THE PERIODIC TABLE OF FOOD INITIATIVE (PTFI)™

TECHNICAL NOTE

Fatty Acid Methyl Esters (FAMEs)

PTFI Platform

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PTFI FAMEs Platform

The PTFI Fatty Acid Methyl Esters (FAMEs) platform supports targeted characterization of the fatty acid composition in food and/or biological samples. This method uses a biphasic extraction with water and hexane to isolate fatty acids prior to analysis with gas chromatography coupled with flame ionization detection (GC-FID).

What are Fatty Acids?

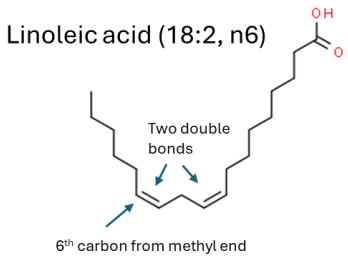
Fatty acids are the building blocks of fat in the food we eat. In foods, fatty acids exist both as free molecules and are contained in complex lipids where they make up the non-polar component of complex lipid structures.

Why study Fatty Acids with FAMEs?

Fatty acids can vary in carbon chain length, double bond content, and orientation of double bonds (cis vs trans fatty acids). As key building blocks of fats, fatty acids can further inform our understanding of the good and bad fat content of foods. The PTFI FAMEs platform allows for absolute quantitation of the total fatty acid (free + bound) content of samples.

How are Fatty acids Named?

The first number in the name indicates the total number of carbons in the molecule. The number after the colon tells us how many double bonds the molecule has. The “n” number tells us the position of the first double bond from the methyl end of the molecule.



Fatty acids detected by the PTFI method:

Saturated: Capric acid (10:0), Undecanoic acid (11:0), Lauric acid (12:0), Tridecylic acid (13:0), Myristic acid (14:0), Pentadecanoic acid (15:0), Palmitic acid (16:0), Margaric acid (17:0), Stearic acid (18:0), Arachidic acid (20:0), Heneicosanoic acid (21:0), Behenic acid (22:0), Tricosanoic acid (23:0), Lignoceric acid (24:0)

Monounsaturated: cis-9-Myristoleic acid (14:1), cis-10-Pentadecenoic acid (15:1), cis-9-Palmitoleic acid (16:1), cis-10-Heptadecenoic acid (17:1), cis-9-Oleic acid (18:1), cis-11-Eicosenoic acid (20:1), cis-13-Erucic acid (22:1), cis-15-Nervonic acid (24:1)

Omega-6: cis-9,12-Linoleic acid (18:2), cis-6,9,12-γ-Linolenic acid (18:3), cis-11,14-Eicosadienoic acid (20:2), cis-8,11,14-Eicosatrienoic acid (20:3), cis-5,8,11,14-Arachidonic acid (20:4), cis-13,16-Docosadienoic acid (22:2)

Omega-3: cis-9,12,15-α-Linolenic acid (18:3), cis-11,14,17-Eicosatrienoic acid (20:3), cis-5,8,11,14,17-Eicosapentaenoic acid (20:5), cis-4,7,10,13,16,19-Docosahexaenoic acid (22:6)

Trans Fatty Acids: trans-9-Elaidic acid (18:1), trans, trans-9,12-Linolelaidic acid (18:2)