

## CONSIDERATIONS REGARDING THE QUALITY OF THE DRINKING WATER OBTAINED IN THE WATER PLANTS

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### ABSTRACT

The paper presents a comparative study regarding the quality of the raw water from the Firiza Lake with the quality of the drinking water resulted from the treated station using in the treated process aluminium sulphate like coagulation reagent and calcium hydroxide like alkalisation reagent.

Was made a monitoring of the mane parameters analysed of the drinking water during a month. The raw water was characterised by higher turbidity and lower temperatures.

### INTRODUCTION

The water exactly like air and light represent an essential condition for the human existence.[1]

The correction of the drinking water quality in the view of the quality parameter assurance in accordance with the low requirements is realized by treatment processes, determinated by the nature and the dispersions state of the mineral and organic substances contained in the water, which may necessity a total or a partial elimination.[2]

The efficiency of a treated station is appreciated in special by the way in which is assured day by day and hour by hour the parameters quality of the treated water, comparative with the quality of the charging water.[3]

The accumulation lake Strimtori-Firiza with a total volume of 16.5 mil. m<sup>3</sup> and an useful volume of 13.9 mil. m<sup>3</sup>, represent in present the main source of alimentation with water of the Baia Mare city. In general the water quality of the lake is good with the exception of 4-5 month when are registered higher turbidity of the raw and drinking water.[4]

The technological flux include the next treatment procedures: catching of the raw water, aluminium sulphate and calcium hydroxide dosing in the view of coagulation, filtration, and disinfection. The optimum coagulation pH is 7.[10]

### MATERIALS AND METHODS

For the turbidity determination was used a 350IR turbid meter. The pH determination was made using an electronic pH-meter Hanna. The residual aluminium, ammonium, nitrites and nitrates were determinate with a molecular absorption spectrophotometer HACH-DR2000.

For the alkalinity, oxidability and total hardness determination were used volumetric chemicals methods. All methods of the parameters determinations are in accordance with the law requirements regarding the quality of the drinking water.

## RESULTS AND DISCUSSION

For the assurance of the drinking water quality produced in the treated station from Baia Mare city was determined the main parameters for the raw and drinking water.

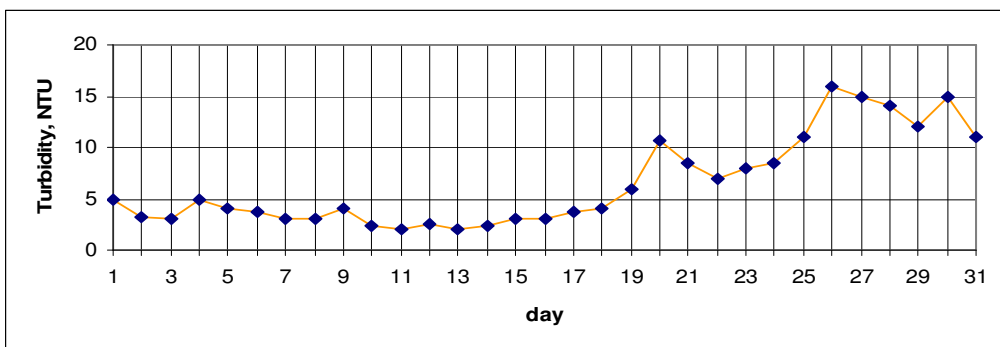
Was taken in study the March month 2004, because the raw water is characterised by higher turbidity and lower temperatures and alkalinity.

The raw water samples taken in work were characterised in accordance with the NTPA-013. In table no.1 are presented a part of the determined parameters regarding the quality of the raw water.

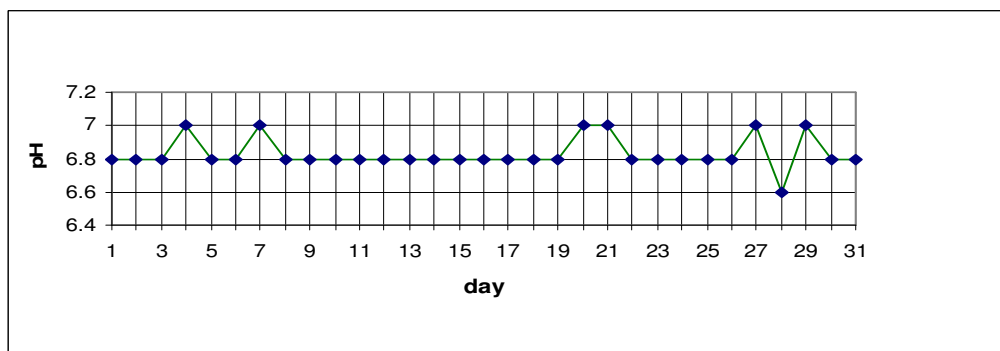
**Table 1.** The determined parameters for the raw water

No.	Parameter	value	
		Min	Max
1.	Turbidity, UNT	6	40
2.	pH	6.6	6,8
3.	Alkalinities, mval/l	0,5	0,5
4.	Hardness,G	1,68	1.9
5.	Aluminium, mg/l	0.009	0.017
6.	Temperature, <sup>0</sup> C	3	4

In figures 1-7 are presented the dependence of the determined parameters versus the studied days.



**Fig. 1.** The turbidity dependence versus the days



**Fig. 2.** The pH dependence versus days

From the experimental data in figure 1 it can be observed that the turbidity of the treated water is in conformity.

This is due to the quality of the raw water characterised by higher turbidity and lower temperatures and alkalinity, and also the impossibility of the technological flux to assure a corresponding turbidity of the drinking water.

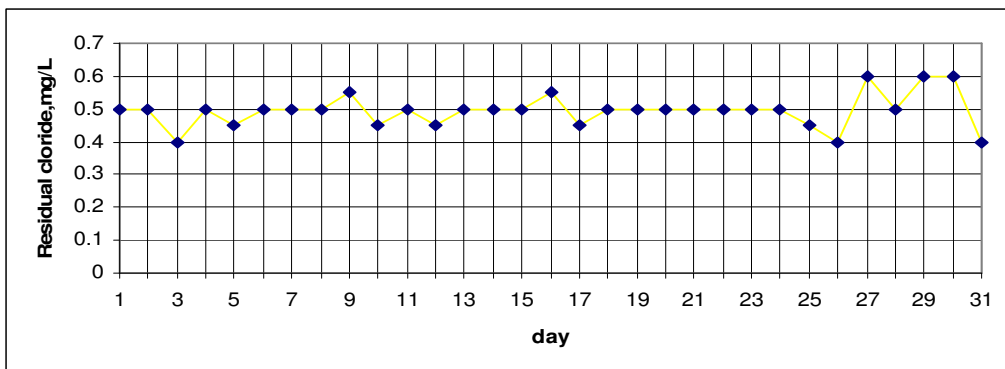


Fig. 3. The residual chloride dependence versus days

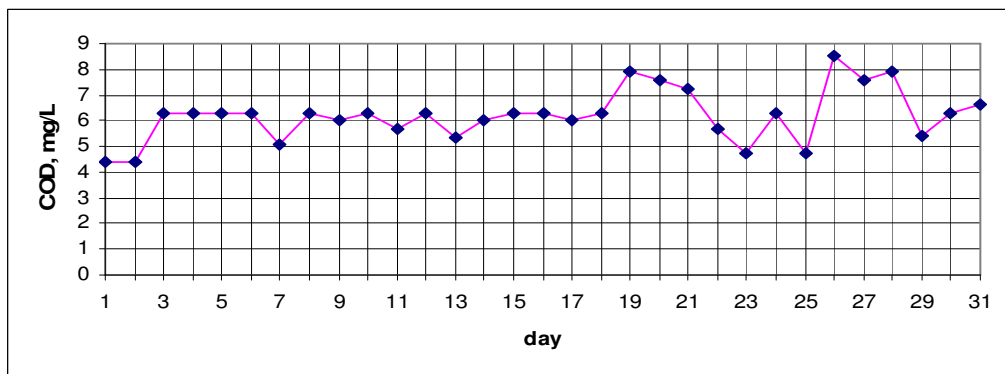


Fig. 4. The COD dependence versus days

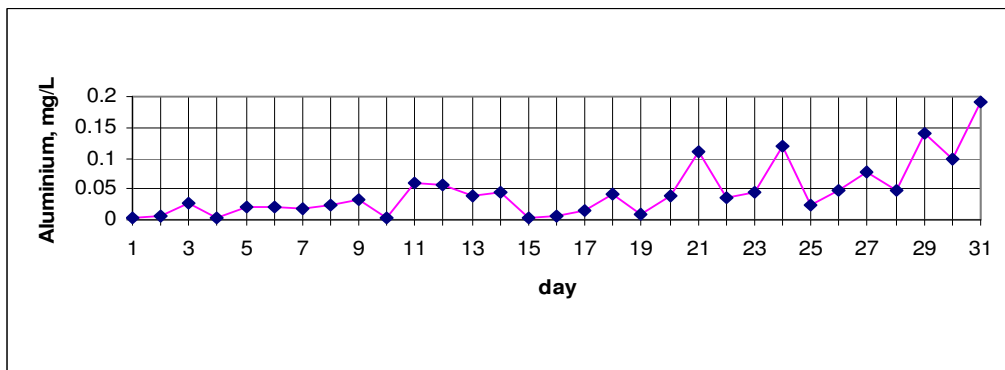


Fig. 5. The residual aluminium dependence versus days

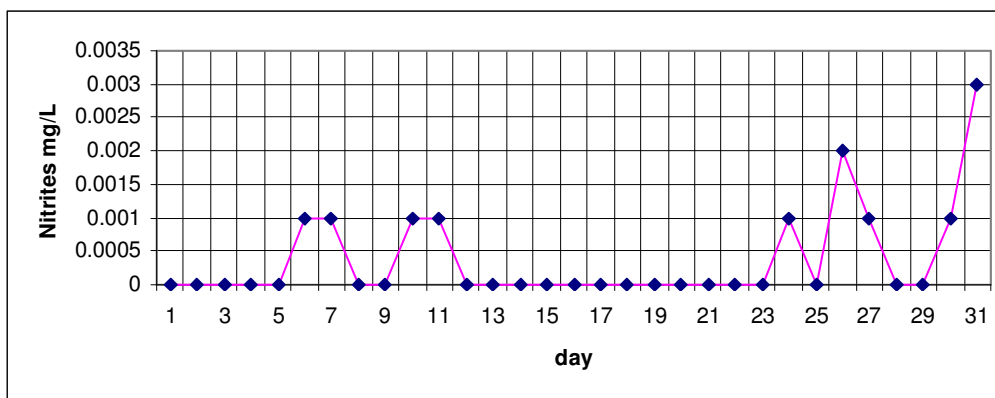


Fig. 6. The nitrites dependence versus days

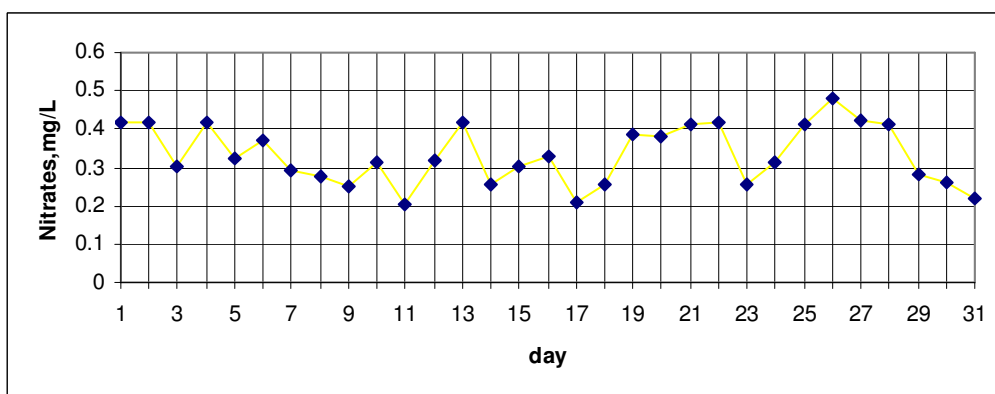


Fig. 7. The nitrates dependence versus days

From figure 3 it can be observed that in the days in which the turbidity of the raw water is in conformity, the chloride doses needed for disinfection are higher so the residual concentration of chloride to the treated water is between 0.55-0.6 mg/L. From the reason that the raw water temperature is under 10 °C the hydrolyze speed of the aluminium sulphate decrease considerable, in addition the coagulation process is worsen. In the view to realise the optimum condition of coagulation, the aluminium sulphate doses added in the water increase, which determine later a meaningful increasing of the residual aluminium in the drinking water until 0.2 mg/L, as is show in figure 5.

From the experimental data presented in figures 2, 4, 6, and 7, it can be observed that the studied parameters are in accordance with the law requirements.

## CONCLUSION

In the frame of the paper was analysed the quality of the drinking water in the March month 2004, produced in the treated station of the Baia Mare city. Were determined experimental the main parameters of the raw and drinking water and was established a view inefficiency of the technological flux which determine inconformity of the turbidity for the drinking water.

The per kinetic and orto kinetic coagulation is realised in the mixing tour and on the way from the tour to the clarifications. The distance between the mixing tour and classifications is covered in 5-7 minutes, insufficient to realise the optimum conditions of coagulation.

The colloidal systems are not in totality destabilised, which made impossible the form of the floccules. Are formed small floccules which don't settle in the clarifications, they pass further in the filtrate stratum, worsening the washing operation.

The absence of the settles from the technological flux existent in present in the treated station is a deficiency. The clarifications are overweighted these retain almost 40% from suspensions causing further a lower filtration capacity.

The residual concentration of aluminium is higher.

The higher values of the turbidity indicate a higher consumption of chloride for the disinfection assurance, which involve higher costs bearing with the obtained quality.

In the view of the quality improvement of the drinking water produced in the treated stations is recommended:

- the introduction of the settling stage in the technological process, the elimination of the classifications;
- the testing of new coagulation reagent: pre hydrolysed aluminium sulphate, aluminium based poly chlorides, sodium aluminate;
- the testing of new alkalize reagents: sodium carbonates, sodium aluminate, sodium hydroxide;
- the testing of different combination of the presented reagents;
- modern filters with higher efficiency and lower consumes of washing water;
- automation of the technological process.

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