Wastewater Generation and Their Biological Treatment

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ABSTRACT

The article provides information on the generation and biological treatment of wastewater from high-water plants using pistia (Pistia stratiotes L) and eichhornia (Eichhornia crassipes Solms).

Keywords: waste water, high-water plant, pistia (Pistia stratiotes L), eichhornia (Eichhornia crassipes Solms), physical-chemical composition, industrial wastewater, raw materials, population.

Introduction. President of the Republic of Uzbekistan Sh.M. Mirziyoev's issues of improving the ecological situation and environmental protection in the Republic of Uzbekistan in 2017-2021; five priority areas of development.4.3. Activity strategy to the paragraph "... increasing the level of providing the population with communal and household services, first of all, fundamentally improving the provision of clean drinking water to the population in rural areas through the construction of new drinking water networks, the step-by-step introduction of economical and effective modern technologies" according to [1].

As a result of the increase of production and industrial enterprises and the establishment of new cities, they need large amounts of clean water.

The physical properties and chemical composition of water consumed by humans are in a certain standard (norm).

Today, many of our scientists are conducting scientific research work on the production and treatment of wastewater on a global scale and in our Republic.

A number of methods are used in wastewater treatment.

1. Mechanical method (stirring, sedimentation, filtration, centrifugation), etc.
2. Physico-chemical method (adsorption, coagulation, flocculation, ion exchange, extraction)
3. Chemical (reagent) method (neutralization, oxidation, reduction)
4. Biochemical method (under aerobic, anaerobic conditions)
5. Thermal methods (flame cleaning with high temperature)
6. Biological method (using plants)

The most useful of these methods is the biological method. Therefore, in our scientific research work, we aimed to treat wastewater using a biological method. R.Sh.Shoyakubov and S.B. It is mentioned in the research works of Boriev (1993).

Physical properties and chemical composition of wastewater Yu.Yu. It was done using the method of Lur'e (1984). T.T. in determining the productivity of aquatic plants. Taubaev(1970), V.M.Katanskaya (1981), and I.A. Beideman (1974) methods were used.

In the cultivation of aquatic plants, A.M. Muzaffarov, R.S. Shoyaqubov, O.A. Ashurmetov, S.B. It was used in practice using the nutrient media recommended by Boriev.

Wastewater from the enterprise was determined in the laboratories of the Biotechnology and Ichthyology research laboratory established under the Department of Biotechnology and Food Safety of Bukhara State University and water analysis laboratories of the State Committee for Ecology and Environmental Protection of Bukhara Region. Experimental experiments on determining the composition of wastewater were carried out in 20-liter aquariums and plasma tanks.

Table 2

T/r	Options	Development days of pistachio plant:					
		1	2	3	4	5	6
1	Blackcurrant+pistachio	100	140	250	460	680	800
2	Sewage+3:1 ratio tap water	100	180	220	330	550	660
3	Wastewater 1:1 ratio	100	190	245	350	390	420

The development and reproduction of pistachio plant in the wastewater from Bukhara textile enterprise lasted for 6 days, and the biomass on the surface of the wastewater was 800 g, 660 and 420 g. According to the experiments, it was found that without diluting the waste water with tap water, pistia actively produces a large amount of biomass.

Before planting pistia (Pistia stratiotes L) plant in wastewater, their physico-chemical composition was determined.

Physico-chemical composition of wastewater before the experiment

Table 2

t/r	Indicators	Sewage	Sewage + mains water (3:1)	Sewage + mains water (1:1)
1	Temperature, 0C	25,0	25,0	25,0
2	Light, lux/thousand	20	20	20
3	pH	6,5	7,0	7,0
4	Ingredients, mg/l	180,0	125,0	60,0
5	Watercolor flow	flow	flow	flow
6	Suvninghidi, score	5,0	4,0	3,0
7	Amount of dissolved oxygen in water, mg/l	no	no	no
8	Biochemical consumption of oxygen, mgO2/l	195,0	135,5	105,0
9	Oxidation level, mgO2/l	185,0	140,0	90,4
10	Ammonia, mg/l	8,0	6,0	4,0
11	Nitrites, mg/l	0,8	0,6	0,4
12	Sulfates, mg/l	110,0	80,3	50,9
13	Chlorides, mg/l	90,5	68,8	40,4

When determining the composition of wastewater brought to the laboratory from the enterprise, it was found that Ph-6.5, 7.0, the amount of suspended substances 180.0, 125.0, 60.0 mg/l, the smell of water 5.0, 4.0, 3.0 points, the biochemical consumption of oxygen 195, 0, 135.5, 105.0mgO2/l, oxidation level 185.0, 140.0, 90.4mgO2/l, ammonia 8.0, 6.0, 4.0mg/l, nitrite 0.8, 0.6 , 0.4mg/l, sulfates were 110.0, 80.3, 50.9mg/l. The data of the wastewater after the experiment are presented in the table.

Physico-chemical composition of wastewater after planting pistia (Pistia stratiotes L) plant

Table 3

t/r	Indicators	Sewage	Sewage + mains water (3:1)	Sewage + mains water (1:1)
1	Temperature, 0C	24.0	24.0	24.0
2	Light, lux/thousand	18	24.0	24.0
3	pH	7.5	7.0	7.0
4	Ingredients, mg/l	no	no	no
5	The water color is	clear	clear	clear
6	Suvninghidi, no score	no	no	no
7	Amount of dissolved oxygen in water, mg/l	9.0	9.6	10.5

According to the results of these experiments, it was found that without diluting the waste water of the textile enterprise with tap water, the pistachio plant actively develops in the waste water itself and produces a large amount of biomass.

Experiments with several types of aquatic plants were carried out on wastewater from a textile factory. The results of the eichhornia plant are cited in the experiments.

Development of eichhornia (Eichhornia crassipes Solms) plant in wastewater

Table 4

T/r	Variant	development days of eichhornia plant:					
		1	2	3	4	5	6
1	Okhavasuv+eichorniya	100	160	310	480	710	990
2	Tap water + tap water 3:1 ratio	100	175	280	350	590	775
3	Wastewater 1:1 ratio	100	180	275	410	420	460

Eichhornia plant actively developed on the surface of wastewater and formed 990g, 775g and 460g of biomass. A low amount of biomass was observed in variants diluted with tap water.

Because, when wastewater is diluted, the content of organic and mineral substances in it decreases. The physical and chemical composition of wastewater was determined before the experiment.

The physico-chemical composition of waste water of textile enterprises is presented in the table.

Table 5

т/r	Indicators	Sewage	Sewage + mains water (3:1)	Sewage + mains water (1:1)
1	Temperature, 0C	24-25	24-25	24-25
2	Light, lux/thousand	25	25	25
3	pH	6,5	7,0	7,0
4	Ingredients, mg/l	155,5	105,4	56,8
5	Watercolor	flow	flow	flow
6	Suvninghidi, score	5,0	4,0	3,0
7	Amount of oxygen dissolved in water, mg/l	no	no	no
8	Biochemical consumption of oxygen, mgO2/l	205,5	112,8	95,5
9	Oxidation level, mgO2/l	195,4	135,5	105,4
10	Ammonia, mg/l	7,0	5,0	3,0

Determination of the physico-chemical composition of wastewater shows that there is no dissolved oxygen in the water, the biochemical index of oxygen is 205.5 mgO2/l, in diluted versions 112.5-95.5 mgO2/l; oxidation level 195.4 mgO2/l, in diluted versions 135.5-105.4 mgO2/l.

These indicators are presented in table 5, changes in the composition of wastewater were observed during the development of the eichhornia plant. During the development of the Eichhornia plant, the water temperature was 24-25 0C, and the light was around 25,000 lux. As a result of the growth of the plant in the wastewater, the color of the water became clear. The smell is gone.

It was observed that the amount of dissolved oxygen in water increased to 10.4 mg/l in the first option, 9.0 mg/l in the second option, and 9.5 mg/l in the third option.

Biochemical consumption of oxygen 10.5; 9.0; It was observed that the level of oxidation decreased to 7.5 mgO2/l, to 30.3, 25.4, and 18.9 mgO2/l. Table 6 shows that ammonia, nitrites

and nitrates in the wastewater were fully absorbed by the eichhornia plant.

Physico-chemical composition of wastewater after planting Eichhornia crassipes Solms

Table 6

т/r	Indicators	Sewage	Sewage + mains water (3:1)	Sewage + mains water (1:1)
1	Temperature, 0C	24-25	24-25	24-25
2	Light, lux/thousand	25	25	25
3	pH	7,5	7,0	7,0
4	Ingredients, mg/l	no	no	no
5	The water color is	clear	clear	clear
6	Suvninghidi, no score	no	no	no
7	Amount of dissolved oxygen in water, mg/l	10,4	9,0	9,5
8	Biochemical consumption of oxygen, mgO2/l	10,5	9,0	7,5
9	Oxidation level, mgO2/l	30,3	25,4	18,9
10	Ammonia, mg/l	no	no	no
11	Nitrites, mg/l	no	no	no
12	Sulfates, mg/l	45,4	38,4	32,3
13	Chlorides, mg/l	55,8	50,4	45,4

The effectiveness of the recommended method is as follows:

1. Energy is saved;
2. Cleaning of the atmospheric air of the area, reduction of odors if applicable;
3. Formation of a large amount of biomass;
4. If the dry and wet mass of the produced plant biomass is added to the standardized feed used in fisheries and animal husbandry, the percentage of carbohydrates and proteins will be high;

Summary. As a result of the experiments, Pistia (Pistia stratiotes L) and Eichhornia plants actively developed in the waste water of the textile enterprise and produced a large amount of nutrient-rich biomass.

Пистия *(Pistiya stratiotes L)*ва эйхорния(*Eichhorniya crassipes* Solms)оқава сувларни сувда эриган кислород билан бойитиб, сувни органо- минерал моддалардан 87-90 % гача тозалаш мумкинлиги аниқланди. Тозаланган оқава сувни иккиламчи сув сифатида қишлоқ хўжалик экинларини суғоришда тавсия қиламиз.Ҳосил бўлган яшил биомассадан балиқчилик, паррандачилик, чорвачиликда озуқа сифатида қўлланилиш мумкинлиги аниқланди. It was found that by enriching Pistia (Pistia stratiotes L) and Eichhornia (Eichhornia crassipes Solms) wastewater with dissolved oxygen, it is possible to purify water from organo-mineral substances up to 87-90%. We recommend the treated wastewater as secondary water for irrigation of agricultural crops.

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