

UDC: 637.52

**Oleg Galenko, Ph.D., Assoc. Prof., Mykola Vorontsov, applicant for a Ph.D.
National University of Food Technologies, Ukraine**

MODELING THE NUTRITIONAL VALUE OF PATÉS WITH FAT REPLACEMENT AND USING BAMBOO FIBER

Introduction. Within the European Union and Ukrainian markets, wheat fiber is among the most commonly used dietary fibers. Nevertheless, despite its wide application, there is a growing demand for alternative fiber sources that are free from wheat gluten, which underscores the need for gluten-free ingredients [1]. The increasing relevance of this issue is further reinforced by advances in highly sensitive detection methods for wheat proteins, based on immunological assays, as well as the ongoing challenges in controlling residual gluten content in wheat-derived products [2]. Moreover, the price volatility of wheat, driven by seasonal fluctuations and broader economic conditions, strengthens the rationale for the use of alternative raw materials [3].

Methods. In this context, a pâté formulation was developed in which a portion of the raw materials was replaced with bamboo fiber (Table 1). Bamboo fiber, like the bamboo stems from which it is derived, is inherently gluten-free and contains none of the 14 major food allergens identified by the Codex Alimentarius. The extensive raw material base available for bamboo fiber production ensures its stable supply and minimizes exposure to price fluctuations [3].

Results and discussion. Mathematical modeling of the nutritional value of pâtés enables precise determination of product composition, optimization of the formulation, and prediction of the impact of specific ingredients on product properties. This approach supports efficient product development with targeted characteristics while reducing time and resource expenditure prior to conducting experimental studies. Based on the proposed formulation, a theoretical calculation of fat content and energy value in the final product was performed.

Table 1 – Formulation, Calculated Fat Content, and Energy Value of the Pâté

Ingredient	Typical Pâté Formulation (kg/100 kg)	Model Formulation with Fiber (Fat 10%) (kg/100 kg)
Pork fat	30.0	10.0
Broth	30.0	30.0
Pork liver	30.0	30.0
MDM	10.0	10.0
Bamboo fiber	-	1.0
Potato starch	-	2.0
Additives (emulsifier, spices, etc.)	~0.5	~2.0
Total Fat Content	27.8%	12.4%
Energy Value	310 ккал/100 г	100 ккал/100 г

Conclusion. The analysis of pâté formulations incorporating bamboo fiber allows for a well-founded conclusion regarding the feasibility and appropriateness of developing reduced-fat products. Reducing the fat content to 10% within the formulation maintains the technological suitability of the product and decreases its energy value to approximately 100 kcal per 100 g, which is particularly relevant in the context of current health-conscious dietary

trends. The addition of bamboo fiber, such as **JeluCel BF 300**, not only enhances the structural and mechanical properties of the pâté but also serves as a moisture-binding stabilizer, which is especially important when the fat phase is reduced. It should be noted that this formulation model aligns well with the clean-label concept and meets the expectations of targeted consumer groups.

References

1. SANTOSH, S., et al. Bamboo shoot and its food applications in last decade: An undervalued resource for functional foods. Food Research International, 2023, 163, 112222. DOI: 10.1016/j.foodres.2022.112222.
2. DOS SANTOS, B. A., et al. Evaluation of nutritional, technological, oxidative, and sensory characteristics of meat products enriched with bamboo fiber. Food Research International, 2024, 171, 112974. DOI: 10.1016/j.foodres.2024.112974.
3. SAMPAIO, U. M., et al. Bamboo Fiber Applications for Food and Feed. In: Biopolymers in Pharmaceutical and Food Applications. Wiley, 2024, pp. 293-310. DOI: 10.1002/9781119677864.ch16.