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Ecological And Sanitary Assessment Of Biological Ponds Based On The Species Composition Of Algae

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ABSTRACT

Among the complex of anthropogenic factors, one of the leading places is occupied by the "water factor" associated with pollution of water sources, shortcomings in water purification and disinfection. Discharge of insufficiently treated and untreated wastewater into watercourses predetermines abnormal changes in their chemical composition and degradation of biocenoses.

Background and Aim: Municipal wastewater contaminated with organic and nitrogen-phosphorus-containing compounds, as well as bacteria and viruses, also contribute to the pollution of water bodies. The main factor affecting the change in the quality indicator of water bodies is municipal wastewater. In the treatment facilities of Bukhara, about 20 thousand m^3 of wastewater, which will lead to a change in the chemical and biological composition of water. At the same time, there is no complete picture of the distribution of algae and their role in determining the ecological and sanitary state of biological ponds of the treatment plant in Bukhara, which prompted us to study these important problems.

Material and Methods: Processing of the collected algological material was mainly carried out in the laboratory of algology and hydrobotany of the Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan and was also partially processed at the Department of Botany of the University of Bukhara. The physicochemical composition of wastewater in biological ponds was determined by the generally accepted methodology of A. S. and Yu. Yu. Lurie.

Conclusion: According to our observations, representatives of all systematic groups of algae developing in a particular reservoir participate to varying degrees in the processes of self-purification of wastewater. Even species of the same genus are characterized in different ways. This indicates the need for comprehensive and deep floristic studies of the natural algal population of water bodies used as biological ponds - reservoirs, sedimentation tanks and filtration fields.

Keywords: factor, pond, algae, flora, algoflora, pollution of water, systematic, filtering, season.

1. INTRODUCTION

The treatment facilities of Bukhara are located on the 2nd left-bank terrace of the Zerafshan river valley, 2.8 km south of the border of the city of Bukhara and is located 180-200 meters south of the Kagan-Ashgabat railway. In 480-750 meters to the west of the sites of treatment facilities there is a collector named after Sakovich. The plot has the shape of a rectangle

elongated from north to south. The relief of the site is calm with insignificant drops from north-east to south-west.

In 1996, the Sanitary Rules and Norms for Protecting Surface Water from Pollution were developed and approved by the Ministry of Health of the Republic of Uzbekistan [18] the main purpose of which was to prevent and eliminate existing pollution of water bodies, leading to the development of intoxication among the population when using water for household and drinking purposes, the occurrence of cases of infectious and parasitic diseases spreading by water, as well as to violation of the conditions of recreation in connection with the appearance of unpleasant odors in the water, ok Asuka, Foam or film formation.

At the present stage, industrial methods, such as chemical, physicochemical, are widely used for water purification. Most of these traditional methods, with sufficient efficiency, are also associated with the need to solve a number of problems, such as high energy costs, increased equipment requirements, difficulty in operation, additional chemical treatments, etc., which leads to a significant increase in the cost of water treatment.

The species composition of the algae flora of ponds in different regions of Uzbekistan and Central Asia is different. These reservoirs differ in area, depth, mineralization, nutrition, location, composition of prevailing species.

So in the biological ponds of purification plants in the city of Bukhara in early spring, late autumn and in winter, the algae found are peculiar to the mountain and northern water bodies proper. In the spring, summer and early autumn, the more thermophilic forms of algae developed.

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The main factor affecting the change in the quality indicator of water bodies is municipal sewage. About 30 daily are thrown into the treatment facilities of Bukhara 20 thousand m^3 of effluent, which will lead to a change in the chemical and biological composition of water. At the same time, there is no complete picture of the distribution of algae and their role in determining the ecological and sanitary state of biological ponds of the treatment plant in Bukhara, which prompted us to study these important problems.

Purpose and objectives of the study: In order to study the species composition and seasonal change of algae, to establish the dynamics of the development of dominant species and their abundance and biomass, as well as to determine saprobic species and their indicator role in the self-purification of water, a number of research objectives were set:

- study of the natural composition and seasonal change of algae in biological ponds of treatment facilities in Bukhara;
- determination of the number and biomass of algae in ponds;
- study of the dynamics of development of the dominant species of algae;
- identification of ecological and floristic analysis of algae;
- determination of the composition and distribution of saprobic algae, their indicator role in determining the ecological and sanitary state and in the self-purification of water.
- establishing a comparative analysis of the algal flora of the ponds of Bukhara with the analogous flora of Uzbekistan.

2. MATERIALS AND METHODS

Algological studies in biological ponds of Bukhara (9 ponds from three sections) were carried out in 2015-2020. A total of 650 algological samples were collected, of which 380 are qualitative, -150 quantitative, -120 benthos and fouling. From each biological pond, 3 samples were collected, one of which is qualitative, the second quantitative and the third fouling and benthos. When sampling, the temperature of water and air was measured, the transparency was determined using a Secchi disk, hydrogen ions (pH) were measured using a universal indicator [5] depth and others.

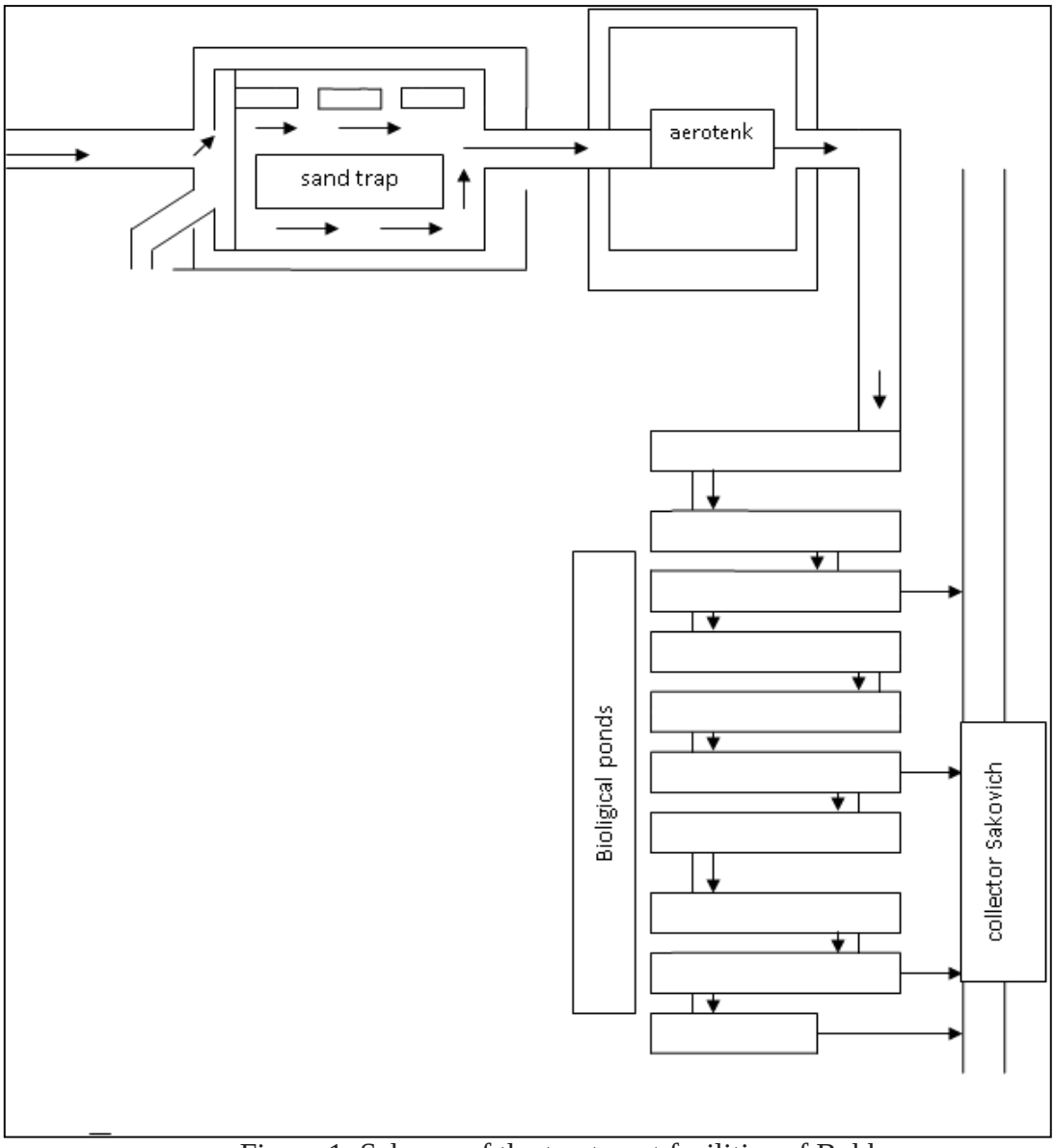

Figure 1: Scheme of the treatment facilities of Bukhara.

For high-quality collection, a plankton network of silk gas No. 76-80 was used.
Quantitative samples were taken with a one-litre bottle bathometer. Quantitative samples were collected at depths of 0.5-1-2 meters (here, high-quality samples were simultaneously taken). Fouling of the accumulation film from the surface of underwater objects, concrete, stones, boards was collected with a scalpel, knife, spoon and directly with your hands. Samples were fixed with a 4% formalin solution and concentrated by the conventional

sedimentation method[4] To determine the species composition of algae, both high-quality, visible in live form and sedimentary species samples were used.
Quantitative calculation of algae was carried out in the counting chamber of Goryaev [5]. Before taking a portion (0.1 ml), the samples were shaken without letting the body sit down, immersed in a glass slide and covered with a 24x24 mm cover glass.
The preparation of permanent preparations from diatoms was carried out mainly according to the method of [5] and partially cold method according to Vrun. Part of the sample (or ½ volume of the entire sample) containing the population was burned in concentrated sulfuric acid (H_2SO_4) until the organics were completely burned, then washed from the acid, centrifuged with distilled water. Permanent preparations were prepared from a certain volume (1 ml of washed precipitate in formaldehyde resin). Rare and new species for water bodies in Uzbekistan and Central Asia, when determined, were grained using the RA-6 drawing apparatus. Saprobity of algae according to the "Unified Method for the Study of Water Quality".
All data on the algae encountered, the number and shape of the colonies characteristic algae, colour and nature of the sample, and others listed in a special journal.
Processing of the collected algological material was mainly carried out in the laboratory of algology and hydrobotany of the Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan and was also partially processed at the Department of Botany of the University of Bukhara.
The physicochemical composition of wastewater in biological ponds was determined by the generally accepted methodology of A. S. and Yu. Yu. Lurie[19].

3. RESULTS AND DISCUSSION

The study of the qualitative and quantitative composition of algae in the ponds of the Kalgan Chirchik fish farm in the Tashkent region, as well as the periodicity of its development for the seasons of the year, was studied by P.N. Saksen also identified 522 taxa, of which blue-green -87, golden -6, diatoms -209, dinophyte -6, euglena -37, yellow-green -4, green -172. In the list of algae found in the Kalgan Chirchik fishery, 56 species of algae are similar to our studies.
Since, for example, Merismopedia punctata, Gomfhosphaeria lacustris, Pediastrum duplex, P.simplex. Tetraedron minimum, Ankistrodesmus densus, Scenedesmus acuminatus, Pandoriuna morum and others were also found in the spring, summer and autumn of the biological ponds of the purification facilities in Bukhara.
Also, studied the algoflora of the ponds of the Kolkhoz Farm[9]. Kalinin Yakkabagsky district of the Kashkadarya region. As a result of the processing of the collected algological material, 118 taxa were found out of them, blue-green, -38 diatoms, -68 euglens, -12 green, -2 green. Similar species were found in 32 species: Oscillatoria lacteirens, O.grinceps, O.woronichinii, Phormidium tenue, Gloecapsa tarrgida, mastogloia smittii, M.baltica, Nitzshia sigina, N. Signoidea, N.trublionella, Euglena oxyuris, Chlorella vulgaris and others.
Ponds of the fish farm of the Akkurgan district of the Tashkent region collected 104 algological samples and as a result of treatment 168 taxons were found, among them blue-green -28, diatoms -64, dinophyte -6, euglenic -8, green -58 [4]. Of the algae found common to our ponds -17, such common are Microcystis aeruginosa, M.pulverea, Gomphosphaeria lacustris, Anabaena flosague from blue-green; Cyclotella kuetzingiana, C.meneghiana, Melosira granulata Fragilara crotoneusis, F.capucina of diatoms; Euglena oxyuris of euglena; Chlamydomonos ehrenberii, Dalmella microscopica, Tetrraedron minimum, Pediadtrum duplex, P.simplex, Scenedesmus quadricauda, S.obliquus and others from green algae.

Ponds of Tashkent fish hatchery registered 118 species and algae species, consisting of 118 taxa of which blue-green-14, diatoms-18, euglenic -22, green -78 [11]. Similar to ours are Oscillatoria amphibia, Lungbua aestuarii of blue-green, Synedra ulna, Nitzschia sigmoidea of diatoms; Euglena texta, E.proxima, E.gracilis from Euglena; Golenkinia radiata, Dictyosphaerium ehrenbergienum, Sphaerocustis schroeterii, Cladophora glomerata and others from green algae. Thus, the species composition of algae biological ponds of purification facilities in Bukhara has some commonness with flora ponds of Uzbekistan and Central Asia.

We begin our comparisons in the ponds of Uzbekistan and Central Asia. When comparing the flora of algae in the biological ponds of sewage treatment plants with some other places in Uzbekistan and Central Asia, one can see here that it has much in common with the flora of other regions.

Algae biological ponds purification plants in Bukhara, we studied the first time. According to our observations, representatives of all systematic groups of algae developing in one or another body of water participate to a varying degree in the processes of self-purification of sewage.

This indicates the need for comprehensive and deep floristic studies of the natural algal population of water bodies used as biological ponds - storage tanks, sedimentation tanks and filtration fields. In addition to scientific interest, such studies are of purely practical significance, since the features and seasonal changes in the species composition of the algoflora can be used to enrich it with the species most desirable in this case.

Before the algalization, we investigated the species composition of the natural algae flora and their distribution by bioplasts, 120 species, varieties and forms of algae characteristic of polluted water bodies were identified.

With the development of introduced organisms in biological ponds, favourable conditions are gradually created for many accompanying species of hydrobionts. Some introduced algae gave active development in ponds.

This contributed to a decrease in the organic content of water and gave rise to an increase in the amount of oxygen dissolved in water. In the coastal parts in all ponds, there were often accumulations of filamentous algae consisting of the waters of the genera Stigeolonium, Cladophora, Spirogyra and others. Along with them occasionally came across blue-green, diatoms and other algae. Among them, Oscillatoria tenuis, O.sancta, Phormidium foveolarum, Lungbya aestuari and others were distinguished.

Fouling was observed on the surface of various underwater objects (branches, boards, stones) consisting of Stigeoelonium tenue, along with them the threads Oscillatoria brevis, O.irrigua, O.limosa, O.tenuis and on the surface of filaments epiphytic species of diatoms Cocconeis placentula, Navicula tryptocophala and much more.

Thus, after algalization, the phytoplankton and phytobenthic groups were enriched in qualitative and quantitative terms of the biological ponds of the purification plant in the city of Bukhara. The increase in the species composition of algae up to 357 taxa and their adaptation in bioproducts allowed to continue work on revealing the role of algae in wastewater treatment.

Algae are mostly composed of alpha-beta-mesosaprobes. The content of dissolved oxygen in water is one of the important factors of water self-purification. As the amount of dissolved oxygen increases, the self-cleaning process accelerates. In the spring period, when the temperature of water and solar energy rises in biological ponds, intensive development of phytoplankton is observed. As microalgae develop in water, the amount of dissolved oxygen increases to 3.0-4.0 mg/l. Reduces the amount of organic substances in BOD_5 to 44.0-50.8 mg O_2/l.

On the basis of 520 algological samples collected biological ponds of the city of Bukhara and as a result of treatment 357 algal taxa, belonging to 5 systematic groups, were found; blue-green - 105, diatoms - 100, dinophytes - 10, euglenic - 30, green - 112. The highest occurrence is observed by the predominance of green algae, then blue-green and diatom algae. A small number is euglenic and dinophyte. As can be seen, species diversity of bioproducts is great.

Algae of biological ponds largely determine the appearance of phytoplankton in various water bodies. The difference in the species composition of algae in biological ponds of purification plants from other bioproducts in Uzbekistan and Central Asia is not surprising, since the hydrological and hydrochemical characteristics of water bodies affect the composition of the flora. The level of development of phytoplankton in biological ponds of sewage treatment plants is much more common from other ponds in Uzbekistan and Central Asia.

With the development of introduced organisms in biological ponds, favourable conditions are gradually created for many accompanying species of hydrobionts. Some introduced algae gave active development in ponds. This contributed to a decrease in the organic content of water and gave rise to an increase in the amount of oxygen dissolved in water. In the coastal parts in all ponds, there were often accumulations of filamentous algae consisting of the waters of the genera Stigeolonium, Cladophora, Spirogyra and others. Along with them occasionally came across blue-green, diatoms and other algae. Among them, Oscillatoria tenuis, O.sancta, Phormidium foveolarum lungbya aestuari and others were distinguished.

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According to saprobity, the first place is occupied by β-mesosaprob of 84 species and forms, or 38.1%, of which blue-green -32, diatom-12, euglena 10, green -30. α-mesosaprob is only 41 taxa, of which green algae occupy the first place -14, then blue-green and diatoms have 10 species, and euglena 7.

Polysaprobic of only 36 species and varieties is 16.3%. Diatom algae are the most abundant here, 10 green and euglena are 9 species, blue-green.

Saprobes is -28 species of algae, of which blue-green-8, diatomaceous 6, euglenic -4, green -10. (table 1)

Table 1. Saprobic algae found in water biological ponds of treatment facilities

Algae departments	Saprogenic algae					Total saprobic species
	x	o	β	α	p	
Cyanophyta	1	2	5	7	2	17
Bacillariophyta	1	8	35	9	-	53
Dinophyta	-	-	-	-	-	-
Euglenophyta	-	-	7	-	2	9
Chlorophyta	-	5	16	5	1	27
Total	2	15	63	21	5	106

Note: *x-xenosaprob, o-oligosaprob, β-beta-mezasaprob, α-alpha-mesosaprob, p-polysaprobю Alpha-beta mesosaprobes of only 21 taxa, blue-green 3, diatoms 6, euglenic 5, green -7. Mesosaprob only 5 species, of which diatoms -4, green -1.*

The remaining saprobic, such as oligo-beta mesosaprob, alpha-mesosaprob, polysaprob, meso-oligosaprob, oligo-mezasaprob and others are contained in one or two species. To understand the dynamics of phytoplankton, a clear representation of both the seasonal periodicity and the distribution of populations of mass species of algae is necessary. The dominant is dominant, giving in this or that period a large number and number of phytoplankton. The composition of the dominant species of algae in different types of water bodies located in different regions varies, changing with environmental factors such as temperature, sunlight, biogenesis, mineralization of water, transparency of hydrogen ions (pH), gas content and others.

Analysis of the seasonal dynamics of algae makes it possible to identify, the nature of the prevailing algal species is so stable. Consequently, the nature of the distribution of the dominant algal species in the reservoir depends to a large extent on the composition and intensity of phytoplankton development [3].

In the works of a number of authors [8-13], an analysis was made of prevailing algae and studied reservoirs. Consider the data of Uzbek and Central Asian researchers who studied rivers, rivers, ponds, lakes, reservoirs and others, conducted a scientific analysis of the development and distribution of algae. These authors indicate for the development and distribution of algae the main role belongs to temperature, light, biogenic and mineral substances, water transparency and others[1].

The composition of the dominant algae of biological ponds of purification plants varies in seasons as follows. In the spring, 14 taxa are dominant, as in spring, the prevailing algae are blue-green algae. In the summer, the prevailing algae of biological puddings of purifying structures turned out to be 18 species and varieties. These predominant algae include blue-green-8, diatom-2, euglenic-2, green-6.

Most of these predominant algae are dominant in the spring, for example, Microcystis aeruginosa, M.pulverea, Aphanothece clathrata, Oscillatoria irrigua, O.brevis, O.lemmermanii, O.woronichinii, Nodularia spunigena from blue-green algae; Nautococcis grandis, Palmellocystis planctonica, Oocystis marssonii, O.lacustris, Scenedesmus quadricauda, Ankistrodesmus acicularis of the green; Cyclotella kuetzingiana, Nitzschia hungarica of diatoms; Euglena acus, E. oxyuris from euglene algae.

Along with them, Aphanothece clathrata f often occurs in summer. brevis, Nodularia harveana f. sphaerocarpa from the blue-green; Chaetopeltis orbicularis, Chlamydmonas globosa, Ch.simplex, Coelastrum microporum, Scenedesmus obliquus, S, obliquus var. alternans of green; Melosira varians, Synedra ulna, Cocconeis placentula, Nitschia linearis from diatoms; The species Nitzschia linearis was dominant in the spring, but this species is often observed in the summer.

Euglena caudata, E. caudata var., Was often recorded from euglene algae in summer. minor bucharica, E. acus, E. oxyuris and others. In summer the leading role belonged to blue and green algae. Along with them, euglenic, diatom and dinophyte algae became common.

In autumn, the dominant group includes -12 taxa, of which the largest number is found in representatives of diatoms such as Synedra ulna, Nitzshia hungarica, N. linearis, Navicula cryptocephala. Then the blue-green algae, Microcystis aeruginosa, Oscillatoria irrigua, O.brevis, Phoromidium fovetlar, from the green algae during this period, the dominants turned out to be Palmellocystis planctonica, Coelastrum microporum, Scenedesmus guadricauda.

Here the leading position is occupied by diatoms and blue-green algae. Blue-green and green algae dominated in early autumn, after the second half of October, the dominant position was occupied by diatoms. Representatives of euglenic and dinophyte algae are rarely seen in the

autumn period, it was not predominant. The winter period was not dominant, some representatives of diatoms and green algae were rare. It should be noted that most of these prevalent algae biological ponds purification plants in Bukhara somewhat coincide with the dominant algae of fishponds Kalgan Chirchik of the Tashkent region [9], ponds of the Kolkhoz farm. Sabira Rakhimova of the Denau district of the Surkhandaryn region, ponds of the Yakkabag district of the Kashkadarya region, ponds of the fish farm of the Akkurgan district of the Tashkent region, [9, 10], algal flora of the bioproducts of the city of Chimkent of the Republic of Kazakhstan (Tazhiev) algae biological ponds of industrial sewage of the Chirchik production association [8]. Let us briefly characterize the dominant algae found in ponds of biological treatment facilities of the city of Bukhara [10].

1. Microcystis aeruginosa Kuetz. Emend. Elenk blue-green algae is a widespread species of dominant in mid-spring, summer and early autumn in the plankton in all ponds. Vegetation of this species begins at a water temperature of 21-31 °C, thermophilic in the spring the number is 860 thousand KL/l, in the summer of 1860 thousand KL/l. in early spring, late autumn and winter, this species at a water temperature of 0 °C-12-14 °C will not be registered.

2. Microcystis pulverea (Wood) Fortti.emend Elenk. blue-green algae, vegetation in all ponds begins in spring, summer and early autumn. Mass development reaches at a water temperature of 23-30 °C thermophilic species in the spring is 810 thousand KL/l, in the summer of 1100 thousand KL/l, autumn 620tys. CL/L. in late autumn and winter, this species disappears completely from the plankton.

3. Aphanothece clathrata Wet G. S. West.- cyanotic algae. Registered very often in late spring, summer and autumn at a water temperature of 23-31 °C. Thermophilic species the number of population in spring in all ponds is 980 thousand cells/l, in the summer of 1250 thousand cells/l, in the autumn of 970 thousand KL/l In early spring and in late autumn at a water temperature of 12-16 is very rare. In the winter stopped Dating.

4. Nodularia spumigena Nert. Blue-green algae develops abundantly in summer at a water temperature of 26-30 °C. Thermophilic species. The number of all ponds reaches 910-980 thousand cells/L. This species in other seasons of the year were found.

5. Oscillatoria brevis Kuetz. Cyanotic algae are observed in all seasons of the year. Abundant occur in spring, summer and autumn at a water temperature of 18-28 °C. In the spring, the number was 716 thousand cells/l, in the summer of 820 thousand KL/l, in the autumn of 780 thousand KL/l In late autumn and winter the temperature of water ºC 8-2 is very rare.

6. Oscillatoria irrigua (Kuetz) Gom. Blue-green algae appear in the plankton in early spring 10-16 °C and gives an outbreak of mass development in mid-spring, summer and early autumn at a water temperature of 18-26 °C. The strength of the spring in all the ponds is 620 thousand cells/l, in the summer of 810 thousand cells/l, in the autumn of 715 thousand KL/l In late autumn and winter ceased to meet.

7. Oscillatoria lemmermannii Wolosz. Blue-green algae are widespread. It occurs in all seasons of the year, but very often occur in spring and summer at a water temperature of 18-27 °C. In the spring the number was 810 thousand cells/l, in the summer of 1.080 thousand cells/L. This species in late autumn and winter when the water temperature is 8-2 is rarely detected.

8. Oscillatoria woronichinii Anissim. Cyanotic algae, widely distributed. The species was detected during the year at a water temperature of 4-26 °C. It develops abundantly in spring, summer and autumn at a water temperature of 18-26 °C. In spring the number in all ponds is 580 - 720 thousand KL/l.

9. Nautococeus grandis Korsch. Green algae thermophilic occur in late spring, summer and early autumn at a water temperature of 20-27ºC. In the spring there is the number 580

thousand cells/l, in the summer of 815 thousand KL/l. This kind of early spring, late autumn and winter was found.

We studied the algoflora of biological ponds of sewage treatment plants in Bukhara for the first time. According to our observations, representatives of all systematic groups of algae developing in a particular reservoir participate to varying degrees in the processes of self-purification of wastewater. Even species of the same genus are characterized in different ways. This indicates the need for comprehensive and deep floristic studies of the natural algal population of water bodies used as biological ponds - reservoirs, sedimentation tanks and filtration fields.

Before the start of algolization, we investigated the species composition of the natural algae flora and their distribution over biological ponds; 120 species, varieties and forms of algae that were characteristic of contaminated water bodies were identified.

Phytoplankton and phytobenthic groups of algae are of great importance in the process of self-purification of contaminated water bodies. But until recent years, biological factors have not been given due attention in the self-cleaning of rivers, canals, ponds, reservoirs and lakes[3]. Noted that during the self-purification of highly polluted waters, not even diluted urban wastewater, one of the indicators of the self-purification process is the development of phytoplankton.

Table 2. The amount of organic substances

Indicators	Wastewater before entering biological ponds	1-pond	2-pond	3- pond
Temperature °C	8- 15	8- 15	8- 15	8- 15
pH	6,5 –7,0	6,5 –7,0	6,5 –7,0	6,5 –7,0
Smell	4,0-5,0	3,0-4,0	3,0-3,5	2,5-3,0
Suspended Substances, mg / l	65,0- 75,0	60,0- 67,0	57,3- 65,0	62,0- 68,0
Dissolved Oxygen, mg / L	1,0- 2,5	2,2 –2,5	2,5- 3,0	3,0- 4,0
BOD5, mg O2 / L	72,0 – 78,3	70,4 – 75,6	60,3 – 65,3	44,0 – 50,8
Oxidation, O2 / l	90,8 - 98,3	83,9 - 90,2	80,1 - 87,8	76,2 - 82,4
Ammonia, mg / l	6,0 – 8,0	5,0 – 7,5	4,5- 6,0	4,0 – 5,0
Nitrite, mg / l	0,02- 0,04	0,02- 0,04	0,02- 0,03	0,02- 0,03
Nitrates, mg / l	7,0 – 8,5	6,5 – 8,0	6,0 – 7,5	5,0 – 6,0
Chlorides, mg / l	160,0 – 175,0	163,0 – 173,0	160,0 – 170,0	158,0 – 169,0
Sulfates, mg / l	250,0 –268,0	248,0 –264,0	240,0 –270,0	245,0 –262,0
Dense residue, g / l	2,441 – 2,549	2,400 – 2,538	2,410 – 2,520	2,400 – 2,515

In the summer, the water temperature rises to 25-30 ºC. A mixed suspension of algae, such as Chlorella vulgaris, Ch. pyrenoidosa, Oocystis borgei, O. marssonii, Palmellacystis planctonica, Pediastrum boryanum, P. duplex, Scenedesmus obliquus, S. acuminatus, S. bijugatus, Ankistrodesmus acicularis, A.densus, A.minutissinnus, other species of the Chlamydomonas genus and many others.

In the spring, with an increase in the temperature of water and solar energy in biological ponds, the intensive development of phytoplankton is observed. As microalgae develops in water, the amount of dissolved oxygen increases to 3.0–4.0 mg/l. The amount of organic substances according to BOD_5 decreases to 44.0-50.8 mg O_2/l. (table 2).

4. CONCLUSION

1. In biological ponds of treatment facilities there are 21 dominant species, most of which belong to the blue-green 8 species, then green 7, diatoms 4,euglenic 2 species.
2. The main factors favouring the development of predominant species in biological ponds of treatment facilities are the temperature of water and air, mineralization, nutrients, transparency and other environmental factors.
3. In the composition of the dominant species of algae there is no one that would dominate in all seasons of the year, but most of the predominant species are registered in the spring, summer and autumn, in the winter dominants are not found.
4. Most of the prevailing species of biological pond treatment facilities similar to the flora of other ponds in Uzbekistan.
5. In biological ponds of treatment facilities there are 21 dominant species, most of which belong to the blue-green 8 species, then green 7, diatoms 4,euglenic 2 species.
6. The main factors favouring the development of predominant species in biological ponds of treatment facilities are the temperature of water and air, mineralization, nutrients, transparency and other environmental factors.
7. In the composition of the dominant species of algae there is no one that would dominate in all seasons of the year, but most of the predominant species are registered in the spring, summer and autumn, in the winter dominants are not found.
8. Most of the prevailing species of biological pond treatment facilities similar to the flora of other ponds in Uzbekistan.

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