ASSESSMENT OF THE PHYSICOCHEMICAL CHANGES AND PROXIMATE COMPOSITION OF TRADITIONALLY PRODUCED 'MUȘCHI ȚIGĂNESC' DURING THE MATURATION PERIOD

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Abstract

In contrast to industrially obtained products, pork meat specialties manufactured according to traditional recipes are considered by consumers to be a healthier and more authentic choice. The preference for these products is based on their superior sensory qualities and a nutritional profile perceived as more beneficial to the human body.

The physicochemical examination of 'Mușchi țigănesc' is employed to assess the safety and wholesomeness of the product throughout its shelf-life, using principles and methods based on laboratory analyses.

This study aimed to track the dynamics of physicochemical changes in the 'Mușchi țigănesc' product during its maturation period (days 1, 20, and 40). The objective of the study was to characterize the maturation process and to evaluate the stability and quality of the final product. The content of water, mineral substances, protein, lipids, and nitrogen-free extractives was analyzed.

The results indicated a gradual and controlled decrease in moisture content, from 46.49% on day 1 to 43.92% on day 40. This dehydration process led to a concentration of the other components, with the protein content increasing from 21.04% to 21.98% and the lipid content from 27.63% to 28.13%.

Key words: *maturation, physicochemical analysis, stability, quality*

INTRODUCTION

A traditional meat product is defined as the result of processing raw materials of animal origin, characterized by a high-quality chemical composition, using a specific traditional technological process [7, 8].

The specificity of these preparations is attributed to recipes that include unique spice blends, responsible for imparting a distinct aroma, as well as particular preservation techniques [3]. From a compositional standpoint, traditional preparations are often characterized by a lower sodium chloride [10] content compared to those produced conventionally and by a high protein value, a direct consequence of the quality of the raw material [2, 5]. The preservation technologies used ensure a distinctive sensory profile and allow for the direct consumption of the products without requiring additional thermal processing [1, 9], a feature that underlies their appreciation by consumers [4, 6].

This study aimed to assess the physicochemical quality and food safety of the 'Mușchi țigănesc' product throughout its maturation period.

MATERIAL AND METHOD

The 'Mușchi țigănesc' product was subjected to physicochemical analysis, for which a series of thirty-six replicates of the

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The manuscript was received: 20.07.2025
Accepted for publication: 29.08.2025

product were performed. The analysis aimed to determine the content of water, mineral substances, protein, lipids, and nitrogen-free extractives.

For the chemical characterization of the samples, standard analytical methods from the literature were applied. Thus, moisture was determined gravimetrically by drying the samples in an oven at a temperature of 105°C until a constant mass was achieved. The mineral substance content (crude ash) was established by the method of calcination at 550°C. Subsequently, crude protein was quantified using the Kjeldahl method, which involves sample digestion, distillation of ammonia, and its titration, while crude lipids were extracted with an organic solvent using a Soxhlet apparatus. Finally, the nitrogen-free extractives (NFE) were calculated by difference, by subtracting the percentages of the other previously determined components (protein, lipids, and ash) from the dry matter.

For each physicochemical parameter, the results were subjected to statistical analysis. The table presents the mean values, and for each dataset, the standard deviation (STDEV), coefficient of variation (CV%), and standard error of the mean (±sX) were calculated to verify the precision of the determinations and the homogeneity of the samples. The mean is the most representative value, being obtained from multiple analyzed samples. The coefficient of variation indicates the homogeneity of the product, while the standard deviation refers to the dispersion of individual values from the mean. A low value indicates that the product is consistent.

Data processing was performed using Microsoft Excel

RESULTS

Table 1 presents the mean values of the physicochemical results for the 'Mușchi țigănesc' product, evaluated at three distinct time points during its maturation: day 1, day 20, and day 40.

Analysis of the data obtained from day 1 to day 40 reveals clear trends that describe the product's maturation process. Regarding the water content, a gradual decrease is observed, reaching a value of 43.92% on day 40, compared to 46.49% on day 1. Concurrently, the dry matter content in the product increases from 53.51% to 56.08%. This increasing trend in dry matter is considered normal, playing an essential role in the development of sensory parameters such as aroma and texture, as well as in extending the product's preservation period.

Table 1. Dynamics of physicochemical changes in "mușchi țigănesc" during the maturation period

Trait	Day 1			Day 20			Day 40		
	Mean	±sX	CV%	Mean	±sX	CV%	Mean	±sX	CV%
Water (g/100 g)	46.49	0.71	9.11	45.32	0.72	9.52	43.92	0.76	10.41
Dry matter (g/100 g)	53.51	0.81	9.11	54.68	0.87	9.52	56.08	0.97	10.41
Mineral substances (g/100 g)	4.26	0.06	8.42	4.43	0.06	8.31	4.71	0.07	9.32
Organic substances (g/100 g)	49.25	0.88	10.75	50.25	0.83	9.86	51.37	0.90	10.54
Protein (g/100 g)	21.04	0.27	7.64	21.39	0.29	8.25	21.98	0.31	8.59
Collagen (% in prot.)	9.64	0.11	6.82	10.37	0.13	7.54	11.02	0.14	7.83
Collagen (g/100g)	2.03	0.02	6.46	2.22	0.03	6.89	2.42	0.03	7.28
Lipids (g/100 g)	27.63	0.50	10.92	27.91	0.52	11.28	28.13	0.50	10.64
Nitrogen-free extractives (g/100 g)	0.58	0.01	6.50	0.95	0.01	6.89	1.26	0.02	7.21

The detailed analysis of the coefficient of variation (CV%) provides a clear picture of the quality and consistency of the manufacturing process. It is an essential statistical indicator because, as a measure of relative variability (the ratio of the standard deviation to the mean), it allows for the comparison of the degree of dispersion for parameters with different units and orders of magnitude. The CV% values obtained in this study, mostly ranging from 6% to 11%, demonstrate a high level of control throughout the entire technological flow, from the raw material to the final matured product.

Chemical indicators such as mineral substances and nitrogen-free extractives show coefficient of variation values below 9%. These compounds are directly influenced by the amount of salt, sugars, and spices in the product's recipe. The collagen content registers the lowest values for the coefficient of variation, ranging between 6.4% and 7.8%. This indicates that the raw material selection for the product is rigorous. In the case of proteins and lipids, a somewhat higher coefficient of variation is noted, ranging between 10% and 11%; however, this cannot be attributed to a defect in the production process, but rather as a reflection of the natural biological variability of the raw material.

To better illustrate the results, Figure 1 brings to the forefront the mean values of the ‘Mușchi țigănesc' product on day 1 of its maturation period.

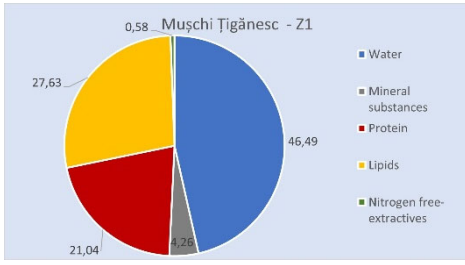

Fig. 1. Physicocochemical composition (%) of the 'Mușchi Țigănesc' product on day 1

From the chart data, it is observed that water is the main component, representing 46.49% of the total mass, a typical value for the initial stage of the maturation process. The dry matter is composed of the protein (21.04%) and lipid (27.63%) content. Mineral substances account for 4.26% and nitrogen-free extractives for 0.58%, thus completing the chemical profile.

Figure 2 refers to the mean values obtained for day 20 of maturation.

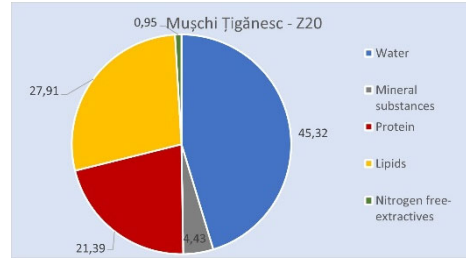

Fig. 2. Physicochemical composition (%) of the 'Mușchi Țigănesc' product on day 20

In this stage, the dehydration process continues as the water content decreases to 45.32%. This, in turn, causes a concentration of lipids (27.91%) and proteins (21.39%), marking an evolution in the product's nutritional and structural profile.

Figure 3 shows the values obtained for the product on the 40th day of its maturation period.

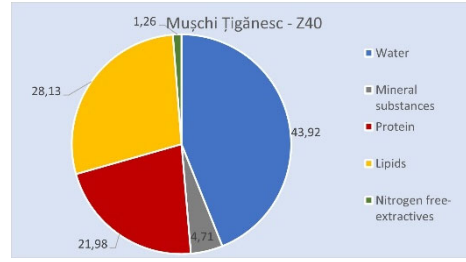

Fig. 3. Physicochemical composition (%) of the 'Mușchi Țigănesc' product at the end of the maturation period

CONCLUSIONS

Following the physicochemical analysis of the 'Mușchi țigănesc' product throughout the 40-day maturation period, it can be concluded that the maturation and drying process proceeded normally, with the product becoming more concentrated in flavor and nutrients. The decrease in water content occurred in a controlled and gradual manner, falling from 46.49% on the first day to 43.92% on day 40.

From a nutritional standpoint, an increase in the proportion of protein and lipids was observed, an effect due to the decrease in the product's moisture content. On day 40, the total protein content is 21.98% and the lipid content is 28.13%.

Based on the data obtained, it can be affirmed that the technological process is very well-controlled and stable. Therefore, the physicochemical profile of the 'Mușchi țigănesc' product is well-balanced. The stability and consistency demonstrated throughout the analyses validate the manufacturing technology and confirm the superior quality of the final product.

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