

Supplementary Data 2. MS² fragmentation patterns for oxidatively truncated and full-length oxygenated lipids.

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General notes:

1. All *m/z* values given in the table were calculated considering the charge.
2. Representative MS² spectra do not always contain signals corresponding to the position-specific fragments (the latter were acquired in MS³ experiments).
3. For simplicity, only *E*-conformers of PUFAs are depicted. Fragmentation patterns do not allow to elucidate the configuration of a double bond, but keep in mind the natural *Z*-configuration for some double bonds in (ox)PUFAs.
4. Modification- and position-specific fragments: the most intense ones are highlighted in **bold**, the intermediate intensity ones are regular, and the weak ones are grayed out.

PHOSPHATIDYLCHOLINES

Oxidatively truncated: <COOH>

[M-H]⁻ adducts (precursors)

Mod. position	Precursor	Chemical Formula	<i>m/z</i>	MS ² Fragmentation	Mod./pos.-specific fragment ¹	Chemical Formula	<i>m/z</i>	
4	PC(16:0/4:0<COOH>)	C ₂₈ H ₅₃ O ₁₀ NP	594.3413		FA(4:0<COOCH ₃ >)	C ₅ H ₇ O ₄	131.0350	
5	PC(16:0/5:0<COOH>)	C ₂₉ H ₅₅ O ₁₀ NP	608.3569		FA(5:0<COOCH ₃ >)	C ₆ H ₉ O ₄	145.0506	
7	PC(16:0/7:0<COOH>)	C ₃₁ H ₅₉ O ₁₀ NP	636.3882		FA(7:0<COOCH ₃ >)	C ₈ H ₁₃ O ₄	173.0819	
8	PC(16:0/8:0<COOH>)	C ₃₂ H ₆₁ O ₁₀ NP	650.4039		FA(8:0<COOCH ₃ >)	C ₉ H ₁₅ O ₄	187.0976	
9	PC(16:0/9:0<COOH>)	C ₃₃ H ₆₃ O ₁₀ NP	664.4195		FA(9:0<COOCH ₃ >)	C ₁₀ H ₁₇ O ₄	201.1132	
10	PC(16:0/10:0<COOH>)	C ₃₄ H ₆₅ O ₁₀ NP	678.4352			FA(10:0<COOCH ₃ >)	C ₁₁ H ₁₉ O ₄	215.1289
	PC(16:0/10:1<COOH>)	C ₃₄ H ₆₃ O ₁₀ NP	676.4195			FA(10:1<COOCH ₃ >)	C ₁₁ H ₁₇ O ₄	213.1132
11	PC(16:0/11:1<COOH>)	C ₃₅ H ₆₅ O ₁₀ NP	690.4352			FA(11:1<COOCH ₃ >)	C ₁₂ H ₁₉ O ₄	227.1289
	PC(16:0/11:2<COOH>)	C ₃₅ H ₆₃ O ₁₀ NP	688.4195			FA(11:2<COOCH ₃ >)	C ₁₂ H ₁₇ O ₄	225.1132
12	PC(16:0/12:1<COOH>)	C ₃₆ H ₆₇ O ₁₀ NP	704.4508			FA(12:1<COOCH ₃ >)	C ₁₃ H ₂₁ O ₄	241.1445
	PC(16:0/12:2<COOH>)	C ₃₆ H ₆₅ O ₁₀ NP	702.4352			FA(12:2<COOCH ₃ >)	C ₁₃ H ₁₉ O ₄	239.1289
13	PC(16:0/13:2<COOH>)	C ₃₇ H ₆₇ O ₁₀ NP	716.4508			FA(13:2<COOCH ₃ >)	C ₁₄ H ₂₁ O ₄	253.1445
	PC(16:0/13:3<COOH>)	C ₃₇ H ₆₅ O ₁₀ NP	714.4352			FA(13:3<COOCH ₃ >)	C ₁₄ H ₁₉ O ₄	251.1289
14	PC(16:0/14:3<COOH>)	C ₃₈ H ₆₇ O ₁₀ NP	728.4508			FA(14:3<COOCH ₃ >)	C ₁₅ H ₂₁ O ₄	265.1445

¹ Although other characteristic fragments can be formed occasionally, "Mod./pos.-specific fragment" column contains the most reproducible fragment ion *m/z*. Such fragments as FA<COOH>, FA<COOH>-CO₂, FA<COOH>-H₂O (or FA<COOCH₃₃OH) were occasionally observed, and might be also used as supporting the annotation.

PHOSPHATIDYLCHOLINES

Oxidatively truncated: <oxo>

[M+HCOO]⁻ adducts (precursors)

Mod. position	Precursor	Chemical Formula	m/z	MS ² Fragmentation	Mod./pos.-specific fragment ²	Chemical Formula	m/z
4	PC(16:0/4:0<oxo>)	C ₂₉ H ₅₅ O ₁₁ NP	624.3518	<p>PC (16:0/FA<oxo>)</p> <p>1) -HCOOH (46 Da) 2) S_N2: CH₃ migration from choline</p> <p>FA 16:0</p> <p>FA<oxo></p> <p>FA<COOCH₃></p> <p>Water loss</p> <p>Relative Abundance vs m/z spectrum: 157.0862 (red), 171.1019 (yellow), 255.2321 (green), 620.3900 (blue), 680.4217 (yellow), -60 Da, -46 Da.</p> <p>● Fragments containing oxFAs ● Fragments containing methylated oxFAs ● Fragments related to water loss ● Fragments not containing oxFAs</p>	FA(4:0<oxo>)	C ₄ H ₅ O ₃	101.0244
5	PC(16:0/5:0<oxo>)	C ₃₀ H ₅₇ O ₁₁ NP	638.3675		FA(5:0<oxo>)	C ₅ H ₇ O ₃	115.0401
7	PC(16:0/7:0<oxo>)	C ₃₂ H ₆₁ O ₁₁ NP	666.3988		FA(7:0<oxo>)	C ₇ H ₁₁ O ₃	143.0714
8	PC(16:0/8:0<oxo>)	C ₃₃ H ₆₃ O ₁₁ NP	680.4144		FA(8:0<oxo>)	C ₈ H ₁₃ O ₃	157.0870
9	PC(16:0/9:0<oxo>)	C ₃₄ H ₆₅ O ₁₁ NP	694.4301		FA(9:0<oxo>)	C ₉ H ₁₅ O ₃	171.1027
10	PC(16:0/10:0<oxo>)	C ₃₅ H ₆₇ O ₁₁ NP	708.4457		FA(10:0<oxo>)	C ₁₀ H ₁₇ O ₃	185.1183
	PC(16:0/10:1<oxo>)	C ₃₅ H ₆₅ O ₁₁ NP	706.4301		FA(10:1<oxo>)	C ₁₀ H ₁₅ O ₃	183.1027
11	PC(16:0/11:1<oxo>)	C ₃₆ H ₆₇ O ₁₁ NP	720.4457		FA(11:1<oxo>)	C ₁₁ H ₁₇ O ₃	197.1183
	PC(16:0/11:2<oxo>)	C ₃₆ H ₆₅ O ₁₁ NP	718.4301		FA(11:2<oxo>)	C ₁₁ H ₁₅ O ₃	195.1027
12	PC(16:0/12:1<oxo>)	C ₃₇ H ₆₉ O ₁₁ NP	734.4614		FA(12:1<oxo>)	C ₁₂ H ₁₉ O ₃	211.1340
	PC(16:0/12:2<oxo>)	C ₃₇ H ₆₇ O ₁₁ NP	732.4457		FA(12:2<oxo>)	C ₁₂ H ₁₇ O ₃	209.1183
13	PC(16:0/13:2<oxo>)	C ₃₈ H ₆₉ O ₁₁ NP	746.4614		FA(13:2<oxo>)	C ₁₃ H ₁₉ O ₃	223.1340
	PC(16:0/13:3<oxo>)	C ₃₈ H ₆₇ O ₁₁ NP	744.4457		FA(13:3<oxo>)	C ₁₃ H ₁₇ O ₃	221.1183
14	PC(16:0/14:3<oxo>)	C ₃₉ H ₆₉ O ₁₁ NP	758.4614		FA(14:3<oxo>)	C ₁₄ H ₁₉ O ₃	235.1340

² + additional weak signals in MS² spectra: FA<COOH> -H₂O (or FA<COOCH₃>-CH₃OH), FA<COOH>-CO₂.

PHOSPHATIDYLCHOLINES

Full-length oxygenated: <oxo>

[M+HCOO]⁻ adducts (precursors)

Precursor	Chemical Formula & m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula & m/z	Pos.-specific fragmentation	Chemical Formula	m/z
PC(16:0/18:1<oxo>)	C ₄₃ H ₈₁ O ₁₁ NP 818.5553	<p>PC (16:0/FA<oxo>)</p> <p>1) -HCOOH 2) S_N2: CH₃ migration from choline</p> <p>FA <oxo></p> <p>FA 16:0</p> <p>FA<COOCH₃></p>	<p>FA(18:1<oxo>)</p> <p>Methylation</p> <p>CO₂ loss</p>	<p>C₁₈H₃₁O₃ 295.2279</p> <p>C₁₉H₃₃O₃ 309.2435</p> <p>C₁₇H₃₁O 251.2380</p>	<p>9</p> <p>C₈H₁₃O₂ 141.0921</p> <p>C₁₀H₁₉O 155.1441</p> <p>C₁₀H₁₇O₃ 185.1183</p>		
PC(16:0/18:2<oxo>)	C ₄₃ H ₇₉ O ₁₁ NP 816.5396	<p>● Fragments containing oxFAs</p> <p>● Fragments containing methylated oxFAs</p> <p>● Fragments not containing oxFAs</p> <p>* Signal of precursor ion might not always be present in MS² spectra due to the intensive fragmentation</p> <p>FA fragmentation pattern:</p>	<p>FA(18:2<oxo>)</p> <p>Methylation</p> <p>CO₂ loss</p>	<p>C₁₈H₂₉O₃ 293.2122</p> <p>C₁₉H₃₁O₃ 307.2279</p> <p>C₁₇H₂₉O 249.2224</p>	<p>8</p> <p>C₉H₁₅O₃ 171.1027</p> <p>9</p> <p>C₉H₁₅ 123.1179</p> <p>C₈H₁₃O 125.0972</p> <p>C₁₀H₁₇O₃ 185.1183</p> <p>10</p> <p>C₉H₁₅O 139.1128</p> <p>C₁₀H₁₇O 153.1285</p> <p>C₉H₁₅O₂ 155.1078</p> <p>11</p> <p>C₇H₁₃ 97.1023</p> <p>C₉H₁₅O 139.1128</p> <p>C₁₀H₁₇O₂ 169.1234</p> <p>C₁₁H₁₇O₃ 197.1183</p> <p>C₁₂H₁₉O₃ 211.1340</p> <p>12</p> <p>C₆H₁₁ 83.0866</p> <p>C₁₃H₂₁O₃ 225.1496</p> <p>13</p> <p>C₇H₁₃O 113.0972</p> <p>C₁₁H₁₅O₂ 179.1078</p> <p>C₁₂H₁₉O₂ 195.1391</p> <p>C₁₃H₁₇O₂ 205.1234³</p> <p>C₁₃H₁₉O₃ 223.1340⁴</p> <p>14</p> <p>C₆H₁₁O 99.0815</p> <p>C₁₃H₂₁O₂ 209.1547</p>		

³ The signal is seen in the case of FA(18:2<OOH(13)>).

⁴ The signal is seen in the case of FA(18:2<OOH(13)>).

Full-length oxygenated: <oxo> (continued)

[M+HCOO]⁻ adducts (precursors)

Precursor	Chemical Formula & m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula & m/z	Pos.-specific fragmentation	Chemical Formula	m/z																	
PC(16:0/20:4<oxo>)	C₄₅H₇₉O₁₁NP 840.5396	<p>PC (16:0/FA<oxo>)</p> <p>1) -HCOOH 2) S_n2: CH₃ migration from choline</p> <p>FA <oxo></p> <p>FA 16:0</p> <p>FA<COOCH₃></p> <p>● Fragments containing oxFAs ● Fragments containing methylated oxFAs ● Fragments not containing oxFAs</p> <p>* The precursor ion m/z may not always present in MS² spectra due to the intensive fragmentation</p> <p>FA fragmentation pattern:</p>	FA(20:4<oxo>) Methylation CO ₂ loss	<p>C₂₀H₂₉O₃ 317.2122 C₂₁H₃₁O₃ 331.2279 C₁₉H₂₉O 273.2224</p>	5	<p>C₄H₇O C₆H₉O₃ C₁₅H₂₃ 71.0502 129.0557 203.1805</p>	6	<p>C₅H₇O₂ C₁₆H₂₅O 99.0452 233.1911</p>	7	<p>C₁₅H₂₃O 219.1754</p>	8	<p>C₇H₁₁O C₈H₁₃O C₈H₁₁O₃ C₁₂H₁₉ C₉H₁₃O₃ 111.0815 125.0972 155.0714 163.1492 169.0870</p>	9	<p>C₈H₁₁O₂ C₁₁H₁₉ C₁₃H₂₁O 139.0765 151.1492 193.1598</p>	11	<p>C₉H₁₅ C₁₀H₁₃O C₁₁H₁₇O C₁₂H₁₇O₃ 123.1128 149.0972 165.1285 209.1183</p>	12	<p>C₉H₁₃O C₁₀H₁₇O C₁₁H₁₃O C₁₁H₁₅O₂ 137.0972 153.1285 161.0971 179.1078</p>	13	<p>C₁₂H₁₇O₂ 193.1234</p>	14	<p>C₆H₁₁ C₁₃H₁₉O C₁₅H₂₁O₃ 83.0866 191.1441 249.1496</p>	15	<p>C₇H₁₃O C₉H₁₅O C₁₄H₁₉O₂ 113.0972 139.1128 219.1391</p>

Full-length oxygenated: <OH>

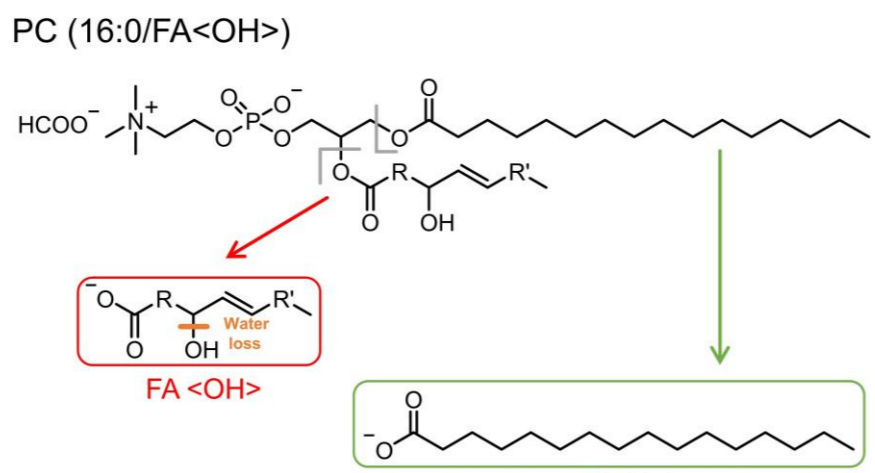
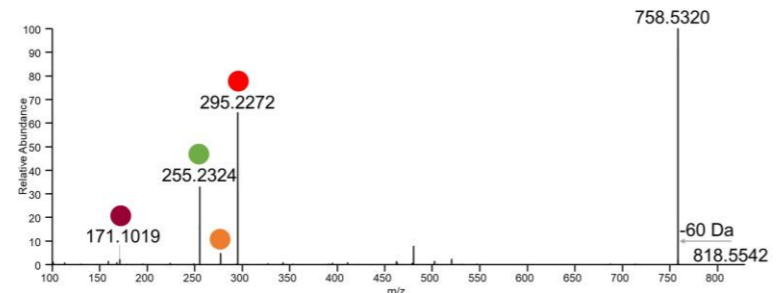
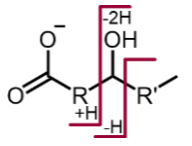
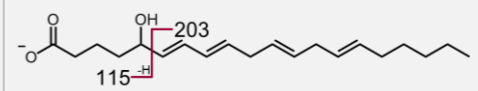
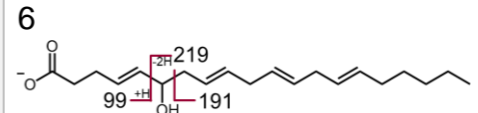
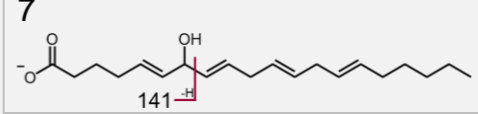
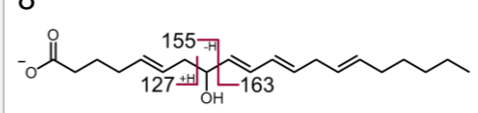
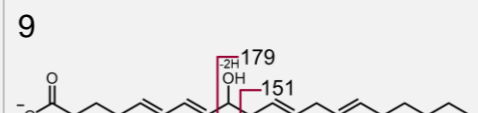
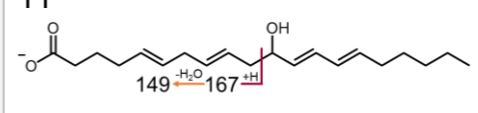
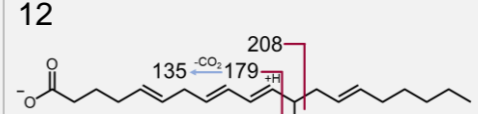
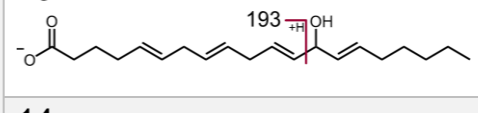
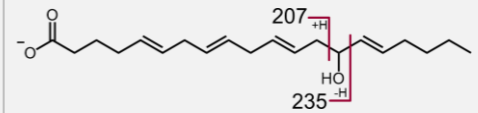
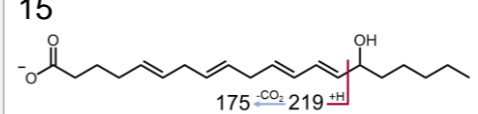
[M+HCOO]⁻ adducts (precursors)

Precursor	Chemical Formula & m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula & m/z	Pos.-specific fragmentation	Chemical Formula	m/z
PC(16:0/18:1<OH>)	C ₄₃ H ₈₃ O ₁₁ NP 820.5709	<p>PC (16:0/FA<OH>)</p> <p>FA <OH></p> <p>FA 16:0</p> <p>● Fragments containing oxFAs ● Fragments related to water loss ● Position-specific fragments ● Fragments not containing oxFAs</p> <p>FA fragmentation pattern:</p>	<p>FA(18:1<OH>)</p> <p>H₂O loss</p> <p>CO₂ loss</p> <p>H₂O&CO₂ loss</p>	<p>C₁₈H₃₃O₃ 297.2435</p> <p>C₁₈H₃₁O₂ 279.2330</p> <p>C₁₇H₃₃O 253.2536</p> <p>C₁₇H₃₁ 235.2431</p>	<p>9</p> <p>141 -H</p> <p>155 -2H OH</p> <p>C₈H₁₃O₂ 141.0921 C₁₀H₁₉O 155.1441</p> <p>C₉H₁₅O₃ 171.1027</p>		
PC(16:0/18:2<OH>)	C ₄₃ H ₈₁ O ₁₁ NP 818.5553	<p>● Fragments containing oxFAs ● Fragments related to water loss ● Position-specific fragments ● Fragments not containing oxFAs</p> <p>FA fragmentation pattern:</p>	<p>FA(18:2<OH>)</p> <p>H₂O loss</p> <p>CO₂ loss</p> <p>H₂O&CO₂ loss</p>	<p>C₁₈H₃₁O₃ 295.2279</p> <p>C₁₈H₂₉O₂ 277.2173</p> <p>C₁₇H₃₁O 251.2380</p> <p>C₁₇H₂₉ 233.2275</p>	<p>9</p> <p>151 -2H OH</p> <p>123 -H</p> <p>171 -H</p> <p>C₉H₁₅ 123.1179 C₁₀H₁₅O 151.1128 C₉H₁₅O₃ 171.1027</p> <p>10</p> <p>183 -H</p> <p>155 -H</p> <p>139 -2H OH</p> <p>C₉H₁₅O 139.1128 C₉H₁₅O₂ 155.1078 C₁₀H₁₅O₃ 183.1027</p> <p>11</p> <p>125 -H OH</p> <p>97 -H</p> <p>169 -H</p> <p>197 -H</p> <p>C₇H₁₃ 97.1023 C₈H₁₃O 125.0972 C₁₀H₁₇O₂ 169.1234 C₁₁H₁₇O₃ 197.1183</p> <p>12</p> <p>211 -H</p> <p>183 -H</p> <p>83 -H OH</p> <p>C₆H₁₁ 83.0866 C₁₁H₁₉O₂ 183.1391 C₁₂H₁₉O₃ 211.1340</p> <p>13</p> <p>195 -H OH</p> <p>C₁₂H₁₉O₂ 195.1391</p> <p>14</p> <p>209 -H</p> <p>C₁₃H₂₁O₂ 209.1547</p>		

PHOSPHATIDYLCHOLINES

Full-length oxygenated: <OH> (continued)

[M+HCOO]⁻ adducts

Precursor	Chemical Formula & m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula & m/z	Pos.-specific fragmentation	Chemical Formula	m/z
PC(16:0/20:4<OH>)	C₄₅H₈₁O₁₁NP 842.5553	<p>PC (16:0/FA<OH>)</p>  <p>FA <OH></p> <p>FA 16:0</p>  <p>● Fragments containing oxFAs ● Fragments related to water loss ● Position-specific fragments ● Fragments not containing oxFAs</p> <p>FA fragmentation pattern:</p> 	<p>FA(20:4<OH>)</p> <p>H₂O loss</p> <p>CO₂ loss</p> <p>H₂O&CO₂ loss</p>	<p>C₂₀H₃₁O₃ 319.2279</p> <p>C₂₀H₂₉O₂ 301.2173</p> <p>C₁₉H₃₁O 275.2380</p> <p>C₁₉H₂₉ 257.2275</p>	5	 <p>C₅H₇O₃ C₁₅H₂₃</p>	115.0401 203.1805 ⁵
					6	 <p>C₅H₇O₂ C₁₄H₂₃ C₁₅H₂₃O</p>	99.0452 191.1805 219.1754
					7	 <p>C₇H₉O₃</p>	141.0557
					8	 <p>C₇H₁₁O₂ C₈H₁₁O₃ C₁₂H₁₉</p>	127.0765 155.0714 163.1492
					9	 <p>C₈H₁₁O C₈H₁₁O₂ C₁₁H₁₉ C₉H₁₁O₃ C₁₂H₁₉O</p>	123.0815 139.0765 151.1492 167.0714 179.1441
					11	 <p>C₁₀H₁₃O C₁₀H₁₅O₂</p>	149.0972 167.1078
					12	 <p>C₁₀H₁₅ C₉H₁₅O C₁₁H₁₅O₂ C₁₂H₁₆O₃</p>	135.1179 139.1128 179.1078 208.1105 ⁶
					13	 <p>C₁₂H₁₇O₂</p>	193.1234
					14	 <p>C₁₃H₁₉O₂ C₁₄H₁₉O₃</p>	207.1391 235.1340
					15	 <p>C₁₃H₁₉ C₁₄H₁₉O₂</p>	175.1492 219.1391

⁵ The signal is not OH{5}-specific (can be found in the spectra of other isomers, but less intense)

⁶ The signal should correspond to an anion-radical that is the unique case for position 12.

PHOSPHATIDYLCHOLINES

Full-length oxygenated: <ep>

[M+HCOO]⁻ adducts

Precursor	Chemical Formula & m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula & m/z	Pos.-specific fragmentation	Chemical Formula	m/z
PC(16:0/18:0<ep>)	C ₄₃ H ₈₃ O ₁₁ NP 820.5709	PC (16:0/FA<ep>) 	FA(18:0<ep>) H ₂ O loss	C ₁₈ H ₃₃ O ₃ 297.2435 C ₁₈ H ₃₁ O ₂ 279.2330	9-10 	C ₉ H ₁₇ O C ₉ H ₁₅ O ₂ C ₉ H ₁₅ O ₃	141.1285 155.1078 171.1027
PC(16:0/18:1<ep>)	C ₄₃ H ₈₁ O ₁₁ NP 818.5553		FA(18:1<ep>) H ₂ O loss	C ₁₈ H ₃₁ O ₃ 295.2279 C ₁₈ H ₂₉ O ₂ 277.2173	9-10 12-13 	C ₉ H ₁₅ O ₃ C ₁₀ H ₁₅ O ₃ C ₇ H ₁₃ O C ₁₁ H ₁₉ O ₂ C ₁₂ H ₁₉ O ₂	171.1027 183.1027 113.0972 183.1391 195.1391
PC(16:0/20:3<ep>)	C ₄₅ H ₈₁ O ₁₁ NP 842.5553	 FA fragmentation pattern: 	FA(20:3<ep>) H ₂ O loss H ₂ O&CO ₂ loss	C ₂₀ H ₃₁ O ₃ 319.2279 C ₂₀ H ₂₉ O ₂ 301.2173 C ₁₉ H ₂₉ 257.2275	5-6 8-9 11-12 14-15 	C ₅ H ₇ O C ₅ H ₅ O ₂ C ₅ H ₇ O ₂ C ₁₂ H ₁₉ C ₁₄ H ₂₃ C ₇ H ₁₁ O ₂ C ₈ H ₁₁ O C ₁₁ H ₁₉ C ₈ H ₁₁ O ₃ C ₉ H ₁₁ O ₃ C ₁₂ H ₁₉ O C ₁₀ H ₁₅ O ₂ C ₁₁ H ₁₅ O ₂ C ₁₂ H ₁₅ O ₃ C ₇ H ₁₃ O C ₁₃ H ₁₉ C ₁₄ H ₁₉ O ₂	83.0502 97.0295 99.0452 163.1492 191.1805 127.0765 ⁷ 123.0815 151.1492 155.0714 167.0714 179.1441 167.1078 179.1078 208.1104 ⁸ 113.0972 175.1492 219.1391

⁷ The abundances of fragments do not differ much, so it is difficult to choose the major one.

⁸ The signal should correspond to an anion-radical that is the unique case for position 12.

PHOSPHATIDYLCHOLINES

Full-length oxygenated: <OOH>

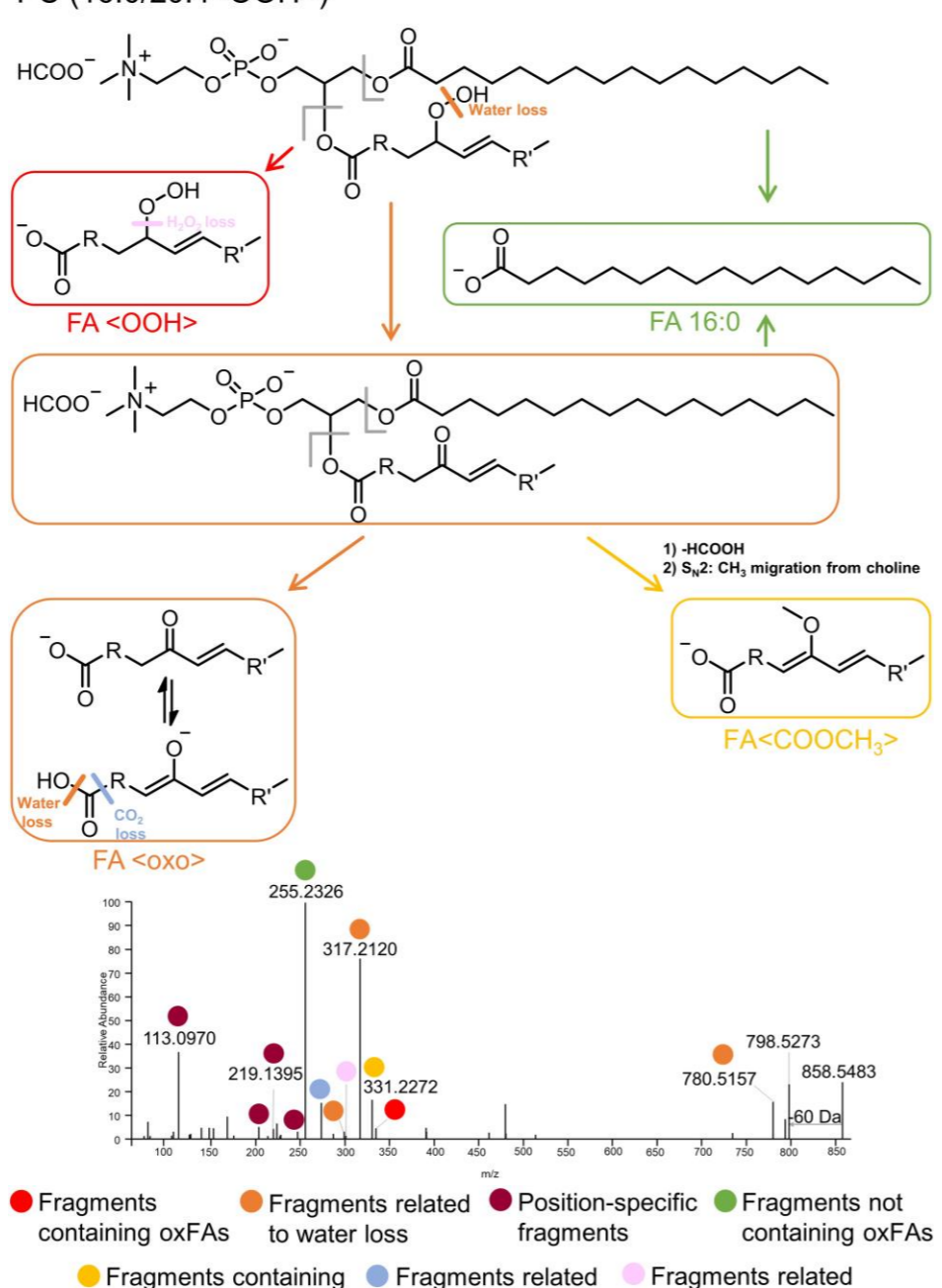
[M+HCOO]⁻ adducts

Precursor	Chemical Formula & m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula & m/z	Pos.-specific fragmentation
PC(16:0/18:1<OOH>)	C ₄₃ H ₈₃ O ₁₂ NP 836.5658	<p>PC (16:0/FA<OOH>)</p>	<p>FA(18:1<OOH>)</p> <p>H₂O loss</p> <p>Methylation</p> <p>H₂O&CO₂ loss</p> <p>2H₂O loss</p> <p>H₂O₂ loss</p>	<p>C₁₈H₃₃O₄ 313.2384</p> <p>C₁₈H₃₁O₃ 295.2279</p> <p>C₁₉H₃₃O₃ 309.2435</p> <p>C₁₇H₃₁O 251.2380</p> <p>C₁₈H₂₉O₂ 277.2173</p> <p>C₁₈H₂₇O₂ 275.2016</p>	
PC(16:0/18:2<OOH>)	C ₄₃ H ₈₁ O ₁₂ NP 834.5502	<p>1) -HCOOH 2) S_N2: CH₃ migration from choline</p>	<p>FA(18:2<OOH>)</p> <p>H₂O loss</p> <p>Methylation</p> <p>H₂O&CO₂ loss</p> <p>2H₂O loss</p> <p>H₂O₂ loss</p>	<p>C₁₈H₃₁O₄ 311.2228</p> <p>C₁₈H₂₉O₃ 293.2122</p> <p>C₁₉H₃₁O₃ 307.2279</p> <p>C₁₇H₂₉O 249.2224</p> <p>C₁₈H₂₇O₂ 275.2016</p> <p>C₁₈H₂₉O₂ 277.2173</p>	See above (Full-length oxygenated: <oxo>)

PHOSPHATIDYLCHOLINES

Full-length oxygenated: <OOH> (continued)

[M+HCOO]⁻ adducts

Precursor	Chemical Formula & m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula & m/z	Pos.-specific fragmentation
<p>PC(16:0/20:4<OOH>)</p>	<p>C₄₅H₈₁O₁₂NP 858.5502</p>	<p>PC (16:0/20:4<OOH>)</p>  <p> ● Fragments containing oxFAs ● Fragments related to water loss ● Position-specific fragments ● Fragments not containing oxFAs ● Fragments containing methylated oxFAs ● Fragments related to CO₂ loss ● Fragments related to H₂O₂ loss </p>	<p>FA(20:4<OOH>)</p> <p>H₂O loss</p> <p>Methylation</p> <p>H₂O&CO₂ loss</p> <p>2H₂O loss</p> <p>H₂O₂ loss</p>	<p>C₂₀H₃₁O₄ 335.2228</p> <p>C₂₀H₂₉O₃ 317.2122</p> <p>C₂₁H₃₁O₃ 331.2279</p> <p>C₁₉H₂₉O 273.2224</p> <p>C₂₀H₂₇O₂ 299.2017</p> <p>C₂₀H₂₉O₂ 301.2173</p>	<p>See above (Full-length oxygenated: <OXO>)</p>

CHOLESTERYL ESTERS

Oxidatively truncated: <COOH>

[M+Na]⁺ adducts

Mod. position	Precursor	Chemical Formula	m/z	MS ² Fragmentation	Mod./pos.-specific fragment	Chemical Formula	m/z
4	CE(4:0<COOH>)	C ₃₁ H ₅₀ O ₄ Na	509.3601	<p>CE (FA<COOH>)</p> <p>FA<COOH></p> <p>Cholestene cation (-H⁺: NL Cholesterol)</p> <p>Relative Abundance vs m/z</p> <p>● Fragments containing oxFAs (red dot)</p> <p>● Fragments not containing oxFAs (green dot)</p>	FA(4:0<COOH>)	C ₄ H ₆ O ₄ Na	141.0158
5	CE(5:0<COOH>)	C ₃₂ H ₅₂ O ₄ Na	523.3758		FA(5:0<COOH>)	C ₅ H ₈ O ₄ Na	155.0315
7	CE(7:0<COOH>)	C ₃₄ H ₅₆ O ₄ Na	551.4071		FA(7:0<COOH>)	C ₇ H ₁₂ O ₄ Na	183.0628
8	CE(8:0<COOH>)	C ₃₅ H ₅₈ O ₄ Na	565.4227		FA(8:0<COOH>)	C ₈ H ₁₄ O ₄ Na	197.0784
9	CE(9:0<COOH>)	C ₃₆ H ₆₀ O ₄ Na	579.4384		FA(9:0<COOH>)	C ₉ H ₁₆ O ₄ Na	211.0941
10	CE(10:0<COOH>)	C ₃₇ H ₆₂ O ₄ Na	593.4540		FA(10:0<COOH>)	C ₁₀ H ₁₈ O ₄ Na	225.1097
	CE(10:1<COOH>)	C ₃₇ H ₆₀ O ₄ Na	591.4384		FA(10:1<COOH>)	C ₁₀ H ₁₆ O ₄ Na	223.0941
11	CE(11:1<COOH>)	C ₃₈ H ₆₂ O ₄ Na	605.4540		FA(11:1<COOH>)	C ₁₁ H ₁₈ O ₄ Na	237.1097
	CE(11:2<COOH>)	C ₃₈ H ₆₀ O ₄ Na	603.4384		FA(11:2<COOH>)	C ₁₁ H ₁₆ O ₄ Na	235.0941
12	CE(12:1<COOH>)	C ₃₉ H ₆₄ O ₄ Na	619.4697		FA(12:1<COOH>)	C ₁₂ H ₂₀ O ₄ Na	251.1254
	CE(12:2<COOH>)	C ₃₉ H ₆₂ O ₄ Na	617.4540		FA(12:2<COOH>)	C ₁₂ H ₁₈ O ₄ Na	249.1097
13	CE(13:2<COOH>)	C ₄₀ H ₆₄ O ₄ Na	631.4697		FA(13:2<COOH>)	C ₁₃ H ₂₀ O ₄ Na	263.1254
	CE(13:3<COOH>)	C ₄₀ H ₆₂ O ₄ Na	629.4540		FA(13:3<COOH>)	C ₁₃ H ₁₈ O ₄ Na	261.1097
14	CE(14:3<COOH>)	C ₄₁ H ₆₄ O ₄ Na	643.4697		FA(14:3<COOH>)	C ₁₄ H ₂₀ O ₄ Na	275.1254

CHOLESTERYL ESTERS

Oxidatively truncated: <oxo>

[M+Na]⁺ adducts

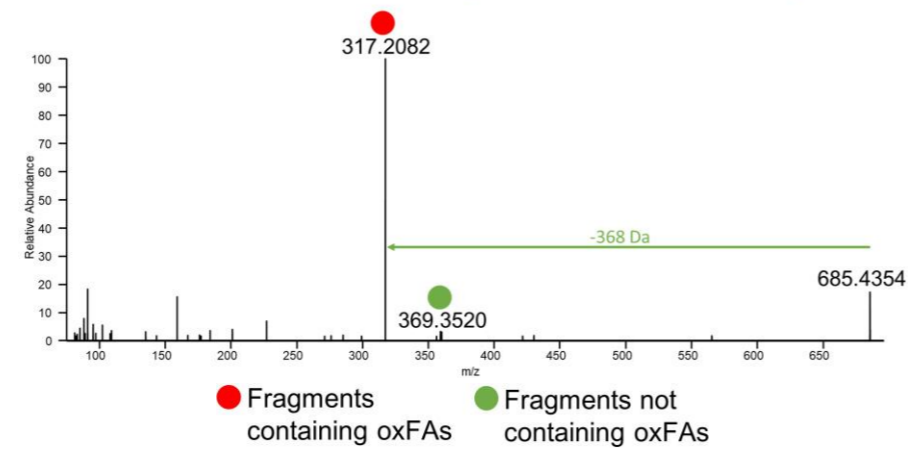
Mod. position	Precursor	Chemical Formula	m/z	MS ² Fragmentation	Mod./pos.-specific fragment	Chemical Formula	m/z
4	CE(4:0<oxo>)	C ₃₁ H ₅₀ O ₃ Na	493.3652	<p>CE (FA<oxo>)</p> <p>Cholestene cation (-H⁺: NL Cholesterol)</p> <p>Relative Abundance vs m/z</p> <p>● Fragments containing oxFAs (Red dot)</p> <p>● Fragments not containing oxFAs (Green dot)</p>	FA(4:0<oxo>)	C ₄ H ₆ O ₃ Na	125.0209
5	CE(5:0<oxo>)	C ₃₂ H ₅₂ O ₃ Na	507.3809		FA(5:0<oxo>)	C ₅ H ₈ O ₃ Na	139.0366
7	CE(7:0<oxo>)	C ₃₄ H ₅₆ O ₃ Na	535.4122		FA(7:0<oxo>)	C ₇ H ₁₂ O ₃ Na	167.0679
8	CE(8:0<oxo>)	C ₃₅ H ₅₈ O ₃ Na	549.4278		FA(8:0<oxo>)	C ₈ H ₁₄ O ₃ Na	181.0835
9	CE(9:0<oxo>)	C ₃₆ H ₆₀ O ₃ Na	563.4435		FA(9:0<oxo>)	C ₉ H ₁₆ O ₃ Na	195.0992
10	CE(10:0<oxo>)	C ₃₇ H ₆₂ O ₃ Na	577.4591		FA(10:0<oxo>)	C ₁₀ H ₁₈ O ₃ Na	209.1148
	CE(10:1<oxo>)	C ₃₇ H ₆₀ O ₃ Na	575.4435		FA(10:1<oxo>)	C ₁₀ H ₁₆ O ₃ Na	207.0992
11	CE(11:1<oxo>)	C ₃₈ H ₆₂ O ₃ Na	589.4591		FA(11:1<oxo>)	C ₁₁ H ₁₈ O ₃ Na	221.1148
	CE(11:2<oxo>)	C ₃₈ H ₆₀ O ₃ Na	587.4435		FA(11:2<oxo>)	C ₁₁ H ₁₆ O ₃ Na	219.0992
12	CE(12:1<oxo>)	C ₃₉ H ₆₄ O ₃ Na	603.4748		FA(12:1<oxo>)	C ₁₂ H ₂₀ O ₃ Na	235.1305
	CE(12:2<oxo>)	C ₃₉ H ₆₂ O ₃ Na	601.4591		FA(12:2<oxo>)	C ₁₂ H ₁₈ O ₃ Na	233.1148
13	CE(13:2<oxo>)	C ₄₀ H ₆₄ O ₃ Na	615.4748		FA(13:2<oxo>)	C ₁₃ H ₂₀ O ₃ Na	247.1305
	CE(13:3<oxo>)	C ₄₀ H ₆₂ O ₃ Na	613.4591		FA(13:3<oxo>)	C ₁₃ H ₁₈ O ₃ Na	245.1148
14	CE(14:3<oxo>)	C ₄₁ H ₆₄ O ₃ Na	627.4748		FA(14:3<oxo>)	C ₁₄ H ₂₀ O ₃ Na	259.1305

CHOLESTERYL ESTERS

Full-length oxygenated: <oxo>

[M+Na]⁺ adducts

Precursor	Chemical Formula	m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula	m/z
CE(18:1)<oxo>	C ₄₅ H ₇₆ O ₃ Na	687.5687	<p>CE (FA<oxo>)</p> <p>FA<oxo></p> <p>Cholestene cation (-H⁺: NL Cholesterol)</p>	FA(18:1)<oxo>	C ₁₈ H ₃₂ O ₃ Na	319.2244
CE(18:2)<oxo>	C ₄₅ H ₇₄ O ₃ Na	685.5530		FA(18:2)<oxo>	C ₁₈ H ₃₀ O ₃ Na	317.2087
CE(20:4)<oxo>	C ₄₇ H ₇₄ O ₃ Na	709.5530		FA(20:4)<oxo>	C ₂₀ H ₃₀ O ₃ Na	341.2087



CHOLESTERYL ESTERS

Full-length oxygenated: <OH>

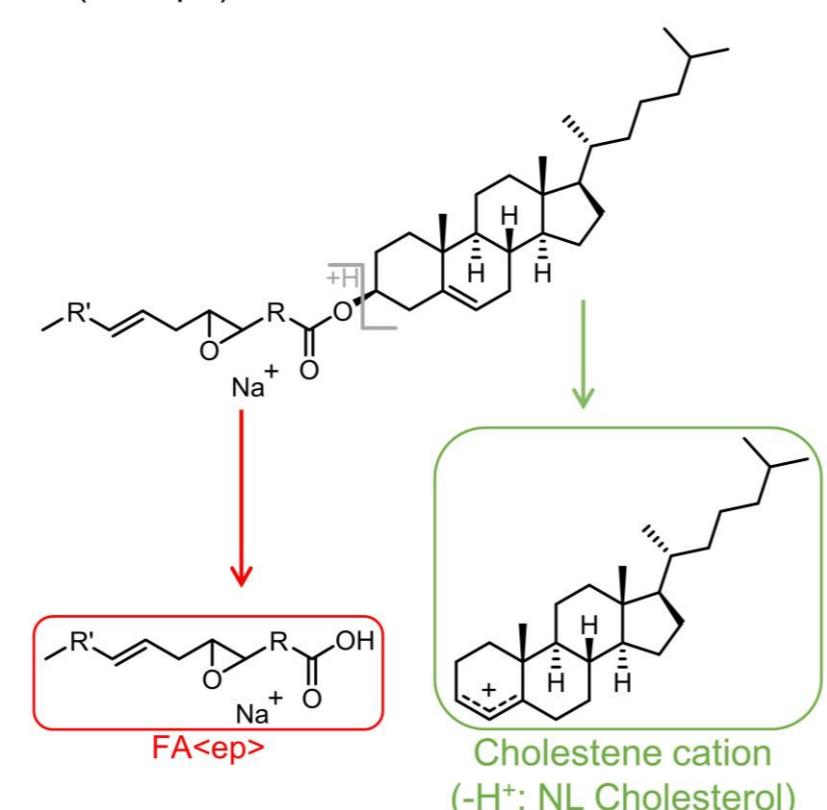
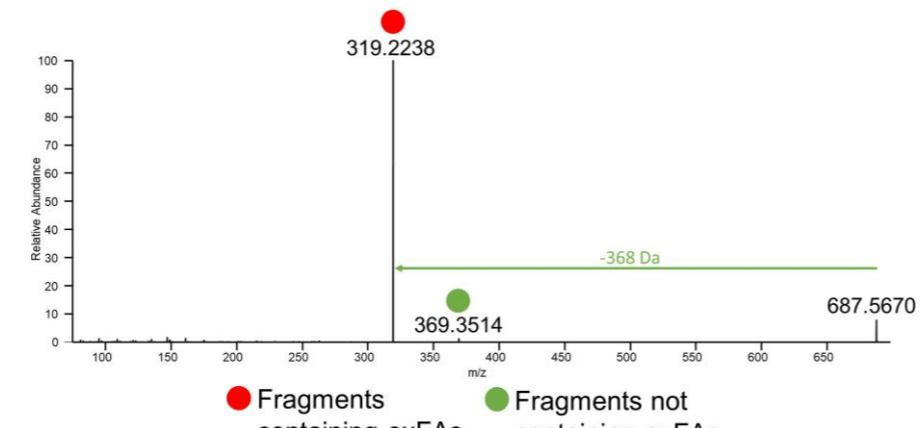
[M+Na]⁺ adducts

Precursor	Chemical Formula	m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula	m/z
CE(18:1<OH>)	C ₄₅ H ₇₈ O ₃ Na	689.5843	<p>CE (FA<OH>)</p> <p>Water loss OH Na⁺ FA<OH></p> <p>Cholestene cation (-H⁺: NL Cholesterol)</p> <p>Relative Abundance vs m/z plot: - 319.2238 (red dot, peak at ~100% abundance) - 301.2135 (orange dot, peak at ~40% abundance) - 369.3511 (green dot, peak at ~20% abundance) - 687.5670 (peak at ~10% abundance) - A green arrow labeled '-368 Da' points from 687.5670 to 319.2238.</p> <p>● Fragments containing oxFAs ● Fragments related to water loss ● Fragments not containing oxFAs</p>	FA(18:1<OH>)	C ₁₈ H ₃₄ O ₃ Na	321.2400
				H ₂ O loss	C ₁₈ H ₃₂ O ₂ Na	303.2295
CE(18:2<OH>)	C ₄₅ H ₇₆ O ₃ Na	687.5687		FA(18:2<OH>)	C ₁₈ H ₃₂ O ₃ Na	319.2244
			H ₂ O loss	C ₁₈ H ₃₀ O ₂ Na	301.2138	
CE(20:4<OH>)	C ₄₇ H ₇₆ O ₃ Na	711.5687		FA(20:4<OH>)	C ₂₀ H ₃₂ O ₃ Na	343.2244
				H ₂ O loss	C ₂₀ H ₃₀ O ₂ Na	325.2138

CHOLESTERYL ESTERS

Full-length oxygenated: <ep>

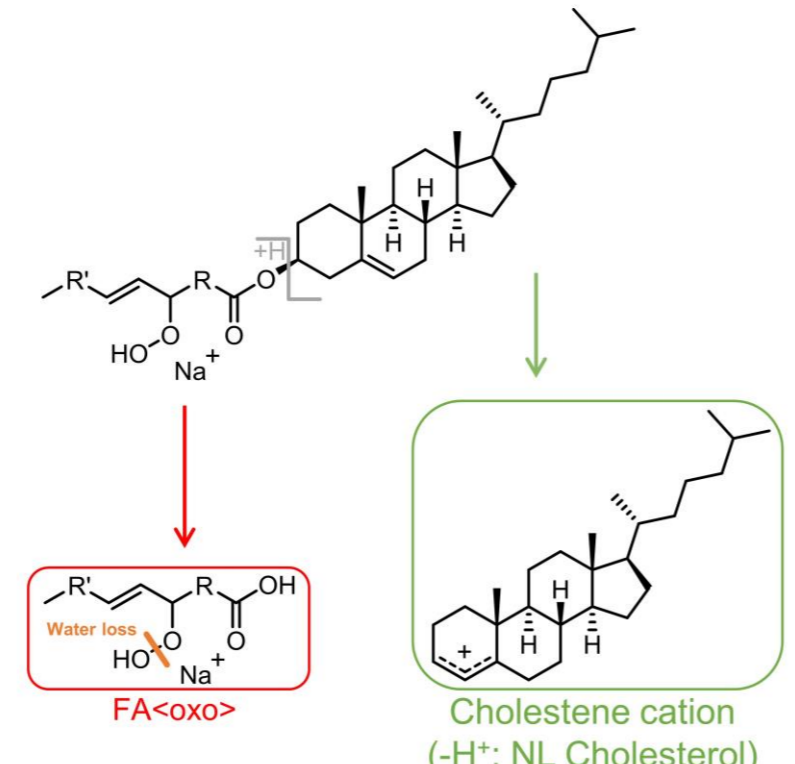
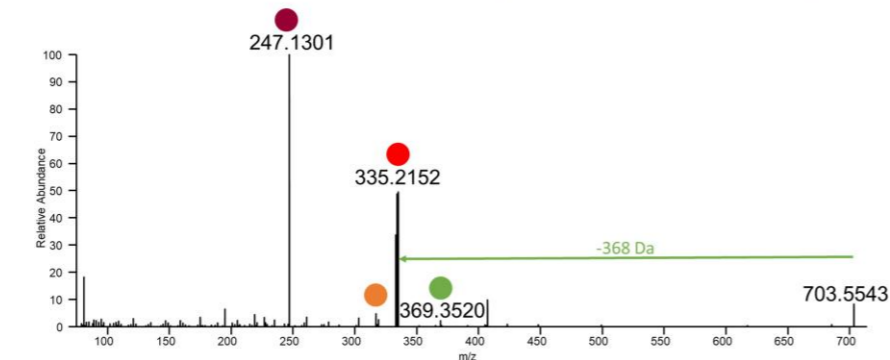
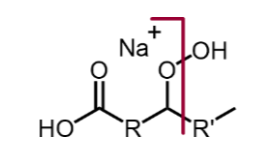
[M+Na]⁺ adducts

Precursor	Chemical Formula	m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula	m/z
CE(18:0<ep>)	C ₄₅ H ₇₈ O ₃ Na	689.5843	<p>CE (FA<ep>)</p>  <p>FA<ep></p> <p>Cholestene cation (-H⁺: NL Cholesterol)</p>	FA(18:0<ep>)	C ₁₈ H ₃₄ O ₃ Na	321.2400
CE(18:1<ep>)	C ₄₅ H ₇₆ O ₃ Na	687.5687		FA(18:1<ep>)	C ₁₈ H ₃₂ O ₃ Na	319.2244
CE(20:3<ep>)	C ₄₇ H ₇₆ O ₃ Na	711.5687		 <p>Relative Abundance</p> <p>m/z</p> <p>● Fragments containing oxFAs</p> <p>● Fragments not containing oxFAs</p>	FA(20:3<ep>)	C ₂₀ H ₃₂ O ₃ Na

CHOLESTERYL ESTERS

Full-length oxygenated: <OOH>

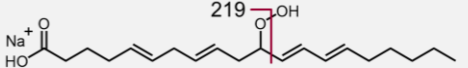
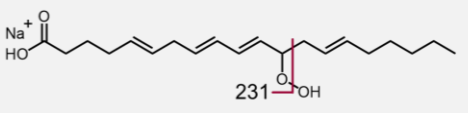
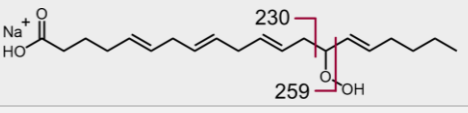
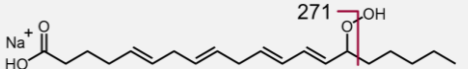
[M+Na]⁺ adducts

Precursor	Chemical Formula & m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula & m/z	Pos.-specific fragment	Chemical Formula	m/z
CE(18:1<OOH>)	C ₄₅ H ₇₈ O ₄ Na 705.5792	CE (FA<OOH>)	FA(18:1<OOH>) H ₂ O loss	C₁₈H₃₄O₄Na 337.2349 C ₁₈ H ₃₂ O ₃ Na 319.2244	9 195 193	C ₉ H ₁₆ O ₃ Na C ₉ H ₁₄ O ₃ Na	195.0992 193.0835
CE(18:2<OOH>)	C ₄₅ H ₇₆ O ₄ Na 703.5636	 <p>Water loss FA<oxo></p> <p>Cholestene cation (-H⁺: NL Cholesterol)</p>	FA(18:2<OOH>) H ₂ O loss	C₁₈H₃₂O₄Na 335.2193 C ₁₈ H ₃₀ O ₃ Na 317.2087	9 10 11 12 13	C ₉ H ₁₆ O ₃ Na C ₁₀ H ₁₆ O ₃ Na C ₁₁ H ₁₈ O ₃ Na C ₁₁ H ₁₉ O ₂ Na C ₁₂ H ₂₀ O ₃ Na C ₁₃ H ₂₀ O ₃ Na	195.0992 207.0992 221.1148 206.1277 ¹⁰ 235.1305 247.1305
CE(20:4<OOH>)	C ₄₇ H ₇₆ O ₄ Na 727.5636	 <p>Relative Abundance</p> <p>m/z</p> <p>● Fragments containing oxFAs ● Fragments related to water loss ● Position-specific fragments ● Fragments not containing oxFAs</p> <p>FA fragmentation pattern:</p> 	FA(20:4<OOH>) H ₂ O loss	C₂₀H₃₂O₄Na 359.2193 C ₂₀ H ₃₀ O ₃ Na 341.2087	5 6 8 9	C ₅ H ₈ O ₃ Na C ₆ H ₈ O ₃ Na C ₈ H ₁₂ O ₃ Na C ₉ H ₁₂ O ₃ Na	139.0366 151.0366 179.0679 191.0679

CHOLESTERYL ESTERS

Full-length oxygenated: <OOH> (continued)

[M+Na]⁺ adducts

Precursor	Chemical Formula & m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula & m/z	Pos.-specific fragment	Chemical Formula	m/z
CE(20:4<OOH>)	C ₄₇ H ₇₆ O ₄ Na 727.5636		FA(20:4<OOH>) H ₂ O loss	C ₂₀ H ₃₂ O ₄ Na 359.2193 C ₂₀ H ₃₀ O ₃ Na 341.2087	11 	C ₁₁ H ₁₆ O ₃ Na	219.0992
					12 	C ₁₂ H ₁₆ O ₃ Na	231.0992
					14 	C ₁₃ H ₁₉ O ₂ Na C ₁₄ H ₂₀ O ₃ Na	230.1277 ⁹ 259.1305
					15 	C ₁₅ H ₂₀ O ₃ Na	271.1305

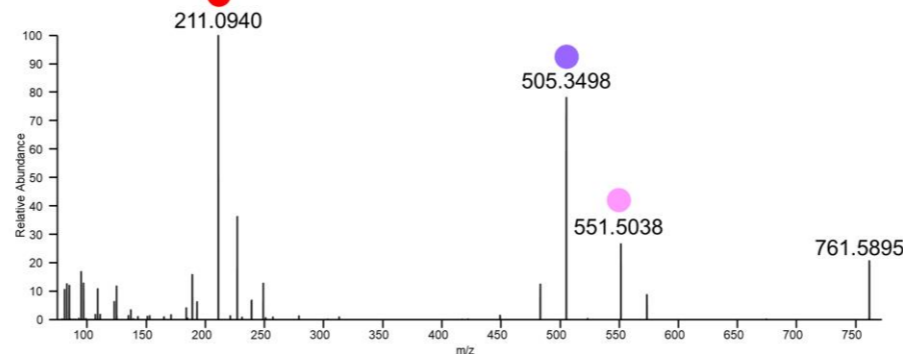
⁹ See Ito, J., Mizuochi, S., Nakagawa, K., Kato, S., Miyazawa, T., 2015. Tandem Mass Spectrometry Analysis of Linoleic and Arachidonic Acid Hydroperoxides via Promotion of Alkali Metal Adduct Formation. *Anal. Chem.* 87, 4980–4987.

TRIACYLGLYCEROLS

Oxidatively truncated: <COOH>

[M+Na]⁺ adducts

Mod. position	Precursor	Chemical Formula	m/z	MS ² Fragmentation	Mod./pos.-specific fragment	Chemical Formula	m/z
4	TG(16:0/16:0/4:0<COOH>)	C ₃₉ H ₇₂ O ₈ Na	691.5119	<p style="text-align: center;">TG (16:0/16:0/FA<COOH>)</p> <p style="text-align: center;"> ● Fragments containing oxFAs ● Fragments related to FA16:0 loss ● Fragments related to oxFA loss </p>	FA(4:0<COOH>)	C ₄ H ₆ O ₄ Na	141.0158
5	TG(16:0/16:0/5:0<COOH>)	C ₄₀ H ₇₄ O ₈ Na	705.5276		FA(5:0<COOH>)	C ₅ H ₈ O ₄ Na	155.0315
7	TG(16:0/16:0/7:0<COOH>)	C ₄₂ H ₇₈ O ₈ Na	733.5589		FA(7:0<COOH>)	C ₇ H ₁₂ O ₄ Na	183.0628
8	TG(16:0/16:0/8:0<COOH>)	C ₄₃ H ₈₀ O ₈ Na	747.5745		FA(8:0<COOH>)	C ₈ H ₁₄ O ₄ Na	197.0784
9	TG(16:0/16:0/9:0<COOH>)	C ₄₄ H ₈₂ O ₈ Na	761.5902		FA(9:0<COOH>)	C ₉ H ₁₆ O ₄ Na	211.0941
10	TG(16:0/16:0/10:0<COOH>)	C ₄₅ H ₈₄ O ₈ Na	775.6058		FA(10:0<COOH>)	C ₁₀ H ₁₈ O ₄ Na	225.1097
	TG(16:0/16:0/10:1<COOH>)	C ₄₅ H ₈₂ O ₈ Na	773.5902		FA(10:1<COOH>)	C ₁₀ H ₁₆ O ₄ Na	223.0941
11	TG(16:0/16:0/11:1<COOH>)	C ₄₆ H ₈₄ O ₈ Na	787.6058		FA(11:1<COOH>)	C ₁₁ H ₁₈ O ₄ Na	237.1097
	TG(16:0/16:0/11:2<COOH>)	C ₄₆ H ₈₂ O ₈ Na	785.5902		FA(11:2<COOH>)	C ₁₁ H ₁₆ O ₄ Na	235.0941
12	TG(16:0/16:0/12:1<COOH>)	C ₄₇ H ₈₆ O ₈ Na	801.6215		FA(12:1<COOH>)	C ₁₂ H ₂₀ O ₄ Na	251.1254
	TG(16:0/16:0/12:2<COOH>)	C ₄₇ H ₈₄ O ₈ Na	799.6058		FA(12:2<COOH>)	C ₁₂ H ₁₈ O ₄ Na	249.1097
13	TG(16:0/16:0/13:2<COOH>)	C ₄₈ H ₈₆ O ₈ Na	813.6215		FA(13:2<COOH>)	C ₁₃ H ₂₀ O ₄ Na	263.1254
	TG(16:0/16:0/13:3<COOH>)	C ₄₈ H ₈₄ O ₈ Na	811.6058		FA(13:3<COOH>)	C ₁₃ H ₁₈ O ₄ Na	261.1097
14	TG(16:0/16:0/14:3<COOH>)	C ₄₉ H ₈₆ O ₈ Na	825.6215		FA(14:3<COOH>)	C ₁₄ H ₂₀ O ₄ Na	275.1254



TRIACYLGLYCEROLS

Oxidatively truncated: <oxo>

[M+Na]⁺ adducts

Mod. position	Precursor	Chemical Formula	m/z	MS ² Fragmentation	Mod./pos.-specific fragment	Chemical Formula	m/z
4	TG(16:0/16:0/4:0<oxo>)	C ₃₉ H ₇₂ O ₇ Na	675.5170	<p>TG (16:0/16:0/FA<oxo>)</p> <p>FA<oxo></p> <p>DG (16:0/16:0) - H₂O</p> <p>DAG (16:0/FA<oxo>) - H₂O</p> <p>● Fragments containing oxFAs ● Fragments related to FA16:0 loss ● Fragments related to oxFA loss</p>	FA(4:0<oxo>)	C ₄ H ₆ O ₃ Na	125.0209
5	TG(16:0/16:0/5:0<oxo>)	C ₄₀ H ₇₄ O ₇ Na	689.5327		FA(5:0<oxo>)	C ₅ H ₈ O ₃ Na	139.0366
7	TG(16:0/16:0/7:0<oxo>)	C ₄₂ H ₇₈ O ₇ Na	717.5640		FA(7:0<oxo>)	C ₇ H ₁₂ O ₃ Na	167.0679
8	TG(16:0/16:0/8:0<oxo>)	C ₄₃ H ₈₀ O ₇ Na	731.5796		FA(8:0<oxo>)	C ₈ H ₁₄ O ₃ Na	181.0835
9	TG(16:0/16:0/9:0<oxo>)	C ₄₄ H ₈₂ O ₇ Na	745.5953		FA(9:0<oxo>)	C ₉ H ₁₆ O ₃ Na	195.0992
10	TG(16:0/16:0/10:0<oxo>)	C ₄₅ H ₈₄ O ₇ Na	759.6109		FA(10:0<oxo>)	C ₁₀ H ₁₈ O ₃ Na	209.1148
	TG(16:0/16:0/10:1<oxo>)	C ₄₅ H ₈₂ O ₇ Na	757.5953		FA(10:1<oxo>)	C ₁₀ H ₁₆ O ₃ Na	207.0992
11	TG(16:0/16:0/11:1<oxo>)	C ₄₆ H ₈₄ O ₇ Na	771.6109		FA(11:1<oxo>)	C ₁₁ H ₁₈ O ₃ Na	221.1148
	TG(16:0/16:0/11:2<oxo>)	C ₄₆ H ₈₂ O ₇ Na	769.5953		FA(11:2<oxo>)	C ₁₁ H ₁₆ O ₃ Na	219.0992
12	TG(16:0/16:0/12:1<oxo>)	C ₄₇ H ₈₆ O ₇ Na	785.6266		FA(12:1<oxo>)	C ₁₂ H ₂₀ O ₃ Na	235.1305
	TG(16:0/16:0/12:2<oxo>)	C ₄₇ H ₈₄ O ₇ Na	783.6109		FA(12:2<oxo>)	C ₁₂ H ₁₈ O ₃ Na	233.1148
13	TG(16:0/16:0/13:2<oxo>)	C ₄₈ H ₈₆ O ₇ Na	797.6266		FA(13:2<oxo>)	C ₁₃ H ₂₀ O ₃ Na	247.1305
	TG(16:0/16:0/13:3<oxo>)	C ₄₈ H ₈₄ O ₇ Na	795.6109		FA(13:3<oxo>)	C ₁₃ H ₁₈ O ₃ Na	245.1148
14	TG(16:0/16:0/14:3<oxo>)	C ₄₉ H ₈₆ O ₇ Na	809.6266		FA(14:3<oxo>)	C ₁₄ H ₂₀ O ₃ Na	259.1305

TRIACYLGLYCEROLS

Full-length oxygenated: <oxo>

[M+Na]⁺ adducts

Precursor	Chemical Formula	m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula	m/z
TG(16:0/16:0/18:1<oxo>)	C ₅₃ H ₉₈ O ₇ Na	869.7205	<p>TG (16:0/16:0/FA<oxo>)</p>	FA(18:1<oxo>)	C ₁₈ H ₃₂ O ₃ Na	319.2244
TG(16:0/16:0/18:2<oxo>)	C ₅₃ H ₉₆ O ₇ Na	867.7048		FA(18:2<oxo>)	C ₁₈ H ₃₀ O ₃ Na	317.2087
TG(16:0/16:0/20:4<oxo>)	C ₅₅ H ₉₆ O ₇ Na	891.7048		<p>DAG (16:0/FA<oxo>) - H₂O</p> <p>● Fragments containing oxFAs ● Fragments related to FA16:0 loss ● Fragments related to oxFA loss</p>	FA(20:4<oxo>)	C ₂₀ H ₃₀ O ₃ Na

TRIACYLGLYCEROLS

Full-length oxygenated: <ep>

[M+Na]⁺ adducts

Precursor	Chemical Formula	m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula	m/z
TG(16:0/16:0/18:0<ep>)	C ₅₃ H ₁₀₀ O ₇ Na	871.7361	<p>TG (16:0/16:0/FA<ep>)</p>	FA(18:0<ep>)	C ₁₈ H ₃₄ O ₃ Na	321.2400
TG(16:0/16:0/18:1<ep>)	C ₅₃ H ₉₈ O ₇ Na	869.7205		FA(18:1<ep>)	C ₁₈ H ₃₂ O ₃ Na	319.2244
TG(16:0/16:0/20:3<ep>)	C ₅₅ H ₉₈ O ₇ Na	893.7205			FA(20:3<ep>)	C ₂₀ H ₃₂ O ₃ Na

TRIACYLGLYCEROLS

Full-length oxygenated: <OOH>

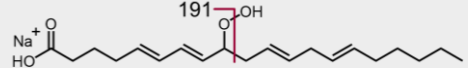
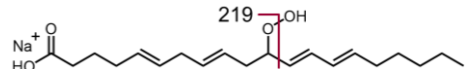
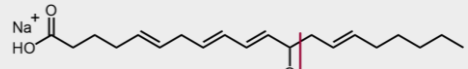
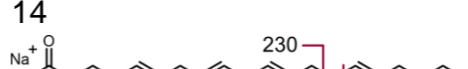
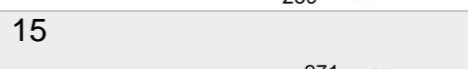
[M+Na]⁺ adducts

Precursor	Chemical Formula & m/z	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula & m/z	Pos.-specific fragment	Chemical Formula	m/z
TG(16:0/16:0/18:1<OOH>)	C ₅₃ H ₁₀₀ O ₈ Na 887.7310	TG (16:0/16:0/FA<OOH>) 	FA(18:1<OOH>) H ₂ O loss	C ₁₈ H ₃₄ O ₄ Na 337.2349 C ₁₈ H ₃₂ O ₃ Na 319.2244	9 195 193	C ₉ H ₁₆ O ₃ Na C ₉ H ₁₄ O ₃ Na	195.0992 193.0835
TG(16:0/16:0/18:2<OOH>)	C ₅₃ H ₉₈ O ₈ Na 885.7154	TG (16:0/16:0/FA<OOH>) 	FA(18:2<OOH>) H ₂ O loss	C ₁₈ H ₃₂ O ₄ Na 335.2193 C ₁₈ H ₃₀ O ₃ Na 317.2087	9 195 10 207 11 221 12 206 235 13 247	C ₉ H ₁₆ O ₃ Na C ₁₀ H ₁₆ O ₃ Na C ₁₁ H ₁₈ O ₃ Na C ₁₁ H ₁₉ O ₂ Na C ₁₂ H ₂₀ O ₃ Na C ₁₃ H ₂₀ O ₃ Na	195.0992 207.0992 221.1148 206.1277 ¹¹ 235.1305 247.1305
TG(16:0/16:0/20:4<OOH>)	C ₅₅ H ₉₈ O ₈ Na 909.7154	 ● Fragments containing oxFAs ● Fragments related to FA16:0 loss ● Fragments related to water loss ● Position-specific fragments ● Fragments related to oxFA loss FA fragmentation pattern: 	FA(20:4<OOH>) H ₂ O loss	C ₂₀ H ₃₂ O ₄ Na 359.2193 C ₂₀ H ₃₀ O ₃ Na 341.2087	5 139 6 151 8 179	C ₅ H ₈ O ₃ Na C ₆ H ₈ O ₃ Na C ₈ H ₁₂ O ₃ Na	139.0366 151.0366 179.0679

TRIACYLGLYCEROLS

Full-length oxygenated: <OOH> (continued)

[M+Na]⁺ adducts

Precursor	Chemical Formula & <i>m/z</i>	MS ² Fragmentation	Mod.-specific fragment	Chemical Formula & <i>m/z</i>	Pos.-specific fragment	Chemical Formula	<i>m/z</i>
TG(16:0/16:0/20:4<OOH>)	C ₅₅ H ₉₈ O ₈ Na 909.7154		FA(20:4<OOH>) H ₂ O loss	C ₂₀ H ₃₀ O ₃ Na 359.2193 C ₂₀ H ₃₂ O ₄ Na 341.2087	9 	C ₉ H ₁₂ O ₃ Na	191.0679
					11 	C ₁₁ H ₁₆ O ₃ Na	219.0992
					12 	C ₁₂ H ₁₆ O ₃ Na	231.0992
					14 	C ₁₃ H ₁₉ O ₂ Na C ₁₄ H ₂₀ O ₃ Na	230.1277 ¹⁰ 259.1305
					15 	C ₁₅ H ₂₀ O ₃ Na	271.1305

¹⁰ See Ito, J., Mizuochi, S., Nakagawa, K., Kato, S., Miyazawa, T., 2015. Tandem Mass Spectrometry Analysis of Linoleic and Arachidonic Acid Hydroperoxides via Promotion of Alkali Metal Adduct Formation. *Anal. Chem.* 87, 4980–4987.

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MS/MS for dioxygenated derivatives of FA(18:2) and FA(20:4) esterified into PC with some position-specific fragment ions indicated (negative ion mode):

- Matsuoka, Y., Takahashi, M., Sugiura, Y., Izumi, Y., Nishiyama, K., Nishida, M., Suematsu, M., Bamba, T., Yamada, K., 2021. Structural library and visualization of endogenously oxidized phosphatidylcholines using mass spectrometry-based techniques. *Nat. Commun.* 12, 6339. <https://doi.org/10.1038/s41467-021-26633-w>

MS/MS of the regioisomeric FA(20:4<OH>), FA(20:4<oxo>), FA(20:3<ep>), FA(20:4<OOH>) (negative ion mode):

- Murphy, R.C., 2015. Tandem mass spectrometry of lipids: molecular analysis of complex lipids, *New developments in mass spectrometry*. Royal Society of Chemistry, Cambridge.
- Murphy, R.C., Barkley, R.M., Zemski Berry, K., Hankin, J., Harrison, K., Johnson, C., Krank, J., McAnoy, A., Uhlson, C., Zarini, S., 2005. Electrospray ionization and tandem mass spectrometry of eicosanoids. *Anal. Biochem.* 346, 1–42. <https://doi.org/10.1016/j.ab.2005.04.042>

Characteristic ions in MS/MS of the regioisomeric FA(18:2<OH>), FA(18:2<oxo>), FA(20:4<OH>), FA(20:4<oxo>), FA(20:3<ep>) in FFA forms (negative ion mode):

- Derogis, P.B.M.C., Chaves-Fillho, A.B., Miyamoto, S., 2019. Characterization of Hydroxy and Hydroperoxy Polyunsaturated Fatty Acids by Mass Spectrometry, in: *Trostchansky, A., Rubbo, H. (Eds.), Bioactive Lipids in Health and Disease, Advances in Experimental Medicine and Biology*. Springer International Publishing, Cham, pp. 21–35. https://doi.org/10.1007/978-3-030-11488-6_2
- Levison, B.S., 2013. Quantification of fatty acid oxidation products using online high-performance liquid chromatography tandem mass spectrometry. *Free Radic. Biol. Med.* 12. <https://doi.org/10.1016/j.freeradbiomed.2013.03.001>

Characteristic ions in MS/MS of the regioisomeric FA(18:2<oxo>), FA(20:4<oxo>) (negative ion mode); use with caution, some fragmentation routes are questioned:

- Garscha, U., Nilsson, T., Oliw, E.H., 2008. Enantiomeric separation and analysis of unsaturated hydroperoxy fatty acids by chiral column chromatography-mass spectrometry. *J. Chromatogr. B* 872, 90–98. <https://doi.org/10.1016/j.jchromb.2008.07.013>

Characteristic ions in MS/MS of FA(18:2<OH{8}>) (negative ion mode):

- Garscha, U., Oliw, E.H., 2007. Steric analysis of 8-hydroxy- and 10-hydroxyoctadecadienoic acids and dihydroxyoctadecadienoic acids formed from 8R-hydroperoxyoctadecadienoic acid by hydroperoxide isomerases. *Anal. Biochem.* 367, 238–246. <https://doi.org/10.1016/j.ab.2007.04.045>

MS/MS of the regioisomeric FA(18:2<OOH>), FA(20:4<OOH>) (positive ion mode, [M+Na]⁺ adducts):

- Ito, J., Mizuochi, S., Nakagawa, K., Kato, S., Miyazawa, T., 2015. Tandem Mass Spectrometry Analysis of Linoleic and Arachidonic Acid Hydroperoxides via Promotion of Alkali Metal Adduct Formation. *Anal. Chem.* 87, 4980–4987. <https://doi.org/10.1021/acs.analchem.5b00851>

Characteristic ions in MS/MS of the regioisomeric FA(18:2<OH>), FA(20:4<OH>), FA(20:3<ep>) in PC-esterified forms (negative ion mode):

- Aoyagi, R., Ikeda, K., Isobe, Y., Arita, M., 2017. Comprehensive analyses of oxidized phospholipids using a measured MS/MS spectra library. *J. Lipid Res.* 58, 2229–2237. <https://doi.org/10.1194/jlr.D077123> (see also MS/MS in *.msp format: <http://prime.psc.riken.jp/compps/msdial/download/msp/MSMS-Neg-RikenOxPLs.msp>)

Characteristic ions in MS/MS of the regioisomeric FA(20:4<OH>) in PC-esterified forms (negative ion mode):

- Mazaleuskaya, L.L., Salamatipour, A., Sarantopoulou, D., Weng, L., FitzGerald, G.A., Blair, I.A., Mesaros, C., 2018. Analysis of HETEs in human whole blood by chiral UHPLC-ECAPCI/HRMS. *J. Lipid Res.* 59, 564–575. <https://doi.org/10.1194/jlr.D081414>

MS/MS of the regioisomeric FA(20:4<OH>) in FFA and PE-esterified forms (negative ion mode; see supplementary files there):

- Slatter, D.A., Aldrovandi, M., O'Connor, A., Allen, S.M., Brasher, C.J., Murphy, R.C., Mecklemann, S., Ravi, S., Darley-Usmar, V., O'Donnell, V.B., 2016. Mapping the Human Platelet Lipidome Reveals Cytosolic Phospholipase A2 as a Regulator of Mitochondrial Bioenergetics during Activation. *Cell Metab.* 23, 930–944. <https://doi.org/10.1016/j.cmet.2016.04.001>

LIPIDMAPS MS/MS spectra

(negative ionization mode, CE 30V)

https://www.lipidmaps.org/resources/standards/index.php?lipid_category=FA

Name / LIPIDMAPS ID

FA(18:1<ep{9-10}>) / LMFA02000037
FA(18:1<ep{12-13}>) / LMFA02000038
FA(18:2<oxo{13}>) / LMFA02000016
FA(18:2<OH{9}>) / LMFA02000036, LMFA02000188
FA(18:2<OH{13}>) / LMFA02000035, LMFA02000228
FA(18:2<OOH{9}>) / LMFA02000012
FA(18:2<OOH{13}>) / LMFA02000034
FA(20:3<ep{5-6}>) / LMFA03080002
FA(20:3<ep{8-9}>) / LMFA03080003
FA(20:3<ep{11-12}>) / LMFA03080004
FA(20:3<ep{14-15}>) / LMFA03080005
FA(20:4<oxo{5}>) / LMFA03060011
FA(20:4<oxo{12}>) / LMFA03060019
FA(20:4<OH{5}>) / LMFA03060002
FA(20:4<OH{8}>) / LMFA03060006
FA(20:4<OH{9}>) / LMFA03060089
FA(20:4<OH{11}>) / LMFA03060003
FA(20:4<OH{12}>) / LMFA03060007, LMFA03060008
FA(20:4<OH{15}>) / LMFA03060001

FA(20:4<OOH{5}>) / LMFA03060012

FA(20:4<OOH{12}>) / LMFA03060013

FA(20:4<OOH{15}>) / LMFA03060014

METLIN MS/MS spectra

(negative ion mode, CE 10, 20V)

https://metlin.scripps.edu/landing_page.php?pgcontent=mainPage

Name / METLIN ID

FA(18:0<ep{9-10}>) / 36008
FA(18:1<ep{9-10}>) / 43441
FA(18:1<ep{12-13}>) / 43442
FA(18:2<OH{9}>) / 35487, 45660, 45662
FA(18:2<OH{13}>) / 35490, 45665, 45667
FA(18:2<oxo{9}>) / 35860
FA(18:2<oxo{13}>) / 36023
FA(18:2<OOH{9}>) / 36019, 64785
FA(18:2<OOH{13}>) / 36036, 64784
FA(20:4<OH{5}>) / 36336, 45646, 45684

FA(20:4<OH{8}>) / 36286, 3840, 45730

FA(20:4<OH{9}>) / 36290, 45649, 45650

FA(20:4<OH{11}>) / 36337, 3838, 45056

FA(20:4<OH{12}>) / 3841, 45054, 45653

FA(20:4<OH{15}>) / 3836, 45651

FA(20:4<oxo{5}>) / 3844

FA(20:4<oxo{12}>) / 36285

FA(20:4<OOH{5}>) / 36281

FA(20:4<OOH{12}>) / 3845

FA(20:4<OOH{15}>) / 3846