Solid Phase Microextraction of Odors in Drinking Water for Analysis by GC/MS

Instrument: HP 5973 MSD with HP 6890 GC

A new method involving the use of Solid Phase Microextraction (SPME)* has been developed for the analysis of trace odor components such as geosmin, methylisoborneol (MIB), isopropylmethoxypyrazine (IPMP) and isobutylmethoxypyrazine (IBMP) from drinking water at parts per trillion (ppt) concentration for analysis by gas chromatography/mass spectrometry (GC/MS). The simple to use, and cost effective method, 6040D, developed by the American Water Works Association (AWWA) describes the use of SPME for odor determination in drinking water.

Table 1. Quantitation Ions and Secondary Ions for Odor Agents

Odor	Quant Ion	Sec. Ion
IPMP	137	124, 152
IBMP	124	151
MIB	95	107
Geosmin	112	125
2,4,6-TCA	197	195, 212

SpectraLab Scientific Incorporation

Figure A. Odors by SPME/GC/MS at 2 Parts per Trillion in Water

Column: **Equity-5, 30m x 0.25mm, 0.25µm film**
Cat. No.: **28089-U**
SPME Fiber: 2cm StableFlex coated with 50/30µm DVB/Carboxen/PDMS, Cat. No. 57348-U
Extraction: headspace, 65°C (30 min)
Desorption: 3 min at 260°C
Oven: 60°C (2 min) to 200°C at 8°C/min
GC Liner: 0.75mm SPME liner
Detector: 5973 MSD, selected ions (SIM) 95, 112, 124, 137, 197; interface at 280°C
Flow: Helium, 37cm/sec @ 60°C (1mL/min constant flow)
Injection: SPME fiber, splitless opened at after 1 min at 50mL/min
Sample: 25mL of water containing 25% NaCl and drinking water odors kit, Cat. No. 47529-U

1. 2-Isopropyl-3-methoxypyrazine, 2ppt
2. 2-Isobutyl-3-methoxypyrazine, 2ppt
3. 2-Methylisoborneol, 2ppt
4. 2,4,6-Trichloroanisole (internal standard), 8ppt
5. (±)Geosmin, 2ppt

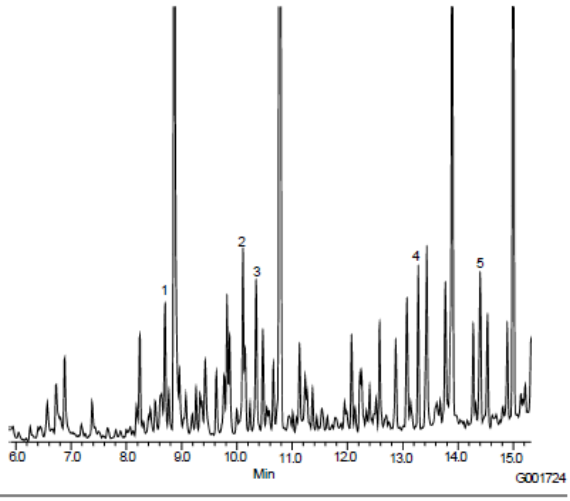
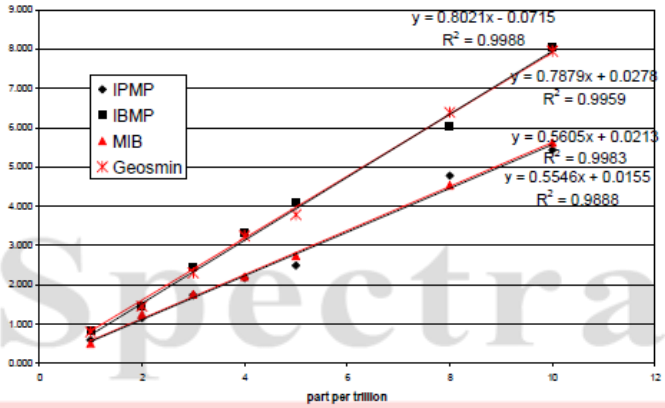


Figure B. Linearity of Relative Responses with Respect to TCA



SpectraLab
Scientific Incorporation

References:

1. Eaton, A., Nguyen, D., Suhady, L. Proceeding of American Water Works Association, Water Quality Conference, November 1999, M3-2.
2. Foster, S., Nanci, J., Owen, C., Proceeding of American Water Works Association, Water Quality Conference, November 1999, M3-3.
3. http://www.sigmaaldrich.com/content/dam/sigma-aldrich/docs/Supelco/Application_Notes/4685.pdf