ABSTRACT AND REFERENCES

TECHNOLOGY AND EQUIPMENT OF FOOD PRODUCTION

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COMPREHENSIVE RESEARCH INTO QUALITY OF THE IMMUNOSTIMULATING BEVERAGE "IMMUNO PLUS" (p. 4-11)

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Based on the methods of theoretical quality measurement, the integrated quality assessment of the immunostimulating beverage "Immuno plus" was carried out. The hierarchic structure of the properties of the finished product, which includes organoleptic, physical and chemical indicators, as well as the indicators of nutritive and biological value, was presented. It was shown that enhancement in consistency, uniformity and stability of the beverage is explained by the presence of glutin, which acts as hydrocolloid, it is according to these indicators that consumers determine the beverage quality. The profiles of the vitamin and mineral composition of the immunostimulating beverage "Immuno plus", as well as the content of nonreplaceable amino acids were presented.

The obtained comprehensive quality indicator of the beverage "Immuno plus" proves high quality of the new product. The calculated competitiveness of the enriched beverage is 1.5 times higher in comparison with the control sample. The authors presented calculations of competitiveness of the beverage with the improved nutritive and biological value by using the procedure of modeling, which includes the indicators of product quality, the information of the analogs of the developed goods and the principle of introducing innovations. It was established that the immunostimulating beverage "Immuno plus" will be competitive on the consumer market of Ukraine due to the improved organoleptic indicators, increase in the content of food fibers, vitamins and mineral substances, as well as existence of preventive properties.

Keywords: comprehensive quality assessment, immunostimulating beverage, quality indicators, preventive product.

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DEVELOPMENT OF A THEORETICAL MODEL FOR OBTAINING THE WHIPPED EMULSIONS FROM A DRY FAT-CONTAINING MIXTURE AND ITS EXPERIMENTAL VERIFICATION (p. 12-19)

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We developed a theoretical model of the Pickering-steric stabilization of whipped emulsions structure with a low fat content, obtained from a dry fat-containing mixture. It was experimentally proven that the yield shear stress of a whipped emulsion is determined by the degree of destabilization of fatty particles. It is shown that in order to ensure the full degree of destabilization of fatty particles, it is necessary that 5.0...7.0 g of oil is introduced with 3.0 g of distilled monoglycerides and 0.08...0.1 g of soy lecithin. The destabilized fatty particles are capable of adhesion to air bubbles thus providing for the Pickering-stabilization of a whipped emulsion. It was established that at low content of oil in the system (5.0...7.0 %), it is necessary to combine the Pickering stabilization with the steric stabilization. Steric stabilization in a whipped emulsion is implemented the complex formation of sodium caseinate and kappa-carrageenan, increasing the yield shear stress of the interface adsorption layers.

Whipped emulsions with a large foaming capacity and yield shear stress are obtained from a dry fat-containing mixture. For this purpose, it is necessary to provide, during crystallization of the fatty phase, a contact with white sugar. This approach ensures formation of the interface adsorption layers and partial wetting the fatty particles (an edge angle of wetting is 25.0±2.0°). The proposed approach is named the quasi-emulsification. Introduction to sunflower oil of 30...37.5 % of distilled monoglycerides of fatty acids provides the obtaining of dry loose fat mixtures. New technology that we propose for obtaining the dry mixtures is characterized by energy efficiency because of the absence of operation of drying the emulsion. Using the developed technology makes it possible to receive whipped emulsions with the foaming capacity that is 1.7...2.0 times higher than that of the products-analogues available in the Ukrainian market.

Keywords: whipped emulsion, Pickering-steric stabilization, dry mixtures, foaming ability, complex formation, destabilization of fat.

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THE INFLUENCE OF CRYOPOWDER "GARBUZ" ON THE TECHNOLOGY OF CURDS OF DIFFERENT FAT CONTENT (p. 20-24)

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The prospects and usefulness of the cryopowder "Garbuz", the unified dietary supplement, to improve the organoleptic and physicochemical parameters, and also to increase the biological value of curds are considered. The focus is given to formulations of sweet and salty curds with the cryopowder "Garbuz".

It is found that the content of the cryoadditive "Garbuz" in salty curds is lower than in sweet. The cryoadditive quantity is increased as a result of increasing the fat content in a milk base. The research of the organoleptic characteristics of curds with the cryopowder "Garbuz" found that salty curds with the cryoadditive had a yellow color, while sweet curds had a cream color with individual yellowish inclusions of the cryoadditive powder. The flavor of salty curds remained fresh, sour-milk, while in sweet curds there was a clearly pronounced flavor of the cryoadditive. Pilot samples of sweet curds had a pronounced taste. The consistency of curds with the cryopowder "Garbuz" was uniform, pasty, soft. Pilot samples had a nice presentation. Introduction of the cryopowder "Garbuz" in curds increased their energy value. The proposed products expand the range of therapeutic and preventive dairy.

Keywords: curds, energy value, cryopowder, therapeutic and preventive products, biological value.

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SUBSTANTIATION OF FEASIBILITY OF USING BLACK CHOKEBERRY IN THE TECHNOLOGY OF PRODUCTS FROM SHORTCAKE DOUGH (p. 25-31)

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The feasibility of using black chokeberry fruit in processing the products from shortcake dough was theoretically substantiated and experimentally proved. The influence of black chokeberry additive on the basic formulation component of shortcake dough – wheat flour – was investigated. It was found that the black chokeberry additive not only contributes to enhancing the nutritive value of shortcake dough, but also makes it possible to improve the quality of shortcake dough.

The influence of physiologically active compounds of BCA on the quality of wheat flour gluten was explored. BCA in the form of powder and its water extract weakens flour gluten, which is a positive factor for the formation of shortcake dough. The gluten capability to stretch increases by 9...23 %, and dough becomes more plastic and does not require any addition of starch, which is often added to formulations with the aim of enhancing plasticity of the formulation mixture.

Polyphenol substances of BCA were found to prevent gluten proteins of wheat flour from swelling due to a decrease in its water-retaining capacity, which provides the possibility of its storing for a long time before baking.

We established a higher degree of inhibition of amylases in wheat flour by the extract of black chokeberry fruit or its juice compared to the powder from dry fruit. Water-soluble phenolic compounds of black chokeberry in reaction mixture interact with metal cations, existing there, and bind them in strong complexes. The obtained experimental data allow us not only to control hydrolytic processes in the dough semi-finished product, but also to extend the possibility of using wheat flour of lower grades after neutralizing the harmful action of enzymes in it.

Keywords: black chokeberry, shortcake dough, wheat flour, anthocyanins, amylolitic activity.

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ANALYSIS OF KINETICS PATTERN IN THE FORMATION AND SEPARATION OF A DROP OF FLUID IN THE FORM OF A CAPSULE (p. 32-40)

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Capsulation, as a technological principle, can provoke the activation of innovations in the food industry and cause the development and implementation of new scientifically substantiated technologies for processing the raw materials, creating new product shapes, convenient in the consumption, increasing production volumes and efficiency of food products, development and application of modern fundamentally new technologies, technological processes, techniques and equipment that collectively are able to significantly affect the state and development of food technologies.

Taking into account the laws of gravity and the use of methods of systems analysis, we devised a model of capsule-formation of fluids, different in origin, by the method of extrusion. Kinetics of the formation of a capsular structure is defined, as well as the patterns for obtaining the spherical shapes of different diameter. The obtained regularities are the basis of scientific and technological principles of obtaining the capsulated oil and fat products with the thermo- and acid stable properties.

It is demonstrated theoretically that the main factor that limits the process of formation and separation of a drop is the stage of germ formation and a drop in particular. Duration of the germ and drop formation is much longer (by about 20 times) than the time of a bridge breakaway. The presence in capsulated fluids of a shell significantly affects both the dimensions of a bridge and a drop and the time of the processes of forming a drop and its separation. In this case, an increase in the relative coefficient of surface tension by 3 times increases the radius of a drop by 1.6 times, and the overall time of the formation separation of a drop by 2.5 times. Resulting equations might be applied in the experimental verification of the proposed model for the formation and separation of a drop of fluid.

Keywords: lipids, capsulation, kinetics, shell, calcium alginate, separation of a drop, bridge of a drop, germ of a drop, current.

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RESEARCH INTO QUALITY OF BEER WITH THE ADDITION OF PINE NEEDLES EXTRACT (p. 40-48)

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The expediency of using nontraditional vegetable raw material for the enrichment of beer, which partially replaces hops, was substantiated. The parameters of extracting (temperature, duration, hydromodule) of biologically active materials from pine needles were explored. The optimum parameters of extracting the Scots pine needles relative to the indicator of antioxidant activity of the extract were determined: hydromodule is 1:20, temperature is 60 °C, extraction duration is 30 min. Pine needles extract has clear aroma and harmonic, refreshing flavor with a pine tone. The content of ascorbic acid in the extract is 0.275 mg/100 g, antioxidant activity is 202.3 Kl/100 g. The numerical ratio of hops and pine needles in the beer formulation was obtained by mathematical modeling. Quantitative composition of pine needles does not exceed 20 % by weight of the estimated norm of hops, which is sufficient for retaining bitterness and aroma of hops. The formulation of beer, containing the aqueous extract of pine needles, was developed. Quality indicators of the finished beverage were explored.

Introducing the pine needles extract, which has plant-based antioxidants, into beer is one of the methods to improve antioxidant capacity of the finished drink. This opens up a prospect for the studies, directed at developing the measures to stabilize beer of different varieties. The research results might be implemented in production, which would positively influence the finished drink quality.

Keywords: plant raw materials, antioxidants, pine needles extract, beer wort, mathematical model, biological objects.

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INFLUENCE OF VITICULTURAL PRACTICES ON THE SENSORY CHARACTERISTICS OF WINE GRAPE VARIETIES (p. 49-56)

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Sensory descriptors, which characterize quality of grape varieties Zagrey and Aromatnyiy of selection of the NCS "IVW named after V. Ye. Tairov" (Ukraine), were determined in accordance with the procedure, developed by Institut Cooperatif du Vin (Montpelier, France). For evaluating visual, tactile and gustatory properties of pulp, skin and seeds, the scientific protocol, which consists of 20 parameters, was used.

A one-way analysis of variance and data analysis by the method of principal components made it possible to establish the interrelation between the viticultural practices of growing a grapevine (planting scheme, trunk height) and sensory descriptors of the berries of the studied varieties.

Growing grape variety Aromatic according to planting scheme, corresponding to 2222 plants per ha, contributed to enhancement of fruit aromas of skin. Training of vines of this variety on the trunk of 160 cm in height intensified perception of sweetness and pulp aroma.

The low-dense planting of grape variety Zagrey (3333, 2222 plants per 1 ha) were distinguished by the harvest with high elasticity of berries, high ability to fall and weak adhesion of tissues of berries. At planting vines by the scheme 3×1, the most intensive aromas of pulp were noted at growing on the trunk of 40 cm in height. At planting vines by the scheme 3×1.5 m, growing on the trunk of 80 cm in height was optimum by indicators of adhesion of pulp and skin, pulp sweetness and intensity of tannin substances of seeds.

Examination of the influence of the complex of viticultural factors on the sensory profile of berries was performed by the methods of two-way analysis of variance based on the example of grape variety Zagrey. The value of calculation indicator η^2 made it possible to establish that the factor of trunk height has the most pronounced influence, determining final grades of ability of berries to fall, ability of skin to rupture, color of skin, sweetness, aroma and intensity of pulp aroma, color and intensity of tannin substances of seeds.

Keywords: sensory assessment of berries, viticultural practices, Zagrey, Aromatnyiy.

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