RESEARCH REGARDING ON SOME CHEMICAL PARAMETERS OF CRISUL REPEDE WATER DOWNSTREAM OF ORADEA

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Abstract

Research was conducted in 2014 by sampling water from Crisul Repede, upstream area Cheresig and Tărian upstream. The analyzes carried out that highlights at Cheresig an average of pH value at water Crisul Repede of 7.92 (variation interval 7.57-8.18). Ammonium had a value of 0.12 (variation interval 0.07-0.43), nitrite had average value of 0.03 - variation interval 0.01-0.07, nitrates had a value of 1.36, variation interval 0.57-2.63, and phosphate had the average value of 0.02, 0.03-0.6% interval of variation. At Tărian chemical parameters studied have higher values than Cheresig and the interval of variation is wider. It is necessary to control the level of ammonium in water if it is found that changes in the status of water, increased pH may be a sign of the presence of ammonia in water.

Keywords*:* water, analysis, chemical parameters, health

INTRODUCTION

Crisul Repede is a river that flows in North-East of Apuseni Mountains (Gilău Mountains) at an altitude of 710 m, cross depression Huedin, pass Ciucea, depression Vad - Borod, Western Hills, the Western Plain, crosses cities Huedin and Ciucea in Cluj county, cities Aleşd and Oradea in Bihor County and flows into the Tisza in Hungary. Traverse through the defile with gorges, caves and rocky cliffs between localities Huedin and Vadu Crisului (Plopiş Mountains and Padurea Craiului Mountains). On Bihor county has a length represented 101 km, and on Romania's territory has longing by 148 km. Along with Crisul Alb and Crisul Negru form the three most important rivers in from Crisana region (Domuta, 2005, 2009, 2012).

MATERIAL AND METHOD

Research was conducted in 2014 by sampling water from Crisul Repede, upstream area Cheresig and Tărian upstream.

The known of the water quality is very important for human helth (Bica, 1998; Carabet, 1999; Chereji, 2011; Cioclac, 1997) and in the exploitation of the irrigation systems (Blidaru, 1962; Cazacu et al., 1989, Grumeza et al., 1989, Grumeza, Kleps, 2005; Ionesci Şişeşti, 1982,1986; Luca, Nagy, 1999; Toncea, Alecu, 1999)

The sanitary research on water was done through laboratory tests and field investigations. Physico-chemical analysis of water was to determine pH, nitrite, nitrate, chloride, ammonia and sulfates in the upstream and downstream of Crişul Repede.

Laboratory tests were conducted in the laboratory of Chemistry and Microbiology of the National Administration "Romanian Waters" Basin Administration of Crisurilor Water.

Harvesting water for physico-chemical analysis was done in glass or polyethylene fitted with glass stopper or sealed. Harvesting vessels were washed thoroughly to remove any dirt or other organic substances would distort the sample composition. Washing was done sulfochromic and detergent mixture, then rinse well with tap water, distilled water and then double distilled, and finally dried.

The standards used to determine the physical and chemical indicators are presented in Table 1.

Tabel 1.

Standardizing methods for determining water quality indicators

Indicators analyzed	Analysis method
pH	SR ISO 10523/97
Nitrate $mgNO^{-}_{2}/l$	SR ISO 6777/A99/2002
Nitrate $mgNO^{-}_{3}/l$	Method APHA
Ammonium $mgNH^{+}_{4}/l$	SR ISO5664/01
E.coli 100 ml	SR EN ISO 9308-1/2004
Intestinal enterococci 100 ml	SR EN ISO 7899-2/2002

RESULTS AND DISCUSSION

The analyzes carried out that highlights at Cheresig an average of pH value at water Crisul Repede of 7.92 (variation interval 7.57-8.18). Ammonium had a value of 0.12 (variation interval 0.07-0.43), nitrite had average value of 0.03 - variation interval 0.01-0.07, nitrates had a value of 1.36, variation interval 0.57-2.63, and phosphate had the average value of 0.02, 0.03-0.6% interval of variation. (Table 2).

Table 2.

Chemical parameters of water Crisul Repede at Cheresig

Analyzed indicators	Average value	Minimum value	Maximum value
pH	7,92	7,57	8,18
Ammonium	0,12	0,07	0,43
Nitrate	0,03	0,01	0,07
Nitrating	1,36	0,57	2,63
Phosphate	0,02	0,03	0,06

At Tărian chemical parameters studied have higher values than Cheresig and the interval of variation is wider (Table 3).

Table 3.

Chemical parameters of water Crisul repede at Tărian

Analyzed indicators	Average value	Minimum value	Maximum value
pH	7,96	7,89	8,16
Ammonium	0,15	0,06	0,38
Nitrate	0,04	0,02	0,07
Nitrating	0,9	0,42	1,32
Phosphate	0,11	0,01	0,67
Total material in suspension	10,4	5	20

The medium and maximum value of pH, ammonia, nitrate, nitrate and phosphate are represented in Figure 1, 2, 3, 4, 5.

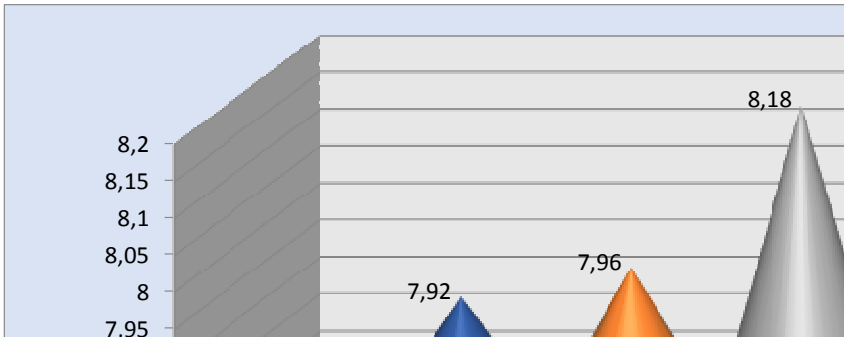

Fig. 1. Medium values of water Crisul Repede at Cheresig and Tarian

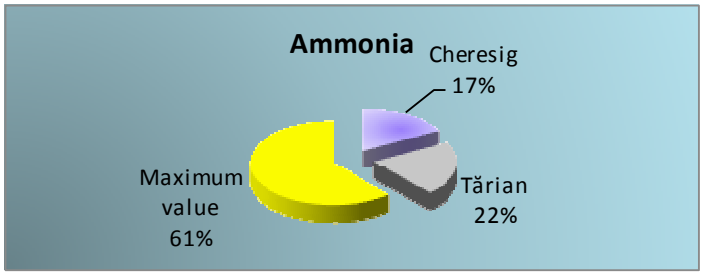

Fig. 2. The average values of ammonia in water Crişul Repede at Cheresig and Tărian and maximum value

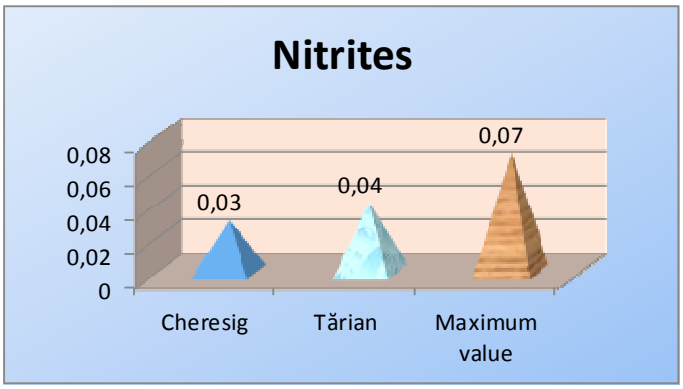

Fig. 3. The average values of nitrites in water Crișul Repede at Cheresig and Tărian and maximum value

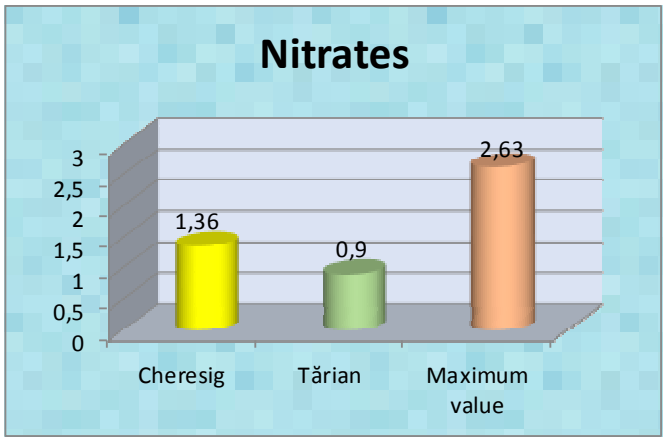

Fig. 4.The average values of nitrates from water Crișul Repede at Cheresig and Tărian and maximum value

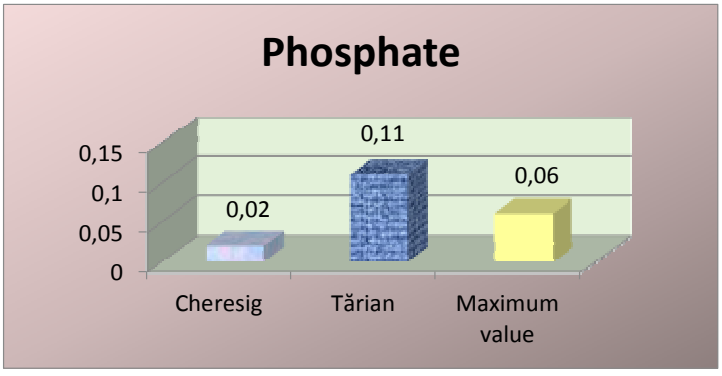

Fig. 5. The average values of phosphate in water Crișul Repede at Cheresig and Tărian and maximum value

The influence of parameters / chemical analyzes on health

The pH is defined on a scale of 0 to 14. The neutral pH is 7 and under this level we talk about acidity, over this level is alkalinity. Each unit is a multiple of 10 of the previous unit. For this reason, smallest variations on degree scale are, in fact, drastic changes that affect the biological balance of the water, the concentration of nitrite and ammonia will affect the biological environment of the water.

Human health is affected by excess nitrates in groundwater or surface water used for drinking. High levels of nitrates in water can quickly lead to fetal harm in pregnant and loss syndrome "blue disease" in neonates.

Nitrites inhibit the ability to transport oxygen in the blood, resulting in cyanosis (bluish discoloration of the skin) and death by suffocate, nitrates resulting from consumption either before or in the lumen of the digestive tract, in the case of migration to the stomach and small intestine. Source of contamination is water, but death had strong increase because of the widespread use of fertilizing substances in agriculture. Nitrites are criminalized for gastric cancer through nitrosamines.

It is necessary to control the level of ammonium in water if it is found that changes in the status of water. Increased pH may be a sign of the presence of ammonia in water.

CONCLUSIONS

Research was conducted in 2014 by sampling water from Crisul Repede, upstream area Cheresig and Tărian upstream from Oradea and determined the following conclusions:

- The analyzes carried out that highlights at Cheresig an average of pH value at water Crisul Repede of 7.92 (variation interval 7.57-8.18). Ammonium had a value of 0.12 (variation interval 0.07-0.43), nitrite had average value of 0.03 - variation interval 0.01-0.07, nitrates had a value of 1.36, variation interval 0.57-2.63, and phosphate had the average value of 0.02, 0.03-0.6% interval of variation.
- At Tărian chemical parameters studied have higher values than Cheresig and the interval of variation is wider
- Human health is affected by excess nitrates in groundwater or surface water used for drinking
- It is necessary to control the level of ammonium in water if it is found that changes in the status of water. Increased pH may be a sign of the presence of ammonia in water.

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