

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

### 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."

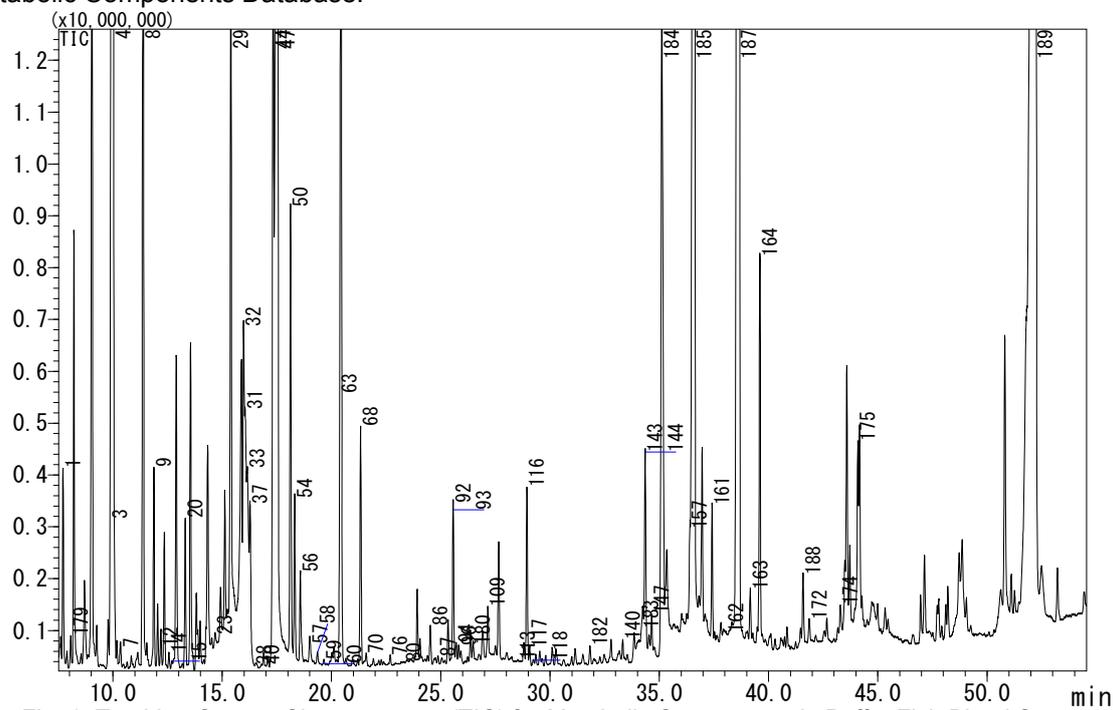


Fig. 1: Total Ion Current Chromatogram (TIC) for Metabolic Components in Puffer Fish Blood Serum

Table 2: List of Metabolic Components Detected

1	Boric 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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