



**BAL’-PRYLYPKO L.¹, SLOBODIANIUK N.², BRONA G.³,
MOROZIUK R.⁴, AL’ RAVASHDEKH A.⁵**

Optimization of Technology of Canned Meat Products

¹ Doktor habilitowany profesor, National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine

² PhD students, National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine

³ PhD students, National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine

⁴ PhD students, National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine

⁵ PhD students, National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine

Abstract

It was determined the parameters of quality of functional canned mince meat products optimized by adding of preparations of proteins of blood plasma (2%) and cellular tissues (2.5%), and developed the optimized technology of their production.

Keywords: canned mince meat products, technology, protein, consistency, nutritional value, juiciness, viscosity, and holding of water, nutritional fibers

Canned meat products had the strategical value in the earlier time but presently they have lost this status. However, it has to be pointed out that such products are important as foods for some categories of a man. One can argue that practical experience shows deficit of proteins in rations of men who work in conditions of big physical, nervous and emotional loading may result in psychical disorders and initiation of diseases of organs of digestion.

To prevent occurrence of such problems, one should put in practice some prophylactic measures, particularly they ought to consume regularly meat products rich in irreplaceable amino acids and nutritional fibers and characterised by high nutritional value. One of possible variants of this kind of foods are the canned meats characterised by considerable nutritional and energetic value. The important factor it is the capability to consume this type of mean without additional culinary treatment. More over, it has to be stated that the regular consumption of such a product may help in the normalization of functioning of digestive tract and the decrease, at the same time, the level of risk of origination of cordial diseases. Such foodstuff has also advantages such as easy assimilation and capability to be stored for a long time without a loss of their usefulness for health.

All these arguments prove the crucial practicality of development of compositions of specialized canned meats of medicinal destination.

The purpose of this work was to develop canned meat products with medicinal properties that are enriched by functional components. The tasks to be solved in it were:

- to study the specialized literature, normative and patent documentation by the problem of enrichment of traditional meat products by functional ingredients,
- to study compositions and structures of preparations of tissues of wheat rich by proteins,
- to determine the rational quantity of nutritional fibers to be put in canned meat products,
- to identify the technological properties of preparations of blood proteins in producing of canned foods,
- to study the effect of functional ingredients of foods on physicochemical, structural and mechanical characteristics of mince meats,
- to develop the optimized technology of producing of minced meat canned products.

The object of analysis is technology to produce canned meats.

The object of research is the study of grade of influence of functional nutritional ingredients of canned meats of optimized composition on complex of indices of quality and safety of finished products. The factors of influence taken into consideration were:

- *the factors of physicochemical nature*: pH and activity of water in meat compositions,
- *the factors of chemical nature*: contents of water, proteins, fats and ashes in the product,
- *the factors of functional and technological nature*: the plasticity of mince meat compositions and their capability to hold water,
- *organoleptic properties* of canned meats.

The experiments were carried out in the research laboratory of the Chair of technology of meat- and fish products of the National University of life and environmental sciences of Ukraine.

The first stage of this work was devoted for the analysis of materials of scientific publications by problems of functional alimentation and identification of probability and expedience of use of nutritional fibers and proteins of vegetative and animal origin in technologies of fabrication of canned meat products recommended for consumption by men who work in conditions of big expenses of energy.

The second stage of this study included experiments in *1)* analysis of properties of preparations of blood proteins, *2)* search of technological properties of preparations of blood proteins, *3)* development of experimental compositions of canned meat products, and *4)* determining of rational doses of ingredients cho-

sen by results of experiments to be put in meats. The principal result of this work was the development of formulation of the product of "*Special mince meat product to be used in producing of sausages*" and its incorporation in the list of compositions normalized by standard of DSTU 4606:2006 "*Canned mince meat products*".

The finishing stage of our work was to study the complex characteristics of finished products, the identification of their physicochemical, structural, mechanical and organoleptic properties and their safety for health of men.

The analysis of developed minced meats meat preparations by criterion of active acidity (the recommended optimal value of pH is of 5.8÷6.4) showed their high quality. At the same time the adding of wheat cellular tissues in meat compositions permits to raise their capability to hold water(84.3%)as compared with the standard samples of minced meats (79.2%).

One of the most important indices of quality of canned mince meat products is their consistency. The objective values of such property were estimated in measuring of indices of resistance of the product to shift and capability to hold water.

It has been observed that a minced meat product is the viscous and plastic object, its rheological properties may be described the best by indices of its plasticity and limiting effort of shift. The numeral values of such parameters of the product in development were measured by standard methods in use of penetrometer of Ulab 3-31 M. The results we obtained showed the phenomenon of decreasing of viscosity of the experimental mix that contained added proteins and nutritional fibers as compared with the standard sample (653 Pa and 742 Pa, respectively). The capability of mince meats to form stable emulsions influences considerably on their consistency, juiciness, appearance and taste. The principal factors of influence on such properties are content of fats, quantity and quality of water, pH value, temperature of the mix, details of technology of their production, intensity of pressurizing of raw materials etc. experiments showed that the meat systems in development form more stable emulsions as compared with the control one, probably because of bigger capability of blood plasma to hold fat, what makes this ingredient especially effective in stabilization of minced meats emulsions. The results of the study of chemical compositions of both samples of the experimental and serial canned meats witness that the basic changes are linked with increasing of fraction of proteins by factor of 8.8% in the experimental mix as compared with the standard sample. The probable cause is that the blood plasma we added to the mix is abundant by protein (75% in the dry substance).

At the same time, we fixed that the experimental mix contained much water (up to 60.6%) because proteins we put in the mix were in hydrated form. It was identified also the fact of increasing of content of ashes in the mix because the experimental samples were enriched by nutritional fibers (2.23% in the finished product) and dry substances of added proteins. The mince meat is the products

capable to be stored for a long time, and it was shown that its capability to resist to processes of its microbial deterioration may be characterized with the satisfactory precision by index of activity of water (A_w) in it. The results we obtained permit to state that the guaranteed terms of storage of canned meats of novel and standard compositions are almost the same because values of their indices of activity of water differ by factor of 0.005 A_w units only.

Conclusions

The results of this survey and research of the accessible literature and patent sources permit to assert that the developed composition of the mince meat product may be recommended for consumption in category of functional food. There were substantiated the perspective of use of albuminous preparations produced of plasma of blood and wheat nutritional fibers in technologies of producing of canned meats.

It was investigated the capability of the mix of blood plasma and wheat nutritional fibers added to the basic minced meat composition increases its capability to absorb and hold water. The maximal effect is reached in adding of preparations of albumens of blood plasma in quantity of 2% and cellular tissues of wheat in quantities of 2.5÷3.0%. The optimal density of gel of plasma protein of 52 g/cm² is ratio of protein: water of 1:5. The maximum effect emulsification of the minced meat was obtained in use of components of the mix in the ratio of protein: water: gel = 1:4:4.

The developed product is also characterised by optimized biological and nutritional values as compared with the compositions produced serially, what permits to recommend it for the consumption by men who work in conditions of big physical, nervous and emotional loading.

Literature

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