

BIOLOGICAL SCIENCES

UDK 639.31.574.55(470.64)

The role of natural factors in the formation of the composition of surface waters of the KBR

Lyudmila A. Kazancheva, Anita A. Mirzoeva, Yulia A. Kumysheva

Abstract. Natural phenomena and human activity have a great influence on the ecological state of hydrosystems. Therefore, the study of the influence of various factors on the formation of the composition of surface and ground waters is relevant. The aim of the study was to assess the ecological and hydrobiological parameters of small water bodies on the territory of the Kabardino-Balkarian Republic (KBR). The seasonal features of surface water quality (content of mineral components, organic substances, pH, alkalinity, gas regime) in five ecological and climatic zones of the KBR were studied. An indicator of the amount of organic substances in water is its oxidizability. Low oxidability indicates the poverty of water in nutrients. At the same time, planting a large number of fish per unit area in ponds, fertilizing ponds and feeding fish also negatively affect water quality. The permanganate and bichromate oxidizability of water as an indicator of the content of organic matter in the studied reservoirs ranges from 4.7 to 16.0 and from 20.4 to 34.7 mg O₂/l, respectively, and reaches the highest rates in IV, V ecological and climatic zones. There is an increase in daily fluctuations in oxygen content. The active reaction of water (pH) in all ecological and climatic zones of the republic is expressed as 6.4-7.5. There are no large changes in pH during the season. Taking into consideration the overall ecological and hydrochemical regime of reservoirs located in different zones, it can be noted that, despite the various environmental conditions and features of the formation of salt composition, the physicochemical parameters of reservoirs were characterized by values that did not go beyond the limits that determine the possibility of conducting hydrobiological processes. Small water resources are in this regard are exceptions located in the I ecological and climatic zone. Therefore, when intensifying fish farming, it is necessary to create conditions that ensure the normal functioning of aquatic organisms.

Keywords: natural resource, substance, monitoring, habitat, hydrology, hydrochemistry, hydrobiology

UDK 574.42/.45(470.64)

Primary biological production and biodiversity of pasture ecosystems of Kabardino-Balkaria

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Abstract. One of the urgent environmental problems is the pasture digression of meadows and subsequent soil deflation. This problem is typical for mountain pastures that are constantly in economic circulation. The aim of the study was to study the current state of pasture ecosystems in the Kabardino-Balkarian Republic (KBR) on the basis of monitoring biodiversity and assessing primary biological production. According to the results of ecological monitoring of pasture ecosystems of the Zolsky district of the KBR (2018-2020), a significant floristic diversity was established, due to the heterogeneity of edaphic and orographic factors. The yield of pastures on average for the pasture period varies from 7.2 to 16.6 c/ha of eaten dry mass.

According to monitoring data, about half of the surveyed phytocenoses are subject to moderate and severe pasture digression. The range of variation in species richness is from 8 to 32 species, projective cover – from 58 to 100%, herbage height – from 20 to 63 cm, and productivity of aboveground phytomass – from 0.07 to 0.22 kg/m². According to the correlation analysis, the biological productivity and biodiversity of pasture ecosystems are determined mainly by the level of pasture digression (strong negative relationship). The result of excessive grazing pressure is the formation of unproductive secondary plant communities of non-edible, poisonous and weed grasses, a decrease in biodiversity, and the development of erosion processes. Restoration of degraded pasture ecosystems is possible on the basis of rationing of pasture loads, compliance with the timing of grazing, phytomelioration using perennial grasses, and short-term isolation of pastures from grazing.

Keywords: pasture ecosystem, phytocenosis, primary biological production, biodiversity, projective cover, pasture digression, soil erosion

AGRONOMY, FORESTY AND WATER MANAGEMENT

General Farming and Crop Production

UDK 633.853.52:631.524.84

Varietal specificity of soybeans in the formation of productivity and yield elements in the conditions of the steppe zone

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Abstract. The article analyzes the results of studies on the formation of photosynthetic and symbiotic apparatuses and their activities in increasing the productivity of soybean plants in the zone of insufficient moisture in Kabardino-Balkaria, carried out in 2020-2022. The purpose of the research is to study the effect of seed inoculation on the indicators of photosynthetic and symbiotic activity during the growing season of soybean plants. It was noted that promising soybean varieties Selecta 302, Olimpia, Vilana and Shama, grown in the same soil and climatic conditions, have different indicators for all elements of productivity. The best varieties were identified, characterized by high rates of photosynthetic and symbiotic activity, which, in turn, contribute to an increase in soybean productivity. Soybean varieties Selecta 302 and Olympia are characterized with maximum values (31.9-31.8 thousand m²/ha and 3.2-3.1 g/m² per day, respectively) in terms of leaf area and net productivity of photosynthesis. Soybean varieties showed indicators lower and amounted Vilana and Shama, these were to 30.3-30.0 thousand m²/ha and 2.8-2.6 g/m² per day, respectively. The accumulation of dry matter in plant organs was also more efficient in soybean varieties Olympia and Selecta 302, amounting to more than 4.5 t/ha. The symbiotic apparatus of these varieties was also characterized for the better indicators. The mass of active nodules and fixed air nitrogen were 5-8% higher than in other varieties. The main parameters that provide an increase in the yield structure indicators are substantiated. The mass of seeds of one plant of the variety Selecta 302 was about 8 grams. Due to the effective activity of the photosynthetic and symbiotic apparatus, the soybean varieties Olimpiya and Selecta 302 formed a higher seed yield (1.88 and 1.94 t/ha) than the soybean varieties Vilana and Shama (1.71 and 1.67 t/ha). The protein content in the seeds is at the level of 41-42%, that means, there hasn't been big difference between the varieties.

Keywords: soy, photosynthesis, symbiosis, nodules, biological nitrogen, yield, quality

UDK 633.854.78(470.64)

Formation of the crop of sunflower seeds depending on the growing conditions in various zones of the Kabardino-Balkarian Republic

Yuri M. Shogenov, Aliy L. Boziev

Abstract. The article analyzes the results of studies on the study of sunflower hybrids in the conditions of vertical zonality of Kabardino-Balkaria. Field experiments were laid during 2020-2022. in the soil and climatic conditions of the steppe, foothill and mountain zones. An agronomic assessment of the cultivation of sunflower hybrids in various soil and climatic conditions of Kabardino-Balkaria is given. The most adaptive and productive sunflower hybrids have been identified. The vegetation period of the studied hybrids was 124-134 days, field germination varied from 91.5 to 94.1%. In the conditions of the steppe zone, the leader in seed yield is the Sanmarin 421 hybrid – 29.6 c/ha, with a deviation from the standard of 9.2 c/ha, Master – 26.7 c/ha, with a deviation of 6.3 c/ha and Kuban 931 – 25.8 c/ha, with a deviation of 5.4 c/ha. In the foothill zone, the hybrids showed the highest yield: Sanmarine 421 – 31.7 c/ha, with a deviation from the standard of 7.9 c/ha, Kuban 931 – 29.6 c/ha, with a deviation from the standard of 5.8 c/ha and Master – 26.5 c/ha, with a deviation from the standard of 2.7 c/ha. In the mountain zone, hybrids: Lakomka – 26.0 c/ha, with a deviation from the standard of 4.4 c/ha, and Donskoy 22 – 26.20 c/ha, with a deviation from the standard of 4.6 c/ha. The oil content of sunflower hybrids varies within 43-54%. The highest oil content (53-54%) is found in the hybrids Rodnik, Master and Flagman, and the lowest content was found in the Lakomka hybrid (43-46%).

Keywords: sunflower, hybrids, field germination, crop thinning, yield, oil content, profitability level, sunflower cultivation technology

UDK 633.11:631.559(470.64)

The influence of predecessors on the yield of winter wheat in the zones of the Kabardino-Balkarian Republic

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Abstract. The article presents the results of field experiments conducted in 2020-2022. in the steppe, foothill and mountain zones of the KBR. The influence of predecessors on the yield of various varieties of winter wheat was studied. Field germination of winter wheat by varieties and predecessors ranged from 62 to 80%. Field germination of the Cheget variety (76, 80%) is higher than that of the Tanya and Yuzhanka varieties, regardless of the predecessor. The accumulation of nitrogen in winter wheat plants depends more on the predecessor than on the variety. On average, for varieties, winter wheat plants accumulated nitrogen in the earing phase for the alfalfa precursor – 2.24 mg/per 1 kg of dry weight, for the pea precursor – 2.61 mg/per 1 kg of dry weight. The dependence of obtaining high yields of winter wheat on varieties and predecessors has been established. Among the studied non-fallow predecessors, a higher yield is achieved by placing winter wheat varieties on peas. Among the studied varieties of winter wheat, the Cheget variety is more productive. When cultivating the winter wheat variety Tanya in various soil and ecological conditions of Kabardino-Balkaria, the best predecessors are peas and alfalfa: the yield increase is 30.9% and 26.7%, respectively, compared with the sunflower predecessor. Compared to the mountainous zone, the steppe and foothill zones are the most favorable for growing this valuable crop, where the increase in yield is 4.7% and 8.3%, respectively.

Keywords: winter wheat, varieties, predecessors, nitrogen accumulation in plants, yield

Horticulture, Vegetable Growing, Viticulture and Medicinal Crops

UDK 634.75:631.8

Evaluation of the use of growth regulators for the development of the root system of seedlings of "Tray" strawberries

**Khusen M. Nazranov, Elena M. Egorova, Elena I. Stepanyan,
Adam A. Abregov, Beslan Kh. Nazranov**

Abstract. The article deals with the production of strawberry planting material using growth regulators. The experience of production, including the conditions of the Strawberry Polyana Plus farm, shows that the transition of strawberry seedlings from Frigo to its own production of Tray seedlings increases the number of produced products, reduces economic costs and increases its environmental safety. The use of this type of seedlings is an advanced, effective and rational agricultural approach both in berry growing and in landscaping. The purpose of the research is to study the effectiveness of the use of biologically active preparations Vitazim, Maxifol Rutpharm for seedlings of strawberry culture using the "Tray" technology. According to the indicators of the formation of the root system in the uterine material of the "Tray" type in the variants of the experiment with the use of stimulating drugs, they have an increase in all the indicators considered. The drug Maxifol Rutpharm has an active influence on the development of vegetative organs and, above all, on its biometrics and quality characteristics. The use of Maxifol Rutpharm allows you to increase the mass of the root system twice, the number of roots by 27.2%. When visually assessing the state of quality indicators against the background of the use of Maxifol Rutpharm, on a 4-point scale, the Asia and Alba varieties were rated at 4 points and the Roxana variety was rated at 3 points.

Keywords: growth regulators, seedlings, root system, strawberry culture, Tray technology

UDK 634.22:631.559/.8

Agrochemical properties of grey forest soils and the effect of nitrogen fertilizers on the yield of plum trees on slopes

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Alim B. Uyanaev**

Abstract. The article presents the results of studies conducted in the foothills of Kabardino-Balkaria at an altitude of 500-550 m above sea level in a garden on sloping lands with grey forest soils. The purpose of the research: optimization of the mineral nutrition regime of plum trees on the sloping lands of the KBR. An agrochemical analysis of soil sections was carried out in two areas: a) virgin soil, b) terrace canvas. The low content of the main elements of nutrition and humus, with the exception of potassium, was found. In the virgin area from a depth of 30 cm and below, there was a sharp decrease in the content of humus – up to 0.35-0.45% and nitrates – up to the value of "traces". The content of mobile forms of phosphorus and potassium increased with depth: P₂O₅ – from 1.0 mg/100g of soil in the 0-10 cm soil layer to 23.8 in the 70-100 cm layer, K₂O – from 21.0 to 26.0 mg/100g of soil, respectively. Ammonia nitrogen was distributed more evenly – in the range of 7.8-4.8 mg/100g of soil in layers from 0-10 to 70-100 cm, pH – from 5.7 to 6.5. On the canvas of the terraces, the level of nutrients remained similar, however, due to the mixing of soil layers, a more uniform distribution of elements across the layers was observed. In

the 2010 there was planting garden of Kabardian early plums on a seedling rootstock (cherry plum) with a 5×3 m planting scheme with contour placement of rows and natural blackening, the yield on average for 3 years of research in the variants of experiment N30, N90, N120, N150, N180 was, respectively: 28.6; 31.2; 32.2; 35.2; and 36.0 t/ha or an increase from the 1st option to the 5th – 7.4 t/ha (25.7%). On a virgin plot in plum orchards, it is recommended to use increased doses of nitrogen fertilizers. The introduction is proposed to be carried out in 2 stages: the 1st part – at the beginning of spring, the 2nd part – after the end of blossom.

Keywords: sloping lands, terracing, nitrogen fertilizers, plums, yield

ANIMAL SCIENCE AND VETERINARY MEDICINE

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

UDK 636.59:636.082.474

Atlas of biological control of incubation of quail eggs. Consequences of thermal impact on quail embryogenesis

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Abstract. A study was carried out in order to form a graphic atlas for biological control of the incubation of quail eggs in the period from laying to hatching under regulatory conditions in comparison with thermal effects on embryogenesis. As a result of the identification of the consequences of incubating eggs in conditions of low air temperature, it was found that the incubation mode with a decrease in temperature leads to a decrease in the output of quail in comparison with the regulatory regime, an increase in the number of abnormal changes in the development of the organism. An increase in air temperature during 16 days of incubation of quail eggs leads to a mass waste of up to 90% from the 10th day of embryo development, which makes it impossible to hatch quail in conditions of constant air temperature in the incubator at 39.1°C. Thus, critical periods in the embryogenesis of quails have been established, leading to fatal outcomes under thermal exposure during egg incubation. Morphometric, photographic and zootechnical evidence of the impossibility of violating the incubation regimes of quail eggs within the violation of $\pm 1.5^\circ\text{C}$ from the norm of 37.6°C is shown. Visual examples of incubation waste are given. The results obtained in the study can be used for biological control of incubation in quail farms as a visual aid.

Keywords: atlas of biological control, incubation of quail eggs, thermal effects, embryogenesis, brood of quail, anomaly of quail development

UDK 636.2:636.084

Indicators of protein metabolism of cows after childbirth and under the influence of therapeutic and prophylactic agents

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Abstract. The article is devoted to the study of changes in the immunobiological reactivity of the body of cows in the postpartum period and under the influence of vitamin A and trivitamin (vitamin A, D₃, E). The relevance of the study lies in the fact that the role of immune and other

factors in the violation of the reproductive function of cows and the influence of therapeutic and prophylactic agents on them is of significant interest for the development of dairy farming in predicting the productive qualities of offspring and purposeful selection of replacement young animals in the conditions of agricultural production of the Kabardino-Balkarian Republic. The purpose of our research is to study the effect of replenishing vitamin A deficiency in the body of cows on reproductive functions and the state of the immune system. The studies were carried out in 2020-2022 at the Department of "Veterinary Medicine" of the Kabardino-Balkarian State Agrarian University, on peasant (farmers) farms of the KBR on animals of the Holstein breed of black-and-white color with a high level of zootechnical registration. The results of the studies have shown that it is extremely important to know that among the many factors affecting reproduction, various types of immunobiological reactions that occur spontaneously in circulating blood or in the genital tract have a special place. The positive effect of the provision of the body of cows with vitamin A on the nature of protein metabolism has been found out, in this case, in the direction of strengthening the processes of assimilation (a significant increase in the content of total protein in cows treated with vitamin A, primarily due to the albumin fraction on the 10th and 20th day after birth).

Keywords: cattle, postpartum period, vitamins, protein fractions

Breeding, Selection, Genetics and Biotechnology of Animals

UDK 636.22/.28.082.26

Crossing dairy and combined cows and heifers with bulls of meat breeds

**Rustam Z. Abdulkhalikov, Mukhamed M. Shakhmurzov, Timur T. Tarchokov,
Anatoly F. Shevkhuzhev**

Abstract. This article substantiates the role of industrial crossing of cattle in order to increase meat productivity and improve the quality of beef. This type of breeding is used for rearing only user animals, i.e. first generation crossbreeds. Individuals of two or more breeds are selected for hybridization in order to produce higher quality meat products, dairy, egg and others. At the heart of the increase in production and economic-useful characteristics, while maintaining feed consumption, is the phenomenon of heterosis. The difference between a complex-variable cross and a simple one is that individuals from a simple cross are intended to produce products, and from a complex queen they are used for further breeding. It should be noted that after a homogeneous (simple) crossing of two parental forms and obtaining a hybrid of the first generation, further breeding of such individuals stops. In cattle breeding, in order to increase the meat content of individuals of the meat direction of productivity, the use of cows of dairy and meat breeds is allowed. Crossbreeds with predominantly heterozygous traits not only have high production and productive performance, but also have high adaptive properties, including production stress. However, this requires appropriate maintenance of containment conditions. The use of two individuals of specialized meat breeds for breeding makes it possible to obtain animals with exceptional production characteristics in the first generation. However, due to the existing farming conditions, programs are being successfully implemented that include intensive beef production technologies. This implies the industrial crossing of cows of a combined or dairy direction with beef bulls. The article contains a review of scientific materials on industrial crossing to increase meat productivity in cattle breeding, an analysis and generalization of the content of previously published scientific papers in the period from 1939 to 2021.

Keywords: cattle, breed, industrial crossing, heterosis, heredity, meat productivity, hybrid calves, crossbreeding efficiency

The influence of the productive potential of female ancestors, methods of keeping and milking technologies on the indicators of milk productivity of first-calf heifers of the Holstein breed

**Orest A. Basonov, Rustam Z. Abdulkhalikov, Timur T. Tarchokov,
Anna S. Kulatkova**

Abstract. The article studied the dependence of the milk productivity of the first-calf heifers of the Holstein breed on the method of keeping and milking technology of the first-calf heifers in the conditions of LLC "Plemzavod named by Lenin" Koverninsky district of the Nizhny Novgorod region. The coefficient of milk production was calculated, the live weight was determined. It has been established that the method of keeping first-calf heifers and the technology of milking cows affect the productive indicators of cattle. So, with the highest live weight of cows kept in a tethered way (559 kg), first-time heifer cows with a robotic milking system (8617 kg) have the highest milk yield. With tethered and loose housing with robotic milking technology for cows, the milk yield (1534.3 and 1556.4 kg, respectively) exceeds the value of the group of cows kept loose with automatic milking of the "Carousel" type by 5.7% and 7.2% respectively. It has been established that the highest milk yield for 305 days of lactation (8590 and 8617 kg) and the mass fraction of protein characterized to cows with tethered and loose housing (in a robotic farm), and the largest mass fraction of fat (4.05%) in cows with loose housing. With a tie-down method of keeping, a weak positive (0.10) relationship between milk yield and the mass fraction of protein was revealed, and a weak negative relationship was found with loose keeping with automatic (-0.22) and robotic milking (-0.26). The average negative dependence of milk yield and mass fraction of fat was characterized to cows with a tie-down method of housing (-0.53) and free-range with automatic milking technology (-0.47).

Keywords: milk yield for 305 days of lactation, live weight, content, tethered, loose, automatic, robotic, milking, milking ratio, mass fraction of fat and protein, realization of genetic potential, parental index of cows, correlation coefficient, heritability coefficient

AGROENGINEERING AND FOOD TECHNOLOGIES

Technologies, Machines and Equipment for the Agro-industrial Complex

Ensuring the required accuracy of the relative position of parts during assembly of the engine crank-ring mechanism

Aslan K. Apazhev, Yuri Kh. Shogenov, Yuri A. Shekikhachev

Abstract. The article presents methodological approaches to solving an urgent problem – ensuring the required accuracy of the relative position of parts when assembling the crank mechanism of diesel engines. The task of analytical modeling of the technological operation of assembling and centering the piston of the crank mechanism in the engine cylinder is reduced to a mathematical description of the appearance and change of piston distortions as a function of production errors in the relative position of the base surfaces of the parts that make up this mechanism, as well as the angle of rotation of the crankshaft. The studies were carried out taking

into account the fact that the assembly accuracy of the crank mechanism can be assessed by two complex parameters: the piston misalignment, which includes the total technological errors in the shape and relative position of the service surfaces of the engines, and the over-piston clearance. A theoretical relationship has been obtained that makes it possible to unambiguously determine the change in the mounting gap between the cylinder liner and the piston as a function of the error in the mutual arrangement of the axes of the main connecting rod journals of the crankshaft, as well as on its angle of rotation. A mathematical model of the technological assembly operation of piston alignment in the cylinder has been developed, the implementation of which allows one to unambiguously approach the solution of questions about the need, possibility, and ways to eliminate compensation for excessive parasitic overlaps of the mounting gap between the piston and the cylinder liner. Calculations using the YAMZ-240 diesel engine as an example showed that, under the condition of limiting the non-assembly of the assembly when the piston axis is shifted relative to the sleeve axis to the left and right by a probability value of 0.0227, disassembly of the piston group using the interchangeability method is possible only if the misalignment of the axes elementary cylinders of the piston and sleeve in the most remote section will not exceed 0.118 mm.

Keywords: diesel engine, piston, cylinder, misalignment, clearance, accuracy, probability, modeling

UDK 621.762.04

Scientific substantiation of the method for studying the concentration distribution of components in composite materials of technical tools

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Abstract. The article considers the process of formation of a liquid phase in the contact of dissimilar metals at a temperature below the melting point of the most fusible component. The resulting liquid diffusion zone after crystallization gives an effect equivalent to the creation of a new material, the properties of which differ from the properties of each individual component involved in this process. The prospects of this direction are obvious for the creation of new composite (structural) materials with the required structure and properties in technologies and technical means of the agro-industrial complex. The article focuses on the description of methods for finding the concentration distribution of components in diffusion zones obtained by the method of contact melting, carried out in a non-stationary-diffusion mode. Date Nowadays a number of methods have been developed that are used by researchers: thermo-EMF, repeated melting, reference points, selection of liquid layers, etc. The analysis of the above mentioned methods for finding the concentration distribution of components in diffusion zones obtained by contact melting indicates their disadvantages and advantages. It is noted that a significant disadvantage is the study of components in diffusion zones in the solid state, the structure of which differs significantly from the liquid state. This disadvantage is solved to a certain extent in the method of liquid layers. For the first time, the dependence of the concentration distribution of components in the bismuth-tin system in the lower part of the contact layer has been constructed. A non-linear course of tin change along the indicated zone is established. On the basis of the studies carried out by X-ray photoelectron spectroscopy, the concentration distribution in the complex system bismuth – (tin + 3 at. % indium) was studied, which made it possible to establish the effect of impurities on the desired course of the concentration distribution – it turned out that the impurity differently affects the process of distribution of components depending on the conditions of the experiment.

Keywords: composite (structural) material, contact melting, concentration distribution, eutectic systems, thermostat, diffusion zone, contact layers, component

UDK 620.22

Study of the strength of structural materials of agricultural machinery parts

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Abstract. The article is devoted to the current problem of creating high-strength composite materials for their use in nodes and parts of agro-industrial equipment. An effective way to solve this problem is to create an oriented structure in the polymer material and strengthen it with dispersed fillers. The purpose of this work is to study the strength of oriented polymer composites within the framework of modern physical concepts. This purpose is realized on the example of an oriented polymer composite based on ultra-high molecular weight polyethylene obtained by solid-phase extrusion. Dispersed particles of aluminum and bauxite were used as a filler. To create an oriented structure in a polymer composite, plunger extrusion has been used in the work, based on the combination of the monolithization process and orientation extraction. The possibility of describing the strength of oriented dispersion-filled polymer composites within the framework of existing theoretical concepts, taking into account the possibilities of voltage transmission through interphase boundaries, is considered. It has been established that the degree of adhesion plays a dual role in this process; its weakening increases the degree of molecular extraction, which has a positive effect on the interfacial strength and at the same time increases the relative proportion of the microplasticity. It is found that the integral consequence of the weakening of the interfacial adhesion is a decrease in the strength of the composite.

Keywords: composites, ultimate strength, ultrahigh molecular weight polyethylene, degree of extraction, interfacial strength, Leidner-Woodhams equation, microplasticity

Food Systems

UDK 641.56

Functional formulations with suspensions, fortified with micronutrients

Anna T. Vasyukova, Irina U. Kusova, Rostislav A. Edvars, Mounir Talbi

Abstract. The authors present a method for introducing flour from whole grain crops (oatmeal/rice/corn), determining the hydromodulus of flour suspensions, which are obtained from the specified type of flour in dry form, pour drinking water at a temperature of 4-6°C in a ratio of 1:1.7 per twenty minutes, a chicken egg is used as an egg product. A technological scheme for the preparation of a suspension has been developed, the dynamics of the accumulation of micronutrients in enriched semi-finished freshly prepared products, and during storage, has been studied. The paper presents the formulation of cutlets with flour suspensions based on grain crops, the retention of nutrients in cutlets depending on the duration of storage of the semi-finished product in a chilled state (at a temperature of 4-6°C) have been studied. The authors studied the influence of the constituent components of the recipe on the structural-mechanical and organoleptic characteristics of semi-finished cutlets with this suspension. The results of a study of the nutritional value of specialized food products based on minced meat with dietary supplements from vegetable raw materials are presented. When adding a flour suspension, sample No. 1 is maximally enriched in the formulation of which buckwheat flour, potassium, calcium, magnesium, phosphorus and iron is included. The second place in terms of saturation with minerals was given to sample No. 3 with cornmeal, which is somewhat inferior to the previous semi-finished meat product, but compared to the control one, is enriched with

potassium, calcium, phosphorus and iron in slightly lower concentrations than sample No. 1. Storage over 12 hours of refrigerated semi-finished products is undesirable due to a decrease in water-holding capacity. The developed technology provides an expansion of the range of functional semi-finished minced meat products for preventive nutrition, increased biological value and improved functional, rheological properties.

Keywords: functional formulations, water-holding capacity, suspensions, enrichment, micronutrients, plant materials

UDK 641.5:637.146

Increasing the consumer properties of the national sauce tuzluk

**Amina S. Dzhaboeva, Anna T. Vasyukova, Irina U. Kusova,
Alena A. Ismailova**

Abstract. Traditions associated with the nutrition of the people are an integral part of their material culture. They were formed under the influence of natural, historical and socio-economic factors. Therefore, the dishes of folk cuisine largely correspond to the climate and lifestyle of each people and are physiologically appropriate. Rational nutrition cannot be built without taking into account local conditions, national tastes and traditions that have developed over many centuries in relation to the economic structure, the level of technological development and living conditions. At present, the recipes and methods of preparing national dishes need a critical analysis, taking into account the latest data from modern nutrition science. Monitoring of the actual nutrition of the population of the North Caucasus revealed the need to optimize the nutritional status. Numerous data indicate a deficiency of vitamins and minerals in diets. One of the traditional fermented milk products most often consumed by the population with meat is tuzluk sauce, which is characterized with a high fat content and a low content of micronutrients. In order to increase the nutritional value of the product, it is proposed to produce it on the basis of sour cream enriched with a multivitamin complex 730/4 with the addition of parsley and dill, containing a wide range of macro- and microelements. The results of the study of the effect of various dosages of green vegetables on the organoleptic quality indicators of tuzluk made it possible to establish the optimal proportions of parsley and dill in the recipe, at which the highest rates are achieved – 3.5 and 1.5% by weight of the sauce, respectively. The data of the chemical composition of the sauce indicate that the use of sour cream in the production of brine, developed with a multivitamin premix 730/4 and the introduction of parsley and dill into the recipe, leads to a significant increase in the vitamin value and improvement of the mineral value of the product.

Keywords: national cuisine, fermented milk products, tuzluk, recipe, vitamin premix, enrichment, green vegetables, minerals

UDK 664.64:633.432

Formation of the quality of bakery products with products of processing of vegetable raw materials

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Abstract. One of the most rational ways to improve the consumer properties of bakery products is the use of processed vegetable raw materials as a recipe ingredient, including powdered semi-finished products from carrot varieties cultivated on the territory of the Kabardino-Balkarian

Republic. Carrots have a rich chemical composition. Carrot roots contain: carotenoids (α -, β -, γ -carotenes), B vitamins, ascorbic acid, mono- and disaccharides, dietary fiber, macroelements and microelements. The processing of carrots into a powdered product contributes to a longer storage of raw materials, high microbiological and biochemical stability during storage, a significant concentration of nutrients and weight reduction. Carrot powder is an affordable and cheap raw material with a good composition that can effectively affect the properties of yeast dough components and improve the quality of finished products. The influence of carrot powder on the baking properties of wheat flour of the first grade was studied; physico-chemical, structural-mechanical and organoleptic indicators of the quality of bakery products. It has been established that the introduction of carrot powder into the recipe of bakery products in an amount of 2 to 6% by weight of flour leads to the strengthening of the gluten framework of the dough and the activation of the fermentation process, which reduces the duration of dough preparation. Carrot powder in the recipe of bakery products helps to increase the acidity, specific volume, porosity and compressibility of the crumb in test samples by 4.3-13.0%, 2.5-6.9%, 1.3-4.0% and 3.8-10.3%, respectively, compared with the control. The best consumer properties are characterized by products with carrot powder in the amount of 4% by weight of flour in the recipe of bakery products.

Keywords: carrot powder, first grade wheat flour, technological properties, bakery products, quality

UDK 664.661:634.74

Study of the effect of a vegetable additive from sea buckthorn fruits on the rheology of dough and the quality of bread

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Abstract. Improving the quality of food provides for scientific research aimed at the prevention of alimentary-dependent diseases and the development of food technologies with a directed biological effect through the use of natural ingredients. The mass consumption of bread gives reason to consider it as a product with exceptional potential and significance for improving the quality of nutrition and protecting the body from the effects of harmful environmental factors. In this regard, the aim of the research was to study the fractional composition of pectin in phytopowder from sea buckthorn fruits, to assess its effect on the rheological characteristics of the dough, the quality of wheat bread, sorption capacity and shelf life. Phytopowder from buckthorn fruits; wheat flour of the first grade; experimental bread samples were used as objects of research. The fractional composition of pectin in sea buckthorn powder was determined – 2.2%. It was found that the introduction of sea buckthorn powder when kneading dough in an amount of 2-3% increases the water absorption capacity, kneading time and dough dilution. It is shown that the introduction of phytopowder in a dosage of 2.3% improves the quality characteristics of bread produced on fermented yeast semi-finished product and prolongs the shelf life. The sorption capacity of bread with sea buckthorn powder exceeded the indicator of the control sample by 4.7 times and amounted to 187mg Pb²⁺/g. The proposed recipe of wheat bread with a dosage of 2% by weight of flour allows you to get a high-quality product, which, thanks to the sorption ability, can be recommended as a therapeutic and prophylactic product.

Keywords: sea buckthorn fruits, phyto powder, pectin, flour, dough rheology, yeast semi-finished product, bread quality, sorption capacity

Changes in the physico-chemical parameters of apple sparkling wine during storage

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Abstract. This work is devoted to the determination of the physicochemical parameters of freshly prepared wine materials and apple sparkling wine at various periods of storage. The objects of research were apples of summer ripening varieties – Melba, Pepin saffron, Fortuna, White Sun, apple wine material and ready-made sparkling wine. 2 types of sparkling wines were subjected to the study: apple sparkling light with an alcohol content of 6–9% vol. and apple sparkling 10% vol. The wine was stored at a temperature of 8-10°C for a year. Samples of apple sparkling wine were prepared from the wine materials of apples harvested in 2021 and 2022. It was determined that during the storage of fermented juices during the year there was a slight decrease in the value of the redox potential; in the process of secondary fermentation of materials, it also decreased in all samples. It has been established that in the process of secondary fermentation, the content of e-glycerin in all samples increases, regardless of the period of preparation of the wine material. One of the important factors in determining the quality of apple sparkling wine is its shelf life. The content of higher alcohols, glycerol, 2,3-butylene glycol and volatile acids did not change significantly during 3 months of storage. Tasting samples of sparkling cider after 3 months of storage showed that all samples retained well the original taste, aroma and appearance. Samples from Melba and Fortuna received the highest rating.

Keywords: apples, varieties, raw materials, wine material, wine, shelf life, composition, quality

Influence of melange on the quality of biscuit dough

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Abstract. The article presents the results obtained in the study of the effect of melange on the quality of biscuit dough. It is revealed that the foaming ability of the melange significantly depends on its viscosity – the higher the viscosity value, the lower its foaming ability and the higher the foam stability. When the viscosity of the melange is 3.9-10.2 Pa·s, the density of the whipped egg-sugar mass is 400-445 kg/m³. With a high viscosity of the melange, when moisture is most associated with the egg mass, the liquid phase exfoliates in relatively small amounts – up to 10.0%. With a decrease in the viscosity of the melange, there is a tendency to increase the foaming ability, but the amount of the exfoliated liquid phase increases significantly. An analysis of the quality of the biscuit dough by its density and appearance showed that a well churned fluffy dough is obtained when using a melange with a viscosity of 2.8-3.0 Pa·s. In this case, the density of the material is on average 463 kg/m³. It is established that the optimal temperature of the melange when it is churned down should be considered 10-20°C. Melange churning at low temperatures leads to an increase in the duration of this process, and heating to a temperature of 45°C intensifies the churning process, but this is due to the additional time spent on warming it up.

Keywords: biscuit dough, melange, foaming ability, viscosity, density