SHIMADZU

Application Data Sheet

No.3

GCMS

Gas Chromatograph Mass Spectrometer

Analysis of Amino Acids Contained in a Grain of Rice

Amino acids contained in a grain of rice were treated with EZ:faastTM (Phenomenex, Inc.), which enables easy pretreatment, and then analyzed with a GC-MS system.

Experiment

Pretreatment

A grain of rice was treated with EZ:faast. Norvaline was added as an internal standard.

Instrument

A GCMS-QP2010 Ultra (with high-power oven) was used for the measurements. Analysis conditions, shown in Table 1, were in conformity with the “Amino Acid Method” 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 mmI.D.) (Phenomenex, Inc.)
[GC]	
Injection quantity	: 1 μL
Vaporization chamber temperature	: 280℃
Column oven temperature	: 110℃ -> (30 ℃/min) -> 320℃
Control mode	: Constant pressure (15 kPa)
Injection mode	: Split
Split ratio	: 15
Carrier gas	: Helium

[MS]	
Interface temperature	: 280℃
Ion source temperature	: 200℃
Solvent elution time	: 0.4 min
Data sampling time	: 0.5 min to 7 min
Measurement mode	: Scan
Mass range	: *m/z* 45-450 (3,333u/sec)
Event time	: 0.15 sec

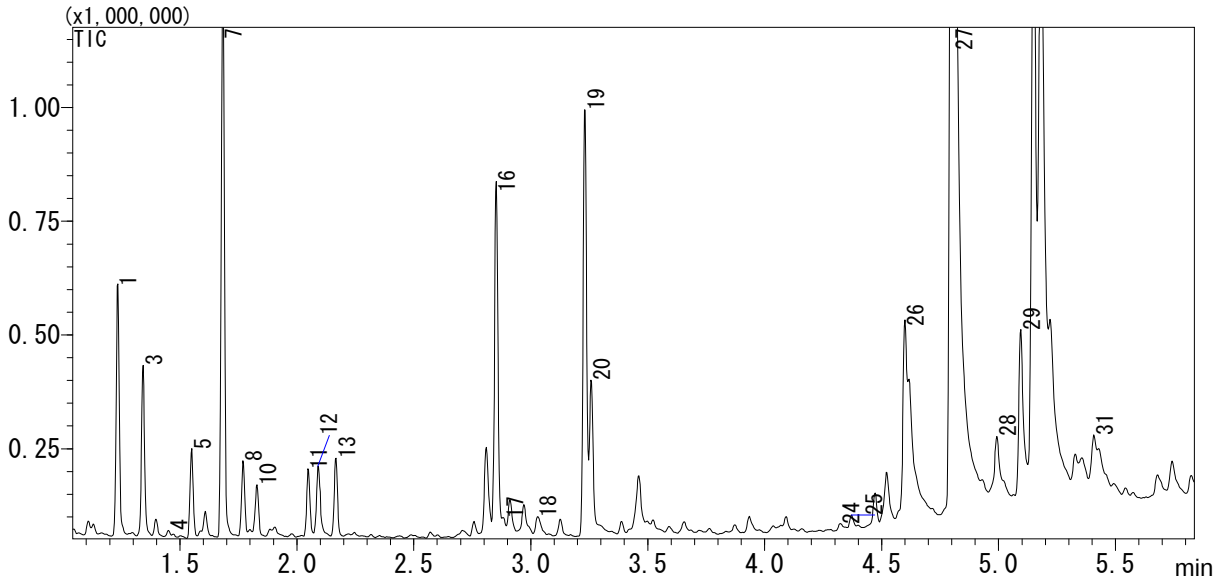

Fig. 1: Total Ion Current Chromatogram for Amino Acid Derivatives in Katsuobushi Extract

The numbers for each component follow the serial numbers in the “GC/MS Metabolic Components Database.”

1 Alanine	8 Leucine	16 Asparatic acid	24 Ornithine	28 Hydroxylysine
3 Glycine	10 Isoleucine	17 Methionine	25 Glycine-proline	(2 isomers)
4 alpha-aminobutyric acid	11 Threonine	18 4-Hydroxyproline	(dipeptide)	29 Tyrosine
5 Valine	12 Serine	19 Glutamic acid	26 Lysine	31 Tryptophan
7 Norvaline (I.S.)	13 Proline	20 Phenylalanine	27 Histidine	

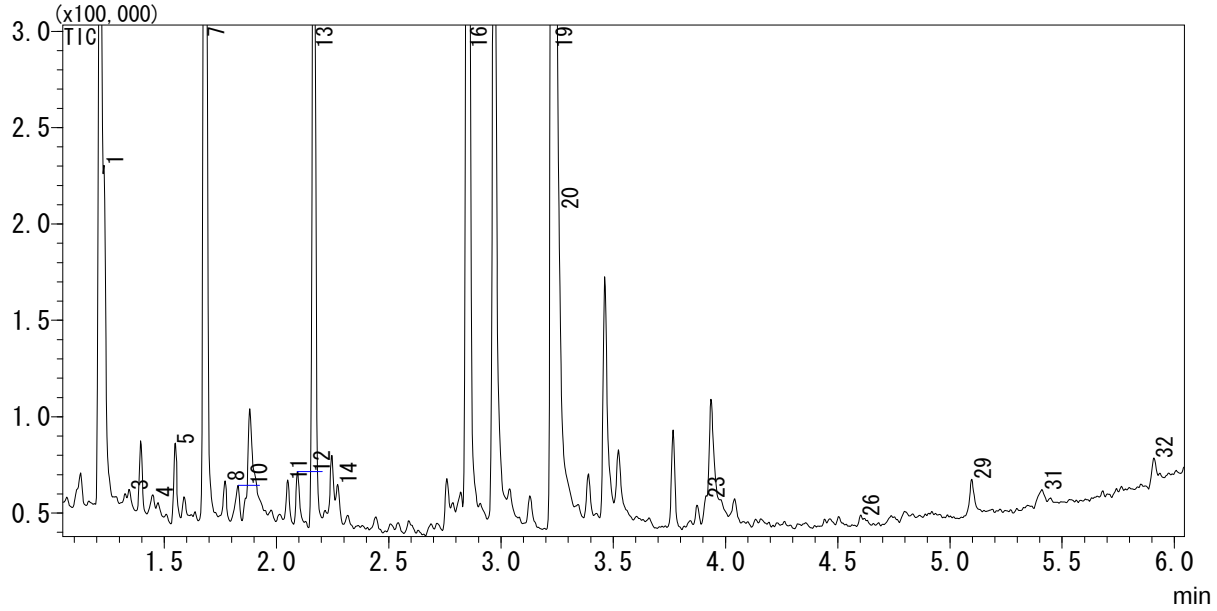

Fig. 2: Total Ion Current Chromatogram for Amino Acid Derivatives in Kombu Extract
The numbers for each component follow the serial numbers in the "GC/MS Metabolic Components Database."

1 Alanine	8 Leucine	14 Asparagine	26 Lysine
3 Glycine	10 Isoleucine	16 Aspartic acid	29 Tyrosine
4 alpha-aminobutyric acid	11 Threonine	19 Glutamic acid	31 Tryptophan
5 Valine	12 Serine	20 Phenylalanine	32 Cystathionine
7 Norvaline(I.S.)	13 Proline	23 Glutamine	

Summary

Pretreatment using the EZ:faast kit, followed 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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