

# 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 Preparation Procedure

Edible Oil

Place 10 g of oil in a 20 mL vial

Sampling (HeadSpace)  
MonoTrap RGC18 TD

60 °C, Headspace gas collection 1 h

Heating method 1. **Thermostatic Chamber Static** method

Heating method 2 **Bath Shaking** method



HandyTD / GC/MS

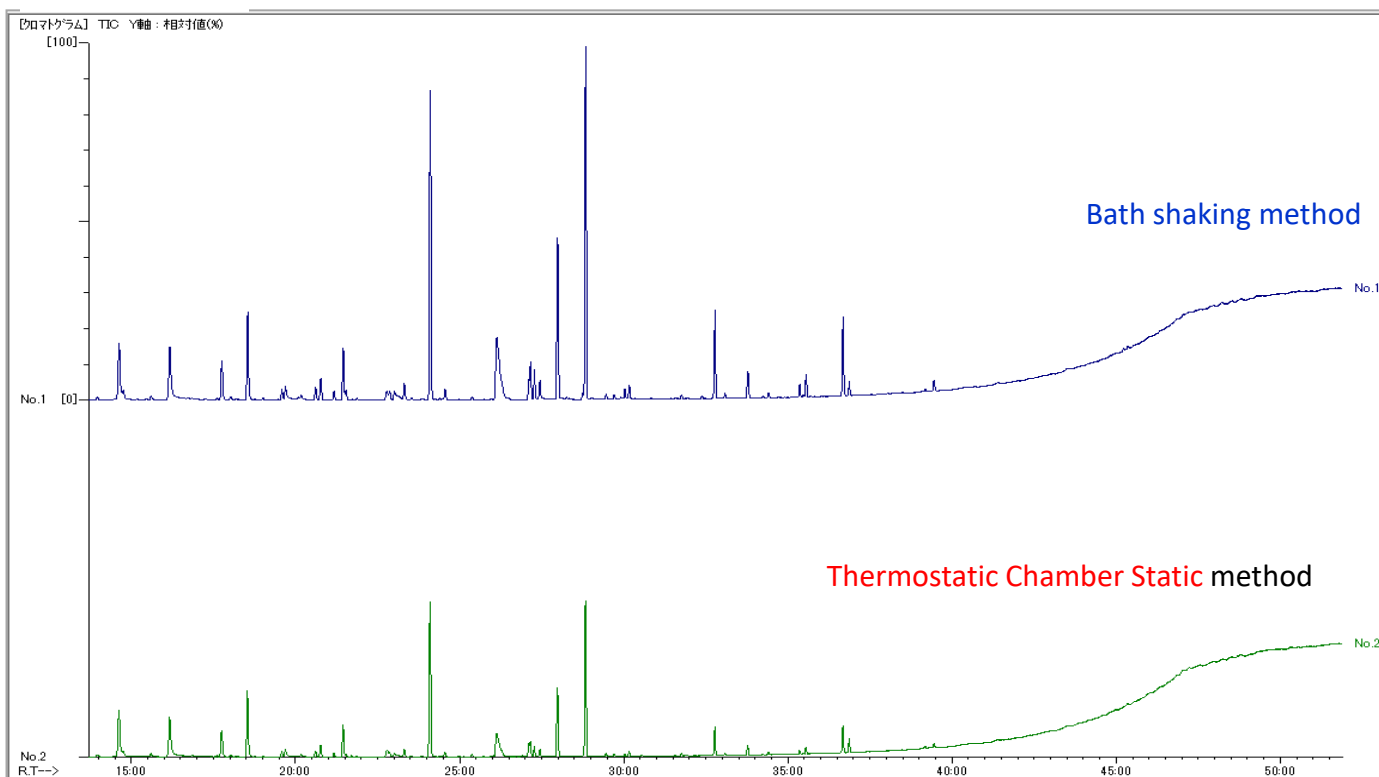
### GC/MS Conditions

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

### HandyTD Conditions

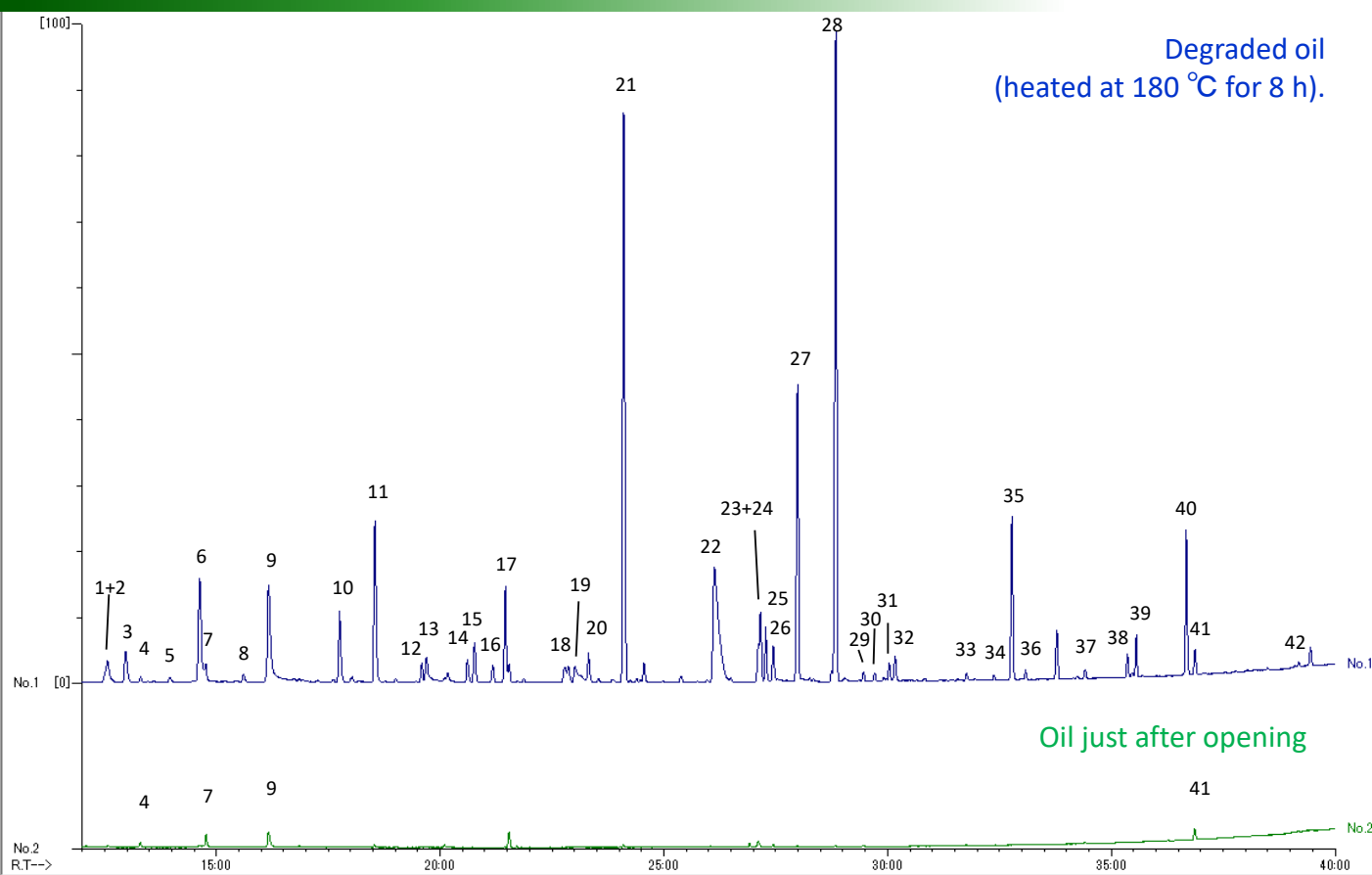
<b>Desorb Temp.</b>	: Room temperature- 45 °C/sec- 250 °C (5 min)
<b>Pre Desorb Press.</b>	: 140 kPa

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

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