CONTRIBUTIONS REGARDING THE WATER QUALITY EVALUATION FROM VRANCEA COUNTY, SIRET HYDROGRAPHICAL BASIN

III.THE HYDRO CHEMICAL CHARACTERIZATION SIRET RIVER

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Abstract
The water quality of Siret River in Vrancea County certainly shows the direct negative influence on the quality of the tributaries that are infected with residual waters resulted from the industrial activities.

Kewords: Siret River, hydro chemical quality

1. INTRODUCTION

Siret River is situated in the eastern group and it has a length of 686 km, out of which 559 km are on the Romanian territory on a surface of 12 890 square km. It lies in the east – north – east part of the country, having the chain of the Oriental Carpatheans in the west, Bucovina Hillocks in the north; in the east of the hillock region and the Moldova Plateau, Baragan Plain in the south.

Siret River collects the waters of 972 tributaries, Ramnicu Sarat , Putna River and their tributaries are in Vrancea geographical zone.

At the level of Siret hydrographic basin we distinguish the following subsystems contained in the national surveillance system of water quality: surface running waters; lakes; phreatic underground waters; waste waters.
In table 1 we present you the monitored situation of the tributary flows for Siret River.

Table 1. Water volumes collected in Siret River for Vrancea County

Water type	Medium volumes (mil. mc)
Putna River	460.288.600
Ramnicu Sarat River	383.398.900
Waste waters	0.93375

Siret River composition and hydro chemical regime is related to the rapid change of the water in the riverbed, to the hydrological regime and climatic conditions, to the interaction with the soils and rocks situated above the erosion base.

The Moldavian Platform which is crossed by Siret River in Vrancea zone, is characterized by a morphological monotony, by uniform, low cemented, creatine, tertiary deposits with a low resistance at erosion process which compose it.

2. MATERIALS AND METHODS, RESULTS

Siret River quality analysis was realized through the scheduled monitoring for Vrancea zone where the river gets in and out the county.

Siret River enters Vrancea County from Adjudu-Vechi having a medium debit determined for the analyzed period: 1999, 2000, 2001, 2002 without forgetting to say that the water quality is directly influenced by Ramnicu-Sarat tributary.

The qualitative characteristics were determined by the use of the standard methods in force and followed the suspension content and the chemical consume of oxygen. The research results are illustrated in the following figures.

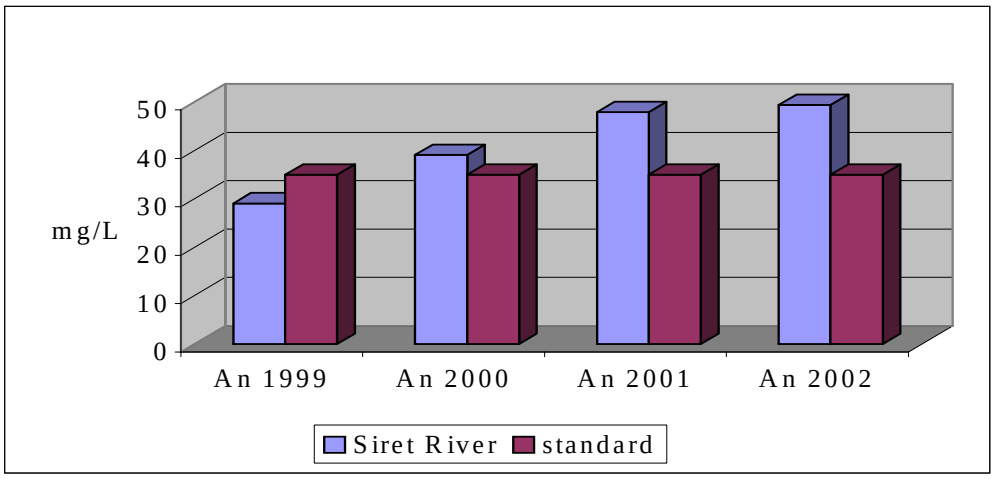

Fig. 1. Values of the suspension substances on Siret River

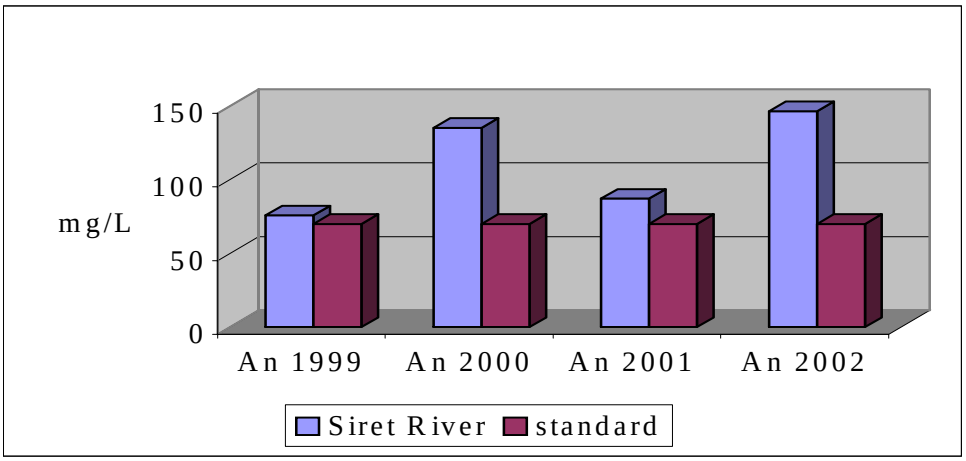

Fig. 2. Values of the oxygen chemical content on Siret River

The polluting influence for which the sodium, chloride, hydrogen ions have been established is dominant on Ramnicu-Sarat River.

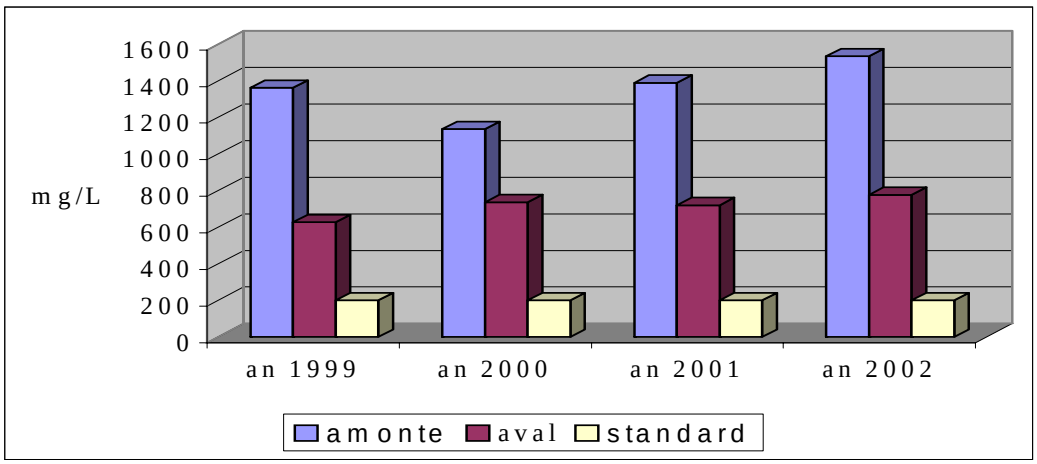

Fig. 3. Sodium ion values on Ramnicu-Sarat River

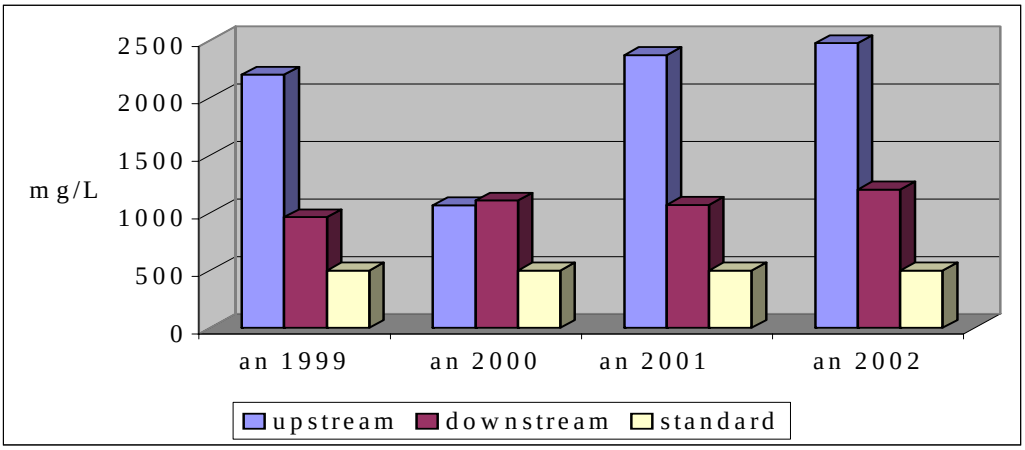

Fig. 4. Chloride ion values on Ramnicu- Sarat River

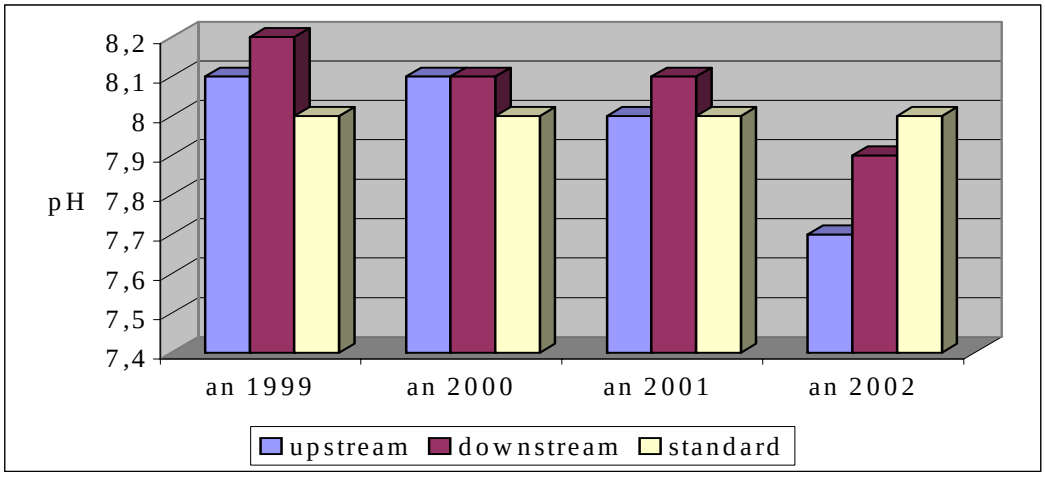

Fig. 5. Values of hydrogen ion concentration

3. DISCUSSIONS

Ramnicu-Sarat River is a tributary of Siret River and it belongs to the chlorinate and sulphate water class. Thus, the chlorines and the sodium ions are in high concentration so that the water of this river isn't included into the quality categories. The sodium ion content in the water increased from 626,9 mg/L in 1999 to 1533,9 mg/L in 2002. Taking into consideration the content of sodium ions, the figure illustrates the increased values of sodium ions during the studied four years in comparison with the standard value.

In the above figure we can notice that the content of sodium ions upstream is much higher in comparison with the content downstream. This situation is possible because the zone crossed by the river is mountainous and presents rocks rich in salts.

The chloride content is as high as the sodium content. Big differences are between the two zones: upstream the values are two times bigger from downstream. The main factor in the rise of the ion concentration is the relief structure. Ramnic River crosses all the relief forms and accumulates mostly salts.

According to the hydrogen ion concentration, Ramnic River is an alkaline water, of standard quality. In the figure we can see the hydrogen ion concentration limits.

If we analyze the chart illustrating the suspension content, we can see that the most affected zones are those in the central and inferior part of the river at the confluence with Galati County. The analyses done during the mentioned period situates Siret River in the following quality categories:

Table 2. Siret River fitting into the quality categories

Year	Ist Cathegory	II nd Cathegory	III rd Cathegory	IV th Cathegory	Total L
1999	189,3 km	-	-	-	189,3 km
2000	-	113,3 km	76 km	-	189,3 km
2001	-	189,3 km	-	-	189,3 km
2002	-	7 km	135 km	54,3 km	189,3 km

This table shows us that the pollution phenomenon increased after the year 2000. Siret River quality decreased across Vrancea County, because of the indifference manifested by the economic agents concerning the malfunction of the cleansing stations. Lepsa holiday zone is one of the main polluting waters of Vrancea County Rivers.
The resulting waste waters are polluted both with substances used for the material boiling solution and similar fibers from the celluloses factory. The main characteristics of the waters used to the cardboard fabrication are specified in the following table:

Table 3. Indicators' values of the waste waters from cellulose factory

Indicator	**Value**
pH	7-8
CCO - Cr	700-1200 mg/L
CBO_5	150-200 mg/L
Fixed waste	300-400 mg/L
Calcinated waste	200-300 mg/L

The waste waters evacuated from SA Vrancart Adjud cause great modifications to Siret River through the deposits of cellulose fibres that cover the banks and the bottom of the rivers, obturating the fish gills; the acid reaction of the water, the decreasing of the dissolved oxygen, the decreasing of water self cleansing capacity due to the existence of hard oxidized organic substances, and the decreasing of the photosynthesis process owed to the water brown color. During the four year period the indicators underwent major modifications in comparison with the values shown in the NTPA 001 norms from 2000. In the following chart the evacuated residual water volumes are presented in the mentioned period:

Table 4. Volume of waste water evacuated into Siret River

Year	**Waste water volume (mil mc/year)**
1999	0,783
2000	1,036
2001	0,633
2002	1,283

In the above chart we can notice the value fluctuations caused by the production line capacity that in the years following 2000 nearly doubled and by the materials used in the fabrication process.

4. CONCLUSIONS

The centralized physical–chemical characteristics for Siret River are strongly influenced by the quality of the tributaries and by the waste water overflow, this water being evacuated without using an efficient cleansing process that SA Vrancart Adjud factory should observe.

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