

MEAT PRODUCTS FOR PREVENTIVE AND CURATIVE NUTRITION

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Background

Meat and meat products are first class protein sources, i.e. they contain all the essential amino acids in large quantities and in favorable correlation for human organism. Beef also contains high quantities of iron, which is well assimilated by the organism; pork contains a large amount of vitamins of group B, participating in the regulation of carbohydrate metabolism, normalizing the work of cardiovascular, central and peripheral nervous system. However, traditional meat products don't have in their composition the necessary amounts of nutritive substances that could satisfy organism requirements in energy and plastic materials, and correlations between these nutritive substances in most cases don't ensure their maximum assimilation and normal metabolism processes in the organism. To achieve this purpose it is necessary to develop combined meat-based products with added different vegetable raw materials, enriched with proteins, vitamins, polyunsaturated fatty acids, and ballast and mineral substances.

Objective

The objective of the investigation was the development of various meat-based compositions with added different vegetable raw materials for preventive and curative purposes, meeting medical and biological requirements of foods for adult people.

Methods

The methodology of designing of foods with required complex of indices of food value were used in this work, as well as physical and chemical methods of determination of the composition and functional properties of the composition.

Results and discussion

As the main ingredients of the compositions were used: meat (beef and pork) for cutlets; protein-fat emulsions, obtained on the basis of modified wheat flour (MWF) at hydrated state and vegetable oils: sunflower and corn. Use of vegetable oils in the composition of protein-fat emulsions (PFE) was connected with their high content of polyunsaturated fatty acids (vitamin F), tocopherols (vitamin E) and sitosterols. High total content of polyunsaturated fatty acids in the used vegetable oils will be a factor for use of the meat product having this composition for the nutrition for prophylaxis of atherosclerosis, thrombosis, coronary diseases and sclerosis. Besides, tocopherols of vegetable oils belong to the means of biological protection of the organism from destructive effects of radiation and possess high antioxidant and antimutagenic activity.

Use of PFE in the compositions will bring to formation of stable easily assimilable complexes and increase of assimilation of products.

The MWF was used as the main vegetable component as it had preferable functional-technological properties as compared to the usual wheat flour (WF), and as a result of combining MFW with meat components the composition is enriched with vitamins of group E (that are absent in meat), a number of macro- and microelements, food fibers, that improves the work of gastro-intestinal tract and has a prophylactic effect on organism. As an additional source of necessary vitamins, mineral substances and carbohydrates, dried beet and carrots were used in these compositions.

The protein-fat emulsions with vegetable oils were white, unclear with weakly expressed sweetish smell, characteristic of MWF. The mass fraction of dry matter in PFE was 31%.

To determine the values of PFE that can be added to the compositions that would meet medical and biological requirements, a method of mathematical designing of foods with the required complex of food value indices was used.

The criteria of optimization were: correlation between proteins, fats and carbohydrates (P:F:C) in the product; correlations between saturated, mono- and polyunsaturated fatty acids (S:M:P); correlation between calcium, magnesium and phosphorus.

Using this methodology of designing, several versions of the compositions were developed in which the correlation of raw materials ingredients is presented in Table 1.

Table 1. Correlation of raw materials ingredients in the compositions.

Versions of recipe	Beef, %	Pork, %	PFE, %		MWF, %	Beet, carrot, %	Energy value, Kcal
			sunflower oil	with corn oil			
V1	45	4	38	-	-	13	140.0
V2	46	3	-	41	-	10	175.5
V3	54	3	43	-	-	-	162.7
V4	56	4	-	40	-	-	178.8
V5	22	10	29	-	30	9	242.4
V6	34	6	-	36	14	10	209.2

The relations between the most important ingredients in the compositions being designed as compared to medical and biological requirements are presented in Table 2.

Table 2. Correlation between ingredients of the compositions being designed.

Versions of recipe	P:F:C (according to caloric content	S:M:N	Ca:P	Ca:Mg
Reference	1:2:3	1:1:1	1:0.5-1.8	1:0.6-0.8
V1	1:2:1	1:1.2:1	1:4.5	1:0.8
V2	1:2:0.9	1:1.2:1	1:5.6	1:0.9
V3	1:2:0.5	1:1.2:1	1:16.5	1:2.1
V4	1:2:0.5	1:1.2:0.8	1:16.9	1:2.2
V5	1:2:2.8	1:1.3:1	1:4.6	1:0.8
V6	1:2:1.8	1:1.2:1	1:5.0	1:0.8

The designed versions of the compositions meet current medical and biological requirements on the correlation of protein and fat, possess high food value according to quality composition of fatty acids, composition and correlation of amino acids; they are balanced over calcium and magnesium.

Conclusions

The presented versions of the compositions can be used for the production of meat products of curative and preventive purposes, because the use of meat raw materials with the above mentioned components of vegetable origin helps to form stable, easily assimilated complexes, binding and removal cholesterol from the organism, prolonging the processes of digestion, increasing assimilation of the product, improves vitamin, mineral, protein and fatty acid composition of the product.

References

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