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| Original article  УДК 663.935 DOI: 10.17217/2079-0333-2025-73-8-15  **ANALYSIS OF COLOR CHARACTERISTICS OF COFFEE BEANS USING CONVOLUTIONAL NEURAL NETWORKS**  Frolova N.A.1, Verkhoturov V.V.1, Shkrabtak N.V.2, Aleksandrov I.S.1, Podashev D.B.1, Shcherbakova E.P.1, Snytnikov A.V.1  1 Kaliningrad State Technical University, Kaliningrad, Sovetsky Prospekt 1.  2 Amur State University, Blagoveshchensk, Ignatyevskoye Shosse 21.  Arabica coffee (*Coffea arabica*) is a type of coffee tree with small beans, which belongs to the Rubiaceae family. *Coffea arabica* is one of the types of drinks that, when consumed in adequate (established) doses, can have a positive effect on the human body. This is due to the content of key biologically active compounds such as caffeine, lipids, polyphenols, mineral and aromatic compounds. Consumer properties of finished drinks depend on the stage of roasting coffee beans. In the work, a series of 160 digital images of each batch of experimental samples of coffee beans was made: standard roasted, overroasted and underroasted. To determine the optimal stage of roasting coffee beans, the use of artificial neural networks is proposed in the context of applying the “RGB” and “Lab” models, which contribute to a more accurate analysis of the color characteristics of the samples. The results obtained indicate that with an accurate visual album of color images using the “RGB” model for analyzing food systems from the standpoint of quality control, it is possible to monitor the authenticity of food products, including organoleptic indicators.  **Key words:** coffee beans, underroasted, roasted, overroasted, color analysis. |
| Original article  УДК 664.6 DOI: 10.17217/2079-0333-2025-73-16-27  **INFLUENCE OF PRE-TREATMENT MODES OF HYDROBIONTS USED  IN CONFECTIONERY PRODUCTION ON THEIR DISPERSION DEGREE**  Chmykhalova V.B.  Kamchatka State Technical University, Petropavlovsk-Kamchatsky, Klyuchevskaya Str., 35.  Currently, the organization of proper nutrition of the population is relevant, which involves providing the consumer with not only a high-calorie product, but also a balanced chemical composition, ensuring the consumption of essential nutrients due to the introduction of enriching additives. Sugar confectionery products contain fast carbohydrates, providing high caloric value of food, but have a deficiency of proteins, respectively amino acids, many mineral and vitamin components, which reduces the value of chocolate as a complete food product. Therefore, the introduction of additives based on hydrobionts into the prescription composition simultaneously has the following functions: enriching the product with protein, vitamins and minerals, and, at the same time, reducing the caloric value of the product due to a decrease in the fat and carbohydrates in the composition.  **Key words:** dehydrogenation, cucumaria, enrichment, chocolate. |
| Original article  УДК 664.6 DOI: 10.17217/2079-0333-2025-73-28-36  **USE OF PHYTOPOWDER FROM *HIPPOPHAE RHAMNOIDES* L. BERRIES  IN THE TECHNOLOGY OF CONFECTIONERY PRODUCTS  WITH HIGH NUTRITIONAL VALUE**  Frolova N.A.1, Verkhoturov V.V.1, Shkrabtak N.V.2, Grinchuk M.A.1, Veremey E.E.1  1 Kaliningrad State Technical University, Kaliningrad, Sovetsky Prospekt 1.  2 Amur State University, Blagoveshchensk, Ignatyevskoye Shosse 21.  Sea buckthorn (*Hippophae rhamnoides* L*.*), a shrub belonging to the Elaeagnaceae family, grows everywhere in the Kaliningrad region. *Hippophae rhamnoides* L*.* fruit is rich in biologically active substances (BAS): antioxidants, phenolic compounds, L-ascorbic acid, flavonoids, carotenoids, essential oils, vitamins, etc. When obtaining juice from *Hippophae rhamnoides* L. fruit, a large number of secondary products of their processing remain - pulp, which is of interest from the point of view of its rich chemical composition and rational use of raw materials in the region. During the research, we analyzed the possibility of using *Hippophae rhamnoides* L. fruit phytopowders in the amount of 5; 10 and 15% of the total amount of chocolate mass obtained after squeezing the juice in the technology of obtaining milk chocolate of increased nutritional value. The most optimal sample in terms of increasing the nutritional value, preserving the taste and rheological properties were the experimental samples with the addition of 15% of the *Hippophae rhamnoides* L. fruit phytopowder. Increasing the dosage of the *Hippophae rhamnoides* L*.* fruit phytopowder to 15% led to an increase in the values of the analyzed rheological characteristics, i.e. maximum hardness, total shear energy, cohesivity and stickiness. The experimental samples with the introduction of 10 and 15% of the *Hippophae rhamnoides* L.fruit phytopowders contain approximately 4 times more β-carotene and lycopene.  **Key words**: milk chocolate, nutritional value, sea buckthorn fruit, rheological properties, phytopowders. |
| Review article  УДК 591.9 (571.66) DOI: 10.17217/2079-0333-2025-73-37-53  **INVASIVE HYDROBIONTS IN THE WATERS OF KAMCHATKA**  Tokranov A.M.  Kamchatka Branch of Pacific Geographical Institute FEB RAS, Petropavlovsk-Kamchatsky, Partizanskaya Str. 6.  Based on a summary of the own materials and the available literature data, the appearance of four invasive species of aquatic organisms in the waters of Kamchatka at the end of the XX – early of the XXI centuries - the Siberian stone loach *Barbatula toni*, the marsh frog *Pelophylax ridibundus*, the grass frog *Rana temporaria*, and the Yesso scallop *Mizuhopecten yessoensis* – is considered. Having significantly changed with the help of a human the natural boundaries of their geographic distribution, its species have now formed self-reproducing population groups here and have become part of the fauna of the Kamchatka region.  **Key words:**waters of Kamchatka region, invasive hydrobionts, marsh and grass frogs, Yesso scallop, Siberian stone loach. |
| Review article  УДК 598.2:639.2.081.4 DOI: 10.17217/2079-0333-2025-73-54-74  **THE PROBLEM OF BIRD INTERACTIONS WITH RECREATIONAL FISHING:  A REVIEW BASED ON PRINT AND ONLINE SOURCES**  Artukhin Yu.B.  Kamchatka Branch of Pacific Geographical Institute FEB RAS, Petropavlovsk-Kamchatsky, Rybakov Prospect 19a.  This study analyses 14 print publications and 369 online sources from Northern Eurasia within the borders of the former USSR, published between 2004 and 2025. These sources document 407 cases of interactions between birds and recreational hook-and-line tackle. Seventy-four bird species belonging to 13 orders and 26 families were identified. The orders Charadriiformes (22 species/141 cases) and Anseriformes (13 species/118 cases) led in terms of taxonomic diversity and number of observations. The majority of incidents involved birds from the ecological group of waterfowl and wading birds (68.9% and 82.6% of the total species and observations, respectively). Bird mortality from fishing tackle was recorded 31 times. The causes of death were equally frequent: 1) accidental hooking and entanglement in fishing line during active fishing and 2) entanglement in lost or discarded fishing tackle in bodies of water. In popular recreational fishing areas, discarded fishing line and other fragments of fishing tackle are a primary source of environmental pollution and pose a significant threat to bird populations. The results of this analysis indicate an existing conflict between the hobby of recreational angling and the necessity for bird population conservation.  **Key words:** pollution, recreational fishing, recreational angler, bycatch, fishing tackle, bird mortality. |
| Original article  УДК 57.084.2 + 599.745.31 DOI: 10.17217/2079-0333-2025-73-75-86  **INVESTIGATION OF THE CRITICAL FREQUENCY OF FLICKER FUSION  IN GRAY SEALS (*HALICHOERUS GRYPUS* FABRICIUS, 1791) IN CAPTIVITY**  Pakhomov M.V., Zaytsev A.A.  Murmansk Marine Biological Institute of the Russian Academy of Sciences, Murmansk, Vladimirskaya Str. 17.  A group of 10 gray seals (Halichoerus grypus Fabricius, 1791) of different sexes and ages were trained to select and indicate by touch one of two demonstrated similar light sources. The animals had to touch an object with a flashing light and ignore the constantly glowing object. To determine near the threshold values of perception, the frequency of flickering was gradually increased until the proportion of correct choices did not decrease below 75%. During the experiment, it was found that the seals studied are able to distinguish flashes in the range of 23–47 flashes per second. Individual features, dependence on the level of illumination, time of year and age are revealed.  **Key words:** MMBI aquatic complex, critical frequency of flicker fusion, behavioral experiment, Gray seal, *Halichoerus grypus*. |
| Original article  УДК 574.6(571.150) DOI: 10.17217/2079-0333-2025-73-87-100  **UPDATING METHODOLOGICAL APPROACHES FOR RESOURCE RESEARCH**  **ON THE HYPERHALINE BOLSHOE YAROVOE LAKE (ALTAI TERRITORY)**  Lukerina G.V., Surkov D.A., Pyatkova Y.S., Tolkushkina G.D., Kosacheva U.N., Scherbakov V.I.  Altai Branch of the Federal State Budgetary Scientific Institution VNIRO (AltaiNIRO), Barnaul, Bavarin Squire, 2.  Bolshoe Yarovoe Lake (Altai Territory) belongs to hypersaline, relatively deep reservoir with a stable fishery for the valuable bioresource Artemia (at the stage of cysts). The temperature regime of the lake causes an uneven vertical distribution of crustaceans and Artemia cysts (Anostraca: Crustacea). For a more efficient assessment of the volume of the “living” zone for crustaceans and Artemia cysts in 2021, zooplankton samples were collected using a large plankton network with a diameter of 0.5 m and a parallel closing plankton network with a diameter of 0.25 m. The samples were collected along the sections (horizons) of the water column in increments of 2.0 m. A comparative analysis of data obtained using different models of the plankton network revealed differences in the number of crustaceans and Artemia cysts in different horizons of the water column within 7.6% to 13.1%, no significant differences were observed. The use of closing plankton network has several advantages and allows for the acquisition of data comparable to the long-term indicators average values calculated during sampling with a large plankton grid, which ensures the continuity of scientific data.  **Key words:** Artemia,vertical distribution, hyperhaline lake, thermal stratification, number. |