ЭКОЛОГИЧЕСКОЕ ПРЕИМУЩЕСТВО ОЧИСТКИ СТОЧНЫХ ВОД В БИОЛОГИЧЕСКИХ ПРУДАХ ПОД ДЕЙСТВИЕМ РАСТЕНИЯ АЗОЛЛА (AZOLLA CAROLINIANA).

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Annotatsiya. *Ushbu maqolada Xorazm viloyati Urganch shahar kommunal xo‘jalik oqava suvlarida dala sharoitida biologik hovuzlarda Azolla (Azolla caroliniana) o‘simligini ko‘paytirish va uning suvni tozalash xususiyatlarini o‘rganish maqsadida olib borilgan ilmiy tadqiqot natijalari bayon qilingan.*

Kalit so‘zlar. *Azolla, biologik hovuz, oqava suv, biofiltr, biologik usul, spora, mikroblar.*

Abstract. *In this article, the results of the scientific research carried out in order to study the properties of Azolla (Azolla caroliniana) in biological ponds in field conditions in the municipal wastewater of Urganch city of Khorezm region and to study its water purification properties are described.*

Keywords. *Azolla, biological pool, wastewater, biofilter, biological method, spores, microbes.*

Абстрактный. *В данной статье описаны результаты научных исследований, проведенных с целью изучения свойств азоллы (Azolla caroliniana) в биологических прудах в полевых условиях в коммунально-бытовых сточных водах города Ургенч Хорезмской области и изучения ее водоочистных свойств.*

Ключевые слова. *Азолла, биологический бассейн, сточные воды, биофильтр, биологический метод, споры, микробы.*

Water has become one of the most scarce resources today. The depletion of water is not only related to the uneven distribution of water resources (underground and surface water reserves), but also to the pollution of the used water and the lack of effective treatment. Contaminated industrial and agricultural wastewater is being dumped into some open water bodies. If the contaminated water is not cleaned in time, it can spread various diseases, become a source of germs and harmful substances. The problem of rational, complex use and protection of water is

becoming one of the most urgent and important scientific and technical tasks of today.[1]

At this point, in Uzbekistan, great attention is being paid to the further improvement of wastewater treatment methods and the creation of a system of effective use of such water and its implementation.

The use of high-water plants gives effective results in the treatment of wastewater using ecologically safe biological methods. Organization of biological ponds is of great importance in wastewater treatment. Biological ponds are specially created relatively shallow ponds in which natural biochemical processes of self-purification of water take place in aerobic and anaerobic conditions. Ponds are built for primary biological treatment, as well as complete wastewater treatment after biofilters and aerotanks. [1]

Material and methods. Azolla (Azolla caroliniana), a member of the group of high water plants, can be used in the biological treatment of wastewater. This plant is a plant with high biofiltration and nutritional properties.

Azolla grows well in natural conditions in the waters of North America, Western and Central Europe, South America and the Galapagos Islands. Adapted to the conditions of Uzbekistan. This plant is mainly grown as a biofilter and feed. Azolla is a small, beautiful, spore-reproducing, surface-floating herbaceous plant, up to 2.5 cm in size, with leaf plates up to 1 mm in size.[2]

Azolla plant (Azolla caroliniana) was planted and propagated in the waste water released from the household enterprise of Urganch city, Khorezm region, in order to purify the wastewater by biological method and reuse it in the national economy, and conducted scientific research in field conditions.

Experiments were conducted in biological ponds belonging to Urganch city wastewater treatment facilities belonging to Khorezm water supply LLC. In determining the productivity of the plant, V.M. Katanskaya recommendations were used [3]. The growth and development of Azolla in wastewater was determined by measuring the resulting biomass on a scale. The physical and chemical composition of wastewater, the composition before planting and after planting, general hydrochemical Y.Y. Lure and N.S. It was determined based on the Strogonov method [4][5].

Research results

200 g of plant biomass per 1 m2 of the water surface was planted on the surface of the wastewater that goes to the biological ponds after the aerotanks that clean urban household wastewater. Experiments were observed for 8 days.

In order to determine the plant yield, 1m2 of azoles on the surface of the water were collected and weighed. Determining the yield showed that the amount of growth of Azolla in the first biological pond was 540 g in 8 days, the weight of the plant in the second pond was 515 g, and the yield of the plant in the third pond was 485 g. In this case, daily growth reached 42.5 g/m2 in the first biological pool, 39.3 g/m2 in the second biological pool, and 35.6 g/m2 in the third biological pool. It was found that the productivity of azolla biomass in the first biological pond is higher than the biomass in the second and third biological ponds, and the amount of organic and mineral nutrients in the first biological pond is high. (Table 1).

Before planting azolla in biological ponds, the physico-chemical composition of municipal wastewaters discharged from Urganch city wastewater treatment facilities belonging to Khorezm water supply LLC was studied. (Table 2).

After planting azolla in biological ponds, that is, after the water surface was completely covered with plants, the 8-day physical and chemical composition of the wastewater coming out of the first, second and third ponds was determined, and a significant change in the composition of the wastewater was observed (Table 3). .

Dynamics of growth and development of Azolla in biological ponds of the Urganch city economic-domestic wastewater treatment complex. Table 1.

Nº	Biological ponds	Wet biomass of Azolla, g/m 2				
		At the nning of xperiment	Daily growth		Biomass unt for 8 days	Total ass
		G	G	%	G	G
1	The first biological t is Azolla	200	42,5 ±0,84	21,2 ±0,16	340,0 ±0,48	540 ±0,45
2	The second biological is Azolla	200	39,3 ±0,46	19,6 ±0,10	315,0 ±0,42	515 ±0,38
3	The third biological t is Azolla	200	35,6 ±0,38	17,8 ±0,22	285,0 ±0,28	485 ±0,32

Physico-chemical composition of wastewater in the biological ponds of the Urganch city economic-domestic wastewater treatment complex before planting Azolla. Table 2

	Indicators	**Tajriba turi**		
		I	**II**	**III**
		1st ogical pool	2nd biological	3rd biological
1	Temperature, 0C	26,0±0,23	26,0±0,23	26,0±0,23
2	pH	7,5±0,05	7,5±0,07	7,5 ±0,06
3	Color	Red	Yellow	Blonde
4	The smell	3,0±0,04	2,0±0,02	No
5	Oxygen mg/l	1,4 ±0,16	2,5 ±0,16	3,3 ±0,23
6	KBS5 mg O2/l	119,4 ±3,4	95,3 ±2,7	71,4 ±2,1
7	Oxidation mg O2/l	82,2 ±2,8	67,3 ±2,2	58,2 ±2,1
8	Ammonia mg/l	5,0 ±0,2	4,0 ±0,3	3,0 ±0,34
9	Nitrite mg/l	0,08±0,004	0,07±0,006	0,06±0,005
10	Nitrate mg/l	4,0 ±0,24	3,0 ±0,36	3,0 ±0,47
11	Chlorides, mg/l mg/l	65,4±1,4	51,5±1,6	40,5±1,3
12	Sulfates, mg/l	54,5±1,6	44,5±1,2	38,5±1,4
13	Phosphates, mg/l	7,5±0,08	5,6±0,03	4,2±0,04
14	Suspended substances, mg/l	75,0±2,4	40,0±1,8	29,0±1,4
15	Plant biomass, g/m2	-	-	-

Physico-chemical composition of wastewater in the biological ponds of the Urganch city economic-domestic wastewater treatment complex after planting Azolla (day 8).

Table 3

	Indicators	**Type of experience**		
		I	**II**	**III**
		1st ogical pool	2nd biological	3rd biological
1	Temperature, 0C	25,0±0,26	25,0±0,23	25,0±0,28
2	pH	7,5±0,06	7,5±0,08	7,5±0,04
3	Color	Colorless	Colorless	Colorless
4	The smell	No	no	no
5	Oxygen mg/l	4,0±0,63	5,6±0,74	8,4±0,48

6	KBS5 mg O2/l	55,3±2,4	23,1±1,4	11,3±0,6
7	Oxidation mg O2/l	38,4 ±1,6	21,1 ±1,2	9,8 ±0,4
8	Ammonia mg/l	3,0±0,14	1,0±0,06	no
9	Nitrite mg/l	0,02	no	no
10	Nitrate mg/l	1,0±0,14	No	no
11	Chlorides, mg/l mg/l	55,4±2,2	44,8±1,8	28,4±1,4
12	Sulfates, mg/l	39,3±1,2	35,5±1,8	26,5±1,4
13	Phosphates, mg/l	5,5±0,06	3,0±0,04	2,0±0,03
14	Suspended substances, mg/l	25,0±1,2	22,4±0,8	14,5±0,4
15	Plant biomass, g/m2	540	515	485

In conclusion, we can say that when the results are analyzed, when azole is grown in the waste water released from municipal enterprises, it accumulates biomass from 150-200 to 485-540 g on the surface of 1 m2 of water, and the level of purification of waste water from organic-mineral substances is 88 It was found that it reached -90%. It can be seen that the biological treatment of wastewater under the influence of high plants is an ecologically safe and economically effective method.

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