

Application Data Sheet

No.4

GCMS

Gas Chromatograph Mass Spectrometer

Analysis of Adipose Fatty Acids in Human Serum

Adipose extracted from human serum was converted to fatty acid methyl ester, and then analyzed with a GC-MS system. This analysis was performed in conjunction with representatives from Shimane University.

Experiment

Pretreatment

Adipose was extracted from serum and then converted to fatty acid methyl ester (derivatized). Seven deuterium labeled fatty acids were added as internal standard substances.

Instrument

A GCMS-QP2010 Ultra system was used for the measurements. The analysis conditions are shown in Table 1.

Table 1: Analysis Conditions

GC-MS	: GCMS-QP2010 Ultra		
Column	: SP-2560 (100 mL. × 0.25 mmI.D., df = 0.25 μm) (Supelco)		
[GC]		[MS]	
Injection quantity	: 1 μL	Interface temperature	: 250°C
Vaporization chamber temperature	: 250°C	Ion source temperature	: 200°C
Column oven temperature	: 40°C(2 min) → (20°C/ min) → 140°C(min) → (4°C/ min) → 240°C(15min)	Solvent elution time	: 11.5 min
Control mode	: Constant linear velocity (20cm/sec)	Data sampling time	: 11.6 – 51.0 min
Injection mode	: Splitless	Solvent elution time	: Scan
Sampling time	: 1min	Mass range	: m/z 40-500
Carrier gas	: Helium	Event time	: 0.5 sec

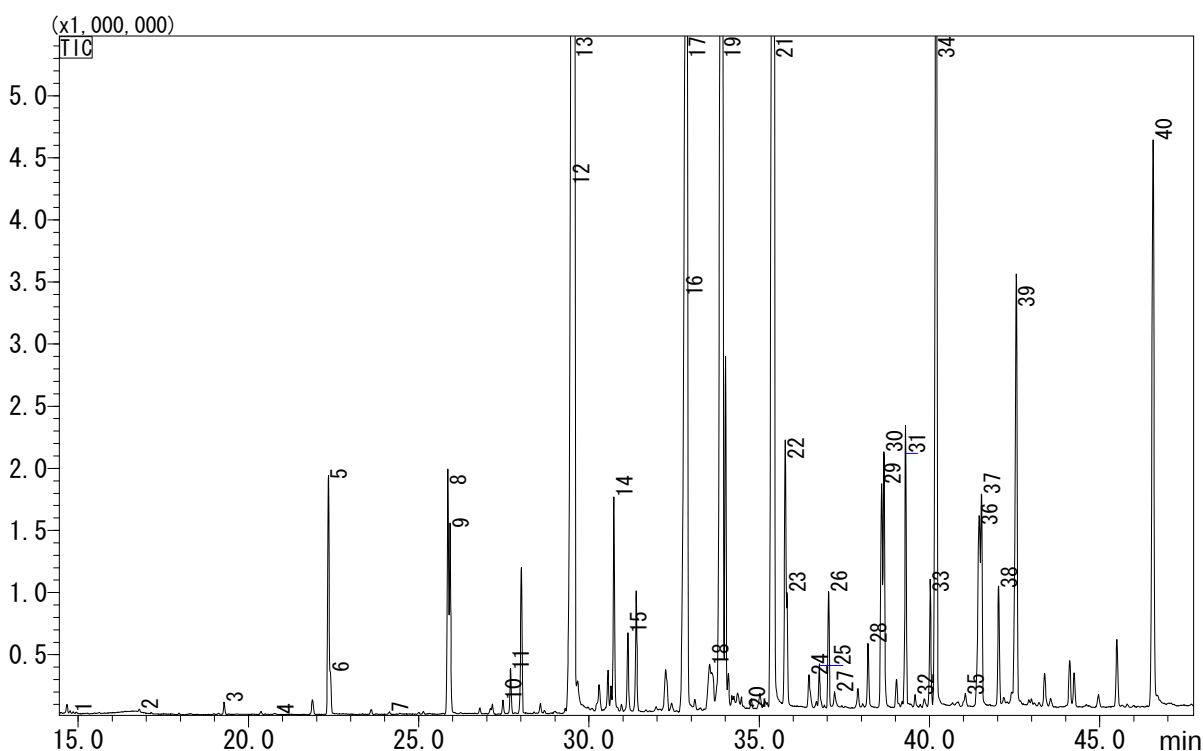


Fig. 1: Total Ion Current Chromatogram for Fatty Acid Methyl Esters (Analysis of Adipose Fatty Acids in Serum)

Peak	Fatty Acid Methyl	Peak	Fatty Acid Methyl
1	Methyl caproate;6:0	21	Methyl linoleate;(Z)18:2n-6
2	Methyl caprylate;8:0	22	Methyl arachisate(D3);20:0 (I.S.)
3	Methyl caprate;10:0	23	Methyl arachisate;20:0
4	Methyl undecanoate;11:0	24	Methyl gamma-linolenate;(Z)18:3n-6
5	Methyl laurate(D3);12:0 (I.S.)	25	Methyl cis-11-icosenoate;(Z)20:1n-9
6	Methyl laurate;12:0	26	Methyl linolenate;(Z)18:3n-3
7	Methyl tridecanoate;13:0	27	Methyl heneicosanoate;21:0
8	Methyl myristate(D3);14:0 (I.S.)	28	Methyl cis-11,14-Icosadienoate;(Z)20:2n-6
9	Methyl myristate;14:0	29	Methyl behenate(D4);22:0 (I.S.)
10	Methyl myristoleate;(Z)14:1n-5	30	Methyl behenate;22:0
11	Methyl pentadecanoate;15:0	31	Methyl eicosa-8,11,14-trienoate;20:3n-6
12	Methyl palmitate(D3);16:0 (I.S.)	32	Methyl erucate;22:1n-9
13	Methyl palmitate;16:0	33	Methyl tricosanoate;23:0
14	Methyl palmitoleate;(Z)16:1n-7	34	Methyl arachidonate;(Z)20:4n-6
15	Methyl margarate;17:0	35	Methyl cis-13,16-Docosadienoate;(Z)22:2n-6
16	Methyl stearate(D3);18:0 (I.S.)	36	Methyl lignocerate(D4);24:0 (I.S.)
17	Methyl stearate;18:0	37	Methyl lignocerate;24:0
18	Methyl elaidate;(E)18:1n-9	38	Methyl cis-5,8,11,14,17-Eicosapentaenoate;(Z)20:5n-3
19	Methyl oleate;(Z)18:1n-9	39	Methyl nervonate;(Z)24:1n-9
20	Methyl linolelaidate;(E)18:2n-6	40	Methyl cis-4,7,10,13,16,19-Docosahexaenoate;(Z)22:6n-3

Summary

Forty fatty acid components were separately detected, illustrating the use of GC-MS as an effective approach for the analysis of fatty acids in serum.

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