4.9 Analysis of Fishy Smell in Water (1) - GCMS

•Explanation

Fishy smells are attributed to unsaturated aldehyde in uroglene Americane and has become a problem in drinking water supplies along with musty smell ever since vast outbreaks of it occurred in Lake Biwa in 1995. The 4 compounds of unsaturated aldehyde with carbon number 7 or 10 trans, cis-2,4-heptadienal and trans, cis-2,4-decadienal are the cause of this fishy smell. The purge & trap method is more effective than the headspace method to analyze these substances because of the low vapor pressure. The threshold values of these substances as odors are several 100ppb, and the lower detection limit of this method is several ppb.

References

Shimadzu Application News No. M181

•Analytical Conditions

Instrument	: GCMS-QP5000
Column	: DB-1701 0.32mm × 30m df = 1.0μm
Col.Temp.	: 40℃(8min)-200℃(20℃/min)(5min)
Int.Temp.	: 230℃
I/F Temp.	: 230℃
Carrier Gas	: He(20kPa)
– P&T –	
Instrument	: Tekmar 3000J
Sample Size	: 5mL(35℃)
Trap Tube	: Tenax GR
Purge	: 11min
Dry Purge	: 3min
Desorb	: 225℃, 8min

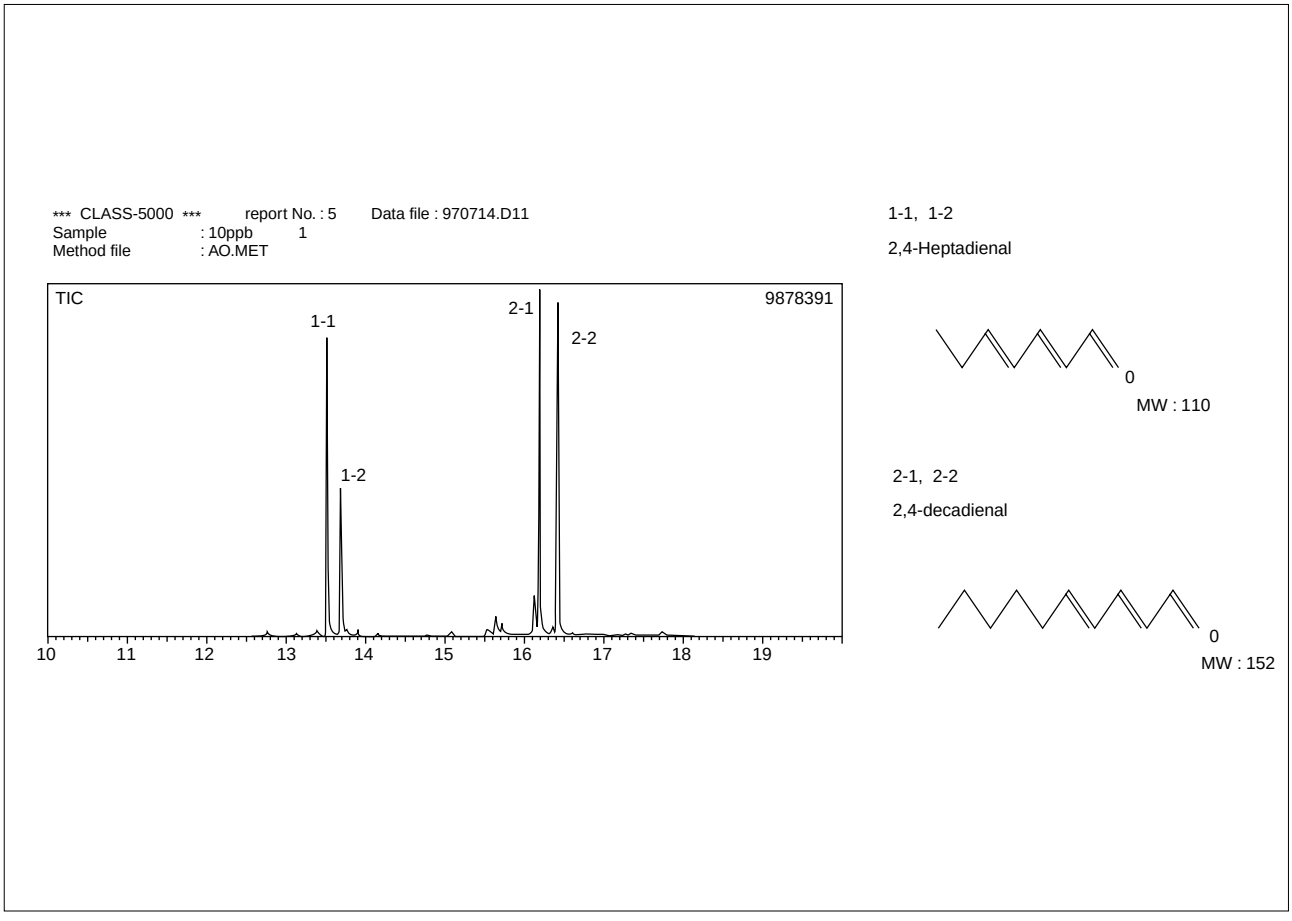

Fig. 4.9.1 TIC chromatogram of fishy smell components

4.9 Analysis of Fishy Smell in Water (2) - GCMS

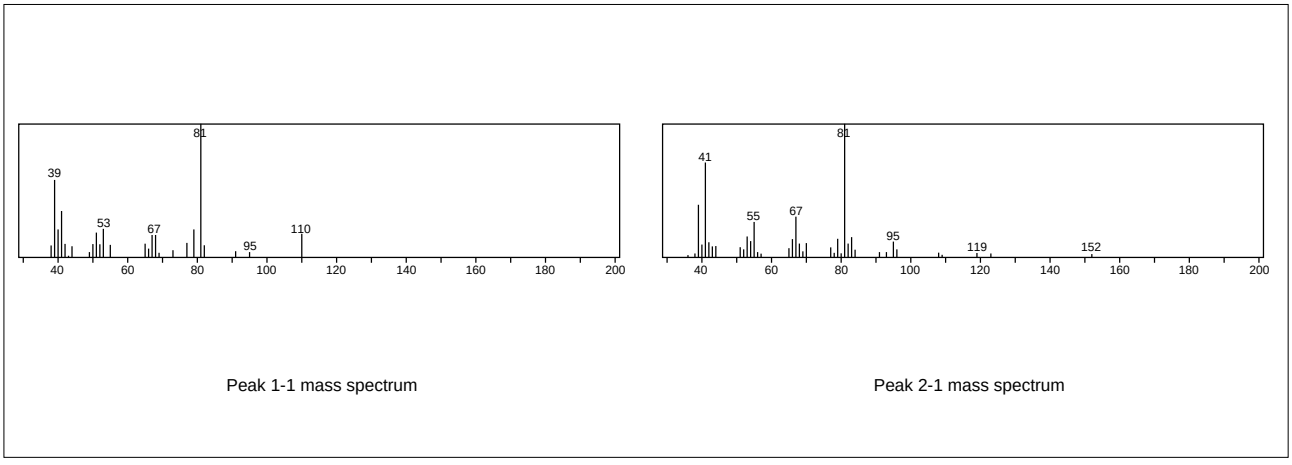

Fig. 4.9.2 Mass spectrum

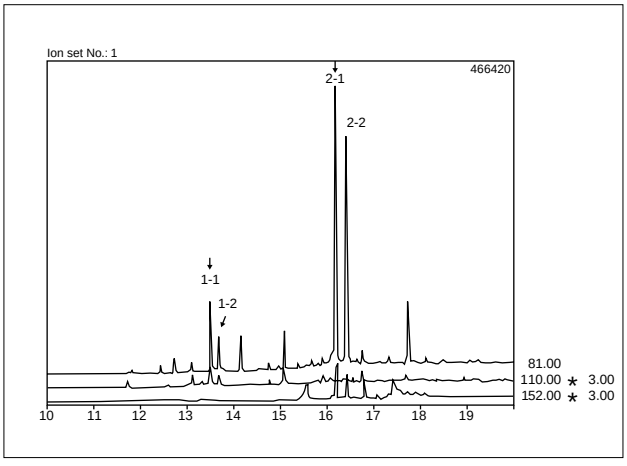

Fig. 4.9.3 SIM chromatogram of 100ppt

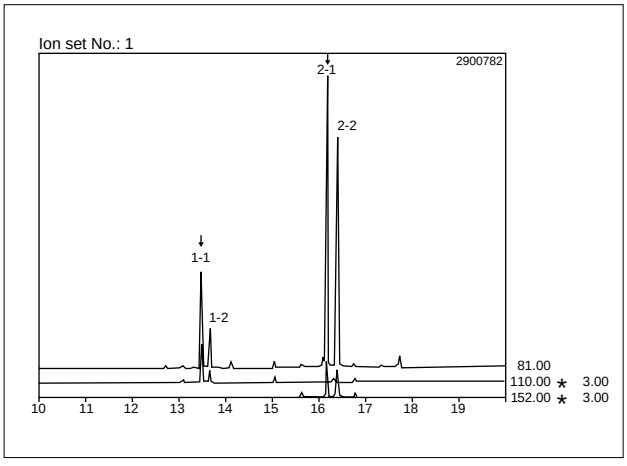

Fig. 4.9.4 SIM chromatogram of 1ppb

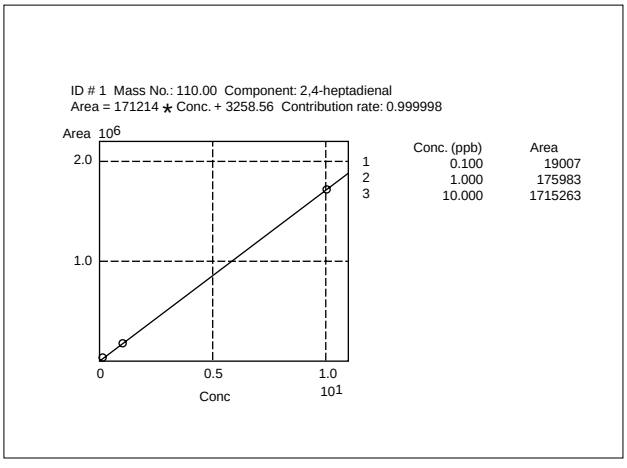

Fig. 4.9.5 Calibration curve for 2,4-heptadienal

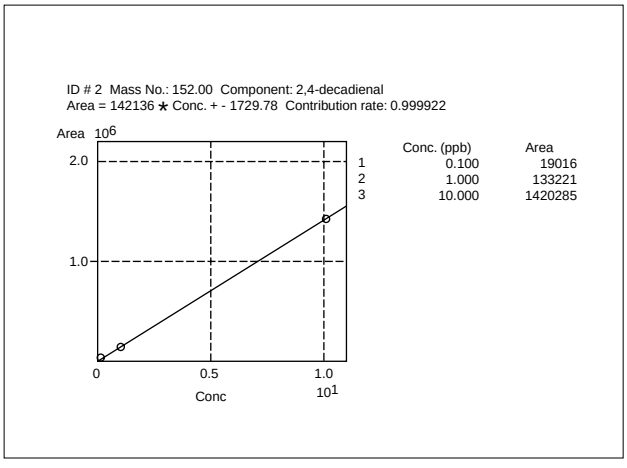

Fig. 4.9.6 Calibration curve for 2,4-decadienal