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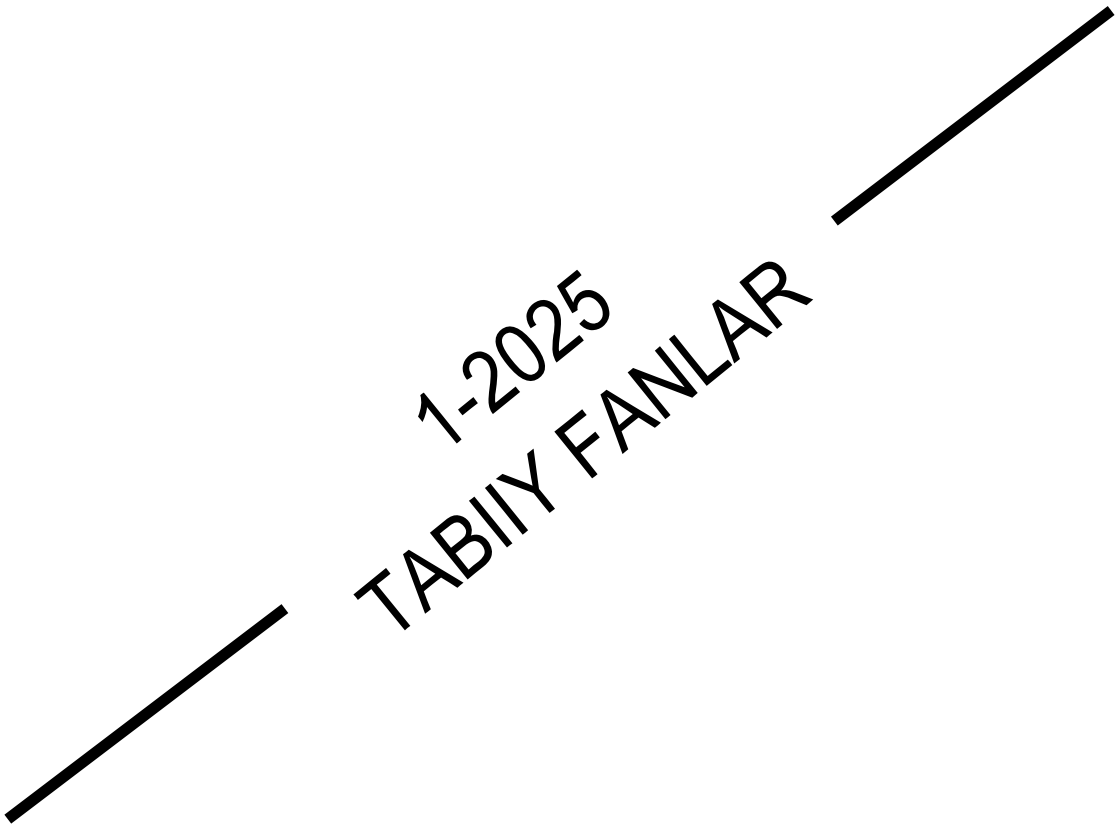

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BALIQ HAMDA BALIQ SUYAGINING KIMYOVIY TARKIBI VA SHIFOBAXSH XUSUSIYATLARI

ХИМИЧЕСКИЙ СОСТАВ И ЦЕЛЕБНЫЕ СВОЙСТВА РЫБЫ И РЫБНЫХ КОСТЕЙ

CHEMICAL COMPOSITION AND MEDICINAL PROPERTIES OF FISH AND FISH BONES

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Annotatsiya

Ushbu maqolada baliq va baliq suyagining kimyoviy tarkibi, mikro- va makroelementlari haqida ma'lumotlar keltirilgan. Shuningdek, baliqning inson salomatligi uchun ahamiyati va shifobaxsh xususiyatlari yoritilgan. Tadqiqotda baliq va baliq mahsulotlarining ayrim kasalliklarni oldini olish va davolashdagi roli tahlil qilingan.

Аннотация

В данной статье представлена информация о химическом составе рыбы и рыбных костей, их микро- и макроэлементах. Также рассмотрена роль рыбы в поддержании здоровья человека и ее целебные свойства. В исследовании проанализирована значимость рыбы и рыбных продуктов в профилактике и лечении некоторых заболеваний.

Abstract

This article provides information on the chemical composition, micro- and macroelements of fish and fish bones. It also explores the role of fish in human health and its medicinal properties. The study analyzes the importance of fish and fish products in the prevention and treatment of certain diseases.

Kalit so'zlar: *baliq, baliq suyagi, oqsil, vitaminlar, minerallar, kollagen*
Ключевые слова: *рыба, рыбные кости, белок, витамины, минералы, коллаген*
Key words: *fish, fish bones, protein, vitamins, minerals, collagen*

INTRODUCTION

After Uzbekistan gained independence, a new stage of development has emerged in the life of the people. Increasing the medical literacy of the people, systematically establishing a system for preserving the health of society is an important link in the policy of social protection. In recent years, providing the population with affordable, high-quality medicines has become a key task at the state level. Natural, harmless means of folk medicine, safe treatment methods are of great importance in solving the problem.

The role of fish products in the human diet is incomparable. Fish and fish products are one of the important sources of high-quality protein, vitamins, microelements, fats and other biologically active compounds for the human body. The richness of fish in such useful compounds determines its healing properties.

LITERATURE REVIEW

Fish has long been consumed as a healing food that cleanses the human body and strengthens bones and teeth. In particular, its quick digestion and dietary value further increase the value of fish. Fish meat contains a large number of vitamins and trace elements, so its biological value is higher than that of beef and mutton. 100 grams of fish meat contains a sufficient amount of iodine necessary for human health[1].

Based on the chemical composition of fish, about 70 chemical elements have been found in the body of fish. Fish meat is a very valuable food product. It contains proteins and fats that are well absorbed by the human body, as well as carbohydrates, vitamins A, D, B_1, B_2, B_{12}, and minerals[2].

Fish meat contains the following main substances (%):

1-Table

Substance	Percentage (%)
Water	52-83
Protein	12-23
Fats	0,2-33
Minerals	0,5-3
Vitamins	Less than 1%
Carbohydrates (glycogen)	Less than 1%

Vitamins are unevenly distributed in the fish body. Vitamins are divided into two large groups - water-soluble and fat-soluble. Water-soluble vitamins found in fish include B1, B2, B6, B12, folic acid, H, PP, inositol and pantothenic acid, and small amounts of vitamin C. Fat-soluble vitamins include vitamins A, D3, E.

Minerals are present in different amounts in different parts of the fish body. Minerals are found in ash from burning meat and other parts and organs of fish. The largest amount of mineral elements is found in bones. The total amount of minerals in the fish body is 4%. The chemical composition of fish is not constant and depends on the type of fish, its age, sex, place of residence, time of fishing and other factors.

Consuming meat that is rich in nutrients such as protein, vitamins, minerals, especially iron, iodine, magnesium, phosphorus, helps to preserve health. Fish, in particular, is considered highly beneficial for several reasons: it reduces the risk of heart diseases, improves vision, enhances cognitive abilities, promotes better sleep, alleviates rheumatoid arthritis, lowers cholesterol levels, accelerates metabolism, reduces blood pressure, and is beneficial for neurological disorders and liver health.

Fish is also a source of vitamin D, which is indispensable for the functioning of the intestines, kidneys and bones. The absorption of calcium and phosphorus in the intestines is stimulated, which helps to strengthen the bones and affects the correct structure of the skeleton. Vitamin D deficiency can negatively affect the bone system in children (rickets) and adults (osteoporosis, osteomalacia).

Fish bones are a very nutritious and often overlooked part of the fish. They contain high amounts of calcium, phosphorus, collagen, and other important vitamins and minerals, providing overall health and well-being benefits. In addition to their nutritional value, fish fins offer many recipes and cooking tips for those interested in incorporating them into their diet, including safe cooking methods. Utilizing fish fin broth, to fried fish fins, their usage is considered highly important.

Calcium is an important mineral for maintaining strong bones and teeth, and fish bones are an excellent source of this nutrient. In fact, fish bones contain more calcium than many other foods, including milk. This makes them an ideal choice for those who are lactose intolerant or do not consume dairy products.

Phosphorus is another mineral found in fish bones that is essential for bone health. Works with calcium to keep bones strong and healthy. Phosphorus also plays a role in energy

metabolism, cell growth, and maintaining pH balance. Eating fish bones helps to provide the body with enough phosphorus to function properly.

Collagen is an essential component found in fish bones that is important for healthy skin, hair, and nails. It is beneficial for the overall health of these tissues, as it supports moisture retention and reduces brittleness. Collagen supplements have gained popularity in recent years, but utilizing fish fins is a natural and sustainable way to obtain this important nutrient.

METHODS

To determine the amount of macro- and microelements in the bone archive of whitefish and whitefish, a 1 g sample, previously dried, ground, weighed on a scale with an accuracy of 0.001 g (Navigatortm, OHAUS®), was ashed in a porcelain crucible using the dry ashing method by heating it to 500 °C in a muffle furnace (Nabertherm, Germany). Initially, it was heated to 500 °C at a rate of 100 °C/h and held at 500 °C for 5 hours. 6 ml of concentrated HNO_3 of ICP-MS purity and 2 ml of 60% H_2O_2 were added to the resulting ash and heated on a hot plate in a fume hood until the formation of white smoke ceased. The cooled solution was transferred to a 100 ml polypropylene volumetric flask and made up to the mark with ultrapure water. This working solution was filtered using a syringe filter and used for analysis.

The analysis was performed on an iCAP PRO X Duo ICP-OES inductively coupled plasma optical emission spectrometer manufactured by Thermo Fisher Scientific (USA). Method development and analysis of the analysis results were performed using the QTegra ISDS software. The analysis parameters are listed in Table 1.

Table 1. Analysis method parameters

Parameters	Settings	
Pump pipe	For sample Tygon® yellow/white	For drainage Tygon ® white/white
Pump speed	45 rpm	
Spray cell	Glass cyclonic	
Nebulizer	Glass concentric	
Nebulizer gas flow	0,6 L·min^{-1}	
Refrigerant gas flow	12,5 L·min^{-1}	
Auxiliary gas flow	0,5 L·min^{-1}	
Central tube	2 mm	
RF power	1150 Vt	
Cycle	3 times	
Analysis time	Axial	Radial
	15 sec	15 sec

DISCUSSION OF THE RESULTS

Results of determination of chemical elements in the sample using the IBP-OES method (mg/100 g).:

2-Table

№	Name of macro- and microelements	Catfish	Whitefish
1	P	1135,21	1135,23
2	Ca	335,67	138,47
3	Na	287,77	389,79
4	Al	204,06	0,5246
5	Mg	156,84	135,55
6	Sr	110,54	55,08
7	K	88,16	146,91
8	Cs	27,63	4,75
9	Rb	7,71342	2,4404
10	Ba	7,59707	0,6728
11	Zn	6,48	5,16
12	Re	5,66	13,13
13	Fe	2,83	2,17

14	Si	2,70352	1,15898
15	Mn	2,5387	1,22434

The content of chemical elements in the bones of whitefish and mackerel was determined by the inductively coupled plasma optical emission spectrometry method, which revealed that there were more than 60 elements. The results of the analysis were compared based on the elements present in the largest quantities. The main function of phosphorus is to convert energy, and it also takes an active part in the formation of bone tissue. Zinc contributes to the early healing of wounds, the restoration of damaged skin areas, is part of many enzymes. Its deficiency is confirmed by a change in taste, a long recovery of damaged skin areas. Iron is responsible for oxidation processes, as it is included in cytochromes. Iron deficiency can affect growth retardation, weakening of the body, and lead to the development of anemia.

CONCLUSION

In summary, fish and fish products are highly beneficial as they contain essential elements, proteins, vitamins, and minerals necessary for the human body. Consuming them improves overall health by supporting the preservation of these important components, enhancing cognitive abilities, reducing the risk of heart diseases, rheumatoid arthritis, aiding in neurotransmitter synthesis, promoting fin strengthening, lowering cholesterol levels, and treating neurological disorders. We recommend incorporating fish and fish products that contain iron, iodine, magnesium, calcium, phosphorus, and collagen into your diet.

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