

Technology and characteristics of boiled sausages enriched with dietary fibers of *Plantago Psyllium l.*

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ABSTRACT

This study is based on the thesis that the lack of dietary fibers in the diet of the population is a problem that needs to be solved by the production of enriched mass-consumption products. The proposed formulation of boiled sausages includes a highest grade beef (as the main raw material), bold pork, chicken eggs and powder milk with different levels of replacement of pork for the flour from the husk of *Plantago psyllium L.* Sodium Nitrite was not added, the polyamide shells with a diameter of 60 mm were used. The technology of boiled sausages is described. The optimum dosage of flour (2.35%) from the husk of *Plantago psyllium L.* is defined through simulation. It is shown that the addition of this ingredient in boiled sausages leads to a slight decrease in protein, fat and an increase in the mass fraction of carbohydrates. However, within the examined limits it does not lead to a decrease in biological value. The additive positive effect of dietary fibers of *Plantago psyllium L.* husk (arabinoxylans) on the functional and technological properties and organoleptic characteristics of cooked sausages is defined. In this regard, there is the possibility of using the flour from the husk of *Plantago psyllium L.* not only as a functional food ingredient – dietary fiber, but also as a water-retaining agent that improves the consumer properties of the product. The expiry dates for boiled sausages are set. These expiry dates have not decreased compared to the control samples and amounted to 7 days at a temperature of +2...+6 °C. The compliance with safety indicators of the developed products to the requirements of technical regulations is shown. The regulatory documentation is approved and three patents are received. Economic efficiency of production of boiled sausages, enriched with flour from the husk of *Plantago psyllium L.* reaches 4000 RUB per ton of product.

Keywords: boiled sausages, *Plantago psyllium L.*, dietary fibers.

1. INTRODUCTION

Dietary fibers are substances of carbohydrate nature that are included in the edible part of plants, resistant to digestion and adsorption in the human small intestine, while fully or partially fermented in the large intestine [1-5]. They form gel-like structures in the intestine, causing its peristalsis, adsorbing bile acids, reducing cholesterol level in the blood, removing heavy metals and radionuclides from the body and show prebiotic activity [6]. Some of them (lignin) have antioxidant properties [7]. At the same time, modern scientific knowledge allows expanding the range of dietary fibers at the expense of animal products. Thus, the functions of dietary fiber are inherent in the hydrolysates of collagen of the connective tissue of meat [8], chitosan synthesized from the chitin cover of mollusks and insects [9]. Cellulose-like polysaccharide tunicin is found in the sea squirts of *Halocynthia aurantium* Pallas [10]. Medical studies have shown the importance of dietary fibers in the prevention of atherosclerosis, hypertension, diabetes, cancer [11].

Adequate daily consumption of dietary fiber is 20 g [12], the highest limit is 40 g [13]. However, the intake of refined food and the lack of fresh fruits and vegetables in the diet of Russians, for decades formed a stable deficit of dietary fiber that reaches 10-25% for certain categories of the population [14]. In this regard, the need to find new ways to replenish dietary fiber in everyday products was declared directly or indirectly in such policy documents as the Strategy of Development of the Food and Processing Industry of the Russian Federation (for the period up to

2020), the Doctrine of Food Security of the Russian Federation, the Strategy of Scientific and Technological Development of the Russian Federation. The development of food products enriched with dietary fibers for the population of the Far East of Russia, where life expectancy is lower (in Khabarovsk and Primorsky Krai it is 2 – 2.5 years lower than the average in Russia), and the growth of cancer and cardiovascular diseases progresses by 12.6% and 2.7% per year respectively, [15] is particularly relevant.

The proposed study presents the enrichment of boiled sausages - food products of mass consumption - with flour from the husk of *Plantago psyllium L.* *Plantago psyllium L.* (lat. *planta* – «sole», *ago* – «drive», «follow»; lat. *psyllium* /greek. *psylla* – «flea») is an annual herbaceous plant from the Plantaginaceae family with 20-30 cm height, that grows on the dry slopes of the Caucasus and cultivated in several countries.

Its black seeds, *Semen psyllii*, visually resembling fleas, contain a large amount of mucus (10-30%), concentrated in the shell [16]. Mucus is mainly represented by soluble, high branched, gel-formed polysaccharides with arabinoxylans (85%) having the backbone of xylose with arabino- and xylo- contained side chains [17, 18]. Atypical molecular branching makes it almost impossible for arabinoxylans to be fermented in the intestine [19]. The rest of the polysaccharides (arabinogalactan, xylan, pectin, etc. [20]) is not capable to the formation of gels and it is a substrate for bifidobacteria and lactobacilli of the intestine [21-23].

The combination of fermentable and non-fermentable dietary fibers observed in husk of *Plantago psyllium* L. is unique [24], and is not comparable, for example, with wheat, rice or barley bran nutrients (no more than 50% of insoluble fibers [25-27]) or carrageenan (only soluble fibers) [28]. Therefore, the complex of dietary fibers of *Plantago psyllium* L. husk has a wide range of therapeutic and prophylactic properties, helping both with constipation and diarrhea, lowering cholesterol and blood pressure, normalizing blood sugar level, having anti-inflammatory effect. These aspects were noted by a large number of researchers [29-37].

The scientific novelty of the proposed study is determined by the lack of development of boiled sausages enriched with dietary fibers (arabinoxylans) of plantain.

Thus, there are available patents RU 2376889 [38] and RU 2495572 [39] for a wide range of food and drinks, modulating the intestinal flora of man. They are also enriched with cereals' and legumes' arabinoxylanes. I. Van Hasendok and colleagues [40] described bread with a high content of arabinoxylans, G. Lacaze and others developed liquid composition for the enrichment of bakery products based on arabinoxylan [41], Pillsbury Company applies arabinoxylan to improve the storage sustainability of refrigerated dough [42]. The enrichment with arabinoxylane psyllium husk of beer [43], yogurt [44] and pastry [45] is registered. Their use in feed supplements for agriculture [46] and domestic [47, 48] animals are noted.

On the other hand, hydrated dietary fiber in the amount of 3%, were used by G.N. Rummyantseva and others to increase the stability of boiled sausages during storage [49]. Enrichment of

liverwurst with dietary fibers (fiber fetlock), made from extruded chickpea flour, is described in patent RU 2560951 [50]. Artamonova M. P. and others suggested the use of a composition based on the modified wheat fiber and xanthan gum in meat products [51]. T. M. Giro and others added hydrated pumpkin powder (particle size of powder is 0.2-0.6 mm) in lamb sausages [52]. Citrus fibers as raw materials for the enrichment of sausages are described in the patent RU 2390273 [53]. A. A. Nogina, S. L. Tikhonov and others used arabinogalactan in the production of boiled sausages from poultry [54].

The aim of the study considered the development of technology, evaluation of consumer properties and safety of boiled sausage, enriched with flour from the husk of *Plantago psyllium* L. To achieve this aim, the following tasks were solved:

1. To substantiate the expediency of the development of boiled sausage enriched with flour from the husk of *Plantago psyllium* L. by methods of marketing and sociological research.

2. To develop recipes and technology of boiled sausages enriched with dietary fibers of *Plantago psyllium* L.

3. To give the merchandising characteristic of the developed boiled sausages, including results of tasting, analysis of food and energy value, functional and technological properties.

4. To investigate the biological value of boiled sausages developed by the method of calculating the amino acid score.

5. To set the normalized safety indicators for developed boiled sausages to determine the expiry date.

6. To evaluate the economic efficiency of the production of boiled sausages enriched with flour from the husk of *Plantago psyllium* L.

2. MATERIALS AND METHODS

The objects of study were the boiled sausages, enriched with different amounts of flour from the husk of *Plantago Psyllium* L., made in the form of biologically active additives (BAA) "Colon pure purified Psyllium Husk" from the "General Nutrition Centers (GNC)", Pittsburgh (certificate of registration EN.77.99.11.003.E. 004543.05.14). In conditions of meat processing enterprise their production used the following equipment: gyroscope VRD-50 with a capacity of 150 kg/h, mincemeat mash machine IPKS-019 with the capacity 300 kg/h, vacuum cutter MPCS-032-80 IN(H), with the capacity of 700 kg/HR, flake ice generator FIM 500 with the capacity of 500 kg/day, syringe-dispenser COMPO MINI 1500 with the capacity of 800 kg/h and thermal chamber UK-3/1A with the capacity of 150 kg/hour.

The methodology for the study of the range of boiled sausages included a continuous collection of information about the products sold in 42 trade enterprises of different locations within Khabarovsk city area, the calculation of the assortment structure according to various criteria and the frequency of occurrence of individual names of boiled sausages, the presentation of the results in a convenient form and their generalization. Methods of research of the range by M.A. Nikolaeva [55] were used.

Sociological research was carried out by the survey method according to S.G. Svetunkov [56], with the help of questionnaire including 16 closed questions. Processing of the results of the study was carried out using GoogleForms and MSExcel. The

representative sample included 232 respondents of different gender, age, education and income level living in Khabarovsk.

Organoleptic indicators were determined in accordance with GOST 9959-2015 on a 5-point scale, including the weight coefficients of the tasting commission of 8 experts. To define the mass fraction of moisture, protein, fat and sodium salt, pH level, safety indicators, standardized methods were used according to GOST 33319-2015, GOST 25011-2017, GOST 23042-2015, GOST R 51480-99, GOST R 51478-99, GOST 26932-86, GOST 26933-86, GOST 5178-90, GOST R 54016-2010, GOST 10444.15-94, GOST 31747-2012, GOST 29185-2014, GOST 31746-2012. The mass fraction of ash was defined by the method described by S.K. Chogovadze [57]. The water-binding power of sausage minced meat was defined by Grau-Hamm method in the modification of the Russian Research Institute of Meat Industry (RRIMI). The measurements were carried out in three-five-fold repetition, the measurement results were mathematically processed using Student coefficients for the reliability value $p=0.95$.

Amino acid composition was defined with the help of the amino acid analyzer Hitachi L-8800 (Japan) by the method of L.A. Osterman [58], as well as by calculation method. The energy value was defined by the calculation method using the coefficients by M.F. Nesterin, I.M. Skurikhin [59]. Economic calculations were made according to V.D. Gribov [60], based on wholesale prices for raw materials as of January 1, 2019.

Research in the framework of the tasks performed in the Department of Commodity Science of "Khabarovsk State

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(Khabarovsk), Department of Food Science and Technology of the "Far Eastern Federal University" and in the "Pacific Scientific and Research Fishery Centre" (Vladivostok).

3. RESULTS AND DISCUSSION

In the course of the research, 54 names of boiled sausages were found in the retail network of Khabarovsk. The predominant sausages of various manufacturers, made in accordance with the national standard, were "Doctorskaya" (23%), "Molochnaya" (20%) and "Chainaya" (10%). It is noted that the majority of commercial enterprises today refused to cut boiled sausages in the presence of the consumer. This matter led to a decrease in the weight of the baloney from 1.0-1.5 kg to 400-600 g as the most acceptable for the consumer (up to 84%). At the same time, 96.2% of boiled sausages sold in the retail network are produced in a synthetic shell, with an important advantage over natural shell that increases the expiry date. It was found that 89.5% of boiled sausages sold in the retail network of the city contain sodium nitrite (potassium), but some recipes of sausages, primarily intended for baby food, do not include nitrite.

As a result of the survey, potential consumers of the product were identified. Despite the fact that 60.7 % of respondents are aware of the role of dietary fibers for the normal functioning of the body, the majority (53.3%) when buying sausages will not pay attention to their presence, as well as the content of flour from the husk of *Plantago Psyllium*. At the same

time, 19.3% of consumers are ready to buy enriched sausages even with a slight increase in prices, 14.1% would buy if this does not affect the cost, the remaining 13.3 % would refrain from such a product. This, in total, gives 86.7% of loyal customers. In addition, more than 70% of respondents opposed the use of sodium nitrite in sausages. The results of marketing researches allow to draw a conclusion about the desirability of boiled sausage, enriched with flour from the husk of *Plantago psyllium L.* - a new product for the reduction of deficit of dietary fibers in the diet of Russians.

"The Technological Instruction on Production of Boiled Sausages", developed by SRU Russian Research Institute of Meat Industry n.a. V. M. Gorbato, was the basis of the production scheme for a new type of sausages. The introduction of a new ingredient – flour from husk of *Plantago psyllium L.*, was implemented at the stage of preparation of the primary minced mixture. It was introduced in the form of BAA "Colon pure purified Psyllium Husk" in an amount of 1-3 kg per 100 kg of unsalted raw materials, by reducing the content of bold pork. Sodium nitrite was not added to the minced mixture (Table 1).

Table 1. Recipe composition of boiled sausages.

Ingredients, kg	Control sample (CS)	Sample, containing flour from husk of <i>Plantago psyllium</i> L., %		
		1 (№1)	2 (№2)	3 (№3)
Unsalted raw materials, kg (/100 kg)				
Prime beef	25	25	25	25
Bold pork	70	69	68	67
Chicken eggs	3	3	3	3
Milk powder	2	2	2	2
Flour from husk of <i>Plantago psyllium</i> L. (BAA)	-	1	2	3
Spices and materials, g (/100 kg of unsalted raw materials)				
Sodium salt	2090	2090	2090	2090
Caster sugar	200	200	200	200
Nutmeg	50	50	50	50
Water	20 000	20 000	20 000	20 000
Casing	Polyamide Ø 60 mm	Polyamide Ø 60 mm	Polyamide Ø 60 mm	Polyamide Ø 60 mm

The developed technology of production of boiled sausage, enriched with flour from the husk of plantain *Plantago psyllium L.* included 6 stages:

1. Preparation of raw meat with a pH below 6.3 (cutting, deboning, veining).

2. Chopping of beef and pork separately on tops with a 2 – 6 mm hole diameter and salt pickling of dry table salt with 3 – 4 min agitating in stirrers of various designs. For maturing minced meat was kept for 12 – 24 hours at a temperature of not more than 10 °C in the thickness.

3. Formation of thin-emulsified sausage mince by cutter in the proportions of the components provided by the recipe for 100 kg of unsalted raw materials. Pre-prepared gel-like aqueous solution of flour from the husk of *Plantago psyllium L.* "Colon pure purified Psyllium Husk" in hydro module 1 (2, 3) kg of flour on 5,00 (10,00, 10,00) kg of water, to prevent the formation of powdery agglomerates in the finished sausages. The process itself

presents the swelling flour made from husk of *Plantago psyllium L.* to the state of gel in cool drinking water, which took 3 to 5 minutes in continuous stirrers.

Minced meat was carried out in 2 stages. Primarily processed low-fat raw materials: beef, obtained gel-like aqueous solution of flour from husk of *Plantago psyllium L.*, eggs and 5 kg of ice (at a concentration of flour from husk of *Plantago psyllium L.* 1% was added 5 kg of water in the recipe), lasting 5 – 7 minutes, with the 3 – 5 °C temperature of the minced meat mixture. Then bold pork, milk powder, sugar, spices, the remaining 5 kg of ice were added and all this composition was chopped for another 5 – 7 minutes with the temperature of the finished minced meat not higher than 14°C.

4. Shaping of sausages with syringes with the use of vacuum to durable polyamide casings with 60 mm caliber. These casings do not require soaking, followed by precipitation of the

baloneys and increasing the expiry date. The weight of the baloney is 500 ± 5 g.

5. Bringing sausages to the state of readiness by step cooking in thermal chambers, based on the temperature difference between the chamber and the sausages at the beginning of the

process ($15 - 20$ °C), followed by its reduction to reach $70 - 72$ °C in the center of the baloneys of products.

6. Cooling by showering for $10 - 15$ minutes and further cooling in the refrigerating chamber at $0 - 8$ °C (Fig. 1).

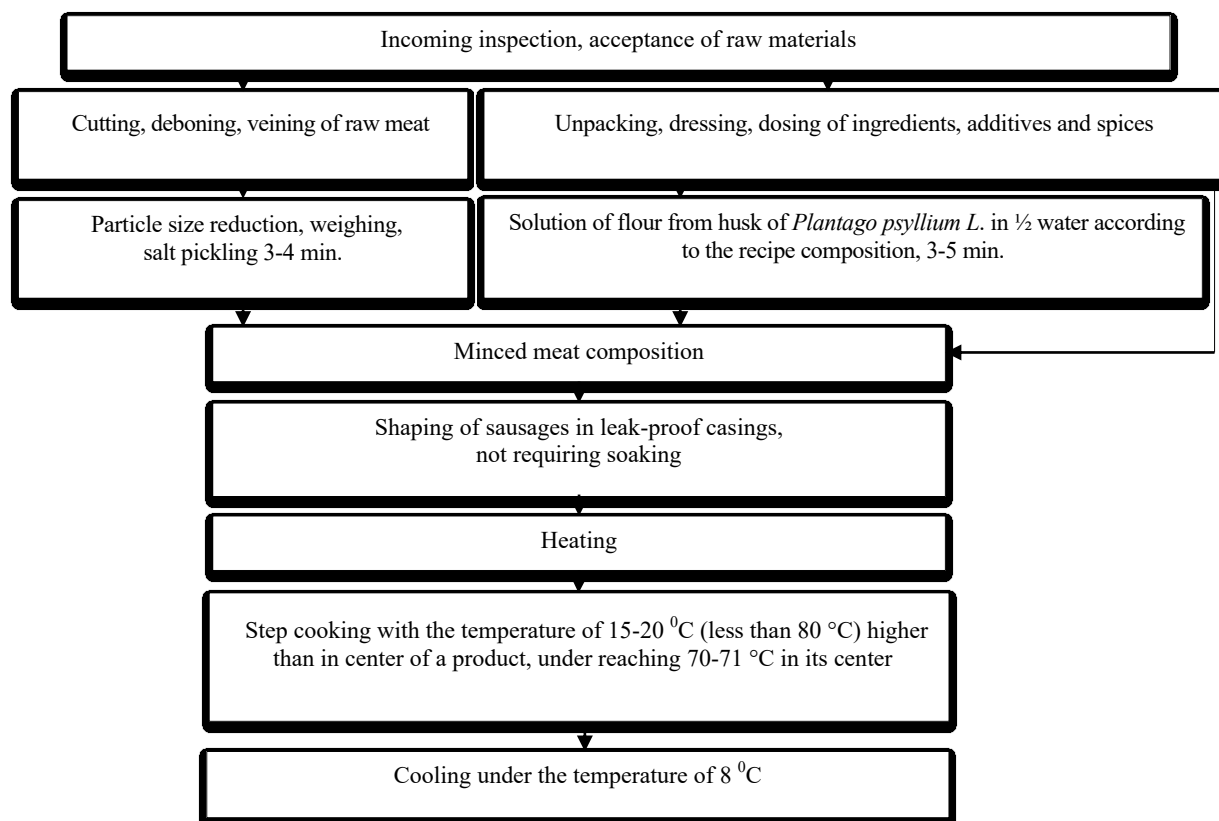


Figure 1. Technological scheme of boiled sausages enriched with flour from husk of *Plantago psyllium* L.

Ready-to-eat sausages were subjected to examination by organoleptic and physico-chemical parameters. This allowed identifying the most balanced recipe with optimal consumer properties.

A good quality of all boiled sausages was noted during the tasting. The sample with the 2% BAA contents, characterized by a complete absence of defects, texture, appearance, surface, and baloney slices, moderate intensity of taste and smell and high richness was acclaimed as the best one (Fig. 2).

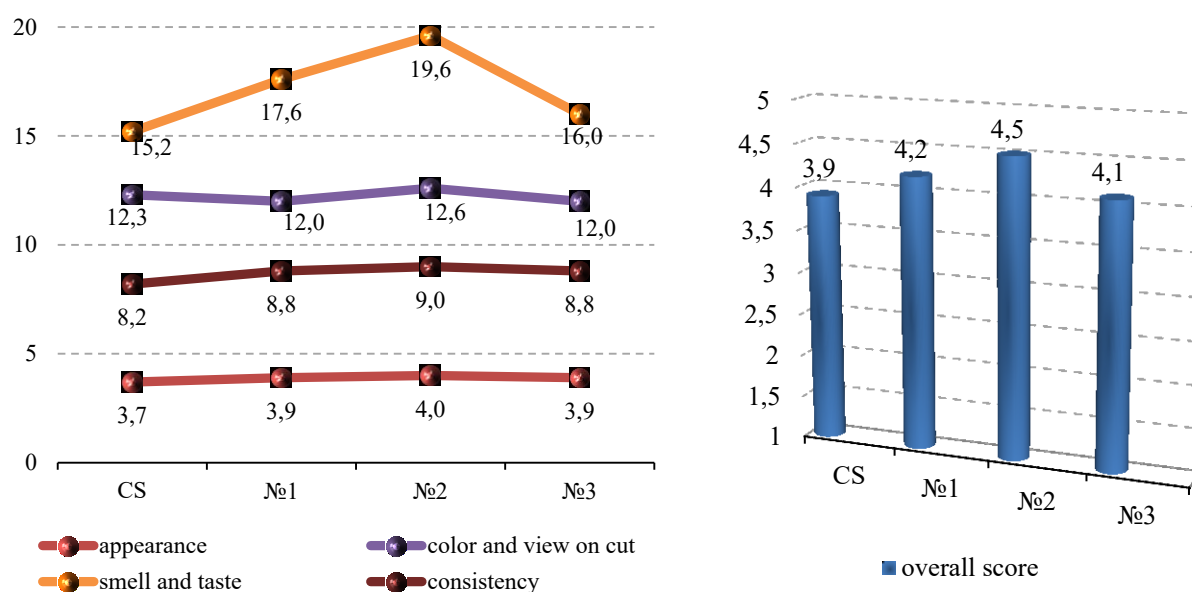


Figure 2. Score of boiled sausages.

More significant deviations from the ideal characteristics were observed in the control sample, where there were minor defects in both appearance and consistency. The color of all

samples was light gray, which is typical for boiled sausages made by non-nitrite technology.

The results of defining the pH and water-holding capacity (WHC) of boiled sausages are shown in Fig. 3.

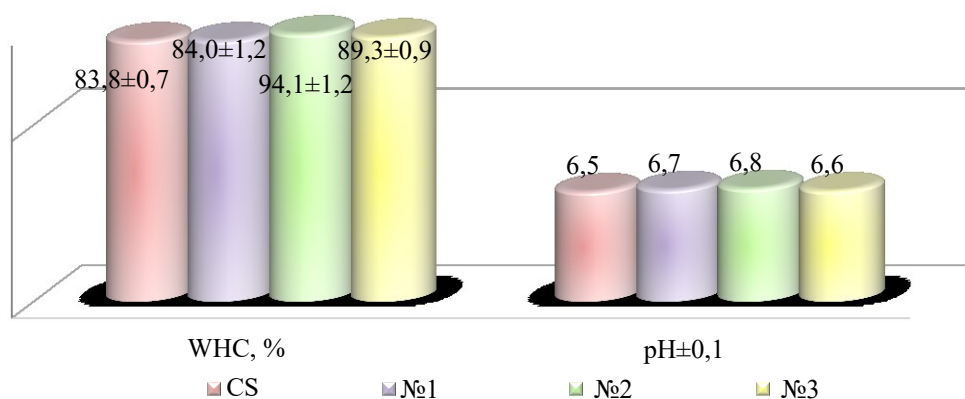


Figure 3. Functional and technological properties of boiled sausages.

For the model samples, a positive correlation between the WHC and the amount of BAA is defined. It is mainly caused by an increase in the gel-forming ability of the minced meat composition, as well as, probably, by a shift in the pH of the prescription mixture to the neutral side from the isoelectric point of the meat protein.

With the help of mathematical modeling it was found that the maximum moisture binding is achieved when the content of dietary fiber of *Plantago psyllium L.* in the recipe composition is 2.35%. This dependence (the coefficient of approximation for $R^2=0,997$ within the value of x from 0 to 3%) was precisely described by the equation of the third degree:

$$y = -5,03x^3 + 20,06x^2 - 14,81x + 83,8 \quad (1)$$

With further increase in the content of *Plantago psyllium L.*, the reverse process of reducing the WHC began. It is apparently associated with excessive accumulation of dietary fibers.

Enrichment of sausages with flour from husks of *Plantago psyllium L.* contributed to a slight (within error) decrease in energy value by reducing the proportion of fats, against the background of increasing ash and total carbohydrates (Table 2).

Table 2. Physico-chemical parameters of boiled sausages enriched with flour from husk of *Plantago psyllium L.*

Samples of minced meat-containing semi-finished products	water (±1,62)	protein (±0,50)	fats (±0,10)	Content, % mineral substance (±0,01)		carbohydrates (±0,71)
				total	Including salt	
Control	65,8	14,4	16,5	2,5	1,63	0,8
Sample containing 1% of the flour from husk of <i>Plantago psyllium L.</i>	65,3	14,3	16,3	2,5	1,64	1,6
Sample containing 2% of the flour from husk of <i>Plantago psyllium L.</i>	64,9	14,2	16,1	2,6	1,64	2,2
Sample containing 3% of the flour from husk of <i>Plantago psyllium L.</i>	64,4	14,0	15,9	2,7	1,62	3,0

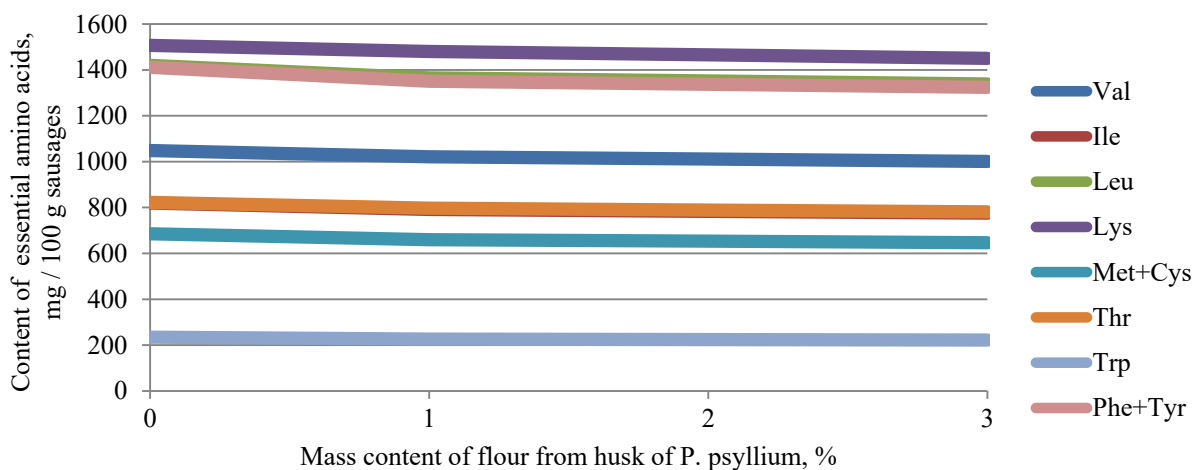


Figure 4. Dependence of amino acid composition of boiled sausages on the content of flour from husk of *Plantago psyllium L.*, mg of amino acids / 100 g of product.

The introduction of flour from husk of *Plantago psyllium* L. at the same time influenced mainly on the carbohydrate content. Other differences in the chemical composition of the samples, depending on the content of BAA, did not exceed the statistical error.

At the next stage, the amino acid composition and amino acid score of the objects of study were identified (Fig. 4, Tables 3, 4).

During the study of the amino acid composition, the values of the amino acid score (which do not fall below 100%) were obtained. This aspect suggests a high biological value of the

developed product. At the same time, it was noted that the biological value of boiled sausages with the addition of flour from husk of *Plantago psyllium* L., in the ranges determined by the experiment, did not decrease.

Thus, it was found that the introduction into the sausage recipe of boiled flour from husk of plantain *Plantago psyllium* L. on the one hand, contributed to the enrichment of the product with biologically active components – dietary fibers, and on the other, significantly improved the functional and technological and, consequently, organoleptic characteristics.

Table 3. The content of essential amino acids in boiled sausages, enriched with flour from husk of plantain *Plantago psyllium* L., g /100 g of protein.

Essential amino acids	Mass content of flour from husk of <i>Plantago psyllium</i> L., %			
	0 (control)	1	2	3
Valine	6,0	5,8	5,8	5,8
Isoleucine	4,7	4,5	4,5	4,5
Leucine	8,1	7,8	7,8	7,8
Lysin	8,6	8,5	8,4	8,5
Methionine + Cysteine	3,9	3,8	3,8	3,8
Threonine	4,7	4,6	4,5	4,6
Tryptophan	1,3	1,3	1,3	1,3
Phenylalanine + Tyrosine	8,0	7,7	7,7	7,7
Total	45,1	44,0	43,8	44,0

Table 4. Amino acid score of boiled sausages enriched with dietary fibers of *Plantago psyllium* L., %.

Essential amino acids	Mass content of flour from husk of <i>Plantago psyllium</i> L., %			
	0 (control)	1	2	3
Valine	119,0	116,8	116,4	116,9
Isoleucine	116,3	113,1	112,7	113,2
Leucine	115,2	111,5	111,2	111,7
Lysin	155,6	153,9	153,4	154,0
Methionine + Cysteine	111,1	107,7	107,4	107,9
Threonine	116,7	113,9	113,6	114,0
Tryptophan	133,3	129,4	129,0	129,5
Phenylalanine + Tyrosine	133,5	128,7	128,3	128,9
Score (limiting amino acid)	111,1 (-)	107,7 (-)	107,4 (-)	107,9 (-)

Table 5. Justification of expiry date of the developed products.

Indicators	Norm (normative document)	Indicators' value in control points		
		1 (background)	2 (7 days and nights)	3 (11 days and nights)
Organoleptical, score	Not less than 4,0 (MGC 4.2.1847-04)	4,5	4,5	4,4
Microbiological, including: – QMAFAM, CFU*/g	Not more than $1,0 \times 10^3$ (TR CU 034/2013)	$9,2 \times 10^1$	$1,6 \times 10^2$	$3,1 \times 10^2$
– coliform bacteria	Not allowed in 1 g (TR CU 034/2013)	Not found	Not found	Not found
– sulfite-reducing clostridia	Not allowed in 0,1 g (TR CU 034/2013)	Not found	Not found	Not found
– S. aureus	Not allowed in 1 g (TR CU 034/2013)	Not found	Not found	Not found
Chemical, including: – lead, mg/kg	Not more than 0,5 (TR CU 021/2011)	Not found	Not found	Not found
– arsenic, mg/kg	Not more than 0,1 (TR CU 021/2011)	Not found	Not found	Not found
– cadmium, mg/kg	Not more than 0,05 (TR CU 021/2011)	0,01	0,01	0,01
– mercury	Not more than 0,03 (TR CU 021/2011)	Not found	Not found	Not found
Radionuclides, including: gram-cesium-137specific activity, Bq/kg	Not more than 200 (TR CU 021/2011)	70	72	72

*QMAFAM - quantity of mesophilic aerobic and facultative anaerobic microorganisms

CFU - colony-forming unit

This matter allowed to recommend this ingredient not only for the enrichment of minced meat compositions, but also as a water-retaining agent that improves the consumer properties of products. The optimal content of flour from husk of plantain *Plantago psyllium L.* was 2.35 % of the ingredient composition. At the next stage, the expiry date of this product was defined.

The expiry date of boiled sausage, enriched with flour from husk of *Plantago psyllium L.*, was defined in accordance with SanPiN (Sanitary Regulations and Standards) 2.3.2.1324-03. For boiled sausages without the addition of preservatives in a vapor-gas-tight shell this date is not more 7 days at a reserve ratio of 1.5 (MYK 4.2.1847-04). There were three control points for the objects of study: background, 7 and 11 days, where organoleptic indicators, microbiological, chemical and radiation safety indicators were defined (Table 5).

The results indicate compliance of the developed innovative food products with the requirements of technical

regulations TR CU 021/2011 and TR CU 034/2013 and allow us to confirm the stated expiry date of 7 days for boiled sausage (in a polymer shell), made according to the non-nitrite technology.

The developed product that contains 2.35% of the flour from husk of *Plantago psyllium L.* is prepared for serial production under the trademark "Emilien". For this type of innovative food products, regulatory documentation was developed (SRT 02067994-004-2017 "Boiled Sausages, Enriched with Dietary Fibers of Plantain") and three patents of the Russian Federation were obtained [61-63].

The production of sausages enriched with flour from husk of plantain *Plantago psyllium L.* entails an increase in only the monetary equivalent of raw materials, without requiring investments in fixed assets and equipment. The profitability of meat-processing enterprises that have implemented the technology will increase by 4000 RUB per ton of output.

4. CONCLUSION

Thus, the study showed the integrity and efficiency of the development and high consumer properties of boiled sausages enriched with flour from husk of plantain *Plantago psyllium L.* Their use may be in demand in the development of enriched meat and meat-containing foods not only as a functional food ingredient – dietary fiber, but also as a water-retaining agent that improves consumer properties of the product. Through simulation, the optimum BAA dosage of "Colon pure purified Psyllium Husk", amounting 2.35%. The features of the chemical and amino acid composition, energy value, functional and technological properties of the developed food products are defined. It is also shown that the addition of flour from husk of *Plantago psyllium L.* leads to a slight decrease in protein and fat content. In addition to an increase in the mass fraction of carbohydrates, but does not lead to

a decrease in biological value within the examined limits. The additive positive effect of dietary fibers of *Plantago psyllium L.* husks on the functional and technological properties and organoleptic characteristics of boiled sausages is shown. The expiry date for the developed food products did not decrease (in comparison to the control samples) and amounted to 7 days at a temperature of +2...+6 °C. Compliance with the regulatory safety indicators of the developed products to the requirements of TP TC 034/2013 and TP TC 021/2011 is shown. The developed products are approved by regulatory documentation CTO 02067994-004-2017 "Boiled Sausages, Enriched with Dietary Fibers of Psyllium". Economic efficiency of production of boiled sausages, enriched with flour from the husk of *Plantago psyllium L.* reaches 4000 RUB per ton of product.

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