**Bulletin 47, March 2019**

|  |
| --- |
| УДК (620.193+620.197.5):620.5.023  **D.A. Archibisov, V.A. Shvetsov, А.B. Doroganov**  **VERIFICATION OF RESULTS OF NATURAL CORROSION TESTS IN STEEL ship hulls OF small-sizeD vessels**  The expediency of verifying the results of natural corrosion tests of steel hulls in small-sized vessels is substantiated by comparing them with the results of diagnostics during production and state control. As shown, the results of measurements performed during our research coincided with the data of state and production control. This confirms the high practical significance of the research, which will allow to create an improved system of state and industrial control of ship protection against corrosion.  **Key words:** corrosion, protective coating, small-sized vessels, ultrasound diagnostics, ship hull’s condition control.  *DOI: 10.17217/2079-0333-2019-47-6-15* |
| УДК [552.8:552322.6](470.5)  **S.V. Sverguzova, I.G, Shaikhiev, Zh.A. Sapronova, R.R. Valiev**  **physical and chemical properties of porphyrite from the “abzakovSKIY” QUARRY (Bashkortostan)**  The physical and chemical properties of porphyrite from the “Absakovskiy” quarry (Bashkortostan) were studied. The processing waste of porphyrite – shards, debris, crumbs, dust, etc. were used for the research. The mineral, oxide and elemental structure of the material were determined by means of X-ray phase analysis. The composition of the porphyrite includes the greatest quantity of SiO2 (52–65 wt %), Al2O3 (15–18 wt %), Fe2O3 (7–12% by weight), CaO (3,5–10,5% by weight). To clarify the chemical composition of porphyrite the energy dispersive studies were carried out with a raster electron microscope Quanta 200-3D with energy dispersive distribution of elements. The relative uniformity of the porphyrite composition and the lack of toxic and radioactive elements were detected. During the study of the porphyrite particles microstructure surface the chips, irregularities, roughness and other defects indicating the energy heterogeneity of the surface were revealed. It is supposed to use processing waste of porphyrite for the pastes, putties, mastics, fillers production as well as for obtaining sorption materials which are applicable in wastewater purification processes.  **Key words:** porphyrite, processing waste, X-ray phase analysis, mineral composition, energy-dispersive spectrum, sorption materials, water purification.  *DOI: 10.17217/2079-0333-2019-47-16-23* |
| УДК 664.68:(582.272+582.273)  **A.P. Krekhnova, M.V. Efimova, А.А. Efimov**  **DEVELOPMENT OF TECHNOLOGY OF CONFECTIONERY FILLINGS WITH BROWN  AND RED ALGAE USED AS POLYFUNCTIONAL ADDITIVES**  The use of fillings with added algae allows to enrich traditional food products with valuable nutrients and ballast substances. The paper presents results of research on the development of fillings for flour confectionery products with brown alariaceaen and red palmariaceaen algae. The amount of algae added to the fillings was specified more rationally: 0,4–0,7% and 0,4–1,7% of the brown and red algae, correspondingly, from the total weight of the fruit base. The parameters of algae preparation and the potential possibility of increasing the amount of red algae in the food fillings were determined. The technology of preparation of food fillings with algae was developed.  **Key words:** *Alaria esculenta*, brown algae, red algae, fillings, confectionery, enrichment, organoleptic characteristics, *Palmaria stenogona*.  *DOI: 10.17217/2079-0333-2019-47-24-32* |
| УДК 637.146.4  **A.V. Mangazeev, V.V. Potapov, D.S. Gorev**  **FINE-DISPERSE DRY PRODUCT OF MILK WHEY CONCENTRATE PRODUCTION**  Rational and full use of milk whey is an urgent task of milk processing. The problem of milk whey utilization is caused by both ecological and economic factors. Using the process of whey membrane concentration, it is possible to obtain a filtrate with physical and chemical parameters corresponding to the permissible limit of environmental safety and to obtain a significant amount of whey concentrate with a high content of nutrients. The analysis of scientific and technical achievements has shown that the production of condensed milk whey is more preferable from an economic point of view, but a product with a dry fine structure is more reasonable for the storage, transportation and consumption. During the experiments on the milk whey thickening by means of reverse osmosis membrane and drying the concentrate in an experimental vacuum sublimation unit the content of harmful substances in the filtrate was minimized to standard indicators. The useful substances contained in the milk whey concentrate were completely preserved in the obtained fine-dispersed dry product. The conducted experiments confirmed the possibility to use the described method of milk whey processing and the effectiveness of the proposed method from economic and environmental points of view.  **Key words:** curd milk whey, dry whey concentrate, chemical composition of whey concentrate, vacuum-sublimation, use of reverse osmosis membrane.  *DOI: 10.17217/2079-0333-2019-47-33-48* |
| УДК 664.93:664.641.2  **N.L. Naumova, A.A. Lukin, V.S. Lyulkovich**  **ON THE DEVELOPMENT OF MEAT PUDING WITH ADDITION OF VEGETABLE RAW MATERIALS**  The possibility of using flour from pumpkin seeds in a dosage of 7% in the meat pudding formulation with high nutritional value by replacing the appropriate amount of beef is scientifically explained in the article. The combined products differ in high consumer characteristics, the changed quantitative structure of proteins, fats, carbohydrates, the raised mineral value, microbiological and toxicological safety. The use of pumpkin flour in pudding technology increases the content of lipids, protein and moisture in the finished products by 18,5; 7,2 and 4,3%, respectively; the vegetable fibers in the meat product in amount of 2,52 ± 0,30 g / 100 g; the content of minerals: manganese (in 5 times), copper (in 2,1 times), magnesium (in 1,9 times), iron (in 1,7 times), phosphorus (45,2%), calcium (5,8%), zinc (2,8%). The average portion of pudding (137 ± 2 g) with the "pumpkin filling" allows with high probability to eliminate deficiency of iron (by 25,5%), copper (by 12,4%), manganese (by 10,2%), phosphorus (by 9,7%), magnesium (by 6,8%) in human organism.  **Key words:** meat pudding, pumpkin seed flour, nutritional value, quality.  *DOI: 10.17217/2079-0333-2019-47-49-54* |
| УДК 664.952  **L.D. Petrova, V.D. Bogdanov**  **CHANGES OF FUNCTIONAL AND TECHNOLOGICAL PROPERTIES  OF MINCED FISH BASED ON DIFFERENT METHODS OF PRODUCTION**  In the production of minced fish from the frozen giant grenadier (Albatrossia pectoralis) with improved functional and technological properties different methods of technological impact such as blanching and salting with simultaneous dehydration, salting combined with defrosting were used. Technochemical and structural mechanical properties, water-holding capacity and organoleptic characteristics were determined in the obtained minced systems. As a control sample the muscle tissue of giant grenadier was used. The studies showed that the minced fish developed in this way is characterized by high functional and technological properties. They have good structural and mechanical properties, high water-holding capacity, good consistency and formability. They are characterized by a moderately dense, elastic consistency. Products made from such minced fish are also characterized by high organoleptic characteristics. The developed technology allows to obtain raw materials suitable for the molded products manufacture with improved quality characteristics and high biological value.  **Key words:** minced fish, methods of technological impact, functional and technological properties, giant grenadier.  *DOI: 10.17217/2079-0333-2019-47-55-61* |
| УДК 637.05:637.5  **R.T. Timakova**  **THE EVALUATION OF RADIATION-PROCESSED PORK FRESHNESS INDICATORS**  As a result of the research it was found that the use of electronic paramagnetic resonance (EPR) method allows with high degree of reliability to detect radiation-processed meat raw materials by main parameters of the EPR signal. The distinctive features of pork (from pigs of different meat productivity) by the ionizing radiation influence are established. Thus, the high intensity of the ESR signal was detected in pork meat in comparison with its value in bacon pork. Radiation processing of pork (absorbed dose of 0,4–0,47 kGr) provides high levels of microbiological raw meat safety and fat goodness, as well as organoleptic characteristics of meat freshness. The reduction of antioxidant activity in radiation-processed pork allows to use the potentiometric method as an indirect method for detecting radiation-processed products and the indicator of antioxidant activity as its indicator.  **Key words:** pork, radiation technologies, EPR method, antioxidants, organoleptic evaluation, microorganisms.  *DOI: 10.17217/2079-0333-2019-47-62-67* |
| УДК 639.3.043.2:639.32:597.423  **V.G. Krymov, S.I. Vershinin, N.A. Yurina, D.A. Yurin,  E.A. Maxim, E.L. Machneva, I.A. Perepelitsa**  **USE OF FEEDS WITH DIFFERENT PROTEIN AND FAT CONTENTS  IN THE PROCESS OF INDUSTRIAL COMMERCIAL GROWING OF STURGEON FISH IN CLOSED WATER SUPPLY INSTALLATIONS**  The comparative analysis of weight indexes of sturgeon fish juvenile, kept in conditions of closed water supply with complete feed application, which contains various concentrations of crude protein and crude fat is presented in the article. As a result of the study, it was found that maintaining of stable and optimal (or close) conditions of keeping provides the conditions for more effective utilization of feeds with reduced energy value. The favorable hydrological regime, the use of specialized production feed for sturgeon, daily feeding rates reduction in comparison with those recommended by the manufacturer for the appropriate temperature conditions and the average individual weight of the object as well as the favorable feeding regime during the industrial commercial growing make it possible to eliminate completely the factor of nitrogen-containing metabolites accumulation in reservoirs for keeping hydrobionts. The use of feeds with lower fat content in conditions of closed water supply installations helps to reduce significantly the risk of excessive fat accumulation in the fish body while maintaining, at an acceptable level, the physiological value and fish-breeding qualities of the object.  **Key words:** sturgeon (*Acipenseridae*), closed water supply installation, mass accumulation, degree of useful feed utilization, feed.  *DOI: 10.17217/2079-0333-2019-47-68-78* |
| УДК 577.152.277:582.739  **S.I. Lavrentyeva, O.A. Terehova, L.E. Ivachenko, K.S. Golokhvast, A.S. Konichev**  **RIBONUCLEASIC ACTIVITY OF SOYBEAN SEEDLINGS under CONDITIONS OF OXIDATIVE STRESS**  The effect of oxidative stress on the activity and multiple forms of soybean seedlings (*Glycine max* (L.) Merrill) ribonuclease (EC 3.1) on the third day under the influence of heavy metals was investigated. The content of malon dialdehyde was determined as an indicator of the lipid peroxidation degree. It was found that under conditions of oxidative stress caused by copper sulfate or zinc sulfate, the specific activities of the antioxidant enzyme catalase (EC 1.11.1.6) and ribonuclease decreased, and the number of multiple forms varied within the control.  **Key words:** *Glycine max* (L.) Merrill, oxidative stress, heavy metals, malonic dialdehyde, catalase, ribonuclease, specific activity, multiple forms.  *DOI: 10.17217/2079-0333-2019-47-79-85* |
| УДК 574.64:561.273  **K.S. Pikula, Zh.V. Markina, A.M. Zakharenko, V.V. Chernyshev, V.V. Chaika, K.S. Golokhvast**  **TOXIC EFFECTS OF VEHICLE EXHAUST PARTICLES ON MARINE MICROALGAE PORPHYRIDIUM PURPUREUM AND HETEROSIGMA AKASHIWO**  The influence of particulate matter (PM) emitted by automobiles, motorcycles and specialized vehicle with different types of engines and powered by different types of fuel on the microalgae *Porphyridium purpureum* and *Heterosigma akashiwo* was studied. Changes in cell size, growth rate, level of esterase activity, membrane potential, chlorophyll *a* fluorescence intensity were used to determine the response of cells to the toxic effects of studied particles. Flow fluorescence cytometry was used to determine all the listed parameters. It has been shown that PM emitted by vehicles powered by diesel fuel have the greatest negative impact on the viability of microalgae and that used microalgae species can be useful test objects for assessing the toxicity level of vehicle emitted particles. It was established that the level of vehicle emitted particle toxicity increases if the volume of the vehicle engine increases. The influence of the mileage and vehicle manufacture year on the toxicological properties of emitted particles was not detected.  **Key words:** particulate matters of the exhausted gases, ecotoxicology, microalgae, test object, *Porphyridium purpureum*, *Heterosigma akashiwo*.  *DOI: 10.17217/2079-0333-2019-47-86-95* |
| УДК [595.384.12:591.342] (265.52)  **N.A. Sedova, O.B. Tepnin**  **Ecology and distribution of caridean shrimps larvae along eastern coast of Kamchatka Peninsula**  Early larvae were distributed over all bottom depths. Ocean currents carry these larvae deeper, sometimes quite far from the hatching site. During early development the larvae migrate to the shore, using compensatory sea currents or moving along large gyres. By the end of the metamorphosis, they appear above the depths suitable for settling to the bottom. The timing of the release of larvae into plankton and the duration of larval development depend on environmental factors, primarily on temperature conditions.  **Key words:** larvae, stage, zoea, distribution, bottom depths, south-eastern Kamchatka, Kronotsky Gulf, Avachinsky Gulf, meroplankton.  *DOI: 10.17217/2079-0333-2019-47-96-108* |
| УДК 591.524.1(282.256.86)  **Y.N. Chekaldin**  **nutrition ecology OF THE benthophagous AND euryphagous FISH**  **IN THE KOLYMA RIVER AND KOLYMa RESERVOIRS**  Regarding the nutrition mode, peaceful fishes inhabiting Kolyma River are divided into two groups, including obligatory benthophagous and euryphagous. The first group includes sturgeon (Acipenser), humpback whitefish, broad whitefish, round whitefish and *Catostomus*, commonly known as suckers. The second group includes Lenoks (otherwise known as Asiatic trout), graylings (*Thymallus*) and common dace (*Leuciscus leuciscus*). The nutrition ecology of fish in the reservoir depends on the intensity of feeding, quantity and distribution of food and also competition for food. In the average flow of Kolyma River, *Catostomus* can compete with whitefishes and sturgeons. In the Kolyma and Ust-Srednekansky reservoirs, *Catostomus* does not compete with other benthophagous fishes.  **Key words:** benthophagous, Kolyma, competition, nutrition, *Catostomus* (sucker), euryphagous, ecology.  *DOI: 10.17217/2079-0333-2019-47-109-116* |