

Application Data Sheet

No.15

GCMS

Gas Chromatograph Mass Spectrometer

Analysis of Metabolic Components Contained in Puffer Fish Blood Serum

Puffer fish blood serum was analyzed with a GC-MS after pretreatment and trimethylsilylation (TMS). This analysis was performed in cooperation with Dr. Shigeo Takenaka from the Graduate School of Life and Environmental Science, Osaka Prefecture University.

Experiment

Pretreatment

Puffer fish blood serum was pretreated and underwent derivatization (TMS).

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 - Organic Acid and Amino Acid Analysis Method (Trimethylsilyl Derivative)

GC-MS	: GCMS-QP2010 Ultra	
Column	: DB-5 (30 mL x 0.25 mm I.D., df=1µm)	
[GC]		[MS]
Injection quantity	: 1µL	Interface temperature: 280°C
Vaporization chamber temperature	: 280 ° C	Ion source temperature: 200°C
Column oven temperature	: 110°C(4 min) → (4 °C/min) → 320°C	Solvent elution time : 6.5 min
Control mode	: Constant linear velocity (39 cm/sec)	Data sampling time : 7 min to 59 min
Injection mode	: Split	Measurement mode : Scan
Split ratio	: 15	Mass range : m/z 35-600
Carrier gas	: Helium	Event time : 0.3 sec

Results

The total ion current chromatogram (TIC) obtained is shown in Fig. 1, and the quantitative results are shown in Table 2. The peak numbers for components 1 to 178 follow the serial numbers in the "GC/MS Metabolic Components Database."

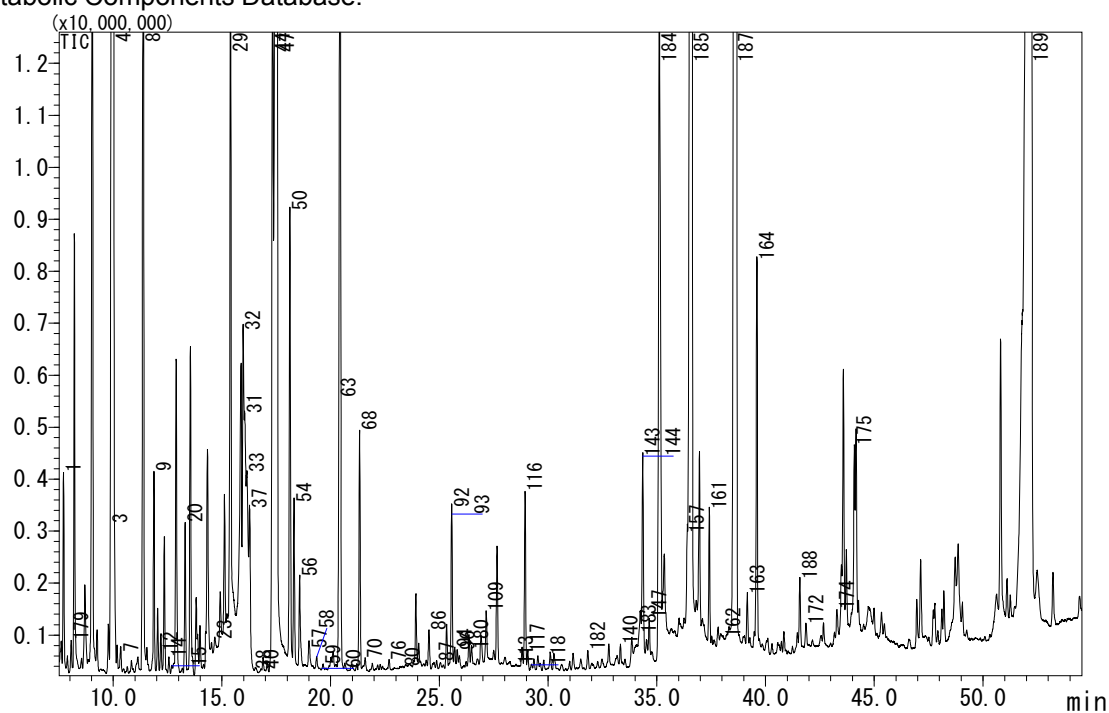


Fig. 1: Total Ion Current Chromatogram (TIC) for Metabolic Components in Puffer Fish Blood Serum

Table 2: List of Metabolic Components Detected

1	Boroic acid-3TMS	86	Malic acid-3TMS
3	Phenol-TMS	87	Adipic acid-2TMS
4	Lactic acid-2TMS	92	Aspartic acid-3TMS
7	Glycolic acid-2TMS	93	L-Methionine-2TMS
8	L-Alanine-2TMS	94	5-Oxoproline-2TMS
9	L-Glycine-2TMS	96	4-Hydroxyproline-3TMS
12	2-Hydroxybutyric acid-2TMS	109	2-Hydroxyglutaric acid-3TMS
14	Sarcosine-2TMS	113	L-Glutamic acid-3TMS
15	3-Hydroxypropionic acid-2TMS	116	L-Phenylalanine-2TMS
20	3-Hydroxyisobutyric acid-2TMS	117	4-Hydroxyphenylacetic acid-2TMS
23	2-Methyl-3-hydroxybutyric acid-2TMS	118	Lauric acid-TMS
29	L-Valine-2TMS	140	Azelaic acid-2TMS
31	Urea-2TMS	143	Citric acid-4TMS
32	4-Hydroxybutyric acid-2TMS	144	Glucuronic lactone-3TMS
33	2-Hydroxyisocaproic acid-2TMS	147	Myristic acid-TMS
37	2-Hydroxy-3-Methylvaleric acid-2TMS	157	4-Hydroxyphenyllactic acid-3TMS
38	Benzoic acid-TMS	161	L-Tyrosine-3TMS
40	Octanoic acid-TMS	162	Indol-3-acetic acid-2TMS
44	L-Leucine-2TMS	163	Palmitoleic acid-TMS
47	Phosphoric acid-3TMS	164	Palmitic acid TMS
50	L-Isolucine-2TMS	172	Margaric acid-TMS
54	L-Proline-2TMS	174	Indolelactic acid-3TMS
56	Succinic acid-2TMS	175	Stearic acid-TMS
57	Methylsuccinic acid-TMS	179	1,2-propanediol-2TMS
58	Glyceric acid-3TMS	180	Threonic acid-4TMS(1)
59	Fumaric acid-2TMS	182	pentose sugar alcohol-5TMS
60	Uracil-2TMS	183	monosaccharide-5TMS(1)
63	L-Serine-3TMS	184	monosaccharide-5TMS(2)
68	L-Threonine-3TMS	185	monosaccharide-5TMS(3)
70	Glutaric acid-2TMS	187	monosaccharide-5TMS(4)
76	2-Deoxytetronic acid-3TMS	188	Inositol-6TMS
80	Decanoic acid-TMS	189	Cholesterol-TMS

Notes

1. The numbers for each component follow the serial numbers in the "GC/MS Metabolic Components Database."
2. Components 1 to 178 were analyzed utilizing the "GC/MS Metabolic Components Database," while components 179 to 189 were analyzed utilizing the "NIST Mass Spectral Library."

Summary

64 metabolic components contained in puffer fish blood serum were identified.
(55 components utilizing the "GC/MS Metabolic Components Database," and 9 components utilizing the "NIST Mass Spectral Library")

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