# Supporting Information

# Poria cocos lanostane triterpenoids extract Promote Collagen and Hyaluronic acid Production in D-Galactose-induced Aging Rats

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**1. The characteristics of Triterpenoid Compounds (1-6).**

**Table S1.** $^1$H NMR (400 MHz) and $^{13}$C (100 MHz) Spectroscopic Data for **1-6**.

**2. Chromatogram of Triterpenoid Compounds (1-6) using UPLC/MS.**

**Figure S1.** The UPLC chromatogram of pachymic acid (**1**).

**Figure S2.** The ESI-MS spectrum of pachymic acid (**1**).

**Figure S3.** The UPLC chromatogram of dehydropachymic acid (**2**).

**Figure S4.** The ESI-MS spectrum of dehydropachymic acid (**2**).

**Figure S5.** The UPLC chromatogram of tumulosic acid (**3**).

**Figure S6.** The ESI-MS spectrum of tumulosic acid (**3**).

**Figure S7.** The UPLC chromatogram of dehydrotumulosic acid (**4**).

**Figure S8.** The ESI-MS spectrum of dehydrotumulosic acid (**4**).

**Figure S9.** The UPLC spectrum of polyporenic acid C (**5**).

**Figure S10.** The ESI-MS spectrum of polyporenic acid C (**5**).

**Figure S11.** The UPLC spectrum of 3-Epi-dehydrotumulosic acid (**6**).

**Figure S12.** The ESI-MS spectrum of 3-Epi-dehydrotumulosic acid (**6**).

# 1. The characteristics of Triterpenoid Compounds (1-6).

Pachymic Acid (**1**): white powder; ESI−MS m/z: 527.3822 [M−H]$^-$; $^1$H NMR (400 MHz, Pyridine-d$_5$) and $^{13}$C-NMR (100 MHz, Pyridine-d$_5$) data see Table S1.

Dehydropachymic Acid (**2**): white powder; ESI−MS m/z: 525.3657 [M−H]$^-$; $^1$H NMR (400 MHz, Pyridine-d$_5$) and $^{13}$C-NMR (100 MHz, Pyridine-d$_5$) data see Table S1.

Tumulosic Acid (**3**): white powder; ESI−MS m/z: 485.3635 [M−H]$^-$; $^1$H NMR (400 MHz, Pyridine-d$_5$) and $^{13}$C-NMR (100 MHz, Pyridine-d$_5$) data see Table S1.

Dehydrotumulosic Acid (**4**): white powder; ESI−MS m/z: 483.3475 [M−H]$^-$; $^1$H NMR (400 MHz, Pyridine-d$_5$) and $^{13}$C-NMR (100 MHz, Pyridine-d$_5$) data see Table S1.

Polyporenic Acid C (**5**): white powder; ESI−MS m/z: 481.3332 [M−H]$^-$; $^1$H NMR (400 MHz, Pyridine-d$_5$) and $^{13}$C-NMR (100 MHz, Pyridine-d$_5$) data see Table S1.

3-Epi-Dehydrotumulosic Acid (**6**): white powder; ESI−MS m/z: 483.3533 [M−H]$^-$; $^1$H NMR (400 MHz, Pyridine-d$_5$) and $^{13}$C-NMR (100 MHz, Pyridine-d$_5$) data see Table S1.

**Table S1.** $^1$H NMR (400 MHz) and $^{13}$C (100 MHz) Spectroscopic Data for **1-6**.

| | **3** | | | **5** | | **6** | | | **4** | |
|---|---|---|---|---|---|---|---|---|---|---|
| no. | $\delta_H$ multi (J in Hz) | $\delta_C$ | | $\delta_H$ multi (J in Hz) | $\delta_C$ | $\delta_H$ multi (J in Hz) | $\delta_C$ | | $\delta_H$ multi (J in Hz) | $\delta_C$ |
| 1 | 1.65 (br t, J=13) | 36.58 t | | 1.65 (td, J=14, 4.3); 2.09 (m) | 36.8 t | 2.26 (m); 1.72(br d, J=12.4) | 30.6 t | | 1.97 (m); 2.57 (m) | 36.74 t |
| 2 | 1.88 (m) ; 1.96 (m) | 29.13 t | | 2.3; 2.75 (m) | 34.9 t | 1.88 (dd, J=13.7, 8.4) 2.07 (m) | 26.7 t | | 1.51 (m); 1.95 (m) | 29.14 t |
| 3 | 3.43 (t, J=8.0) | 78.53 d | | | 215.2 s | 3.62 (s) | 75.1 d | | 3.48 (t, J=8.0) | 78.47 d |
| 4 | | 40.02 s | | | 47.5 s | | 38.0 s | | | 39.82 s |
| 5 | 1.18 (d, J=3.8) | 51.42 d | | 1.59 (dd, J=11.5, 3.7) | 51.0 d | 2.01 (br t, J=8.3) | 43.7 d | | 1.32 (d, J=3.8) | 50.27 d |
| 6 | 1.56 (m) ; 1.76 (m) | 19.21 t | | 1.96 (m); 2.13 (m) | 23.9 t | 2.10 (m); 2.10 (m) | 23.4 t | | 2.16 (m) | 23.99 t |
| 7 | 2.13 (m) | 27.47 t | | 5.57 (br d, J=6) | 120.7 d | 5.62 (s) | 121.3 d | | 5.65 (br s) | 121.76 d |
| 8 | | 135.39 s | | | 142.8 s | | 142.8 s | | | 143.19 s |
| 9 | | 135.29 s | | | 144.7 s | | 146.7 s | | | 146.86 s |
| 10 | | 37.88 s | | | 37.5 s | | 37.9 s | | | 38.34 s |
| 11 | 2.01 (m) | 21.46 t | | 5.35 (br d, J=5.6) | 117.7 d | 5.46 (d, J=5.7) | 116.2 d | | 5.40 (br s) | 117.02 d |
| 12 | 2.20 (d, J=12.5) ; 2.00 (m) | 30.20 t | | 2.37; 2.67 (br d, J=18.2) | 36.3 t | 2.64 (br d, J=15.6); 2.40 (m) | 36.3 t | | 2.71 (d, J=12.5); 2.42 (m) | 36.79 t |
| 13 | | 49.22 s | | | 45.0 s | | 45.1 s | | | 45.56 s |
| 14 | | 46.76 s | | | 49.4 s | | 49.5 s | | | 49.89 s |
| 15 | 1.74 (d, J=13) ; 2.42 (dd, J=13, 8) | 44.18 t | | 2.42; 1.91 (d, J=13) | 44.4 t | 2.40 (m) | 44.5 t | | 1.74 (d, J=13); 2.42 (dd, J=13, 8) | 44.92 t |
| 16 | 4.56 (t, J=6.8) | 77.16 d | | 4.52 (t, J=7, 6.8) | 76.4 d | 4.51 (t, J=7.2, 6.5) | 76.5 d | | 4.56 (t, J=6.8) | 76.91 d |
| 17 | 2.80 (dd, J=11.1, | 57.79 d | | 2.86 (dd, J=11.2, | 57.6 d | 2.85 (dd, J=11.1, | 57.6 d | | 2.92 (dd, J=11.1, | 58.12 d |

| | 5.9) | | 5.8) | | 5.7) | | 5.9) | |
|---|---|---|---|---|---|---|---|---|
| 18 | 1.17 (s) | 18.28 q | 1.04 (s) | 17.6 q | 1.08 (s) | 17.7 q | 1.09 (s) | 18.11 q |
| 19 | 1.05 (s) | 19.42 q | 1.12 (s) | 22.0 q | 1.09 (s) | 23.0 q | 1.09 (s) | 23.47 q |
| 20 | 2.93 (m) | 49.28 d | 2.94 (m) | 48.5 d | 2.94 (br t, J=9.5) | 48.6 d | 2.92 (m) | 49.03 d |
| 21 | | 179.49 s | | 178.7 s | | 178.7 s | | 177.87 s |
| 22 | 2.66 (m)；2.50 (m) | 32.08 t | 2.46 (m); 2.62 (m) | 31.4 t | 2.45 (m); 2.70 (m) | 31.5 t | 2.51 (m)；2.43 (m) | 31.94 t |
| 23 | 2.41 (br t, J=12)；2.57 (br t, J=12) | 33.72 t | 2.41 (m); 2.53 (m) | 33.2 t | 2.37; 2.52 (t, J=11.6) | 33.2 t | 2.41 (br t, J=12); 2.53 (br t, J=12) | 33.69 t |
| 24 | | 156.58 s | | 156.0 s | | 156.1 s | | 156.52 s |
| 25 | 2.30 (m) | 34.61 d | 2.25 (m) | 34.1 d | 2.26 (m) | 34.1 d | 2.33 (m) | 34.58 d |
| 26 | 0.97 (d, J=6.75) | 22.52 q | 0.97 (dd, J=7.2) | 22.0 q | 0.96 (d, J=7) | 22.0 q | 1.01 (d, J=6.75) | 22.48 q |
| 27 | 0.98 (d, J=6.75) | 22.38 q | 0.99 (dd, J=7.2) | 21.9 q | 0.98 (d, J=7) | 21.9 q | 1.01 (d, J=6.75) | 22.34 q |
| 28 | 1.23 (s) | 29. 15 q | 1.12 (s) | 25.7 q | 1.18 (s) | 29.2 q | 1.23 (s) | 29.31 q |
| 29 | 1.06 (s) | 16.87 q | 1.04 (s) | 22.4 q | 0.98 (s) | 23.2 q | 1.15 (s) | 17.12 q |
| 30 | 1.47 (s) | 25.94 q | 1.44 (s) | 26.4 q | 1.42 (s) | 26.6 q | 1.53 (s) | 27.08 q |
| 31 | 4.83 (s)；4.97 (s) | 107.01 t | 4.83 (s)；4.97 (s) | 107.5 t | 4.83 (s); 5.02 (s) | 107.1 t | 4.86 (s)；5.00 (s) | 107.51 t |

| no. | 1 δ_H multi (J in Hz) | δ_C | | 2 δ_H multi (J in Hz) | δ_C |
|---|---|---|---|---|---|
| 1 | 1.11 (m) 1.60 (br t, J=13) | 35.3 t | | 1.42 (m); 1.89 (m) | 35.5 t |
| 2 | 1.60 (m) 1.69 (m) | 24.5 t | | 1.77(m); 1.68 (m) | 24.5 t |
| 3 | 4.66 (dd, J=11.6, 4.4) | 80.6 d | | 4.70 (dd, J=12, 4) | 80.6 d |
| 4 | | 38.0 s | | | 37.8 s |
| 5 | 1.14 (m) | 50.7 d | | 1.25 (dd) | 49.5 d |
| 6 | 1.52 (m) | 18.4 t | | 2.05 (m); 2.05 (m) | 23.0 t |
| 7 | 2.10 (m); 2.10 (m) | 26.7 t | | 5.55 (br, s) | 120.7 d |
| 8 | | 135.0 s | | | 142.7 s |
| 9 | | 134.4 s | | | 145.7 s |
| 10 | | 37.1 s | | | 37.5 s |
| 11 | 1.92 (m); 1.90 (m) | 20.9 t | | 5.28 (d, J=5.6) | 116.9 d |
| 12 | 2.26 (t, J=6.7); 2.00 (m) | 29.6 t | | 2.68; 2.42 (br d, J=18) | 36.2 t |
| 13 | | 48.8 s | | | 45.0 s |
| 14 | | 46.2 s | | | 49.3 s |
| 15 | 1.69 (d, J=13) 2.37 (dd, J=13, 9) | 43.6 t | | 2.42; 1.92 (d, J=13) | 44.3 t |
| 16 | 4.51 (t, J=6.8, 6.4 ) | 77.6 d | | 4.50 (t, J=8, 6.8) | 76.4 d |
| 17 | 2.80 (dd, J=10.8, | 57.3 d | | 2.87 (dd, J=11.2, | 57.5 d |

| | | | | |
|---|---|---|---|---|
| | 6.4) | | 5.8) | |
| 18 | 1.12 (s) | 17.8 q | 1.02 (s) | 17.6 q |
| 19 | 0.94 (s) | 19.2 q | 0.98 (s) | 21.0 q |
| 20 | 2.93 (m) | 48.8 d | 2.92 (m) | 48.5 d |
| 21 | | 178.8 s | | 178.7 s |
| 22 | 2.63(m)<br>2.47 (m) | 31.6 t | 2.51 (m); 2.64 (m) | 31.4 t |
| 23 | 2.40 (br t, J=12)<br>2.53 (br t, J=12) | 33.2 t | 2.40 (m); 2.54 (m) | 33.2 t |
| 24 | | 156.1 s | | 156.0 s |
| 25 | 2.27 (m) | 34.1 d | 2.28 (m) | 34.0 d |
| 26 | 0.97 (d, J=6.8) | 22.0 q | 0.96 (dd, J=7) | 22.0 q |
| 27 | 0.99 (d, J=6.8) | 21.9 q | 0.97 (dd, J=7) | 21.8 q |
| 28 | 0.89 (s) | 28.0 q | 0.86 (s) | 28.1 q |
| 29 | 0.91 (s) | 16.8 q | 0.96 (s) | 17.1 q |
| 30 | 1.47 (s) | 25.4 q | 1.46 (s) | 26.5 q |
| 31 | 4.83 (s)<br>4.96 (s) | 107.0 t | 4.82 (s)<br>4.96 (s) | 107.0 t |

## 2. Chromatogram of Triterpenoid Compounds (1-6) using UPLC/MS.
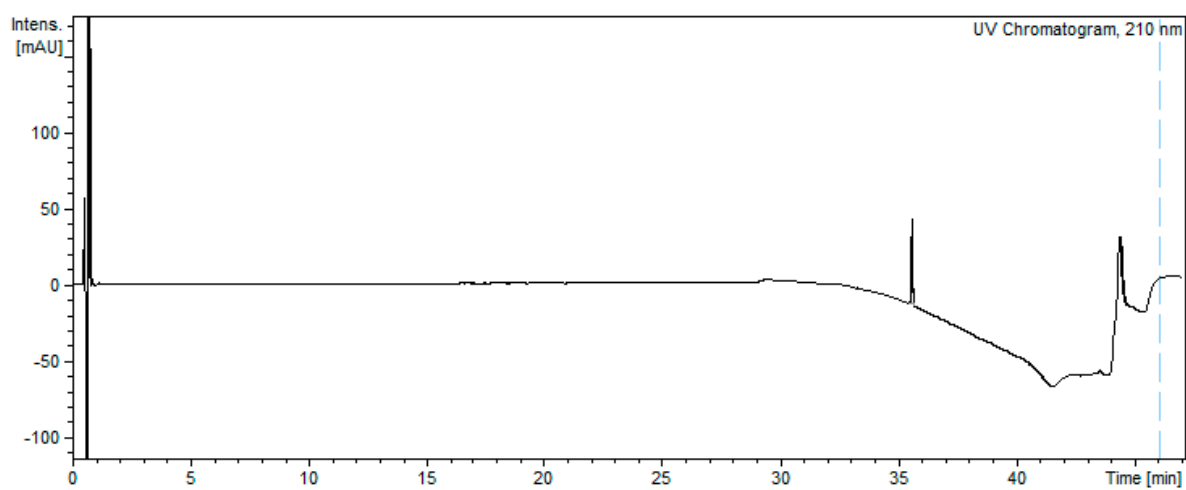


**Figure S1.** The UPLC chromatogram of pachymic acid (**1**).



**Figure S2.** The ESI-MS spectrum of pachymic acid (**1**).
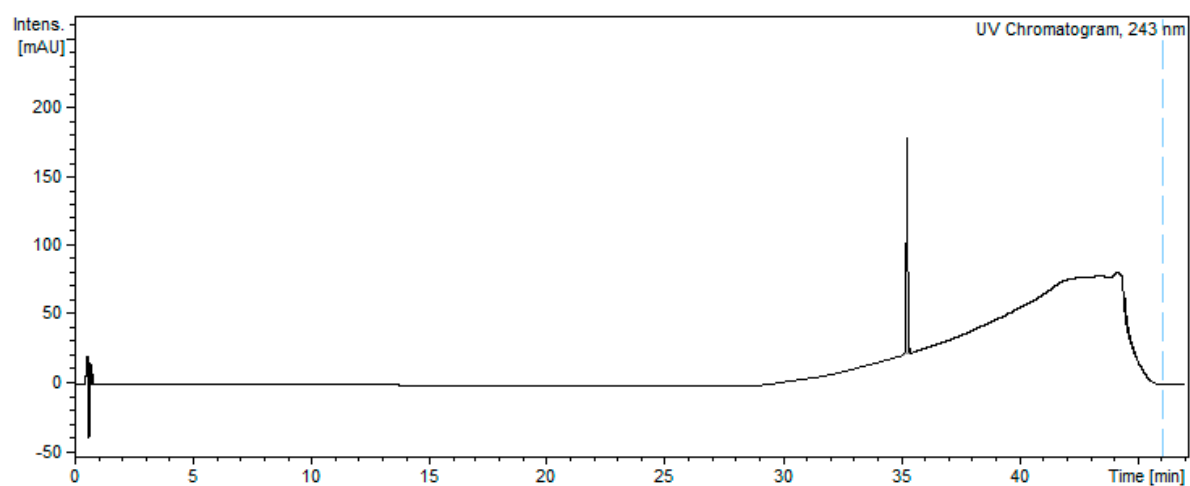
**Figure S3.** The UPLC chromatogram of dehydropachymic acid (2).
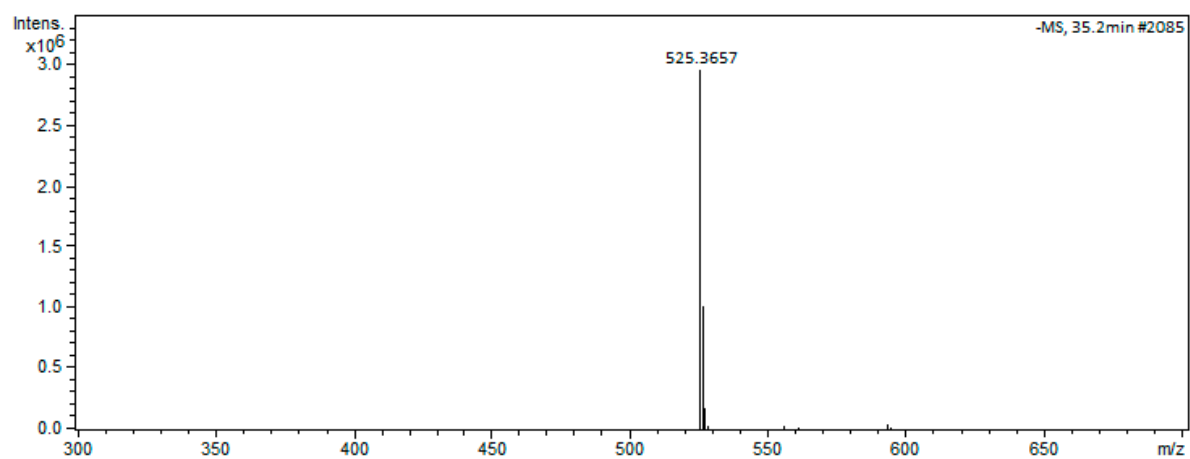


**Figure S4.** The ESI-MS spectrum of dehydropachymic acid (**2**).
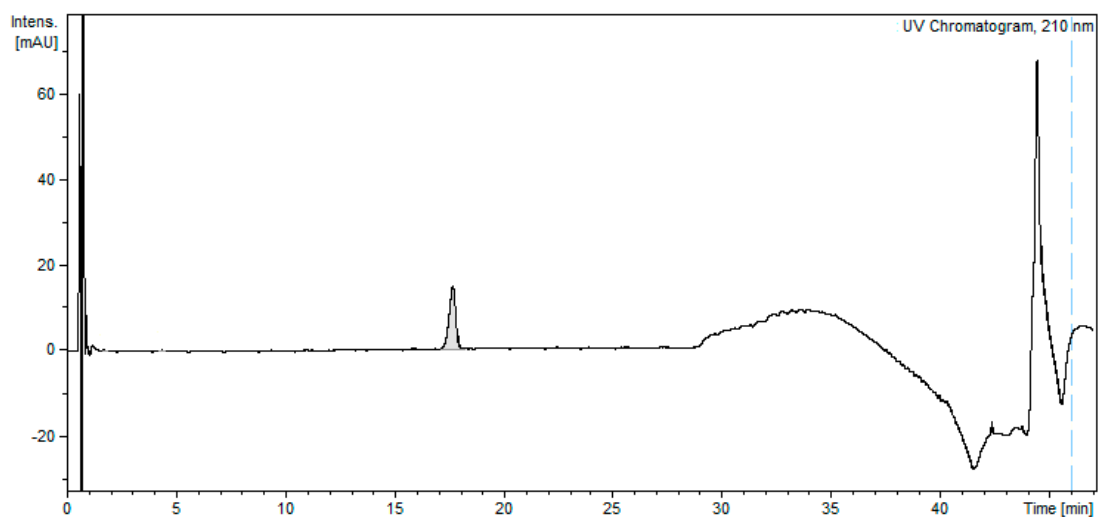
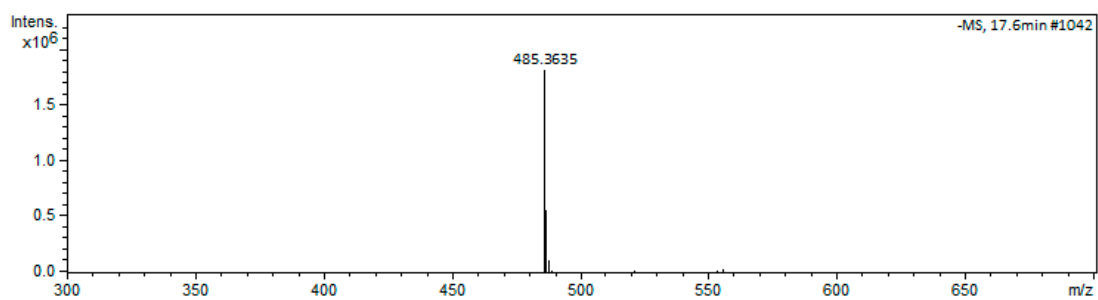**Figure S5.** The UPLC chromatogram of tumulosic acid (**3**).
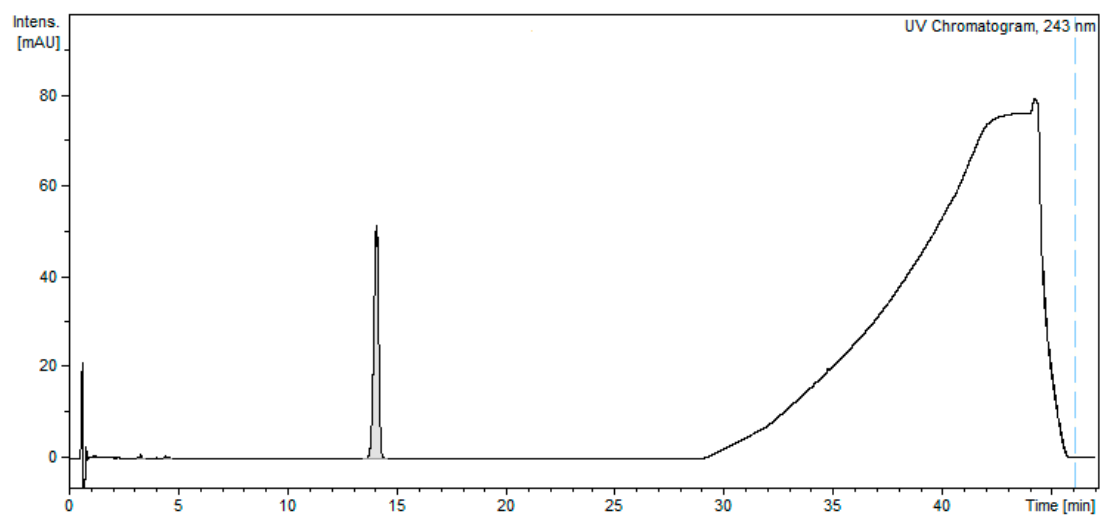


**Figure S6.** The ESI-MS spectrum of tumulosic acid (**3**).

**Figure S7.** The UPLC chromatogram of dehydrotumulosic acid (**4**).
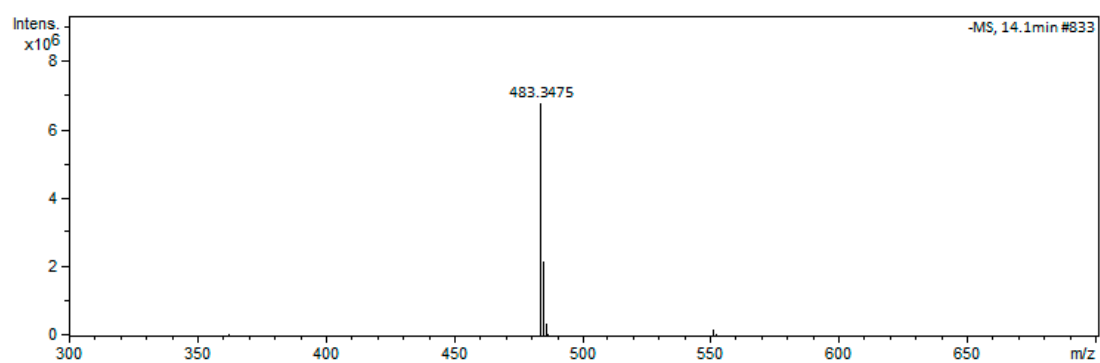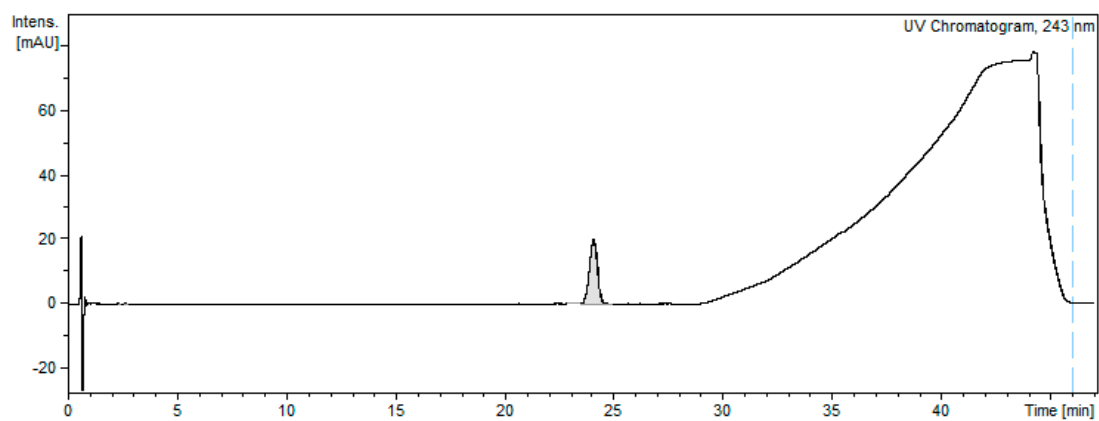


**Figure S8.** The ESI-MS spectrum of dehydrotumulosic acid (**4**).
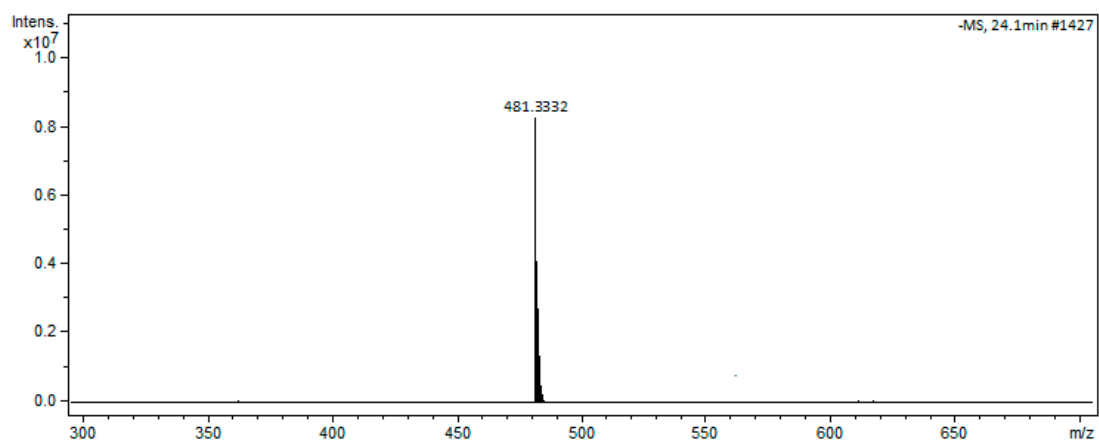
**Figure S9.** The UPLC chromatogram of polyporenic acid C (**5**).



**Figure S10.** The ESI-MS spectrum of polyporenic acid C (**5**).
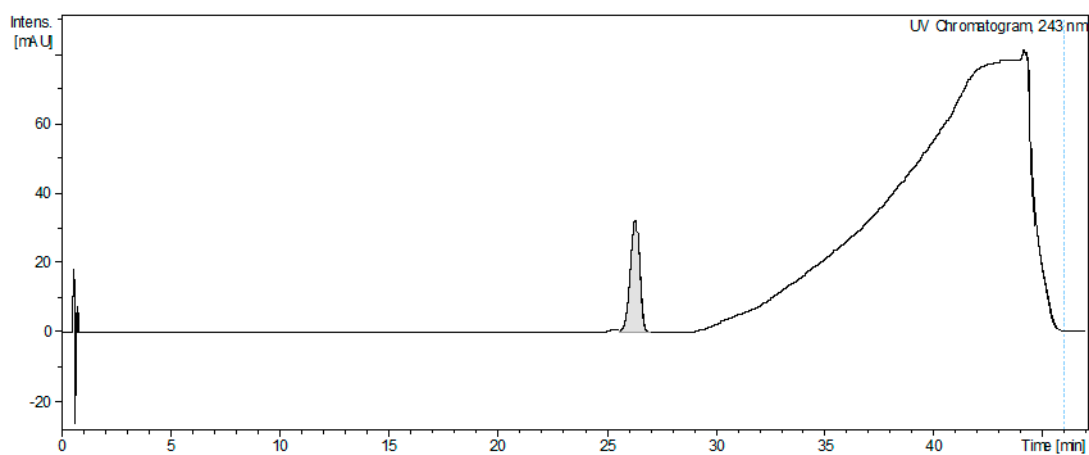
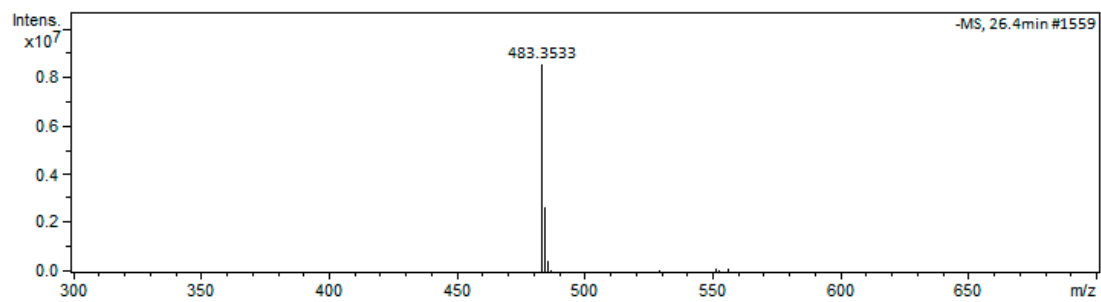**Figure S11.** The UPLC chromatogram of 3-epi-dehydrotumulosic acid (**6**).



**Figure S12.** The ESI-MS spectrum of 3-epi-dehydrotumulosic acid (**6**).