

Pollution of water of River Lepenci from Lime Factory in Kaçanik to the border with Macedonia in Hani Elezit



Environmental protection

Keywords: Pollution, Lepenci, industrial water, lime, cement.

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Abstract

Water pollution of river Lepenci resulting from the industrial water, urban and sewage water, discharges without any treatment. Specific character, type of pollution is depending on the reasons that source are. Population growth, focusing on large settlements in cities with congestion, development of industry and concentration in an area "industrial zone" increases the level of pollution. In this part of Kosovo where is the water flows Lepenci River is developed industry for construction materials, so in Kaçanik is factory for the production of lime "New Lepenci" in Hani Elezit is factory for producing cement "Sharcem" and factory for producing of styropor "KosovaPlast". Also in road length from Kaçanik to Hani Elezit their activities develop three ripraps. All industrial waters of these factories and natural water passing through mergelemines and limestone mines, wastewater of these localities are discharged to the river Lepenci without processing.

1.0 Introduction

Lime factory in Kaçanik his production has started since 1948 and source of raw materials used limestone mines of GuriShpuar and the Ivaje. Since reserves of GuriShpuar are spent, limestone for producing of lime is used in mine limestone of Ivaja. Locality of Ivajais southwest of Kacanik at distance of 3 km. Cement Factory "Shar" his production has started since 1936 and the source of raw material is very close to the factory. Mine mergele is located in southern of Kosovo, near the border with Republic of Macedonia, Hani Elezit, and north side of Kaçanik.

1.1 The impact of extraction and processing industry in the quality of the water of the river Lepenci

The goals of this study is to determine the pollution of the river Lepenci, impact of extractive and processing industry in this part of Kosovo, impact of pollution in their physic and chemical characteristics of water of river Lepenci. Determining the impact of this pollution is the research orientation of this paper along with an explanation of opportunities for purification of industrial water as well as municipal wastewater into the river Lepenci.

1.2 Determining the frequency of sampling

The samplings were performed in the month of April, August, and November 2013.

1.3 Analyzed parameters

Analyzed parameters were: Turbidity [NTU], color, aroma, taste, value of pH, Ammonia [mg / l], Nitrates [mg / l], nitrites [mg / l] Dissolved oxygen [mg / l], KMnO₄ expense, Total hardness [° f], Sulphates SO₄, [mg / l], Phosphates PO₄, [mg / l], Electrical conductivity [μScm-1], Manganese [mg / l], Iron [mg / l], Alkaline [mval / l], and Acidity [mval / l].

1.4 Work scheme

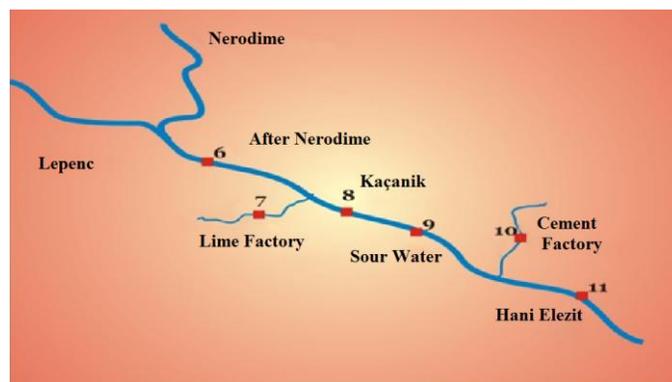


Fig. 1. The scheme for the Champions

1.5 Nomenclature of the samples taken in to riverLepenc

- M 6. Kaçanik, before lime factory
- M 7. Lime Factory,
- M 8. After Lime Factory,
- M 9. Sour water,
- M 10. Cement Factory, Hani Elezit.
- M 11. Hani Elezit near the border with Macedonia.

1.5.1 First cycle of measurements

Table1.Physic - chemical analyses, sampled on 29.04.2013.

Date: April 2013							
Parameter	Max. range allowed	Result	Result	Result	Result	Result	Result
Samples	Unit	M6	M7	M8	M9	M10	M11
Turbidity	1.2-2.4 NTU	5.09	12.2	4.87	6.68	11.84	9.54
Color	0-10 Co-Pt	55	108	51	72	130	101
Smell	without	smell	smell	smell	smell	smell	smell
Taste	without	bitter	bitter	bitter	bitter	bitter	bitter
pH	6.8-8.5	7.7	8.9	7.8	7.1	8.8	7.3
N (ammonia)	0.1 mg/l	0.24	0.29	0.30	0.07	0.87	0.15
N (nitrites)	0.005 mg/l	0.0115	0.0103	0.0121	0.0094	0.0212	0.0217
N (nitrates)	10 mg/l	2.0	2.6	2.2	1.7	3.7	3.1
Solvable oxygen	0 mg/l	2.43	2.74	2.51	2.66	4.55	4.47
Expenditure of KmnO4	8-12* mg/l	9.61	10.85	9.92	10.54	17.98	17.67
Total hardness	30 °dH	7.28	10.08	8.96	9.24	9.08	10.08
Sulphates SO42-	200 mg/l	16.5	17.9	17.8	20.8	28.6	20.9
Phosphates PO43-	0.25 mg/l	0.853	0.822	0.830	0.749	1.236	0.837
Specific conductivity	600-1500 µScm-1	305	230	213	223	294	252
Mn	0.05 mg/l	0.038	0.048	0.040	0.043	0.070	0.058
Fe	0.3 mg/l	0.487	0.715	0.479	0.768	0.535	0.496
Alkaline	0.1 mval/l	2.6	2.5	2.5	2.4	4.0	3.1
Acidity	0.05 mval/l	0.015	0.015	0.015	0.015	0.010	0.015

Table 1 presents the results of measurements of the first cycle of six samples taken in the length of the river Lepenci from the lime Factory in Kaçanik to the border with Macedonia in Hani Elezit.

1.5.2 Second cycle of measurements

Table 2. Physic - chemical analyses, sampled on 17.08.2013.

August 2013							
Parameter	Max. range allowed	Result	Result	Result	Result	Result	Result
Samples	Unit	M6	M7	M8	M9	M10	M11
Turbidity	1.2-2.4 NTU	5.13	12.3	4.92	6.81	12.78	9.71
Color	0-10 Co-Pt	59	109	58	77	140	108
Smell	without	smell	smell	smell	smell	smell	smell
Taste	without	bitter	bitter	bitter	bitter	bitter	bitter
pH	6.8-8.5	7.9	8.7	8.1	7.2	8.9	7.4
N (ammonia)	0.1 mg/l	0.28	0.31	0.33	0.08	0.86	0.16
N (nitrites)	0.005 mg/l	0.0121	0.012	0.013	0.0098	0.0283	0.0225
N (nitrates)	10 mg/l	2.21	2.7	2.4	1.9	3.9	3.6
Solvable oxygen	0 mg/l	2.54	2.7	2.67	2.77	4.79	4.54
Expenditure of KmnO4	8-12* mg/l	9.59	10.80	10.01	11.33	18.54	17.76
Total hardness	30 °dH	7.54	10.00	9.15	9.36	9.51	10.23
Sulphates SO_4^{2-}	200 mg/l	17.7	17.1	18.9	20.9	29.9	21.6
Phosphates PO_4^{3-}	0.25 mg/l	0.891	0.8	0.88	0.763	1.342	0.889
Specific conductivity	600-1500 $\mu S cm^{-1}$	371	235	248	248	301	261
Mn	0.05 mg/l	0.044	0.046	0.049	0.051	0.078	0.062
Fe	0.3 mg/l	0.528	0.71	0.491	0.778	0.581	0.52
Alkaline	0.1 mval/l	2.8	2.52	2.8	2.6	4.2	3.2
Acidity	0.05 mval/l	0.016	0.01	0.011	0.012	0.009	0.017

Table 2 presents the results of measurements of the second cycle of six samples taken in the length of the river Lepenci from the lime Factory in Kaçanik to the border with Macedonia in Hani Elezit.

1.5.3 Third cycle of measurements

Table 3. Physic - chemical analyses, sampled on 10.11.2013.

November 2013							
Parameter	Max. range allowed	Result	Result	Result	Result	Result	Result
Samples	Unit	M6	M7	M8	M9	M10	M11
Turbidity	1.2-2.4 NTU	4.9	10	4.69	6.13	11.8	9.31
Color	0-10 Co-Pt	55	97	50	68	128	91
Smell	without	smell	smell	smell	smell	smell	smell
Taste	without	bitter	bitter	bitter	bitter	bitter	bitter
pH	6.8-8.5	7.1	8.3	7.7	7.4	8.2	7.1
N (ammonia)	0.1 mg/l	0.19	0.22	0.31	0.05	0.8	0.13
N (nitrites)	0.005 mg/l	0.01	0.01	0.011	0.0085	0.021	0.0189
N (nitrates)	10 mg/l	1.76	2.4	2.1	1.5	3.5	0.91
Solvable oxygen	0 mg/l	2.34	2.37	2.33	2.12	4.18	4.12
Expenditure of KMnO ₄	8-12* mg/l	9.11	10.12	9.13	9.44	16.12	17.17
Total hardness	30 °dH	6.58	9.67	8.21	8.99	9.0	9.18
Sulphates SO ₄ ²⁻	200 mg/l	14.6	17.1	16.8	19.7	27.4	19.9
Phosphates PO ₄ ³⁻	0.25 mg/l	0.765	0.769	0.76	0.687	1.133	0.9
Specific conductivity	600-1500 µScm ⁻¹	289	229	210	216	299	240
Mn	0.05 mg/l	0.031	0.044	0.037	0.038	0.067	0.05
Fe	0.3 mg/l	0.41	0.684	0.396	0.715	0.516	0.421
Alkaline	0.1 mval/l	2.4	2.1	2.3	2.3	3.34	3.13
Acidity	0.05 mval/l	0.013	0.016	0.008	0.014	0.012	0.012

Table 3 presents the results of measurements of the third cycle of six samples taken in the length of the river Lepenci from the lime Factory in Kaçanik to the border with Macedonia in Hani Elezit.

1.6 Graphic results of threesampling from lime factory to border Kosovo – Macedonia in Hani Elezit

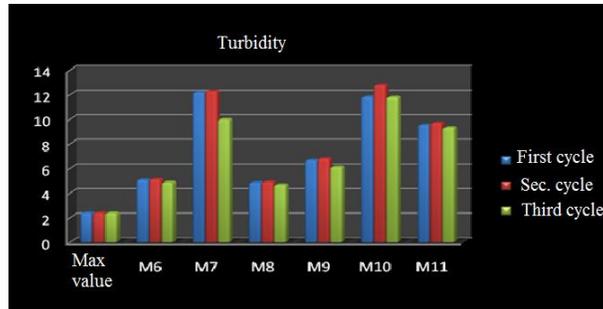


Fig. 2 Turbidity on six sampling

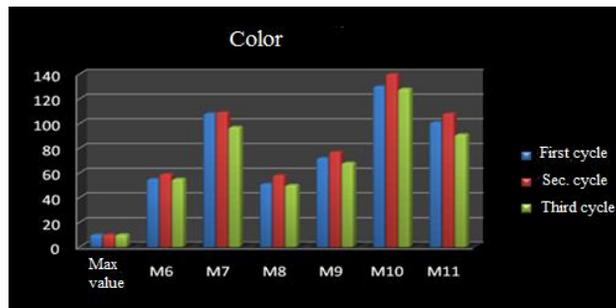


Fig. 3 Color on six sampling

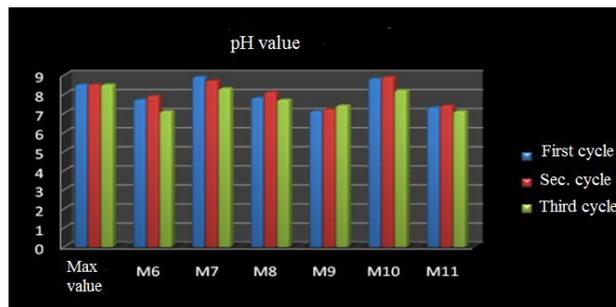


Fig. 4 pH value on six sampling

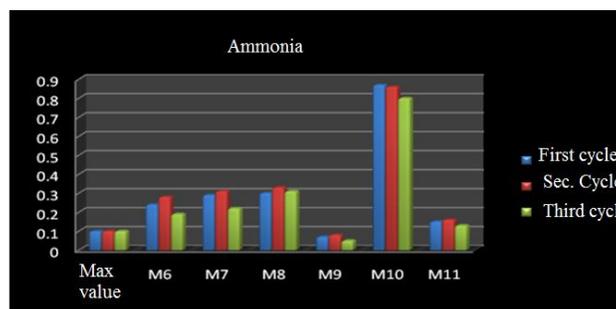


Fig. 5 Ammonia on six sampling

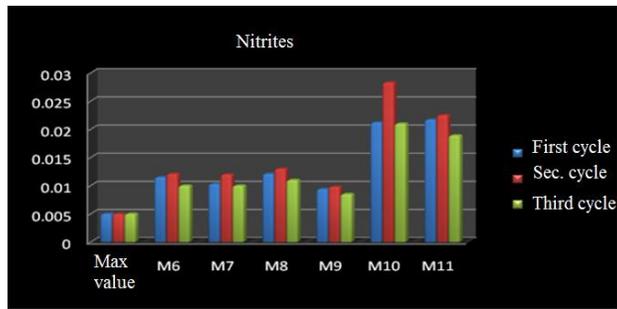


Fig. 6 Nitrites on six sampling

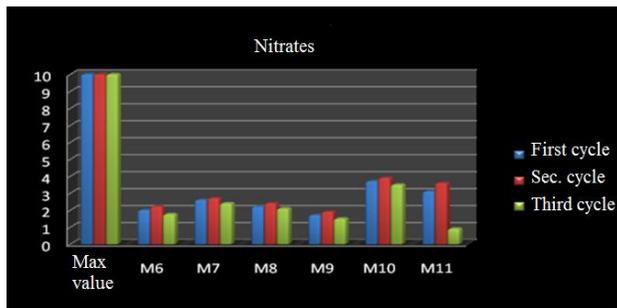


Fig. 7 Nitrates on six sampling

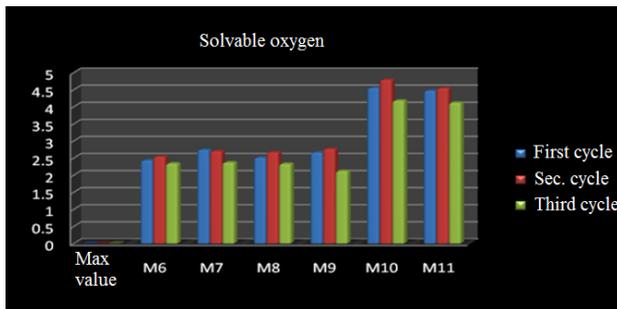


Fig. 8 Solvable oxygen on six sampling

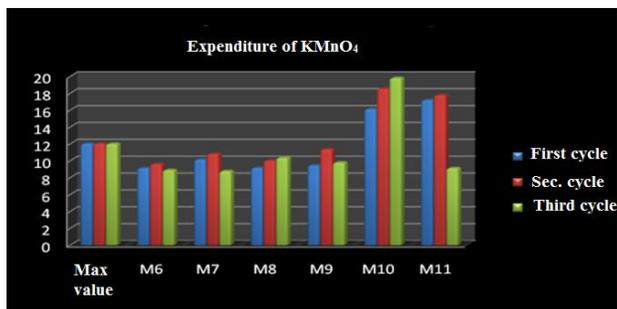


Fig. 9 Expenditure of $KMnO_4$ on six sampling

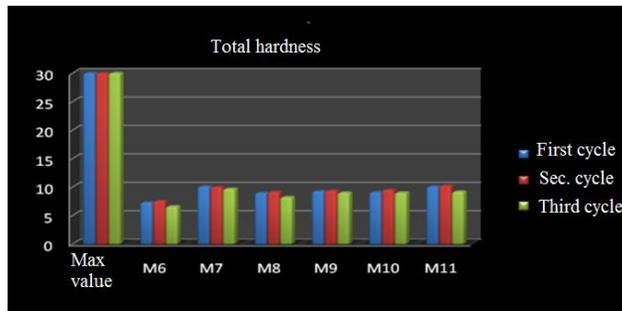


Fig. 10 Total hardness on six sampling

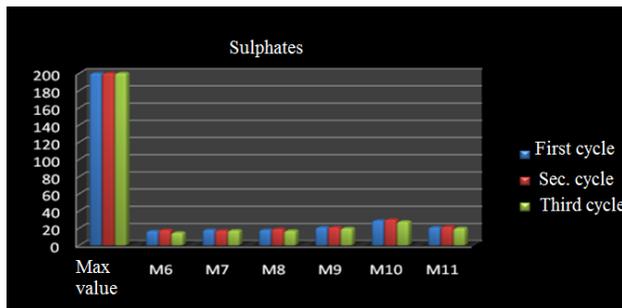


Fig. 11 Sulphates on six sampling

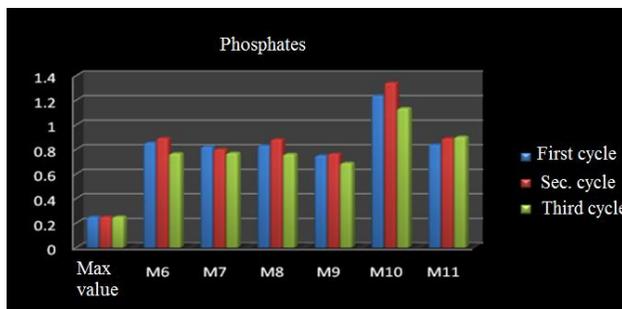


Fig. 12 Phosphates on six sampling

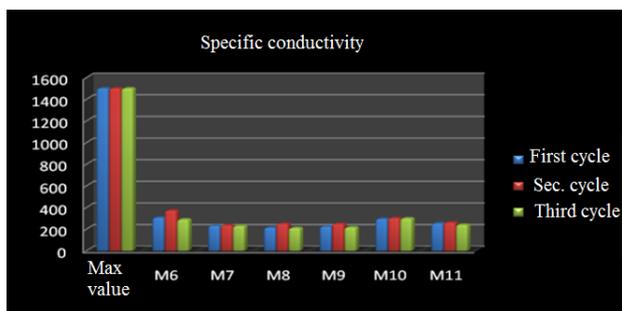


Fig. 13 Specific conductivity on six sampling

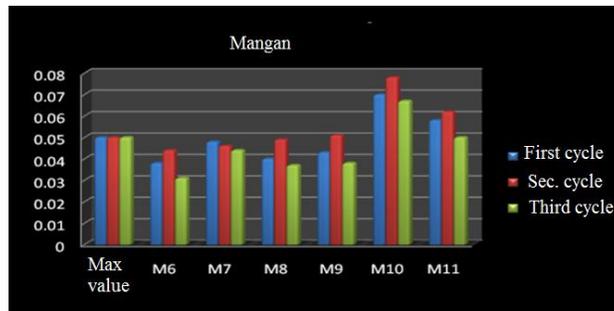


Fig.14 Mangan on six sampling

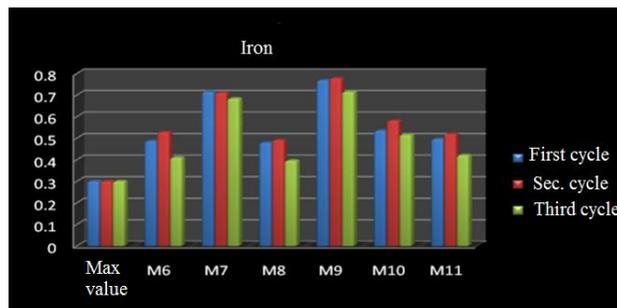


Fig.15 Ironon six sampling

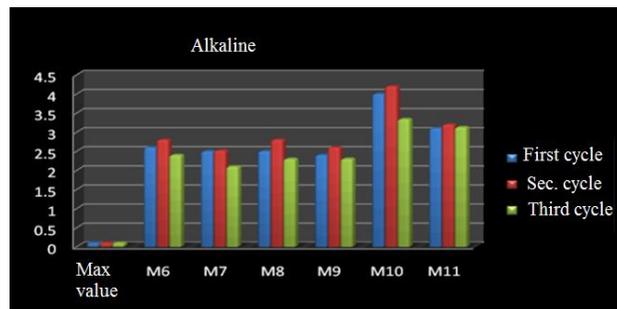


Fig.16 Alkalineon six sampling

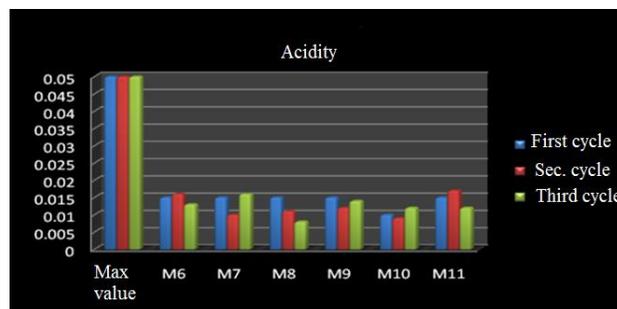


Fig. 17 Acidity on six sampling

2. Conclusions

By of 18 parameters of water of river Lepenc, in which are thrown industrial waters of lime factory “New Lepenci” in Kaçanik, cement Factory “Sharr-cem” in Hani Elezit, we can see impact of extraction and processing industry in the chemical composition of water. The physic-chemical analysis and graphic results of three sampling from lime factory to border Kosovo – Macedonia in Hani Elezit shows that water of river Lepenci is very polluted.

3. Recommendations

- 3.1 Prevention of water pollution through the implementation of environmental protection legislation,
- 3.2 Stopping the dumping of sewage and industrial water in the river Lepenci,
- 3.3 Implementation of standards on maximum permitted values of pollutants in water,
- 3.4 Processing of sewage and industrial water,
- 3.5 In continuous improvement of the technological process,
- 3.6 Taking legal action and sanctions of these activities according to the law on environmental protection,
- 3.7 Identification of contaminated areas and designing programs for their rehabilitation.

References

1. Çullaj, A., *Kimia e mjedisit*, Tiranë, 2005.
2. Agolli, F, *Teknologjia Kimike Inorganike*, FXM-Universiteti i Prishtinës, Prishtinë, 1983.
3. Dani, G, *Analizat kimike të Ujërave*, Tiranë 1985.
4. Gacesa, S, Klasnja, M, *Teknologjia vode i otpadnih voda*, Beograd 1994.
5. Rekalic, V, *Analiza zagadjivaca vazduha i vode*, Tehnolosko-metalurski fakultet u Beogradu 1989.
6. Katundi, K, *Furnizimi me ujë dhe kanalizimi*, Tiranë 2000.
7. Luzha, I, Jashari, N, Gjani, E, *Pollution of Nerodime's River with Sewage*, Journal of International Environmental Application & Science, Year 2013, Volume VIII.
8. Luzha, I, Gjani, E, Kuqaj, S, Bublaku, S, *Influence of industrial waters of plant Silcapora and river Nerodime in physico-chemical characteristics of river Lepenci in Kosovo*, 2nd International Conference "Water resources and wet lands", 2014 Tulcea (Romania).