Chemical Analysis of Wastewater Produced in an Industrial Enterprise

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ABSTRACT

In this article, the chemical composition of wastewater produced in industrial enterprises, in particular, the composition of wastewater produced in the process of obtaining ultramarine pigment produced at the joint venture "Sofitel" LLC located in the industrial area of Jizzakh city, was studied using the mass spectrometry method. results are reported.

Keywords: Wastewater, mass spectrometry, adsorbent, processing, inorganic synthesis, chemical analysis.

Wastewater is divided into domestic, fecal, atmospheric and industrial wastewater depending on the conditions of its formation. Industrial wastewater is generated during the processing and extraction of organic and inorganic raw materials. Sources of waste water in technological processes include: water formed as a result of chemical reactions, free and bound water in raw materials and initial products, and water in the form of moisture generated in processing processes, raw materials, products and devices water formed after washing, flowing aqueous solutions, aqueous extracts and absorbents, cooling water, water from vacuum pumps, mixing condensers, hydrosol loss, washing dishes, devices and buildings.

The amount and composition of wastewater depends on the type of production. It contains various substances: biologically unstable organic compounds, low-toxic inorganic salts, oil products, biogenic compounds, specific toxic substances, including heavy metals, non-degradable organic synthetic compounds. can be contaminated with.

Wastewater contains dissolved inorganic and organic compounds, suspended coarse dispersed and colloidal compounds, sometimes dissolved gases, for example, hydrogen sulfide, carbon dioxide, etc. The water used during the complete technological cycle to obtain a finished product is contaminated with initial, intermediate and final products. For example, wastewater from mineral fertilizers and inorganic substances production enterprises, with acids, alkalis, various salts, wastewater from the main organic synthesis enterprises - with fatty acids, aromatic compounds, alcohols, aldehydes and other wastes. will be polluted.

Currently, great importance is attached to the prevention of pollution of water bodies. Wastewater from household and industrial enterprises is purified in certain facilities, and they again pollute water bodies to a certain extent. In recent years, a number of decisions have been made by our government and the state, which are mainly aimed at improving the sanitary conditions of water bodies [1-3].

The rapid development of industrial and agricultural enterprises is the only factor of pollution of water bodies with sewage. Along with discharging a large amount of waste water into water bodies, maintaining their purity is one of the important tasks of the national economy. Therefore, with the correct selection of the wastewater treatment method, it is possible to ensure that the wastewater discharged into water bodies fully meets the requirements of sanitary standards.

The composition and level of pollution of waste water from industrial enterprises located in Jizzakh region are being studied [4-5].

Research object and used methods:

As an object of research work, experiments were conducted and the composition of wastewater contaminated with various substances used in the production process at the joint enterprise "Sofitel" LLC in the special industrial zone of Jizzakh Jizzakh city was used in the production process. Wastewater from the production process is settled in six ponds. The preliminary results obtained are shown in the following tables.

1-table
Composition of water used for obtaining raw materials

№	**Cations**	**Amount per liter (dm^3)**			**Another results**	
		mg	mg-ekv	% ekv	General hardness (mg-ekv/dm^3)	1,20
1	Na^+, K^+ Sodium and potassium ion	36	1,55	56	carbonate hardness(mg-ekv/dm^3)	1,20
2	Ca^{2+} Calcium ion	12	0,60	22	Carbonateless hardness(mg-ekv/dm^3)	-
3	Mg^{2+} Magnesium ion	7	0,60	22	pH	6,85
4	NH^{4+} Ammonium ion	-	-	-	Dry residue(g/dm^3)	0,172
5	Fe^{3+} Iron ion	<0,05	-	-	Common minerals (g/dm^3)	0,162
6	Al^{3+} Alyuminium ioni	0,05				
	Total	55	2,75	100	fluorides (mg/dm^3)	<0,05
	Anions	**Amount per liter (dm^3)**			Phosphates (mg/dm^3)	<0,05
		mg	mg-ekv	% ekv	SiO_2 (mg/dm^3)	<0,05
1	HCO_3^- Bicarbonate ion	73	1,20	44	Physical properties	
2	CO_3^{2-} Carbonate ion	-	-	-	Blurriness (mg/dm^3)	0,03
3	SO_4^{2-} Sulfate ion	54	1,13	41	t^0	20
4	Cl^-	13	0,36	13	Color	Colorless

	Chloride ion					
5	NO_3^- Nitrate ion	3,40	0,05	2	Smell	Odorless
6	NO_2^- Nitrite ion	0,20	-	-	Settle	did not settle
	Total	143,6	2,75	100	change of status	Not
	formula for determining the salt content of wateri					
$0{,}2=\frac{HCO^{44}{}_3\,SO^{41}{}_4\,Cl^{13}}{(Na+K)^{56}Ca^{22}Mg^{22}}$					$\sum HCO_3=1/2$	

2-table

The composition of the wastewater that enters the pond after receiving the raw materials

№	**Cations**	**Amount per liter (dm^3)**			**Another results**	
		mg	mg-ekv	% ekv	General hardness (mg-ekv/dm^3)	7,80
1	Na^+, K^+ Sodium and potassium ion	664,7	289,02	97	carbonate hardness(mg-ekv/dm^3)	6,40
2	Ca^{2+} Calcium ion	92	4,60	2	Carbonateless hardness(mg-ekv/dm^3)	1,40
3	Mg^{2+} Magnesium ion	39	3,20	1	pH	7,70
4	NH^{4+} Ammonium ion	0,20	-	-	Dry residue (g/dm^3)	19,86
5	Fe^{3+} Iron ion	<0,05	-	-	Common minerals (g/dm^3)	18,73
6	Al^{3+} Alyumium ion					
	Total	795,7	296,82	100	fluorides (mg/dm^3)	0,40
	Anions	**Amount per liter (dm^3)**			Phosphates (mg/dm^3)	0,20
		mg	mg-ekv	% ekv	SiO_2 (mg/dm^3)	<0,05
1	HCO_3^- Bicarbonate ion	390	6,40	2	Physical properties	
2	CO_3^{2-} Carbonate ion	-	-	-	Blurriness(mg/dm^3)	0,03
3	SO_4^{2-} Sulfate ion	5432	113,16	38	t^0	20
4	Cl^- Chloride ion	623,9	176,00	59	Color	Colorless
5	NO_3^- Nitrate ion	78	1,26	-	Smell	Odorless
6	NO_2^- Nitrite ion	0,20	-	-	Settle	Didn't settle
	Total	6524,1	296,82	100	Change of statis	Did Not
	formula for determining the salt content of water					

$19=\frac{Cl^{59}\,SO^{38}{}_4\,HCO^{2}{}_3}{(Na+K)^{97}Ca^{2}Mg^{1}}$	$\sum HCO_3=1/2$

3-table
The composition of the wastewater in the last pond

№	Cations	Amount per liter (dm^3)			Another results	
		Mg	mg-ekv	% ekv	General hardness (mg-ekv/dm^3)	7,80
1	Na^+, K^+ Sodium and potassium ion	236,0	102,63	93	carbonate hardness(mg-ekv/dm^3)	6,60
2	Ca^{2+} Calcium ion	88	4,40	4	carbonateless hardness(mg-ekv/dm^3)	1,20
3	Mg^{2+} Magnium ion	41	3,40	3	pH	6,85
4	NH^{4+} Ammonium ion	0,10	-	-	Dry residue (g/dm^3)	7,113
5	Fe^{3+} Iron ion	<0,05	-	-	Common minerals (g/dm^3)	6,710
	Total	365,1	110,43	100	fluorides (mg/dm^3)	0,30
	Anions	**Amount per liter(dm^3)**			Phosphates (mg/dm^3)	0,20
		Mg	mg-ekv	% ekv	SiO_2 (mg/dm^3)	<0,05
1	HCO_3^- Bicarbonate ion	403	6,60	6	Physical properties	
2	CO_3^{2-} Carbonate ion	-	-	-	Blurriness(mg/dm^3)	0,03
3	SO_4^{2-} Sulfate ion	1203	25,07	23	t^0	20
4	Cl^- Chloride ion	2765	78,00	71	Color	Colorless
5	NO_3^- Nitrate ion	47	0,76	1	Smell	Odorless
6	NO_2^- Nitrite ion	0,20	-	-	Settle	Didn't settle
	Total	4418,2	110,43	100	Chamge of status	Did not
	formula for determining the salt content of water					
	$7{,}1=\frac{HCO^{6}{}_3\,SO^{23}{}_4\,Cl^{71}}{(Na+K)^{93}Ca^{4}Mg^{3}}$				$\sum HCO_3=1/2$	

The above-mentioned results of the composition of wastewater were determined based on the standard of Uz O`U 0677:2015 of the normative document for measurement methods. The general chemical analysis of the wastewater was carried out using the mass spectrometry method (ISP-MS).

Conclusion Wastewater from production is reused in the technological processes of the enterprise. The waste water generated from the economic and drinking activities is thrown into the city sewer network. The results of the analysis of wastewater generated during the production process of the enterprise are as follows:

Substances in the water used to obtain raw materials established Na^{+} 36 mg/l (0,3 REM), Ca^{2+} 12 mg/l (0,067 REM), Mg^{2+} 7 mg/l (0,175 REM), Fe^{3+}<0,05 (0,1 REM), HCO_3^{-}73 mg/l (0,61 REM), SO_4^{2-} 54 mg/l (0,54 REM), Cl^{-} 13,0 mg/l (0,043 REM), NO_3^{-} 34 mg/l (0,075 REM), NO_2^{-} 0,20 mg/l (2,5 REM), Al^{3+} 0,05 mg/l (1,25 REM) (1-table).

Substances contained in the wastewater that enters the pond after the extraction of raw materials established Na^{+} 664,7 mg/l (5,54 REM), Ca^{2+} 92 mg/l (0,51 REM), Mg^{2+} 39 mg/l (0,975 REM), Fe^{3+}<0,05 (0,1 REM), HCO_3^{-} 390 mg/l (3,25 REM), SO_4^{2-} 5432 mg/l (1,55 REM), Cl^{-} 623,9 mg/l (2,08 REM), NO_3^{-} 78 mg/l (1,73 REM), NO_2^{-} 0,20 mg/l (2,5 REM) (2-table).

Substances in wastewater from pond 6 established Na^{+} 236 mg/l (1,97 REM), Ca^{2+} 88 mg/l (0,49 REM), Mg^{2+} 41 mg/l (1,025 REM), Fe^{3+}<0,05 (0,1 REM), HCO_3^{-} 403 mg/l (3,36 REM), SO_4^{2-} 1203 mg/l (0,34 REM), Cl^{-} 2765 mg/l (9,22 REM), NO_3^{-} 47 mg/l (1,04 REM), NO_2^{-} 0,20 mg/l (2,5 REM) (3-table).

A certain amount of waste water from the production process is retained in the filter of the pond during the period of settling in six ponds, and the ultramarine pigment accumulates at the bottom of the pond. Dispersed particles of ultramarine in the pool become larger and sink to the bottom of the waste water as a result of their combination and formation of associates. We know that ultramarine pigment can be used not only for varnishes, but also as a dye in textile, paper, and plastic production. The technology of reprocessing the ultramarine pigment collected as waste in the pond and using it as a dye in the production of textiles, paper and plastic is being considered.

It is not expected that the soil and underground water will be contaminated by wastewater during the enterprise's operation.

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