4.10 Analysis of Alcohols (1) - GCMS

•Explanation

There are two headspace methods: static headspace method and dynamic headspace method. Generally, the term headspace method refers to the static headspace method.

The dynamic headspace method refers to a method where purge gas is continuously fed into the sample to purge out volatile elements, and then the volatile elements are concentrated onto the trapping agent. After concentration, target components are desorbed and analyzed by GCMS. This method enables microanalysis because it involves the concentration of the sample.

Here, the difference between the static and dynamic headspace methods will be shown using Japanese sake and wine.

A Chrompack CP4010 and a Tenax trapping set were used in the dynamic headspace analysis.

Sensitivity was clearly higher in dynamic headspace analysis.

•Analytical Conditions

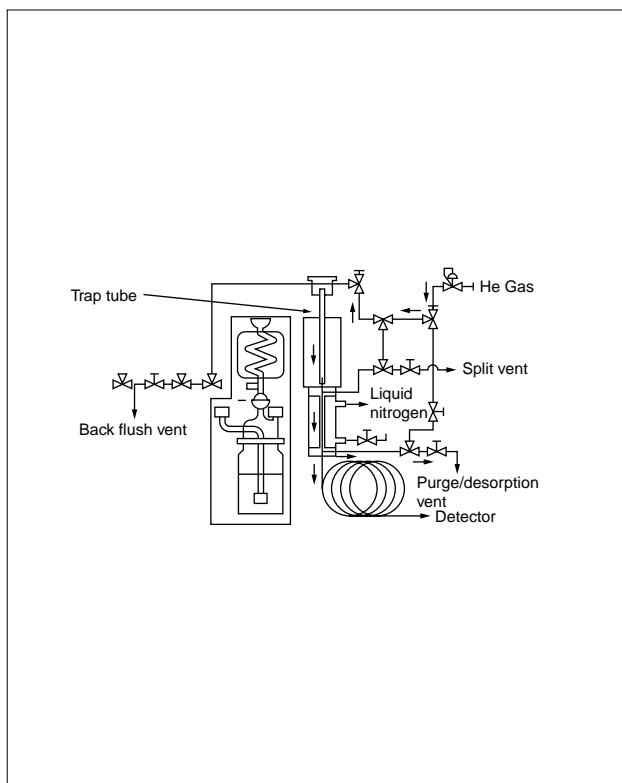|	
Instrument	: GCMS-QP5000
Column	: DB-1701 0.32mm × 30m df = 1.0μm
Col.Temp.	: 40℃(5min)-250℃(5℃/min)(5min)
Int.Temp.	: 250℃
Carrier Gas	: He(35kPa)
: HS –	
Instrument	: HSS-4A
Sample Size	: 10mL
Sample Temp.	: 60℃
Thermostat	: 30min
Injection	: 0.8mL
– TCT –	
Instrument	: CP4010+Tenax Trap Set
Sample Size	: 20mL(room Temp.)
Purge	: 20mL/min(5min)
Trap Tube	: TenaxGR(0.1g)
Precool	: –150℃(3min)
Thermal	: 250℃(5min)

Fig. 4.10.1 CP4010 flow line diagram
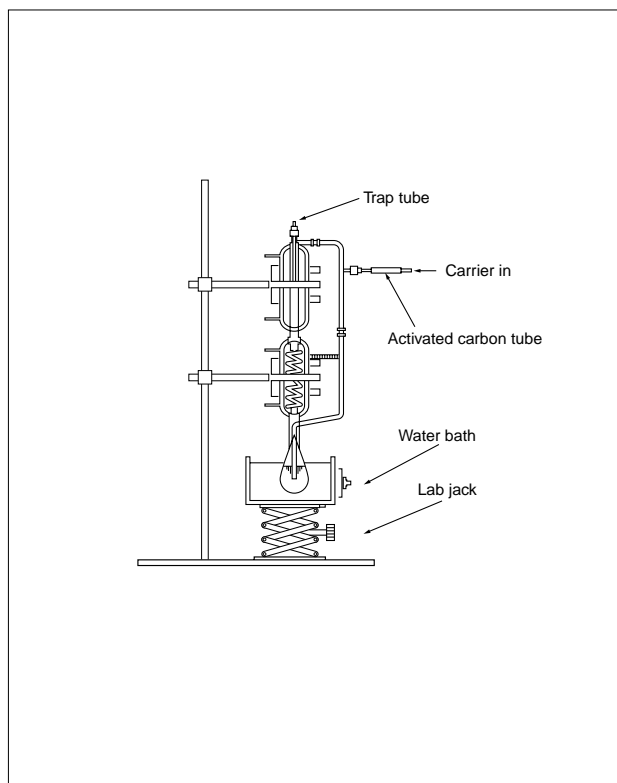
Fig. 4.10.2 Schematic diagram of Tenax Trapping Set

4.10 Analysis of Alcohols (2) - GCMS

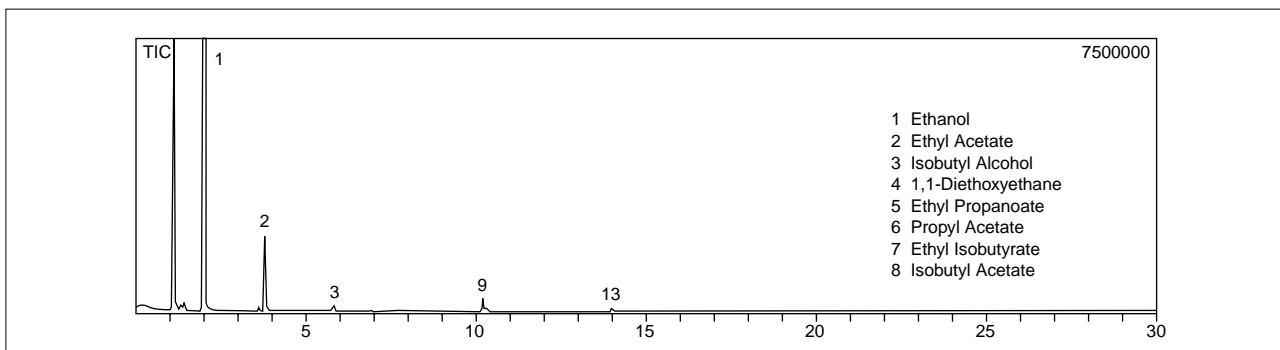TIC   7500000

1 Ethanol
2 Ethyl Acetate
3 Isobutyl Alcohol
4 1,1-Diethoxyethane
5 Ethyl Propanoate
6 Propyl Acetate
7 Ethyl Isobutyrate
8 Isobutyl Acetate

Fig. 4.10.3 TIC chromatogram of Japanese sake (HS method)

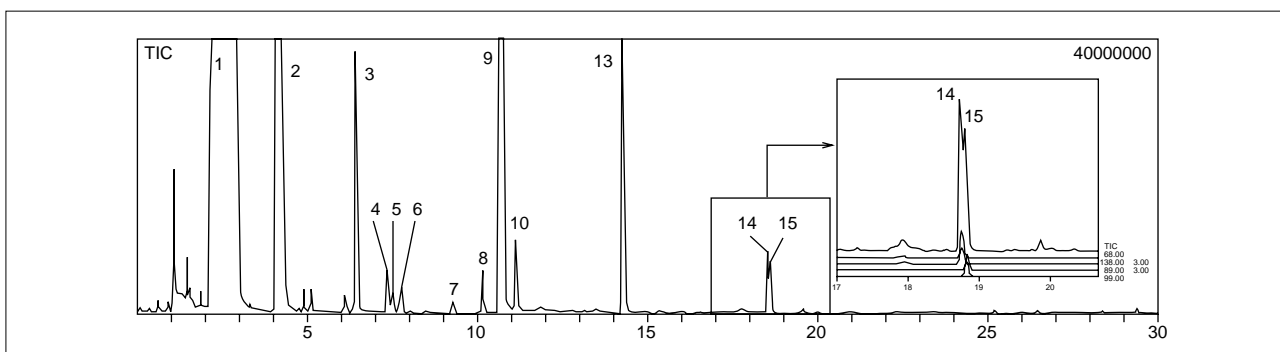TIC   40000000

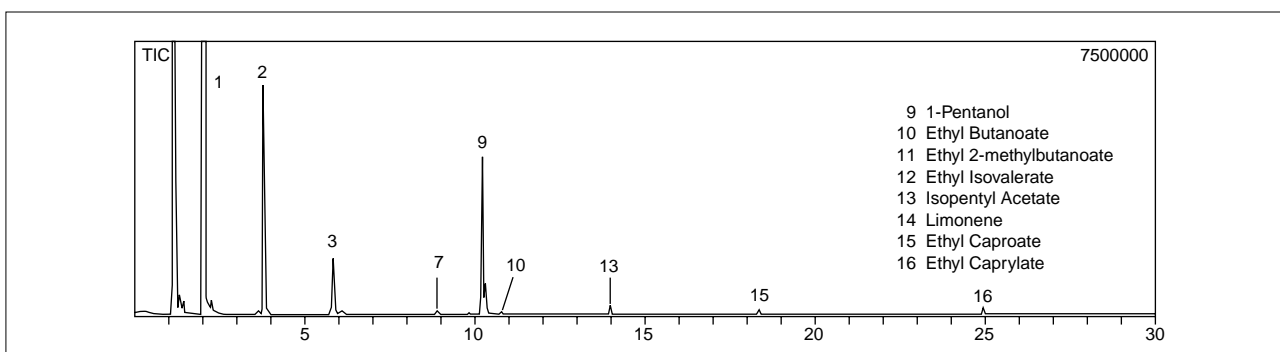Fig. 4.10.4 TIC chromatogram of Japanese sake (TCT method)

TIC   7500000

 9 1-Pentanol
10 Ethyl Butanoate
11 Ethyl 2-methylbutanoate
12 Ethyl Isovalerate
13 Isopentyl Acetate
14 Limonene
15 Ethyl Caproate
16 Ethyl Caprylate

Fig. 4.10.5 TIC chromatogram of wine (HS method)

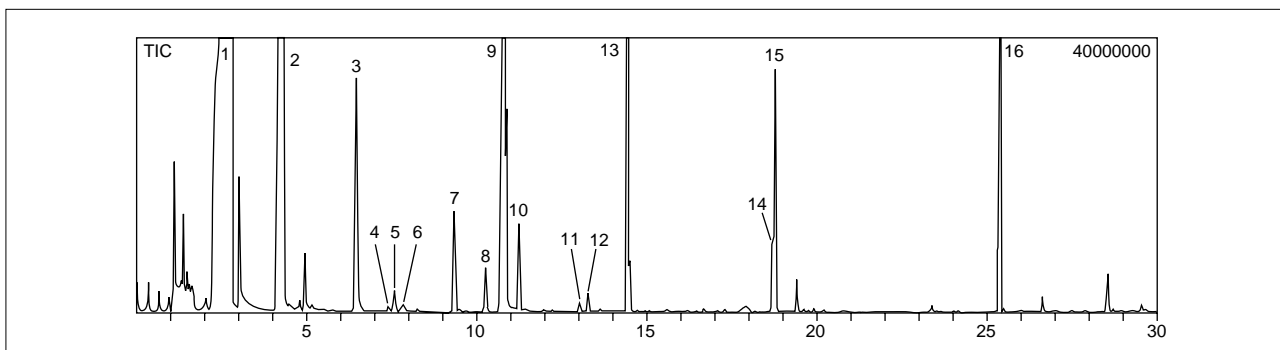TIC   40000000

Fig. 4.10.6 TIC chromatogram of wine (TCT method)