RESEARCHES CONCERNING THE WATER QUALITY IN DAMBOVITA RIVER ALONG LACUL MORII - GLINA

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Summary

Water quality in Dambovita River, along Lacul Morii was established by sampling in five checkpoints.

After sampling there were carried out the chemical and physical parameters: temperature, pH, calcium, ammonium, nitrites, nitrates, ortophosphates, and dissolved oxygen, chemical and biochemical consumption of oxygen.

The sampling, transport and analyze methods used for the quantitative establishing of the quality indicators are the ones stipulated by standards.

The interpretation of the data was made regarding 1146/2002 Order concerning surface water classifying.

Following the determinations we can conclude:

- from the oxygen regime point of view (dissolved oxygen, CCO–Mn, CBO_5), Dambovița-River water is framed within the first quality class in all checkpoints, excepting downstream Glina section where the quality is "degrade".

- in nutrients category (N – NH_3, N – NO_2, N – NO_3) the recorded values are framed into the second and the third quality classes in four checkpoints; but in downstream Glina sector in the fifth quality class.

- in general ions (calcium, magnesium, natrium, chlorines, sulphates, fixed residue) Dambovita River water is framed in the first and the second quality classes for all 5 checkpoints.

Key words: water, quality classes, parameters

Water is one of the environmental factors whose quality depends on the other factors quality, respectively air and soil and of course it influences them too.

The surface waters are also affected by the pollution provoked by industry, agriculture, transports and tourism.

Surface water pollution protection is made by avoiding the spreading of some pollutants in water, but also by maintaining them into a natural and health status, with a strong natural ability of filtration. The existing of some different pollution sources along Lacul Morii – Glina lead to establishing some physical and chemical parameters of water in the mentioned area. Dambovita River crosses Bucharest on 16,2 km length.

Materials and methods

Water quality in Dambovita River along Lacul Morii – Glina was established based on samples harvested from five checkpoints: Dambovita on Lacul Morii exit, Grozavesti CET, Pod Vitan, downstream and upstream Glina.

By samples there were carried out the physical and chemical parameters, which were divided conformingly 1146/2002 MAAP Order into physical indicators (temperature, pH), general ions (calcium, magnesium, fixed residue, chlorines, sulphates, natrium); nutrients (ammonium, nitrites, nitrates, ortophosphates) and indicators which expose the oxygen into water regime (dissolved oxygen, CCO-Mn, CBO_5).

The sampling, transport and analyze methods used for the quantitative assessment of the quality indicators are the ones stipulated by standards.

Results and discussions

Water quality of Dambovita is shown in four tables from the physical and chemical parameters point of view.

In table 1 are shown the average values of the physical indicators: temperature and pH.

Table 1

Physical indicators of Dambovita River water

Sampling checkpoint		Physical parameters	
		Temperature	pH
Dambovita (Lacul Morii exit point)		5,3	7,93
CET Grozavesti		15,3	8,04
Pod Vitan		14,6	8,1
Upstream Glina		14,3	8,38
Downstream Glina		17,9	7,58
Limits conforming Order no. 1146/27.03.02	Qality class I	not considered	6,5 – 8,5
	Qality class II		
	Qality class III		
	Qality class IV		
	Qality class V		

Analyzing the data in the table it could notice that conformingly 1146/2002 Order temperature is not considered and pH is framed into the values stipulated by this order.

pH shows the level of water acidity in Dambovita River. Conformingly to the recorded values along the analyzed area, Dambovita water is an alkaline one.

The oxygen regime was established by carrying out three indicators: dissolved oxygen, oxygen chemical consumption (CCO-Mn) and biochemical oxygen consumption (CBO_5). The average values of the three indicators, carried out on the five checkpoints are shown in table 2.

Analyzing the obtained values it could notice the following:

The dissolved oxygen frames Dambovita water in the first four checkpoints in the first quality category, but downstream Glina section is in the fifth quality category.

CCO-MN recorded values which border the water in the second quality category for the first four checkpoints and in the third category for downstream Glina section.

The biochemical oxygen consumption has values conformingly the first category for the water samples in Lacul Morii, CET Grozavesti, Pod Vitan, upstream Glina sections and the fifth category for downstream Glina section.

For all three carried out parameters, water in downstream Glina section is framed in the degraded quality category.

Table 2

Oxygen regyme of Dambovita River water

Sampling checkpoint		Carried out parameters (mg/l)		
		Disolved oxygen	CCO- Mn	CBO_5
Dambovita (Lacul Morii exit point)		6,33	6.79	5
CET Grozavesti		7,51	6.47	3
Pod Vitan		7,10	6.32	4
Upstream Glina		8,05	6.16	3
Downstream Glina		1,04	22.12	42
Limits conforming Order no. 1146/27.03.02	Qality class I	7	5	3
	Qality class II	6	10	5
	Qality class III	5	20	10
	Qality class IV	4	50	25
	Qality class V	< 4	>50	>25

Regarding the nutrients, there were carried out four parameters: ammonium, nitrites, nitrates and ortophosphates. The obtained results are presented in table 3.

Table 3

Nutrients in Dambovita River water

Sampling checkpoint		Carried out parameters (mg/l)			
		$N - NH_4^+$	$N - NO_2^-$	$N - NO_3^-$	$P - PO_4^{3-}$
Dambovita (Lacul Morii exit point)		0.47	0.06	0.08420	0.37
CET Grozavesti		0.40	0.08	1.0124	0.21
Pod Vitan		0.35	0.11	1.2102	0.18
Upstream Glina		0.48	0.21	1.4052	0.35
Downstream Glina		13.00	0.43	7.2245	3.85
Limits conforming Order no. 1146/27.03.02	Qality class I	0.2	0.01	1	0.05
	Qality class II	0.3	0.06	3	0.1
	Qality class III	0.6	0.12	6	0.2
	Qality class IV	1.5	0.3	15	0.5
	Qality class V	>1.5	>0.3	>15	>0.5

Analyzing the obtained data it could notice that from the ammonium parameter point of view Dambovita River water is framed into the second quality class for the first four checkpoint and in the “degraded” class for downstream Glina

section, the recorded value in this area being 8,6 times higher than stipulated limit for the fifth quality class.

Nitrites recorded values which framed water in the second quality class for Lacul Morii section, the third quality class for CET Grozavesti, Pod Vitan and upstream Glina sections and the fifth quality class for downstream Glina section.

Nitrates have values for the second quality class in water sampled from the first four sections and the fourth class for downstream Glina section.

Regarding the ortophosphates quality, this water is framed into the third quality class for the first four sections and in the degraded class for the fifth section (downstream Glina), where there was recorded an increasing of 7,7 times beside the admitted limit.

Sodium is one of the main elements in sustaining life and is appears into the water linked by different organic combinations: NH_3, NO_2^-, NO_3^-.

Ammonium represents a middle stage in the bio-geo-chemical cycle of it, appearing in the surface water in large quantities due to the protein and organic material degradation from vegetal and animal residues and chemical industry pollution. Their presence into the water is due to bacterial oxidation of ammonium and nitrates reducing which represents the final oxidative stage of the organic nitrogen.

In table no. 4 there are presented the average values of the general ions (calcium, magnesium, natrium, fixed residue, chlorines and sulphates).

Table 4

General ions in Dambovita River water

Sampling checkpoint		Carried out parameters (mg/l)					
		Ca^{2+}	Mg^{2+}	Reziduum	Cl^-	SO_4^{2}	Na^+
Dambovita (Lacul Morii exit point)		76.61	14.4	392.25	31.91	49.0	12.5
CET Grozavesti		78.24	16.32	386.25	35.46	48.0	5.75
Pod Vitan		40.05	15.36	411.75	42.55	31.0	17.5
Upstream Glina		51.26	15.55	387.00	31.91	47.0	11.75
Downstream Glina		89.76	6.72	657.75	67.37	94.0	87.75
Limits conforming Order no. 1146/27.03.02	Qality class I	75	fond	fond	fond	80	fond
	Qality class II	150	25	500	100	150	50
	Qality class III	200	50	1000	250	250	100
	Qality class IV	300	100	1300	300	300	200
	Qality class V	>300	>100	>1300	>300	>300	> 300

Analyzing the data in the table it could notice that almost all the parameters are framed into the first quality category conformingly 1146/2002 Order for the first four checkpoints, but downstream Glina section, the values represent the second quality class.

Magnesium recorded values corresponding to the first quality class in all checkpoints.

Analyzing the value obtained for all indicators in all sections, the general conclusion is the one that water in Dambovita River along the analyzed area is

framed into the first category class, excepting downstream Glina section, where it is framed into "degraded" category.

Conclusions

1. The oxygen regime represented by the three parameters (dissolved O_2, CCO-Mn, CBO_5) frames Dambovita River water in the first category class conformingly 1146/2002 Order, along the analyzed area, excepting downstream Glina section, where the water quality is "degraded".

2. In nutrients category, N-NH_3, frames Dambovita – water in the first quality for the first four sections and in the second quality class and in the "degraded" one, downstream Glina section. N-NO_2 and P-PO^{3-}_4 frames the Dambovita water in the third quality class and in the fifth class for downstream Glina section. NHO_3 recorded values corresponding the second quality class for the first four sections and in the fourth class for downstream Glina section.

3. For general ions (calcium, magnesium, natrium, fixed residues, chlorines, sulphates) water is framed into the first category and the water is framed into the first and the second classes for all the analyzed area.

4. Dambovita River water during Lacul Morii – Glina sections, conformingly the first quality class excepting the downstream Glina section which enters in the "degraded" category".

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