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BACTCONTROL - ON LINE ANALYZER FOR WATER MICROBIOLOGY

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Introduction

For water producers is important to monitoring the water quality. It is more important to know the surface water quality because from this type of water, drinking water is obtained (by chlorination). Romanian legislations ask to monitoring the physico-chemical and microbiological parameters. If the physico-chemical results are obtained up to-maximum few hours, to obtain the microbiological results lasts couple of days. Because the drinking water process takes place continuously and in real time, physico-chemical parameters are monitoring with on line sensors that allow us to ensure safe operation of the system.

The study present the analysis made with on line analyzer at different types of water, to obtain microbiological results in the shortest time. The monitoring was performed in 2018, starting in June, finishing in November. The tests was made in collaboration with TehnoInstrument Romania and MicroLan- Netherlands.

Materials and methods

BactControl device is based on ISO 15839 (that describes the procedure and performance of on-line water sensors). This is an on-line automated tool for detecting microbiological activity in water. It measures the specific enzymatic activities of β - glucuronidase (*E. coli*), β - galactosidase (total coliforms) and alkaline phosphatase (total activity, biomass) as an indicator of bacterial presence. Enzymatic activity is detected by the addition of reagents containing a specific luminescent substrate. The amount of specific substrate that is converted to fluorescent product provides a measure for the presence of specific enzymes / bacteria in the sample. The increase in detected fluorescence is induced by enzymatic activity, and the final result of a measurement can be converted to the number of bacteria per sample volume. It is a warning system that complements the accepted methods for detecting microbiological activity, (the purpose is to provide a faster answer to a possible contamination, but the confirmation of the results will be made in the lab, with classical methods). Measurements are made in a short period of time, one to four hours.

Results and conclusions

We test the device for 6 month (but not successive), for 3 types of determination (Total Activity, Total Coliforms, *E.coli*), 3 types of samples (tap water, filtrated water, river water) and CRM. At the same time, standard methods were worked out. Total number of analyzes performed with BactControl device, including here DW and CRM, was 600. The tests was made at river water, filtrated water and tap water, both on-line and discontinuous (sample in the lab, at different dilutions)

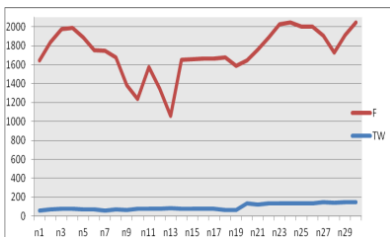


Figure 1. Total Activity variation

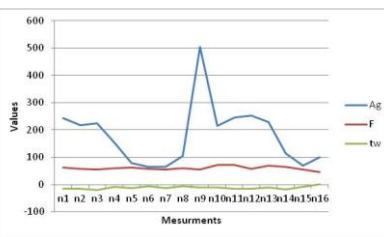


Figure 2. *E. coli* variation

Legend: F- Filtrated water cell. /100 ml; TW- tap water cell. /100 ml; n- Number of determinations

The difference between clean water and the water without disinfection is big, does not matter the determination. We can see the progressive growth for other types of water. The purpose of this device was reached, can be use for microbiological contamination warning. The big problem for this device, at this time, is that it have a reaction chamber that include a membrane. After a couple determination, the reaction chamber must be cleaned, because the membrane has been dirty.



Figure 3. BactControl device

After testing, we concluded that:

- ✓ Is an autonomous, robust and user friendly device;
- ✓ We obtained good results at tap water (that showed no contamination)/ Without chlorine - higher results);
- ✓ If we have faster results, this means faster precautions for our water production process;
- ✓ Possibility to work on line;
- ✓ Simultaneous determinations;
- ✓ Possibility to move the device;
- ✓ Can be used for microbiological contamination warning;
- ✓ For the moment, can not be use at river water.