GC Technical Note

GT121

GL Sciences Inc.

Enrichment Analysis of Volatile Components of Edible Oils
— Comparisons of Sampling Methods using MonoTrap and HandyTD

Using a trapping media MonoTrap RGC18 TD and a thermal desorption device HandyTD TD265, we conducted a simplified screen-analysis of volatile components arising from pseudo-degraded oils (heated for 8 h in 180 °C oven).
This time, the samples were heated at 60 °C and sampled by headspace gas sampling method. Thermostatic Chamber Static method which means leave the sample into oven and heating. Bath Shaking method means heating while shaking in a water bath at a constant temperature. After a comparison of both methods it found the bath shaking method was able to detect volatile components with higher sensitivity. Furthermore, used the bath shaking method to compare the differences of volatile compounds between edible oil just after opening and the degraded oil. Some typical oil odor compounds such as 2, 4-Heptadienal, 2, and 4-Decadienal were detected with good sensitivity from degraded edible oil.

Sample Preperation Procedure

Edible Oil

Place 10 g of oil in a 20 mL vial

60 °C, Headspace gas collection 1 h

Sampling (HeadSpace)
MonoTrap RGC18 TD

Heating method 1 . Thermostatic Chamber Static method
Heating method 2 Bath Shaking method

HandyTD / GC/MS

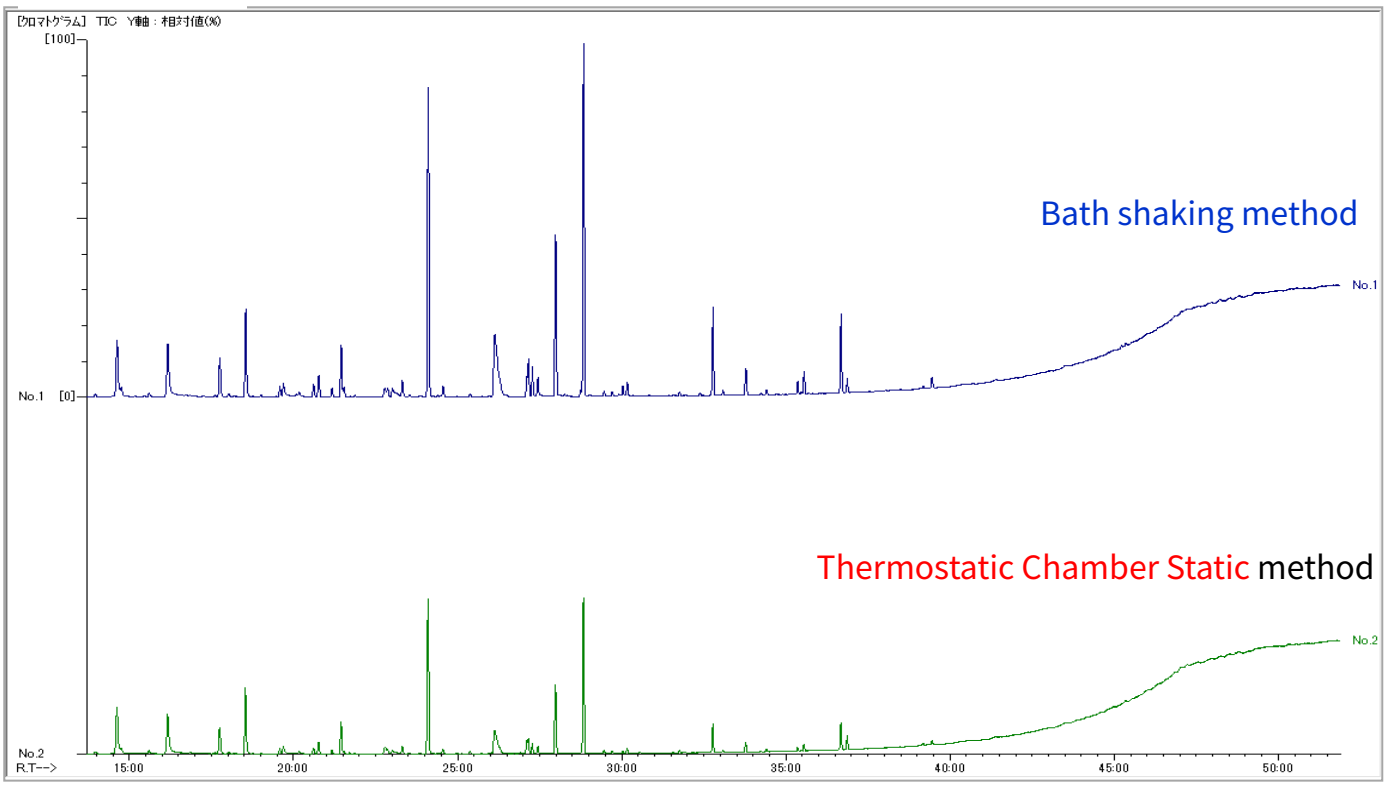
GC/MS Conditions

System	: Thermal Desorption-GC/MS (HandyTD TD265)
Column	: InertCap Pure-WAX 0.25 mm I.D. X 60 m, df = 0.5 µm
Col. Cat. No.	: 1010 - 68164
Col. Temp.	: 40 °C(5 min) - 5 °C/min - 250 °C
Carrier Gas	: He, 1 mL/min (constant flow)
GC Inlet	: 250 °C Split 10:1
Detection	: MS Scan (*m/z* 30-350)

HandyTD Conditions

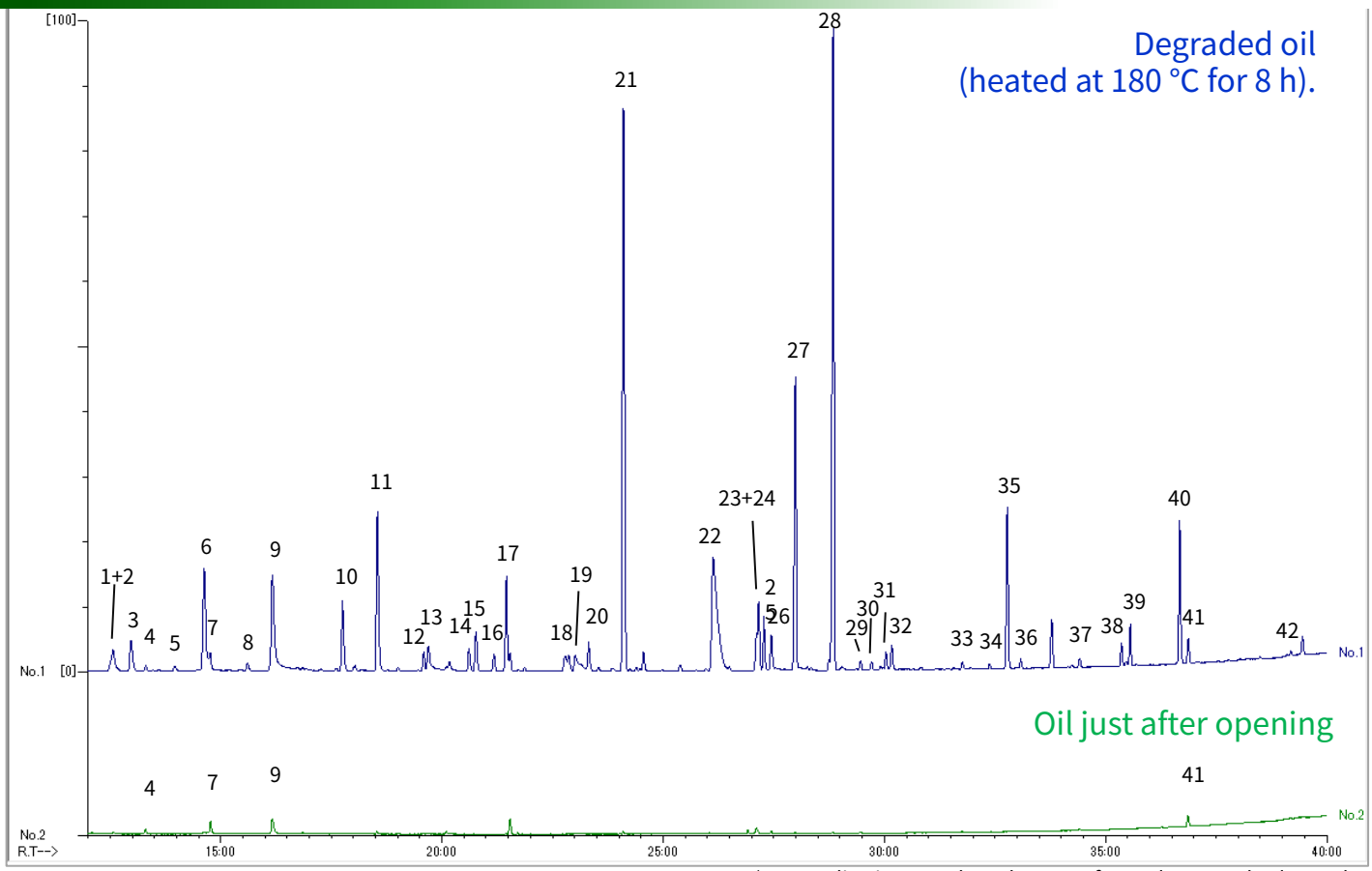
Desorb Temp.	: Room temperature- 45 °C/sec-250 °C (5 min)
Pre Desorb Press.	: 140 kPa

Comparison of Sampling Methods (degraded oil)



Qualitative of ingredients from library searches can be found on the following pages

Comparison of Oil Just After Opening and Degraded oil (water bath shaking method)



* No qualitative tests have been performed on standard samples. Library search results.

1. 2-Pentanone
2. Pentanal
3. 3-Penten-2-one
4. 6-Ethyl-2-methyldecane
5. 1-Penten-3-one
6. 2-Butenal
7. 6-Methyl-1-heptanol
8. 4-Hexen-3-one
9. Hexanal
10. 2-Pentenal
11. 1-Penten-3-ol
12. 2-Heptanone
13. Heptanal
14. 3-Hexen-2-one
15. 2-Hexenal
16. 2-Pentylfuran
17. 1-Pentanol
18. 2-Octanone
19. Octanal
20. Ethylhexanol
21. 2-Heptenal
22. Nonanal
23. Acetic acid
24. 2-Octenall
25. 1-Octen-3-ol
26. Heptanol
27. 2,4-Heptadienal
28. 2,4-Heptadiena
29. Propanoic acid
30. Benzaldehyde
31. 2-Nonenal
32. 1-Octanol
33. Butanoic acid
34. Butyrolactone
35. 2-Decenal
36. Vinyl caproate
37. Pentanoic acid
38. 2-Undecenal
39. 2,4-Decadienal
40. 2,4-Decadienal
41. Hexanoic acid
42. Heptanoic acid

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