

SAUSAGES FOR CHILDREN'S NUTRITION: INFLUENCE OF LOW CONTENT OF FATS ON ORGANOLEPTIC CHARACTERISTICS

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Abstract: This article represents an experimental and bibliographic scientific study of meat products for children nutrition with a low content of fat. With physical and chemical methods have been analyzed fat content in the raw material, finished products and with sensory methods were studied the influence of low content on the organoleptic characteristics of sausages for children's nutrition.

Key words: sausages for children, low content of fat, analyzes, 15 %.

Introduction

According to the existing technical normative documents (TND) in the Republic of Moldova [1], the European Union [3, 4], the Russian Federation and other states, it is required to reduce the lipid content in products intended for children's nutrition. These requirements have arisen as a result of the significant increase in the number of children suffering from obesity, which has become a global problem. Thereby, the fat content of meat products for children's nutrition should not exceed 15%, according to the EU's TND. Knowing the importance of fat in the nutrition, such as: the concentrated energy source (when burning 1g of lipids in the body releases 9.0 kcal), which is twice as high as the energy released by the burning of proteins, influences the assimilation of mineral salts (Ca, Mg), influences the function of the endocrine system - it inhibits the function of the pancreas, the thyroid, diminishes the motility of the stomach and intestines (long-lasting feeling of the satiety) etc. From a technological point of view, lipids have a very important function such as ensuring a more pleasant taste of foods, especially in meat products.

Decreasing fat content in children meat products has questioned the quality of these products and their organoleptic characteristics. In order to answer these questions, several methods of analysis were used: physico-chemical (Mohr method, drying in the oven until the constant mass, the Soxhlet method of determining the total fat content in the product), and sensory methods (organoleptic characteristics analysis of the products).

Methods of analysis

In the analyzed samples realized for research and in raw material was analyzed several indicators, such as:

- Content of NaCl by Mohr method; [6]
- Content of humidity in products by the method of drying in the oven until the constant mass [5];
- Determination of total fat content by Soxhlet method [5];
- Analysis of organoleptic indices using the 5-point scale.

Results and discussions

Several samples of sausages for children nutrition were performed in the laboratory. The basic criterion for obtaining a conformable product was the reduction of fat content up to a value of less than 15 %.

In order to obtain reliable results and to make a preliminary theoretical calculation, driven by mathematical calculus formulas, the raw material was analyzed from both organoleptic and physico-chemical point of view. Thus the raw material used was of high quality, satisfying the GD 696 of 04.08.2010 "Meat - raw material. Production, Import and Marketing "[2].

The type of raw material and auxiliary materials used for elaboration of sausages for children nutrition recipe are presented in tabel 1.

Table 1. Meat sausages for children nutrition

| Products name | Recipe |
|--|---|
| Antianemic sausages [7, 9] | Edible blood (27%), bovine meat (40%), fatty or semi-fatty porcine meat (25%), whey protein concentrate, melange, onion, salt, sodium nitrite, aromatic pepper, nutmeg, ascorbic acid and others. |
| Poultry meat sausages [8, 9] | Chicken meat (65%), fatty porcine meat (20%), dairy butter, melange, wheat flour, Milk, sugar, salt, sodium nitrite, ascorbic acid, nutmeg, white and black pepper. |

Table 2. Physico-chemical indicators of sausages for children nutrition

| Physico-chemical indicators | Indicator value | | | | | |
|-------------------------------------|---------------------|-------|-------|-----------------------|-------|-------|
| | Antianemic sausages | | | Poultry meat sausages | | |
| | V-I | V-II | V-III | V-I | V-II | V-III |
| pH | 6,04 | 6,03 | 5,97 | 6,53 | 6,62 | 6,30 |
| Mass fraction of humidity, % | 76,28 | 77,21 | 69,02 | 59,06 | 73,31 | 66,97 |
| Mass fraction of fat, % | 12,85 | 2,68 | 9,28 | 21,16 | 7,05 | 15,0 |
| Mass fraction of NaCl, % | 1,4 | 1,4 | 1,4 | 1,45 | 1,45 | 1,45 |
| a_w | 0,945 | 0,944 | 0,946 | 0,938 | 0,943 | 0,944 |

According to the data from Table 2, we notice a deviation of fat content in finished products. In the V-I of antianemic sausages was used fatty pork meat (according to the hematogenic sausages), obtaining a result of 12,85 %, a good one, but the high content of blood in this sample, made the consistency and exterior appearance, not an attractive one. Thereby in V-II of antianemic sausages occurred the change of fatty meat with semi-fatty porc meat, a quantity of blood was replaced with high quality beef meat, also other essential modifications. The final result of total fat content is 2,68 %, a small amount that has influenced considerable organoleptic indices in fish product, hat served like a reason for repeating the test.

In V-III of the antianemic sausages, semi-fatty porcine meat was replaced with fatty meat, but with respect of the amount of raw material and balanced auxiliary materials for obtaining the antianemic V-II sausages recipe. Thus, the result obtained is 9.28%, an optimal result for the given product type, which imprints the necessary organoleptic characteristics. Due to the fact that antianemic sausages are a functional product that

provides 75% of the daily iron requirement, the increase in lipid levels by up to 15% would remove the product from the functional list.

The classic recipe - the V-I of the poultry sausages, consists of poultry, porc fat and spices. This combination of raw material gave a result of 21.16% fat, which does not correspond to national and international technical normative documents. To reduce lipid content, the porc fat was replaced with dairy butter and the amount of poultry used was increased - chicken breast.

Thereby, version II of poultry meat sausages gave a result in a total fat content of 7.05%, which for this product type is not enough.

In the V-III of poultry meat sausages, the fatty meat, butter and poultry meat were added to the recipe. Because of the combination and the consistent ratio of raw material, we obtained a 15.0% fat content - the result that meets the EU requirements.

The analyzed samples were performed under laboratory conditions, respecting the parameters and working conditions, obtaining harmless products.

In the organoleptic analysis, the 5-point scale was used, looking at the commercial appearance, the color and appearance in the section, the aroma and the smell, the taste, the consistency and the succulence. The data of the sensory analysis are presented in Table 3.

1) Antianemic sausages

V-I: The cold state is unattractive, brownish-brown, sweet taste, slightly spiced, unsalted, mild consistency, grainy, without pronounced juice eliminations, aroma and odor characteristic of the type of product (blood sausages).

V-II: small sticks with clean, dry surface, without stains and membrane rupture, without adhesion, broth and grease. The composition of red to dark brown colour, finely chopped. The taste and smell characteristic of the type of product that is not spicy, less salted, without taste and foreign smell.

V-III: small sticks with clean, dry surface, without stains and membrane ruptures, without adhesion, broth and grease leakage. Composition of dark red to dark brown colour, finely chopped. The taste and smell characteristic of the given product type, slightly spicy and salted, without taste and foreign smell.

2) Poultry meat sausages

V-I: With the low marks was appreciated the flavor and smell, consistency which was determined to be less fine. Due to the fact that in recipe is included poultry meat that has a low level of myoglobin and pork fat, the color of finished products was gray, less appealing. The product taste was one of pronounced meat, thereby diminishing the flavor of seasonings.

V-II: The product obtained low marks on consistency and taste. The consistency was determined to be a little succulence. The taste is much more harmonious, comparing with V-I of poultry meat products, which is due of adding milk and dairy butter in the recipe, these components harmonized the taste of products, in the same time emphasizing the seasoning flavor.

V-III: The sample was manifested by well-defined organoleptic characteristics, satisfying all the characteristics. They are small sticks with clean, dry surface, without stains and membrane rupture, without adhesion, broth and grease leakage.

Thus, from all the prepared samples, the third variant of the poultry meat sausage obtained the best result, having a lipid content of 15.0%. What has to be demonstrated, the amount of fat in the product influences the sensory characteristics of the product, improving them.

Table3. Tasting list of quality appreciation of sausages for children nutrition

| Organoleptic appreciation of products with the 5-point scale | | | | | | | |
|---|------------------------------|-------------------------------------|----------------------------|--------------|--------------------|-------------------|---------------------|
| Nr. sample | Commercial appearance | Color and appearance section | Aroma and the smell | Taste | Consistency | Succulence | General mark |
| 1) Antianemic sausages | | | | | | | |
| V-I | 4,25 | 3,88 | 4,46 | 4,28 | 4 | 3,91 | 4,13 |
| V-II | 4,83 | 4,83 | 4,83 | 4,83 | 4,83 | 4,75 | 4,82 |
| V-III | 5,00 | 5,00 | 5,00 | 5,00 | 4,86 | 4,70 | 4,93 |
| 2) Poultry meat sausages | | | | | | | |
| V-I | 5,00 | 4,00 | 4,23 | 4,50 | 3,90 | 4,33 | 4,33 |
| V-II | 5,00 | 4,95 | 5,00 | 5,00 | 5,00 | 5,00 | 4,99 |
| V-III | 5,00 | 5,00 | 5,00 | 5,00 | 5,00 | 5,00 | 5,00 |

Conclusions

Scientific research has shown that fat content influence taste and consistency, so products with a low lipid content are giving up in front of organoleptic properties.

Optimal lipid content in meat products for children should not exceed 15%.

In antianemic sausages case, the optimal lipid content, obtained according to experimental research is 9-10%, because this meat product for children nutrition is a functional one, and must provide 75% of the daily iron requirement.

The value of fat content in poultry meat sausages for children nutrition is 15%, which meets EU regulations.

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