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СЕМЕЙ ҚАЛАСЫНЫҢ ШӘКӘРІМ АТЫНДАҒЫ МЕМЛЕКЕТТІК УНИВЕРСИТЕТІ
РАДИОЭКОЛОГИЯЛЫҚ ЗЕРТТЕУЛЕРДІҢ ҒЫЛЫМИ ОРТАЛЫҒЫ



«Азық-түлік қауіпсіздігі тұрғысында жаңа идеялар мен
шешімдер» халықаралық ғылыми-тәжірибелік
конференциясының
МАТЕРИАЛДАРЫ



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«Продовольственная безопасность
в контексте новых идей и
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«Food security in the meaning of
new ideas and solutions»

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Семей - Semey
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**«АЗЫҚ-ТҮЛІК ҚАУІПСІЗДІГІ ТҰРҒЫСЫНДА ЖАҢА ИДЕЯЛАР
МЕН ШЕШІМДЕР»
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В материалах международной научно-практической конференции **«Продовольственная безопасность в контексте новых идей и решений»** представлены научные труды участников конференции по приоритетным научным направлениям в области продовольственной безопасности, агропромышленного комплекса, пищевой промышленности, лабораторного анализа, ветеринарной медицины и санитарии, профессиональной подготовки конкурентоспособных кадров, в которых рассматриваются современные подходы и проблемы развития новых методов и технологий для эффективного развития производств в условиях глобальной конкуренции.

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СЕКЦИЯ 1

Роль качества и безопасности продуктов питания в обеспечении продовольственной безопасности

Safety assessment the content of heavy metals in fish of the Bashkir Zauralie

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Abstract

Content of heavy metals in muscles and a liver of a crucian of the silver (*Carassius auratus gibelio*) lake Kultuban in a zone of influence of ore fields in the territory of the Bashkir Zauralie is studied. The histologic characteristic of her internals for assessment of safety of fish is given. The destructive changes in bodies of a crucian silver of the lake Kultuban are confirmed by reality of environmental risk in this region where production and technogenic pressure on reservoirs is the considerable and the problem of prevention of hit of heavy metals in reservoirs is particularly acute.

Introduction. Every year more and more importance is the use of natural biological resources, but due to the rapid development of the industry intensified negative phenomena in the interaction of man and nature. Fishery is subject to the largest pressure which completely depends on quality of water in reservoirs and waterways. Meat of fish contains 20% of protein and does not concede on this index to meat of warm-blooded animals. At the same time protein of fish is acquired better. Meat of fish contains various mineral substances, including necessary minerals, vitamins, iodine, phosphorus. Now the information about structure and amount of metals in tissues of fishes and assessment of possible influence of the heavy metals (HM) on a condition of their organism has important practical value. It is bound to the fact that fish is one of the making components of a diet and the excess content of metals in fish products is reflected on health of the person as the consumer of this production [1, 2, 4].

Materials and methods. In the real work the content of copper (Cu), zincum (Zn), lead (Pb), cadmium (Cd) in muscles and a liver of a crucian silver (*Carassius auratus gibelio*) is studied and the histologic research of their liver, kidneys and intestines is conducted. Object of studying was the lake Kultuban which is in 7 km to the south of the city of Sibay.

To assess the levels of heavy metals content in fish, muscle and liver were used as they are important in the human diet. Field and laboratory processing of ichthyological material was conducted according to the practical standards of researches (the SanPiN 2.3.2.1078-01, GOST - 269321-86, 26932-86, 26933-86, 26934-86). The analysis of heavy metals was carried out with use of back muscles of fishes. The maintenance of TM was determined by method of an atomic absorption spectroscopy on the Quantum-2A device.

Results. Now a large number of fish from the lake is caught for personal consumption. Studying of influence of heavy metals on histologic structures of internals of fishes of the Bashkir Zauralie are of interest because the region is the rich ore field. Reservoirs of neighborhood of the city of Sibay systematically experience the strong anthropogenic pollution because of production and processing of concentrates of cupriferous ores. In all considered exemplars of fishes the content of zincum and copper prevails, minimum concentration are characteristic of lead and cadmium (table 1).

Table 1. Content of heavy metals in a liver and muscles of a crucian of the silver lake Kultuban

Element	Concentration of HM, mg/kg		
	Muscles	Liver	Admissible level *
Cu	1,98 ± 0,07	4,01 ± 0,02	10,0
Zn	3,48 ± 0,31	6,24 ± 0,15	40,0
Pb	0,04 ± 0,01	0,05 ± 0,01	1,0
Cd	0,06 ± 0,01	0,04 ± 0,01	0,2

* admissible levels of concentration of metals in muscles of fishes on the SanPiN 2.3.2.560-96

In a liver the content of heavy metals is considerable above it contents in muscles. But about 50% of the lump of a body of fishes fall to the share of muscles and the absolute mass of fishes is concentrated in them [3, 5]. It is explained by intensive accumulation in an organism of elements which take the fissile part

in course of physiological processes (respiration, a hemopoiesis, selection, etc.). At the same time their contents is significantly lower than the marginal levels established by sanitary standards and rules for fresh-water fishes and fish products.

Toxic influence of heavy metals on crucians silver the lake Kultuban is characterized by some histologic changes in their bodies. Some dystrophy of hepatocytes of a liver is noted.

Intestines are characterized by particular destructive processes, in places, especially on tops of folds of a mucosa, enterocytes are exfoliated. Some increase in quantity of leukocytes in friable fibrous connecting fabric is noted. The nonuniform plethora of folds of a mucosa of intestines comes to light.

The technogenic anomalies in the neighborhood of the city of Sibay created because of production and processing of ore led to expansion of an area of distribution of heavy metals and, as a result, increases its content in lake Kultuban water, bodies and tissues of fishes [4].

Conclusion. The destructive changes in bodies of a crucian silver of the lake Kultuban are confirmed by reality of environmental risk in this region where production and technogenic pressure on reservoirs is the considerable and the problem of prevention of hit of heavy metals in reservoirs is particularly acute. The biological regulation of receipt in reservoirs of heavy metals is a design way of prevention of further pollution of a reservoir, so fish. It should be noted that many physiological systems of fishes are similar to those of warm-blooded animals, so and the person therefore it is possible to predict consequences of such influences of metals and for the person. The conducted researches showed need of more detailed ecological, hydrochemical and biological research, and also the organization of environmental monitoring.

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Perspectives of application collagen in food industry

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Abstract

The article deals with the structure, function and application of collagen in the food industry. Collagen is the most abundant protein of animal origin. It helps maintain the structure of various tissues and organs. This modern food product and is widely used in the food industry and the beverage industry to improve the elasticity and stability of the production sequence. Therefore, this article will be considered a function of collagen and applications in the food industry.

Түйіндеме

Бұл мақалада тағам өндірісінде қолданылатын коллаген және оның құрылымы, атқаратын қызметі қарастырылған. Коллаген кең тараған жануартекті ақуыз болып табылады. Ол түрлі органдар

мен ұлпалардың құрылымын сақтап тұруға көмектеседі. Бұл заманауи өнім тамақ өндірісінде және сусын өндірісінде икемділігін, тұрақтылығын жақсарту мақсатында кеңінен қолданылады. Сол себепті осы мақалада коллагенді тамақ өндірісінде қолдану және оның құрылымы, атқаратын қызметі қарастырылады.

Аннотация

В статье рассматривается структура, функции и применение коллагена в пищевой промышленности. Коллаген является наиболее распространенным белком животного происхождения. Он помогает поддерживать структуру различных тканей и органов. Это современный продукт питания и широко используется в пищевой промышленности и в производстве напитков, чтобы улучшить эластичность, последовательность и стабильность продукции. Поэтому, в этой статье будут рассмотрены функции и способы применения коллагена в пищевой промышленности.

Collagen - the main structural protein of the extracellular matrix. It is about 30% of the total protein in the body - that is, 6% of body weight. "Collagen" The name refers to a family of closely related fibrillar proteins, which are the main protein of the skin element, bones, tendons, cartilage, blood vessels, teeth. In different tissues is dominated by different types of collagen, and this in turn is determined by the role of collagen plays a specific organ or tissue, i.e. intravital functions [1].

Collagens are widely used in various industries. However, manufacturers are generally not focusing on what type of collagen added to a particular product. In today's market featured three collagen types: animal, vegetable and marine. The most famous, studied and used is animal collagen, which began to receive a 30-ies of XX century from tannery waste (edge portions skins Gol'eva splits skins Gol'eva spilkovye trimming skins, tendons, bovine (cattle), Gol'eva splits pig skins) and waste the meat industry (bone) [2].

Reception of collagen proteins from aquatic organisms are currently receiving a lot of attention because they provide a deficit of collagen of animal origin.

With regard to the vegetable collagen, it is well absorbed by the skin, but it is more difficult to produce than an animal that not all companies can afford the production of cosmetic products containing this type of collagen. [3] In fact, collagen - a protein of animal origin, and what is called "vegetable collagen" is a hydrolysed wheat protein (known and other sources), which has the properties of soluble collagen, which is the most suitable alternative to natural collagen of animal origin. However, a fundamental difference in the composition of amino acids, namely the absence of hydroxyproline and hydroxylysine, cast doubt on the similarity of the biological action of the drug [4].

The complexity of the structure of collagen determines the important functional properties of the protein:

- The ability to maintain the structure at the molecular level in the allocation of the tissue and separated from other components;
- After isolation and the ability to transfer the solution to the reconstruction of various types to form supramolecular structures that are widely used for various kinds of artificial collagen materials which find application in the food industry, medicine, veterinary medicine and other branches of the economy;
- The ability to stabilize the supramolecular structure and its further structuring underlying canning, primary processing and processing of collagen raw material (tanning leather and fur), and obtaining synthetic or modified collagen materials [5].

In the food processing industry as food supplements collagen added to foods to improve color, texture, taste and quality. Also used to improve the rheological properties of the sausages [6].

Adding collagen to pluck improves product quality and reduces the rate of occurrence of fat tissue. The study showed that heat-treated collagen fibers have good potential for use as an emulsifier in the food industry, especially in acidic products. The stability of the microstructure and rheology of the emulsions were evaluated.

Thermo-stabilized collagen fibers may be a natural alternative to synthetic emulsifiers for use in acidic foods and beverages in the compositions [7].

Collagen used as edible food films and coatings used in food products in thin layers. The main application of collagen films as a barrier membrane to protect against the migration of oxygen, moistures and solutes providing structural integrity and water vapor permeability to food [8]. It is well known that collagen is subjected to special processing, which may be used for the preparation of sausage casings [6].

D. M. Greene praised the use of collagen as a protective coating in the fragrance in dry pet foods. [8].

Currently, collagen drinks are another trend in the global market. There are many products produced by manufacturers such as soy collagen, cocoa collagen, collagen, cappuccino juice with collagen. A. Trier offered an energy drink with collagen. The drink helps to naturally generate adipose tissue [9].

In Malaysia, several organizations have conducted research and development of collagen drinks. Malaysia Dairy Industry (MDI) added collagen peptides in their nutritious probiotic beverage. [9] It contains a prebiotic fiber and added 500 mg of the collagen peptide and 30 mg vitamin C. collagen peptides serve as components necessary for the synthesis of collagen. In addition, vitamin C was added to a beverage as an antioxidant and coenzyme vital biosynthesis of collagen. As a result, the beverage "Vitagen Collagen" was created to stimulate the growth of beneficial intestinal bacteria and radiate the beauty of the skin. [10] Nestle Malaysia has also produced collagen coffee, containing collagen from fish sources [11] .

The basis of research is the study of modern ideas about the structure and properties, and the application of technology of collagen from various sources.

The object of research is the scientific data of domestic and foreign sources of information on collagen of use.

The theoretical methods were used as research methods:

- Method of analysis and selection of information sources;
- Compilation and systematization of information data.

The search for new sources of collagen proteins to study their structure and properties is the subject of research by many scientists. This is due to the advent of modern, high-precision research methods and equipment which make it possible to further explore the structure and properties of these proteins. In the development of domestic production of collagen should be recognized as priorities for the production of collagen of animal origin.

As we age, collagen production slows down, and the result becomes the aging of the skin, joint pain, fatigue, fragility of blood vessels, muscle tension, weakening of the bone structure, reduced motor activity, deterioration of general condition. Violations of collagen synthesis leads to various diseases.

For use in industrial applications of collagen goes through changes in the natural properties under the influence of temperature. By heating the three tropocollagen strands completely or partially divided into globular domains that contain various secondary to normal collagen structures (polyproline II (PPII), i.e. the random coil. In this way the formation of the gelatin occurs.

Gelatin is widely used in the food industry, particularly in desserts, jellies, pastes and so forth. In addition to using food gelatin used in pharmaceutical and cosmetic products and photofission.

Due to the fact that the gelatin does not contain the required set of amino acids in a sufficient amount to the human body, of nutritional substances is very low. However, some manufacturers of dietary supplements on the basis of collagen continue to claim that their products contributes to the improvement of the skin, nails and a very beneficial effect on the organism as a whole. Scientific evidence of these claims to date does not exist.

In the food industry gelatine is used in the manufacture of a wide variety of foods. Also manufacture thereof jelly in the home, which children like and is used as a thickener, emulsifier and stabilizer.

In the production of confectionery gelatin used to create volume and improve palatability. In the dairy industry it is used in the manufacture of processed cheese, sour cream, yogurt, ice cream and other products in order to stabilize the consistency and increase the output of finished products. The addition of gelatin in sauces and mayonnaises enhances the stability of these products to the freezing and heating. Gelatine - excellent tonic for the joints and ligaments, as well-known athletes. But as sports nutrition is not suitable for building muscles. If you are an athlete, the gelatin must include in your daily diet. It is important that this stuff is very cheap, so protect your joints every [12] may, at the enormous physical strain.

People who are often faced with serious physical exertion, require higher doses of hydrolyzed collagen, because it has the following properties:

- strengthens the ligaments, bones, joints;
- Provides flexibility of ligaments and tendons, and muscles;
- prevents the thinning of the cartilage;
- minimizes the risk of injury during exercise or physical labor.

Collagen showed that an important component in the food industry and the beverage industry. It is mainly used in the form of collagen fibers. Collagen has been used as protein supplements carriers in meat processing, food and coating film products and food supplement to improve product quality. Furthermore, collagen may improve the health and the nutritional value of foods.

Reference