Section 3. **IMPROVEMENT OF FOOD PRODUCTS QUALITY**

**ANALYSIS OF BIOLOGICAL VALUE OF EXPENDABLE DIETS OF THE SECOND GENERATION**

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The presented study analyzes biological value of protein in multi-purpose expendable diets of the second generation (for breakfasts and lunches, dinners and suppers) with automatically calculated scores of eight essential amino acids (valine, leucine, isoleucine, lysine, threonine, tryptophan, methionine, phenylalanine), and an indicator of the generalized biological value or (which is the same) an indicator of protein approximation the «ideal».

The performed research revealed that scores of essential amino acids in the diets under study exceeded 50%. The number of diets with the scores of amino acids is lower than the indicated level equals less than 3%. It is determined that most of the created expendable diets of the second generation are characterized by a high level of the generalized biological value. Four diets, included to various subgroups (for breakfasts, lunches, dinners and suppers) are characterized by the highest generalized biological value. The index of protein approximation to the ideal in them equals 90,39...100%. Only three expedient diets for other breakfasts have the parameters of protein approximation close to the ideal, and equal 58,18%, 62,0 and 68,8% respectively. We can explain the obtained results by rather low scores of such essential amino acids as methionine, threonine and lysine.

We performed one of the stages of projecting daily diets as the components of healthy and dietary nutrition systems – the totality of the expendable diets of the second generation was «filtered». About 75% of the best diets in terms of the generalized biological value are chosen. The index of protein approximation to the ideal in them is 85% and more. The choice is made with the purpose of further application of expendable diets to healthy and dietary nutrition systems.

**Keywords**: expendable diets, protein, biological value, essential amino acids.

**STUDY OF RHEOLOGICAL PROPERTIES OF FOOD HYDROCOLLOIDS**

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One of the important directions of modern food industry development is the use of stabilizers’ consistency, thickeners, emulsifiers, gelling agent. Hydrocolloids relate to preparations that perform these functions in food composition. They are high molecular compounds, which are soluble or swellable in water.

The article describes data of the research to determine rheological characteristics of a 1% aqueous solution of hydrocolloids such as carrageenan, sodium alginate, xanthan and guar gums. The results of the effect of thermal processing conditions, specific to the technology of cooked sausages, on their
dynamic viscosity were analyzed. The changes of this indicator, as a result of the addition of pyrogenic silica A300 were specified.

It is proved that the introduction of silica to aqueous solutions of guar and xanthan gum somewhat improve dynamic viscosity before and after the heat treatment parameters, whereas in the composition of sodium alginate this indicator does not change. Introducing this additive to carrageenan, this indicator decreases. It is found that introduction of the mentioned additives as anti-caking agent prevents caking both of food hydrocolloids, and partially affect their properties.

**Keywords:** hydrocolloids, silica, dynamic viscosity.

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**PERSPECTIVE OF USING PHYTOEXTRACTS IN THE PRODUCTION OF LOLLIPOP CARAMEL**

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One of the priorities of the confectionery industry is to create food using nontraditional plant material in the form of extracts containing essential substances in concentrated amounts. Introduction of confectionery plant components to the recipe provides them with preventive and curative properties. It can solve the problem of shortage of physiologically active substances involved in metabolism, and gives improved process of performance to the finished product.

In the literature, there is no information concerning the use of extracts of basil, cinnamon, clary, carnation, spirulina, skin and stone of garden-stuffs in the manufacture of confectionery lozenges. Therefore, the research of the prospects of phytoextracts used in the manufacture of confectionery candies, studying their properties and technological influence on the manufacturing process is an urgent task.

The article is to study biochemical and bactericidal performance of phytoextracts as a raw material in the manufacture of confectionery lozenges and substantiation for the choice of ingredients to form a functional and technological lollipop caramel.

Biochemical and antibacterial properties of phytoextracts from basil, cinnamon, clary, carnation, spirulina, skin and stone of garden-stuffs are researched. The best antimicrobial activity (relative to culture as gram-positive Bacillus subtilis, or gram-negative - Escherichia coli) of the test substances of herbal extract has shown carnation, skin of garden-stuffs and basil. From the results of biochemical studies of skin of garden-stuffs, we have found that the most promising source of natural antioxidants are polyphenols (tannins) that inhibitors the growth of pathogens, carry local anti-inflammatory effect that is not poisonous. It is found that 100 g of product contains 44.3 mg of vitamin C.

Therefore, the study is aimed at the use of pomegranate extract skin of garden-stuffs as enrichers caramel. We can make a conclusion that the moisture
content of reducing substances in lollipops, candy organoleptic quality control samples (no additives extract) and with the skin of garden-stuffs extracts of pomegranate peel comply with the standard. A monitoring of heavy metals in the finished product has been done. The content of copper, cadmium, zinc, mercury and arsenic in the samples of lollipop does not exceed the permissible level. Being a part of the recipe of lollipop caramel, phytoextract content increases from 0.010 to 0.117 mg/kg. The content of plumbum in the investigated samples decrease the dependence on the phytoextract concentration.

Conclusion. Biochemical and bactericidal properties of basil, cinnamon, clary, carnation, spirulina, skin and stone of garden-stuffs of pomegranate phytoextracts are researched. The composition of lollipop caramel of higher nutritional food value with phytoextract based on garden-stuffs of pomegranate skin is offered. Phytoextract enriches the products by natural antioxidants, vitamins, adds bactericidal properties, does not affect the running and parameters of technological process.

**Keywords:** phytoextracts, natural antioxidants, lollipop caramel.

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**THE INFLUENCE OF THE DESIGN PARAMETERS OF MEAT GRINDERS ON MERCHANDISING PROPERTIES OF CHOPPED MEAT PRODUCTS AND PRODUCTS FROM THEM**

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The authors study the influence of the design parameters of meat grinders such as the diameter of the holes of knife grids at this property of chopped meat products and semi-finished products as a specific surface area of minced meat. The original laboratory device is designed for the determination of ground meat dispersion, the use of which lets more accurately determine the surface area of the dispersed products.

The lack of systematic research data concerning the impact of the design parameters of meat grinders on the level of products crushing, and the corresponding change in the mincemeat properties do not to optimize quality parameters of finished products and improve the technology of their production. It is known that the degree of grinding meat determines the consistency of semi-finished and finished products, forms of moisture bonding and structure of the product, its viscosity, elasticity, flexibility, output of the finished product, its juiciness and tenderness [5]. However, the literature there are almost no comprehensive data on the impact of the diameter holes of knife grids of meat grinding and multiplicity in quality parameters of semi-finished and finished products.

To determine the relationships between the diameter of the holes in knife grids, the angle of sharpening the edges of their holes, angle sharpening of the cutting edges of the knives' blades and a particle size of mincemeat of plant and animal origin, we have conducted comprehensive research of the results presented...
in Fig. 1, 2 and 3. To be able to compare the results of the research with the data from other scientists [5] involved in the determination of the dispersed composition of different types of mincemeat obtained in cutters, the results of the experiments concerning the determination of the dispersed composition of mincemeat from beef, obtained on grinders are represented as three-dimensional image in Figure 1. The results of the dispersed analysis of vegetable stuffing are presented in a two-dimensional form, as they are, in our view, more convenient for use (Fig. 2, 3). Analyzing the dependence of the dispersed beef mincemeat on the diameter of the holes in knife grids (Fig. 1), it may be noted that the stuffing being poly-disperse system includes fractions with the average particle size greater than the diameter of the holes in knife grids. During grinding in a meat grinder by means of knife grids with the holes’ diameter 9 mm, this fraction constitutes 9%. In case of chopping by knife grates with the holes’ diameter of 1 mm, the fraction increases to 64%. The maximum value of fractions, an average particle size of which is 7.5 and 1.5 mm respectively are milled by knife grids with the holes’ diameter of 9 mm and 1 mm.

All the above mentioned means that the diameter of the holes in knife grids is not the only though the main parameter that determines the size of the particles, because the distribution of stuffing particles is remotely close to the law of normal distribution of a random variable.

**Keywords:** mince, grind, grinder, dispersion, property.

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**THE INFLUENCE OF PLANT CRYO-ADDITIVES ON RHEOLOGICAL CHARACTERISTICS AND WATER MOBILITY IN FRUIT JELLIED MARMALADE**

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Due to the deterioration of ecological environment and food quality, distribution range of useful products for human health is an important task for food industry scientists. The purpose of the article was to study the influence of plant cryo-pastes and cryo-powders on rheological characteristics, and water mobility in the samples of fruit jellied marmalade with pectin. It is impossible to improve the marmalade technology by adding supplements of fruits and vegetables without studying their impact on rheological parameters that allow characterize the structure of jellied products, and possess high impact on the peculiarities of manufacturing operations. Rheological characteristics of marmalade products were studied on Kargin-Sogolov modified scales by the standard method. The strength was determined by «Labor» penetrometer and calculated by the Rebinder formula. Rheological characteristics of fruit-jellied marmalade with cryo-additives from quince, apples, carrots, pumpkins, grapes and cryopowders from hips, grapes and sea buckthorn are studied. It is determined that addition of plant cryo-additives facilitates creation of stronger jellies with the increased elasticity and plasticity. These changes can be explained by the formation of new bonds with
macromolecules due to pectic substances in plant cryo-pastes. Water mobility indicators in fruit jellied marmalade with cryo-powders and cryo-pastes was studied in pulsed NMR spectrometer. The time for the spin-spin relaxation of new types of marmalade with additives was determined. In terms of spin-spin relaxation judge, it is possible to judge about the trends in water mobility depending on various additives. The index of water mobility increased compared with controls in 1,5... 2,5 times depending on the type of additive. It was established that the introduction of plant cryo-pastes and cryopowders positively influence the technological process of producing advanced technology of jellied-fruit marmalade with pectin. Namely, the stage of boiling marmalade mass will be faster and as a result, the loss of vitamins, minerals and pectin will be less. Improvement of rheological characteristics of products indicates that jellied-fruit marmalade is better formed with the use of cryo-additives. It is easier to take it out of the forms and they are less deformed during transportation.

**Keywords:** cryo-paste, cryo-powder, strength, rheological characteristics, marmalade, spin-spin relaxation.

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**CHANGES IN THE QUALITY PARAMETERS OF SHORTBREAD BISCUITS WITH GRAPE POWDER DURING THE STORAGE**

T. Brykova, N. Grevtseva, O. Samohvalova

The technology of shortbread biscuits with the addition of fine-dispersed powders made of grape seeds and grape skins in the amount of 15,0% by weight of wheat flour was developed. Cookies are characterized by a pleasant taste and aroma, crumbly structure, increased food and biological value.

We have studied the changes in parameters of the quality of the developed products during the storage. Samples of the biscuits were stored packed in cellophane bags at 18 ± 3 °C for 60 days. Every 5 days we determined organoleptic, physical and chemical indicators of quality as well as studied the processes of accumulation of free fatty acids and peroxide compounds in the samples. It was determined that after 45 days visible foreign taste and odor appeared in the control sample without additives, indicating the start of fat oxidation. A sample with the addition of grape seed powder acquired such taste after 60 days, and the organoleptic characteristics of cookies with the addition of the powder from the grape skins have not changed throughout the storage period. In addition, cookies with the powder stay crisp for a longer period and slowly lose moisture.

Adding grape powder into biscuits inhibits the accumulation of products of primary oxidation of fats, as evidenced by the lower values of acid and peroxide numbers of fat throughout the shelf life as compared to the control. This is due to a high content of substances with antioxidant activity in powders. Their addition can extend the shelf life of shortbread biscuits.

**Keywords:** grape, powders, shortbread biscuits, storage.
The analysis of the consumption of alcoholic drinks and raw materials for their production is performed. The necessity to conduct researches concerning the influence of alcoholic drinks on a human body together with sanitation services of medicine and to consider both alcohol itself, which affects an organism, and ratio of quantitative content of micro impurity in it.

It is established that for quality evaluation of drinks, it is desirable to use both traditional chemical or organoleptic control methods, and develop express train methods, objective tool methods for the determination of taste, smell and safety of drinks, which can have advisory nature for the entities.

By means of sense organs: sight, sense of smell, taste it is possible to feel the impurities, which cannot be found chemically, or other methods. It is possible to assume that tasting is an objective assessment, which is necessary to use for product quality determination. This assessment commission methodically considers features of a human body to correct its mistakes.

It is established that for the production, transportation, storage and consumption of alcoholic drinks, it is necessary to take into account what material the equipment, a container and packaging is manufactured from. For this purpose, it is necessary to use neutral materials despite the fact that aqueous-alcoholic solution is a good solvent of some metals, their alloys and glass.

It is known that net ethanol – the basis of strong drink, does not create positive micro impurity in certain proportions render a drink bouquet. In this sense, artificial introduction of drink quantitative and high-quality additional additive into structure can create the set bouquet. This acceptance is widely used for the development of a range of drinks.

The performed analysis promotes to further scientific research by the determination of influence of micro impurity in alcoholic drinks on their quality and safety.

**Keywords:** alcoholic drinks, raw materials for production, quality and safety, tasting score.