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АНАЛІЗ НАЙБІЛЬШ ТРАВМОНЕБЕЗПЕЧНИХ ВИДІВ ПОДІЙ,

MODELING OF RECIPES OF MULTIPLE COMPONENT CANNED FOODS WITH HYDROBIONTS

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Introductions. A characteristic feature of the last decade is the dramatic change in food priorities. The lack of animal protein supply caused global interest in the use of ocean bioresources. The share of hydrobiont proteins is 24… 25% of all animal-derived proteins consumed by mankind. In addition, hydrobionts play a significant role in providing the people with essential biologically active substances that have a unique chemical nature.

The production of sterilized canned fish is one of the main areas of food use of fish and seafood raw materials due to the versatility and high profitability of finished products, prolonged shelf life, as well as the possibility of improving the taste qualities of raw materials by modeling the recipe composition of the finished product.

It is necessary to revise the concept of processing of objects of water fishing, the essence of which should be to search for new methodological approaches of modeling and designing of recipes and corresponding rational technologies, ensuring more complete use of valuable components of raw materials, high quality of finished products with the given properties, ecological purity and economic efficiency production.

Aim. Increasing organoleptic properties and the nutritional value of canned fish in terms of nutritional adequacy, taking into account the physiological needs of population nutrition, by modeling the recipe composition of multi-component canned fish products.

Materials and methods. Selection of fish and vegetable raw materials for the production of multi-component canned foods was carried out on the basis of the basic principles of the science of rational nutrition, based on the satisfaction of human needs in basic nutritional components, precise knowledge of the chemical composition of the original components, their organoleptic characteristics and their combination.

In the present work, fish such as hake (***Merluccius merluccius***), sander (***Sander lucioperca***), and pollock (***Theragra chalcogramma***), currently available from an economic and resource point of view, were used as fish raw material to model the composition of the multi-component canned foods. Vegetables with a low content of crude fibers, namely potatoes, cabbage, zucchini, onions, and carrots, were selected as a vegetable component in canned fish.

General methods for assessing the amino acid composition included the method of comparing the balance of amino acid scales of the test and reference proteins. Used indicators included: utilization factor of an essential amino acid, coefficient of rationality of amino acid composition, coefficient of balance of amino acids, coefficient of imbalance and excess, comparative redundancy rate and index of essential amino acids.

Amino acid composition is one of the most important indicators of food. Insufficiency of protein in the human body can lead to various disorders. The effectiveness of protein in the body is determined by the ratio of essential amino acids to the standard.

As a result of protein deficiency in the body, its normal operation is disturbed - there is a loss of memory and a decrease in mental capacity, a decrease in the body's resistance. At the same time, excess protein in the food leads to organ overload, in the first place it refers to the functioning of the liver and kidneys. The value of protein for the human body is defined by two basic parameters: its balance in the content of essential amino acids and the ratio to the standard protein, in addition, the efficiency of metabolism and utilization of protein by the human body.

Results and discussion. When choosing a nomenclature of recipe components, it was assumed that the modeling of all essential amino acids in a physiologically justified amount, taking into account a certain age group, is a prerequisite for modeling.

The composition and properties of foodstuffs for the population must meet physiological and chemical parameters, meet the norms of physiological needs of the human body for nutrients, meet the requirements for safety and high quality:

1. The developed recommendations are specific to multi-component canned foods for wellness, balanced nutrition of a wide range of consumers.

2. Canned foods include fish raw materials (40… 50%), chopped vegetables (up to 45%), tomato sauce (up to 6%).

3. Canned food is a dish that does not require additional heat treatment, with increased nutritional value due to the balance of nutritional value of the components.

4. It is recommended to use frozen and chilled fish, as well as frozen fish fillets such as walleye, hake, pollock, for the manufacture of this type of canned foods. The use of vegetables gives the finished product the ability to enrich the product with natural vitamins and minerals in the optimal ratio. The expediency of the introduction of vegetable raw materials is due to the fact that they stimulate the peristaltic and processes of food digestion in the gastrointestinal tract, increase appetite, and improve the absorption of nutrients. To enhance the taste, a decision was made to add tomato sauce and spices to canned food.

5. The product must be balanced in terms of the amino acid composition of the protein according to the physiological needs of the adult. This parameter was carried out on the basis of conventional indicators.

Mass fraction of recipe components were chosen so that when included in the diet, they provide support for the conditionally optimal material and energy balance of the body.

The design of multi-component canned recipes consisted of providing a balanced chemical composition in terms of protein, fat and solids content that meet the requirements of formalized nutrient-technological recommendations.

The main feature of the developed multi-component canned food is the unique chemical composition of fish raw materials, the balance in amino acid and biological value, and the increased organoleptic value.

Recipes of the multicomponent canned products of the following assortment are designed: "Fish and vegetable stew", "Fish fillet with potatoes", "Fish fillet with broccoli", "Fish fillet with zucchini".

In accordance with the chemical composition and energy value, the mass portions of the components were calculated. The data are shown in Table 1.

Table 1

The mass portions of the components per 1 can (m=350 g), g

Name	Fish	Tomato sauce	Vegetable components
«Vegetable and hake stew»	140,0	21,0	189,0
«Vegetable and pollock stew»	140,0	21,0	206,0
«Vegetable and sander stew»	140,0	21,0	205,0
«Hake fillet with potatoes»	124,5	21,0	205,0
«Pollock fillet with potatoes»	124,5	21,0	205,0
«Sander fillet with potatoes»	124,5	21,0	205,0
«Hake fillet with broccoli»	140,0	21,0	157,5
«Pollock fillet with broccoli»	140,0	21,0	157,5
«Sander fillet with broccoli»	140,0	21,0	157,5
«Hake fillet with zucchini»	157,5	21,0	178,5
«Pollock fillet with zucchini»	157,5	21,0	178,5
«Sander fillet with zucchini»	157,5	21,0	178,5

Organoleptic quality assessment, aimed at determining the most attractive in terms of taste of the product, was carried out for canned foods.

According to the results of the organoleptic evaluation, we can conclude that this range of developed canned fish foods meets the generally accepted standards, has

a high organoleptic properties. Thus it shows that developed technologies and recipes are effective and able to ensure a harmonious taste and prolonged shelf life.

The chemical composition of developed multi-component canned foods shown in table 2.

Table 2

Chemical composition of developed multi-component canned foods

Name	Chemical composition		
	Lipids, %	Protein, %	Ash, %
«Vegetable and hake stew»	1,9	9,8	2,18
«Vegetable and pollock stew»	1,6	9,5	2,29
«Vegetable and sander stew»	1,7	10,2	2,37
«Hake fillet with zucchini»	1,8	9,6	2,02
«Pollock fillet with zucchini»	1,7	9,4	2,19
«Sander fillet with zucchini»	1,5	10,0	2,35
«Hake fillet with broccoli»	1,7	9,9	2,57
«Pollock fillet with broccoli»	1,6	9,7	2,79
«Sander fillet with broccoli»	1,5	10,5	2,66
«Hake fillet with potatoes»	2,1	9,7	2,13
«Pollock fillet with potatoes»	1,8	9,6	2,28
«Sander fillet with potatoes»	1,9	10,1	2,41

The obtained data show protein content in the range 9.5… 10.5%, lipids - 1.5… 2.1%, mineral substances - 2.02… 2.79%. The data obtained goes well with the recipe modeling data and meets the recommendations given.

Physical and chemical quality indicators of finished products meet the requirements of state standards of the Ukraine. According to microbiological indicators of safety products meet the requirements of industrial sterility.

Conclusions. The technology of production of multi-component canned foods containing hydrobionts and vegetables with enriched nutritional composition, is developed taking into account the recommendations on chemical, biological and food indicators, current standards and technological instructions. The recipe composition of canned food has been developed to produce a product with increased nutritional value. Nutritional and technological recommendations for the use of the product based on the daily needs of the adults for nutrients are scientifically substantiated and developed. The chemical composition and feasibility of introducing this range of canned food for adult men and women has been calculated.