

# Concentration Analysis of Volatile Components of Japanese Sake ( rice wine ) - Confirmation of Salting-out effects in MonoTrap's RGC18 TD

Using MonoTrap RGC18 TD and HandyTD TD265, volatile components in Japanese sake were screened and analyzed, with differences in the analytical results compared between the two different collection methods.

MonoTrap RGC18 TD is used to collect volatile constituents. HandyTD TD265 is used to introduce the volatile compounds collected on the trapping agent into a GC by thermal desorption. Volatile components were collected by a dip-shaking method (a method in which a MonoTrap is added to sake, with the volatile components collected by shaking with a constant-temperature shaker at 60 °C). The effect of salting-out was confirmed by comparing a method of sample collection without salting out, with a method with sodium chloride added to the sample.

Salting-out improves the sensitivity for all components with detection of many flavor compounds in Japanese sake. In particular, Isovaleraldehyde diethyl acetal, a fragrance substance produced by the deterioration of sake, was detected by salting-out.

## Pretreatment procedure

Japanese sake (rice wine)

Place 15 mL of Japanese Sake in 40 mL vials

### GC/MS Conditions

#### System

: GC - MS - Thermal Desorption (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) - 10 °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)

Collection (HS)

MonoTrap RGC18 TD × 1

60 °C 1 hour collection



Sample 1  
With salting-out



Sample 2  
No salting out

Sodium chloride  
5 g

HandyTD/GC/MS



### HandyTD Conditions

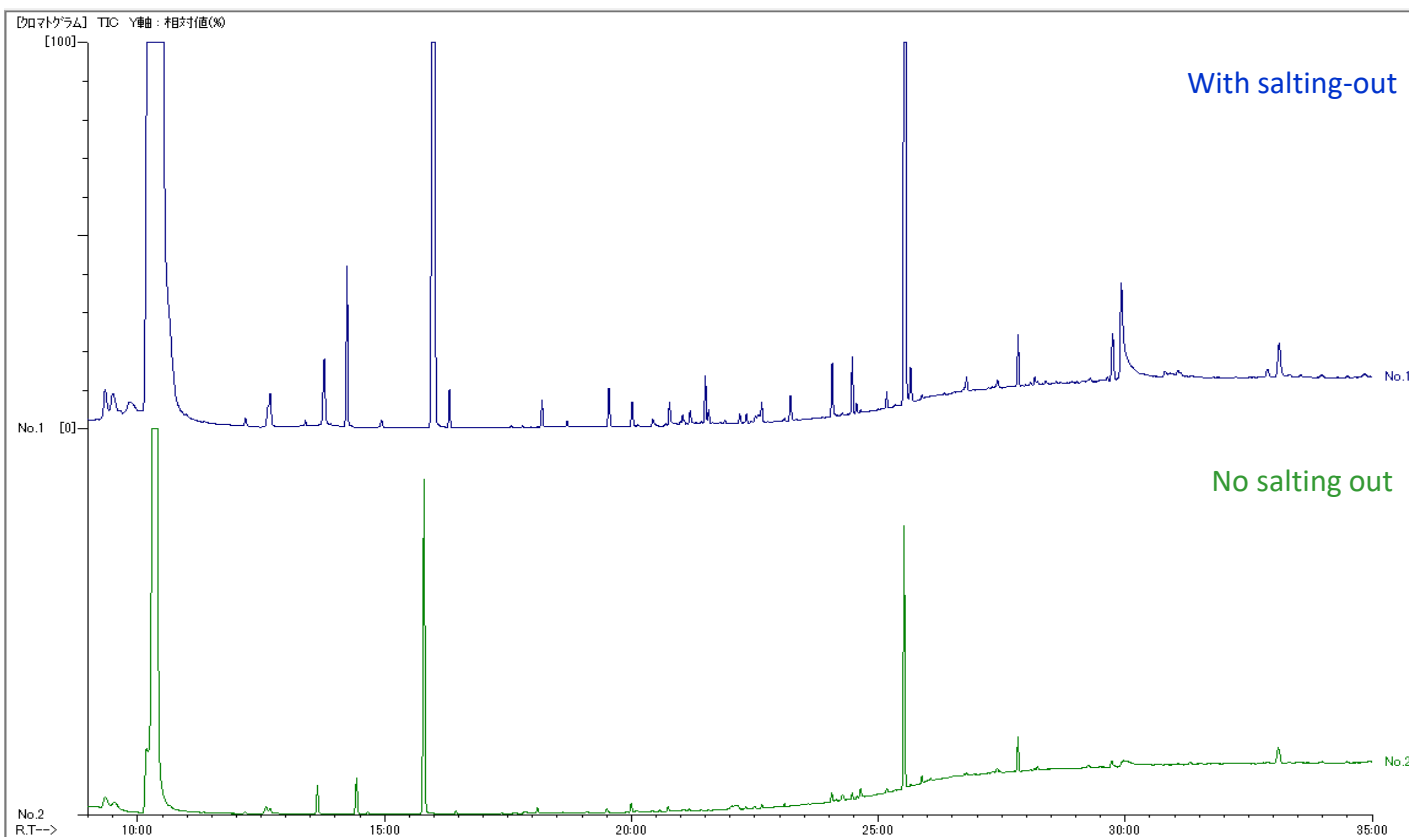
#### Desorb Temp.

: Room temperature - 45 °C/sec -

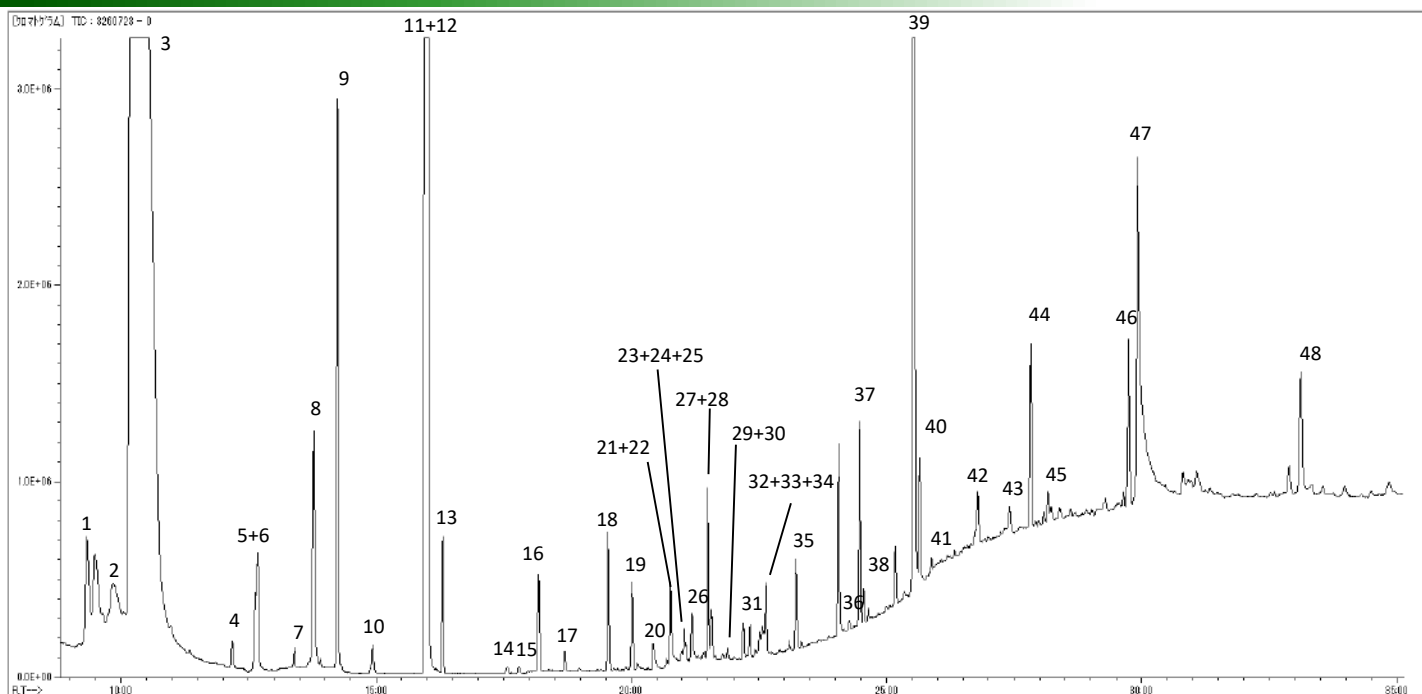
#### Pre Desorb Press.

: 200 °C (5 min)

: 140 kPa



## Analysis results of sake with salt analysis



\* Standard samples are not used for qualitative analysis.  
Results from a library search.

- |                                    |                                  |                              |
|------------------------------------|----------------------------------|------------------------------|
| 1. Ethyl acetate                   | 17. Propylene glycol ethyl ether | 33. Benzeneacetaldehyde      |
| 2. Methanol                        | 18. Acetic acid                  | 34. Diethyl succinate        |
| 3. Ethanol                         | 19. Furfural                     | 35. Dodecanal                |
| 4. Isobutyl acetate                | 20. Formic acid                  | 36. Phenylethyl formate      |
| 5. 1-Propanol                      | 21. Ethyl hydroxybutyrate        | 37. Caproic acid             |
| 6. Ethyl butyrate                  | 22. 2,3-Butanediol               | 38. Phenethyl acetate        |
| 7. Isovaleraldehyde diethyl acetal | 23. Ethyl 2-hydroxycaproate      | 39. Phenylethyl alcohol      |
| 8. Isobutanol                      | 24. 1-Octanol                    | 40. Tetradecanal             |
| 9. Isoamyl acetate                 | 25. Benzaldehyde                 | 41. 1-Dodecanol              |
| 10. Butanol                        | 26. 2,3-Butanediol               | 42. Octanoic acid            |
| 11. 2-Methyl-1-butanol             | 27. 2-Oxopentanedioic acid       | 43. Dihydroxyacetone         |
| 12. Isoamyl alcohol                | 28. 5-Methyl-furfural            | 44. Diisobutyl adipate       |
| 13. Ethyl caproate                 | 29. 2-Cyclopentene-1,4-dione     | 45. Myristyl alcohol         |
| 14. Acetoin                        | 30. Butanoic acid                | 46. Hydroxydihydromaltol     |
| 15. Acetol                         | 31. Furfuryl alcohol             | 47. Glycerin                 |
| 16. Ethyl lactate                  | 32. Butyrolactone                | 48. 5-Hydroxymethyl furfural |

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