

GC/MS/O Analysis by Simple Concentration of Volatile Components of Miso (soybean paste) - Using Handy TD Portable Thermal Desorber and MonoTrap Simplified Enrichment Tools and OPV277

The volatile components of commercial miso (soybean paste) were screened and analyzed using HandyTD TD 265 and MonoTrap RGPS TD simplified enrichment tool. After headspace gas was collected using a MonoTrap, the gas was heated in the HandyTD, and a GC/MS/O was used to evaluate the sensory properties of the flavor components.

GC/O [Gas Chromatography/Olfactometry] is a technique in which the outlet from a GC analytical column is split, with one connection to an FID or MS detector for component analysis, and a second to allow an operator to smell the odor at the same time. HandyTD TD 265 is a compact, portable, and easy-to-operate thermal desorption device. After collection insert a glass liner containing the MonoTrap and introduce the thermally desorbed components into the GC inlet.

Pretreatment procedure

Miso

Place 11.29 g
in a 44 mL vial

Collection (HS)

One MonoTrap RGPS TD

37 °C, 1 time



TD/GC/MS/O

From the HandyTD
introduced into GC/MS/O

GC/MS/O Conditions

System	: GC - MS/O - Thermal Desorption (HandyTD TD265)
Column	: InertCap Pure-WAX 0.25 mm I.D. x 60 m, df = 0.25 µm
Col.Cat. No.	: 1010-68162
Col.Temp.	: 40 °C (5 min) - 8 °C/min - 250 °C
Carrier Gas	: He, 260 kPa
GC Inlet	: 250 °C, Split 5:1
Detection	: MS Scan (m/z 15-450)
Olfactory port	: OP275, 250 °C

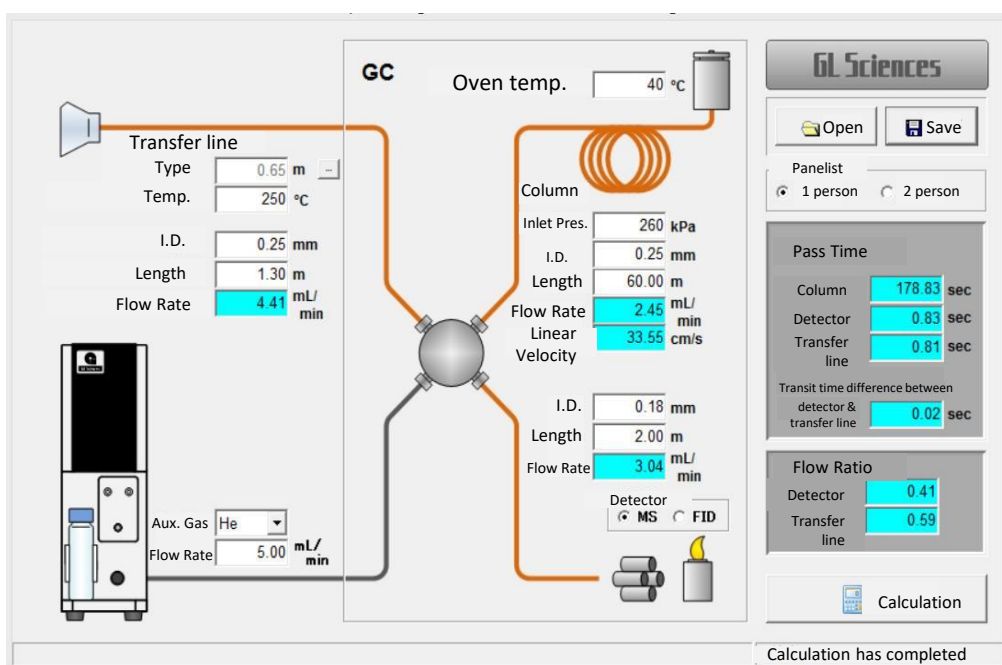
HandyTD Conditions

Desorb Temp.	: 40 °C - 45 °C/sec - 250 °C (1.5 min)
Desorb Press.	: 290 kPa

Calculation of the GC/O split ratio

The split ratio from the column outlet to the detector, and transfer line operator (nose) is adjusted by changing the internal diameter and length of the connection tubing. The Split manager allows simulation of the balance and GC conditions, such as the inner diameter and length of the tubing required for GC/O analysis.

The following figure shows the conditions for the application analysis. The points of the setup are: (1) the point at which the transit time difference between the detector and the transfer line is small (not more than 1 second), (2) the injection pressure is adjusted to optimize the linear velocity (flow rate) in the analysis column.

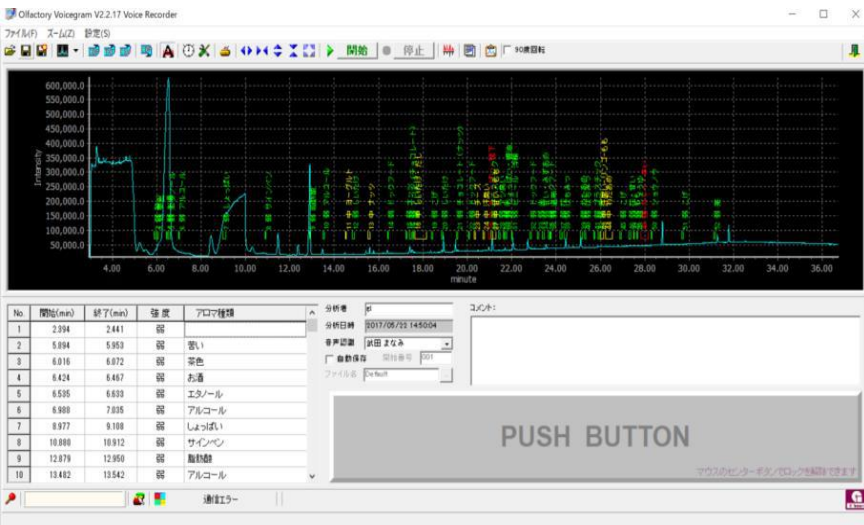


Simulation of conditions used in acquiring the application data using the Split manager

Recording and Editing Odor

<Voice Recording Software Olfactory Voicegram>

During voice recording of the GC/O analysis, the operator continually senses a variety of odors. It is difficult to write down when and what odors have been sensed while smelling. In this application, dedicated odor recording software was used to record miso flavor components. The Olfactory Voicegram uses a headset microphone and mouse clicks to record the odor.



During GC/MS/O analysis

Voice recording software is used to record when and what smell you have identified

When an odor is sensed, click "PUSH BUTTON" and record your voice with the microphone.

The Aromatic Palette can also be selected using pre-registered key words.

* For GC/MS, the real-time chromatogram is not displayed on this software screen.



Aroma pallet

The number of palettes and background colors can be edited.

Completion of the assay

Click on the text box to listen to the recording.

Place the recorded speech, perform text conversion, or enter directly the odor information into the text box.

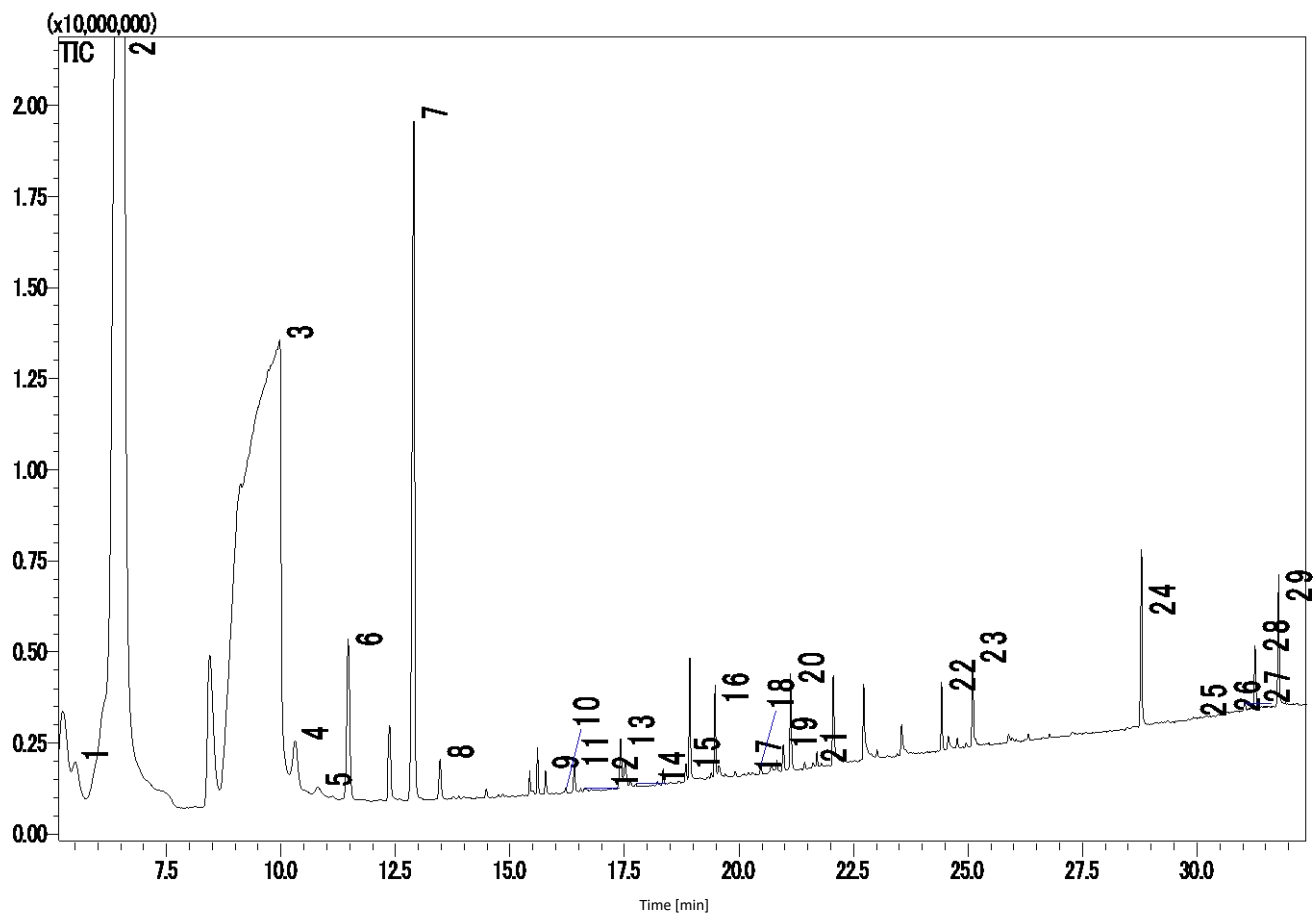
Checking and editing the content of the recording



Chromatogram of GC/MS
And synthesis

For GC/MS, convert the chromatogram to AIA format using the GC/MS workstation. Load the converted AIA files and combine them with the odor recordings.

GC/MS chromatogram



- | | |
|--|---------------------------------------|
| 1. Ethyl acetate | 16. 2,3-Butanediol |
| 2. Ethyl alcohol | 17. 1,5-Pentanediol |
| 3. Water | 18. Butyrolactone |
| 4. 2-Methyl-1-propanol | 19. Isovaleric acid |
| 5. Isoamyl acetate | 20. Ethyl benzoate |
| 6. 1-Butanol | 21. 2,5-Dimethyl-4-hydroxy-3-hexanone |
| 7. 3-Methyl-1-butanol | 22. Phenylethyl alcohol |
| 8. Ethyl hexanoate | 23. Maltol |
| 9. 1-Hexanol | 24. Ethyl decanoate |
| 10. 3-Ethoxy-1-propanol | 25. Ethyl hexadecanoate |
| 11. 2-(1-Ethoxyethoxy)-3-methylbutane-1,4-diol | 26. Benzenecarboxylic acid |
| 12. Nonanal | 27. Ethyl octadecanoate |
| 13. Acetic acid | 28. Ethyl Oleate |
| 14. Furfural | 29. Linoleic acid ethyl ester |
| 15. Benzaldehyde | |

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

Product used

MonoTrap RGPS TD



Cat.No. :1050-74202

* Supplied individually in ampoules.

InertCap Pure-WAX



Cat.No. : 1010-68162

0.25 mm I.D. × 60 m, df = 0.25 μm

Portable thermal desorber HandyTD TD265



Cat.No. :2709-80000

Olfactory system for audio recording

The olfactory system for audio recording consists of a sniffing port and audio recording software.

Sniffing port

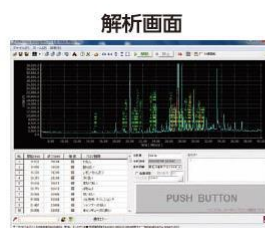


OP275



OP275Pro

Audio recording soft-fair Olfactory
Voicegram



Aroma pallet

Lemon	Grapefruit	Pineapple	Peach	Banana
Strawberry	Apple	Curry	Caraway	Spicy
Citrus Candy	Rose	Pineal, Sweet	Pineal, Bitter	Pineal, Spicy
Sweet	Grass	Garlic	Butter, Onion	Excreta
Relax	Fresh	Applesauce	Roasted	Sulfur

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