DEFINING OF PHYSICAL-CHEMICAL PARAMETERS OF KRENA RIVER AS THE POLLUTER OF ERENIKU RIVER

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Abstract

The Krena river based on its length has bigger flow than Llukaci river, and both of them spillat Ereniku river. The purpose of this study is to provide details on the quality of the waterof Krena river and its flow to the Ereniku river. The study and monitoring performed in of this paper annual period january-december 2011gives its physical-chemical results as:Iron,Manganese,nitrites,nitrates,Aluminium,phosphate,consumption of Potassium permanganate,dissolved Oxygen,water temperature,air temperature,pH value etc.Water samples were taken in polyethylene bottles of 500 ml, which initially are well cleaned.Some of parameters were measured at the location of the taken sample, since other analyzes were sent immediately to the laboratory and analyzes were made,based on pH value, conductometric,turbidymetric, spectro photometric etc. The given results show the quality of the pollution of Krena river as result of discharge of pollutants , municipal and industrial.

Keywords: River, Krena , results, study, pollutant

Introduction

Water is a natural resource with limited amounts and unequal time and space distribution. All shapes of life and all human activities depends on water. Water resources are of high importance for human life and economy and are the main source to fulfill drinking water needs irrigation of lands and for industry. Lack of water is considered as socio – economic restrictive factor of a country.

Industrial development and modern urbanism have resulted in the formation of large urban zones, industrial zones and intensive development of agriculture. This has increased the need for water, but also growth of urban and industrial discharges at the rivers with no prior treatment at the same time, decreasing this way the possibility of water self-cleaning (auto purifying)

Today, the need for clean water is considered as one of the biggest environmental global problems. Currently, more than 1.2 billion people in the world have no access to drinking water, and 3 billion people (half world's population), have appropriate sanitary service. More than 200 diseases have origin from the contaminated water. About 6.000 people a day die from the diarrhea diseases. According to World Health Organization it is estimated that every year around 5 million people die by consuming the contaminated water. Basing on actual urbanism trend in the world until 2025, around 3 billion people will need the water supply and more than 4 billion people will need the access to sewage.

In Kosovo like in most of other countries the human health and fulfilling needs are threatened more and more by the bad quality of water or the lack of clean water. It is estimated that Kosovo has limited water resources. Therefore, maintaining, conservation and monitoring of the water quality is one of the biggest environmental challenge for our society.

But stable management of water resources, maintaining of water and improvement of water quality requires special dedication by all responsible factors.

Discarded water from the cities contain itself inorganic and organic dissolved substances or it appears in the form of rotter or suspension.

In this study, there are physical and chemical parameters of Krena river followed during 2011 followed, and from the results we concluded that Krena river is one of the biggest pollutants of Ereniku river. Since, during its journey until uniting with Ereniku river there are sewage waters that are being discharged with atmosphere waters and other pollutants. These are the reasons of one year monitoring of this study.

One way to decrease the impact of human society on natural waters can be done by applying general and "all inclusive" monitoring regime. Monitoring of the water sources will determine the water quality and quantity, in terms of identifying impairments and helping politicians to take decisions on using the land which not only will protect the natural zones, but would improve the quality of life, as well.

Material and methods

Krena river is the river that passes throughout Gjakova City. In this river there are contaminated substances dissolved, such as from: the atmospheric precipitation, sewage waters, industrial waters etc. These contaminated waters disintegrate by decreasing the amount of macerated amount of Oxygen forming in this way eutrophication in the monitored Krena river waters.

Therefore the goal of this study is to give information over the quality of Krena river waters and the contamination that it causes while pouring into Ereniku river.

Water samples were taken in three points (localities): at the IMN Factory (Industry of Building Materials). From each of these three points first samples were taken 50 meters before sewage waters pouring. Second point samples are taken at the place where the sewage waters pour. And the third samples are taken 50 meters after pouring of the contaminated waters pour.

Water samples are taken in the 500 ml polyethylene bottles and the prior use were cleaned well and the sample was kept safe at the temperature 4^0C in the local refrigerator. In the sample taking place were determined these parameters: water temperature, ph value, electrical conductivity, turbidity, potassium permanganate, etc. To analyze the water in the laboratory we used standard methods as prescribed by APHA standard.

Through spectrophotometer UV Hach, Merck's urbidymeter pectraquant 1500 T, we used titrometric, conductometric, pH-metric methods etc.

Results and discussion

The research made in the laboratory of Regional Company for Water supply Radoniqi and some of them measured in the sampling site, during the study are monitored the parameters showed as below.

Table 1.Physic – Chemical analyses of the river Krena results

2011		IMN - River Krena May			IMN - River Krena Avgust		
Parameters		I	II	III	I	II	III
Temperature air	^{0}C	17.6	11.2	11.4	28.9	29.5	29.9

TºC							
Temperature water TºC	^{0}C	8.2	8.0	7.9	19.1	19.1	19.5
Color	Sh.Co-Pt	23	41	33	6	18	10
Turbidity	NTU	7.7	25.2	13.8	4.3	13.7	8.1
pH value	-	8.24	9.65	8.65	8.08	9.66	8.57
$KMnO_4$ value	mg/dm^3	18.96	85.32	30.02	11.69	79.42	22.17
Electr.conductivity	µs/cm	246	415	318	226	347	278
Total hardness	ºdH	7.70	8.54	8.12	7.56	8.12	7.84
Dry residue	mg/dm^3	147.6	249	190.8	135.6	208.2	166.8
CO_2	mg/dm^3	5.61	8.25	6.27	5.06	5.94	5.72
Chlorides	mg/dm^3	8.50	19.14	10.63	7.44	19.14	10.65
Dissolved oxygen	mg/dm^3	10.8	6.9	9.9	10.4	6.7	9.5
Iron(Fe)	mg/dm^3	0.18	1.13	0.44	0.14	1.04	0.35
Manganese(Mn)	mg/dm^3	0.22	0.81	0.39	0.15	0.71	0.31
NH4 + ammonium	mg/dm^3	0.27	1.19	0.62	0.20	1.12	0.53
Nitrites(NO_2)	mg/dm^3	0.018	1.16	0.53	0.011	1.08	0.42
Nitrates NO_3	mg/dm^3	0.46	9.8	4.7	0.24	7.7	3.7
Sulphate	mg/dm^3	43	75	58	32	60	47
Phosphate	mg/dm^3	0.46	11.3	3.9	0.47	10.1	8.9

Table 2. Physic – Chemical analyses of the river Krena results

2011		IMN - River Krena Octobar			IMN - River Krena December		
Parameters		I	II	III	I	II	III
Temperature air TºC	^{0}C	16.5	16.5	16.6	16.7	16.8	16.8
Temperature water TºC	^{0}C	14.6	14.7	14.8	15.0	15.2	15.3
Color	Sh.Co-Pt	9	20	14	8	19	15
Turbidity	NTU	5.9	14.5	9.1	6.1	14.8	9.9
pH value	-	8.14	9.71	8.75	8.17	9.82	8.94
$KMnO_4$ value	mg/dm^3	12.0	69.52	20.54	12.32	71.10	22.17
Electroconductivity	µs/cm	229	379	284	233	381	285
Total hardness	ºdH	7.56	8.12	7.98	7.7	8.26	7.98
Dry residue	mg/dm^3	137.4	226.8	170.4	139.8	228.6	171
CO_2	mg/dm^3	5.28	6.05	5.83	5.5	7.15	5.94
Chlorides	mg/dm^3	7.79	19.82	10.28	8.15	20.56	11.6

Dissolved oxygen	mg/dm^3	10.6	6.8	9.7	10.5	7.1	9.9
Iron(Fe)	mg/dm^3	0.16	10.7	0.38	0.41	1.07	0.39
Manganese(Mn)	mg/dm^3	0.18	0.74	0.35	0.16	0.69	0.26
NH4 + ammonium	mg/dm^3	0.23	0.15	0.54	0.18	1.14	0.47
Nitrites(NO_2)	mg/dm^3	0.018	1.11	0.47	0.019	1.07	0.44
Nitrates NO_3	mg/dm^3	0.29	7.9	4.1	0.28	7.8	4.2
Sulphate	mg/dm^3	34	62	49	33	67	52
Phosphate	mg/dm^3	0.38	10.2	3.0	0.37	10.3	3.1

Diagram 1, Turbidity, pH value, $KMnO_4$ value, electroconductivity.

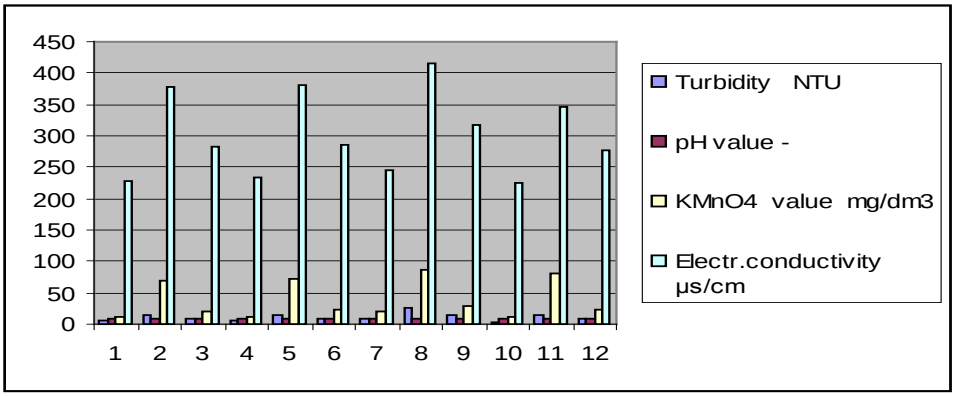
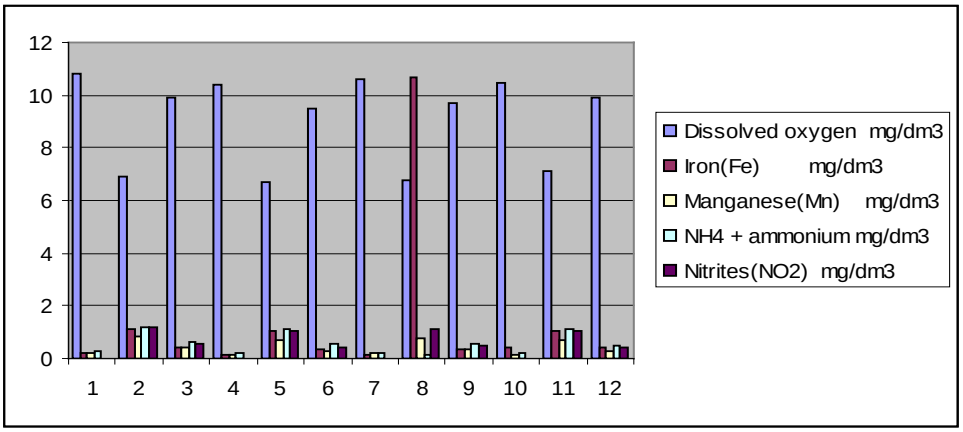


Diagram 2, Dissolved Oxygen, Iron(Fe),Manganese(Mn),NH4 + ammonium, nitrites(NO_2).



Discussion

During the seasons: spring, summer, autumn and winter of 2011, were made these physic – chemical analyses, in three sites of Krena river in Gjakova. From the tested parameters are: temperature, turbidity, pH value, dissolved Oxygen, $KMnO_4$ consumption, ammoniac, nitrites, Iron,Manganese, etc.

From the analyzes results, temperature is as an important parameter which shows that there are changes from the first site with temperature 7.9^0C in december up to higher temperature of 19.5^0C which was shown in august month at the third site. These parameters depends from the time, season and the place where the samples were taken. Turbidity vary from 5.9 taken at the first site up to maximum 25.2 taken at the second site, which means that

we are faced with an increase of turbidity. As the result of this increased values are the precipitation and many uncontrolled discharges made throughout Krena river and the municipal discharges.

pH value of 8.08 is marked in august 2011 in the first site of Krena river. Higher pH values appeared in the second site 9.82 in december 2011. Taken as a whole level of pH is not very high ,considering high discharges made into this river.The dissolved Oxygen in water which is very important for ecosystems and for all forms of water life including all the organisms. According to the results values,lowest value is measured in october (6.8 mg/l), and the highest is in spring in may 2011 (10.8 mg/l).

Potassium permanganate consumption is considered as a measure of organic substances content in the water, lowest level of this parameter in the water is marked in summer in august 2011, (11.69 mg/l) in the first site of Krena river. Highest potassium permanganate expenditure is in the second site of the Krena river (79.42 mg/l) in august 2011. Based in these results there are big differences which comes as result of the over-contamination of this water from uncontrolled discharges and sewage waters.

According to ammoniac the lowest level was marked in october at the second site (0.15 mg/l), and the highest level was in august at the second site (1.19 mg/l). Except the everyday discharges, in increasing of this parameter had influented the high temperatures and the lack of the water in the flow of the river's bed itself. Lowest nitrites in the water were marked in october 2011 (0.018 mg/l) in the first site of Krena river, and the highest were marked in the second site (1.16 mg/l) in spring, in may 2011.The presence of Iron vary from 0.16 mg/l in the first site up to 10.7 mg/l in the site 2 and that during october.

Level of Manganese in this water analysis is not that high, while we now that there are permanent discharges of contaminated water in this river, probably it's result of continual flow of this river and does not appear as rotter as Fe and Mn as well.

Conclusion

From the experimental samples taken in the Krena river results in 2011 we have concluded that:

There are river Krena water samples analyzed, in order to determine the physic-chemical parameters.Some parameters were measured at the site of the place of taking the samples , and the other analyses were sent immediately in the laboratory to analyze.The taken results show that the quantity of contamination of river Krena is indicated from discharge amounts of municipal and industrial contaminanters, and these contaminants of the river Krena indicate in contamination of river Erenik as well.It is recommended by the major state institutions to express responsibility at the institutions for water monitoring and maintence, in order to make control over the water, to make the gradual reduction of contamination, degradation and other activities that pose greater risk to the water environment and to build plants for sewage treatment with the aim of protecting the environment especially rivers. And by all this steps we should provide preserving the waters under EU Standards.

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