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BIOTECHNOLOGY OF CULTIVATION OF PHYTOPLANKTON AND ZOPLANKTON CONTAINING PHYSIOLOGICAL ACTIVE SUBSTANCES

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Abstract. *This article provides information on the extraction, cultivation and applying in pisciculture of dominant species of phytoplankton and zooplankton, containing high levels of physiologically active substances, that are intensively developing in fish ponds, ditch waters and wastewater of the Bukhara region.*

Keywords*: water reservoirs, active substances, phytoplankton, zooplankton, cultivation, applying in pisciculture.*

Annontatsiya. *Ushbu maqolada Buxoro viloyati suv havzalaridagi baliqchilik, zovur, oqava suvlardagi fiziologik faol moddalarga boy bo'lgan va intensive holatda rivojlanuvchi fitoplanktonlar va zooplanktonlar turlarini ajratish, ularni ko'paytirish va baliqchilikda qo'llash haqida ma'lumotlar keltirilgan.*

Kalit so'zlar*: suv havzalari, faol moddalar, fitoplanktonlar, zooplanktonlar, ko'paytirish, baliqchilikda qo'llash.*

Аннотация. *В этой статье представлена информация об извлечение, выращивании и использовании доминирующих видов фитопланктона и зоопланктона, содержащих высокие уровни физиологически активных веществ, которые интенсивно развиваются в рыбоводных прудах, канавных водах и сточных водах Бухарской области.*

Ключевые слова*: водоёмы, активные вещества, фитопланктоны, зоопланктоны, культивирование, применение в рыбоводстве*

Biotechnology is the human use of various microorganisms, the substances that produce microorganisms, biomolecular phenomena necessary to improve human health, nutrition and life in general. Biotechnology is the result of a combination of various fields of biology, as well as technologies. The problems of growth and development of various plants caused by high levels of air and water pollution, food shortages, various diseases, contamination of soil composition are among the urgent problems today. Consequently, modern biotechnologists solve these and many other problems with the help of various plants, living organisms and biologically active substances (vitamins, antibodies, amino acids, hormones, etc.).

Biotechnology is used in the following topical areas: medicine (allows people to prevent, diagnose, treat many diseases with the help of human cells, genes, organelles), industry (an area that allows us to develop biological processes and create new organisms with the participation of microorganisms and wide variety of enzymes), the environment (natural resources coming from nature to save natural resources, increase yields, restore polluted ecosystems), molecular biotechnology (area, which allows the use of various types of living systems in many areas of biology), in crop production (breeding plant varieties by various methods, eliminating harm to them by insects, diseases, for instance: some biotechnology plants can be modified in part to bear certain type of herbicides, which make tare control simpler and more efficient), in animal

husbandry (contribute to the conservation of animal species, improve animal health, have a significant impact in such agricultural sectors as animal husbandry, horse breeding, poultry farming, fishing, make it possible to improve the provision of high-quality meat to society), in the field of medicine (antibiotics used as a measure to combat many diseases, participation in the creation of vaccines), on the water sectors (increasing the productivity of animals raised in these waters, as a result of studying the composition of water and purification of polluted waters with the help of various types of bottom algae, improving their habitat by studying the state of aquatic organisms).

Nowadays, due to the rapid growth of the population of Uzbekistan, providing high-quality and inexpensive food is one of the most important tasks of not only farmers but also scientists. One of the burning problems is the cultivation and increase of productivity of economically profitable, tasty, in-demand fish species, especially in an area with a shortage of fresh water as Bukhara. Currently, in our Bukhara region, fish farms operate on several natural reservoirs and artificial reservoirs, and the task facing them is to meet the demand of the population for fish and fish products. That is why for the cultivation of herbivorous fish grown on these fish farms, there is not always enough high and low algae growing and reproducing in ponds.

It is known that of the species of green algae living in reservoirs, Chlorella and Scenedesmus Lab contain proteins 50-55%, carbohydrates 25-30%, fats up to 10% and more than a dozen vitamins (1,2,3,4) from active substances.

The (dominant) types of phytoplankton that are actively developing in the waters of fish ponds, ditch (collector) waters and sewage reservoirs of the Bukhara region have been determined. They include from blue-green algae –*Anabaena variabilis kütz*, *Oscillatorio brevis*, O*scillatorio boryona*, *Spirulina senneri*, *Spirulina abbreviate Lemm;* from green algae *Chlamydomonas snowial*, *Chlamydomonas oblanga Anach*, *Paediatrum duplex*, *Chlorella vulgaris*, *Chlorella ellipsoidea*, *Scenedesmus obliquus*, *Scenedesmus acuminarus*; from diatoms – *Diatoma vulgare*, *Synebra acus*, *Synebra pulonella*, *Cyclotella comta*; from euglenoids - *Euglena acus*, *Euglena candara*, *Euglena proxima* and etc. Algologically pure Chlorella vulgaris and Scenedesmus obliquus cells were isolated from the identified phytoplankton species.

Isolated algologically pure cells were propagated under laboratory conditions in a mineral nutrient medium "04". For their reproduction, they were mixed in microcompressors, at a temperature of 25-28 ° C, in conditions with a luminosity of 20-25 thousand lux, for 5 days the number of *Chlorella* cells was 31.5 million/ml, *Scenedesmus* cells - 25.8 million / ml. These algae were bred in different waters to increase the number of cells and biomass. During the experiments, *Chlorella* and *Scenedesmus* cells were diluted in laboratory conditions in the waters of fish farming ponds, in the waters of ditches and in sewage. At the beginning of the experiment, 1.5 million cells per 1 ml of each variant were planted. The results are shown in the table.

Reproduction of *Chlorella* and *Scenedesmus* cells in various environments:

N	Type of water	Number of cells, mln/ml				
		1	2	3	4	5
1	Water from fish ponds + *Chlorella vulgaris*	1,5	4,8	10,4	18,5	26,4
2	Water from fish ponds + *Scenedesmus obliquus*	1,5	4,4	9,0	16,5	24,3

3	Ditch waters + *Chlorella vulgaris*	1,5	3,4	8,5	12,0	18,3
4	Ditch waters + *Scenedesmus obliquus*	1,5	3,0	7,5	11,4	17,0
5	Sewage waters (housing and communal sectors) + *Chlorella vulgaris*	1,5	6,5	15,5	30,1	45,6
6	Sewage waters (housing and communal sectors) + *Scenedesmus obliquus*	1,5	5,8	15,0	28,5	43,2

As a result of experiments, *Chlorella* cells increased by 26.4 million/ml, *Scenedesmus* cells increased by 24.3 million/ml in the waters of fish ponds for 5 days. In the ditch waters, *Chlorella* cells increased by 18.3 million/ml, and *Scenedesmus* -by 17.0 million/ml. In the wastewater of housing and communal sectors, an increase in *Chlorella* cells was observed to 45.6 million/ml, and *Scenedesmus* cells- to 43.2 million/ml. The hydrochemical composition of the waters in which microscopic algae are planted has been determined. Due to the low content of biogenic elements (nitrogenous, phosphoric) in the waters of fish ponds, *chlorococcales* are poorly developed.

It is known that ditch waters are formed as a result of leaching of mineral salts contained in soils. Since they have a high content of minerals and they are in a connective state - chlorides, carbonates, bicarbonates, sulfate compounds, their assimilation by algae is a complex process. Consequently, the number of cells was 18.3 - 17.0 million.

Wastewaters from housing and communal sector contain mainly organic substances. They decompose under the action of microorganisms, a mineralization process occurs and nitrogenous and phosphoric compounds are formed. Microscopic algae develop in wastewater, an aerobic process occurs during photosynthesis, enriching the water with oxygen, and they develop with activity, destroying pathogenic microorganisms contained in the water, under the action of antibiotics.

Due to the high content of organo-mineral substances in wastewater, the number of *Chlorella* cells increased - 45.6 million/ml, *Scenedesmus* - 43.2 million/ml. These processes are shown in the figure.


It was found that *Chlorella* and *Scenedesmus* cells multiply in different waters, where they are fed as food for *Hypophthalmichthys molitrix*, increasing their productivity by 25-30%.

Dominant zooplankton species growing and developing in the aforementioned waters have been identified. These are *Daphnia pulex*, *Daphnia magna*, *Cyclops strenuus*, *Euglena viridis*, *Euglena acus*, *Euglena spiryra*, *Paramaecium caudatum*, *Moina macrocopa*, *Moina rectirostris*, *Artemia salina* and many others. From the identified species, *Daphnia magna* and *Daphnia pulex* were isolated and propagated in laboratory conditions from species actively developing in the conditions of the Bukhara region. Favorable conditions for the development of daphnia are considered to be the high level of weather in the conditions of the Bukhara region. For this reason, *Daphnia* is bred and used as food for Cyprinus carpio (carp), while their productivity has increased by 25-30%./.

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