Sources of Industry and their Environmental Impact to Surface Waters

Fidan Feka, Adem Dreshaj, Ismet Beqiraj, and Dritan Topi

***Abstract*—The progress in science and technology was accompanied by the man's preferences to live a healthy live which brought to the establishing of modern urban areas that directly influenced the environment. The object of the study was the evaluation of pollution with origin from the heavy industry effluents and evidencing of the hot spots to the Kosovo' fresh waters. Kosovo has one asset very rich with natural resources, addition to this are developing of some chemical industry which are being continuously degraded these assets. The main goal of the study is analyzing some samples of water in pool as in Lepenci which lies in the region of Ferizaj and Llap river that lies in the Prishtina region and the industrial pouring along these rivers. It gives suggestions to diminish the environmental impact of effluent discharges and further improvements of actual situation. In many cases the impact on water, air and soil compartments has resulted irreversible. Effluents produced by these economical sectors are discharged, with no previous treatment processes, by dumping the pollutants to the surface waters. Recognizing the advancement of the ICP method, are determined concentrations of chemical elements present. Because of advantages (lower limit of detection for many elements, very good selectivity, and high accuracy) ICP (induction of kopuluar plasma) techniques analysis provide much more complete multi elementary than other techniques matters.**

***Keywords*—water pollution, heavy metal, urban area, environment.**

I. INTRODUCTION

The reason/origin of the environmental pollution can be unpredicted, but the main contributors are grouped to the physical, chemical and biological pollution. Lakes, ponds, rivers, and streams serve many critical functions for the environment and for human life. They provide drinking water for people and support agriculture, industry, hydropower, recreation, and other uses (2). The pollution from the chemicals is the main contributor to the environment in our planet. A variety of biological, physical, and chemical characteristics are used to assess the condition of fresh surface waters. An important biological characteristic is the presence and diversity of bottom-dwelling (benthic) macro invertebrate communities (2). Dumping of effluents of intensive agriculture to surface waters increased the nutrients concentration, diminishing the concentration of the oxygen dissolved (COD) and increasing the concentrations of the heavy mineral and trace elements to these ecosystems.

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Some of the toxic chemicals may persist to the surface and other compartments of ecosystem. Through the bio-concentration, bio-magnification processes they persist to leaving beings organism for a long period of time. Due to the continuous discharge of urban and industrial the effluents are dumped to streams and rivers, and finally depositing to the upper layers of the earth surface. All toxic compounds of anthropogenic origin indirectly pass surface waters: rivers, underground waters, lakes, which is real threat to potable water contamination. A number of health effects to humans such as: rare diuretic illnesses, typhus of intestine, dysenteric, jaundice, cholera, skin and kidney illnesses. These illnesses, in many cases, display as epidemics to urban and rural areas, where the pathologic bacteria are one of the main reasons. A continuous non-uniform distribution of the anthropogenic pollutants to the surface waters, in the near future, the society will face global crisis for potable waters.

II. MATERIALS AND METHODS

Sampling sites was selected based on the risk analysis for the anthropogenic sources to the river map, close to the industry establishments, agriculture intensive sites, road traffic and main urban areas to the watershed. (Çullaj; 2005), (Bertino, and Zepp, 1991.) (Herning & Morel, 1998). The samples quantity, 2 dm3, was accompanied by their geographic position by GPS, Extrax model, "GARMIN", 12 channel, water temperature, date and sampling time. During the experiment were use chemical compound of Pure Applied quality of "Merck". The samples were shipped to plastic bottles (1 dm3), treated with 0.1 M HNO3 to pH 1–2 and transported directly to the scientific laboratory (Korça 2003; Smith, R. M. & Martell 1981). The water samples were analyzed by ICP-MS and ICP– OES analytical methods (Induction Coupled Plasma-Mass Spectrometry and - Induction Coupled Plasma –Optic Emission Spectroscopy), to the Accredited Laboratory "Agrovet'' Fushe-Kosove, Kosovo.

III. Results and Discussions

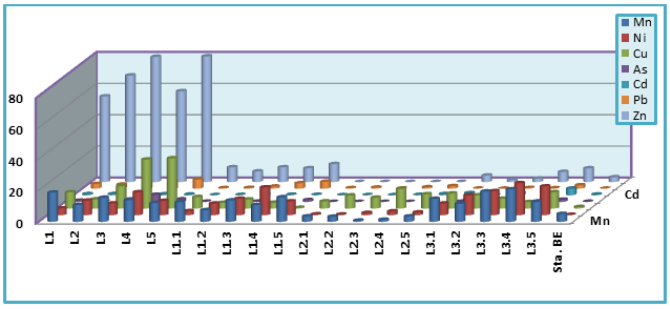

Fig. 1: Metal concentrations from Lepenci watershed sampling sites (ppm)

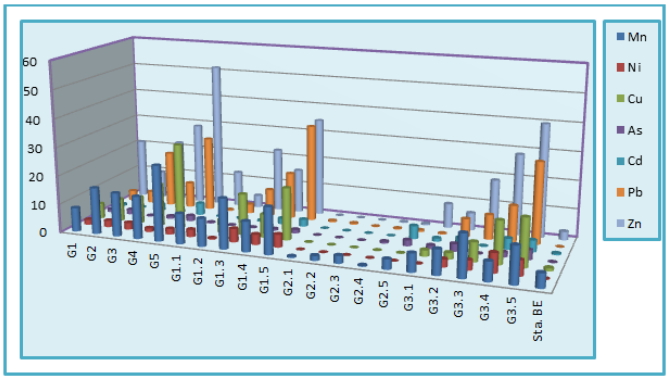

Fig. 2: Metal concentrations from Llapi watershed sampling sites (ppm)

From the evaluation of measurements on the content of heavy metal elements in river water and Llapi Lepenci season for May, September and December of 2014 and March of 2015, which are presented in the table above reveals that: Content of manganese (Mn) ranging from 0.78 - 20.7 ppm for Lepenci River while Llapi River from 0.34-14,8 ppm. Nickel (Ni) in the tested samples ranged in values from 0.45-20.4 ppm for Lepenci River, while the maximum value is Llapi River, identified 6.8ppm. % of the samples have a load with Cu values ranging 0.45-18,9 ppm for river Lab maximum value is identified 29.7 ppm, about 70% of the samples varies in the range of 4-15 ppm For element zinc (Zn) identified the maximum value is 56.34 ppm, characteristic for this element is its highest loads in samples tested, namely, 75% of the samples have a content of 0-30 ppm Zn over to river Llapi River Lepenci while values range from 0-51.42 ppm concentrations. Arsenic (As) ranges from 0 - 2:34 ppm, while Llapi River from 0-3.4ppm

Cadmium (Cd) ranges 0.50 - 4.26ppm, where 40% of the samples ranging in values from 0.2-0.5 ppm and 65% of them and Llapi River have high load 0-4.56 ppm Cdvalues, Content of lead (Pb) in samples tested has greater variation in values that fluctuate from 0:12 to 6:24 ppm, samples resulting loads on a content ranging from 0.13-28.7 ppm for Llapi River.

From the results of tests that are done during the season, May, September and December of 2014 and March of 2015 River Lepenci and Llapi, when compared with the maximum values of përqendimeve heavy metal European Union (EU) may, we state that in May of 2014 and March of 2015 the values of concentrations of elements that are taken for analysis are much higher than the maximum values of the European Union.

IV. Conclusions and Recommendations

Analysis of the quality of the water samples from this ecosystem, during the period of the study resulted that: Concentration of the heavy mineral and trace elements increase toward the river flow during increase of the effluent discharges, due to the antrophogenic activities to this river. Prevention and conservation of the surface water from Lepenci end Llapi watershed some recommendations are drawn: treatment of the urban wastewaters to prevent the pollution of this ecosystem. Collection and processing of solid waste waters, classified as raw materials. Creation of new relieves and forestations of this new relieves and degraded areas. Protection of the rivers' bed from their abusive exploitation. Mounting of electro-philters to Thermo Power Plants (TPP) and metallurgic plants for capturing of solid particles, and prevention of emission to atmosphere. Processing of raw materials to produce construction materials. Construction of monitoring stations to control the quality indicators to the environment, either chemical and biological.

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