

Solid phase extraction using new Polar Magic Chemisorber®

5. Headspace analysis of blue cheese flavor components

[Background] Headspace method based on solid phase extraction (SPE) using a new Magic Chemisorber® MC-PEG is described for the analysis of flavor components in blue cheese.

[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 was held in the headspace of a 13.5 mL vial, which contained 1.0 g of blue cheese for 30 min at 40 °C. The Magic Chemisorber® was then 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 blue cheese are shown in Fig. 1, and peak assignments are summarized in Table 1. Various polar components, butanoic acid and hexanoic acid 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 solid samples.

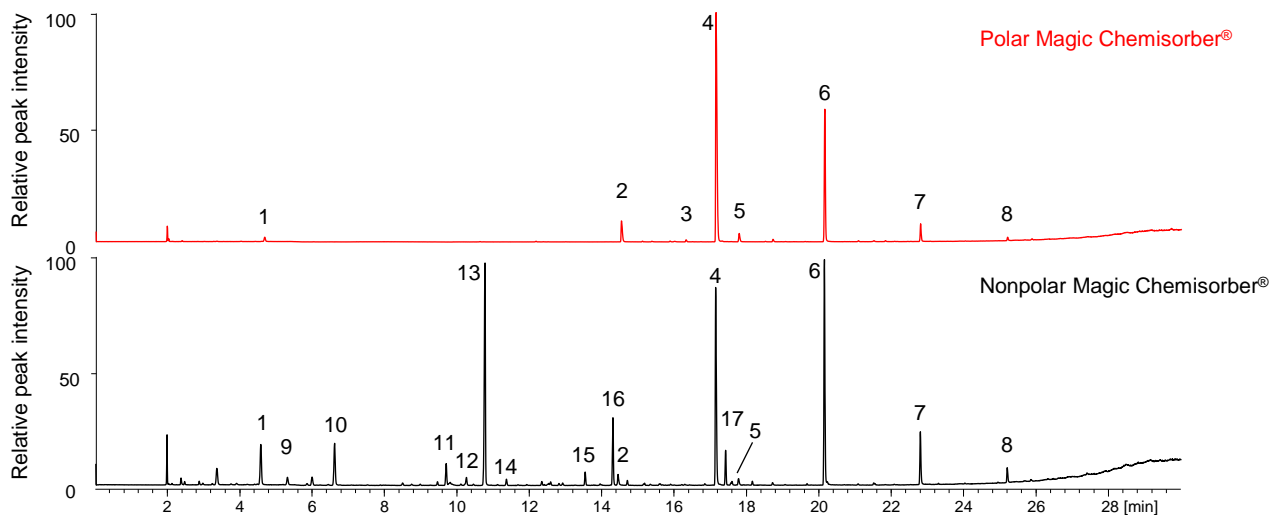


Fig. 1 Chromatogram of extracted compounds from blue cheese by polar and nonpolar Magic Chemisorber®

Sample amount: 1.0 g of blue cheese, headspace extraction: 30 min at 40 °C
 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, 9 min hold)

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

#	Compound	#	Compound	#	Compound
1	Ethanol	9	2-Pentanone	17	Ethyl decanoate
2	Acetic acid	10	Ethyl butanoate		
3	Isobutyric acid	11	2-Heptanone		
4	Butanoic acid	12	Isoamyl alcohol		
5	Isovaleric acid	13	Ethyl hexanoate		
6	Hexanoic acid	14	Isoamyl butanoate		
7	Octanoic acid	15	2-Nonanone		
8	Decanoic acid	16	Ethyl octanoate		

Keywords : Solid phase extraction, Polar sorbent, PEG, Headspace method, TD-GC/MS, blue cheese

Products used : Multi-functional pyrolyzer, Magic Chemisorber® MC-PEG, MC-S500, MicroJet Cryo-Trap, UA-WAX

Applications : Foods, flavors analysis

Related technical notes : MCA-006E

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