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Methods of mechanical and physical-chemical treatment of the level of pollution of branched water resources

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Abstract

The article provides information on how to treat contaminated waste water, which provides information on mechanical, chemical, electrolysis and biological. As noted above, water contamination differs from the bacterial contamination, the disinfection of water to end contamination, ie disinfection. There are methods of water purification in special places. In addition, it has been suggested that the removal of waste water through mechanical methods, removal of insoluble mineral and organic compounds in water. Filtration of sewage water is carried out more closely by filtration, water treatment methods in artificial conditions. The coagulation process employs a method of cleaning the waste water from formulas. The possibility of using biotechnological methods for polluted water treatment is given in[6,15,24].

Key words*:* Aquaculture, artificial, mechanical, chemical, electrolysis and biological, physical, sand, hydro cyclone, coagulation, hydrolysis, flocculation, adsorbents**.**

1. INTRODUCTION

In mechanical treatment, water-insoluble compounds are suspended by mechanical devices. To do this, the gratings can be used with screwdrivers and bolts. The water is digested in special places, and heavy particles are dripping, and the lighter ones fall on the surface of the water. Mechanical cleaning of the aqueducts is carried out in the removal of insoluble mineral and organic compounds in water.

Mechanical purification is usually a preparatory process for achieving a high level of purification of one of the physical, chemical, biological, and thermal methods of industrial waste water.

This type of cleaning ensures the reduction of sediment content from the waste water to 90-95% and reduction of organic pollution by 20-25%.

2. THE MAIN PART

Modern water purification facilities are mechanically cleaned with various sized grids, such as slippage, sandblasting, purification and filtering. The dimensions and types of such structures are largely dependent on the quantity, composition and properties of wastewater, as well as on post-treatment processes.

Water filtration can be further enhanced by filtration of various types of water, such as quartz sand, granite gravel, granular gravel, etc., by using a semi-drum filters or microfiltrers, with large volumes of gassy filters and penopoliuretan or penoplast sailing filters. The advantage of these processes is that they can be cleaned without the use of chemicals. (Figure 1.1).

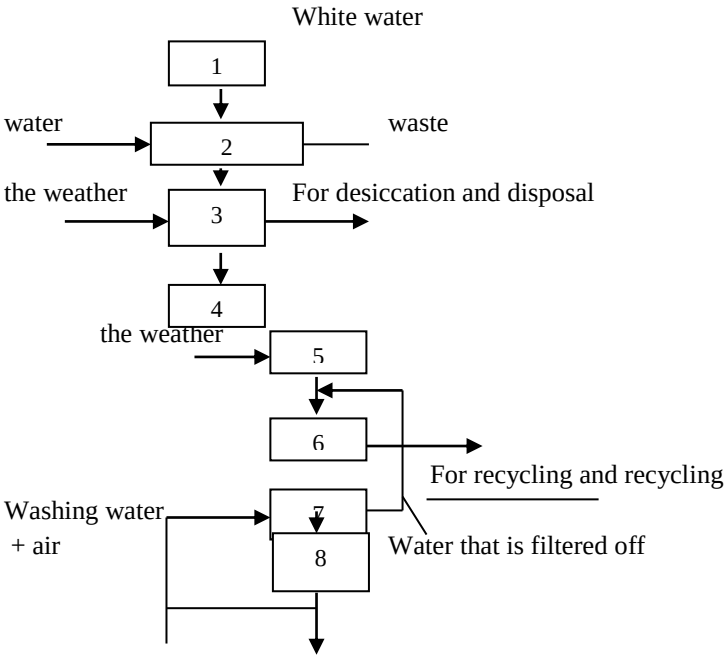

Figure 1.1: Mechanical treatment of industrial waste water

1- receiver camera; 2 - mechanical grille with gratings or crushed grates; 3-sandstone; 4 - water metering device; 5 -scribblers; 6-tinder; 7-drum nets and sand filters or only carcass filters (devices that do not require drag mesh); 8 - pump station.

The selection of the cleansing water from the particles is carried out taking into account the kinetics of the process. The dimensions of the particles in the industrial waste water can be very wide (particle diameter varies from 5-10 to 5-10 to 4 mm). The final stroke rate for particles up to 10μm is less than 10-2 cm / s. If particles are large enough (diameter is 30-50 mc and greater), they are mildly dispersed by means of blasting (voluntary drowning - gravitational forces) or slipping, for example, by microfilters according to the Stox Law. It should be noted that if the concentration of the compounds in the water is greater than the concentration and the concentration of the compounds is less than the next treatment method. Colloidal particles with a diameter of 0.1-1.0 μm can be separated by filtration, but if the concentration of the particles is about 50 mg / l because of the limitations of the filtering layer, then it is considered to be an orthogonic coagulation, [12, 14, 20].

It is crucial to mechanically increase the technological effectiveness of the facility in the creation of a closed water management system of industrial enterprises. These requirements are meticulous, with a wide variety of new construction designs, filters, artificial filters, hydrocyclones (bottled, non-bottled and multi-purpose). Implementation of such facilities will allow the cost reduction to be made 3-5 times and the cost of operating 20-40%. The scheme of asphyxiation of industrial wastewater treatment method includes: a grid for keeping large dirt mixtures from organic and mineral compounds, a sandwich for heavy mineral compounds (mainly sands), a sandwich, a water vaporizer and a mixture of laundry mixtures, detergents for removal of insoluble compounds, filters for removal of detergents and equipment for treatment of filthy impurities r. Cleaning these devices can be done with 2 different options:

- crush and remove large contaminated compounds and discharge them into sewerage network;
- Disposal of emissions for waste disposal in special containers (containers). In most cases, option 1 is applied.

Physical and chemical treatment of white water includes coagulation, flocculation, adsorption, ion exchange, extraction, rectification, weaning, distillation, irradiation and ultra filtration, crystallization, desorption and others. These methods are used for the removal of waste water from the dispersed particles (solid and liquid) gases, minerals and organic matter. The use of physico-chemical methods has several advantages over biochemical purification:

1. Possibility of cleaning of toxic biochemical undirected organic pollutants in water;
2. Diversity and high degree of purification;
3. Small size of devices;
4. Availability of full automation;
5. Deep examination and modeling, mathematical interpretation and optimization of kinetics of some processes;
6. Succession of various substances [13,25,30].

The choice of a method depends on the sanitary and technological requirements, depending on the subsequent application, and the amount of waste water, the concentration of the pollutants, the material and energy resources, and the cost afforded by the process.

Coagulation is a combination of dispersed particles as a result of the joint repression and aggregation of proteins. This method of purification of aqueducts is used for the removal of small dispersants from pollutants and solvents. The method gives the effect of colloid dispersions of 1 to 100 microns in water. The coagulation process can be carried out either by itself or by chemical and physical processes. Certain substances in the purification of aqueduct can be added with coagulants. The coagulants are exposed to the rapidly rising metal hydroxides under the influence of water in the water. Toxicants have the ability to aggregate and consolidate colloidal particles. Colloidal particles (-) are negatively correlated with coagulant lungs (+) because of their positive charge, resulting in mutual interactions. For colloidal particles, it is typical that the secondary electric floor is hot. Part of the secondary layer is located on the surface of the phases, the other part is the ion cloud, the second layer is not moving, the other part is diffusive. The difference in the potential of the residual and moving parts of the film depends on the potential thermodynamic potential E, the thickness of the secondary layer. Its indication indicates the magnitude of the electrostatic charge of the particle's propagation. Colloidal particles need to be reduced to their critical potential value by adding positive ions to their potential potential for coagulation. The efficiency of the coagulation process depends on the coagulation ion valence. The greater the stamina, the higher the coagulant's reputation [18,21,29].

In order for the coagulation process to begin, the particles must approach each other so that they can feel the chemical bond and gravitational force. The closeness of the particles is achieved either by the bridge action or as a result of the laminar and turbulent flow of the water stream.

Hydrolysis of coagulants and lunar eclipses occur in the following stages:

$Me^{2+} + HOH = Me(OH)^{2+} + H^{+}$

$Me\ (OH)^{2+} + HOH = Me(OH)_2^{+} + H^{+}$

$Me\ (OH)_2 + HOH = Me(OH)_3 + H^{+}$

$Me^{2+} + HOH = Me(OH) + 3H^{+}$

he flow of the hydraulic process is much more complicated.

As a result of Me + ion hydroxide ion and polymerization reactions, stable interstitials are formed. The resulting compound has a positive charge and is slightly adsorbed by minuscule colloidal particles. In coagulant cats, most Al, Fe salts or mixtures thereof are used. Coagulant selection depends on its composition, physical and chemical properties and value, concentration of particles in water, pH and salt content of water. Coagulant Claims Al2 (SO4) 3 · 18H2O; sodium illuminate NaAlO3; aluminum hydro oxide A1 (OHN) 2Cl; aluminum tetracosulphate; Potassium KAl2 (SO4) · 12 H2O and ammonium NH2Al (SO4) 2 · 12H2O are used.

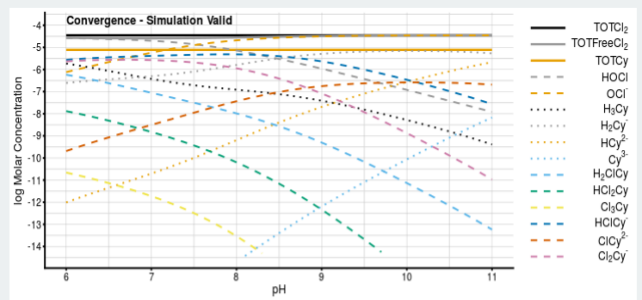

Figure 1.1. Simulation A Chemical Speciation Plots

The most commonly used coagulants are Al2 (SO4) 3. Its efficiency is maximal at pH = 5-7.5. It is well soluble in water and the price is not too expensive. It can be used dry or in a 50% solution:

$Al_2(SO_4)_3 + 3Ca(HSO_3)_2\ 2\ Al(OH)_3\downarrow + 3\ 3CaSO_4 + 6SO_2$

Sodium aluminum NaAlO2 is used in dry and 45% solution. It is an alkaline reagent that rapidly precipitates at pH = 9.3-9.8. In order to neutralize excess quantities, smoke gases containing acid or SO2 are used:

$2NaAlO_2 + SO_2 + 3\ H_2O\ Al(OH)_2 + Na_2CO_3$

In most cases, the NaAlO2 + Al2 (SO4) 3 mixture is used (10: 1) to (20: 1).

6NaAlO2 + Al2 (SO4) 3+ 12 H2O 8Al (OH) 2 + 3Na2SO4

The combined use of these salts increases the clarity efficiency, the squeezing speed and density of the ejaculate.

Iron salts of iron sulphates in the coagulant type Fe2 (SO4)

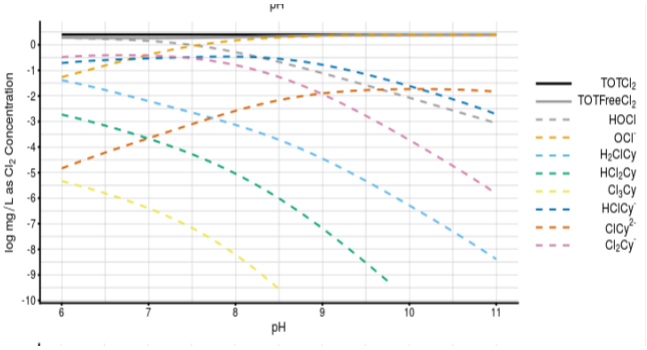

Figure 1.1.2 Simulation A Chemical Speciation Plots

3 · 2H2O; Fe2 (SO4) 3 · 3H2O and FeSO4 · 7H2O and iron chloride FeCl3 are used. The use of three-valiant iron salts makes good use of water. Iron chloride is used as a dry or 10-15% solution.

$FeCl_3 + 3\ H_2O\ Fe(OH)_3 + 3HCl$

$Fe_2(SO_4)_3 + 6H_2O\ Fe(OH)_3 + 3H_2SO_4$

Advantages: Iron salts give a good response when the water temperature is low, the optimal parameters of the pH environment are broader than that of aluminum, have a high hydraulic strength and density, and have the capacity to break away the taste and taste.

Disadvantages: Prevents strong catalyst compounds in dissolved iron cat ions with some organic compounds; strong acidic properties causing corrosion of equipment; the rate of coagulation depends on the electrolyte concentration. The ratio of the number of particle collisions to the total number of collisions ending with the small concentrations of electrolyte is close to zero (ψ=0). Such coagulation is called coagulation slowly. When ψ=1, the fast coagulation is determined, that is, the collision of the particles ends together as aggregate [9,19,26].

The flocculation process involves high molecular weight compositions, such as flocculants, aggregate particles. In contrast to the coagulant process, the enlargement of the particles during the flocculation process occurs not only by the interaction of the particles, but also by the interaction between the adsorbed molecules in the flocculent particles.

The flocculation process is carried out to accelerate the processes of aluminum and iron hydroxide ions. The use of flocculants increases the rate of coagulant diminution, reduction of coagulation time, and susceptibility to viciousness.

Natural and synthetic flocculants are used to clean stream water. Natural flocculants include starch, dentin, esters, cellulose, etc. citrated silicon dioxide is one of the most common inorganic flocculants. Genetically modified synthetic (organic) is polyacrylamide (-CH2-CH-CONH2)n, technical (PAA) and hydrolyzed (GPPA).

Flotation method is used to extract spontaneously hard, non-flammable dyspepsia in water content. In some cases, flotation is also used to extract dissolved matter. This process is called foam separation or foam concentration. The flotation is used by many enterprises for sewage treatment: oil refining, artificial fibers, cellulose, paper, leather, machine building, food, chemical industry. Flotation is also used to distinguish the activity after biochemical purification. The advantages of the flotation technique are the availability of the substance absorption, the width of application, the lack of capital and exploitation costs, simplicity of the device, high humidity (90-95%) scaling, high efficiency of cleaning (95-98%) is calculated. At the flotation, the concentration of bacteria and microorganisms is reduced at the expense of aerosol flux and easy oxidation. Their gratification is the basis for the successful implementation of the next stages of sewage treatment.

The essence of the flotation technique is the following: a water-soluble air bubble and a rigid cell that separates solid hydrophobic particles from cracking in the bubble particle closure. Then, the "bubble-particle" complex rises up to the surface and accumulates particles with higher concentrations than the initial flux.

After the biochemical purification of the aquatic water, the adsorbed method is widely used to remove dissolved organic matter, if these concentrations are low and are biodegradable or strongly toxic, and also used in local units. It is desirable to use local devices when substance adsorption is good when adsorbent is consumed [8,20,27,29].

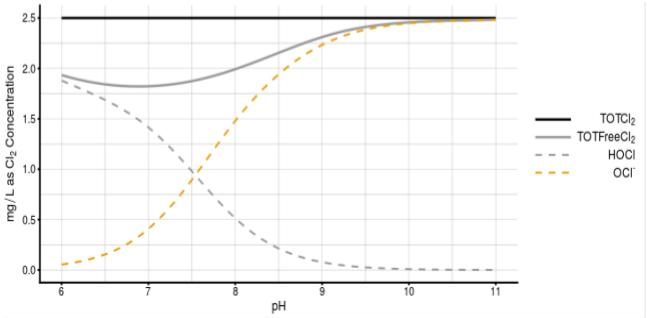

Figure 1.1.3 Simulation A Chemical Speciation Plots

The adsorbed method is used for desalination of sewage water from phenol, herbicide, pesticide aromatic nitrogen compounds. The advantage of this method is high efficacy, the ability to purify and recycle some types of waste water.

Water adsorbent purification may be regenerative, which means separation of the substance from the adsorbent may be destructive and destructive, ie the discharged substance can be lost along with the adsorbent. The efficacy of cleansing water through adsorbing method is 80-95%, depending on the chemical integrity of the adsorbent, the size of the adsorbent and its suitability, the chemical composition of the substance and its composition.

Adsorbents. Coal, cytotoxic sorbents and certain types of waste (gray, slag, sawdust, etc.) are used as adsorbents. Mineral sorbents - soil, tsilicagel, aluminum and metal hydroxides are rarely used for adsorbing various substances in wastewater, since their energy of water molecules is very large, and sometimes adsorbents exceed energy. Most commonly used sorbents are active carbon, but they must be particularly vulnerable. The activated charcoal should be poorly repulsed with water molecules and must be very pleasant with organic matter, having large holes (holes) (radiation 0.8-5 nm) of adsorbent pores, their upper layer (facial) is large and complex for organic molecules need. When in contact with water in a short time it should have high adsorption capacity, high selectivity and low retention time. In the regeneration of coal, the reagent consumption will be insignificant. Coals should be stable, must be quickly immersed in water and have a certain granulometric condition. In the process of purification, fine particle adsorbents (0.25-0.5 mm) and high dispersive coal particles (40 m) are used. Oxidation, condensation, and other reactions need to have low catalytic activity as some organic matter in the breeze is oxidized and smoothed. These processes accelerate catalyst repression. Smudged substances penetrate the adsorbent pores, which prevents the regeneration from going low. Also, they should be cheaper, and the amount of adsorbents should not be reduced after the regeneration, and should return multiple times to the work. For raw coal, raw materials can be used in various combinations of carbon-aggregates such as coal, wood, polymers, food and cellulose wastes and others. The adsorptive strength of the active coal is the result of the development of the part of the surface and cavities.

Electro dialysis of the aqueous stream is based on the disintegration of ionizing substances under the electrostatic force acting on the two sides of the membrane. This process is widely used for saline solemnization. Recently, they have been used to treat industrial wastewater.

The process is carried out by electro dialyzers. The simplest design consists of three cells, each separated by membranes. The solution is poured into the middle chamber and clean water is pumped into the 2 side tubes with the electrodes. Anions pass through an anode spin along with a vapor. Oxygen discharges in the membrane and acids are formed. At the same time, cautions pass into the catholic space. In the cathode hydrogen is separated and the alkaline becomes hot. The concentration of the salts in the middle cell decreases with the transverse momentum passing down to the zero. The H + and OH-fluids are distributed to the center of diffusion. This process slows the transition of salt ions into the corresponding electrodes.

The following oxidants are used for the treatment of sewage water: gas chlorine, chlorine auxiliary, calcium chloride, sodium and calcium hypochlorite, potassium permanganate, potassium bicromat, hydrogen peroxide, air oxygen, azans, pyrolyzite and others [7,16,22].

During the oxidation process, toxic contaminants in the water will become less toxic in the result of chemical reactions and can be separated from the water content. Because the purification of the oxidizer requires a large amount of reagent, this method is used only if it is impossible or inappropriate to purify water from pollutants: For example: cyanide cleaning, removal of dissolved aromatic compounds.

The activity of the substance in the oxidative form is determined by its potential magnitude. The fluorine occupies the first place among all known readers in nature, but because of its high coherence, it can not be applied in practice. The potential pedant potential for other substances is: for azans - 2.07, for chlorine - 0.94, for hydrogen peroxide - 0.68, for potassium permanganate - 0.59

Biological Methods: This method is intended to minimize the contamination of water contaminants by biochemical processes in a distinctive condition. This method of treatment of wastewater is carried out in 2 different ways, ie natural and artificial.

Biological pools are used to clean stream water in natural conditions. In this case, the waste water is pumped into the water reservoirs at an altitude of 0.5 to 1 meter. In the basin, processes such as self-cleaning of water take place. The biological clearance process takes place at a temperature below 6 degrees Celsius. The pools are composed of serial numbers 4-5 and placed in the order that follows from the first to the second one, and then to the third, etc., of the treated water. (Figure 1.2)

Artificial clearance of aqueducts is carried out by biofilters or separateness voters. The biofilm is a device that understands the biological treatment of wastewater by passing through large particle filters.

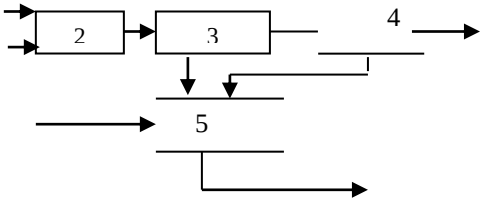

Figure 1.2: The scheme for the operation of the compressor aerobic.

1-aerobben; 2-nd secondary digester; 3 fluid in the fluid; 4- blurred compound: 5 - foggy circulation; Over 6 active foggy: purified water (explains the fuzzy motion of a puncture line, linear motion).

The biofiltrous grain material is covered by aerobic microorganisms with biological stains. Biological treatment of biofilters in aquatic bios stems is similar to biological purification in irrigated areas or filtration fields, but biodiversity is accelerated in this way [2; 23; 28].

Aero tenders are a steel concrete container, which flows through an active project, which is exposed to aeration. An active project is gray-colored pagodas -pages particles. It consists primarily of bacterial cells. Usually, there are many different types of simple organisms in their facial features. The source of nutrition for organisms in active environmental contamination is water pollution.

The aqueous substances in the aqueous fluid are absorbed by the active blurred surface. A few minutes after the active bubbles clash with tap water, the concentration of biological substances in it decreases by half. The dissolved biological agents are transported inside the bacterial cells by the permeate enzymes, and they break down. The substances that are suspended in the aqueous phase of the aerobic tank are also absorbed (swallowed) by the surface of the active bladder. Partly, they become nutrition for animals, together with bacteria, partially converted into soluble fertilizers and digested by microbes. In the biological treatment process, no waste of water is available for all bacteria, especially those that cause illness. Therefore, after the biological treatment, water is disinfected by liquid, chlorine or chlorine oxygen [25].

Possibilities of using biotechnological methods for purification of contaminated waters: Many types of industrial wastes in Uzbekistan, particularly in the gold and other types of metals, are unsustainable and are stored in private reservoirs, and their quantity grows annually and occupy large areas stands out. As a result, environmental protection, the creation of environmentally safe technology for industrial wastewater treatment remains one of the most urgent problems in modern biotechnology. Therefore, it is necessary to develop effective and inexpensive methods for residual effluents. At the same time, wastewater, which is produced during the production process, is still kept in special basins, without purification. This implies the creation of waste-water treatment technologies that are environmentally friendly.

In our country, representatives of various industrial and industrial sewage systems with high water intakes, algae, Bacillus, Pseudomonas, Bacillus cereus, Bacterium moratorium and other bacteria, Pseudomonas fluorescents B-5040 (pesticides, phenols, cyanides, heavy metals salts etc.)) (Shoyakubov et al., 2005; Kuriev, 1993; Sagdieva, 1997; Sanakulov, 2001). In Russia, gold screening plants add ammophos to their source as a source of nutrition. minorium cleaning (Antoninova, 2007). Physical, chemical, biological, microbiological processes of purification of waste water from high water reservoirs such as azalea, pistachio and eichornia have been studied, such as the metabolism of ions, accumulation in tissue tissues [1; 3; 5; 11].

Biotechnology of high-yield water treatment plants has a number of advantages: first, communal-economic waste water is used instead of drinking water for liquefied cyanide and pondidal wastewater; Second, additional feeding media is not required to grow eryxornia, pathos, rascal and azoles; Thirdly, savings in municipal wastewater disposal (labor, electricity, cleaning facilities, disinfecting voters, etc.) will be saved; Fourthly, the use of non-conventional energy sources (biogas, bioethanol, biodiesel) from the biomass of high-rise water bodies in the treatment plant; and, finally, the fifth can be used in the treatment of effluents from effluent treatment water at the treatment plant, for technological purposes at the plant, or for the irrigation of irrigation ditches in the treatment plant [4; 10; 12].

3.RESULT ANALYSIS

Based on the results of the study, we can reach the following general conclusions:

It is known that various levels of drinking water pollution are directly influenced by anthropogenic factors (industrial waste, household waste, agricultural wastewater). Therefore, in the study of the physic-chemical properties of the water of the Zarafshan River, we used it in areas where the influence of environmental factors varies. As the first option, we used water samples from the Karadarya part of the Zarafshan River (hereinafter referred to as the Mediterranean), and the second option was from the Pastdargham District of the Zarafshan River (hereafter referred to as the Mediterranean section). The experiments focused on physicochemical analysis of the samples were performed in the laboratories of the Samarkand Regional State Sanitary Epidemiology Center (The results of the experiments are presented in Tables 1 and 2, Graph 1.3).

Experiments show that in the middle of the Zarafshan River, the main physic-chemical properties of drinking water are taste, odor, color, turbidity, total hardness, nitrates, chlorides, Mg (magnesium) and Ca (calcium). Mean 1.78 ± 0.02, 1.76 ± 0.04 points, 18.4 ± 0.24 degrees, 1.74 ± 0.02, 9.2 ± 0.37, 53.6 ± 0, 4, 266.4 ± 3.7, 14.2 ± 0.37, and 23.2 ± 0.04 mg / dm3, and 1.72 ± 0.02, 1 down-stream of the Zarafshan River. , 76 ± 0.04 points, 18.4 ± 0.24 degrees, 1.84 ± 0.02, 9.2 ± 0.37, 55.0 ± 0.6, 273.2 ± 1.85, 14 , 2 ± 0.37 and 23.2 ± 0.04 mg / dm3.

Based on the above data, drinking water samples from the Zarafshan River have slightly different values than their physical and chemical parameters. The fact that the water from the lower part of the Zarafshan river is slightly dirty compared to the water from the middle part can be attributed to the increase in the amount of wastewater discharged into the river.

Table 1: Physico-chemical sampling of water samples from the lower part of Zarafshan river (Pastdargom region) Indicators

Indicators	Unit of meas-urement	The de-fault	Experiment, n = 5					
			I	**II**	**III**	**IV**	**V**	**Medium**
Taste	Ball	2,0	1,7	1,7	1,7	1,7	1,8	**1,72 ± 0,02**
The smell	Ball	2,0	1,8	1,7	1,9	1,7	1,7	**1,76 ± 0,04**
Color	Level	20,0	19	18	18	18	19	**18,4 ± 0,24**
Relevance	mg / dm3	1,5	1,8	1,8	1,8	1,9	1,9	**1,84 ± 0,02**
Total hardness	mg / dm3	7,0	8	9	10	9	10	**9,2 ± 0,37**
Nitrates	mg / dm3	45,0	57	55	53	55	55	**55,0 ± 0,6**
Chlorides	mg / dm3	250, 0	280	274	270	270	272	**273,2 ± 1,85**
Mg (Magnesi-um)	mg / dm3	12,0	14	13	13	15	14	**14,2 ± 0,37**
Ca (calcium)	mg / dm3	23,0	23	23	24	23	23	**23,2 ± 0,04**

Table .2: Physico-chemical sampling of water samples from the lower part of Zarafshan river (Pastdargom region) Indicators

Indicators	Unit of measure-ment	The de-fault	Experiment, n = 5					
			I	**II**	**III**	**IV**	**V**	**Medium**
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Total hardness	mg / dm3	7,0	8	9	10	9	10	**9,2 ± 0,37**
Nitrates	mg / dm3	45,0	57	55	53	55	55	**55,0 ± 0,6**
Chlorides	mg / dm3	250, 0	280	274	270	270	272	**273,2 ± 1,85**
Mg (Magnesi-um)	mg / dm3	12,0	14	13	13	15	14	**14,2 ± 0,37**
Ca (calcium)	mg / dm3	23,0	23	23	24	23	23	**23,2 ± 0,04**

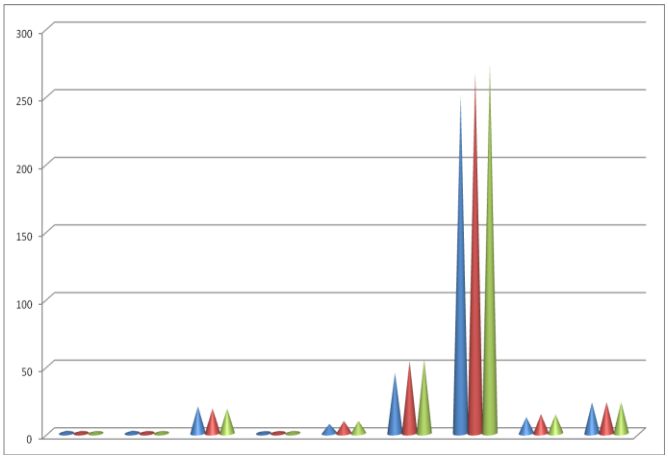

Figure 1.3: Physico-chemical properties of water samples from the middle and lower part of Zarafshan river.

4.CONCLUSION

The abovementioned sources and other sources of information show that current water pollution is one of the global challenges facing the Earth, including our country. Therefore, one of the important tasks is to study the effective methods of disinfecting and purifying contaminated water.

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