

APPLICATION NOTE

ECOLOGICAL AND ENVIRONMENTAL ANALYSIS AND RESEARCH

Continuous Monitoring of Total Organic Carbon (TOC) of Surface Water

Introduction

Monitoring TOC (Total organic carbon) of water is an important parameter since the quality of the water from sources such as rivers, lakes, reservoirs determines the tap water treatment process. The total organic carbon (TOC) of the tap water is such an significant paramater in terms of tap water quality. Fast monitoring of the TOC in surface water, coming to water production units, is essential since produced tap water is often distributed in a few hours. Inorganic carbon content of water is much higher than the organic carbon, TOC determination by difference method will not be suitable because it can lead to large statistical error. European Standardization EN 1484 indicates that the difference method can only be applied when the TIC (total inorganic carbon) value is smaller than the TOC value^[1]. For the analysis of water NPOC method (non purgeable organic carbon) is therefore used. Firstly, water sample is acidified to pH value of 2 or below. After all the inorganic carbon purged, the residual carbon analyzed as non-volatile organic carbon. In this study, intake raw water in tap water production unit was monitored during five days with Trl-Online TOC Monitor.

Principle of operation

Water samples, periodically introduced to sparger, were acidified automatically in the sparger to purge the inorganic carbon. Then, a small portinon of the acidified sample introduced into two zone furnace by the help of high degree accuracy FMI pump on the instrument.

Table 1: TC and IC Analysis Parameters

Parameters	Total Carbon (TC)
Method Mode	TOC Mode
Decomposition furnace temperature	800 °C
Catalytic furnace temperature	500 °C
Air pressure	2 bar
Carrier gas flow rate	100 mL/min
Analysis period	30 minutes
Sample Size	1 mL
Sparge Time	4 minutes
Acidification	0.5 % by volume

Results

Obtained results during 5 day at a tap water production unit, were shown in figure 1. Trl-Online TOC Monitor analyzed raw water samples once every 20 minutes and reported it by software.

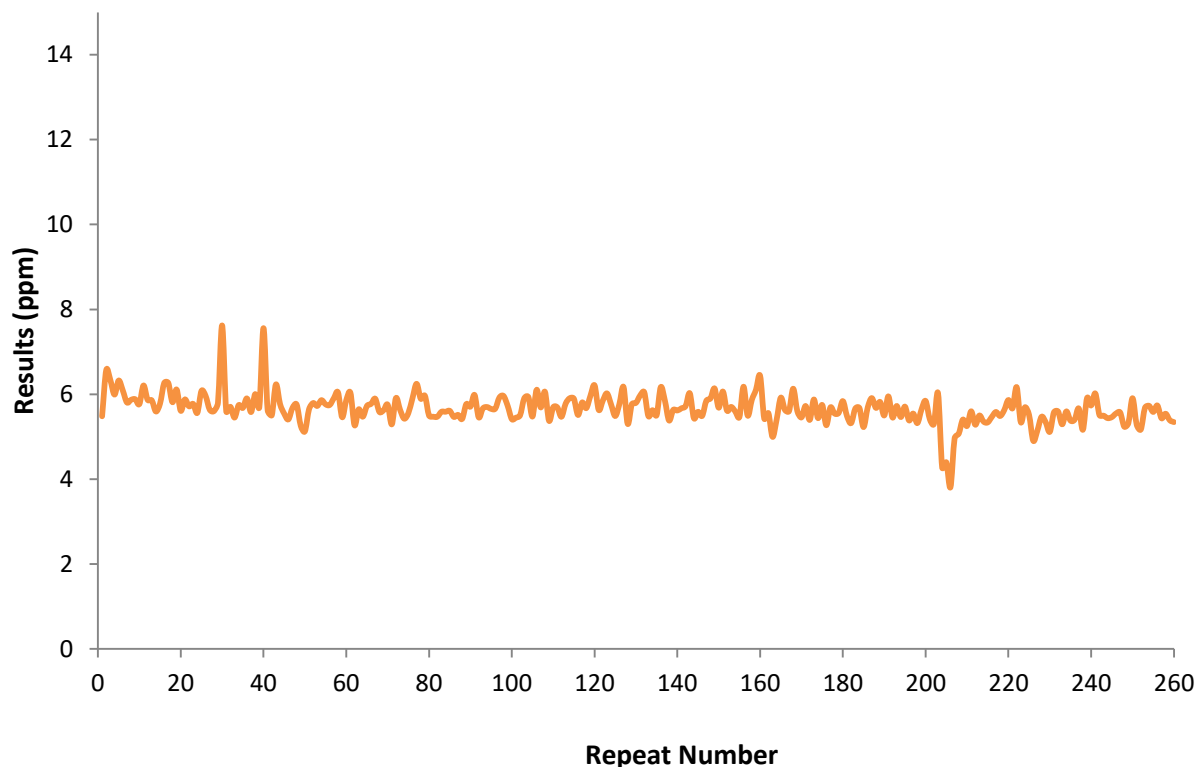


Figure 1: Graphical representation of TOC results of raw water in unit during 5 days

Conclusions

In this study, TOC of surface water in a tap water production unit were analyzed once every 20 minutes automatically by Trl Online-TOC Monitor without any user intervention. Water samples introduced through the sparger from a process stream, automatically and its TOC content analyzed after its inorganic content is purged in the sparger with high sparging efficiency of Trl-OnlineTOC Monitor. As shown in the Figure 1, during 5 days 260 analysis were done by Trl-Online TOC Monitor and repeatable analysis results are observed.

References

[1]: TOC-ISO/CEN norms. (n.d.). Retrieved March 04, 2016, from <http://www.stateoftheart.it/TOC-ISO.htm>