Research Article

Microbiological Assessment of the Water of Krena River (Kosovo) During Autumn Season, 2008

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ABSTRACT

The assessment of the quality of water of the river Krena is done during autumn season, 2008 year, through the microbiological analysis. Samples for microbiological analyses were collected in four localities along the river. Analysed parameters were: total coliform bacteria, SS (Salmonella and Shigella), heterotrophic bacteria, *Streptococcus faecalis* and Fungi. We determined higher number of microorganisms in waters of Erenik river during the autumn season. The locality 4 was higher polluted with microorganisms, compared with the other localities (1, 2 and 3). The results from the river section, examined during the investigation, demonstrate that the river water belongs to the fourth class of quality.

Keywords: Microbiology, analysis, river, Krena, Kosovo.

INTRODUCTION

Contamination of water is a serious environmental problem as it adversely affects the human health and the biodiversity in the aquatic ecosystem. The provision of good quality household drinking water is often regarded as an important means of improving health [6].

The transmission of diseases through drinking water is one of the primary concerns for a safe drinking water. Fecal pollution of drinking water may introduce a variety of intestinal pathogens which may cause diseases from mild gastroenteritis to severe and sometimes fatal dysentery, diarrhea, cholera, typhoid, hepatitis, giardiasis, etc, [1, 9].

Coli form bacteria are bacteria which are always present in the digestive system of humans and animals and can be found in their waste. They are also present in the soil and plant material[4], and are usually gram negative. Ideally, drinking water should not contain any microorganism known to be pathogenic and should be free from bacteria indicative of faecal pollution[3].

MATERIALS AND METHODS

Collection of water samples

Samples were collected from 4 different sites on the river Krena, during autumn season 2008.

Isolation and identification of the strains

Violet Red Bile Agar (VRBA) use for coli form bacteria counts, SS agar for salmonella and shigella bacteria, Nutrient Count Agar for total aerobic mesophilic bacteria counts(heterotrophic bacteria), Bile aesculin agar for streptococcus bacteria and Potato Dextrose Agar of pH 3.5 adjusted with 10% tartaric acid (PDA) for fungi,

In this technique, 100ml of water sample filtered through a membrane filter. After incubation, the number of coli form colonies is counted.

Study area

River Krena is located in western part of Kosovo. The river is also used for the discharge of household sewage water surrounding houses, as well as pollution from traffic, agricultural and industrial activities. First location is nearby source, while second and third location is passed through villages and fourth location it was within the city of Gjakova.

Figure 1: Sampling localities (1, 2, 3, 4) in the Krena River (Kosovo)

RESULTS AND DISCUSSION

The results of microbiological analyses have been presented in Table 1.

As it show at table 1 that the number of coliform bacteria, it was higher at fourth location with 45.000, while the other locality has lower number of Coliform bacteria such as first with 10.000cfu / 100 ml water. At

second location registered 23.600 /100 ml water. While at third location registered 32.000 /100 ml water.

The presence of coli forms group in this water samples generally suggests that a certain selection of water may have been contaminated with faeces either of human or animal origin. Other more dangerous microorganisms could be present.

The higher number of *Streptococcus faecalis* detected at fourth locality with 44.600, while the lower number are detect at first locality with 10.000 cfu/ 100 ml water, followed by second and third locality (23.600 and 35.700).Also and number of Salmonella and shigella, was higher at locality four with 12.200, while the lower number are detect at first locality with 7.300. The lower number of fungi are detect at first locality with 3.000 cfu/ 100 ml water, followed by second and third locality (5.700 and 6.400). The higher number of SS bacteria are registered at fourth locality with 7.200cfu/ 100 ml water. The highest number of heterotrophic bacteria are detect at fourth locality with 570.000, while the lower number are detect at first locality (110.000)

Table 1: Results of microbiological analysis of water of river Krena during autumn season 2008.

Group of bacteria	Amount of analysed water	Locality 1 cfu /100 ml	Locality 2 cfu /100 ml	Locality 3 cfu /100 ml	Locality 4 cfu /100 ml
Heterotrophic bacteria	100 ml	97.000	124.000	178.000	234.000
Total coliform	100 ml	10.000	23.600	32.000	45.000
Streptococcus faecalis	100 ml	12.000	28.500	35.700	44.600
Salmonella and shigella	100 ml	7.300	9.000	11.100	12.200
Fungi	100 ml	3.000	5.700	6.400	7.200

DISCUSSION

The total bacterial counts (TVC) for all the water samples were generally high exceeding the WHO limit of 1.0X102 cfu/ml which is the standard limit of TVC for drinking water[2]. TVC is indicative of the presence of high organic and dissolved salts in the water. The primary sources of these bacteria in water are animal and human activities. The total coli form counts (TCC) for all samples were exceedingly higher than the WHO standard for coli form bacteria in water which is zero total coli form per 100ml of water.

The high coli form counts obtained in the samples may be an indication that the water sources received faecal contamination [5].

CONCLUSIONS

The waters of Krena River are highly polluted by bacteria at all localities. Higher numbers of all microorganisms were found at all localities. On the base of coli form bacteria according to Tumpling system the water of Krena River belongs to the fourth class of pollution.

REFERENCES

1. Crown, G. F., 1986. Water-borne Diseases in the United States. CRC Press, Inc.
2. European Union (EU), 1998. Council directive on the quality of water intended for human consumption. J. Eur. Communit. 330, 32–54.
3. Federal Environmental Protection Agency FEPA 1999. Federal Republic of Nigeria Proposed National Water Quality Standards.
4. Kathleen, P., R.Blake & W.Janice, 1998. Bacterial and other microorganisms in household water, Virginia Cooperative Extension. 356, 487.
5. Martin, R.S., W.H. Gats, R.S. Tobin, D. Grantham, R. Sumarah, P. Wolfe & P. Forestall 1982. Factors affecting coli form bacteria growth in distribution systems. J. Am. Water Works Assoc. 74: 34.
6. Moyo, S. J. Wright, J. Ndamba & S.Gundry, 2004. Realising the maximum health benefits from water quality improvements in the home: A case from Zaka district, Zimbabwe. Phy. Chem. Earth. 29, 1295
7. National Resources Defence Council NRDC 2006: Clean water and oceans.
8. Tumpling, W., 1969. ZurKlassi fizierungder was serbeschaffen heitaus Biolog is cher Sicht. Wiss. Z. Univ. Rostock 18, 793-798.
9. Wanda, E., D. C. Jerry, &A. M. Beverly, 2006. Bacterial in Drinking Water.
10. World Health Organisation (WHO), 1993. Guidelines for Drinking Water Quality. World Health Organization, Geneva, Switzerlan.

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