conclusions

The analysis conducted through the application of the HACCP plan revealed that the technological process involves significant critical control points—particularly during the stages of milk reception, pasteurization, and the addition of ingredients—where strict monitoring is required to ensure food safety.