

ECO-CHEMICAL RESEARCH OF POLLUTANTS IN ENVIRONMENTAL OBJECTS

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ABSTRACT

Samples were taken from the upper, middle, and lower streams of Oxchuchay to explore the role of pollutants in environmental evaluation and their physical and chemical parameters were studied. Initially, it was noteworthy that they had more metals in the upper streams. Given that river water itself has the ability to regulate pollution, even the amounts in the lower streams have exceeded the allowed density limit. In other words, cad content exceeded the norm up to 1.3 times, iron up to 3 times, and manganese up to 3.3 times at different times. Excessive chemicals in the water environment have contributed to the destruction of biochemistry.

Keywords: environment, pollutant, waste water, ecology.

Introduction

During the environmental assessment, the study of toxic substances is of great importance. In this regard, toxicants, ecotoxicants and all pollutants in general should be taken into account [16]. Chemical loading is of great importance in environmental assessment. That is, the fact that some parameters exceed the norm is one of the cases that should be paid attention to. Thus, the excess of metals affects the integrity of the ecosystem. In this regard, samples were taken from the upper, middle and lower streams of Okchuchay in order to study the pollutant in the environment. As mentioned in Okchuchay literature [3], hundreds of thousands of tons of solid sour waters, heavy metal salts and other wastes of the mining industry (metal refining) have excessively polluted Okchuchay. At different times, the amount of copper in the water was 25-50 times higher than the limit, and the amount of phenols was regularly 6-15 times higher than the norm. Aluminum, zinc, manganese, titanium and bismuth polluting elements are constantly found in Okchuchay [3,18]. Under the influence of pollutants in freshwater ecosystems, the reduction of their sustainability in freshwater ecosystems, as a result, disruption of the food pyramid and breaking of signal signs in biocenosis, microbiological pollution, etc. other negative processes occur [4,7,10,15, 20,212]. At the same time, metals, especially toxic compounds included in the group of heavy metals, are very important. In works devoted to the problems of environmental pollution and environmental monitoring, today more than 40 metals of the periodic table are classified as heavy metals by D.I. Mendeleev with an atomic mass of over 50 atomic units: V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Mo, Cd, Sn, Hg, Pb, Bi, etc. [23]. At the same time, the following conditions play an important role in the categorization of HMs: their high toxicity to living organisms in relatively low concentrations, as well as the ability to bioaccumulate. Heavy metals, when released in excess into environmental objects, behave as toxicants and ecotoxicants. At the same time, toxicants include elements and compounds that have a harmful effect on an individual organism or group of organisms, and

ecotoxicants are elements or compounds that negatively affect not only individual organisms, but also the ecosystem as a whole. Environmental protection specialists have identified a priority group among toxic metals.

Experimental methodology

For the purpose of researching Okchuchay, water samples were taken from Oxchuchay in Burunlu, Shayifli and Jahangirbeyli villages and analyzes were carried out. For sulfates ions, ammonium ions, nitrite ions, nitrate ions used Spectrometer, for dissolved oxygen oximeter, for Hydrogen indicators, pH pHmeter, for electrical conductivity conductometer, for hardness avtotitrators devices were used to study the ecosystem, especially the parameters affecting the completeness of biocenosis [6]. Nümunələrdə parametrlərin təyinatı üçün aşağıdakı standartlardan istifadə olunur We use next methods for determanation (Table 1).

Table 1. Standards of indicators determined in water

No	Name of the analysis	Method
1	Hydrogen indicators, pH	İSO 10523
2	Electrical conductivity	İSO 7888
3	Dissolved oxygen	İSO 5814
4	Hardness	İSO 6059
5	Sulfate ion, SO_4^{2-}	GOST 4389-72
6	Chloride ion, Cl^-	İSO 9297
7	Ammonium ion, NH_4^+	GOST 4192-82
8	Nitrite ion, NO_2^-	İSO 6777
9	Nitrate ion, NO_3^-	İSO 7890
10	Metals	İSO 11885

Results and their discussion

As mentioned, the samples were taken three times within the month of April. It was first taken on 05.04.2023 and the results are given in table 1. The results of the Permissible Hardness Limits for Surface Waters are taken from the document "Rules for the Protection of Surface Waters from Wastewater Pollution" approved by the State Ecology and Nature Use Control Committee of the Republic of Azerbaijan by Order No. 01 of January 4, 1994.

Samples were first taken at the following coordinates (Table 2).

Table 2. GPS coordinates of water samples

No	Territories	Coordinates	
1	Burunlu	39°02'43.1 "	46°44'09.0 "
2	Shayifli	39°07'19.1 "	46°34'19.7 "
3	Jahangirbeyli	39°10'23.5 "	46°30'39.8 "

As can be seen from Table 3, according to the analyzes carried out on water samples, iron (Fe) – 2.1 times in Oxchuchay village of Burünlü village, manganese (Mn) – in Jahangirbeyli and Shayifli villages It is 1.6 times higher than MPC in Burunlu village and 3.3 times higher. The samples were retaken for the second time on 12-13.04.2023 from Okchuchay at all three points (Table 4).

Table 3. Results of physical and chemical analyzes conducted on water samples taken from Okchuchay on 05.04.2023

№	Name of component	Unit of measurement	Amount of component			Permissible viscosity limits
			Okchuchay-Zengilan village			
			Jahangirbayli village	Shayifli village	Burunlu village	
1	Hydrogen indicators, pH	—	7.3	7.3	7.3	6.5-8.5
2	Dissolved oxygen	mqO ₂ /l %	7.2 77.0	7.2 77.0	5.6 61.0	≥4.0
3	Electrical conductivity	μSm/sm	1339	1330	1039	—
4	Transparency	Sm	23	21	20	>30
5	Hardness	mq-ekv/l	9.23	11.8	12.53	7.0
6	Calcium ion, Ca ²⁺	mq/l	129.5	165.5	175.8	-
7	Magnesium ion, Mg ²⁺	mq/l	33.7	43.0	45.7	-
8	Chloride ion, Cl ⁻	mq/l	17.4	18.1	16.77	350
9	Hydrocarbon ions, HCO ₃ ⁻	mq/l	134.6	164.7	109.8	-
10	Carbonate ions, CO ₃ ²⁻	mq/l	0	0	0	-
11	Sulfate ion, SO ₄ ²⁻	mq/l	217.6	205.1	197.4	500
12	Ammonium ion, NH ₄ ⁺	mq/l	0	0	0	0.5
13	Nitrite ion, NO ₂ ⁻	mq/l	0.18	0.17	0.50	3.3
14	Nitrate ion, NO ₃ ⁻	mq/l	7.8	4.3	3.19	45.0
15	Zink, Zn	mkq/l	56.6	51.8	149	1000
16	Ferrium, Fe	mkq/l	177	223	618	300
17	Cobalt, Co	mkq/l	2.79	1.78	5.33	100
18	Plumbium, Pb	mkq/l	2.02	4.5	5.38	30
19	Nickel, Ni	mkq/l	1.35	<LOD	<LOD	100
20	Molibden, Mo	mkq/l	87.2	95.4	236	250
21	Mangan, Mn	mkq/l	162	163	329	100
22	Copper, Cu	mkq/l	35.7	36.5	47.5	1000

Table 4. Results of physical and chemical analyzes conducted on water samples taken from Okchuchay on 12-13.04.2023

№	Name of component	Unit of measurement	Amount of component			Permissible viscosity limits
			Okchuchay-Zengilan village			
			Jahangirbayli village	Shayifli village	Burunlu village	
1	Hydrogen indicators, pH	—	7.8	7.6	7.6	6.5-8.5
2	Dissolved oxygen	mqO ₂ /l %	6.3 71.0	5.2 58.0	4.6 51.0	≥4.0
3	Electrical conductivity	μSm/sm	1130	1030	1035	—
4	Hardness	mq-ekv/l	8.3	8.4	10.0	7.0
5	Chloride ion, Cl ⁻	mq/l	19.35	18.7	20.0	350
6	Sulfate ion, SO ₄ ²⁻	mq/l	98.52	104.65	107.06	500
7	Ammonium ion, NH ₄ ⁺	mq/l	0	0	1.05	0.5
8	Nitrite ion, NO ₂ ⁻	mq/l	0.08	0.4	0.62	3.3
9	Nitrate ion, NO ₃ ⁻	mq/l	6.9	5.2	3.76	45.0
10	Zink, Zn	mkq/l	68.9	183	204	1000
11	Ferrium, Fe	mkq/l	459.0	886.0	933	300
12	Cobalt, Co	mkq/l	2.85	2.39	4.97	100
13	Plumbium, Pb	mkq/l	1.9	2.42	7.0	30

14	Nickel, Ni	mkq/l	<LOD	2.59	3.76	100
15	Molibden, Mo	mkq/l	141.0	202	324	250
16	Mangan, Mn	mkq/l	124	175	347	100
17	Copper, Cu	mkq/l	42.6	72.7	63.6	1000

As can be seen from Table 4, according to the analyzes carried out on water samples, iron (Fe) - 1.5 times in Jahangirbeyli village, 3.0 times in Burunlu village, Ammonium ion - 2.1 times in Burunlu village, 1.2 times in Cahangirbeyli and Shayifli villages in Okchuchay 3.1 times in the village of Mangan (Mn)- Jahangirbeyli village 1.2 times, 1.8 times in the village of Shayifli, 3.5 times in the village of Burunlu than the MPC. The samples were retaken a third time, and the results are given in table 3.

Table 5. Results of physico-chemical analyzes conducted on water samples taken from Okchuchay on 20.04.2023

№	Name of component	Unit of measurement	Amount of component Okchuchay-Zengilan village			Permissible viscosity limits
			Jahangirbayli village	Shayifli village	Burunlu village	
1	Hydrogen indicators, pH	—	7.8	7.5	7.6	6.5-8.5
2	Dissolved oxygen	mqO ₂ /L %	6.5 73.0	6.3 71.0	6.9 77.0	≥4.0
3	Electrical conductivity	μSm/sm	980	978	973	—
4	Hardness	mq-ekv/l	7.7	7.6	7.6	7.0
5	Chlorid ion, Cl ⁻	mq/l	19.3	18.5	17.9	350
6	Sulfate ion, SO ₄ ²⁻	mq/l	205.6	200.1	196.4	500
7	Ammonium ion, NH ₄ ⁺	mq/l	0	0	0	0.5
8	Nitrite ion, NO ₂ ⁻	mq/l	0.57	0.66	0.47	3.3
9	Nitrate ion, NO ₃ ⁻	mq/l	7.0	5.2	3.64	45.0
10	Zink, Zn	mkq/l	134.0	121.0	138	1000
11	Ferrium, Fe	mkq/l	546	664	721	300
12	Cobalt, Co	mkq/l	3.63	2.47	2.5	100
13	Plumbium, Pb	mkq/l	2.74	3.17	7.66	30
14	Nickel, Ni	mkq/l	1.36	<LOD	0.168	100
15	Molibden, Mo	mkq/l	208.0	219.0	210.0	250
16	Mangan, Mn	mkq/l	126	153	160	100
17	Copper, Cu	mkq/l	66.3	61.5	71.4	1000

As can be seen from Table 5, according to the analyzes carried out on water samples, codlug - Jahangirbeyli, Shayifli and Burunlu villages 1.1 times, Demir (Fe) - Jahangirbeyli village 1.8 times, Shayifli village 2.2 times, Burunlu village 2.4 times, Mangan (Mn) - Jahangirbeyli village It is 1.3 times, 1.5 times in Shayifli village, 1.6 times higher than YVQH in Burunlu village. As can be seen from the above tables (tables 1, 2, 3), iodine, iron (Fe), ammonium ion (NH₄⁺), manganese (Mn) ions were many times more than normal. The excess amount of such parameters in the ecosystem creates a very serious problem [2]. An excess amount of manganese in the environment affects the biocenosis balance [1,5,8, 19]. If its amount exceeds the permissible concentration, it is a very serious ecological problem, because it means the destruction of the biocenosis [11-14,17, 22]. At the same time, excess of iron, pain in the joints, violation of metabolism, hemochromatosis. If you dont take measures for cleansing, the body becomes

oversaturated, causing cells to mutate. Development of cancer, brain tumors and heart problems - consequences of use. Water with high iron content often develops diabetes due to the burden on the liver and the inability to release glucose. Thus, these pollutants need to be constantly monitored.

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ƏTRAF MÜHİT OBYEKTlərİNDƏ ÇİRLƏNDİRİCİLƏRİN EKO-KİMYƏVİ TƏDQİQATLARI

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XÜLASƏ

Ətraf mühitin qiymətləndirilməsində çirkləndiricilərin rolunu araşdırmaq üçün Oxçuçayın yuxarı, orta və aşağı axarlarından nümunələr götürülmüş və onların fiziki-kimyəvi parametrləri öyrənilmişdir. Başlanğıcda onların yuxarı axınlarında daha çox metal olması diqqət çəkirdi. Nəzərə alsaq ki, çay suyunun özü də çirklənməni tənzimləmək qabiliyyətinə malikdir, hətta aşağı axarlardakı miqdarlar icazə verilən sıxlıq həddini keçib. Başqa sözlə, müxtəlif vaxtlarda treska balığının miqdarı normadan 1,3 dəfəyə qədər, dəmir 3 dəfəyə qədər, manqan isə 3,3 dəfəyə qədər artıb. Su mühitində həddindən artıq kimyəvi maddələr biokimyayın məhvinə kömək etdi.

Açar sözlər: ətraf mühit, çirkləndirici, tullantı suları, ekologiya.

ЭКО-ХИМИЧЕСКИЕ ИССЛЕДОВАНИЯ ЗАГРЯЗНИТЕЛЕЙ В ОБЪЕКТАХ ОКРУЖАЮЩЕЙ СРЕДЫ

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АБСТРАКТ

Для изучения роли загрязняющих веществ в экологической оценке были взяты пробы из верхнего, среднего и нижнего рек Ошчучая, изучены их физические и химические параметры. Первоначально примечательно то, что в верховьях у них было больше металлов. Учитывая, что речная вода сама по себе обладает способностью регулировать загрязнение, даже ее количество в нижних потоках превысило допустимый предел плотности. Иными словами, содержание трески в разное время превышало норму до 1,3 раза, железа – до 3 раз, марганца – до 3,3 раза. Чрезмерное содержание химических веществ в водной среде способствовало разрушению биохимии.

Ключевые слова: окружающая среда, загрязнитель, сточные воды, экология.