SHIMADZU

Application Data Sheet

No. 1

GCMS
Gas Chromatograph Mass Spectrometer

Analysis of Amino Acids Contained in Alcohol

Amino acids contained in alcohol were treated with EZ:faast™ (Phenomenex, Inc.), which enables easy pretreatment, and then analyzed with a GC-MS system.

Experiment

Pretreatment

Three types of alcohol (Japanese *sake*, beer, and wine) were treated using EZ:faast. Norvaline was added as an internal standard.

Instrument

A GCMS-QP2010 Ultra (with high-power oven) was used for the measurements. The analysis conditions, shown in Table 1, were in conformity with the "Amino Acid Analysis Methods" in the "GC/MS Metabolic Components Database."

Table 1: Analysis Conditions (GC/MS Metabolic Components Database: Amino Acid Analysis Methods)

GC-MS	: GCMS-QP2010 Ultra (with high-power oven)
Column	: ZB-AAA (10 mL. × 0.25 mm I.D.) (Phenomenex, Inc.)

[GC]		[MS]	
Injection quantity	: 1 µL	Interface temperature	: 280℃
Vaporization chamber temperature	: 280℃	Ion source temperature	: 200℃
Column oven temperature: 110℃ → (30 ℃/min) → 320℃		Solvent elution time	: 0.4 min
Control mode	: Constant pressure (15 kPa)	Data sampling time	: 0.5 min to 7 min
Injection mode	: Split	Measurement mode	: Scan
Split ratio	: 15	Mass range	: *m/z* 45-450 (3,333u/sec)
Carrier gas	: Helium	Event time	: 0.15 sec

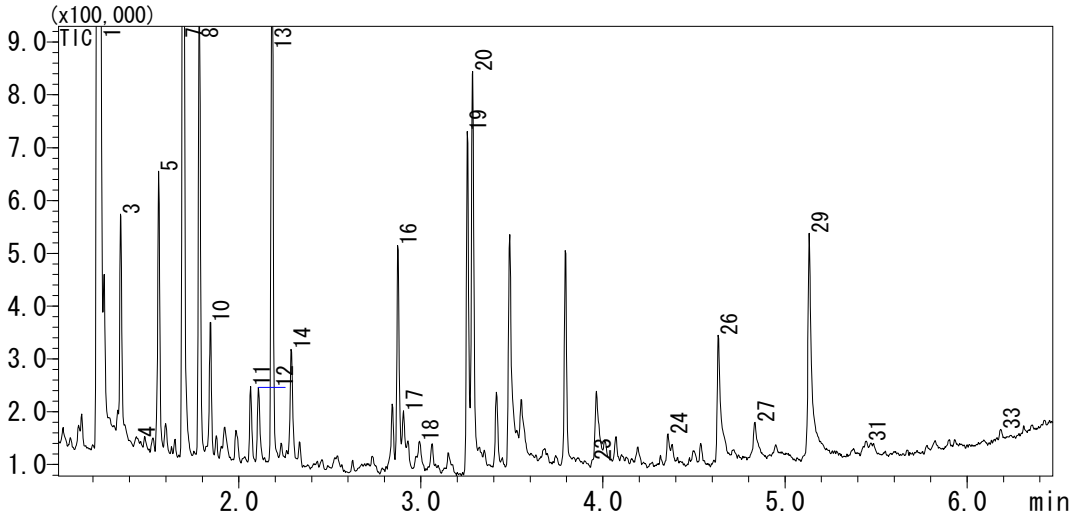

Fig. 1: Total Ion Current Chromatogram for Amino Acid Derivatives in Japanese Sake
The numbers for each component follow the serial numbers in the "GC/MS Metabolic Components Database."

1 Alanine	8 Leucine	14 Asparagine	20 Phenylalanine	29 Tyrosine
3 Glycine	10 Isoleucine	16 Aspartic acid	23 Glutamine	31 Tryptophan
4 alpha-aminobutyric acid	11 Threonine	17 Methionine	24 Ornithine	33 Cystine
5 Valine	12 Serine	18 4-Hydroxyproline	26 Lysine	
7 Norvaline(I.S.)	13 Proline	19 Glutamic acid	27 Histidine	

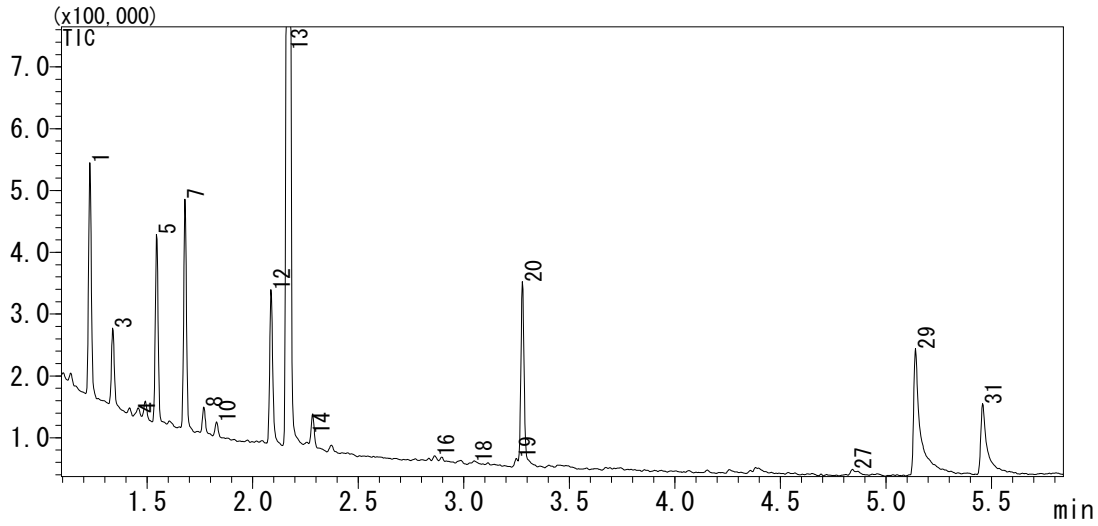

Fig. 2: Total Ion Current Chromatogram for Amino Acid Derivatives in Beer
The numbers for each component follow the serial numbers in the "GC/MS Metabolic Components Database."

1 Alanine	8 Leucine	16 Aspartic acid	29 Tyrosine
3 Glycine	10 Isoleucine	18 4-Hydroxyproline	31 Tryptophan
4 alpha-aminobutyric acid	12 Serine	19 Glutamic acid	
5 Valine	13 Proline	20 Phenylalanine	
7 Norvaline(I.S.)	14 Asparagine	27 Histidine	

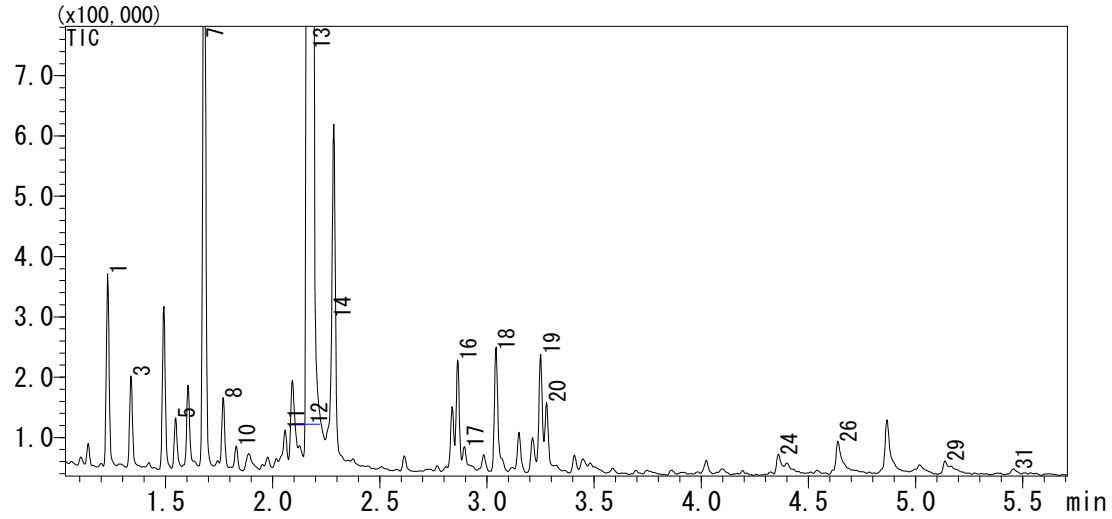

Fig. 3: Total Ion Current Chromatogram for Amino Acid Derivatives in Wine
The numbers for each component follow the serial numbers in the "GC/MS Metabolic Components Database."

1 Alanine	10 Isoleucine	16 Aspartic acid	24 Ornithine
3 Glycine	11 Threonine	17 Methionine	26 Lysine
5 Valine	12 Serine	18 4-Hydroxyproline	29 Tyrosine
7 Norvaline(I.S.)	13 Proline	19 Glutamic acid	31 Tryptophan
8 Leucine	14 Asparagine	20 Phenylalanine	

Summary

Pretreatment using the EZ:faast kit, following by analysis using the GCMS-QP2010 Ultra, which is equipped with a high-speed scanning function, enabled rapid analysis of amino acids. With this combination, it took only 15 minutes per sample from pretreatment to analysis.
(Reference: Shimadzu Application News No. M246 Analysis of Amino Acids Using Fast-GC/MS and Metabolite Database)

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