Solid phase extraction using new Polar Magic Chemisorber®

7. Flavor Components in *sake* (Japanese rice wine)

[Background] Compounds in *sake* (Japanese rice wine) were extracted by a new Magic Chemisorber® MC-PEG and were subsequently thermally desorbed, separated using gas chromatography and detected by a mass spectrometer (MS).

[Experimental] A Polar Magic Chemisorber® MC-PEG (film thickness of PEG: 30 µm, volume: 3.8 µL) was placed onto an Eco-Stick GD and immersed in 5.0 mL of a *sake* (with 1.0 g of sodium chloride) for 30 min at 25 ºC. After 30 min, the Magic Chemisorber® was briefly rinsed with distilled water and wiped with a clean paper tissue. The Magic Chemisorber® was positioned in the pyrolyzer furnace and heated: 100 - 230 ºC (3 min hold). Thermally desorbed compounds were swept by the helium carrier gas to the GC injection port. The desorbed compounds were cryo-trapped at the head of the separation column (UA-CW) using a MicroJet Cryo-Trap. Then, the trap was heated, and the trapped volatiles were separated on the separation column and detected by a quadrupole mass detector. For comparison, the analysis was similarly performed using the nonpolar Magic Chemisorber® MC-S500.

[Results] Chromatograms of the extracted compounds from the *sake* are shown in Fig. 1, and peak assignments are summarized in Table 1. Various polar components, including phenethyl alcohol and tyrosol were observed in the chromatogram. The results show that the use of the Magic Chemisorber® MC-PEG and the pyrolyzer configured for thermal desorption is a quick and simple technique for analyzing polar components in liquid samples.

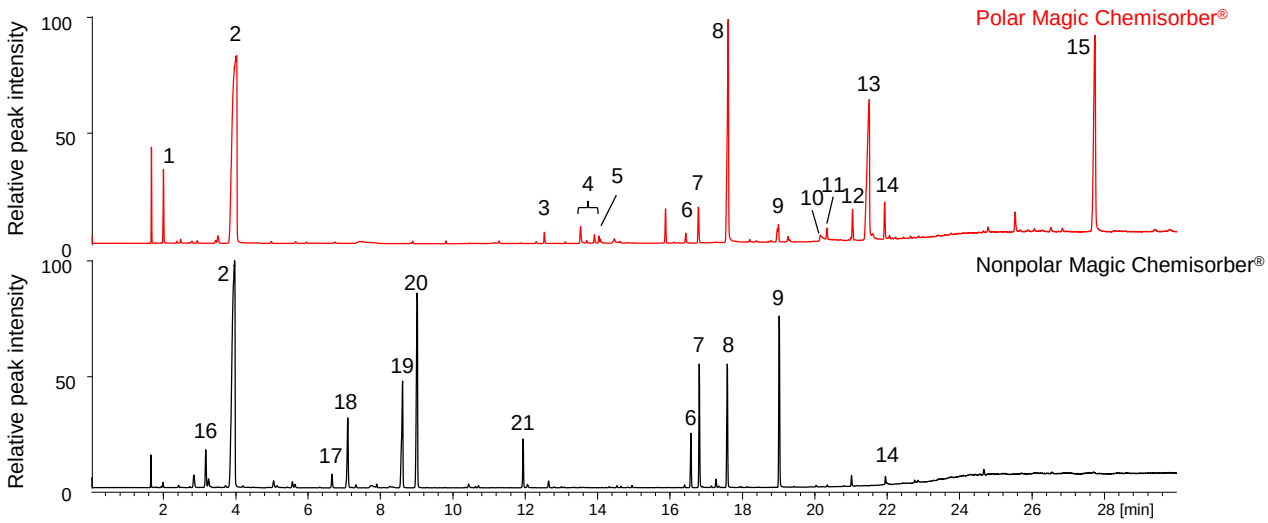

Fig. 1 Chromatograms of extracted compounds from *sake* by polar and nonpolar Magic Chemisorber®

Sample amount: 5.0 mL with 1.0 g of NaCl, Extraction: 30 min immersion at 25 ºC (stirring speed 600 rpm)
Thermal desorption temp.: 100 - 230 ºC (40 ºC/min, 3 min hold), cryo-trapped with MicroJet Cryo-Trap
Separation column: Ultra ALLOY-CW (polyethylene glycol), *L* = 30 m, i.d. = 0.25 mm, df = 0.25 µm
Column flow rate: 1 mL/min, Split ratio: 1/5, GC oven temp.: 40 ºC (3 min hold) - 250 ºC (10 ºC/min, 14 min hold)

Table 1 Compounds extracted from *sake* (compounds extracted only by polar Magic Chemisorber® are shown in red)

#	Compound	#	Compound	#	Compound
1	Acetaldehyde	9	Octanoic acid	15	*p*-Hydroxyphenethyl alcohol (Tyrosol)
2	Ethanol	10	Lactic acid	16	Ethyl acetate
3	Acetic acid	11	4-Vinylguaiacol	17	Isobutyl alcohol
4	2,3-Butanediol	12	2,3-Dihydro-3,5-dihydroxy -6-methyl-4H-pyran-4-one	18	Isoamyl acetate
5	α-Ketoglutaric acid	13	Glycerol	19	Isoamyl alcohol
6	Phenethyl acetate	14	Monoethyl succinate	20	Ethyl hexanoate
7	Hexanoic acid			21	Ethyl octanoate
8	Phenethyl alcohol				

Keywords : Solid phase extraction, Polar sorbent, PEG, Immersion method, Thermal desorption GC/MS, *Sake* rice wine

Products used : Multi-functional pyrolyzer, Magic Chemisorber® MC-PEG, MicroJet Cryo-Trap, UA-CW, Eco-Stick GD

Applications : Brewing, Food component analysis

Related technical notes : MCA-011E

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