BIOCHEMICAL ANALYSIS OF THE SPECIES OF NOSTOC COMMUNE

Abdurahmon Sheraliev
Senior lecturer, candidate of biological sciences, Namangan State University
E-mail: sheraliyev1949@mail.ru

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Abstract: This article describes the morphology of the representative of cyanoprokaryotes - Nostoc commune, its distribution, nutritional elements - protein, lipid, carbohydrate, vitamin, pigment and microelements. The data obtained by many researchers on the amounts of these bioactive substances were compared and analyzed. Also, Nostoc commune is a universal and promising object of biotechnology, has high growth rates, and the cultivation process does not require large investments. In addition, it is a source of biologically active compounds that can be used in food, medicine and agriculture.

Keywords: Nostoc Commune, proteins, carbohydrates, vitamins, pigments, lipids, polysaccharides, minerals.

БИОХИМИЧЕСКИЙ АНАЛИЗ ВИДА NOSTOC COMMUNE

Аннотация: В статье описывается морфология представителя цианопрокариот Nostoc commune, его распространение, элементы питания — белки, липиды, углеводы, витамины, пигменты и микроэлементы. Количество этих биологически активных веществ сравнивалось и анализировалось с данными, полученными многими исследователями. Nostoc commune отличается еще и тем, что является универсальным и перспективным объектом биотехнологии, имеет высокие темпы роста, а процесс выращивания не требует больших капиталовложений. Кроме того, он является источником биологически активных соединений, которые можно использовать в пище, медицине и сельском хозяйстве.

Ключевые слова: Nostoc commune, белки, углеводы, витамины, пигменты, липиды, полисахариды, минералы.

INTRODUCTION

Nostoc Commune Vauch. the cells are rounded, cross-jointed, forming a thread-like appearance, with a clear crease-walled top, initially a whole, later porous, twisted in old age, and like a plate, sometimes cracked. In a wet state, it is branched, green-like, round when dry, comes to a gray-brown appearance. When seen on a microscope, a large number of bent, twisted, coral thread is qualitative in appearance, it is gelatinous-like with a wart, slime, unbranched, and has prominent shell veils, in some of which this veil is clearly inconspicuous. The cells in the threads will look like short cylinders in the nostoks in our conditions. Each strand has one or more heteromorph cells, thick-walled, identical in appearance, cytoplasmic, usually of a clear tone, in which there are nitrogen-retaining enzymes that perform nitrogen uptake.

Nostoc commune it is a species of cyanoprocariotes that has the ability to endure even in drought without loss of vitality. It can be found on the surface of moist soil, for example in fields, roadsides, mountains, etc., or it can be found among weeds, trees and leaves in these places. Even if they have been motionless in shallow conditions for several decades, they come to life as soon as water comes to them.

Increase. Usually Nostoc reproduces even in our conditions by means of heterocysts. Heterocysts are located between the vegetative cells in the thread, placing the long thread as if it were cut into pieces. Each strand that is separated will grow later, due to the division of growth cells. Reproduction in this way is a form of trophic reproduction. This way the reproduction will continue to make Nostoc when there is enough moisture on land.

RESULTS AND DISCUSSION

The nutritional value of Nostoc commune. There has been much research on the nutritional value of Nostoc Commune. While the results obtained in such studies are not exactly the same, the similarities in the data obtained are much closer. We list this information in the table below.

Tab. 1. The principal compoents of the Nostoc commune are (in % account)

Objects	Literature [4]	Literature [6]	Literature [15]	Literature [16]	Our information
Carbohydrates	16,68	18,08	25-27	21,81	22,8-28,7
Svejeya kletchatka	2,75	-	-	-	3,18
Wet oil	4,2	1,05	0,48-0,51	0,58	4,28
Common sugar	8,80	0,52	21,63	23-80	27-34

Nostoc c. in our data, carbohydrates in different samples amounted to 22.8% -28.7%. Mark W. Tarstein-Son et al [1] named the hemoglobin protein in Nostoc as cyanoglobin.

Donna R. Hill et al [2] found that this hemoglobin is an extra-membrane protein. Data from Maikoll Potts [3; 12] also cited data on the capture of the Nostoc myoglobin protein.

Tab. 2. Nostoc c. the amino acid composition of (in % account)

Amino acids	Literature [4]	Literature [6]	Literature [16]	Literature	Literature [17]	Our information
Asparaginic acid (Acp)	0,297	3,83	2,16	0,285	2,38	2,13
Treonin (Thr)	0,154	1,80	1,33	0,185	1,51	1,23
Serin (Ser)	0,138	1,16	0,87	1,350	0,86	0,75
Glutamic acid (Glu)	0,318	2,30	2,01	0,320	1,89	1,93
Prolin (Pro)	0,100	1,03	0,36	0,101	0,90	0,38
Glitsin (Gly)	0,304	1,75	1,09	0,309	1,03	1,06
Alanin (Ala)	0,308	1,55	1,22	0,309	1,36	1,12
sistin	0,030	In very small quantities	0,13	0,030	0,12	0,11
Valin (Val)	0,233	1,64	1,22	0,230	0,44	1,18
Metionin (Met)	0,091	0,23	0,04	0,091	0,12	0,02
Leytsin (Leu)	0,327	1,77	1,39	0,330	1,44	1,28
Tirozin (Tyr)	0,065	0,57	0,46	0,665	0,36	0,44
Izoleytsin (Ile)	0,221	0,47	1,06	0,225	1,05	1,02
Fenilalanin (Phe)	0,160	1,41	1,12	0,162	0,97	0,143
Gistidin (His)	0,083	0,25	0,15	0,082	0,07	0,18
Triptofan (Trp)	0,028	-	-	0,28	unverified	0,20
Lizin (Lys)	0,238	0,06	0,67	0,241	0,53	0,71
Arginin (Arg)	0,312	1,68	1,10	0,321	1,15	0,318

As can be seen from the table, the amount of amino acids is much higher, especially when the eight are not exchanged and the half-exchanged valine is significantly higher in isoleucine, leucine, threonine, methionine, lysine, phenylalanine, tryptophans.

In one sample of Nostoc, 18 amino acids, 8 of which are from non-exchangers, are abundant, the proportions in the structure are much closer. The total amounts of amino acids are also high and it is similar to the results obtained from vegetables. Nostoc microsporin also captures amino acids. This substance is characterized by an abundance of glycine and serines.

Nostoc c. lipids. Lipids in Nostoc are usually compounds with small molecular weights, characterized by the fact that their amounts are on average around 4.28% in our samples. There are literature reports that lipids with small molecular weights can be used as healthy foods [4; 12]. In particular, Nostoc has been shown to hold a certain amount of phospholipids – phosphotidylglycerin and three glycolipids (monogalactosylceryl diglycerides, bigalactosylceryl diglycerides I thioflavonoids), as well as a small amount of monoglycosylcerolipids.

SHin-Ichio Kadziama et al [5; 13] Nostoc c. they isolated a new lipoproteid – nostoimgicidin from their bark. It contains β-amino acid and 3-amino-6-hydroxystearinic acids, which have anti-fungal activity.

Nostoc c. polysaccharides. The total amount of polysaccharides in our sample was an indicator of around 25.7%. Polysaccharides in Nostoc are composed of alginose, sucrose, galactose, glucose, fructose, xylose, rhamnose, pectin polysaccharides, glycosides, and extracellular separating polysaccharides. Lisan-phase et al., [6] found that the amount of alginases in thin-layer chromatography was 0.24 mg/g. Polysaccharide digitolin has accelerated the germination of seeds of certain plants [5; 14]. The maximum extraction of polysaccharides is 7.91% in water-soluble polysaccharides. Alkaline polysaccharides were in the range of 7.27-12.82%. Helms et al [8] found that extracellular polysaccharides consist of xylogalactoses, which are important in their attachment to the substrate. It has also been found that extracellular polysaccharides provide the resilience property of cells in arid weather. In addition, Maria Ponis Briones et al [9; 15] Nastoc s. it has been said that it contains a large amount of nutrient fiber and is later seen as a source of food fiber.

Nostoc vitamins. There is information that Nostoc captures many vitamins, of which vitamins s, B1, B2, B12, E [10]. Vitamin C 42.0 mg/100g, Vitamin B 2.42 mg/100 g, vitamin B12 1.34 mg/100 g retention Nostoc s. the vitamin-rich aspect of fungi and sea algae means that they are much superior to their products.

Nostoc Pigments in algae are divided into 3: chlorophylls, carotenoidalr, and phycobilins. [11; 16] found a large amount of protective pigments with a new UF-shielding molecular mass of 1500-3000 D and a polysaccharide structure in the composition of Nostoc. This UF-protective pigment is very high and accounts for about 10% of the dry mass. This pigment stimulates the increase in the amount of polysaccharides secreted from Nostoc cells. It also increases the levels of carotenoids, especially Ketone and lutein, while chlorophyll is unaffected. Cosmetic ointments made on the basis of these pigments protect against the harmful effects of ultraviolet rays.

Nostoc. Nostoc holds elements such as potassium, sodium, calcium, magnesium, iron, manganese, zinc, manganese, copper, phosphorus, selenium and others [10]. These macro-and microelements are also considered essential substances for the human body, and these substances taken from a dietary point of view are easily absorbed from those taken with drugs.

Nostok tallomi is particularly high in calcium. Istemol for too long can prevent rickets in children. In adults, however, it prevents osteomaly (loss of bone tissue strength) as well as bleeding in the upper gastrointestinal tract.

The role of the Iron element is also very large, and its timely istemol can prevent anemia in young children and pregnant women.

Tab. 3. Nostoc c. composition of minerals (mg/100 g)

Mineral elements	Literature [4]	Literature [6]	Literature [7]	Literature [15]	Literature [17]	Literature [2]	Our information
With calcium	1833	1340	3091	697,70	2910	-	1731
Magnesium	225	670	222	24,60	79	-	21
Phosphorus	131	82,85	-	-	140	-	129
Copper	1,07	-	0,40	1,40	10,46	1,02	1,11
Zinc	32,63	1,50	5	243,40	36,86	31,13	32,87
Iron	4686	360	284	435.29	574.60	447.50	4487
Manganese	90,91	-	3	8,20	4,36	75,05	94,71
Cobalt	0,15	-	-	-	-	0,14	0,09
Celine	0,01	-	-	-	0,08	0,01	0,03
Germanicus	-	-	-	-	0,01	-	-
Sodium	-	74,90	-	-	-	-	71,04
Potassium	-	110	-	-	-	-	138

CONCLUSION

Cyanobacteria are primary producing organisms. The organic matter they produce serves as a source of nutrition for other heterotrophic organisms, as well as reforming atmospheric nitrogen in itself, converting them into nitrogen compounds, enriching the soil with nitrogen, which is important for all living organisms. From its richness in such nutrient elements – proteins, carbohydrates, lipids, pigments and other important secondary metabolites, its use in various branches of folk medicine - in food, rural agriculture, medicine, pharmaceuticals, Microbiology, Biotechnology, cosmetics and other fields-indicates that the role of these organisms is even greater. A more in-depth study of its biochemical compositions and structures, analysis of the connections between their substances with their multifunctional properties and their structures, and determining the position of the results obtained in maintaining and stabilizing biospheric biodiversity are some of the current pressing problems.

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