

THE IMPORTANCE OF ADDING BUCKWHEAT FLOUR IN MEAT PRODUCTS

R.-G. Bobeică¹, B. Păsărin^{1*}, G.-V. Hoha¹, C.-E. Nistor¹, L.-M. Cârstea²

¹Faculty of Food and Animal Sciences, "Ion Ionescu de la Brad" Iasi University of Life Sciences, 8 Mihail Sadoveanu Alley, 700489 Iasi, Romania

²"Virgil Madgearu" Economic College, Iasi, Romania

Abstract

The present study analyzes the use of buckwheat flour in meat products, focusing on its impact on the physico-chemical, technological, and organoleptic properties of sausages. It was found that adding a small amount of buckwheat flour to the sausage samples (from 50g to 250g of the raw material weight) has a beneficial effect on the water retention capacity of the product, enhancing the juiciness and consistency of the sausages. The increase in this water-binding capacity ranges from 1.1% to 15%, indicating a significant impact on the texture and stability of the final product. The appearance, color, smell, aroma, consistency, taste, and juiciness were studied in the produced sausage samples. It was found that introducing hydrated buckwheat flour into the minced meat, up to 150g of the raw meat material, has a positive effect on the physico-chemical, technological, and organoleptic parameters of the sausages.

Key words: buckwheat flour, chemical composition, meat products, physico-chemical parameters, pH

INTRODUCTION

In modern diets, meat products enriched with plant ingredients have gained increasing importance, with a significant rise in consumption in recent years [1]. In response, food industry producers are focusing more and more on developing products that meet these nutritional requirements. Their goal is to attract consumers by offering easy-to-prepare foods that are suitable for a healthy diet [2].

While plant-based raw materials are being used to create functional, dietary, therapeutic, and preventive products for children, another alternative is buckwheat flour. Buckwheat is rich in vitamins, minerals, and starch, and it is particularly advantageous in terms of protein and fiber content compared to wheat [3], [4]. It even has a high biological value protein structure and is gluten-free. Additionally, studies

indicate that it is rich in antioxidant compounds, such as polyphenols [5], [6], [7].

In this regard, the use of buckwheat flour will improve the physical, chemical, technological, and organoleptic properties of minced meat in sausage production [2], [8], [9]. To develop a new meat product (raw sausages), it was decided to use buckwheat flour [10].

MATERIAL AND METHOD

For the production of the experimental sausage samples, the following raw materials were used: lean pork, pork belly, and buckwheat flour. The experimental recipes included additional raw materials: salt, granulated sugar, fresh garlic, black pepper, and ground allspice. All raw materials were purchased from the food market in Iași.

* Corresponding author: benone.pasarin@iuls.ro

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The focus of the research was on raw sausage with added buckwheat. To study the influence of buckwheat flour on the quality and yield of raw sausages, buckwheat flour was used that was produced according to standards. The organoleptic parameters of the flour were as follows: color – light brown, homogeneous, and without foreign inclusions; smell – specific to the culture from which it was made; taste – fresh, specific to the culture. To observe the influence of the added buckwheat flour in the sausage recipe, the physicochemical parameters, pH, and organoleptic characteristics of the final product were determined.



Fig. 1 Fresh sausages with buckwheat

RESULTS AND DISCUSSIONS

The complete recipes for the fresh sausage model samples are presented in Table 1. The appearance, color, smell, aroma, texture, taste, and juiciness were studied in the produced sausage samples. The results of the organoleptic evaluation of the tested samples are presented in Table 2.

The overall assessment of the examined samples differs significantly from one another across the experimental variants. The best was the control sample and the variants with 100g and 150g of buckwheat flour relative to the weight of the meat raw material (4.5 and 5 points, respectively), while the worst were the variants with 200g and 250g of buckwheat flour, which received 2.8 and 2.3 points, respectively. The color characteristics of the sausages (in cross-section) also varied among the variants (Fig. 2). In this regard, preference was given to the control samples and the experimental sample with 150g of buckwheat flour (5 points).

Chemically, sample number 3 has the best properties (Table 3). In the control sample, the pH value was 5.9 units. The maximum pH value was observed in sample number 3 – 6.35 units. With the increase in the dose of buckwheat flour, the active acidity gradually decreased from 6.32 to 6.29 units.

Table 1 The recipes for the sausage samples

Name of the raw material	Control sample (1000g)	Sample no. 1 (50g buckwheat flour)	Sample no. 2 (100g buckwheat flour)	Sample no. 3 (150g buckwheat flour)	Sample no. 4 (200g buckwheat flour)	Sample no. 5 (250g buckwheat flour)
Half-fat pork	250	210	190	170	150	130
Pork belly	250	250	250	250	250	250
Buckwheat flour	-	50	100	150	200	250
Salt	3	2.8	2.5	-	3	3
Sodium nitrite	-	-	-	-	-	-
Sugar	1	1	1	1	1	1
Garlic	6.5	6.5	6.5	6.5	6.5	6.5
Ground black pepper	5	5	5	5	5	5
Ground allspice	6	6	6	6	6	6

Table 2 Organoleptic evaluation of experimental sausage variants subjected to thermal treatment

Sample variants	Overall assessment	Color	Smell	Texture	Taste	Juiciness
Control sample	exceptional	attractive	fresh	tender	delicious	Juicy
Sample no. 1	good	specific	unnoticeable	good enough	tasty	Juicy
Sample no. 2	very good	specific	inherent to meat products	very good	sufficiently tasty	Juicy
Sample no. 3	exceptional	attractive	inherent to meat products	homogeneous	extremely tasty	Juicy
Sample no. 4	satisfactory	dark	insufficiently meaty	acceptable	not tasty enough	Bland
Sample no. 5	unacceptable	unsatisfactory/too dark	not meat smell	unacceptable	tastes like buckwheat flour	Dry

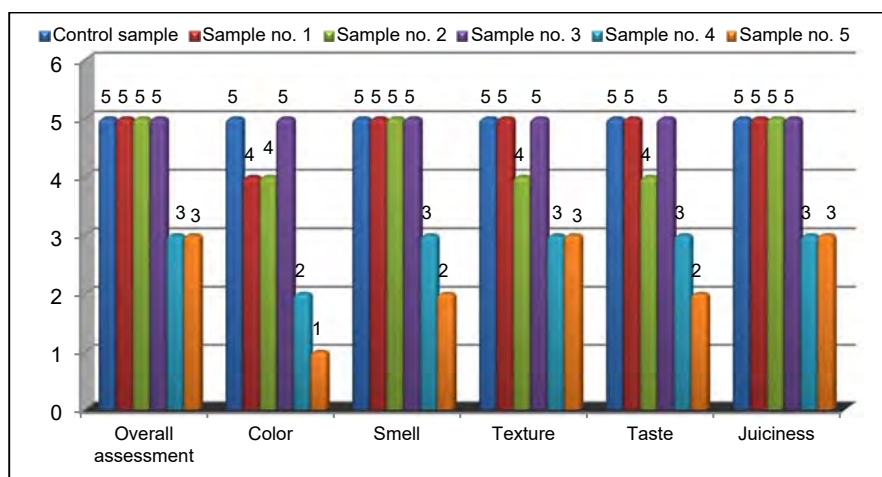


Fig. 2 Histogram of the organoleptic evaluation of the experimental sausage variants subjected to thermal treatment

Table 3 Physico-chemical properties of the experimental samples

Sample variants	Parameters analyzed according to the STAS admissibility conditions for fresh sausages						
	Fat max. 35%	Water max. 63%	Proteins min. 9%	Collagen max. 30%	Sodium chloride max. 3%	Ph 5.6-6.4	Sodium nitrites (NaNO ₂)%
	Average values obtained						
Control sample	28	60	16	14	3	5.9	-
Simple no. 1	27	60.8	18.7	15.4	3	6.15	-
Simple no. 2	25.3	61.1	19.2	16.6	2.8	6.32	-
Simple no. 3	24	62.8	20.1	18.9	-	6.35	-
Simple no. 4	20	58.5	26.7	23.7	2	6.3	-
Simple no. 5	15.8	54.3	29.9	27.6	1.9	6.29	-

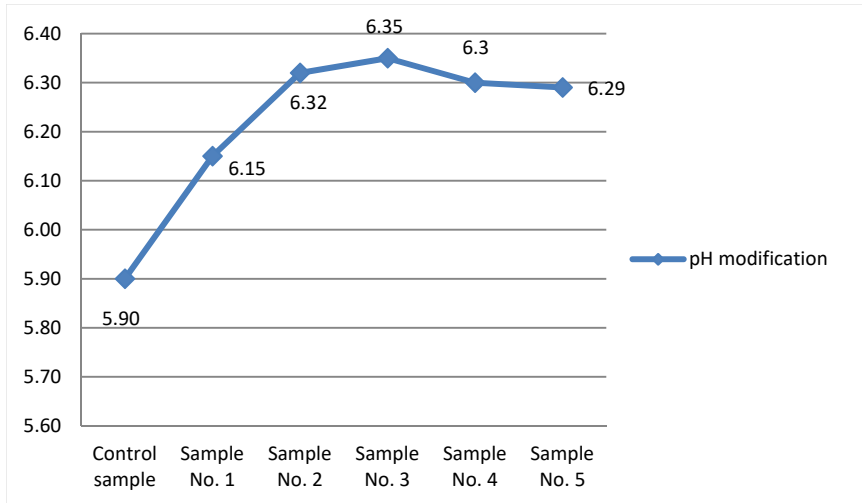


Fig. 3 pH modification in the control and experimental samples, depending on the amount of buckwheat added

CONCLUSIONS

The physicochemical and technological indicators of the minced meat system correlate with the organoleptic indicators of the experimental product. The appearance, color, smell, aroma, texture, taste, and juiciness were studied in the produced sausage samples. Based on the overall organoleptic evaluation of the experimental samples, it was determined that the introduction of buckwheat flour in amounts of up to 100-150g does not negatively affect the organoleptic quality indicators of the sausages.

Thus, it was established that the incorporation of 150g of buckwheat flour into the minced meat positively affects the physicochemical, technological, and organoleptic parameters of the sausages.

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