GC Technical Note

GT112

GL Sciences Inc.

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.

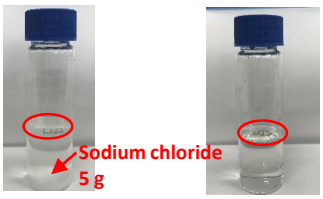
Pretreatment procedure

Japanese sake (rice wine)

Place 15 mL of Japanese Sake in 40 mL vials

Collection (HS)
MonoTrap RGC18 TD × 1

60 ˚C 1 hour collection



Sample 1
With salting-out

Sample 2
No salting out

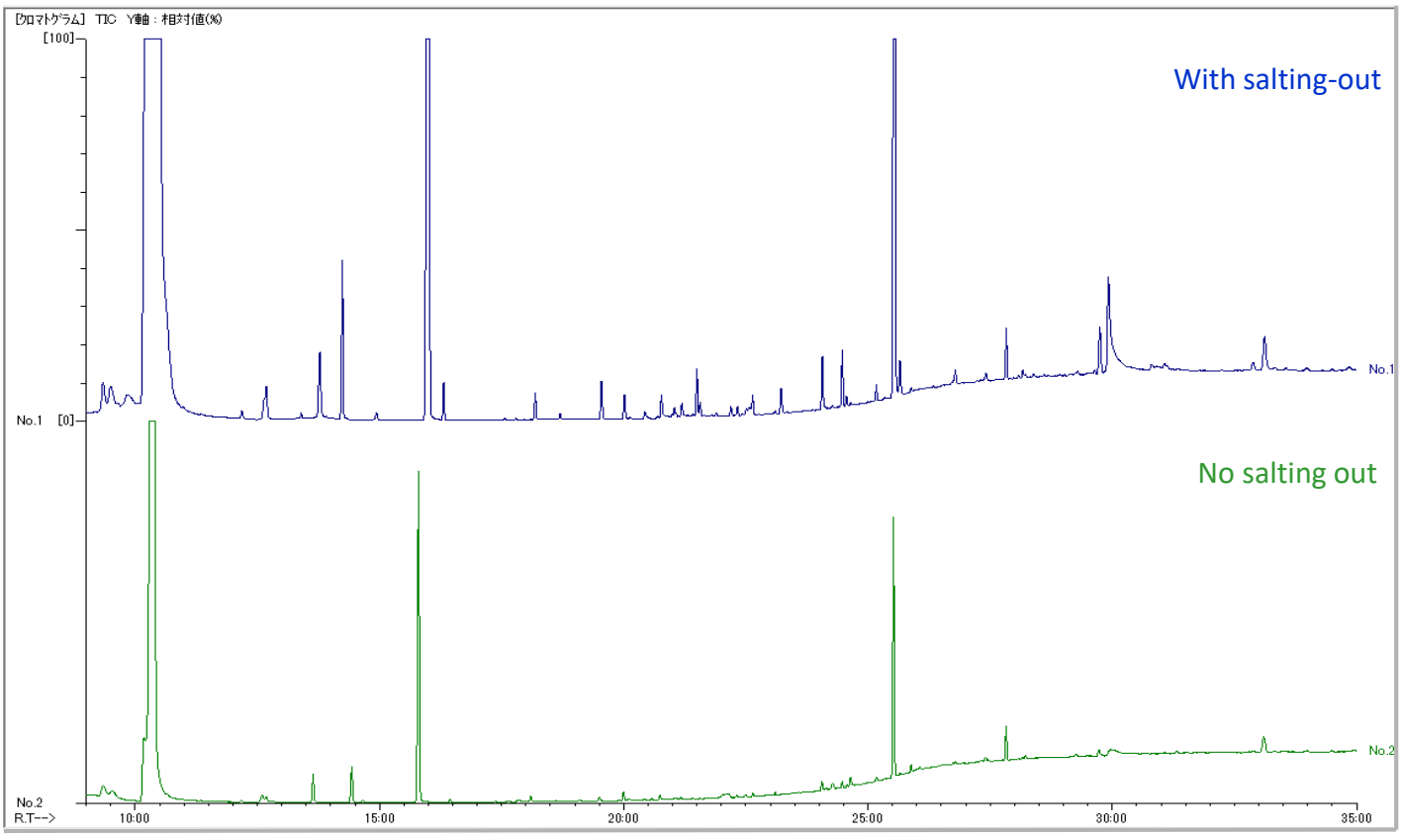
HandyTD/GC/MS

GC/MS Conditions

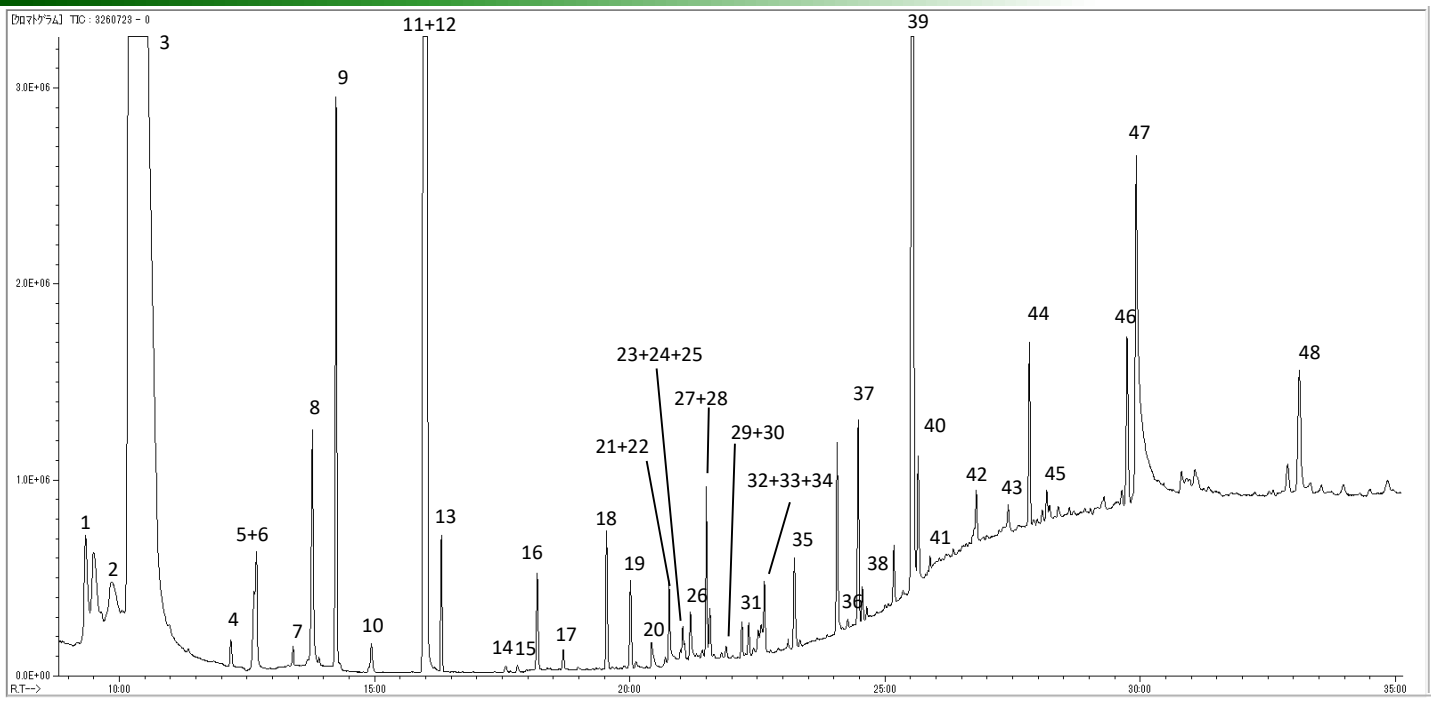
System	: GC - MS - Thermal Desorption (HandyTD TD265)
Column	: InertCap Pure-WAX 0.25 mm I.D. x 60 m, df = 0.5 µm
Col. Cat. No.	: 1010-68164
Col.Temp.	: 40 ˚C (5 min) - 10 ˚C/min - 250 ˚C
Carrier Gas	: He, 1 mL/min (constant flow)
GC Inlet	: 250 ˚C Split 10:1
Detection	: MS Scan (*m/z* 30-350)

HandyTD Conditions

Desorb Temp.	: Room temperature - 45 ˚C/sec - 200 ˚C (5 min)
Pre Desorb Press.	: 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
2. Methanol
3. Ethanol
4. Isobutyl acetate
5. 1-Propanol
6. Ethyl butyrate
7. Isovaleraldehyde diethyl acetal
8. Isobutanol
9. Isoamyl acetate
10. Butanol
11. 2-Methyl-1-butanol
12. Isoamyl alcohol
13. Ethyl caproate
14. Acetoin
15. Acetol
16. Ethyl lactate
17. Propylene glycol ethyl ether
18. Acetic acid
19. Furfural
20. Formic acid
21. Ethyl hydroxybutyrate
22. 2,3-Butanediol
23. Ethyl 2-hydroxycaproate
24. 1-Octanol
25. Benzaldehyde
26. 2,3-Butanediol
27. 2-Oxopentanedioic acid
28. 5-Methyl-furfural
29. 2-Cyclopentene-1,4-dione
30. Butanoic acid
31. Furfuryl alcohol
32. Butyrolactone
33. Benzeneacetaldehyde
34. Diethyl succinate
35. Dodecanal
36. Phenylethyl formate
37. Caproic acid
38. Phenethyl acetate
39. Phenylethyl alcohol
40. Tetradecanal
41. 1-Dodecanol
42. Octanoic acid
43. Dihydroxyacetone
44. Diisobutyl adipate
45. Myristyl alcohol
46. Hydroxydihydromaltol
47. Glycerin
48. 5-Hydroxymethyl furfural

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