RESEARCH RESULTS OF LEVEL CHANGE WATERS OF THE SYRDARYA

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https://doi.org/10.5281/zenodo.17060404

Introduction. Water is one of the most valuable natural resources that plays a key role in maintaining ecological balance and Uzbekistan's socio-economic development. [1,2]. In the arid climate, characterized by a deficit of atmospheric precipitation, water bodies, in particular the Syr Darya River, are of particular importance as the main source of drinking and domestic water supply for a significant part of the country's population. However, in recent decades, there has been a persistent trend towards a deterioration in the qualitative state of water resources due to both natural factors and anthropogenic impact. [3,4,5].

The problem of pollution of the Syr Darya River, which is formed by the confluence of the Naryn and Karadarya rivers and flows through the country's densely populated areas, is becoming particularly relevant. The intensive use of water resources for agricultural and industrial purposes, as well as the discharge of insufficiently treated wastewater, pose serious risks to the river's ecosystem and public health. In this regard, conducting regular monitoring of water quality and assessing its compliance with sanitary and hygienic standards is of particular importance for ensuring sustainable water use. [6,7,8].

The purpose of this research was to conduct a comprehensive hygienic assessment of the water quality of the Syr Darya River during the 2023 winter period, determining the main physicochemical indicators and their compliance with established sanitary standards for drinking water sources.

Materials and methods. Water sampling was conducted in December 2023 at six control wells located in the area of active water use by the local population. Sampling points were selected based on the following criteria:

Reservoir No. 1 - located 100 meters upstream from the place where the Chirchik River flows into the Syr Darya;

Swar No. 2 - directly in the confluence zone of the Chirchik and Syrdarya rivers;

Strait No. 3 - 150 meters downstream from the confluence;

Reservoir No. 4 - 1 km from the water mixing zone;

Strait No. 5 - 2 km from the Chirchik tributary;

Ponds No. 6 - 3 km downstream from the "Riverside" recreational zone

Samples were taken in accordance with the requirements of GOST 31861-2012 "Water. General requirements for sampling" with all necessary precautions to prevent secondary contamination. Analytical studies were carried out using modern physicochemical methods in an accredited laboratory. The following indicators were determined:

Organoleptic characteristics (turbidity, color, transparency);

Main physicochemical parameters (pH, total mineralization, hardness);

Content of basic ions (chlorides, sulfates, carbonates);

Indicators of organic pollution (permanganate oxidation, BPK5);

Biogenic element concentration (phosphates, nitrogen-containing compounds);

Content of heavy metals (common iron).

Interpretation of the results was carried out by comparing them with the standards established by "Hygienic Requirements for Water Quality of Centralized Drinking Water Supply Systems."

Results. Analysis of the river's hydrological regime during the 2023 winter period showed a significant impact of meteorological conditions on the water level. Increased atmospheric precipitation and early melting of snow cover in the

mountainous regions of the basin caused the rise in water levels during the studied period.

The organoleptic indicators of the water varied within the following limits:

Turbidity: 0.012-0.121 mg/dm3 (minimum values were noted in section No6);

Color: 3.0-18.0 degrees of the platinum-cobalt scale;

Transparency: maximum at bar No6 (according to Snell);

The pH value remained in the slightly alkaline range (7.49-7.69)

The study of the chemical composition of water revealed the following features:

Mineral composition: total mineralization exceeded the standard (1000 mg/dm3) in the 1st (1084.9 mg/dm3) and 2nd (1087.4 mg/dm3) sections; total hardness was within permissible values (5.2-6.8 mg-eq/dm3); calcium and magnesium content met the standards;

Ionic composition: the concentration of chlorides and sulfates showed a tendency towards decrease compared to previous studies; the greatest decrease in sulfate content was noted in reservoirs No. 3 and No. 4;

Biogenic elements: Phosphates content in row #1 exceeded background values by 8.3 times; concentrations of ammonium, nitrites, and nitrates were significantly lower than the MPC;

Organic contamination: manganate oxidation did not exceed 4.2 mgO/dm3; low BPK values (1,2-1.8 mgO2/dm3) indicate the absence of significant organic contamination;

Heavy metals: The total iron content in all samples was below hygienic standards.

Conclusions

1. The conducted research indicates that the water quality of the Syr Darya River is satisfactory during the winter period of 2023. All determined indicators met the established sanitary standards for drinking water sources.

2. The identified features of the water's chemical composition are: increased mineralization in the Chirchik River's influence zone (stvores No1 and No2); local increase in phosphate content in the area of the No1 stvor; favorable organic pollution indicators;

3. The absence of significant exceedances of hygienic standards for all determined indicators indicates a relatively favorable ecological state of the river during the winter period.

4. To ensure sustainable water use and prevent potential deterioration of water quality, it is recommended to: strengthen control over the discharge of industrial and municipal wastewater; regularly monitor water quality during seasonal periods; develop and implement measures to reduce the anthropogenic load on the water body.

The obtained results emphasize the importance of continuing systematic research on the water quality of the Syr Darya River to ensure environmental safety and a stable water supply for the population of the adjacent territories.

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