

## NEW BIOLOGICALLY ACTIVE ADDITIVES FOR THE PRODUCTION OF ECOLOGICALLY SAFE FOOD COMPOSITIONS AND MEATS

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## Introduction.

The international experience shows, that for the powerful control of diseases and stresses in addition to the various directions in medicine and pharmacology, the correction of people nutrition is required. Many foods abound in preservatives, synthetic additives, colours, flavours having thus supply genetically foreign compounds into a body. In addition to, the food is not valueable in nutrient composition and contains stereoisomers and racemates not using in metabolism, moreover, they interlock some metabolic processes and form offending systems. These compounds also are the reasons of anaemia, allergy, and toxicosis. Assessing the role and character of nutrition in the growth and evolution of a body, formation of protective mechanisms, quality and time of the life, it is now advantageons to use BBA of natural raw material [2]. It is necessary to note, that some kinds of BBA can be introduced in diet as an own foods. So, the russian consumer will habituaded to the new kinds of food gradually.

## Aims

The aim of this work is to design the curative and prophylactic foods of vegetable and animal raw material containing natural biologically active compounds using advanced biological methods as well as with enzymes and microorganisms.

In spite of a wide range of vegetable sources of protein, the most important among them is soya. The modern technologies increased the protein yield from beans and improved its quality due to the change of native functions. In this case the type and form of the protein product obtained can be varions, namely, liquid, frezed, gelatinous, and dried, as powder or granules. The protein content in these forms are 20, 35, 60, and 90% accordingly, during which these protein products are often enriched with the mineral additives [1].

During the design and obtaining polyfunctional food composition some kinds of meat raw materials or vegetable oils or their combinations can be used as fat component.

The analysis of population nutrition shows that in the body of the most part of people PUFA, especially  $\omega 3$  and  $\omega 6$  families, are in a short supply. So, in our work there are also studied the enriching food compositions with colloidal mixture of  $\omega 3$ ,  $\omega 6$ , and/or W9, which have a good effect on the immunity, blood coagulation and serve to decrease the arterial pressure.

The food oils, namely, sunflower, olive, cotton, soya, flax, and their mixtures are introduced in to the formula. The food fibers soluble as well as insoluble forms take the important part in the correction of the disruption of lipid-carbohydrate change. To this aim the carbohydrate-containing products of processing of cereals, vegetables, fruits are introduced into the formula. The physiological action of natural enterosorbents is the regulation of the intestinal activity, normalization of the amount of useful microflora, and sorbtion of cholesterol and bile acids. Natural enterosorbents also link some toxic components of food and remove radionuclides from a body.

The microflora of the traditional products and food additives is a some what different the natural microbiology of human intestines, and so, is not fully adequate to the biological properties of a body. In this connection the enriching of products with lactic acid bacteria from the microflora of DT is of a particular value. These bacteria serve as the specific factor of a body protection. They inhibit the growth of pathogenic microflora, take part in the regulation of the intestines gas change, produce ferments of metabolism of proteins, carbohydrates, lipids and nucleic acids. As "natural biosorbent" the representatives of the normal microflora are capable of the large accumulation of toxines, heavy metals salts, phenoles, and other xenobiotics forming in a body or entering from the unt side.

The strains of *Lactobacillus plantarum* as homofermentative bacteria produce up to 90% L (+) physiologic isomer of lactic acid taking active part in metabolism. In the course of life on the vegetable substrates lactic acid bacteria accumulate the essential aminoacids (lysine, valine, methyonine, ets) – up to 40% and various antibiotal substances of protein origin, resistant to heating and favoured by the stabilization of intestinal microflora composition.

The analysis of modern medical and biological studies shows that supply of vitamines for a body is the best in a coenzyme form. This form is associated with proteins microbe cell and is easily absorbed. The B<sub>12</sub> vitamine is synthesized in cells of propionic acid bacteria *Propionibacterium shermani* on the substrates with glucose, sucrose, as well as under the presence of lactic acid, so, it is worth while to use they in combination with the lactic acid bacteria.

## Materials and methods

The subjects of inquiry were food composition, biologically active vegetable additive, fermented with lactic acid bacteria.

The chemical composition of the subjects studied were determined, namely, water, fat, protein, ashes (percentage).

Fatty acid compositions were determined on a gas chromatograph. Aminoacid composition was studied on an aminoacid analyzer.

The source raw material was treated with proteolytic and cellulolytic ferments.

The digestibility of protein under the pepsin and trypsin treatment was determined "in vitro".

The fermentation of the vegetable substrates were performed with *Lactobacillus acidophilis*, *Lactobacillus plantarum*, *Propioni bacterium shermani*, allowable to the use in the food industry by the Pharmacological Commettee of Russian Federation.

## Results and discussion

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## Abbreviati

BAA – bio  
PUFA – po  
DT – diges

## Literature

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  2. Shende
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During the design of the food composition the protein-fat-carbohydrate ratio varied into the ranges corresponding to the standard of balanced nutrition 1:0,7:3. Some formulae of the food composition were designed and its industrial technology was developed. The ready product contains (%): water 50±2; fat 4,5±0,5; ashes 3,0±0,5. The content of unsaturated fatty acids varies from 83 to 88%. In the composition, where as fatty component were soya oil, olive oil, mixture of sunflower and olive oils, the ω6/ω3 PUFA ratio is 7,5; 13; 11 accordingly. Under the same conditions such compositions can compensate for a deficiency of ω3 PUFA and corresponds to the diet of a healthy man. The digestibility of protein for the variants indicated is in the average 11,5 mg / 1g(thyrosine/protein), that comparable with standard factor for beef: 13 mg/1g (thyrosine/protein). The composition is the food system with stable emulsive and high gel-forming capacities.

The result of this work is the biologically active additive on the base of vegetable components and wheat brans, fermented with the mixture of physiological bacteria strains. Main characteristics of the additive obtained are presented in the Table.

Chemical composition of the biologically active additives

Table

Factors	Mass proportion, %		
	Variant 1 L.acidophilis, P. shermani	Variant 2 L. plantarum, P. shermani	The source substrate, carrot, cabbage, brans
1. Water	59,68±0,10	54,35± 0,31	55,23± 0,1
2. Fat	0,06±0,02	0,10 ±0,01	2,09± 0,12
3. Ashes	3,37±0,02	4,75 ±0,30	4,05± 0,09
4. Cellular tissue	16,40±0,83	16,40± 0,72	16,40 ±0,75
5. Protein	15,00±0,20	14,00± 0,22	9,20± 0,07
6. Mono- di – succharides	5,49	10,40	13,03

As indicated by the Table, the protein content increases as compared with the source substrate in the both samples of fermented additive. It should be noted that all essential aminoacids occur in large quantities as compared with the source vegetable substrate due to the presence of microbial biomass.

#### Conclusions

1. The introduction of vegetable oils, partially or completely instead of animal fat enriches its fatty acid composition.
2. Food fibers in combination with protein-fat additive change the functional properties of system, make it juicier. Varying their kinds and quantities we can widen the assortment of foods and satisfy the individual tastes of consumers.
3. The fermentation of vegetable substrates with lactic acid bacteria is beneficial for the enriching of it with the active biomass of physiological strains. The products of their activity such as ferments, aminoacids, antibiotic substances, vitamins form the healthy microbiocenosis of a body and stabilize its composition.
4. The use of such additives allows to compensate for a deficiency of essential nutrients in a body, increase its resistance to the detrimental external factors, provide for curative and safe regulation of some organ functions and systems of a body.
5. Food protein – carbohydrate – fat composition can be used as an own product and as an additive to meat, bakery, dairy foods. Biologically active vegetable additives are designed for using in the formulae of minced meat products, such as cooked sausages, pastes, freeze-dried and sublimative semi – products. These additives are recommended for old people with disturbance of the digestive function, chronic and infectious diseases. They are also recommended for the prophylactic of atherosclerosis, diabetes and obesity of children.

#### Abbreviations used

- BAA – biologically active additive  
 PUFA – poly unsaturated fatty acids  
 DT – digestive tract

#### Literature

1. Oluski V., Popon-Rajic J., Sirodsgei proizvodya oblikova nog unitnjenog mesa. – Tehnologija mesa, 1986. V 26, N 10, p 303.
2. Shenderov B.A., Makvelova M.A. Microbiological aspects of functional nutrition. – Medical aspects of microbial ecology, - Moscow, 1994, Vol. 7/8, part 1, p. 10-18.