The physicochemical characteristics of the Ialomita River in Dambovita county

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The experimental results obtained in this paper was made by investigation of water samples collected from different zones of Ialomita River to characterize the quality indices of water. Salinity, electrical conductivity and other physicochemical indicators of samples (pH, turbidity) were investigated in the order to establish the real pollution degree of Ialomita River. The heavy metals concentrations containing Pb, Cd, Zn, Ni, Cr, Mn, and Fe were determined by Flame Atomic Absorption Spectrometry (FAAS). The obtained data confirmed that heavy metals are coming from various pollutant sources and the main anthropogenic sources were industrial waters and municipal wastewaters pathogenic which include organisms, plant nutrients, synthetic organic chemicals, inorganic chemicals, microplastics, sediments, oil etc.

In the region of Targoviste, the Ialomita valley has an asymmetrical development, with intense accumulations, a predisposition to meander, ridges and islands and a peripheral alluvial direction. The terraces deposits, mostly, come from the remodeling of Candesti gravels. The area of the lower terrace of Ialomita, an area that represents the entire built area of Targoviste, as well as the area surrounding the city and is used for agriculture is extended on both the right and the left bank. The maximum development of the terrace is on the right bank, with a width of over 3 km, a low slope (1-2%), a well-defined slope to the river meadow and raised by about 15 m from the major riverbed [1, 2].
The pollution of the Ialomita River in the Targoviste area is mainly due to the effluents from the industrial platform in the north of the city, but it must be specified that the river comes with a very high load of pollutants, especially in spring, summer and early autumn from discharged waste Consciously people, on the banks of the river, many of these wastes reach the river, when the flow increases due to climatic conditions, specific to the mountainous area.

Figure 1. Water sampling points on the Ialomita River, upstream (at Sotanga 44°58'43.5"N and 25°24'01.2"E) and downstream (at Ulmi, 44°55'07.8"N and 25°31'59.6"E) of the municipality of Targoviste

For the determination of the soluble salt content the standard method used is the conductometric, electrometric method which determines the electrical conductivity of the solution of the sample to be analyzed. The conductance meter measures the total salt content in S/cm - WTW ProfiLine Cond 3110 conductometer at which the results are displayed electronically. Atomic absorption spectrometry, probably one of the oldest analysis techniques widely used today, is a method of quantitative analysis that can be used to determine approximately 70 elements (metals, metalloids and non-metals) in environmental samples [3-4].

The samples taken from the Ialomita River (50 samples), upstream and downstream, in different seasons, 5 days/month, were analyzed fresh, on the spot, every morning (according to ISO 5667-3: 2012).
The analyzes followed a series of physical, organoleptic indicators of surface water quality, Ialomita. The following were determined: pH, with the help of the InoLab WTW 720 pH meter (according to SR ISO 10523/1997), conductivity, salinity and totally dissolved substances, with the help of the WTW ProfiLine Cond 3110 conductometer, the results being presented in table 1.

Table 1. Physicochemical parameters for upstream water samples collected on the Ialomita River in 2021 (average of 5 determinations, 5 days/month)

The month of sampling	Quality indicators				
	pH	Temperature [^{0}C]	Turbidity [NTU]	Conductivity at 20^{0}C [mS/cm]	Salinity [‰]
March	7.59	10.9	12.2	758	0.2
April	7.66	10.3	15.3	836	0.2
May	7.63	10.1	15.1	929	0.3
June	7.74	14.2	21.5	952	0.3
July	7.89	14.2	28.4	1023	0.3
August	8.00	14.5	29.8	1042	0.2
September	8.01	12.2	22.8	966	0.3
October	7.61	10.9	17.9	928	0.2
November	7.52	10.6	16.4	816	0.2
December	7.41	4.6	11.5	733	0.2

Analyzing the physicochemical parameters of the Ialomita River, to determine the degree of pollution, the following aspects were found: a higher load of organic substances is observed downstream, which reflects an anthropogenic influence; these values begin to increase in the summer months as the river flow decreases and the degree of pollution is higher. Pollutants detected in concentrations that exceed the reference values, represent a potential to alter the water quality through negative influences on the self-purification processes of the river due to the decrease of biological activity; the high concentrations of heavy metals, iron, lead and copper, determined in the water samples are not appropriate to the formation and development of aquatic organisms and can disturb the ecosystem; from the analysis of the obtained results it is very clearly observed a much higher load of heavy metals downstream of Targoviste, both for lead, iron, chromium, copper, nickel. This leads to the conclusion that some of the wastewater from enterprises on the industrial platform is not fully treated according to environmental standards.

CONCLUSIONS

Water quality is a very important aspect, knowing that water is the main component of living matter. Between 50% and 90% of the weight of living organisms is water. Compared to the CMA of heavy metals from Order 161/16.02.2006 of the Ministry of Environment, the analyzes performed exceeded the values of the analyzed metals, especially in summer. In general, natural waters have the ability to dilute and disperse impurities in the body of water and also have the ability to self-purify naturally (phenomena whose intensity differs depending on the nature of the water: flowing, stagnant or groundwater). However, the possibilities for self-restoration of the initial natural qualities are not unlimited, and when certain thresholds are exceeded, pollution can induce irreversible changes in aquatic ecosystems or seriously affect the use of water resources.

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