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# The impact of industries and gastronomy on quality parameters of river Lumbardhi I Pejës

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# The impact of industries and gastronomy on quality parameters of river Lumbardhi I Pejës

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**Abstract.** The research work for a period of one month was the aim of presenting the current conditions of the river water in terms of quality analyses specifically in Lumëbardhi of Peja. In Peja, is evident the lack of strict and professional water protection. The aim of this research work was to divide the region in four different areas and to take samples from them and to do comparisons between them. The results of the analysis of the samples taken will present the current state of the river in terms of quality and the possibility of use for irrigation. From the samples taken at certain places along the course of the River, have been analyzed several physico-chemical parameters, macro-pollutants and microbiology parameters.
**Keywords:** Water quality, Lumëbardhi river, public health

## 1. INTRODUCTION

Historically, the quality of drinking water has been one of the most important factors in assessing human well-being. Water pollution with feces has often caused diseases that in most cases has had the impact of reducing the population in different regions. Many chemicals since the forties of the last century caused the contamination of water rivers, where we can single out; insecticides and herbicides leached from agricultural lands and from industrial discharges into surface waters (5). Understanding the pitfalls, causes and effects of water pollutants is the most important thing for pollutant control.

Lack of strict and professional water protection during years of war and years after the war in Kosovo, then the revival of economy, old industrial technology inherited, technology not adequate in some sectors, destroyed infrastructure in cities, lack of wastewater treatment, dumping of industrial and urban waste, are a source of major problems and difficult to avoid(8).

On the other hand, with industrialization and population growth it also increases demand for good quality water. Rapidly increasing population, indiscriminate, urbanization and rapid industrialization along the rivers have put tremendous pressure on water resources and their quality (Biswas 2000, Khan 2004). In addition to urban and industrial use the demand for water is increasing in terms of personal hygiene, irrigation in agriculture use in livestock, energy, for cooling in term-energy and industry, as well as for fishing, sailing, etc. (7). All of this affect water quality. In addition to increasing use, many waters are being submerged increasing pollution from concentrated raw urban discharges and industrial, and from accidental spills.

*Figure 1: View of river Lumbadhi I Pejës*

The purpose of this paper was to research the waters, along the course of the River Lumëbardhi. Drini i Bardhë is the longest river with 122 km, which joins the Drini i Zi in Albania and together flow into the Adriatic Sea. Drini i Bardhë springs from a village Radavc on the outskirts of the city of Peja, along its way the river collects together some tributaries of other rivers including the Lumbardhi of Peja. The river Lumbardhi Peja is supplied by groundwater owes in the mountainous area that means from Bjeluha and Jezer on the right side and Boga, Drela and Alag on the left side (Fazliu, 2012). Scarcity and misuse of fresh water pose a serious and growing threat to sustainable development and protection of the environment. Human health and welfare, food security, industrial development and the ecosystems on which they depend, are all at risk, unless water and land resources are managed more effectively in the present decade and beyond than they have been in the past (1).
From samples taken at certain locations along the course of the River Lumbardhi I Pejës, some organoleptic and macro-parameters were also analyzed. pollutants such as: biochemical oxygen consumption (OBS), dissolved oxygen (OT) and some other chemical indicators (ammonia, nitrites, nitrates, heavy metals, etc.).

## 2. METHODOLOGY

The place of sampling is chosen so that they are in one distance 500 - 1000 m from the potential source of pollution (Fig.1.). The first sample as a reference point was taken near the place where water was not in interactions with human activities (M1). The second sample was taken along the flow in parts after discharging the treatment waters of activities of hotel and production industries (M2). Then the third sample was taken near areas where there are some tourism activities(M3), and the fourth sample (M4) was also taken at the exit of the city after discharging all atmospheric and urban treatment waters, a fifth sample (M5) was taken near the fabric of cheese.
Samples for water analysis were taken and canned in the manner that provided for in the Regulation on water standards (9). The main indicators of wastewater are: biochemical oxygen consumption (OI), some chemical indicators (ammonia, nitrites, nitrates, chlorides, etc.).
The following parameters such as; Water temperature, pH, are determined at the receiving point at the time of the sample. Then with standard methods (7), the following water quality parameters were measured: OI, chlorides, nitrites, nitrates, etc. Heavy metals (Fe, Mn) In water, are determined by the method of atomic absorption spectroscopy (SAA). In the other hand the bacterial analyses were done according the standard ISO 9308-1:2014 for coliform bacteria where is used Endo Agar Less and Violet Red Mile as nutrient terrain and for live bacteria where used Total Plate Count Agar-ANB according the standard ISO 6222:1999.

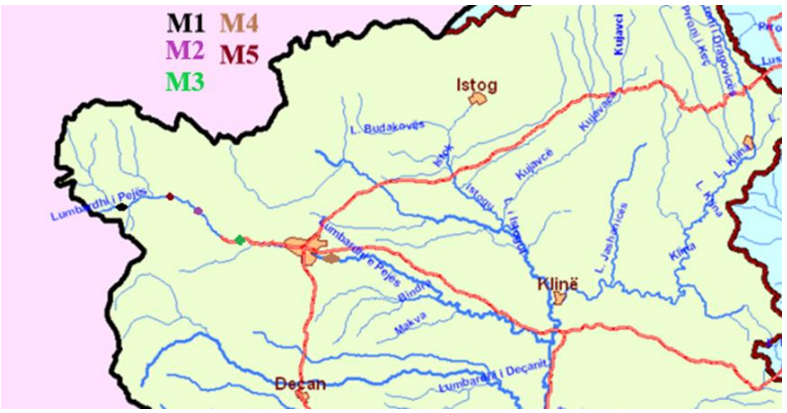


*Figure 2: Map where samples were taken*

# 3. RESULTS

*Table 1: Physical and chemical parameters of samples*

| Physico-chemical analysis | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Parameters tested** | **Standard method** | **The measure** | **Sample 1** | **Sample 2** | **Sample 3** | **Sample 4** | **Sample 5** |
| **Air temperature** | ISO 10524:2012 | °C | 7 | 8 | 8.5 | 10 | |
| **Water temperature in sampling** | ISO 10524:2012 | °C | | | | | |
| **Water temperature during testing** | ISO 10524:2012 | °C | 10 | 10 | 9.8 | 10 | 10 |
| **The smell of water** | ISO/EN 7887:2001 | | without | without | without | without | without |
| **The color of water** | ISO/EN 7887:2001 | °Co-Pt | without | without | without | without | without |
| **The taste of water** | ISO/EN 7887:2001 | | - | - | - | - | - |
| **Water turbulence** | ISO 7027:1999 | NTU | 0.03 | 0.34 | 0.40 | 0.98 | 0.13 |
| **Free chlorine (residual)** | ISO 7393-1:2000 | mg/l | - | - | - | - | - |
| **pH** | ISO 10523:2008 | | 8.29 | 8.53 | 8.66 | 8.57 | 7.70 |
| **Indicator of $KMnO_4$ (Oxidation)** | ISO/CD 8467:1993 | mg/l | 2.04 | 0.76 | 0.60 | 1.08 | - |
| **Conductivity** | ISO 27888:1985 | uS/cm | 132 | 170.1 | 172.9 | 202.9 | 298.6 |
| **Water hardness** | ISO 6059:1984 | d°H | 7.0 | 7.84 | 8.12 | 8.40 | 11.20 |
| **Chlorides** | ISO 9297:1989 | mg/l | 7.79 | 7.09 | 6.38 | 5.67 | 14.88 |
| **Nitrate $NO_3$** | ISO 6777:1984 | mg/l | 0.020 | 0.016 | 0.016 | 0.046 | - |
| **Iron Fe** | ISO 6333:1986 | mg/l | <0.05 | <0.05 | <0.05 | <0.05 | - |
| **Mangesium Mg** | ISO 6333:1986 | mg/l | <0.010 | <0.010 | <0.010 | <0.010 | - |

*Table 2: Microbiological parameters of samples*

| Microbiological analysis | | | | | | |
|---|---|---|---|---|---|---|
| **Date of sampling:** 25.10.2021 | | | | | | |
| **Sample naming:** | | **M1** | **M2** | **M3** | **M4** | **M5** |
| **Sampling time:** | | | 9:25 | 9:40 | 10:00 | 10:40 |
| **Ambient temperature:** | | 2°C | 4°C | 6°C | 8°C | 2°C |
| **Water temperature during sampling:** | | 2°C | 2.5°C | 3°C | 4°C | 2°C |
| | | | | | | |
| Sample number | **Parameters** | **Water pollution indicator CFU/100 ml** | | **Total CFU/1ml** | | |
| | | **Coliform bacteria at 37°C** | **Coliform bacteria of fecal origin at 37 ° C** | **Total number of living bacteria at 37° C** | | |
| | **Standard method** | ISO 9308 - 1:2003 | ISO 9308 - 1:2003 | ISO 9308 - 1:2003 | | |
| | **Limits allowed in clean water** | *0* | *0* | *10* | | |
| | **Limits allowed in closed source** | *10* | *10* | *10* | | |
| | **Limits allowed in open source** | *100* | *100* | *100* | | |
| | **Sample Code** | | | | | |
| 1 | **M1** | *>100* | *>100* | / | | |
| 2 | **M2** | *>100* | *>100* | *>100* | | |
| 3 | **M3** | *>100* | *>100* | *>100* | | |
| 4 | **M4** | *>100* | *>100* | *>100* | | |
| 5 | **M5** | *>100* | *>100* | *11* | | |

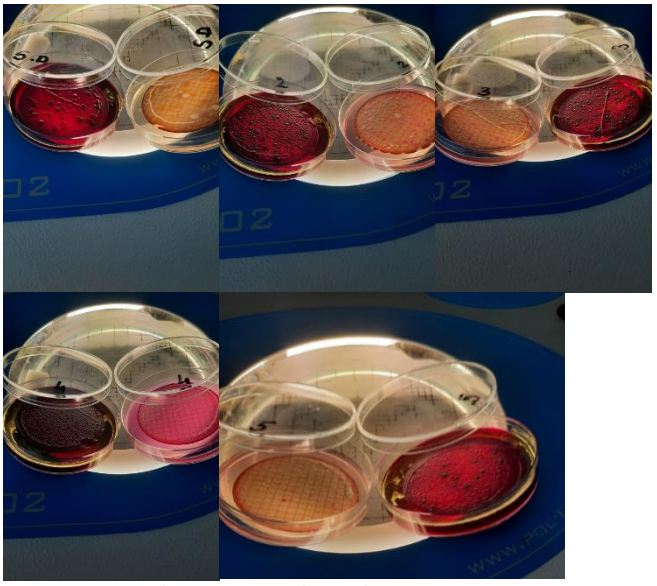

*Figure 3: Photo of samples tested for coliform bacteria*

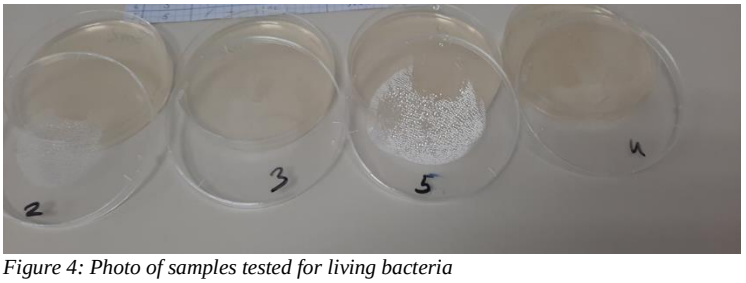

*Figure 4: Photo of samples tested for living bacteria*

# 4. CONCLUSIONS

Based on our results we can conclude:

- *Our analyses about water of the river called Lumbardhi of Peja relate that water quality are good, except in some sample places where they appear like anthropogenic pollutants.*
- *The chlorides even-through are higher in value (M5) in comparison with other samples they are beneath the standards*
- *According to pH the water is basic (pH=7.70-8.66).*
- *According to hardness the water is more or less mild (7.2-11.2 ˚D) the cause of increase of hardness of M5 is because of high percentage of chlorides .*
- *The results of bacteriological analyzes reveal the presence of coliform bacteria and those of fecal origin in quantities above 100 CFU / 100 ml, giving us a clear picture of the state of the river in terms of microbiology that is above the allowed criteria. Also, for living bacteria is the same situation where the identified value is over 100 CFU / 1 ml except makes the first and sample nr.5 where the presence of living bacteria respectively 11 CFU / 1 ml were not detected.*

We have concluded that water resources of Kosovo's are endangered by the pollution caused by human bean, because the presence of coliform bacteria above the criteria are due the pollution made by human wastes respectively gastronomy industry. At M5 we see the impact of pouring cheese production wastes to the water. One other parameter that also indicates that human factor is to be blamed for this pollution is the results of M5 which gives us a clear view of the impact of one parameter (*Chlorides*) to others.. As first step further, surface water pollution has to be stopped and to improve the existing condition. It is necessary prevention, monitoring and reduce of scale pollution, to ensure the quality level, biological equilibrium and these water ecosystems and at those places where quality rehabilitation is possible. We are very concerned about these facts but we hope that is still time to prevent the quality of Kosovo's surface waters.

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