

# 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 °C. 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 °C (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-WAX) 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.

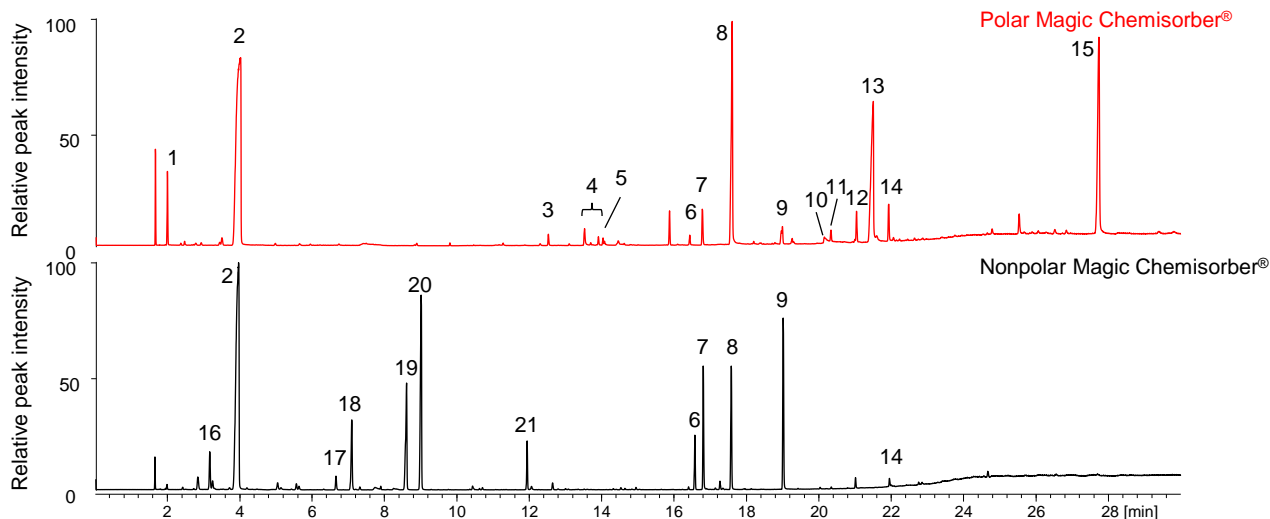


Fig. 1 Chromatograms of extracted compounds from sake by polar and nonpolar Magic Chemisorber®

Sample amount: 5.0 mL with 1.0 g of NaCl, Extraction: 30 min immersion at 25 °C (stirring speed 600 rpm)  
 Thermal desorption temp.: 100 - 230 °C (40 °C/min, 3 min hold), cryo-trapped with MicroJet Cryo-Trap  
 Separation column: Ultra ALLOY-WAX (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 °C (3 min hold) - 250 °C (10 °C/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-Vinylguaicol	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, MC-S500, MicroJet Cryo-Trap, UA-WAX

**Applications :** Brewing, Food component analysis

**Related technical notes :** MCA-011E

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