**Simultaneous Analysis of Taste and Odor Compounds using Solid Phase Microextraction-Gas Chromatograph-QTOF/MS in Natural and Drinking Water**

Hak-sun Kwon, Bo-young Son, Woohyun Yoon, Young kook Ham, Jae-chan An, Bog-Soon Kim

Seoul Waterworks Research Institute, 716-10, Cheonhodaero, Gwangjingu, Seoul, sunnychem@seoul.go.kr

Taste and odor (T&O) compounds is an important issue for drinking water suppliers because consumers react very sensitively to changes in the organoleptic quality of their drinking water. As most of the T&O compounds in drinking water are algal metabolites, mainly water treatment utilities which treat surface water are affected by T&O problems. Despite of intensive research in this field, it takes a long time to assess T&O compounds in the case of consumer complaints. This can be explained by the individual perception of T&O in drinking water and the very low odor thresholds of many T&O compounds typically in the low ppt-range.

The present study aimed to assess the natural occurrence of T&O compounds in surface waters. Towards this end, an analytical approach that is widely applied in the flavor industry has been further developed to detect and quantify T&O compounds in the low ppt-range in natural and drinking waters. Using this simultaneous Analysis, the T&O situation in Han river, Korea was investigated. Furthermore, the method was applied to solve a case of consumer complaints about a earthy-musty odor in the tap water.

The applied analytical method with GC-QTOF/MS detection after extraction with headspace-SPME (solid phase micro extraction), proofed to be highly sensitive and selective for the analysis of T&O compounds in natural and drinking water. The detection limits for the investigated compounds were in the sub ppt to low ppt-range.

This study was conducted for the simultaneous analysis of 25 kinds of T&O substances using GC-QTOF/ MS instruments with CP Sil 8 CB analytical column, with SPME fiber made by 2cm-50/30㎛ DVB/Carboxen/PDMS .

16 kinds of T&O compounds, such as camphor, geosmin, were to be analyzed at ppt concentration levels. Therefore, concentration of the standards for the calibration curve was prepared as a range of 2 to 100 ng/L. The correlation coefficients are shown with good linearity from 0.9948 to 0.9996.

9 kinds of T&O compounds, such as camphene, benzaldehyde, were to be analyzed at higher ppt concentration levels. Concentration of the standards for the calibration curve was prepared as a range of 50 to 1000 ng/L. The correlation coefficients are shown with good linearity from 0.9865 to 0.9991.