

## THE MAIN POLLUTANTS OF TAP WATER IN ZHYTOMYR

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The quality of drinking water is a key element of public health and overall environmental safety. In Zhytomyr, the main source of water supply is the Teteriv River. However, recent years have shown a decline in water quality due to various factors, including intensive economic activity in the catchment area, outdated treatment systems, and changes in climate conditions. The issue of tap water contamination in Zhytomyr is relevant, as it affects the well-being of tens of thousands of city residents [1].

The purpose of the study is to analyse the main pollutants of tap water in Zhytomyr, their sources, degree of harmfulness, and to assess the effectiveness of existing treatment technologies. To achieve this goal, data were collected from open sources, including the official websites of the Zhytomyr Vodokanal, the Department of Ecology and Natural Resources of the Zhytomyr Regional State Administration, publications of Suspilne and Zhytomyr.info, as well as the results of laboratory water tests in recent years [2].

The analysis of water indicators shows that Zhytomyr tap water contains significant concentrations of organic substances. In particular, the chemical oxygen demand (COD) in 2019 was  $48 \text{ mgO}_2/\text{dm}^3$ , which indicates severe organic pollution. This pollution is caused mainly by wastewater from the private sector and agricultural land. In 2021, COD decreased to  $25.25 \text{ mgO}_2/\text{dm}^3$ , which may indicate some improvement, but it still exceeds the regulatory values [3]. At the same time, the biochemical oxygen demand ( $\text{BOD}_5$ ) also remains at an elevated level, indicating the presence of biodegradable organic matter.

The problem of water pollution with heavy metals deserves special attention. In 2019, the concentration of iron in water increased from  $0.598$  to  $0.681 \text{ mg}/\text{dm}^3$ , exceeding the maximum permissible level. In 2021, the figure was  $0.712 \text{ mg}/\text{dm}^3$ . The high iron content can be attributed to natural sources, as well as to outdated pipelines that are subject to corrosion [4]. Another problem is manganese, the concentration of which increases significantly in summer due to biological activity and insufficient

efficiency of treatment facilities. According to representatives of Zhytomyrvodokanal, the existing treatment systems are not designed for water of the fourth quality class, which is currently supplied to the treatment plants [1].

In addition to chemical pollutants, bacteriological abnormalities are also observed in the water. According to the monitoring results, in October 2023, out of 33 water samples from columns and wells, 20 showed deviations from the norm in terms of bacteriological and physicochemical indicators [5]. This indicates a serious problem of microbial contamination, which can be of both natural and anthropogenic origin.

The main sources of pollution are wastewater from industrial enterprises, insufficiently treated discharges from the private sector, agricultural runoff and outdated water supply infrastructure. All of this creates a complex environmental problem that requires urgent solutions. The introduction of modern treatment technologies, such as membrane filtration, ozonation or biological treatment using biofilters, could significantly improve the situation. In addition, it is important to regularly monitor water quality and inform the public about its condition.

In summary, the analysis of Zhytomyr's tap water shows that there is a complex pollution problem that includes both organic and inorganic substances, as well as microbiological factors. To improve the situation, it is necessary to modernise treatment facilities, strengthen control over pollution sources and raise environmental awareness among the population. Only a systematic approach can provide the city's residents with quality and safe drinking water.

### References

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