**Bulletin 65, September 2023**

|  |
| --- |
| УДК 664.95: 664.956 DOI: 10.17217/2079-0333-2023-65-6-17**FISH SNACKS BASED ON SECONDARY HIGHLY MINERALIZED RAW MATERIALS****AS A PROMISING COMPONENT OF THE ASSORTMENT SNACK PRODUCTS**Chmykhalova V.B., Chmykhalov B.A., Efimova M.V., Efimov A.A.Kamchatka State Technical University, Petropavlovsk-Kamchatskу, Klyuchevskaya Str. 35.In this paper, we discuss available references on the state of modern snack market and provide arguments for the need to bring new products to the market that meet the ideas of a healthy lifestyle. Highly mineralized waste, which is generated during fish cutting, is presented as a promising raw material. Its introduction to food compositions during production of snacks will ensure the rational use of resources, allow the production of inexpensive functional products with a reduced salt content, without chemical preservatives, dyes, flavorings, and ensure the attractiveness of snacks for consumers. Sociological study of the target audience of product consumers and analysis of the characteristics of snacks from secondary highly mineralized raw materials in comparison with snacks of other types are presented. The calculation of the nutritional and energy value of our snacks, as well as the degree of satisfaction of the daily human need for basic substances when using 100 g of products, was performed.**Key words:** aquatic bioresources, secondary highly mineralized fish raw materials, nutritional value, snacks. |
| УДК 634.1.054:663.952 DOI: 10.17217/2079-0333-2023-65-18-28**SAFETY OF APLICATION OF THE FAR EASTERN PLANT RAW MATERIALS IN TEA DRINKS PRODUCTION**Poloskov D.A., Dobrynina E.V., Vladykina T.V., Kovaleva E.D.Far Eastern Federal University, Campus 10 Ajax Bay, Russky Island, VladivostokIn Russian Far East, one of the types of plant raw materials, which exhibits high antioxidant activity, is fireweed (*Chamerion angustifolium*). We studied the safety of this raw material and a tea drink produced from it. The studies were carried out in the period 2021–2023. Aqueous extracts of Dahurian rose hips (*Rosa davurica*), cranberries (*Vaccinium vitis-idaea*) and sea buckthorn (*Hippophae rhamnoides*) were used as additional raw materials. We herein present the data on microbiological contamination study and hygienic indicators of the safety of used plant raw materials, the duration of safe storage of the finished drink based on fireweed, as well as the compliance of raw materials and products with the requirements of regulatory documentation, including Technical Regulations of the Customs Union “On food safety” 021/2011.**Key words:** antioxidant activity, biologically active substances, aqueous extracts, narrow-leaved fireweed, safety requirements, *Сhamerion angustifolium*, *Hippophae rhamnoides*, *Rosa davurica*, *Stevia rebaudiana*, *Vaccinium vitis-idaea*. |
| УДК 615.012.6:582.272(265.52) DOI: 10.17217/2079-0333-2023-65-29-40**MODULATION OF NEUTROPHILS PHAGOCYTIC ACTIVITY using PRODUCTS MANUFACTURED FROM THE BROWN ALGAE FROM KAMCHATKA**Perervenko O.V.1, Medzhidova Kh.M.1, Klochkova N.G.21 Federal State Institution “1477 Naval Clinical Hospital”, Branch № 2, Petropavlovsk-Kamchatsky, Ammonalnaya pad Str. 1.2 Kamchatka Branch of Pacific Geographyсal Institute of FEB RAS, Petropavlovsk-Kamchatskу, Partizanskaya Str. 6.In this paper, we present data on the influence of products produced from the kelp seaweeds, such as gel from *Hedophyllum bongardianum* and extracts from *H. bongardianum*, *Alaria esculenta* and *Fucus distichus*, on the modulation of phagocytic activity of human blood neutrophils. Our experiment involved 16 volunteers who took 15 g of algal gel daily for 30 days. Before and after the experiment, their blood was taken for general analysis and also to study the level of immunomodulation after priming exposure to different concentrations (0.5, 1, 2, 5%) of algal extracts. The nonspecific resistance of the experiment participants' body was assessed by the following indicators: phagocytic activity of neutrophils, phagocytic number, absolute phagocytic index, and sum of phagocytosis. Algal extracts diluted with saline to a concentration of 2% showed the highest priming effect on the blood of examined individuals taken both before and after the consumption of algal gel *per os*. Low concentrations (0.25 and 0.5%) did not have a stimulating effect. When algal extracts were diluted to 5% concentration, phagocytosis was noticeably inhibited. After 30 days of consuming the algal gel, the phagocytic activity of neutrophils in all participants increased by an average of 23%, phagocytic number by 10%, and absolute phagocytic index from 2.1 to 42%. The immunostimulating effect was greatest for *Alaria* extracts, and the lowest for *Fucus* extracts. The experimental results allowed us to recommend products from Kamchatka's kelp seaweeds as adaptogenic substances.**Key words:** *Alaria esculenta, Hedophyllum bongardianum, Fucus distichus*, algal gel, Kamchatka, blood neutrophils, priming, phagocytic activity, algal extracts. |
| УДК 574.583: 595.384.12(265.54) DOI: 10.17217/2079-0333-2023-65-41-61**Morphology of larvae of *Spirontocaris intermedia* Makarov, Kobjakova, 1936 (Decapoda, Thoridae) from THE MARINE waters NEAR Kamchatka** Sedova N.A. Kamchatka State Technical University, Petropavlovsk-Kamchatsky, Klyuchevskaya Str. 35The author identified I–VI zoeal stages of *Spirontocaris intermedia* (fem. Thoridae) from the plankton marine waters near Kamchatka peninsula. The basic morphological differences of larvae of the corresponding stages were identified. Descriptions and drawings of existing zoeal stages are given. A comparison of larvae with a closely related appearance of *S. spinus* was carried out. The close relationship of *S. spinus* and *S. intermedia* is evidenced by the similar sizes of larvae, the structure of maxillae, carapace, pleon, pereiopods, uropods and telson. There are morphological differences that do not allow these larvae to be attributed to one species: the structure of rostrum, pleopodes, maxillule, the second and third maxilliped, antennules and antennae at the corresponding stages of development, as well as the number of anteroventral spine of carapace. The asymmetry of the structure is characteristic of carapace, maxillule, maxillae, the first maxilliped, scale. According to the degree of development of most appendages, a noticeable lag in the development of *S. intermedia* is noticeable compared to *S. spinus*. It is suggested that *S. intermedia* develops through 7 zoeal stages.**Key words:** shrimp, morphology of larvae, northwestern part of the Pacific Ocean, Okhotsk Sea, *Spirontocaris intermedia*, *Spirontocaris spinus*. |
| УДК 595.371:591.134.5 DOI: 10.17217/2079-0333-2023-65-62-70**ASSESSMENT OF THE EFFECT OF FIXING SOLUTION ON THE BODY WEIGHT** **OF AMPHIPODS (CRUSTACEA, AMPHIPODA)**Asochakov A.A.Khakass State University named after N.F. Katanov, Abakan, Lenin Prospect Str. 90.We discuss results of experiments evaluating effect of fixing solution on the body weight of three species of amphipods, *Locustogammarus locustoides* (Brandt, 1851), *Orchestia ochotensis* Brandt, 1851 and *Parhyale zibellina* Derzhavin, 1937, in order to estimate the degree of influence of 70% ethanol solution on the weight of crustaceans during long-term storage. As a result, we found that during the period of conservation lasting 16 years and 3 months, the average body weight of individuals of the first two species decreased by 21% and 26%, respectively in comparison to the initial weight. In case of *P. zibellina*, 18% decrease in body weight occurred after 13 years of storage. The need to consider effect of alcohol-containing solutions on the body weight of amphipods is discussed. This is particularly important in studies where weight values are used as input or intermediate data for subsequent calculations. These may include estimation of biological production, determination of energy metabolism rates and modeling of growth processes and etc. It is proposed to use correction coefficients to restore the values of the primary mass of amphipods that were stored in a fixed form.**Key words:** individual weight, body weight, size-weight dependence, Amphipoda, Crustacea. |
| УДК [591.9:598.2]:639.2(571.66)(571.645) DOI: 10.17217/2079-0333-2023-65-71-86**POPULATION OF SEABIRDS IN THE POLLOCK TRAWL FISHERY FROM THE PACIFIC WATERS OF KAMCHATKA AND NORTHERN KURIL ISLANDS IN LATE AUTUMN SEASON**Artukhin Yu.B.Kamchatka Branch of Pacific Geographical Institute FEB RAS, Petropavlovsk-Kamchatsky, Rybakov Prospect 19a.The research was carried out in October – December 2022 in the Pacific waters of Kamchatka and the Northern Kuril Islands on aboard medium-tonnage trawler fishing for pollock. We counted seabirds on line transects and in near-vessel aggregations. A total of 28 species were recorded, mainly larids and alcids. The density of bird distribution in the surveyed seawater area was 25.8 birds/km2 on average. Among them alcids (58.6%) and procellariids (27.4%) predominated. Most of the tubenoses and larids (15 species) wandering in the fishing areas were concentrated near the trawler, where they fed on catch processing waste. The most abundant were the northern fulmar and short-tailed shearwater, whose numbers reached 20 and 5 thousand individuals, respectively. The size of the near-vessel aggregations varied significantly during the fishing period. The population of seabirds had a transitional character, as it consisted of resident species that still continued to stay in the nesting areas, as well as transiting and arriving here for the winter from other regions.**Key words:** Kuril Islands, seabirds, bird population, distribution, vessel surveys, numbers, South-Eastern Kamchatka. |
| УДК 598.279.24(571.66) DOI: 10.17217/2079-0333-2023-65-87-110**REVISION OF THE BIRD FAUNA FROM THE VALLEY OF GEYSERS IN KAMCHATKA:****SPECIES COMPOSITION, ECOLOGICAL FEATURES**Lobkov E.G.Kamchatka State Technical University, Petropavlovsk-Kamchatsky, Klyuchevskaya Str., 35.In this paper, the author presents revision of the investigations of birds from the Valley of Geysers in Kamchatka, which summarizes data obtained for the past 50 years. According to the latest revision, the avifauna of this region includes 91 species (53 nesting species). There are no region-specific species. The discovery and status of the Grey crowned Rosy finch (*Leucosticte tephrocotis*) requires a reliable verification. The high species diversity of birds in a small area (31.5 km2) may be explained by the biotope diversity in the area, which is associated with the geothermal activity at the border of forest and subalpine vegetation. The weighted average bird population density is 211.8 pairs/km2. Its appearance is subalpine with a small proportion of forest species. Twelve (12) species are listed in the Red Data Books of Russia and (or) Kamchatka. The most significant findings are the regular wintering of the Solitary Snipe (*Gallinago solitaria*), the possible reproduction of the Golden Eagle (*Aquila chrysaetos*) and Peregrine Falcon (*Falco peregrinus*), the background status of the Rustic Bunting (*Ocyris rusticus*). The mudflow that passed through the Geysernaya Valley on June 7, 2007 had a catastrophic impact on the natural appearance of the central part of the Valley of Geysers. Variants of its effects on birds are discussed. Geothermal activity determines the possibility of wintering of a number of species in subalpine harsh conditions, a shift in the timing of periodic events in the life of birds, including earlier reproduction, the possibility of nesting on extremely warm ground, behavioral characteristics during incubation and other features of bird ecology.**Key words:** avifauna, Valley of Geysers, geothermal activity, Kamchatka, bird population, mudflow, systematic species list, ecological adaptations. |
| УДК 574.632:597.552.511(265.51) DOI: 10.17217/2079-0333-2023-65-111-122**GENDER DIFFERENCES IN THE CONTENT OF TRACE ELEMENTS IN THE ORGANS AND TISSUE OF SOCKEYE SALMON FROM THE EASTERN GULFS OF KAMCHATKA PENINSULA[[1]](#footnote-1)\***Litvinenko A.V.1, Salimzyanova K.R.1, KhristoforovaN.K.1, 2, 3, Danilin D.D.4, Tsygankov V.Yu.21 Sakhalin State University, Yuzhno-Sakhalinsk, Kommunisticheskiy Ave. 33.2 Far Eastern Federal University, Vladivostok, Russky Island, Ajax Bay 10.3 Pacific Geographical Institute FEB RAS, Vladivostok, Radio Str. 7.4 Kamchatka Branch of Pacific Geographical Institute FEB RAS, Petropavlovsk-Kamchatsky, Partizanskaya Str. 6.The content of essential (Cu, Zn, Fe) and non-essential (Cd, Pb, Ni) elements, which are trace and heavy metals, in the organs and tissues of one of the most popular and consumer-preferred species of Pacific salmon – sockeye salmon, one of the three most significant objects in the salmon fishery in the Far East of Russia, caught in the waters of two gulfs from the eastern Kamchatka – Avacha Gulf and Kamchatka Gulf. Emphasis is made on reproductive products – caviar and testes of fish. Element concentrations were determined by the atomic absorption method on a Shimadzu AA-7000 spectrophotometer on flame and flameless atomizers from sample mineralizates obtained by their decomposition with concentrated HNO3 grade extra pure in a MARS 6 microwave complex, using standard samples with known concentrations. Statistical data processing was performed in MS Excel. It was found that the concentration of copper in eggs was 10 times higher than in the testes, the levels of Zn in the gonads of fish differed by a factor of 2, and the differences in the amount of Fe were less pronounced. No patterns were observed in the distribution of Cd, Ni, and Pb in the gametes of fish. The content of microelements, except for Pb, as a rule prevailed in the liver.**Key words:** Eastern Kamchatka, sockeye salmon, organs and tissues, heavy metals, essential trace elements. |

1. \* This work was carried out with the financial support of the Russian Science Foundation (agreement № 22-24-00465). [↑](#footnote-ref-1)