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**Food safety management on the technological flow of obtaining  
 sweet potato and pumpkin cake**

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**Abstract:** This paper investigates the food safety management strategies applied to the technological process of manufacturing sweet potato and pumpkin cake. The aim of the research is to develop an efficient HACCP plan, capable of preventing biological, chemical and physical risks specific to the use of vegetable raw materials. In the first stage, a detailed analysis of the production flow was carried out, identifying critical control points, with a focus on the reception of ingredients and the heat treatment stage. Given the high moisture and sugar content of sweet potato and pumpkin, monitoring water activity and baking parameters becomes essential for the microbiological stability of the finished product. The results of the study indicate that maintaining a constant temperature in the thermal center of the product and strict compliance with hygiene in the cooling and packaging circuit significantly reduce the likelihood of contamination with fungi or sporulated bacteria. Good storage practices are also evaluated to preserve the antioxidant properties offered by the beta-carotene present in the composition. The conclusions highlight that the implementation of proper safety management not only guarantees consumer health but also optimizes the shelf life of this innovative pastry product. Through rigorous process control, the sweet potato and pumpkin cake can be successfully integrated into wide consumption, representing a safe and valuable nutritional alternative.

**Introduction**

This sweet potato-based vegan cake, free of added sugar and animal-derived ingredients, represents a functional formulation with an optimized nutritional profile. Sweet potatoes provide complex carbohydrates, fiber, and beta-carotene, contributing to a stable glycemic response and antioxidant intake, while unsaturated vegetable oils improve the product's lipid profile. Plant-based flours further enhance the nutritional matrix by supplying additional fiber and micronutrients, supporting the development of a product with potential health benefits.

**Results and discussions**

**Hazard Analysis and CCP Determination**

Process Step	Hazard	Hazard Type	Probability	Severity	Risk Level	Control Measure	CCP?
Reception of raw materials	Contamination with soil microorganisms	Microbiological	Medium	High	High	Supplier selection, visual inspection	No
Washing	Contamination through non-compliant water	Microbiological	Low	High	Medium	Use of potable water, sanitation	No
Cleaning/peeling	Peel fragments, foreign bodies	Physical	Medium	Medium	Medium	Visual control, clean equipment	No
Chopping	Cross-contamination	Microbiological	Medium	High	High	Equipment sanitation	No
Thermal processing of vegetables	Microorganism survival	Microbiological	Low	High	High	Minimum processing temperature	Yes
Mixing ingredients	Cross-contamination	Microbiological	Medium	Medium	Medium	GHP/GMP	No
Baking	Microorganism survival	Microbiological	Low	High	High	Baking time and temperature	Yes
Cooling	Microbial growth	Microbiological	High	High	High	Rapid cooling	Yes
Packaging	Recontamination	Microbiological/Physical	Medium	High	High	Hygiene, compliant packaging	Yes
Storage	Microbial growth	Microbiological	Medium	Medium	Medium	Controlled temperature	No

**Material and method**

This work is based on a comparative analysis of standards and regulations, the examination of HACCP implementation models, the review of specialized literature on food safety risks, and the evaluation of existing technological processes for similar products. The materials used in this work included international food safety standards (ISO 22000:2018, ISO/TS 22002 1), European and national food safety legislation (EC Regulations 852/2004, 853/2004, 178/2002), Codex Alimentarius guidelines on HACCP implementation, specialized literature on sweet potato and pumpkin processing, scientific articles and studies on food safety risks in bakery and pastry products, as well as good hygiene and manufacturing practice manuals (GHP/GMP).

**Conclusions**

The theoretical analysis of food safety management within the technological process for producing the sweet potato and pumpkin cake highlights that product safety fundamentally depends on the rigorous implementation of prerequisite programs (PRPs), which form the basis for preventing cross contamination, on the identification of Critical Control Points (CCPs), and on the integration of HACCP into a food safety management system compliant with ISO 22000:2018, ensuring traceability, documentation, and continuous improvement.

