

AGRONOMY, FORESTRY AND WATER MANAGEMENT

General Farming and Crop Production

UDK 633.11:631.55:631.82

Some aspects of the effect of mineral fertilizers on yield and grain quality of spring wheat

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Abstract. One of the most important problems facing agriculture nowadays is achieving high yields of good quality crops. The article presents the results of studies conducted in the foothill zone of the Kabardino-Balkarian Republic on spring wheat crops of the Voronezhskaya 12 variety. The purpose of the study is to determine the parameters of the impact of mineral nutrition on the productivity and quality of spring wheat grain. The study revealed the dependence of the yield and quality indicators of spring wheat grain of the Voronezhskaya 12 variety on the degree of provision with mineral nutrition elements. It was found that the content of individual proteins in the grain of the studied variety directly correlates with the content of NO_3 , P_2O_5 and K_2O in the aboveground mass and the efficiency of carbohydrate-protein metabolism in the leaves of spring wheat. It was found that the application of mineral fertilizers in the dose of $\text{N}_{90}\text{P}_{90}\text{K}_{40}$ ensures the maximum yield of the spring wheat variety Voronezhskaya from 12 to 31.4 c/ha, where the increase over the years was from 7.5 to 43.1%. In addition, the use of the dose of mineral fertilizers $\text{N}_{120}\text{P}_{90}\text{K}_{40}$ improved the quality of wheat grain, and accordingly, this led to an increase in the protein content in the grain of spring wheat to 13.8%.

Keywords: mineral fertilizers, nutrition, yield, grain quality, spring wheat

CONSTRUCTION AND ARCHITECTURE

Hydraulic engineering, hydraulics and engineering hydrology

UDK 626/627

A new design of a shore protection structure for riverbeds in easily eroded soils

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Abstract. When designing and reconstructing existing bank protection structures on sections of rivers passing in the foothill zone, great difficulties arise in ensuring the joint operation of structures and coastal massifs due to the instability and easy erosion of channel soils flowing in alluvial deposits. As a result, the reliability of structures is significantly reduced. The stability of adjacent territories and objects depends on the effectiveness of bank protection structures. The article proposes an effective technical solution for the design and construction of a new type of bank protection structure in the form of a stepped gabion retaining wall with anchoring of each step into the body of the coastal embankment dam with reinforcement grids. A feature of the proposed design is to increase the stability of the bank protection structure on easily eroded soils by anchoring the steps of the retaining wall into the body of the coastal earth embankment dam

with horizontal reinforcement grids. For greater efficiency, the anchor grid is laid at the level of the top of the gabion box. Unlike bank protection structures with reinforced soil dams, the joint operation of the retaining wall and the coastal mass (dam) is ensured here through the use of lattice anchors, while the proposed design is simpler in execution. This ensures the stability and reliability of the retaining walls.

Keywords: coastal protection structures, easily eroded channel, retaining wall, reliability, stability, stepped front face, gabions, reinforced gabion boxes, anchor, anchor grid

ANIMAL SCIENCE AND VETERINARY MEDICINE

Private Animal Husbandry, Feeding, Feed Preparation and Livestock Production Technologies

UDK 636.234.1.034

The effect of ultraviolet rays of the A spectrum on the growth and development of Holstein heifers in winter stall period

Orest A. Basonov, Polina A. Feoktistova, Ruslan N. Mamedov

Abstract. Providing optimal conditions for the growth and development of young farm animals, especially during the winter stall period, is one of the pressing issues in modern dairy farming. This issue is of great practical importance, since the future productivity of young animals and the economic efficiency of the industry as a whole directly depend on their full physiological development. The article studies the effect of UV rays of the spectrum A on the growth and development of Holstein heifers during the winter stall period. Animals in the experimental groups were exposed to irradiation, while those in the control groups were not. The study found that with three-time irradiation for 15 minutes per day, the live weight of the experimental group at the age of 5 months was 8.17% more than that of the control group, and with three-time irradiation for 20 minutes per day, the live weight of the experimental group at the age of 4 months was 4.3% more than that of heifers that were not exposed to irradiation. It was found that the effect of ultraviolet rays of spectrum A had a positive effect on the growth and development of Holstein heifers during the winter stall period.

Keywords: dairy cattle breeding, ultraviolet, radiation, Holstein breed, live weight, growth rate

UDK 636.59.033:636.084.5

Study of the productivity of meat rock quails at different planting densities in cell batteries

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Abstract. The quail meat market is based on the use of meat breeds in industrial conditions. The aim of the study was to investigate the effect of stocking density on the live weight and meat productivity of quails of meat breeds. The study was conducted on Radonezh quails aged 1-49 days at a stocking density of 10, 90 and 80 heads per 1 m². Reducing the stocking density of quails by 10 and 20 heads increased the survivability of birds by 1,25-2,50%. A stocking density of 90 heads per 1 m² increased the live weight of females by 3,71% (p<0,05), 80 heads per 1 m²

– males by 2,18% and females – by 6,29% ($p < 0,05$). Live weight gain is closely related to the increase in superficial pectoral muscle weight ($r = 0,875 \div 0,998$, $p < 0,05$), which depended on the keel length ($r = 0,630 \div 0,659$, $p < 0,01$). The muscle protein content was influenced to a greater extent by the bird sex rather than by changes in stocking density ($\eta^2_{\text{sex}} = 0,394 \div 0,593$, $p = 0,025 \div 0,005$; $\eta^2_{\text{group}} = 0,082 \div 0,191$, $p = 0,408 \div 0,284$). The muscle lipid content was influenced by both factors (sex and stocking density), although the effect of stocking density was predominant. Reducing the stocking density while maintaining the norms of the watering and feeding frontage did not increase feed consumption. Due to higher livability and slaughter yield, the cost of quail meat production was reduced by 1,97-4,53%.

Keywords: quail breed Radonezh, weight, preservation, muscle mass, chemical composition of meat, cost

UDK 636.52/.58.087.8-053.2:636.5.085.2

Differences in digestibility and assimilation of nutrients in the diet of broiler chickens with a feed additive of phytobiotic and prebiotic

Alexander A. Ovchinnikov, Tatyana A. Shepeleva, Natalya D. Yaptik

Abstract. The study of digestibility and utilization of nutrients in the diet of broiler chickens with the combined addition of chicory grass at a dose of 70 mg/kg of body weight and lactic acid at a rate of 0.5 ml/kg of feed showed that the best results were obtained with their combined use. At the age of three weeks, the digestibility of crude protein in this group of birds was higher by 1.33%, crude fat – by 4.92%, at six weeks – by 2.37% and 5.38%. As a result, nitrogen deposition in the bird's body at the age of three weeks exceeded the control group by 17.8% with the addition of chicory alone, by 11.4% in the group with lactic acid alone and by 21.6% with their combined use, at six weeks – by 5.9%, 4.5 and 8.0%, respectively. Throughout the entire period of broiler rearing, the birds of the experimental groups showed a positive trend in the absorption of calcium and phosphorus from the diet. When using chicory with lactic acid together, the greatest absorption of zinc, cobalt and manganese, as well as chromium, is observed in the body, indicating an increase in the functional activity of the pancreas and protein synthetic function of the liver. The positive dynamics of increasing iron and copper absorption in the birds of the experimental groups explains higher erythropoiesis and an increase in the number of erythrocytes per unit of blood volume.

Keywords: broiler chickens, phytobiotic and prebiotic feed additive, nutrient digestibility and absorption, nitrogen balance.

Breeding, Selection, Genetics and Biotechnology of Animals

UDK 636.32/.38.082.262

Economically useful traits of the Manych Merino sheep of the Manych factory type of different lines

Vasily V. Aboneev, Yuri A. Kolosov, Anna Ya. Kulikova, Ekaterina V. Aboneeva

Abstract. The aim of the study is to determine the level and nature of development of the main economically useful traits in Manych Merino sheep of the Manych factory type, to establish the

degree of combination of various variants of inter-factory crosses. In the Lenin breeding farm-collective farm of the Apanasenkovsky district of the Stavropol Territory, the assessment and shearing of ewes, ewes and rams of the Manych Merino breed of the EM 815, EM 214 and EM 222 lines was carried out. The results obtained in the course of the study indicate that all age and sex groups of the compared lines have a high degree of characteristic traits, which was noted during their testing. This characterizes the increased prepotency of animals and will provide a positive effect when using them in farms of various categories. Based on a comprehensive assessment of animals of different groups, the costs of their rearing, it was found that the greatest economic effect in the form of profit and the level of profitability was obtained from animals of the 815 and 222 lines. Sheep of line 214, although slightly, were inferior to animals of other lines. It was established that long-term purebred breeding of sheep of the Manych factory type of the Manych Merino breed in a closed herd contributed to the preservation of the inherent characteristic features of each line, which indicates that sheep of the Manych factory type of the Manych Merino breed are distinguished by high hereditary qualities and their use in herds of various categories of farms will contribute to obtaining offspring of the desired quality.

Keywords: sheep, breed, Manych merino, Manych type, lines 815, 214, 222, intraline selection, live weight, wool yield, length, fineness, economic efficiency

UDK 636.2:636.082

A new method for determining the categories of breeding value of bulls producing dairy and dairy-meat breeds

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Abstract. In the breeding of large-rotting dairy and mixed breeds, identification and subsequent use of milking and fat-milk-enhancing bulls will improve cow milk productivity in individual herds and across the breed. The article describes a new method developed by the authors to determine the categories of breeding value on milking and fat milking of dairy and milk-meat cattle, which is a modified method «daughter-mother». The authors of the article also proposed scales for determining complex categories of breeding value of bulls-producers by breed and fatness, established using the conventional method «sister-daughter» and new (modified) method «mother-daughter». The aim of the study was to test a new method for determining the categories of breeding value according to milking and fat-milk of bulls-producers of Holstein red-varietal breeds, which were used for reproduction in dairy herd Agricultural production cooperative APC «Lenintsy» of Maysk district of Kabardino-Balkarian Republic. The trial was conducted in 2024 on first-born cows, the daughters of three bulls – Imbir 23433 (15 heads), Tonik 5155 (16 heads) and Tyson 1060 (16 heads). As a result of the conducted studies, it was found that the breeding value categories of bulls-producers by lot, established by the modified method «daughter-mother», were higher than under the use of the method «daughter-sister». The breeding value category for fat milkiness established on the basis of the modified «daughter-mother» method, one of the three bulls was higher than the category established by the «sister-daughter» method, while the other two bulls were the producers of the tribal value categories, established by different methods, were in agreement.

Keywords: milk yield, fat content, producer bull, first-calf cow, breeding value category

The level of interrelationships between the signs of productivity in Soviet Merino sheep and their hybrids with the Stavropol breed

Yuri A. Kolosov, Vasily V. Aboneev, Inna V. Zasemchuk

Abstract. The article presents data on the relationship between the main productivity traits in Soviet Merino sheep and their crosses with the Stavropol breed. The correlation between wool yield and live weight in the experimental groups is average and ranged from 0.31 to 0.44. An insignificant or weak relationship was found between wool yield and wool length of 0.23 to 0.32. Accordingly, it is necessary to pay attention to the wool length, giving preference to animals with longer wool. A weak correlation was observed between wool yield and fineness ($r=0.09-0.12$) and between wool yield and belly fur 0.15-0.24. The highest correlation is observed between wool yield and wool density (0.39-0.45). Live weight is positively correlated with the length of the animals' wool, the correlation coefficients were 0.20 in the purebred ewe group and 0.11 in the crossbred group. A positive correlation was also noted with fat sweat (0.19-0.25). The established levels and the nature of the interrelationships between the traits must be taken into account in differentiated breeding with an emphasis on meat or wool productivity.

Keywords: Soviet Merino, Stavropol breed, correlation coefficient, wool yield, live weight

Meat productivity of descendants bulls-improvers of the Kalmyk breed

Vasiliy N. Pristupa, Diana S. Torosyan, Ruslan Z. Azaev, Natalia N. Kolosova

Abstract. The article analyzes the results of assessing by scoring and index methods the quality of the offspring of five Kalmyk breed bulls and their sons in terms of their own productivity and the formation of their carcass morphological composition. For this purpose, 10 sons of bulls Prometheus 1127, Grilyazh 916, Gomat DRZh-59223, Yago DRZh-39023 and Raskat 8692 were selected from the Solnechnoe Breeding Plant LLC, Oryol district, Rostov region. The sons of the evaluated stud bulls up to 8 months of age were raised on full suction with mothers, and from 8 to 15 months of age were kept in the same group under equal conditions and over a 7-month period, on average, feed was consumed per bull, containing 1569 feed units, 168 kg of digestible protein, 2032 kg of dry matter with exchange energy 15663 MJ. With this level of feeding, all the controlled sires and almost all of their sons, according to the score, met the requirements of the elite-record grading class. However, according to the results of the index assessment, only the bulls Prometheus 1127 and Grilyazh 916 met the requirements of the improver category, and the remaining three bulls met the requirements of the neutral category. The descendants of the leading bulls with a pre-slaughter live weight of 412.1 and 419.9 kg exceeded peers of other groups in carcass weight by 8.5-14.1 kg, in muscle tissue weight by 9.4-15.4 kg, but by 3-5% less yield of fat, bones, cartilage and tendons and the highest meat ratio.

Keywords: bulls, Kalmyk breed, assessment by offspring, pre-slaughter weight, muscle tissue yield

AGROENGINEERING AND FOOD TECHNOLOGIES

Technologies, Machines and Equipment for the Agro-industrial Complex

UDK 631.372: 621.436.1

Investigation of the influence of the technical condition of the elements of the high-pressure fuel system on the parameters of the fuel supply

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Abstract. Fuel equipment must ensure identical fuel supply to all cylinders according to such parameters as: cyclic supply, fuel injection start angle, injection characteristics. The non-identity of the specified parameters for all cylinders of a diesel engine is the reason for the different nature of the working process in them and, naturally, leads to differences in the indicator performance indicators for the cylinders of a diesel engine. Wear of parts of fuel equipment during operation, especially precision elements of the high-pressure fuel system, leads to a change in their hydraulic characteristics, as a result of which the uniformity of the fuel injection process across the sections of the high-pressure fuel pump is disrupted. Thus, in order to develop measures to ensure uniformity of fuel supply parameters during repair and maintenance work, it is necessary to establish the dependence of fuel supply parameters on changes in the technical condition of the elements of the high-pressure fuel system, taking into account their deviation from the established values by technical specifications. As a result of the studies, it was established that: an increase in the effective flow area in the 4Ch11/12.5 diesel operating mode from 0.30 mm² to a critical value of 0.40 mm² caused an increase in the cyclic fuel supply by 5.7%; an increase in the effective flow area from 0.29 to 0.59 mm² led to a decrease in injection pressure by 25%, injection duration by 22.2% and fuel injection retardation angle by 10.0%; An increase in the effective flow area of the fuel line from 0.80 to 1.10 mm² led to an increase in the cyclic fuel supply by 1.1%. At the same time, the pressure and duration of fuel injection decreased by 13.6% and 12.2%, respectively, and the fuel injection retardation angle remained virtually unchanged.

Keywords: diesel engine, fuel, fuel equipment, fuel system, fuel pump, cyclic supply, flow area

UDK 621.45.034.3

Investigation of technical condition parameters of spray nozzles

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Abstract. An analysis of the technical condition of multi-jet sprayers supplied for repair of fuel equipment for tractor diesels shows that failures due to impaired needle mobility account for 27% of injectors, of which 17% are caused by metal setting, 10% by coking. As a result of the analysis of operational tests, it was revealed that the highest rate of pressure reduction at the beginning of the spray needle rise is observed in the first 500-700 hours of engine operation. During the operation of the injectors, the tightness of the locking cone of the sprayer is violated, the needle of the sprayer freezes and wears out, the pressure drop at the beginning of injection, coking and wear of the spray holes of the sprayer, deterioration of the quality of fuel spraying occurs. Comparative accelerated wall tests were carried out to determine the wear resistance of

the nozzle sprayers. The Central Research and Design Institute of Fuel Equipment for Automotive and Stationary Engines (CNITA) has developed an accelerated testing method that allows predicting the technical service life of sprayers. This makes it possible to compare the wear resistance estimates of experimental and serial spray nozzles. After 1000 hours of operation, the pressure continues to decrease, but the intensity of the decrease becomes less with increasing operating time. Studies have shown that the injectors fail mainly as a result of a decrease in the effective flow section and loss of tightness of the locking cone of the atomizer and jamming of the needle in the nozzle guide.

Keywords: nozzle, spray nozzle, reliability, durability, operability

UDK 631.362.34

Theoretical study of the working process of the sowing apparatus of a grain seeder

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Abstract. This paper presents the results of a theoretical study of the working process of a reel seeding unit of a grain seeder. The purpose of the study was to establish the degree of influence of the main parameters of the reel (dimensions, rotation speed, number and shapes of its grooves) of the seeding unit of a grain seeder on the actual thickness of the conditional layer formed during the movement of seeds in an active flow. When establishing the factors associated with the calculation of the reel seeding unit for sowing specified norms, the operating conditions of the seeding unit and the agrotechnical requirements imposed on it as an agricultural machine are taken into account. The characteristic features of the seed material are also important. In terms of physical and mechanical properties (shape, weight, geometric parameters of individual grains, bulk density, flowability properties), seed material can vary greatly and depend not only on the type and variety of crop, but also on the year of harvest, the growing area of the crop, the quality of cleaning and sorting of seed material. As a result of the conducted research it was established that with the increase of the working length of the coil, the thickness of the conventional active layer of seeds increases and, conversely, with the increase of the frequency of rotation of the coil, the thickness of the conventional active layer decreases. In this case, the changes occur to an insignificant extent.

Keywords: seeder, seed box, groove, support wheel, soil, seeds, reel, furrow, sowing, frequency, resistance, force

UDK 620.91:624.92

Improving the energy efficiency of the electric drive of energy facilities

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Said Kh. Kushaev**

Abstract. An increase in prices for utility services in Russia occurs every year, therefore, in modern society, as well as in the production sector, savings are the main indicator of successful development. In this regard, the efficient use of electricity is one of the important indicators, since it is one of the most expensive resources and can lead to serious costs. Manufacturing enterprises are trying their best to reduce their energy costs, trying to monitor all saving

innovations and apply them in their activities. Enterprises are forced to save on electricity; otherwise they simply cannot survive in a competitive market. There is a huge number of ways to save energy, but not all of them are effective. The company sets strict requirements for controlling the combustion mode of lighting fixtures throughout the building, installs automatic shutdown devices, and constantly updates installed equipment. Businesses largely use the same technologies to save energy. Some of them are examined in detail and it is revealed which of them are truly effective and can save energy while maintaining the organization's activities at a high level. Some businesses take advantage of direct energy savings, which results in lower costs by using equipment that uses less energy than alternatives. Installation of such equipment can only be carried out if energy consumption data is available. To identify this data, a special automated information and measurement system is installed in production. The energy efficiency of electric drives of energy equipment of small enterprises will differ significantly from large-scale production. Therefore, the choice of each electric drive must be individual.

Keywords: energy efficiency, electric power, electric drive, energy saving, automated systems, lighting devices, frequency converters

Food Systems

UDK 664.653.124

Study of emulsion viscosity for the production of yeast dough

**Anna T. Vasyukova, Irina U. Kusova, Alexander V. Moshkin,
Ella O. Gerasimova**

Abstract. The article considers the problem of improving the quality of yeast dough prepared in a safe way by introducing emulsion products, pre-prepared with the required consistency and components. The objects of the study were egg-milk, egg-milk-sugar mixtures of various concentrations. In the process of performing the work, organoleptic, rheological, physicochemical and statistical methods were used. The studies were conducted to identify the effect of the concentration of egg protein, individual components of the egg, and, in particular, the yolk in a binary system with milk, on the density of the food system. The studied egg-milk masses were used to substantiate the process of their emulsification and interaction with the structure of yeast dough. The binary composition of the yolk or whole egg (protein and yolk) with milk or milk and sugar was subjected to intensive mixing, as a result of which an emulsion of varying viscosity was obtained. The optimal concentrations of the constituent components of the emulsion were revealed - egg-milk mixture without sugar 12:70; yolk, milk and sugar 8:74:15; egg-milk mixture with sugar 7:38:15. The dynamics of change in emulsion viscosity was established. With a temperature change of 1°C, the viscosity changes by 0.02, and with a change of 25 °C, i.e. up to the critical temperature of the solution (75°C), its viscosity will change by 0.72, not 0.50; i.e. for binary mixtures (yolk – milk) there is a dependence on the properties of the constituent components of the emulsion. With a change in the composition of the emulsion (whole egg or its yolk separately), an increase in viscosity occurs at a lower temperature – from 50 to 62°C, which will ultimately lead to denaturation of the protein, which occurs in the temperature range between 58 and 80°C, and yolk – in a much narrower range – 63-70°C. Therefore, at a temperature of 75°C, denaturation of the mixture of yolk and protein is observed, i.e. the critical temperature for the viscosity of the mixture.

Keywords: emulsion yeast dough formulation, viscosity, protein solutions, binary mixtures speaker concentration

UDK 504.062.2

Comparison of the effectiveness of non-thermal treatment methods for waste prevention

**Nikolai E. Vorotyntsev, Alexander L. Kuznetsov,
Elina A. Bazankova, Oleg A. Suvorov**

Abstract. Controlling bacterial growth in expired products and reducing the number of microorganisms in food waste will increase the volume of processed and reused food products and reduce food waste. A number of studies have shown the effectiveness of non-thermal treatment methods for food products and food waste such as ozonation, ultrasonic wave exposure, ultraviolet irradiation, electrolyzed water exposure, and pulsed electric field treatment. However, the wide range of available studies, often show opposite results, suggesting the need for further research in relation to specific food products and microbial strains. The aim of this study is to investigate and compare the effectiveness of non-thermal treatment methods such as ozonation, ultrasonic wave exposure, ultraviolet wave exposure, electromagnetic and electrostatic fields and their combinations on milk contaminated with *Saccharomyces Cerevisiae* yeast fungi. As a result of the research the most effective non-thermal method of treatment of milk contaminated with *Saccharomyces Cerevisiae* yeast fungi was found, justification of treatment modes was made. The results of the review can be used as a material for further research on extending the shelf life of dairy products by non-thermal treatment methods.

Keywords: non-thermal treatment methods, ozonation, ultrasound, ultraviolet, safety, quality

UDK 641.56:641.85

Development of recipes and technology for dessert products with a low glycemic load to enable their consumption by people with dietary restrictions

**Olga A. Korneva, Maya Yu. Tamova, Tatiana A. Dzhum,
Irina V. Shalamai**

Abstract. The relevance of the material presented in the article is that consumers of food services are increasingly paying attention to their health. In this regard, the demand for desserts without gluten, sucrose, lactose, low-calorie, but at the same time useful due to the high physiological value due to the presence of vitamins, dietary fiber, ash elements is increasing. This request meets modern trends and principles of dietary nutrition, especially for people with diabetes mellitus. In the course of the study, the goal was set to develop a recipe for the appropriate technology for preparing a functional frozen dessert, both low – calorie and having a low glycemic load. The formulation is based on cow's milk and a fruit and vegetable component from the local raw materials of Kuban, characterized by a diverse chemical composition and a low glycemic index. The author's development presented in the article allows you to expand the range of functional frozen desserts for people with dietary restrictions, it is interesting to select prescription components – cow's milk, jerusalem artichoke puree, apple and carrot, the optimal ratio of which allows you to achieve a pleasant taste, original aroma, attractive appearance, whipped consistency. In addition to the high organoleptics, the significance of the developed frozen dessert with fruit and vegetable puree is that this product is preventive against possible deficiencies of vitamins and minerals while maintaining a diet. The identified microbiological

indicators do not exceed the permissible standard level, which guarantees the safety of these products.

Keywords: diabetes mellitus, frozen dessert, overrun, low glycemic load, technology, quality indicators

UDK 663.433

Possibility of intensifying malting through use of a complex of enzyme preparations

Madina B. Khokonova

Abstract. This work is devoted to identifying changes in the amylolytic activity and physicochemical parameters of malt when they are treated with a complex of enzymes. For malting, spring barley varieties were used: Priazovsky 9 (brewery) and Viscount, approved for use in the North Caucasian region. The following enzymes were used for malting: Elzym PGA, Elzym PC, Elzym BMA, Elzym BAT, Elzym KS. To enhance the action of the enzymes, a dienzyme composition (DEC) was prepared, consisting of Amylosubtilin G3x + Ceremix 6X MG in a 1:1 ratio. The addition of all enzymes helps to increase the amylolytic activity of malt compared to the control. Malt samples prepared using Elzym KS had the highest amylolytic activity. Studies have shown that the addition of (DEC) at a concentration of 0.1% by weight of the grain during malting increases the amylolytic activity of freshly sprouted malt compared to the control and malt samples in which the drugs were added individually. It was determined that the malt obtained using Elzym KS had the best dissolution. In both varieties this can be judged by the increase in extract content, the content of reducing substances and amine nitrogen. The malting barley variety Priazovsky 9 stood out for the better. The use of DEC made it possible to improve the quality of the malt; increase extractivity, Kolbach number, content of fermentable substances of laboratory wort – amine nitrogen and reducing substances, reduce viscosity and increase the amylolytic activity of malt enzymes. To improve the quality of malt obtained from domestic barley varieties, we can recommend DEC and Elzym KS.

Keywords: malting, barley varieties, enzyme complexes, amylolytic activity, quality indicators, extract content

UDK 641.1/.3

Using aquafaba in the production of berry mousses

**Natalia T. Shamkova, Tatyana A. Simonenko,
Tatyana V. Tyutyunik, Veronika O. Yakusheva**

Abstract. The aim of the research was to develop a technology for sweet dishes using a decoction of legumes - aquafaba and to evaluate their consumer properties. A comparative assessment of the quality of aquafaba from white beans, red beans, lentils, chickpeas and edamame beans obtained in a specialized workshop of the LUBO restaurant chain in Krasnodar showed that aquafaba from edamame beans has the best organoleptic and foaming properties. In comparison with the control sample, the whipping of aquafaba from edamame beans was 19.5% higher. It has been established that aquafaba from edamame beans contains 4.62% protein, 10.6% carbohydrates, more than 4.5% organic acids, is rich in minerals: potassium – 278.80 mg%,

sodium – 267.50 mg%, calcium – 47.50 mg%, magnesium – 34.20 mg%, phosphorus – 92.00 mg%, and also contains zinc, copper, etc., which justifies the feasibility of its use in the production of sweet dishes with a whipped structure. The influence of whipping temperature from plus 4°C to plus 55 °C, whipping duration from 5 to 15 min and whipping intensity from 600 to 1000 rpm on the organoleptic assessment, whipping and foam stability after 30 min of edamame bean aquafaba was studied. Regression analysis was performed in Statistica v.10, and the mathematical programming problem was solved in MathCAD v.15. The optimal parameters for whipping edamame bean aquafaba were established: temperature plus 4°C, whipping duration 10 min, whipping intensity 1000 rpm. Taking this into account, the technology and recipes for berry mousses with aquafaba were developed. The quality indicators of blackcurrant mousse and raspberry mousse with aquafaba were studied. It was found that after 24 hours of storage at a temperature of plus 6°C, their structural and taste characteristics did not change. The developed products comply with the hygienic standards for quality and food safety indicators of TR CU 021/2011. Due to the absence of egg products, lactose and gluten, these products can be used in dietary nutrition. The practical significance of the study lies in the adaptation of technological modes for the production of mousses with aquafaba to the conditions of public catering establishments.

Keywords: aquafaba, whipping mode, mousse, berries, technological scheme, formulation, nutritional value