

## Supplementary material

# *Design, Synthesis and Biological Evaluation of Lophanic acid derivatives as Antifungal Agents and Antibacterial Agents*

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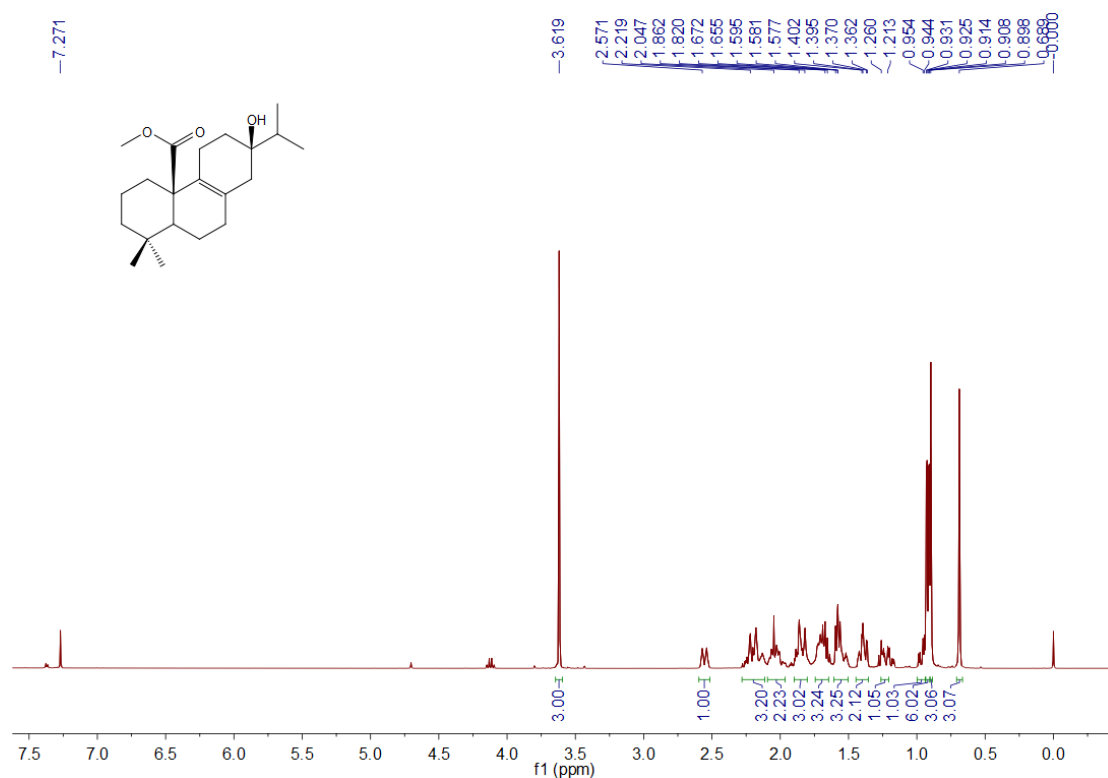


Figure S1. <sup>1</sup>H NMR spectrum of the compound 3a.

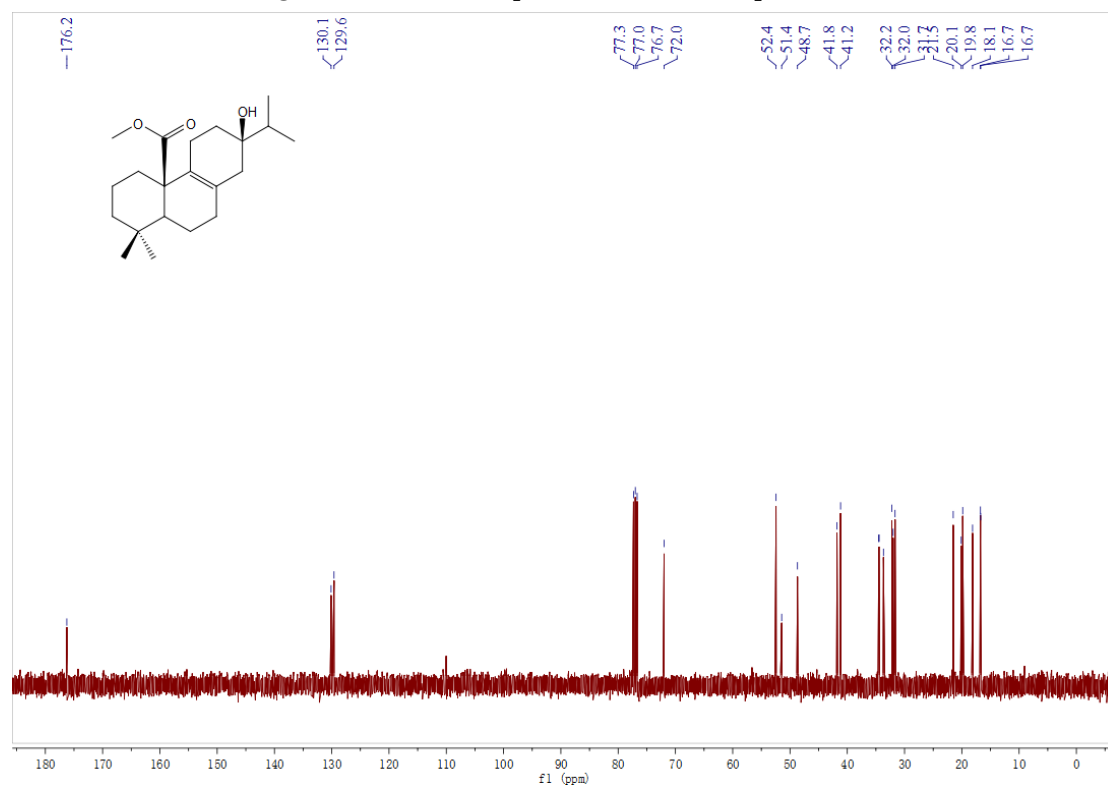


Figure S2. <sup>13</sup>C NMR spectrum of the compound 3a.

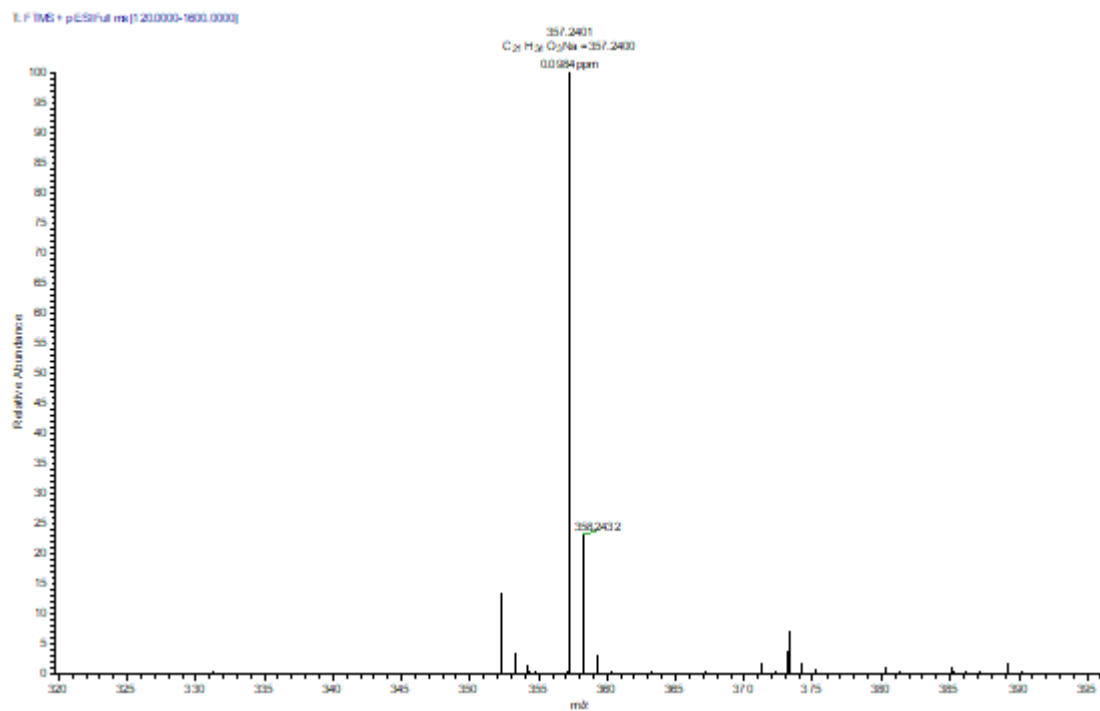


Figure S3. HRMS spectrum of the compound 3a.

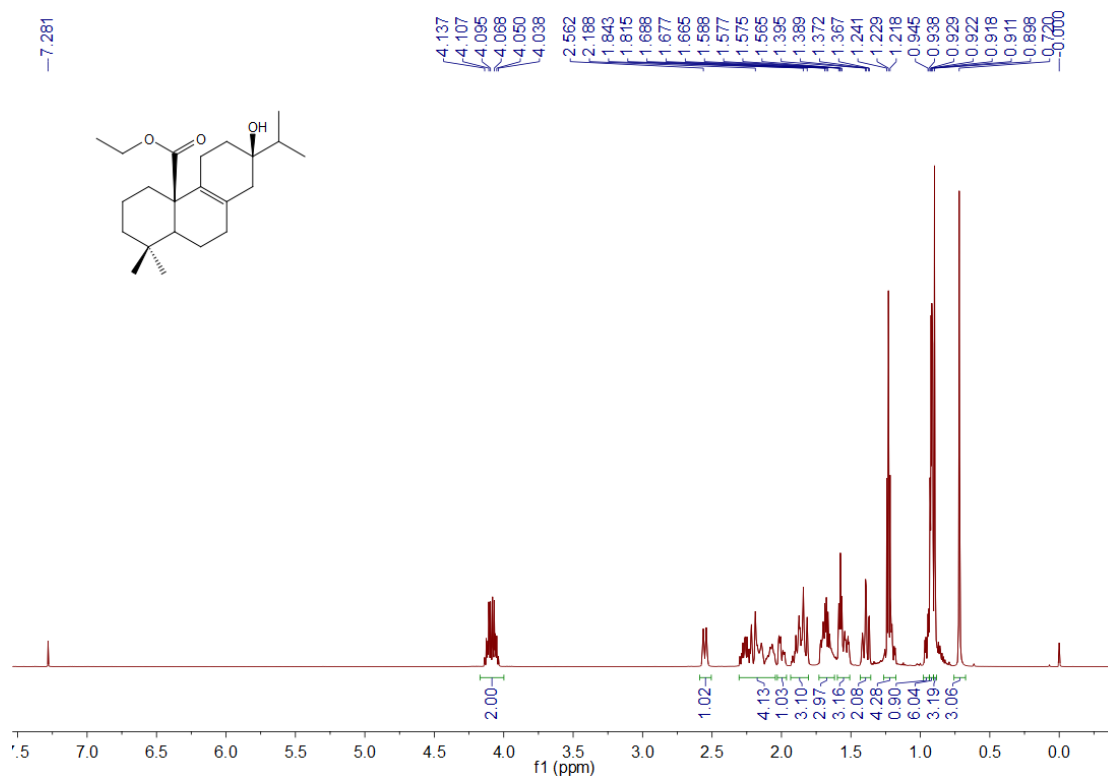
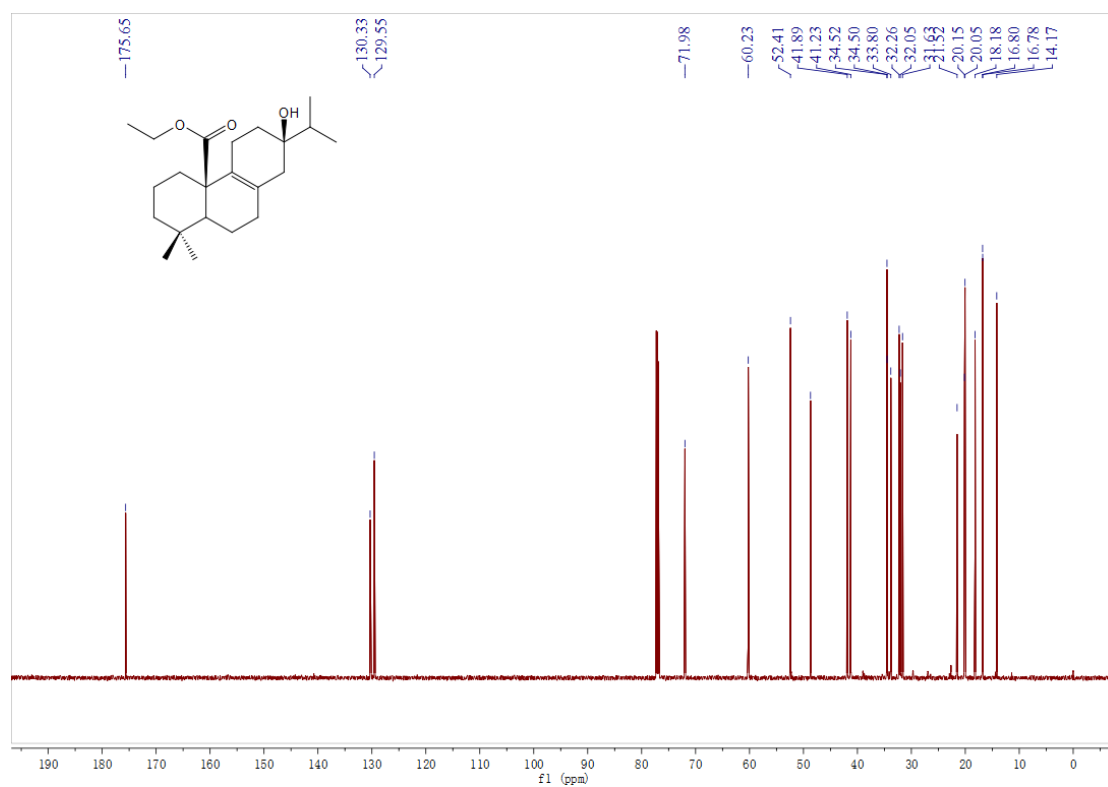
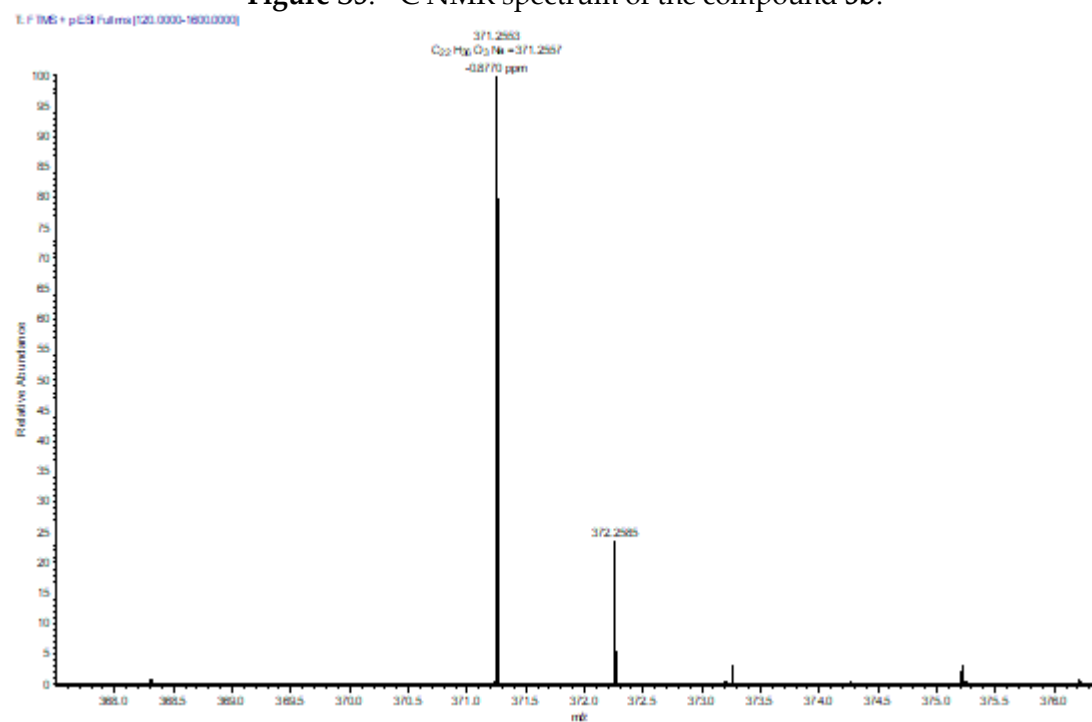


Figure S4. <sup>1</sup>H NMR spectrum of the compound 3b.



**Figure S5.** <sup>13</sup>C NMR spectrum of the compound **3b**.



**Figure S6.** HRMS spectrum of the compound **3b**.



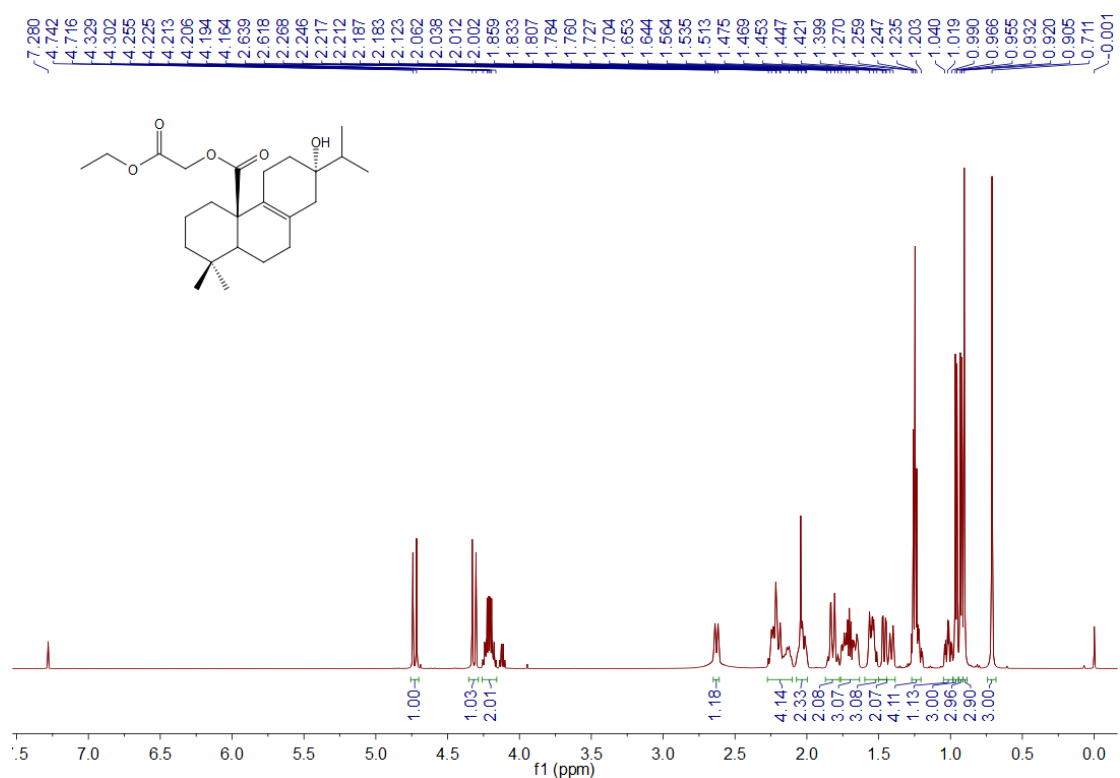


Figure S7. <sup>1</sup>H NMR spectrum of the compound 3c.

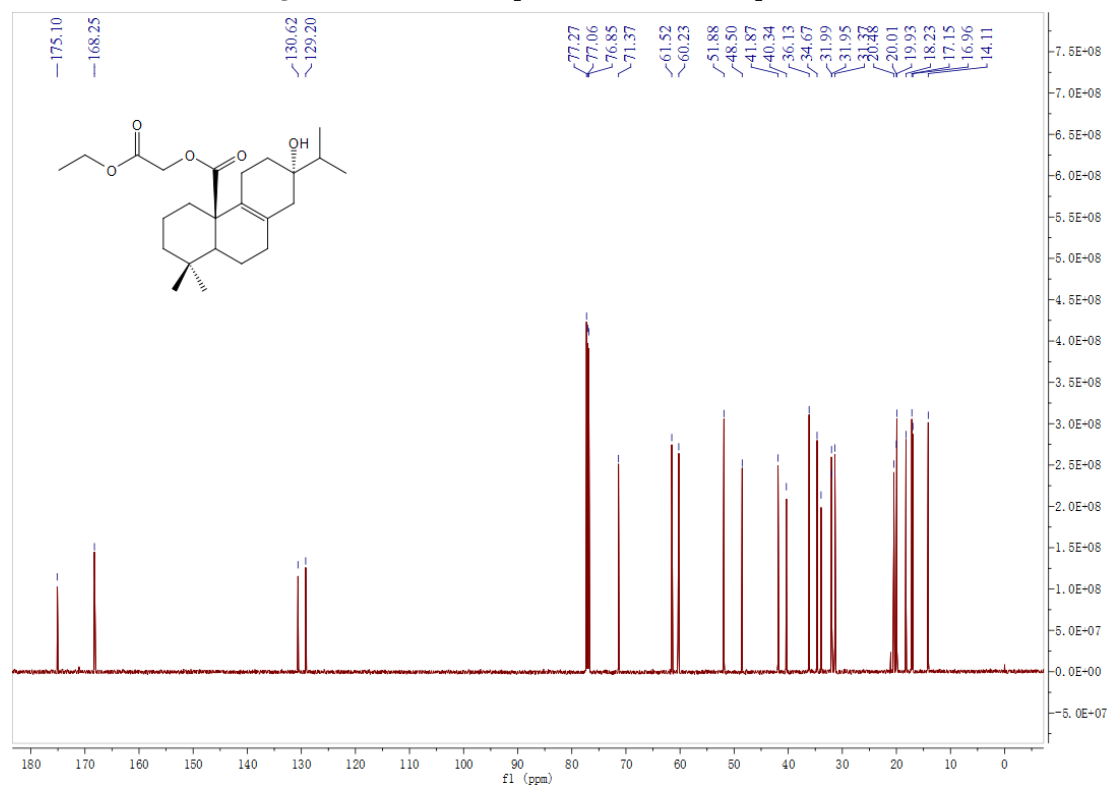


Figure S8. <sup>13</sup>C NMR spectrum of the compound 3c.

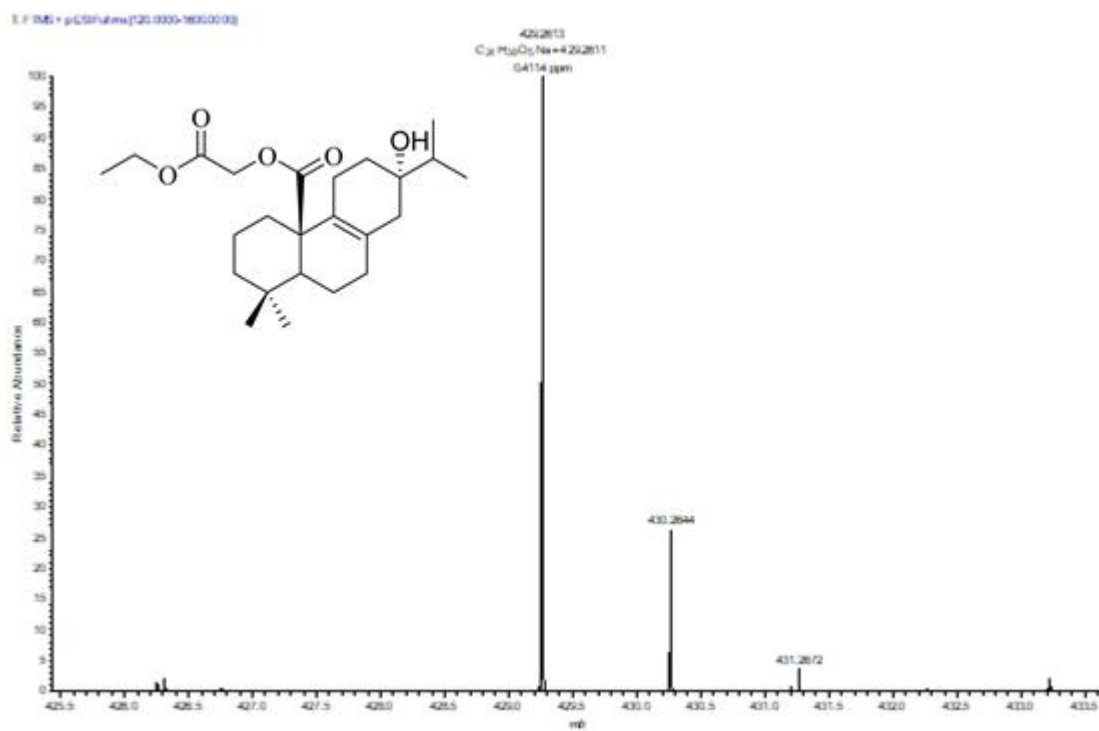


Figure S9. HRMS spectrum of the compound 3c.

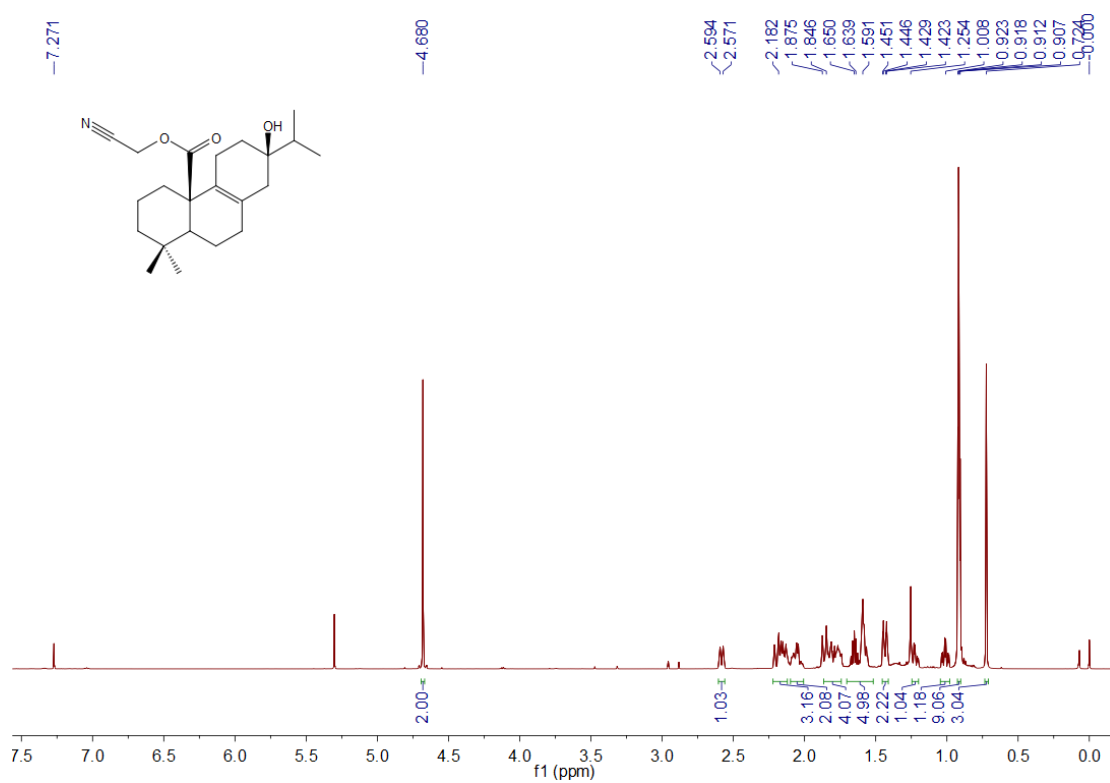


Figure S10. <sup>1</sup>H NMR spectrum of the compound 3d.

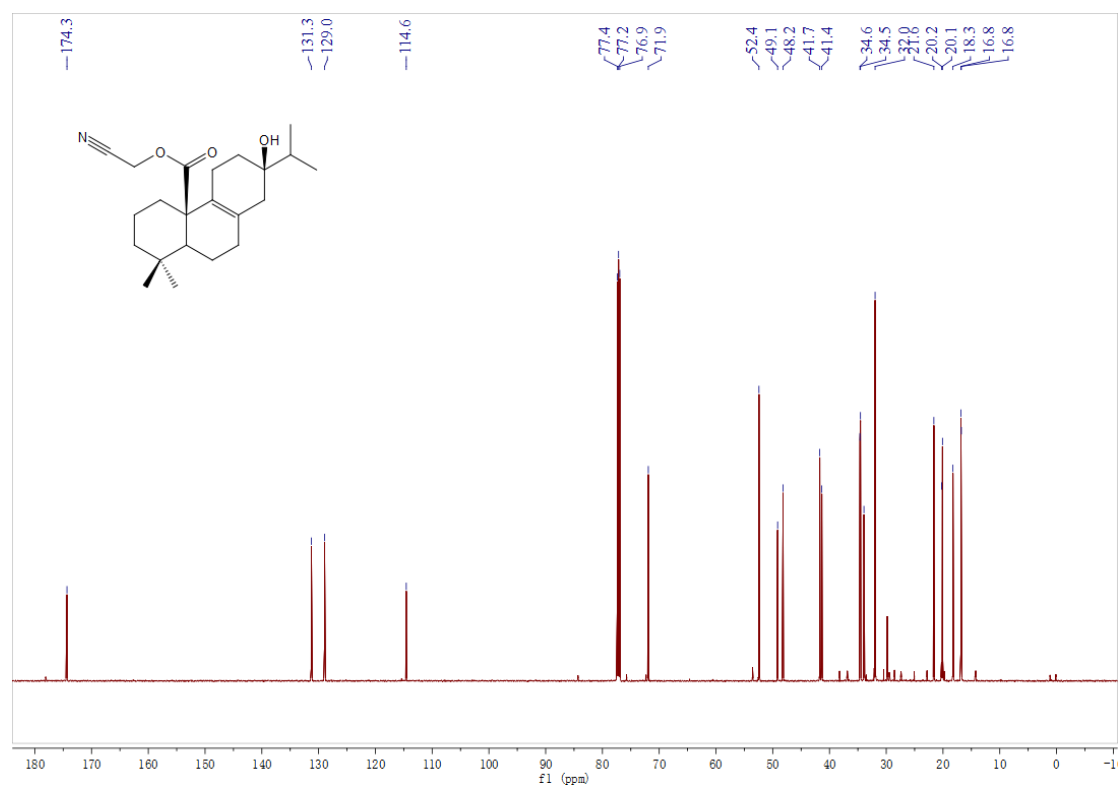


Figure S11.  $^{13}\text{C}$  NMR spectrum of the compound 3d.

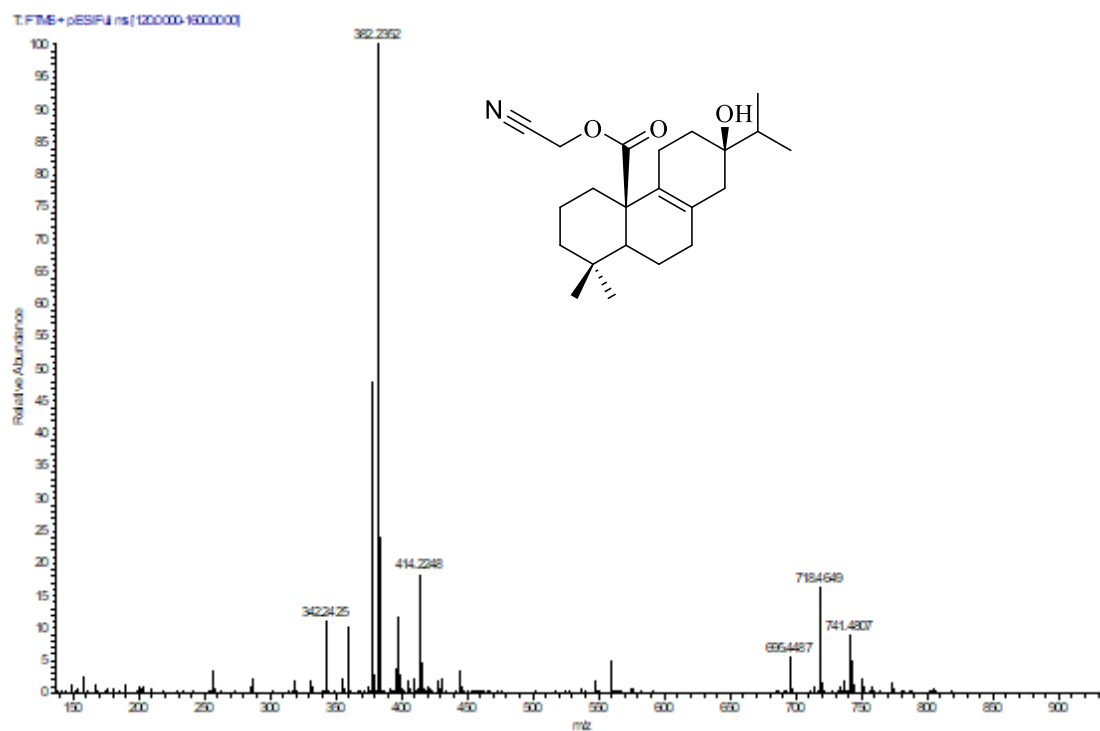


Figure S12. HRMS spectrum of the compound 3d.

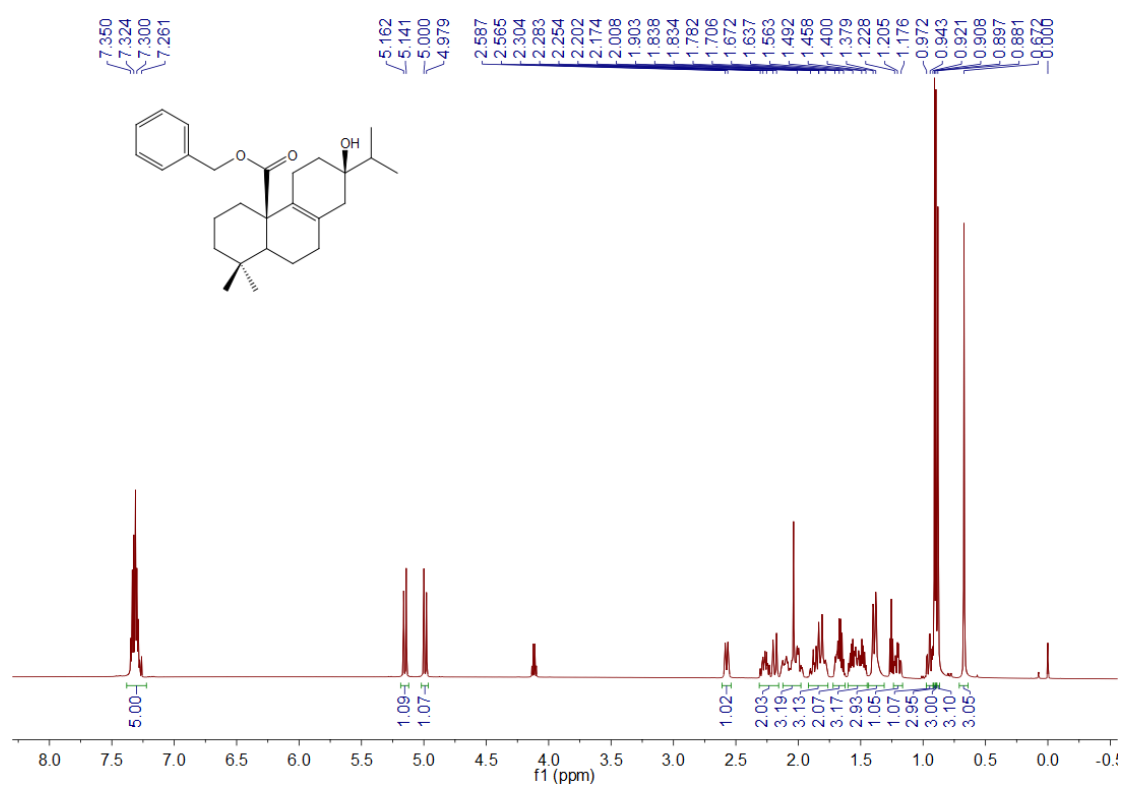


Figure S13. <sup>1</sup>H NMR spectrum of the compound 3e.

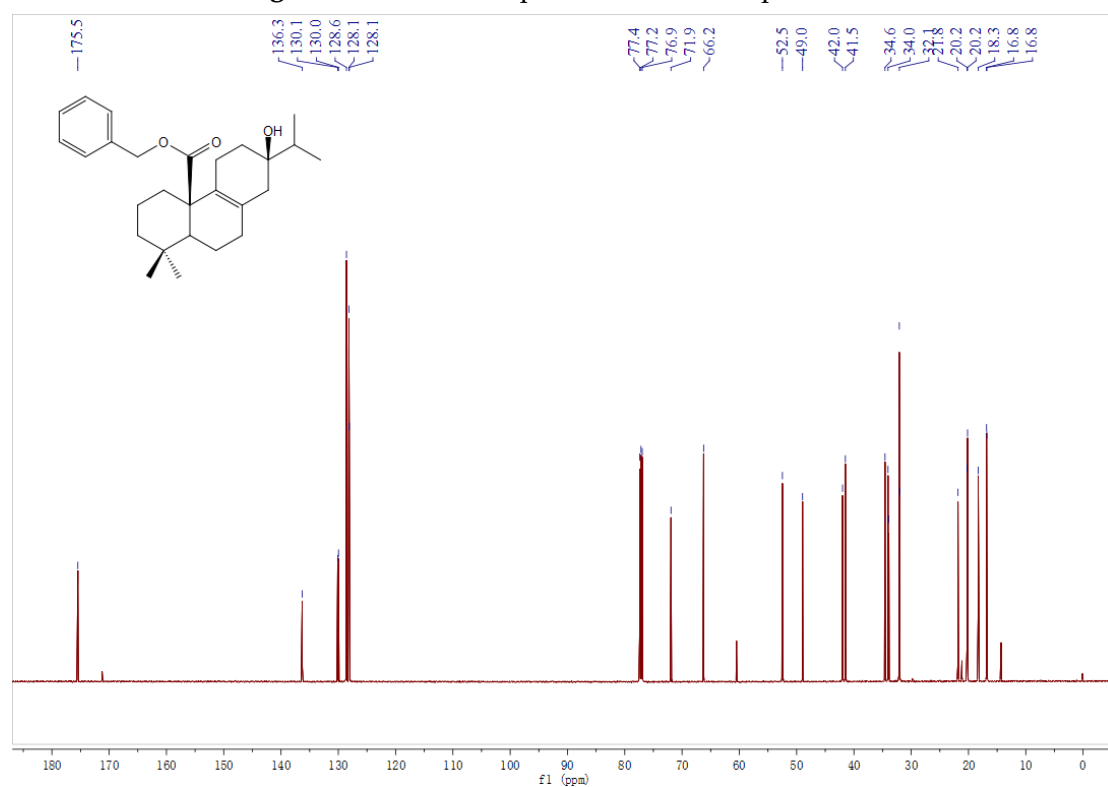


Figure S14. <sup>13</sup>C NMR spectrum of the compound 3e.

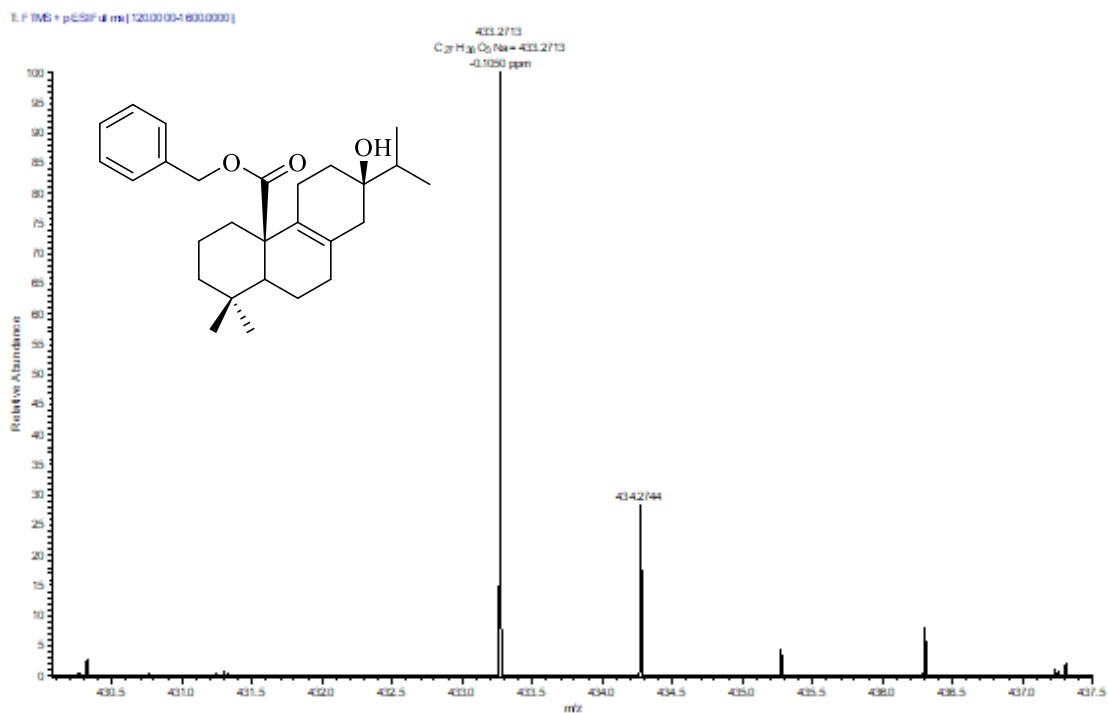


Figure S15. HRMS spectrum of the compound 3e.

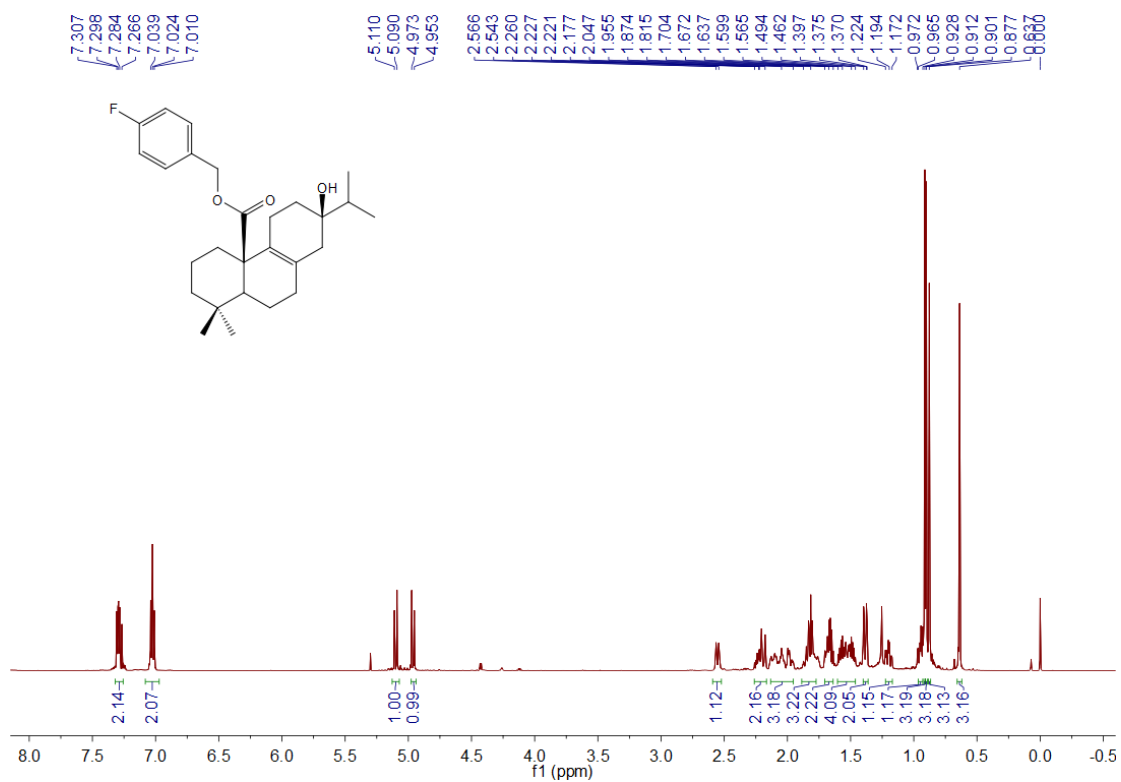


Figure S16. <sup>1</sup>H NMR spectrum of the compound 3f.

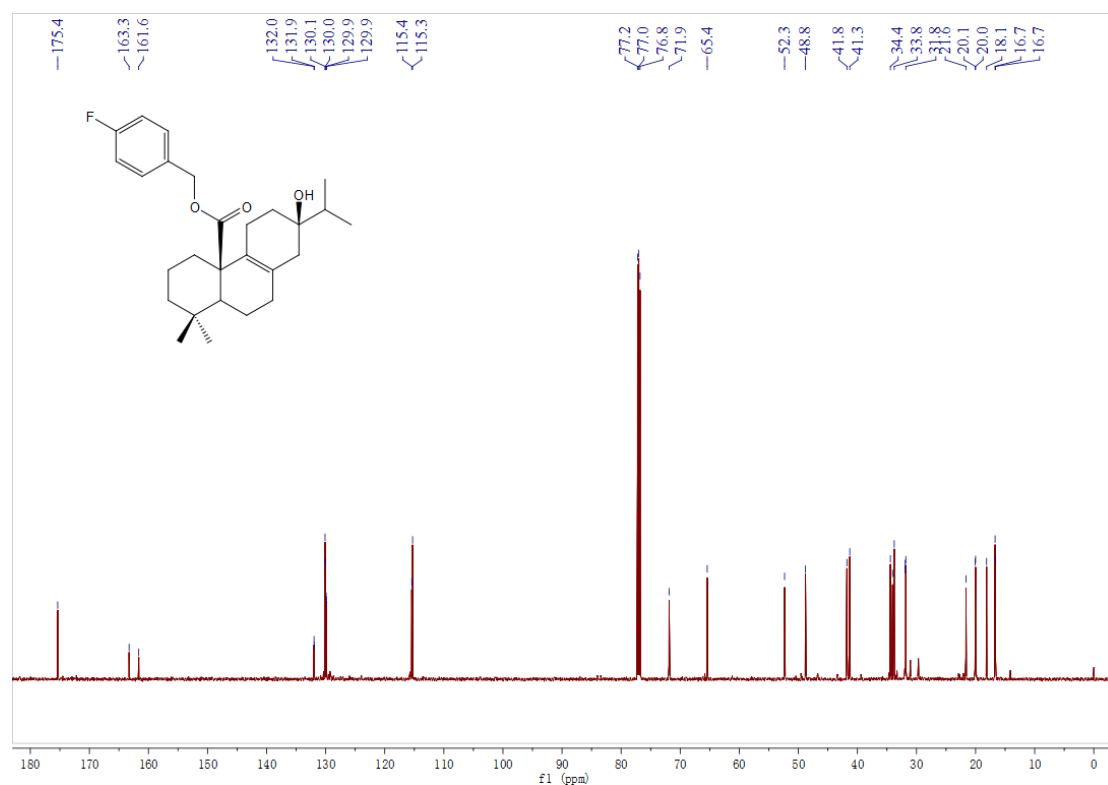


Figure S17. <sup>13</sup>C NMR spectrum of the compound 3f.

Y:58 #39 RT: 0.17 AV: 1 NL: 6.72E7  
T: FTMS + p ESI Full ms [120.0000-1600.0000]

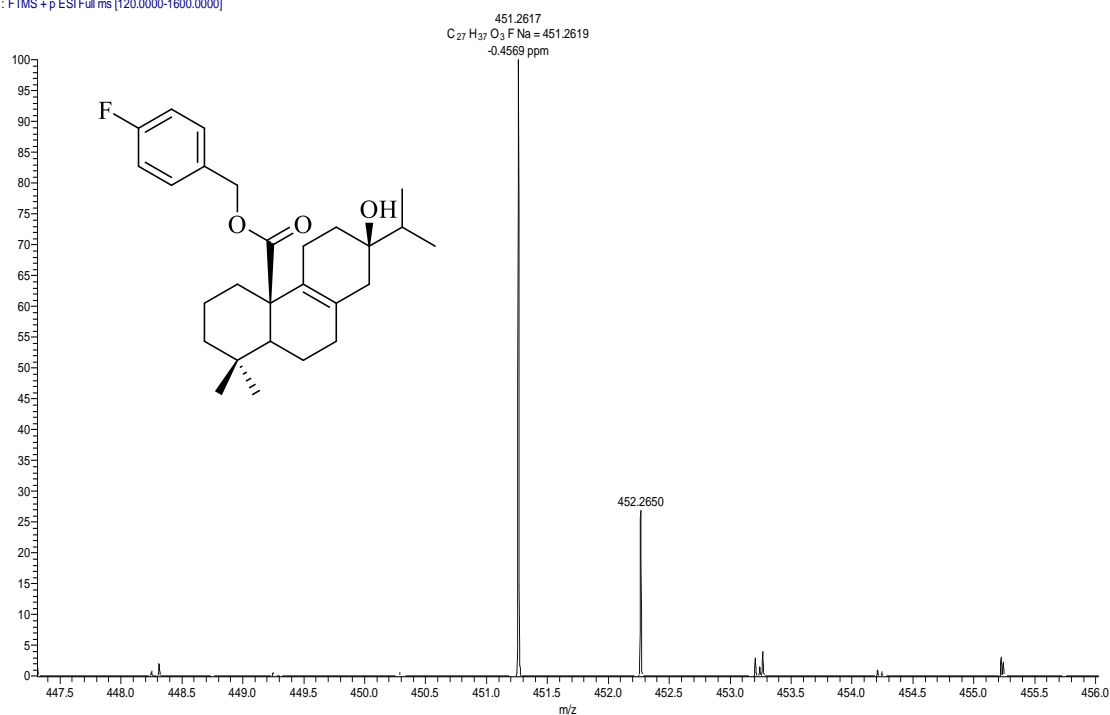


Figure S18. HRMS spectrum of the compound 3f.

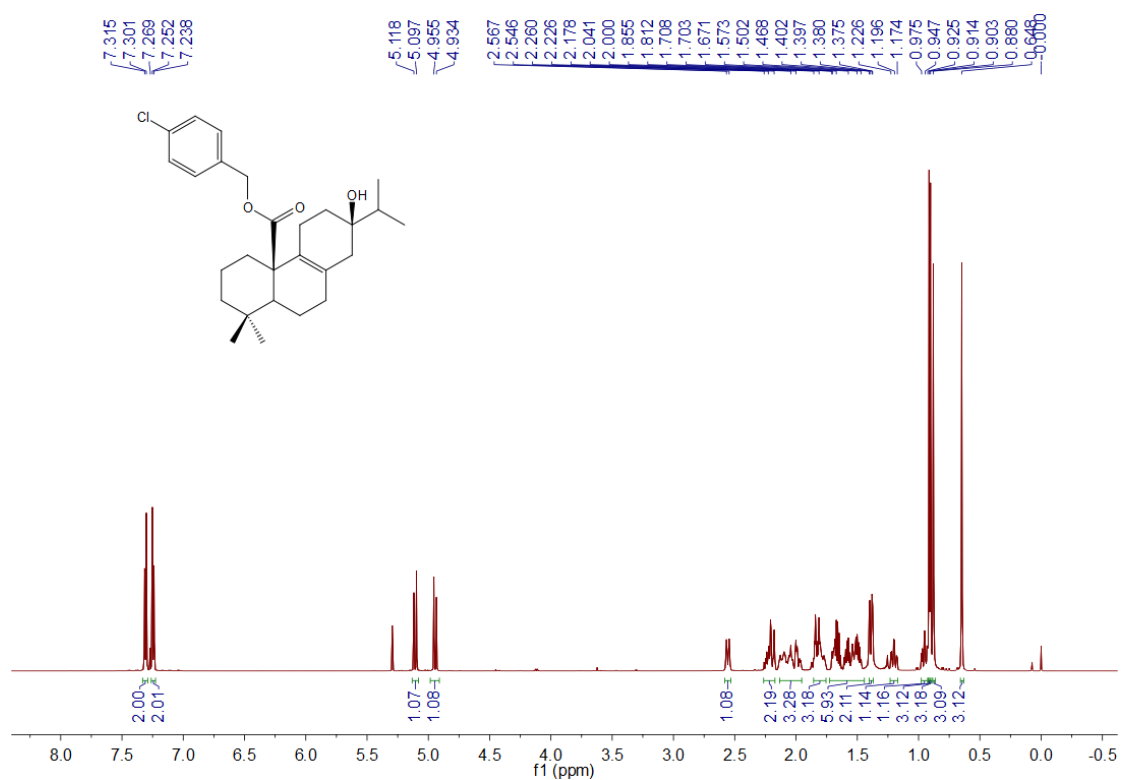


Figure S19. <sup>1</sup>H NMR spectrum of the compound 3g.

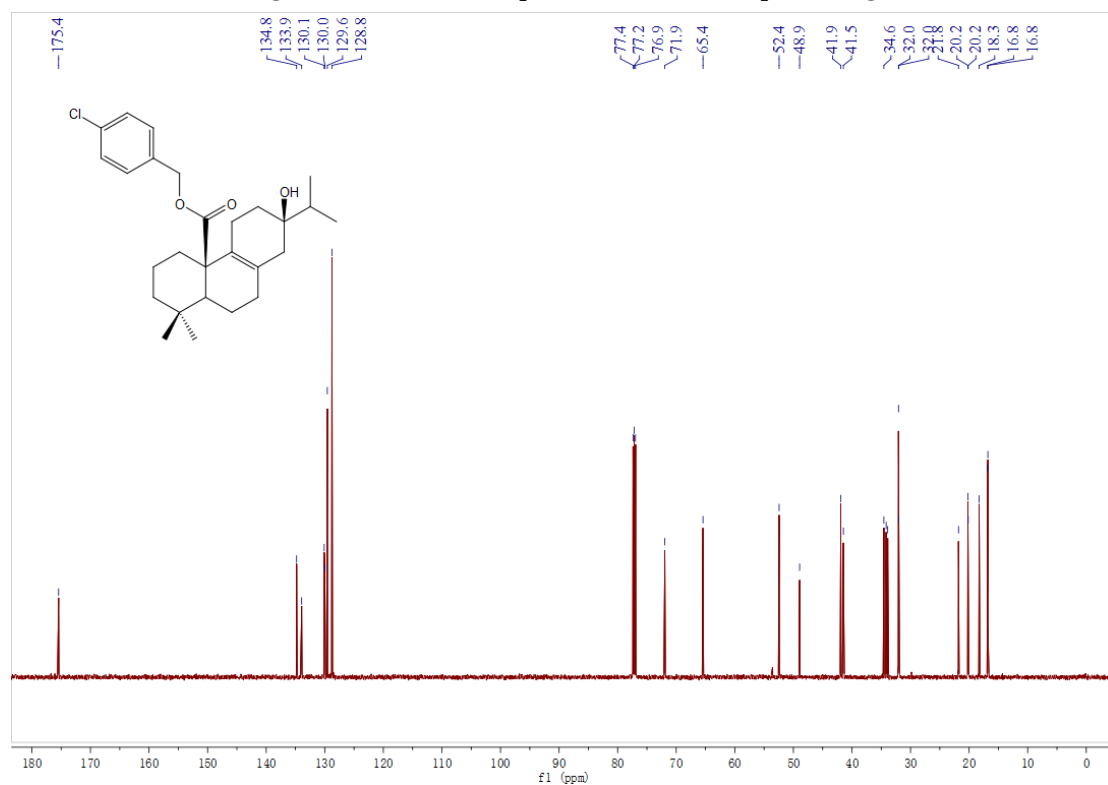


Figure S20. <sup>13</sup>C NMR spectrum of the compound 3g.

Y59 #40 RT: 0.18 AV: 1 NL: 6.77E8  
T: FTMS + p ESI Full ms [120.0000-1600.0000]

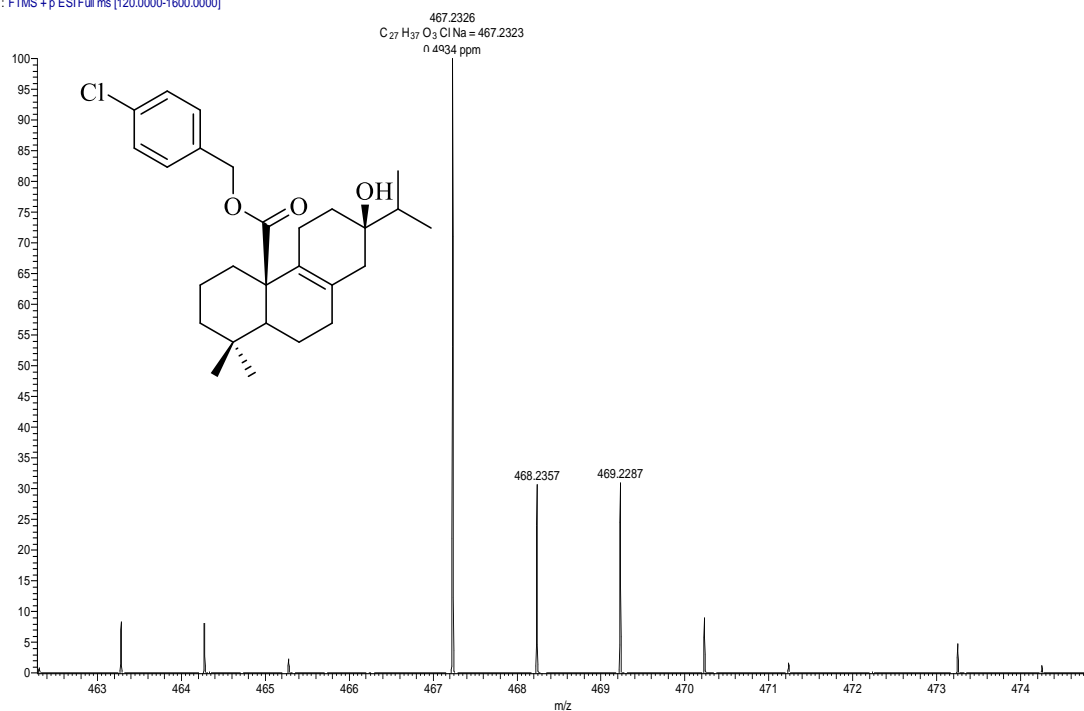


Figure S21. HRMS spectrum of the compound 3g.

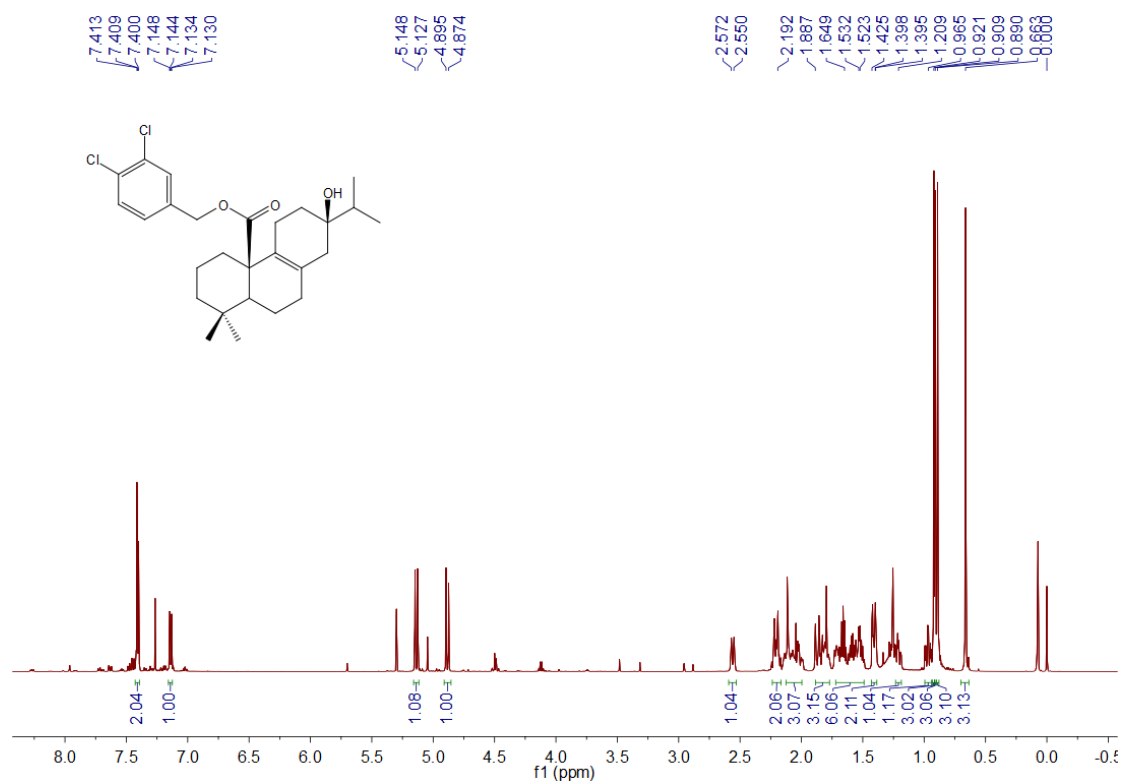
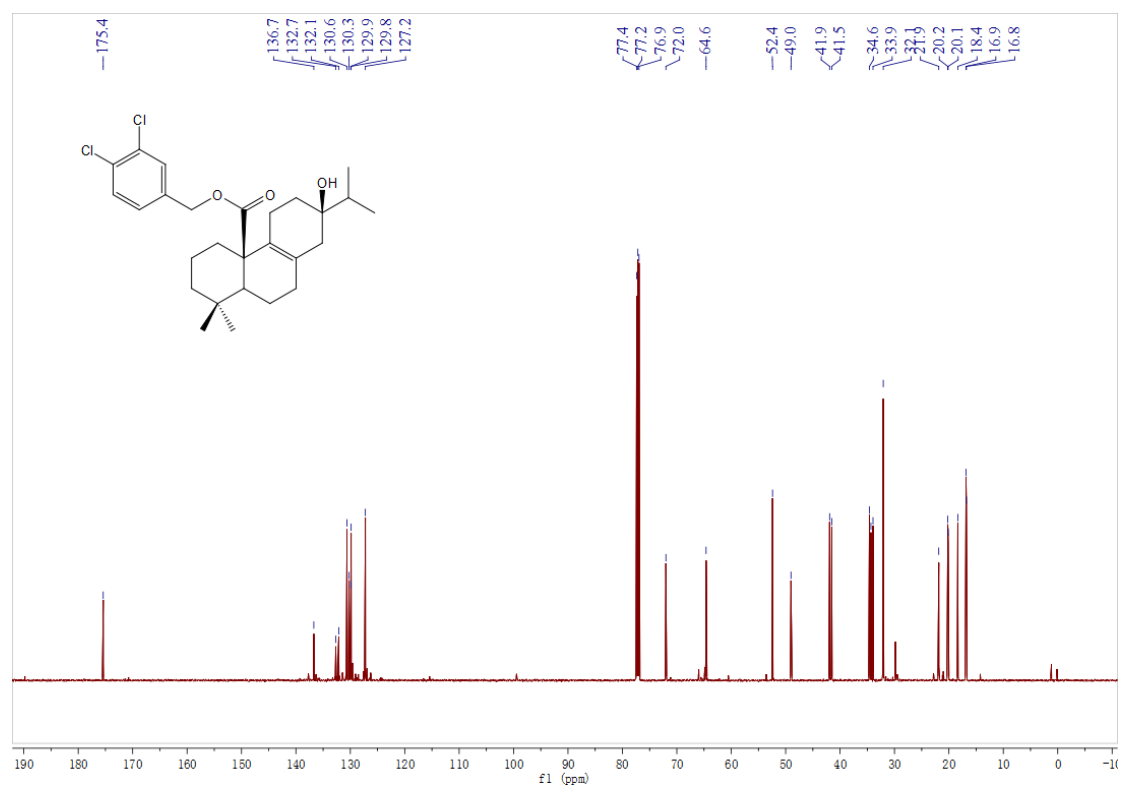


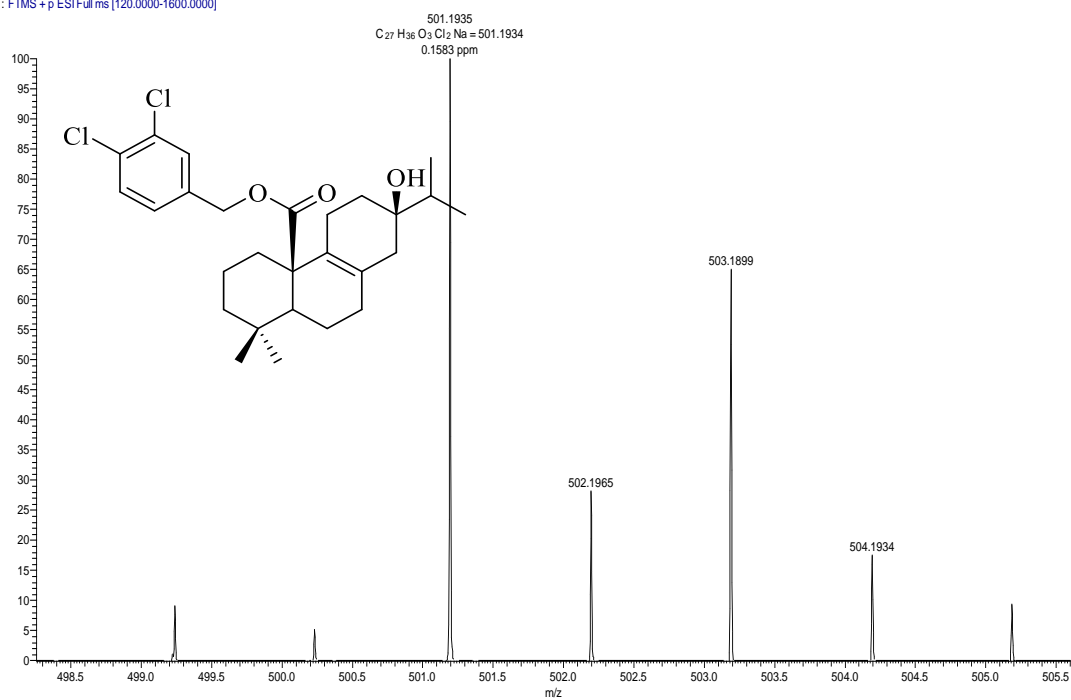
Figure S22. <sup>1</sup>H NMR spectrum of the compound 3h.





**Figure S23.** <sup>13</sup>C NMR spectrum of the compound 3h.

Y-93 #42 RT: 0.18 AV: 1 NL: 9.50E7  
T: FTMS + p ESI Full ms [120.0000-1600.0000]



**Figure S24.** HRMS spectrum of the compound 3h.

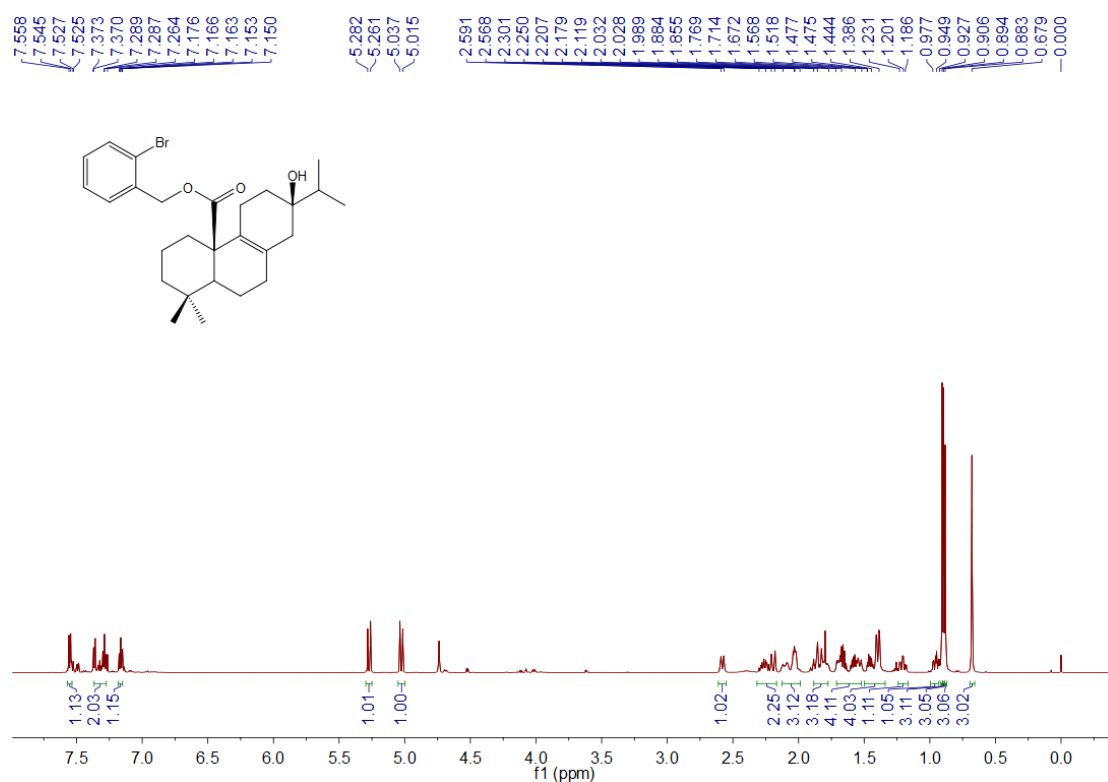


Figure S25. <sup>1</sup>H NMR spectrum of the compound **3i**.

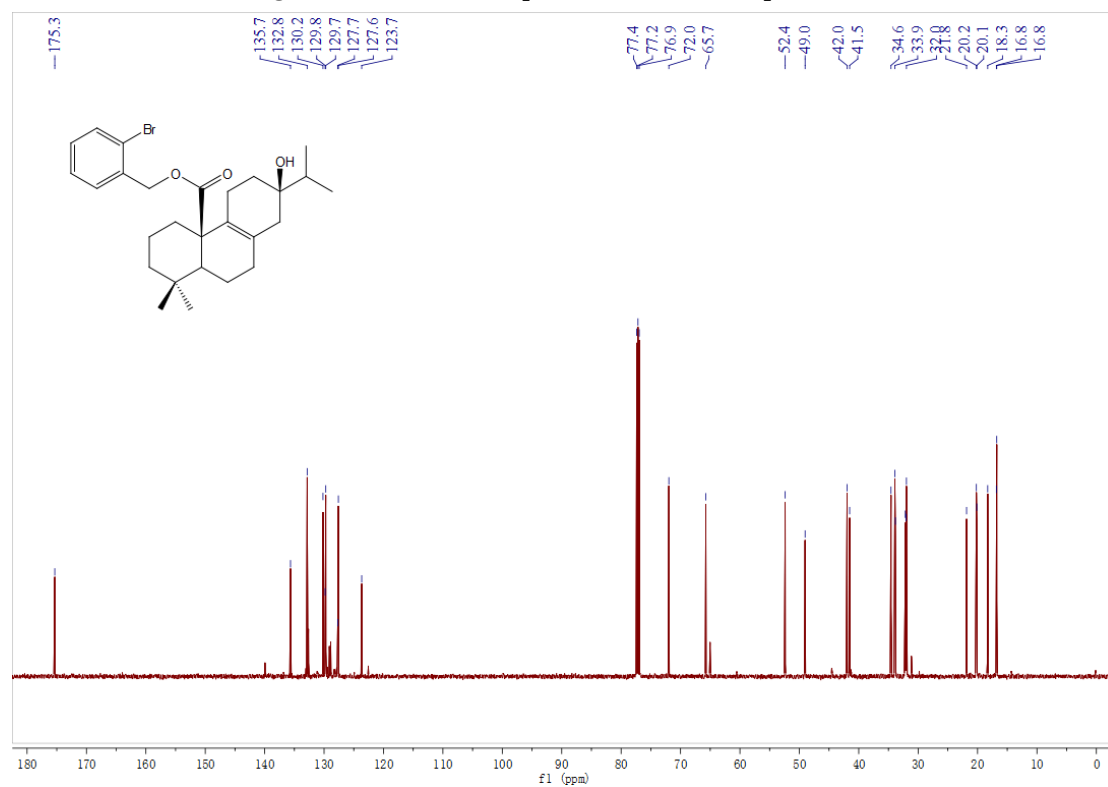


Figure S26. <sup>13</sup>C NMR spectrum of the compound **3i**.

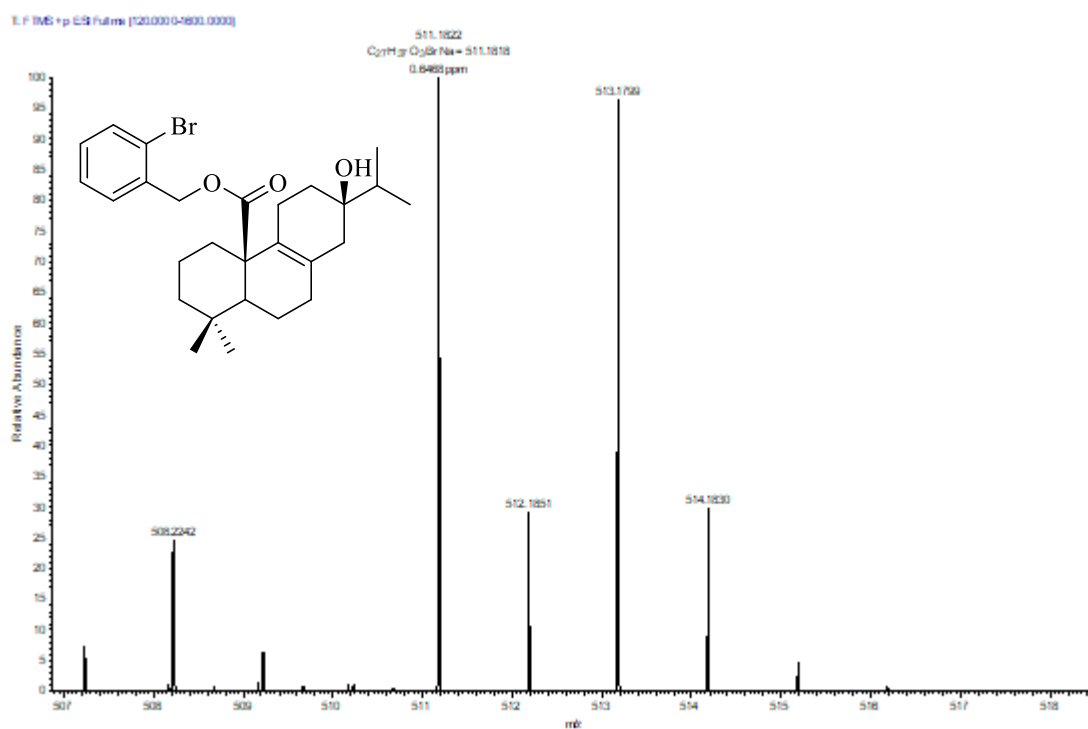


Figure S27. HRMS spectrum of the compound 3i.

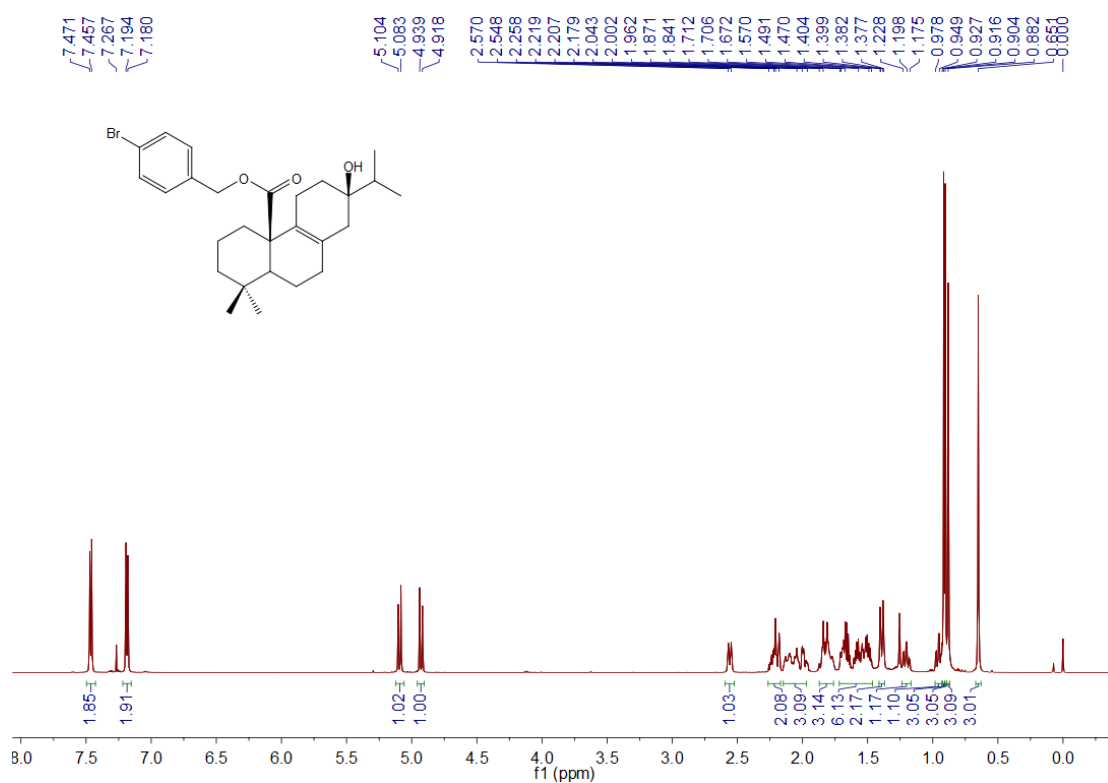


Figure S28.  $^1\text{H}$  NMR spectrum of the compound 3j.

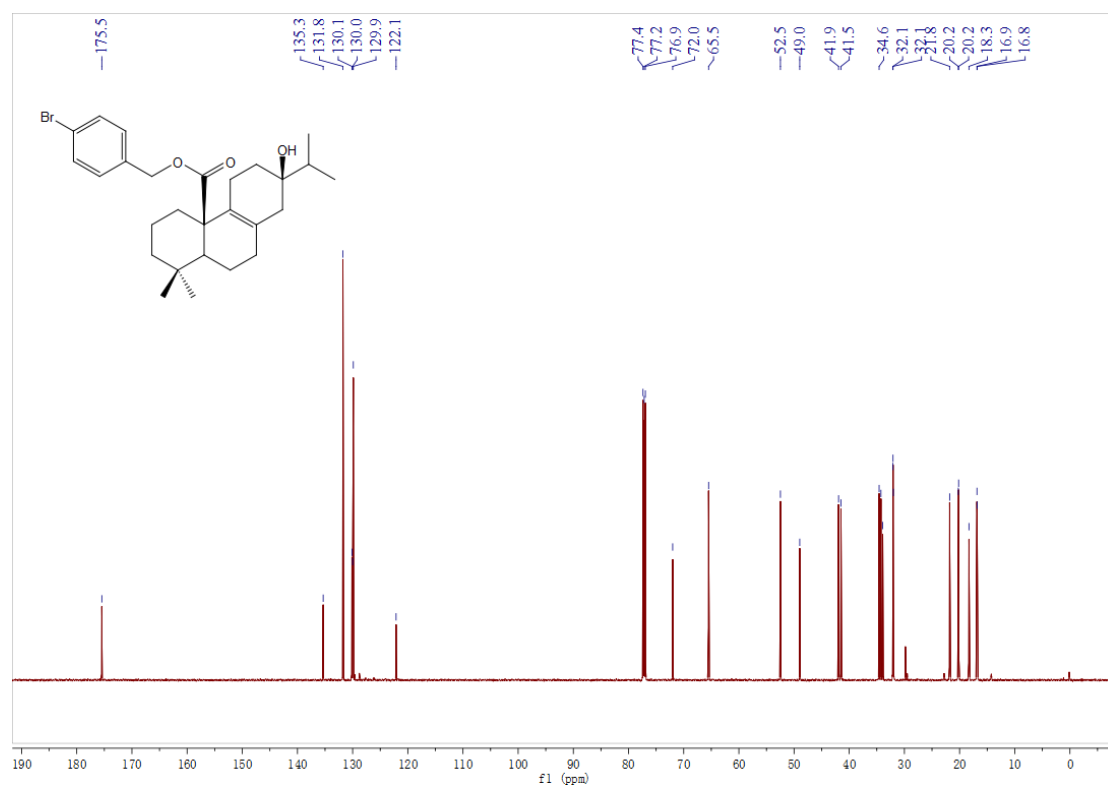


Figure S29. <sup>13</sup>C NMR spectrum of the compound 3j.

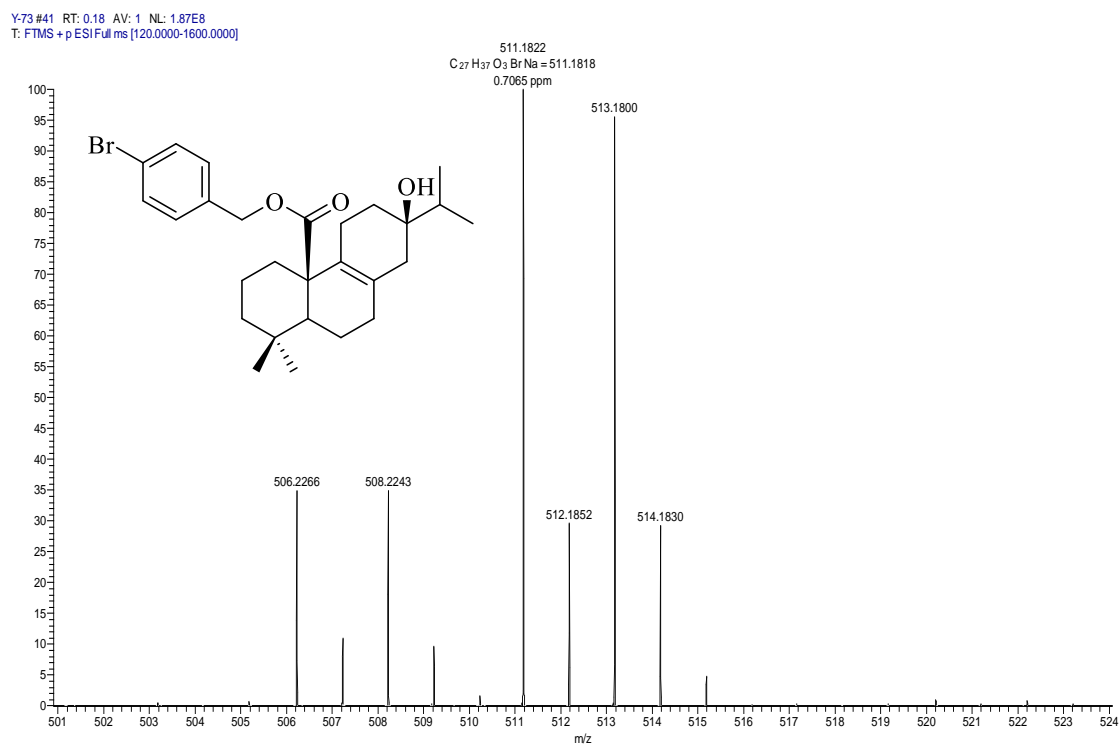


Figure S30. HRMS spectrum of the compound 3j.

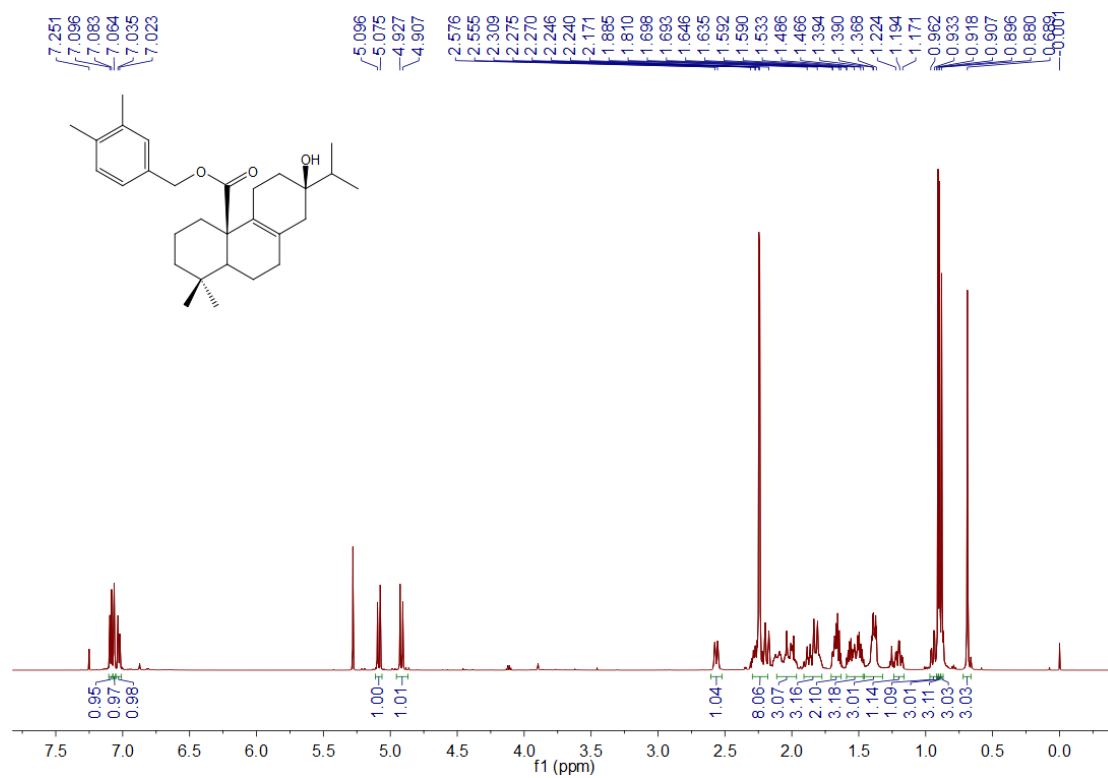


Figure S31. <sup>1</sup>H NMR spectrum of the compound 3k.

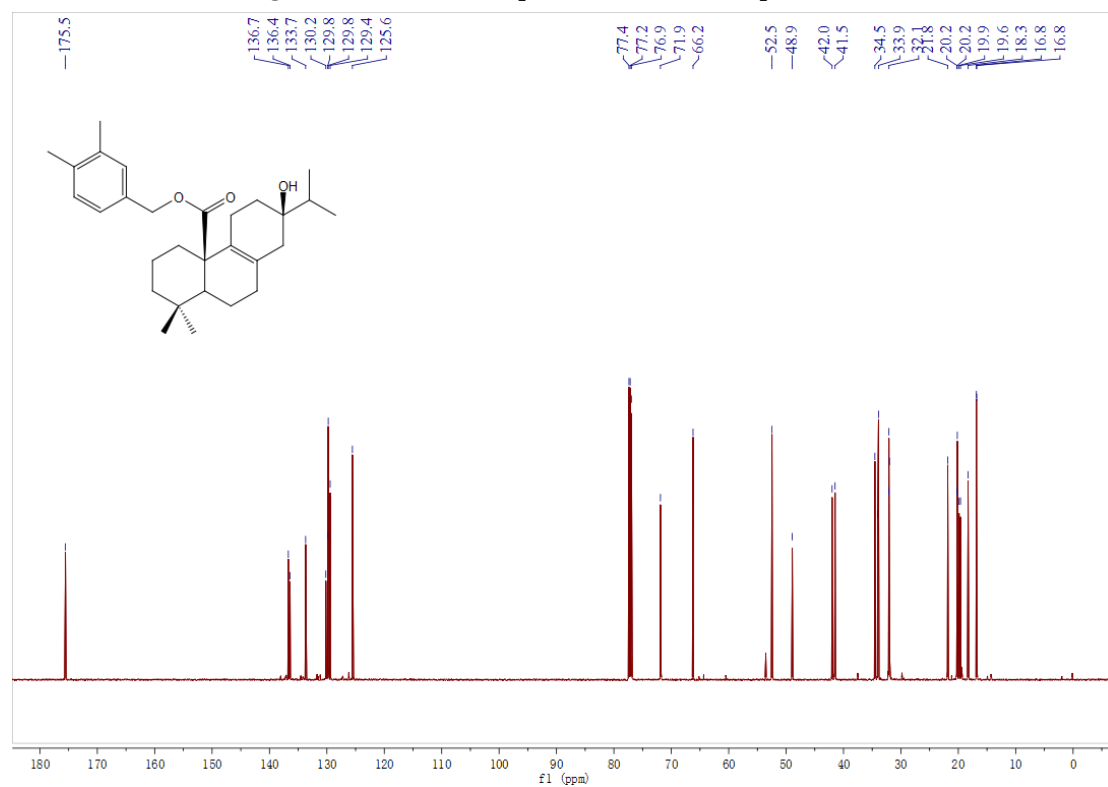


Figure S32. <sup>13</sup>C NMR spectrum of the compound 3k.

Y-55 #44 RT: 0.19 AV: 1 NL: 2.03E8  
T: FTMS + p ESI Full ms [120.0000-1600.0000]

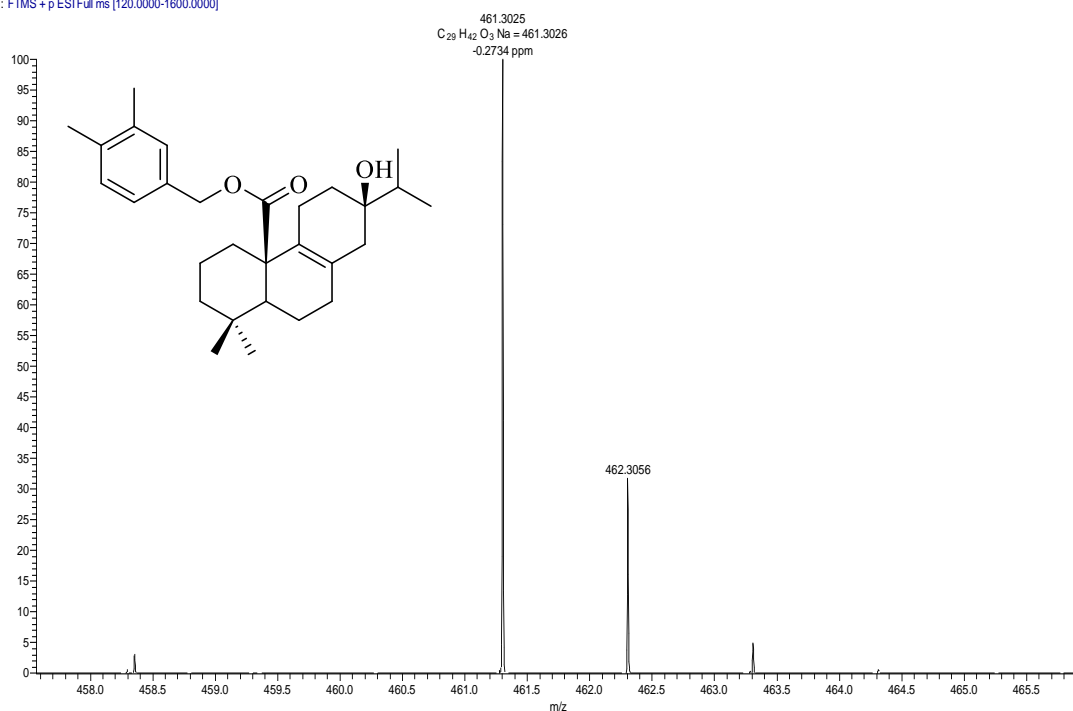


Figure S33. HRMS spectrum of the compound 3k.

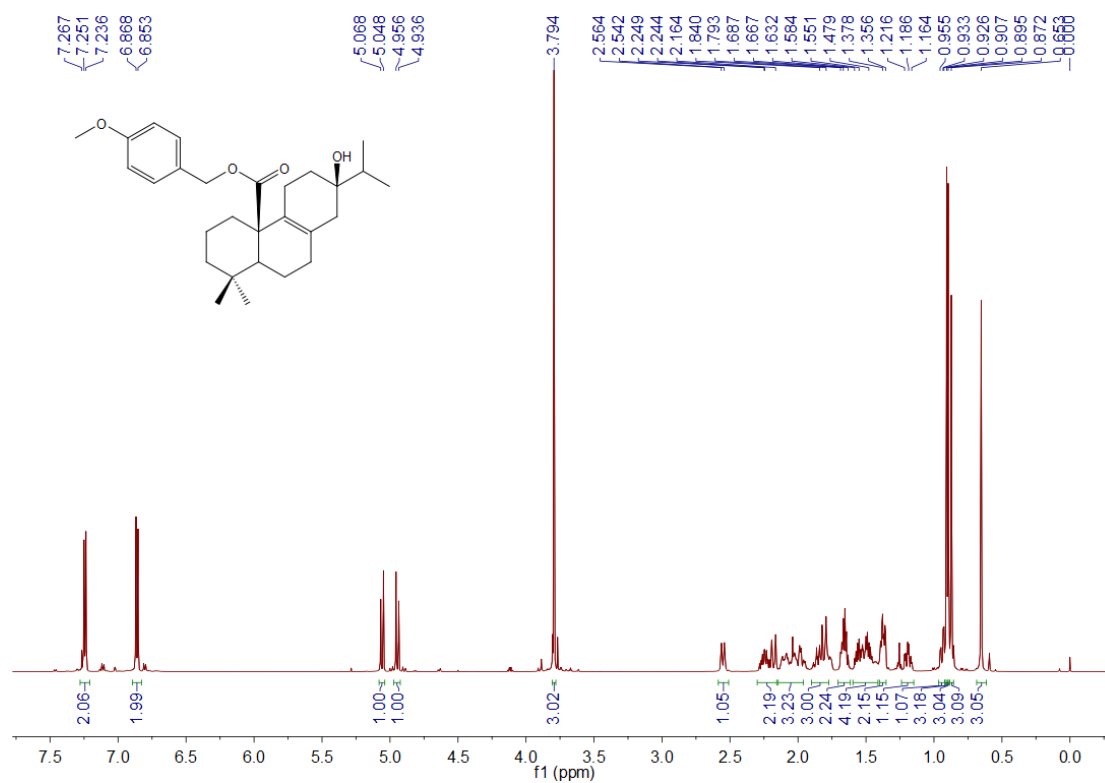


Figure S34. <sup>1</sup>H NMR spectrum of the compound 3l.

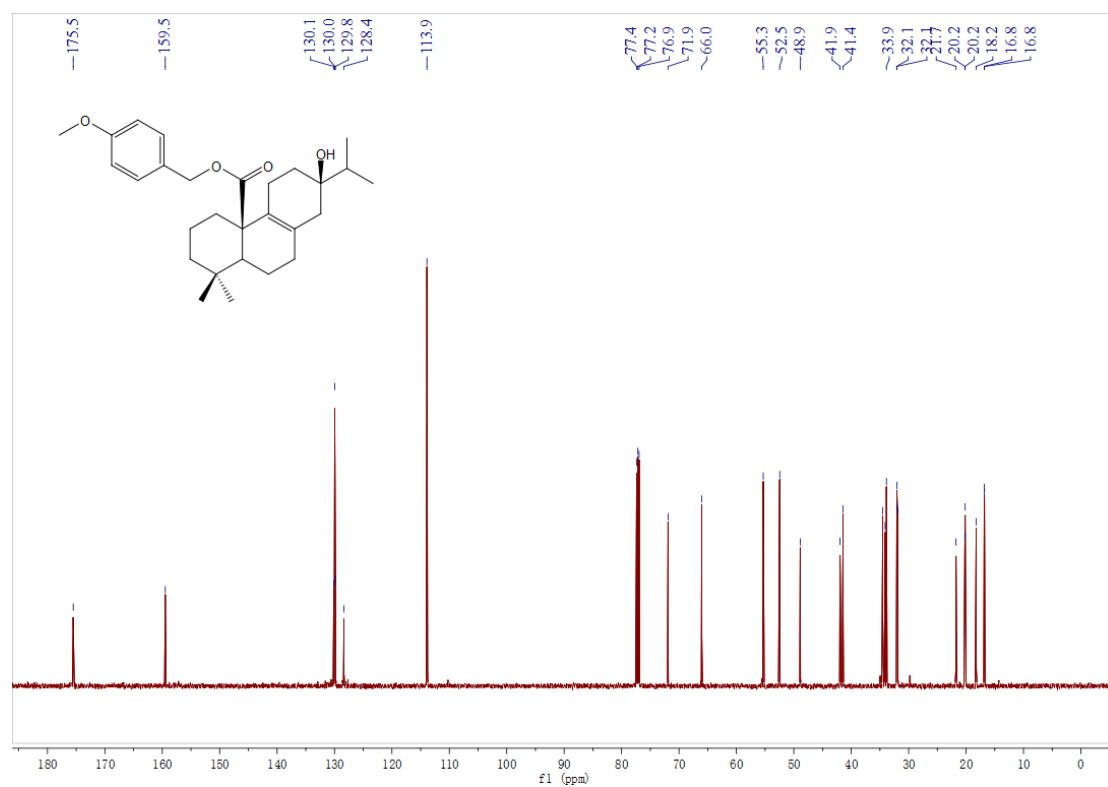


Figure S35. <sup>13</sup>C NMR spectrum of the compound 31.

Y-53 #43 RT: 0.19 AV: 1 NL: 8.70E8  
T: FTMS + p ESI Full ms [120.0000-1600.0000]

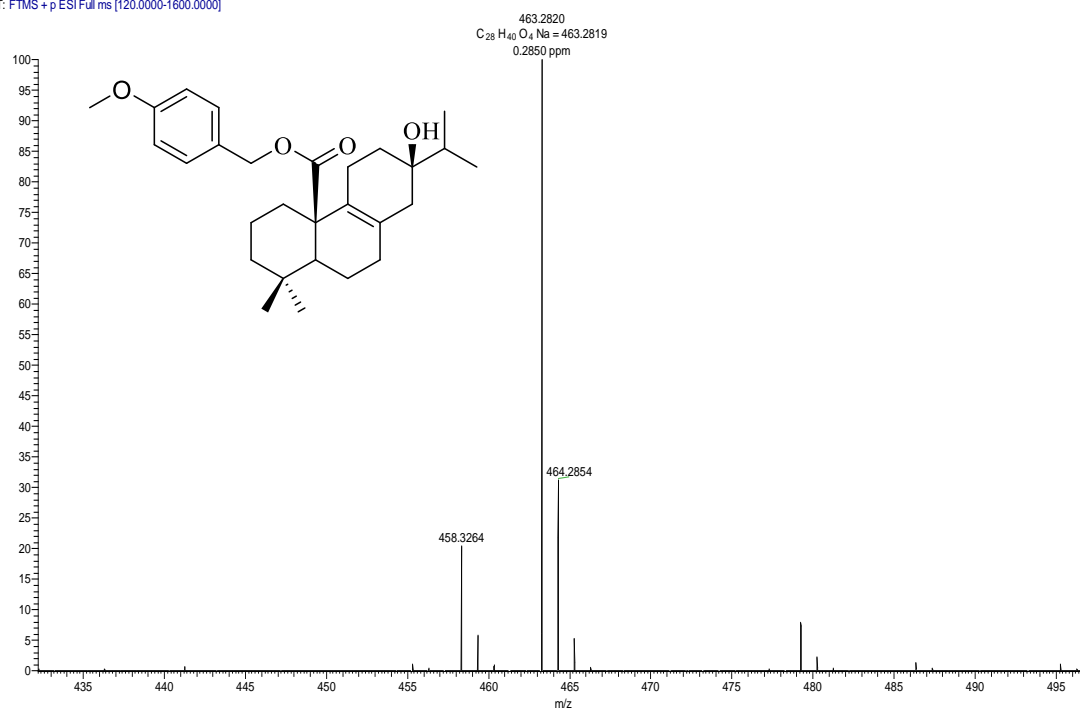


Figure S36. HRMS spectrum of the compound 31.

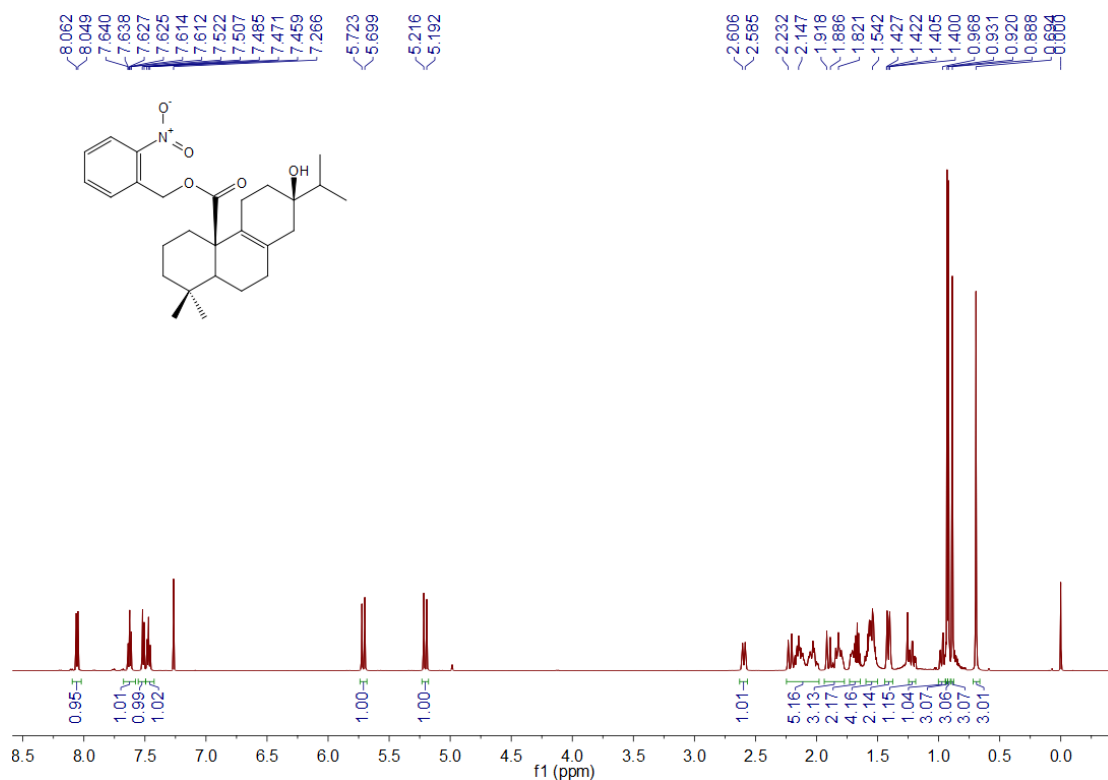


Figure S37. <sup>1</sup>H NMR spectrum of the compound 3m.

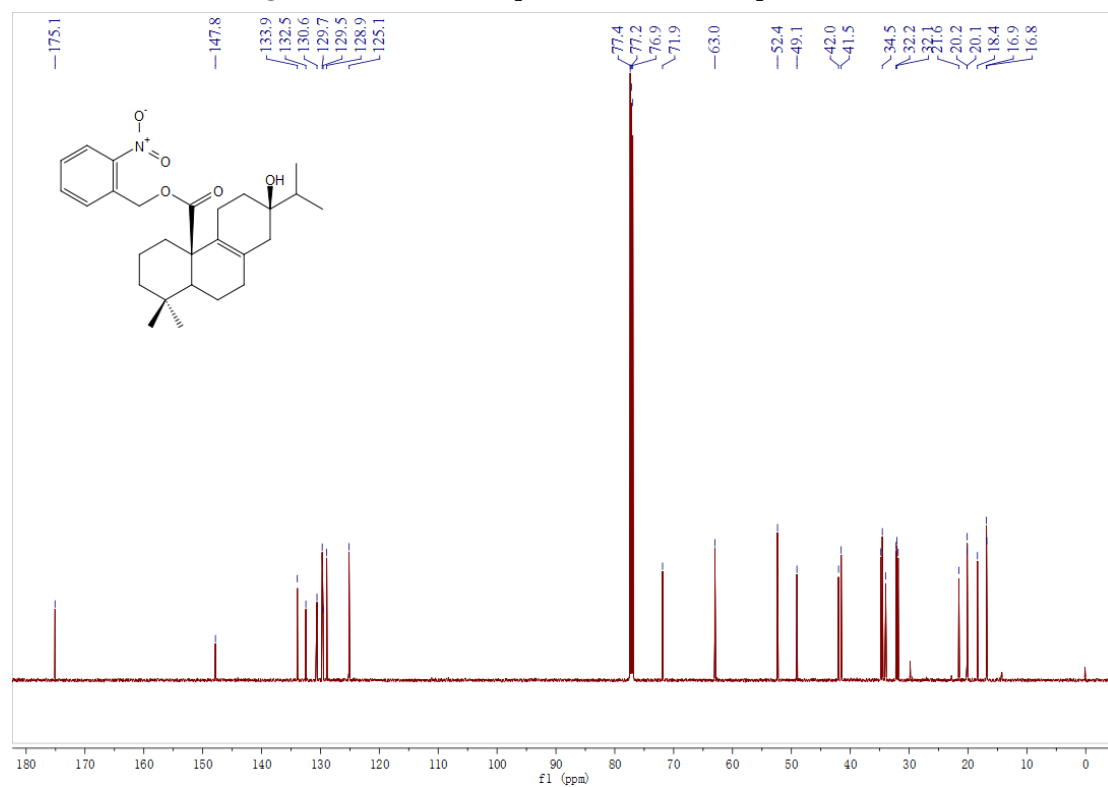


Figure S38. <sup>13</sup>C NMR spectrum of the compound 3m.



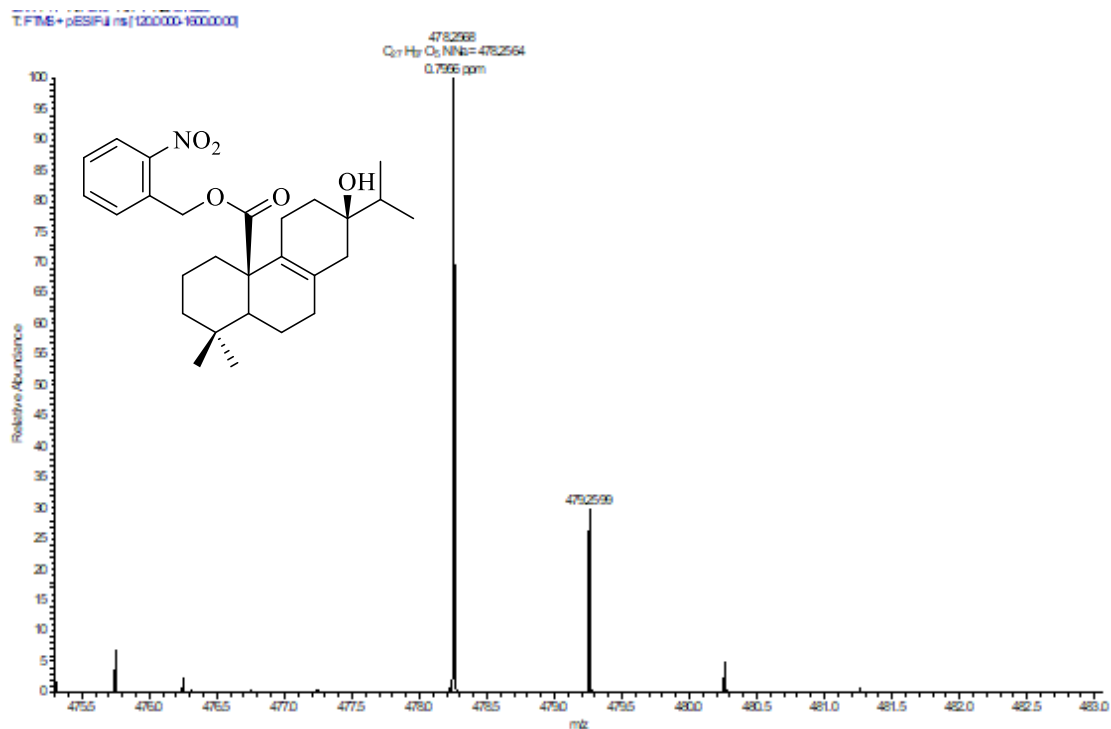


Figure S39. HRMS spectrum of the compound 3m.

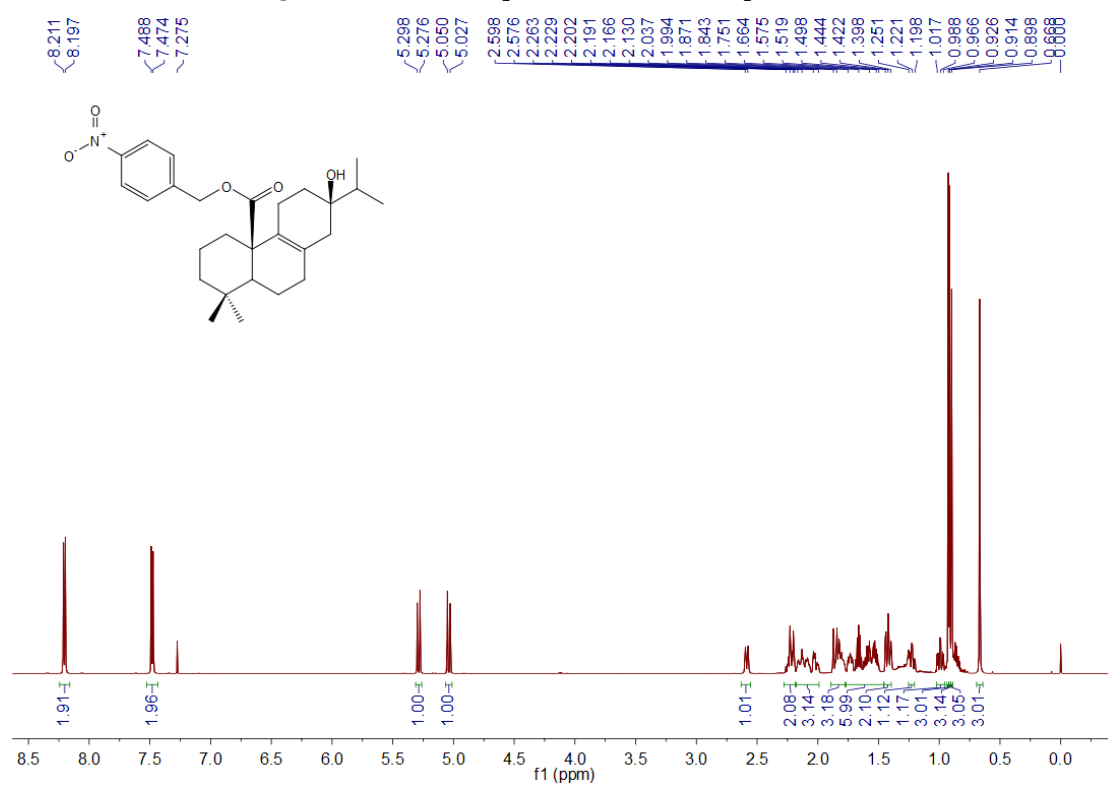


Figure S40. <sup>1</sup>H NMR spectrum of the compound 3n.

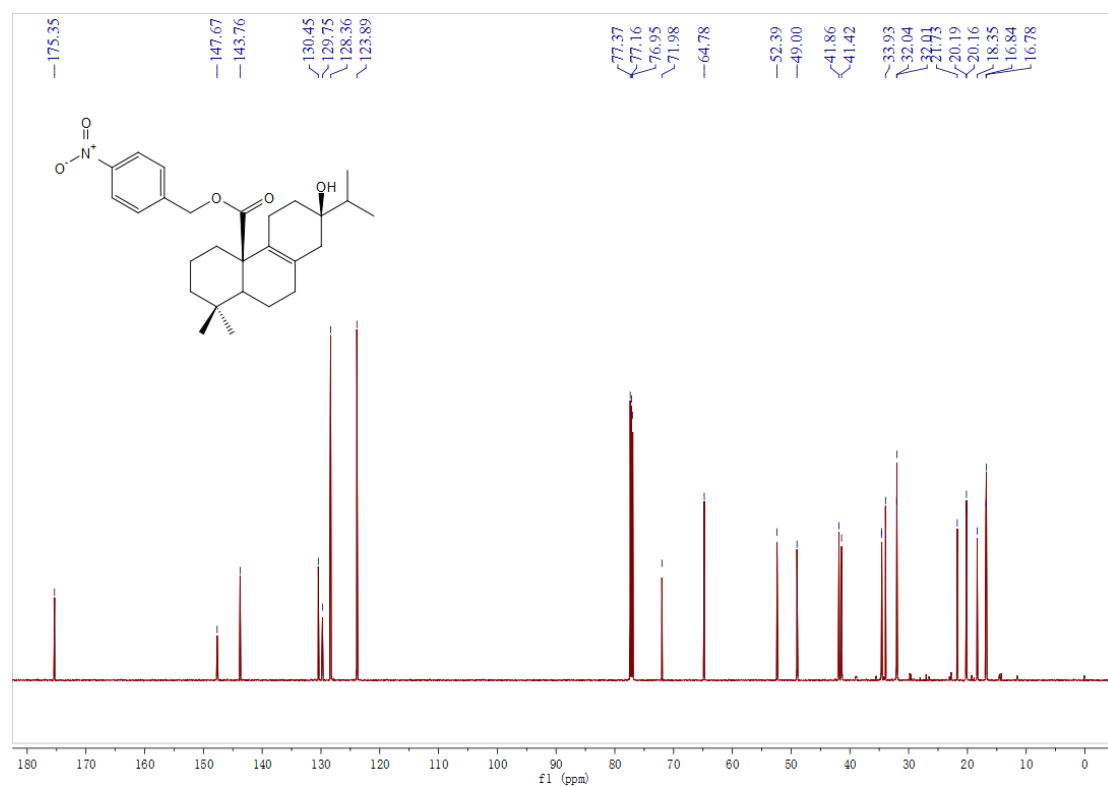


Figure S41. <sup>13</sup>C NMR spectrum of the compound 3n.

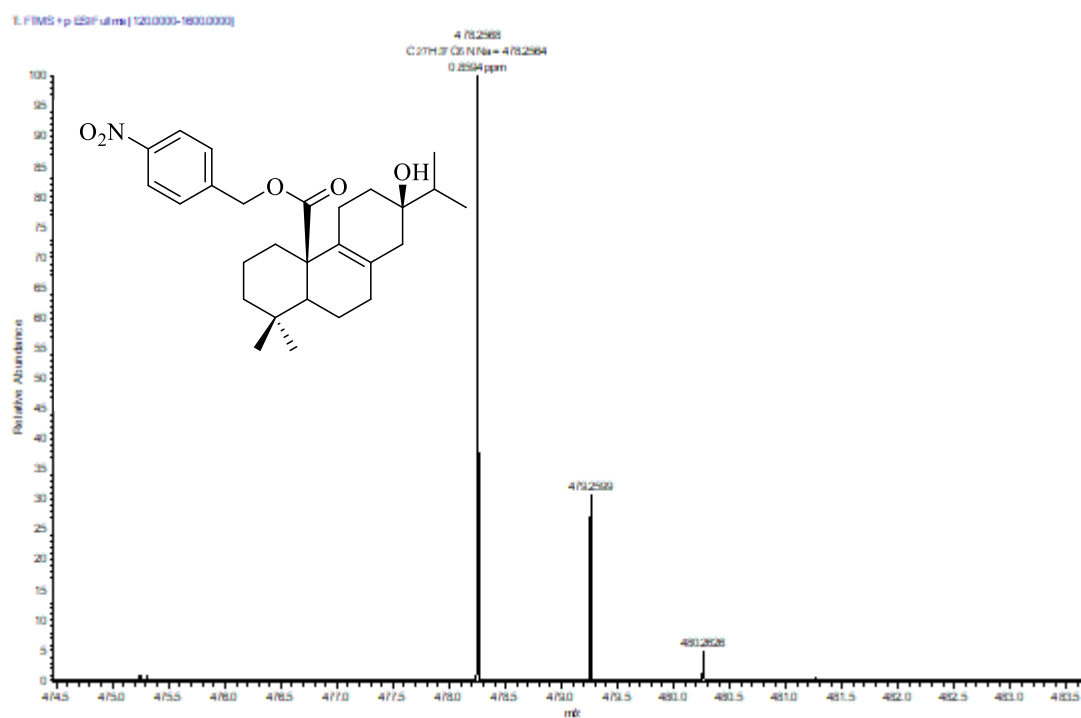


Figure S42. HRMS spectrum of the compound 3n.

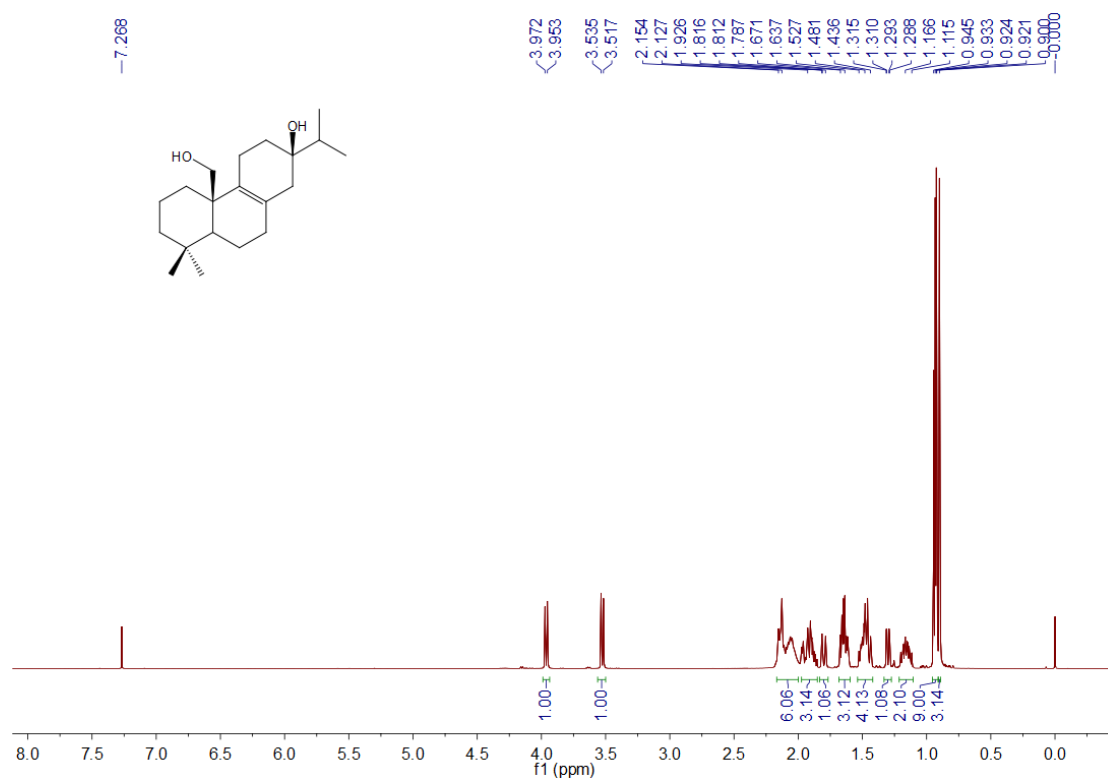


Figure S43. <sup>1</sup>H NMR spectrum of the compound 4.

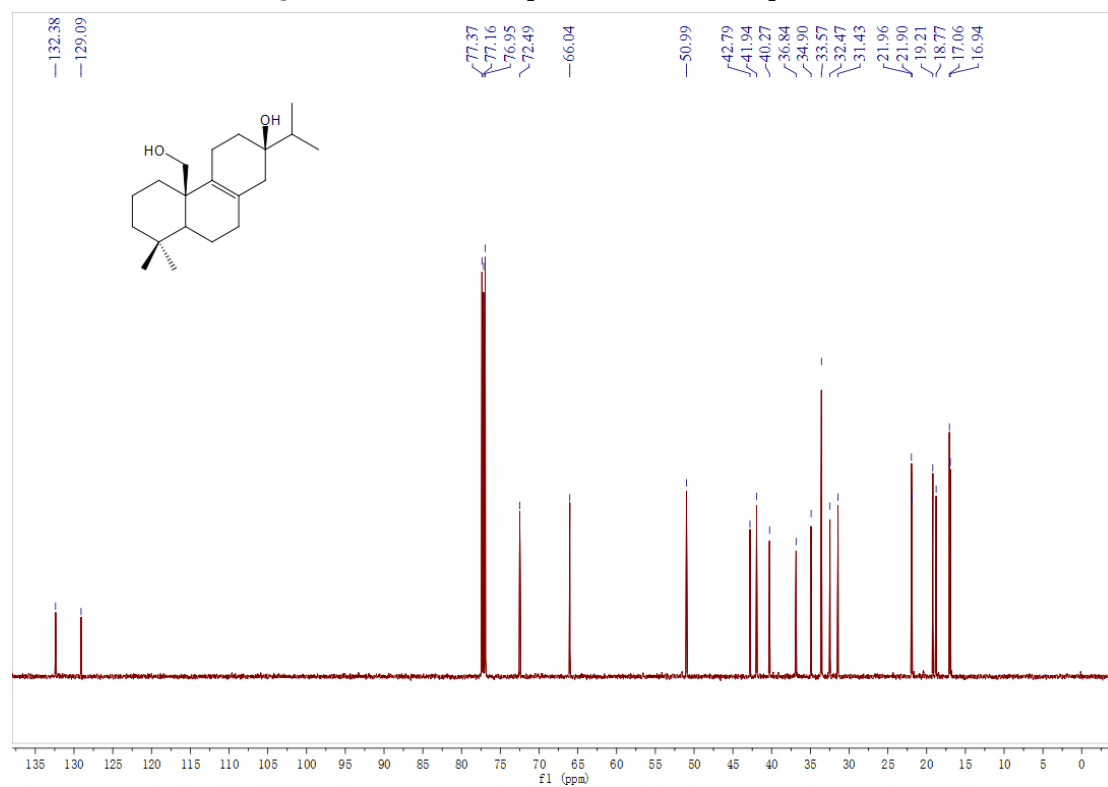


Figure S44. <sup>13</sup>C NMR spectrum of the compound 4.

Y:92 #42 RT: 0.18 AV: 1 NL: 1.33E9  
T: FTMS + p ESI Full ms [120.0000-1600.0000]

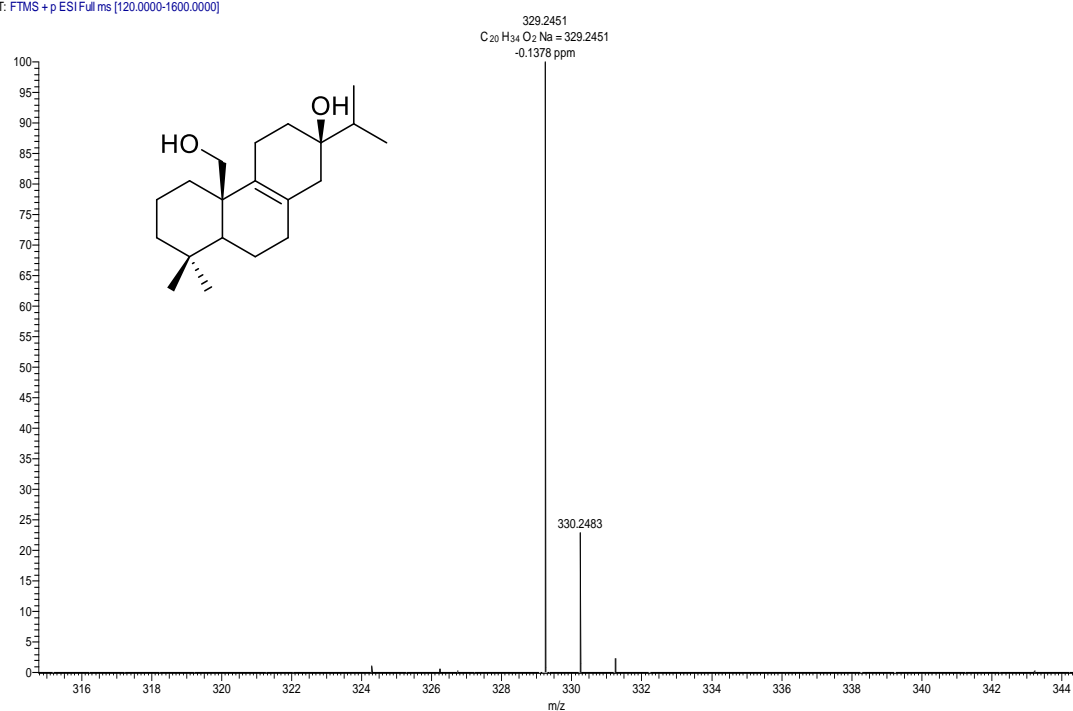


Figure S45. HRMS spectrum of the compound 4.

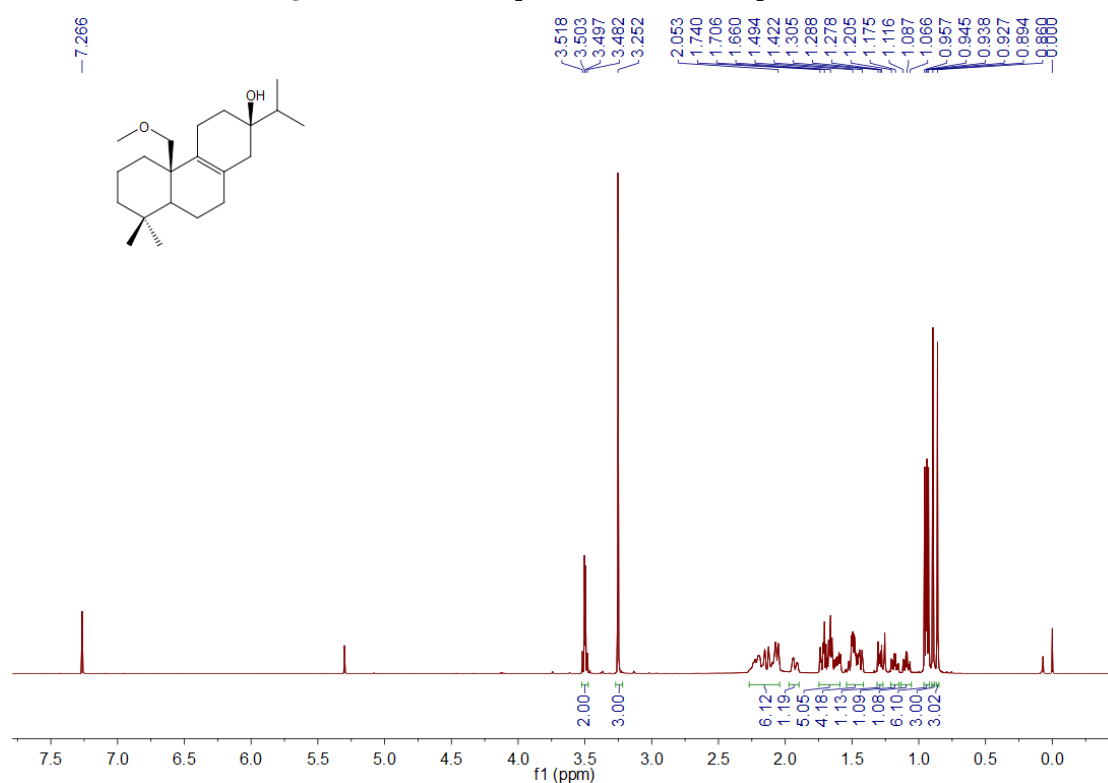


Figure S46. <sup>1</sup>H NMR spectrum of the compound 5a.

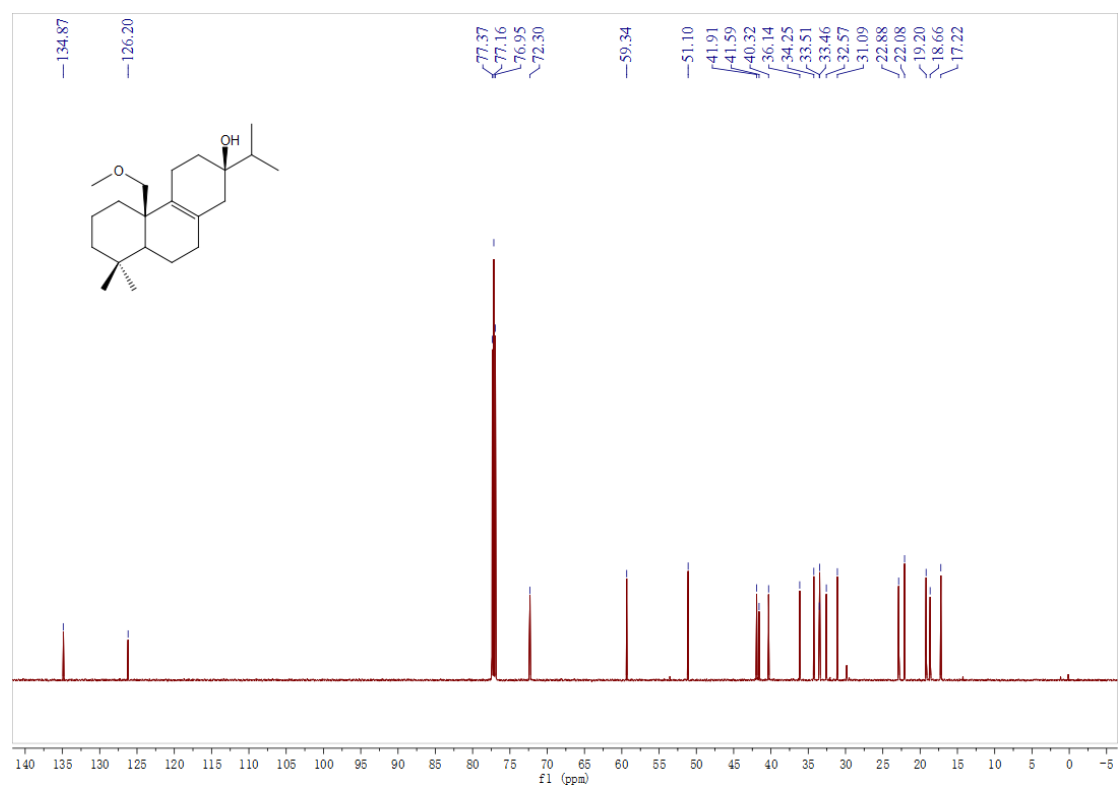


Figure S47. <sup>13</sup>C NMR spectrum of the compound 5a.

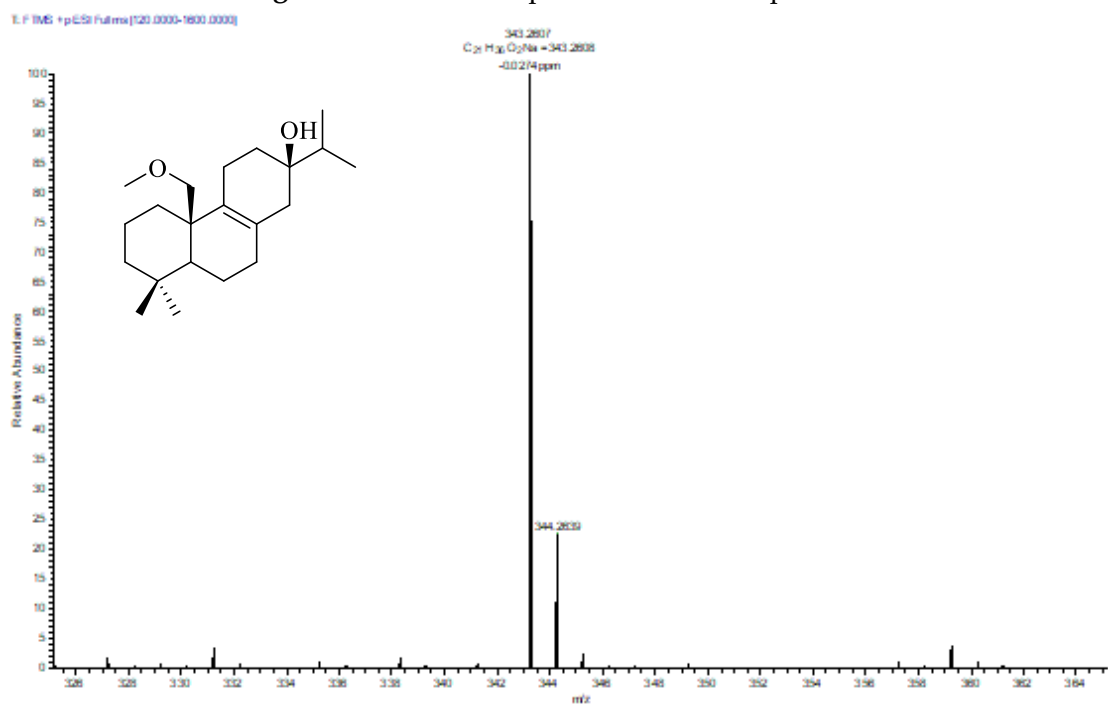


Figure S48. HRMS spectrum of the compound 5a.

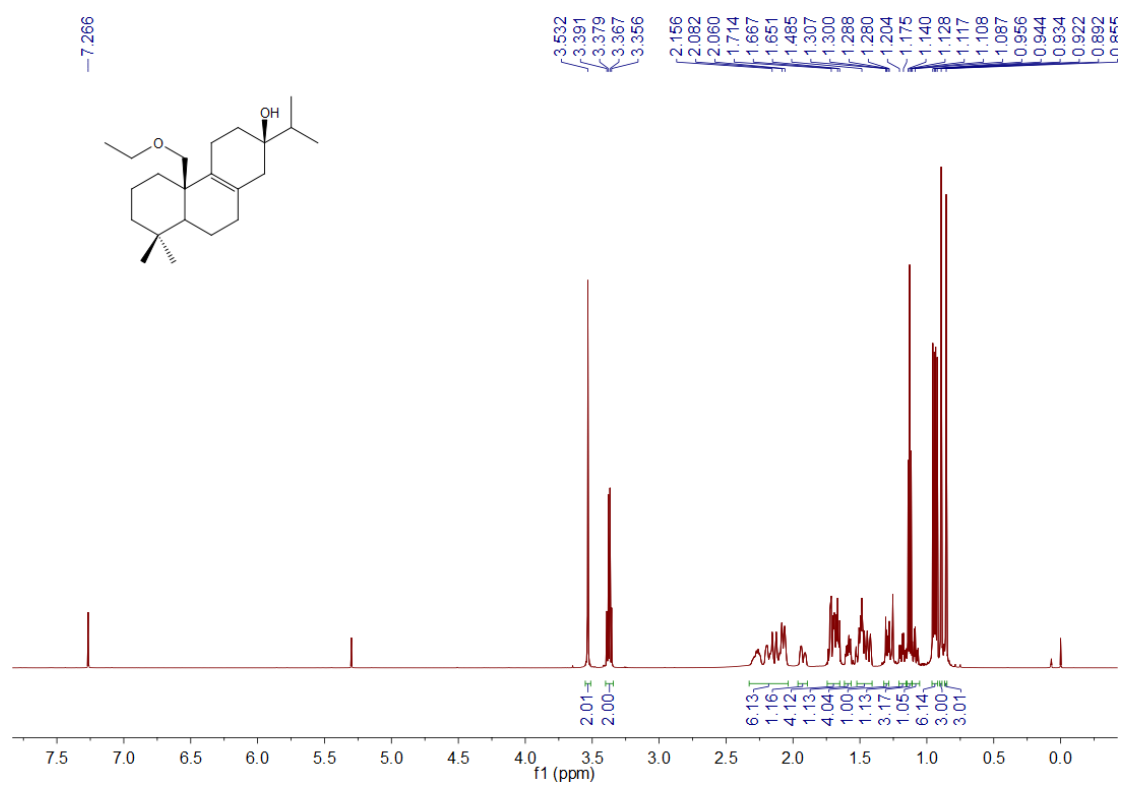


Figure S49. <sup>1</sup>H NMR spectrum of the compound 5b.

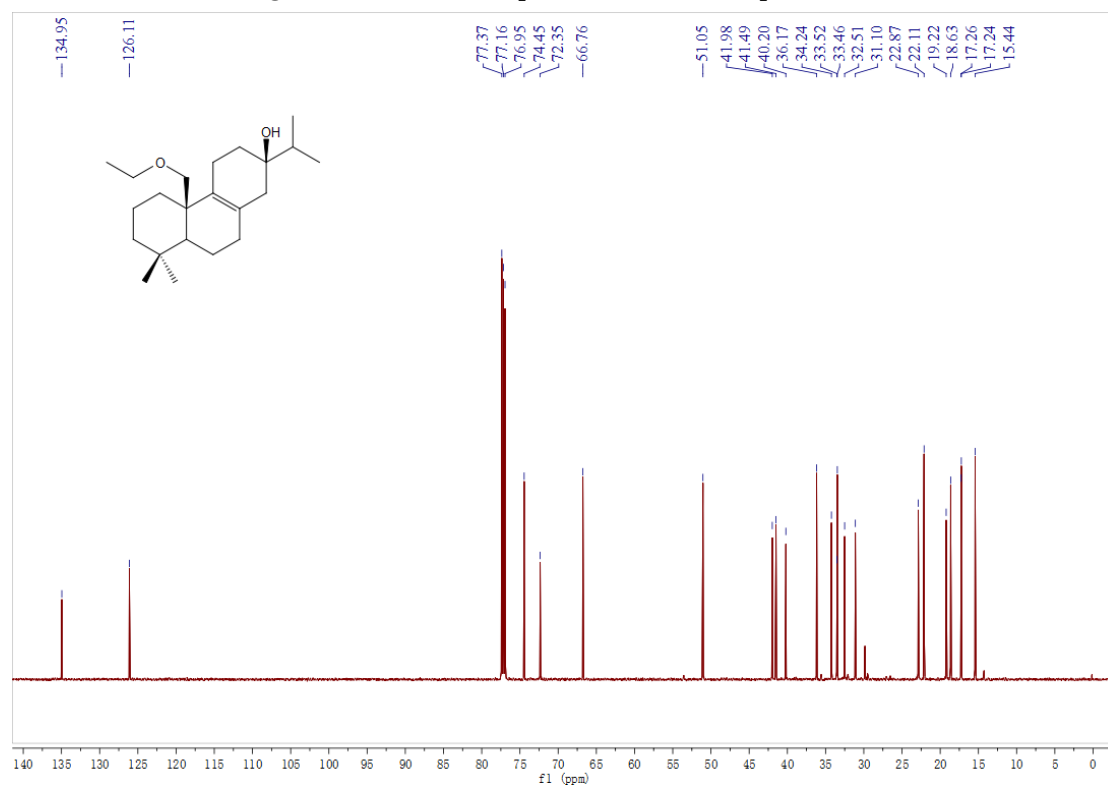


Figure S50. <sup>13</sup>C NMR spectrum of the compound 5b.

LW-28 #36 RT: 0.16 AV: 1 NL: 2.50E8  
T: FTMS + p ESI Full ms [120.0000-1600.0000]

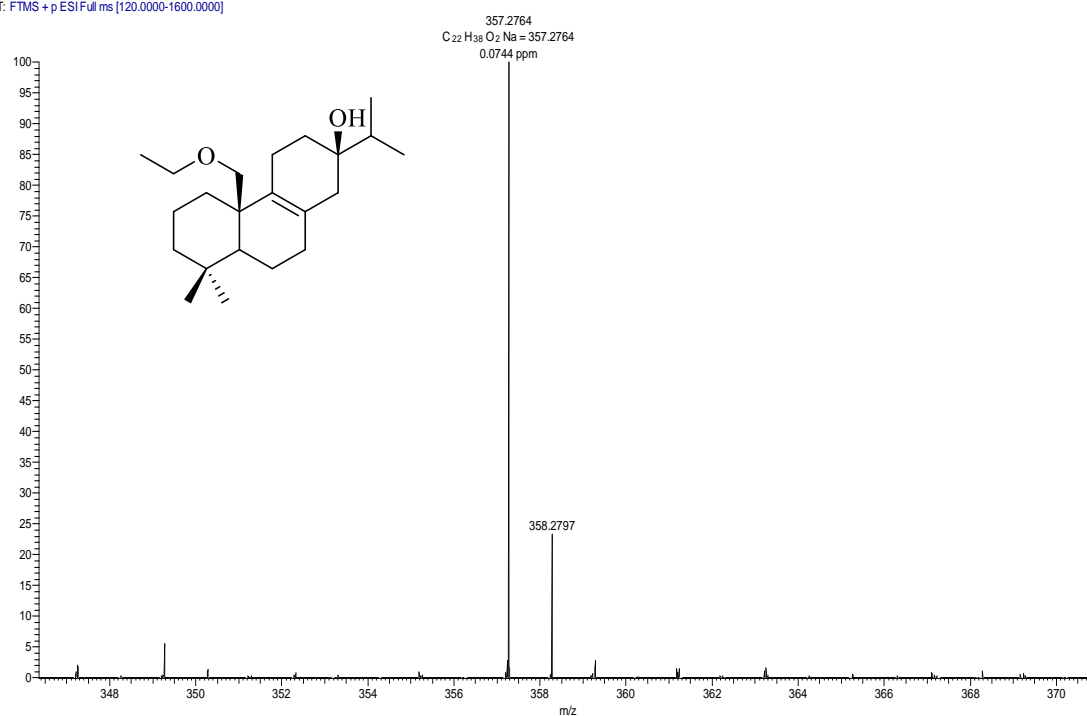


Figure S51. HRMS spectrum of the compound 5b.

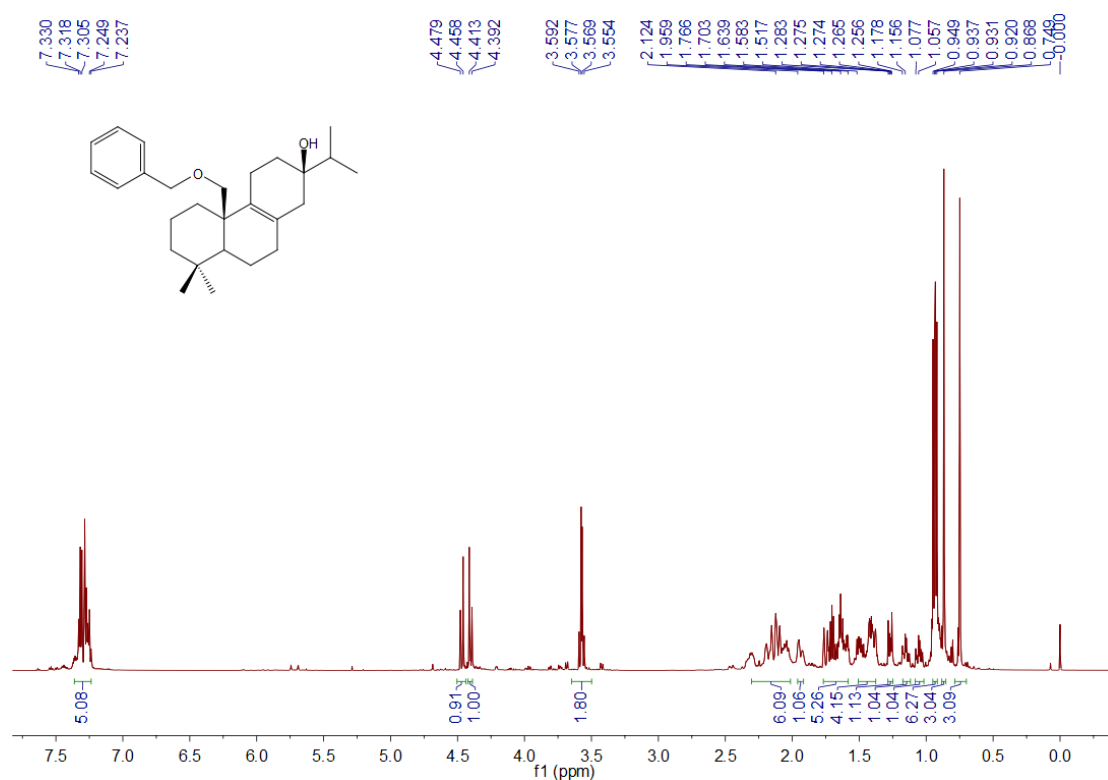


Figure S52. <sup>1</sup>H NMR spectrum of the compound 5c.

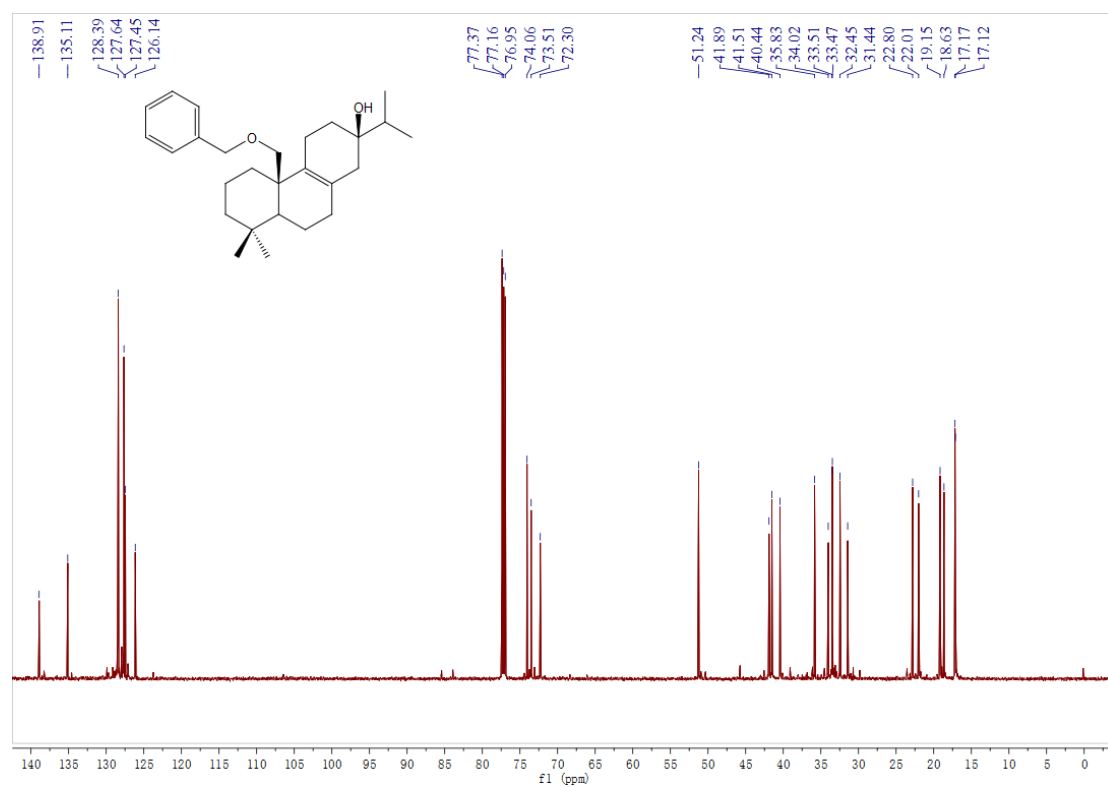


Figure S53. <sup>13</sup>C NMR spectrum of the compound 5c.

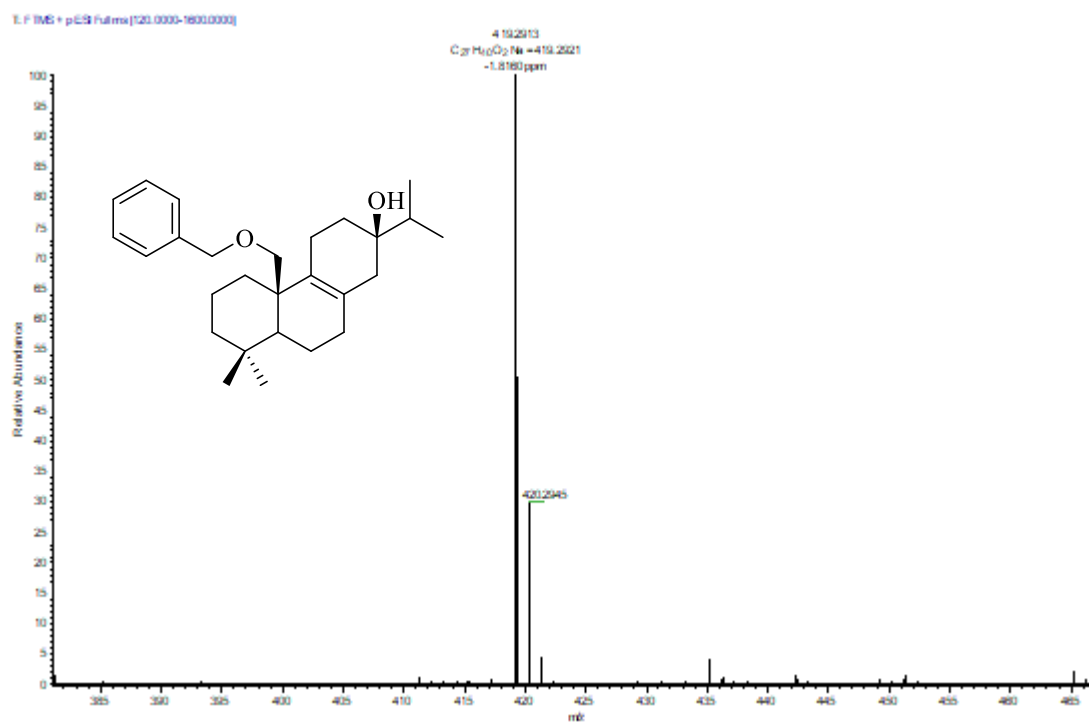


Figure S54. HRMS spectrum of the compound 5c.



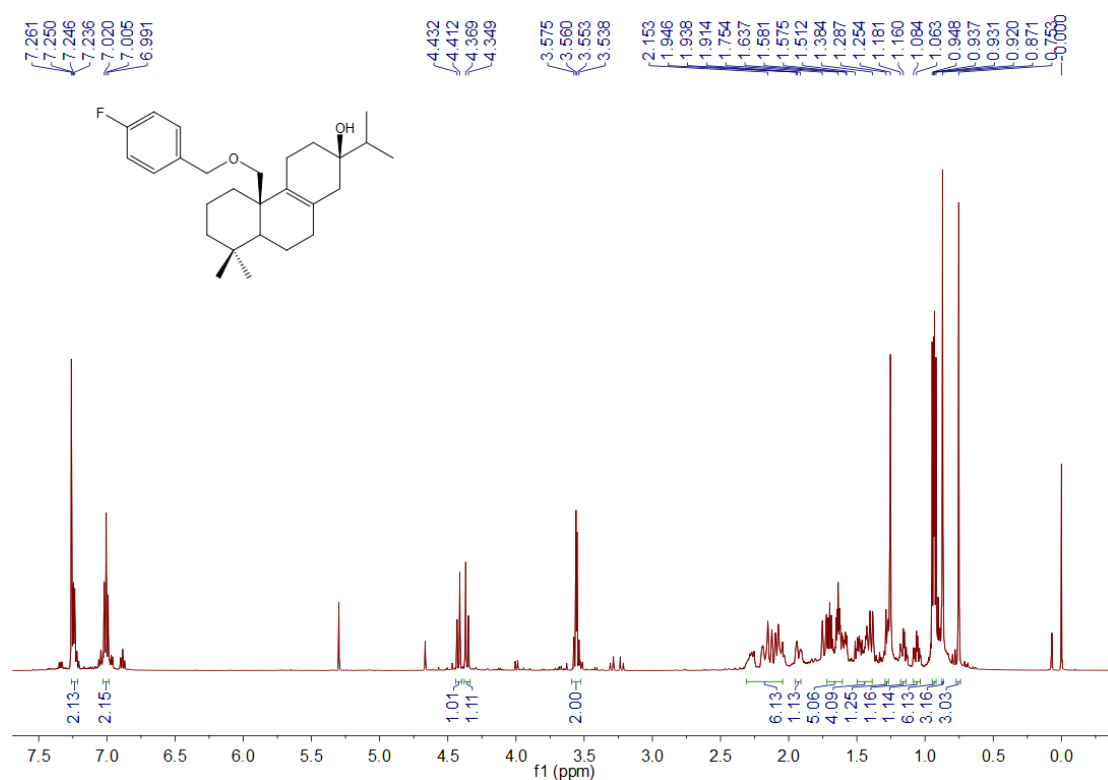


Figure S55. <sup>1</sup>H NMR spectrum of the compound 5d.

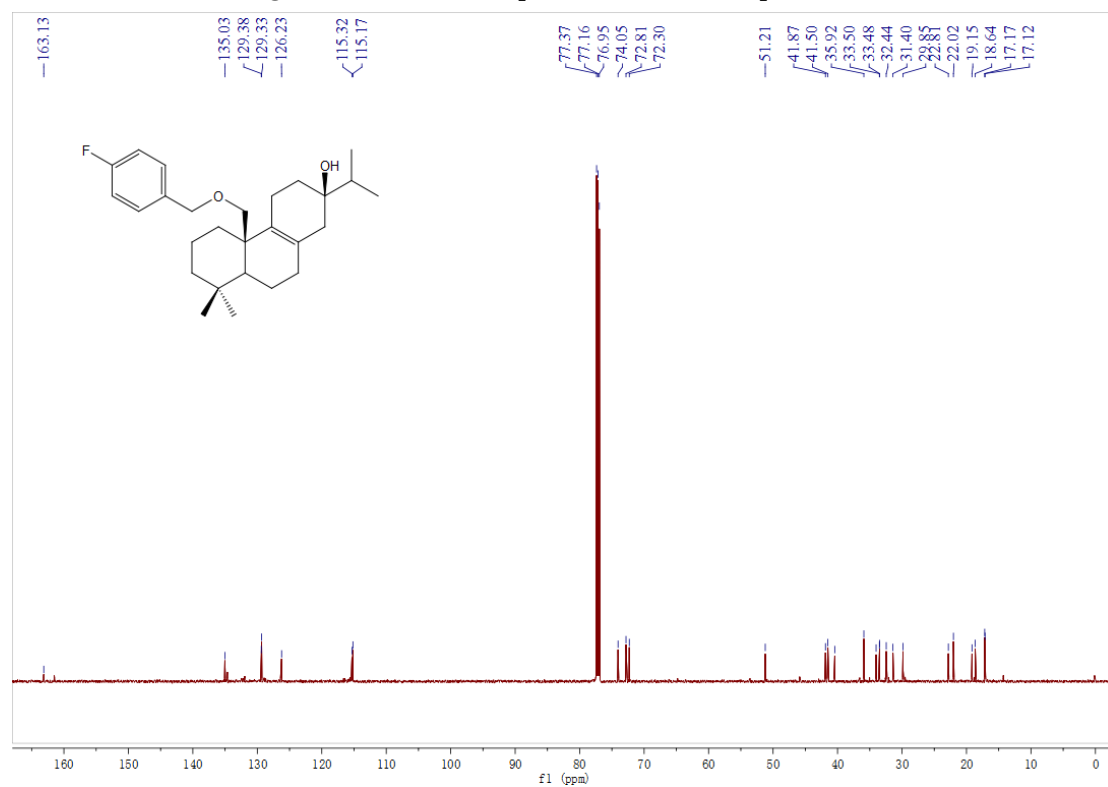


Figure S56. <sup>13</sup>C NMR spectrum of the compound 5d.

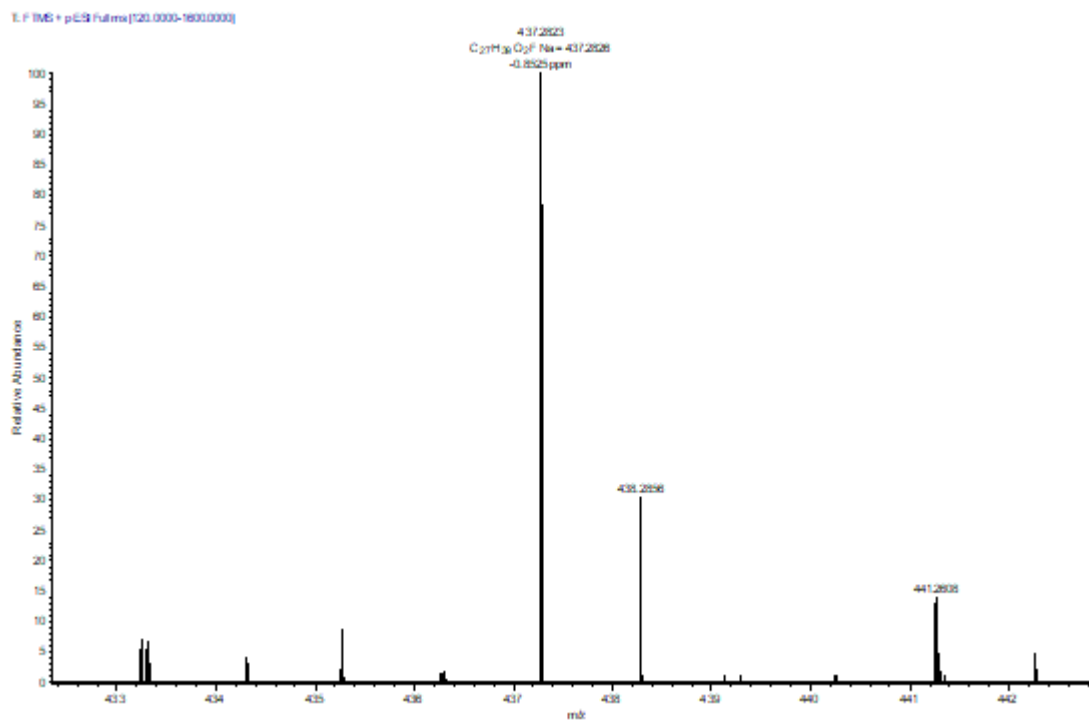


Figure S57. HRMS spectrum of the compound 5d.

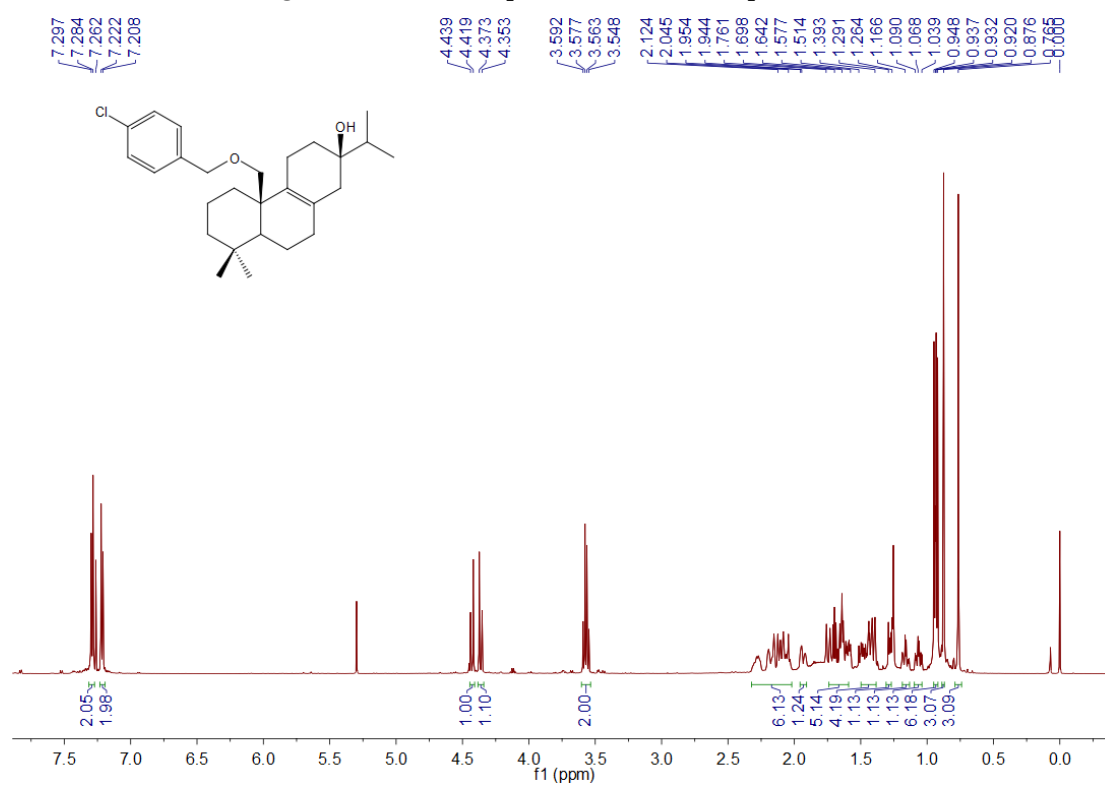


Figure S58. <sup>1</sup>H NMR spectrum of the compound 5e.

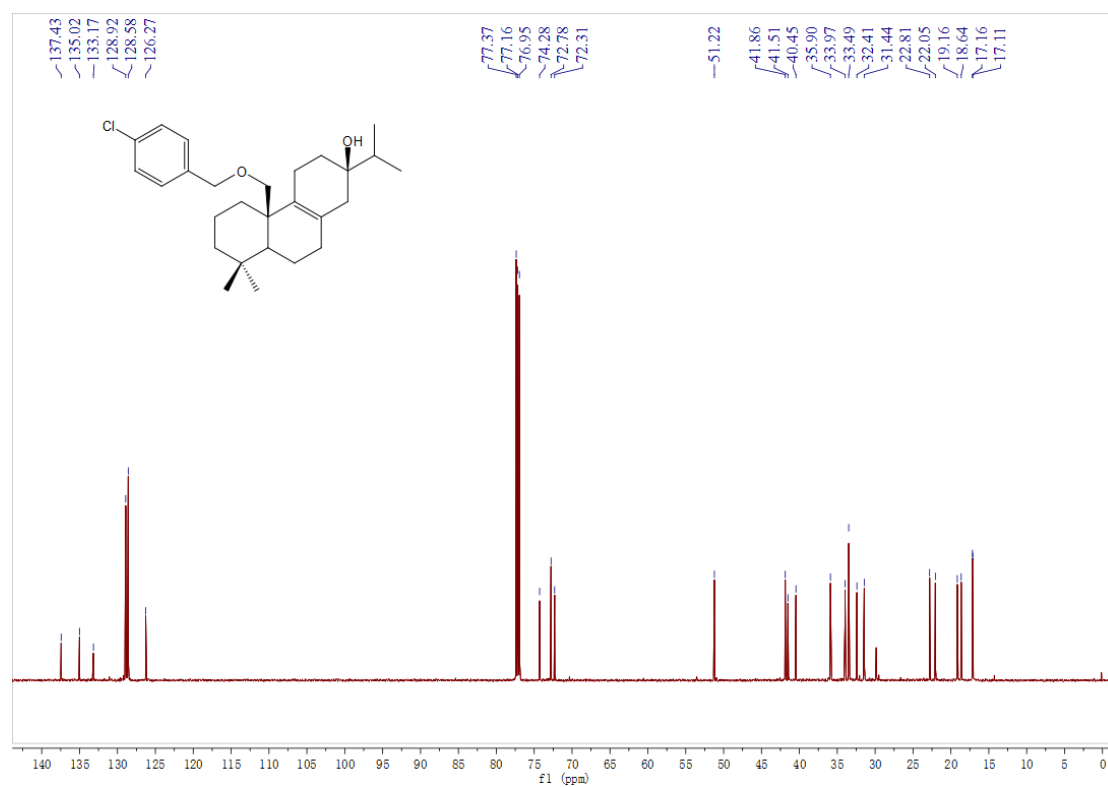


Figure S59.  $^{13}\text{C}$  NMR spectrum of the compound 5e.

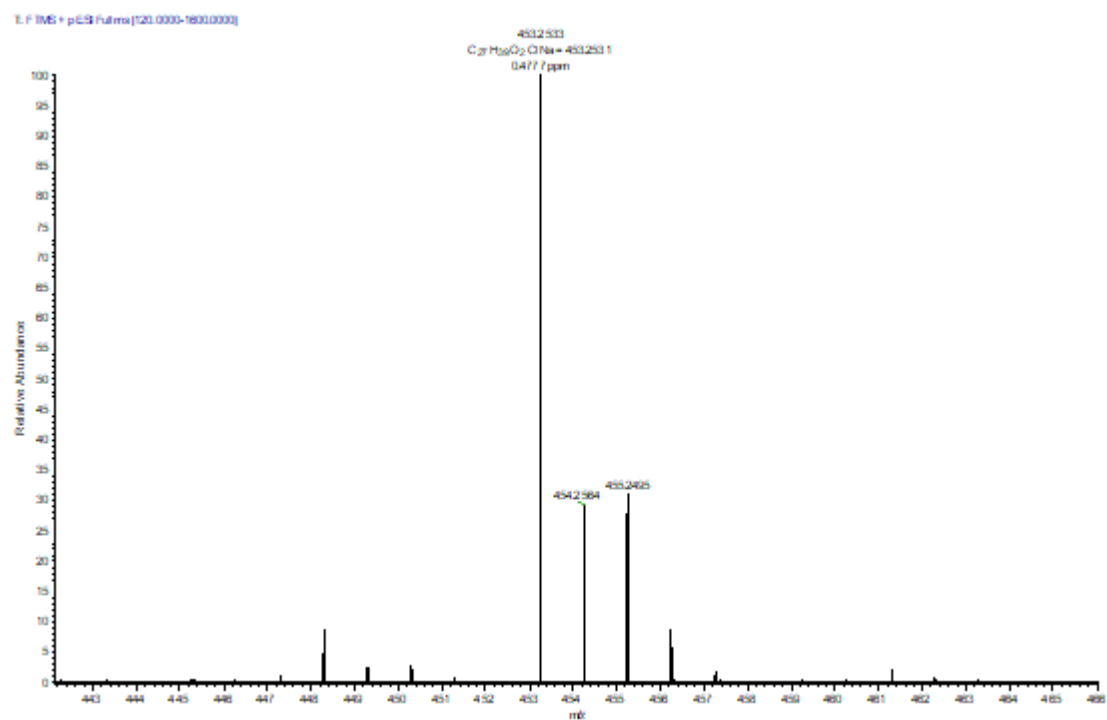


Figure S60. HRMS spectrum of the compound 5e.

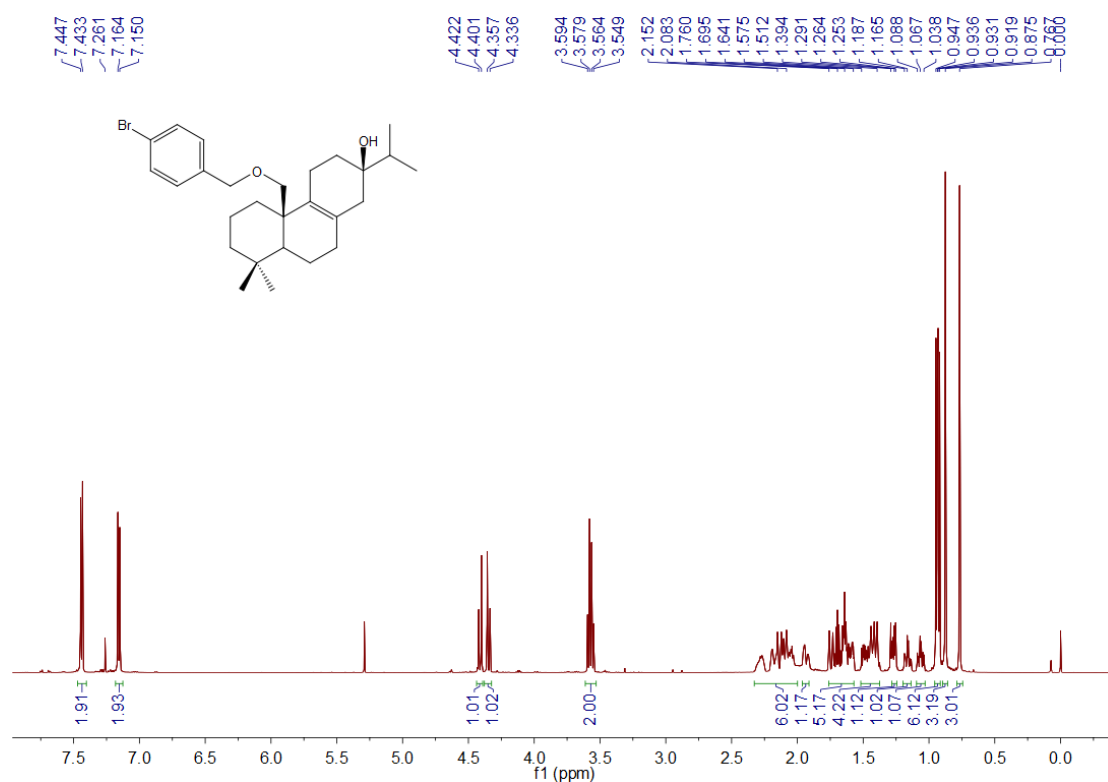


Figure S61. <sup>1</sup>H NMR spectrum of the compound 5f.

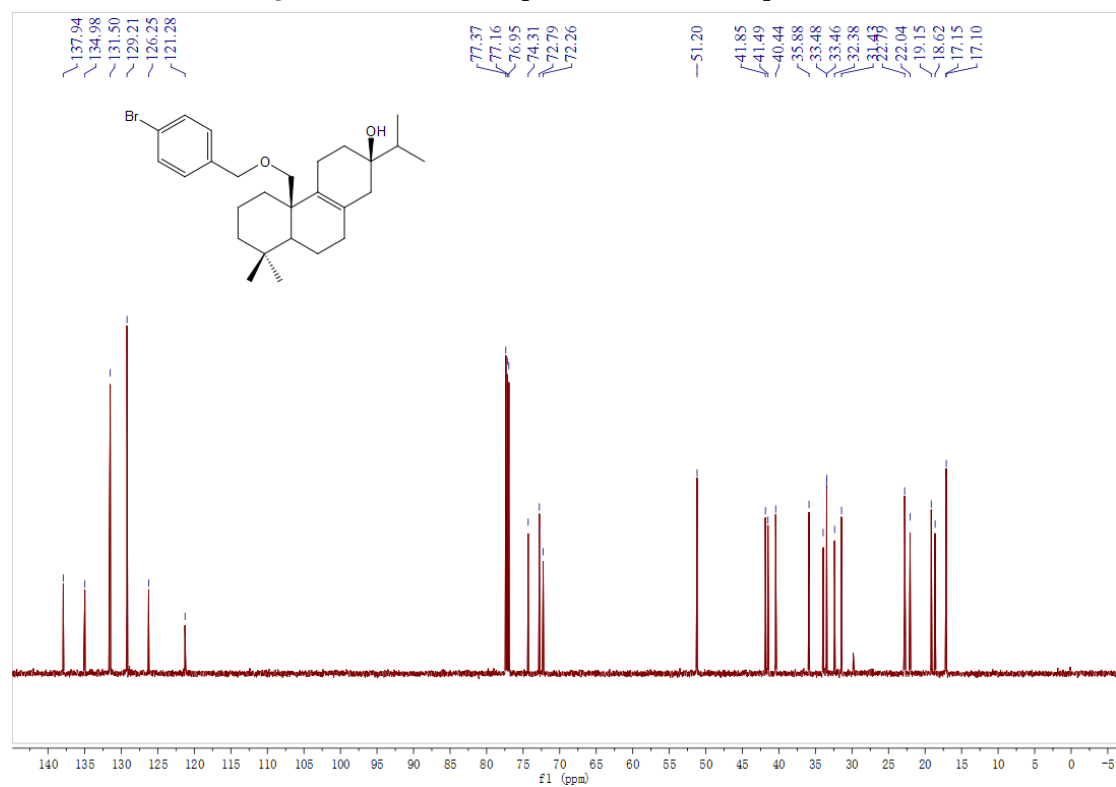


Figure S62. <sup>13</sup>C NMR spectrum of the compound 5f.

LW-63 #40 RT: 0.18 AV: 1 NL: 7.53E7  
T: FTMS + p ESI Full ms [120.0000-1600.0000]

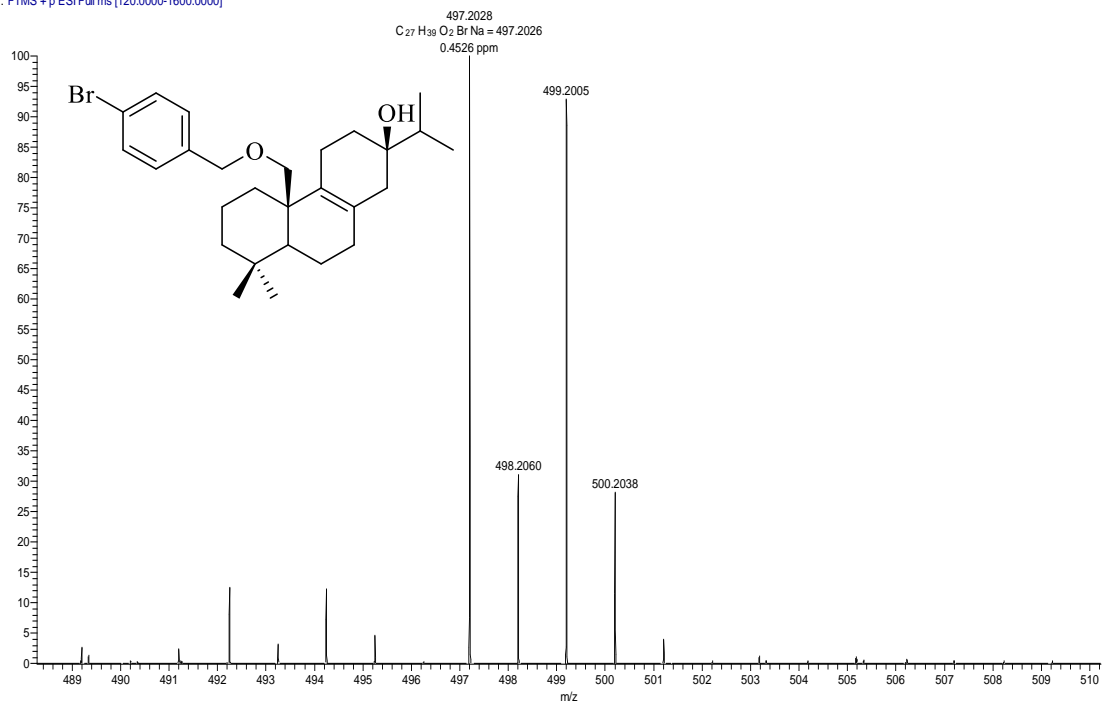


Figure S63. HRMS spectrum of the compound 5f.

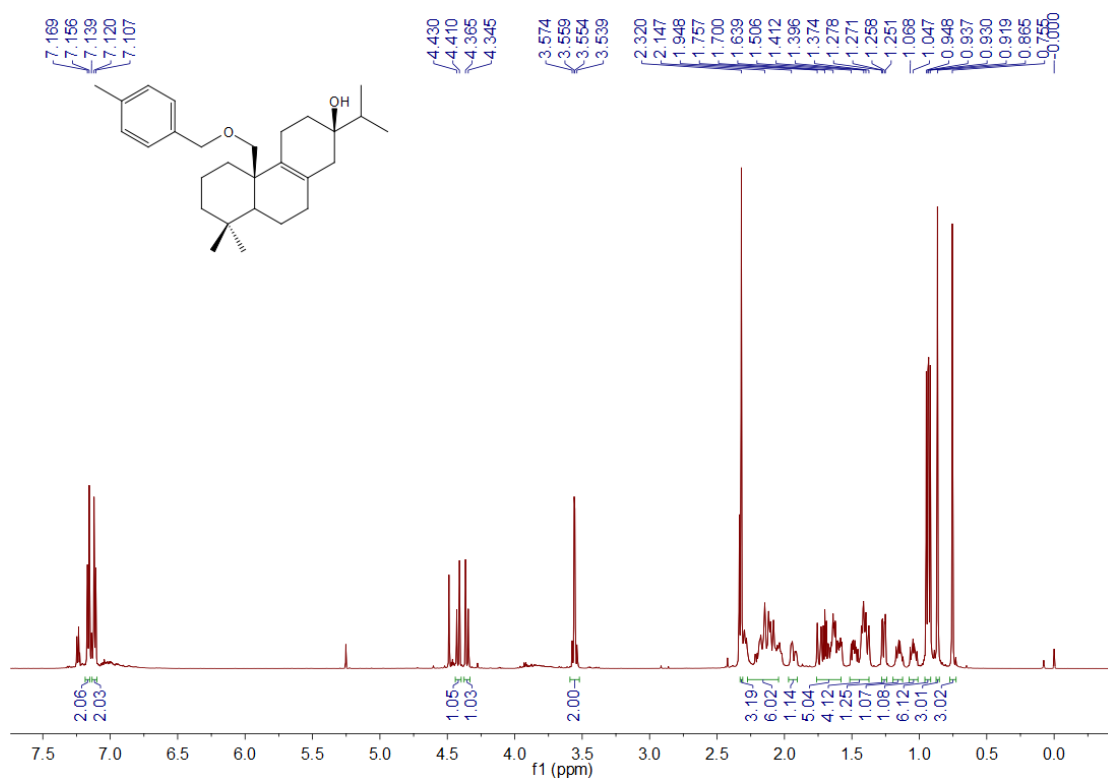


Figure S64. <sup>1</sup>H NMR spectrum of the compound 5g.

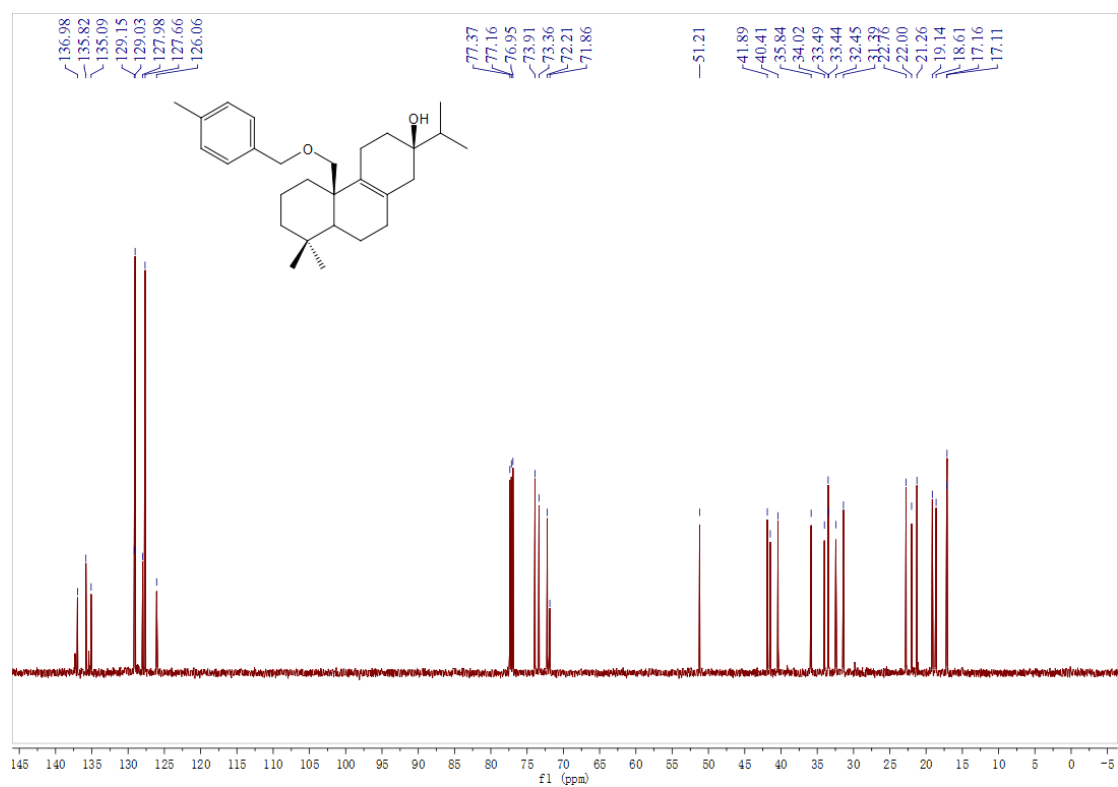


Figure S65. <sup>13</sup>C NMR spectrum of the compound 5g.

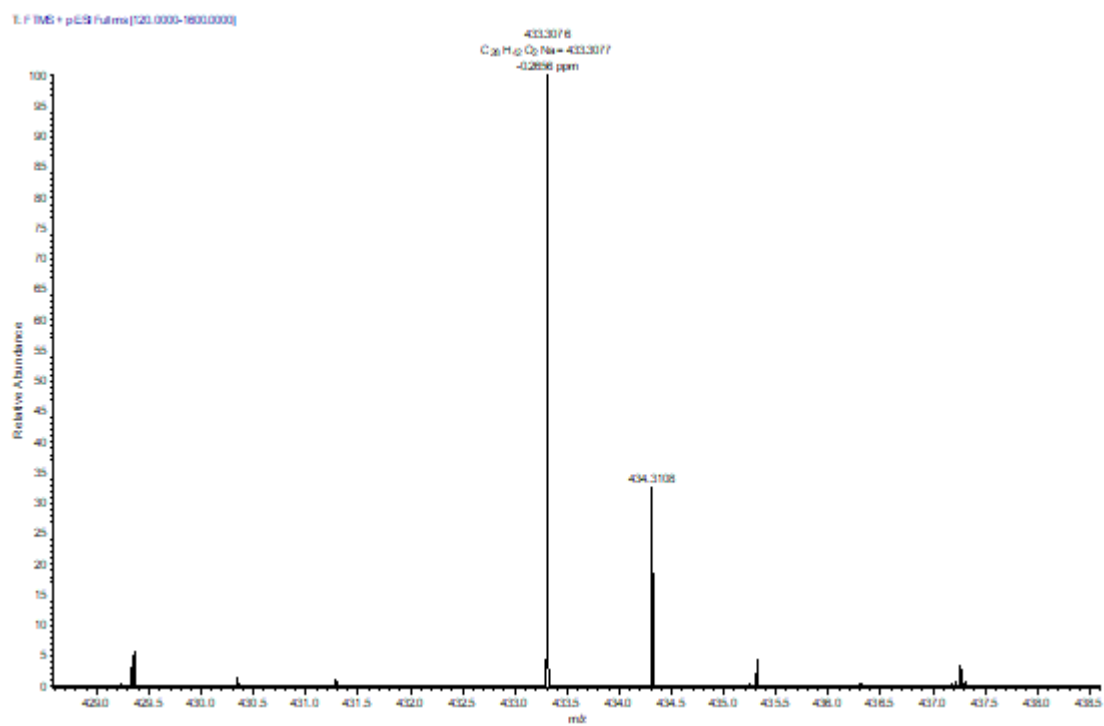


Figure S66. HRMS spectrum of the compound 5g.

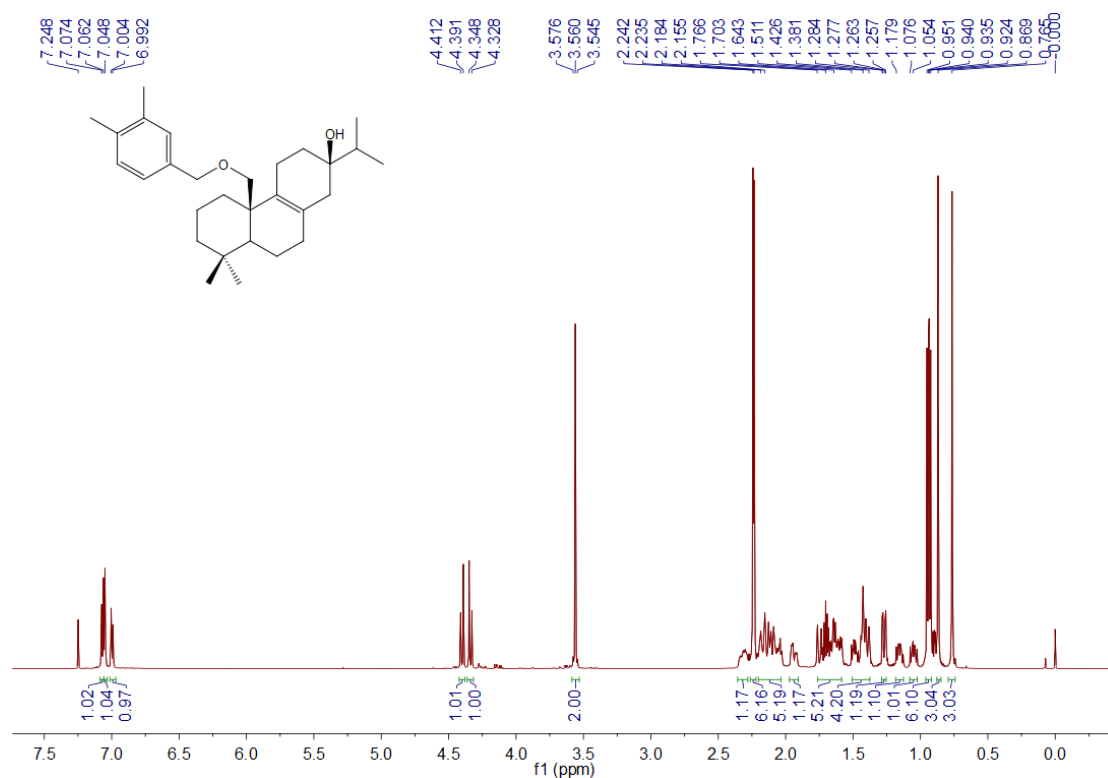


Figure S67. <sup>1</sup>H NMR spectrum of the compound 5h.

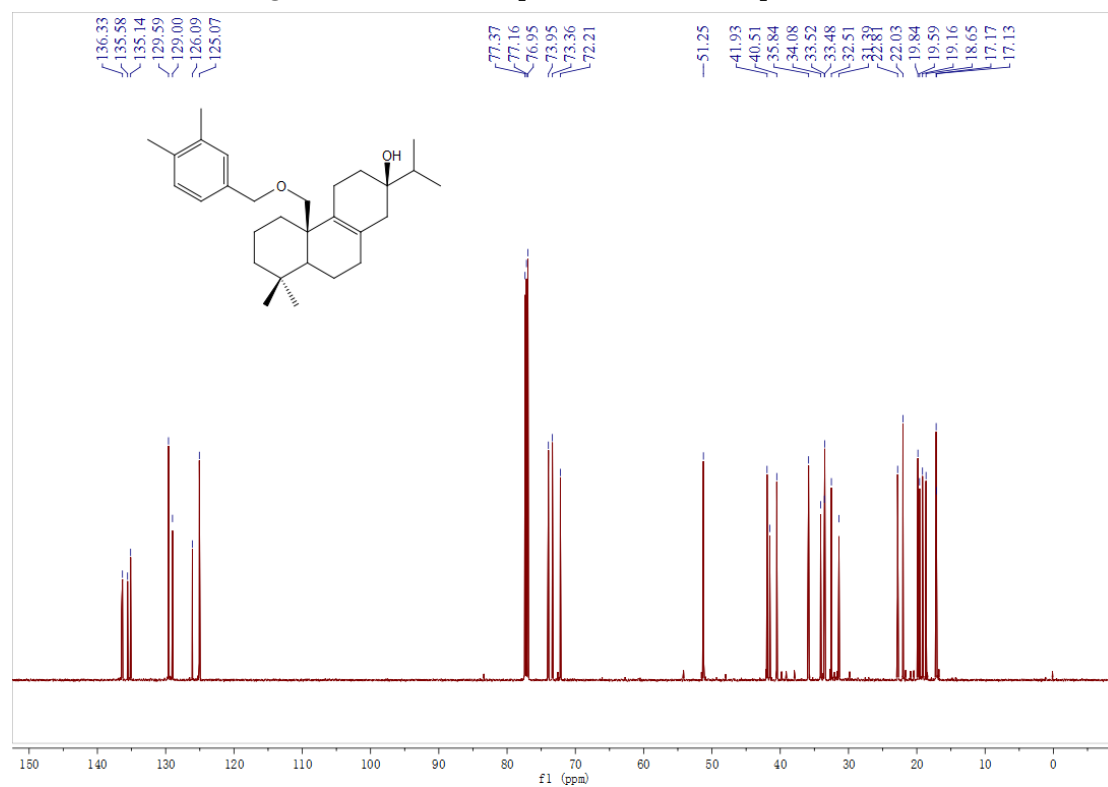


Figure S68. <sup>13</sup>C NMR spectrum of the compound 5h.

LW-67 #44 RT: 0.19 AV: 1 NL: 2.43E7  
T: FTMS +p ESI Full ms [120.0000-1600.0000]

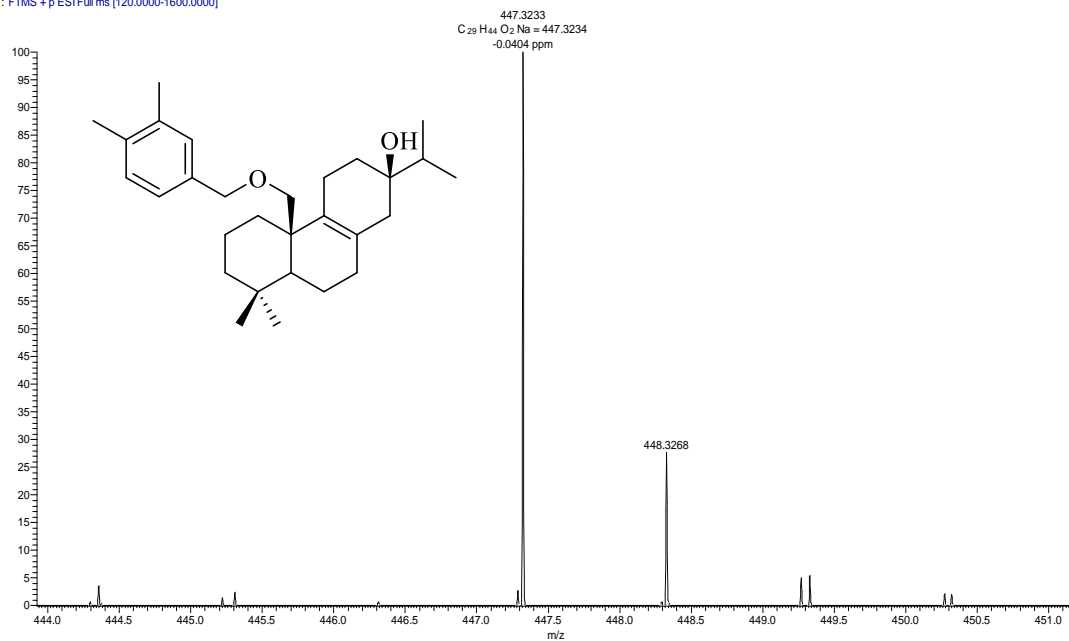


Figure S69. HRMS spectrum of the compound 5h.

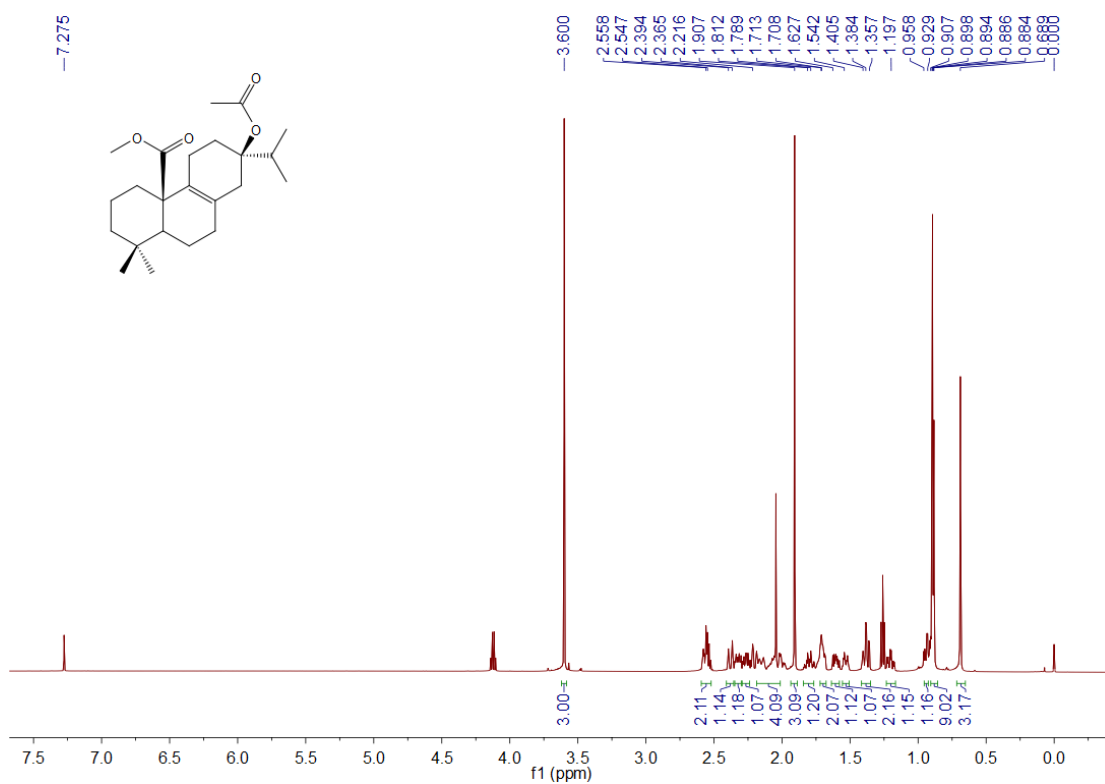


Figure S70. <sup>1</sup>H NMR spectrum of the compound 6a.



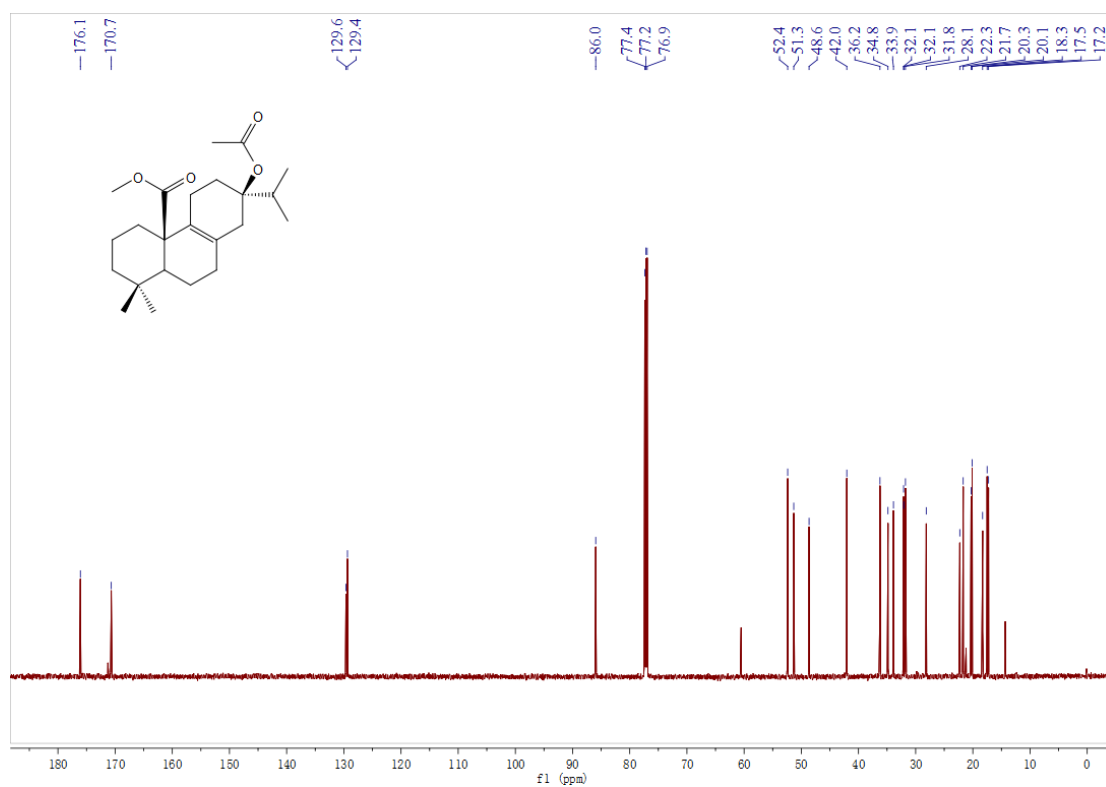


Figure S71. <sup>13</sup>C NMR spectrum of the compound 6a.

ZY-52B #42 RT: 0.18 AV: 1 NL: 8.39E8  
T: FTMS + p ESI Full ms [120.0000-1600.0000]

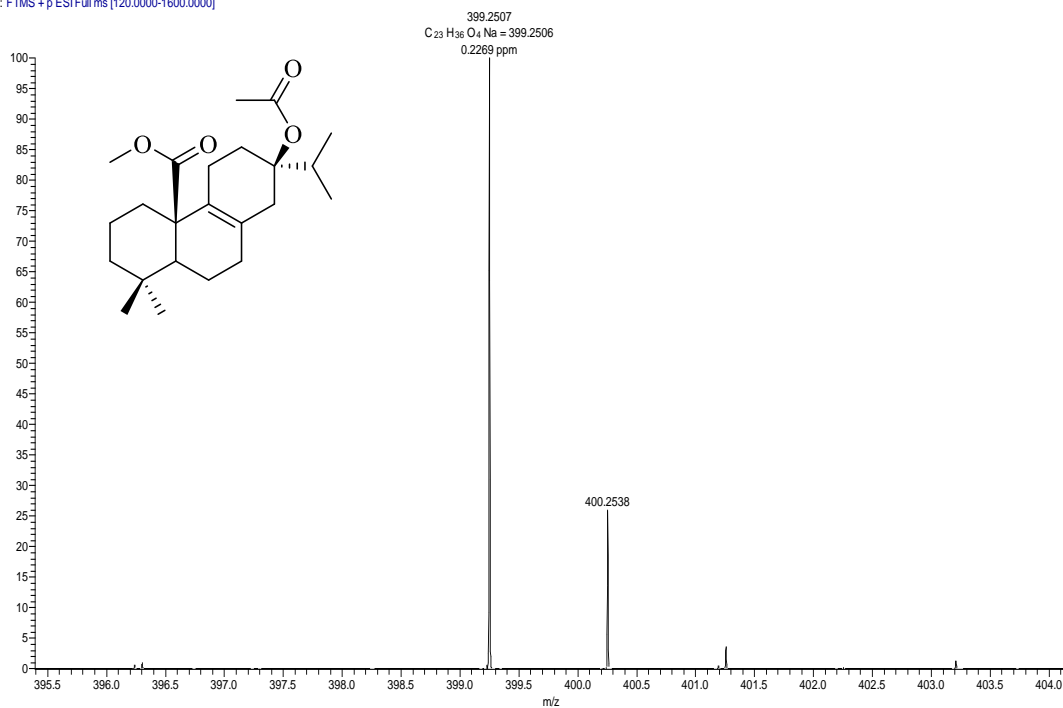


Figure S72. HRMS spectrum of the compound 6a.

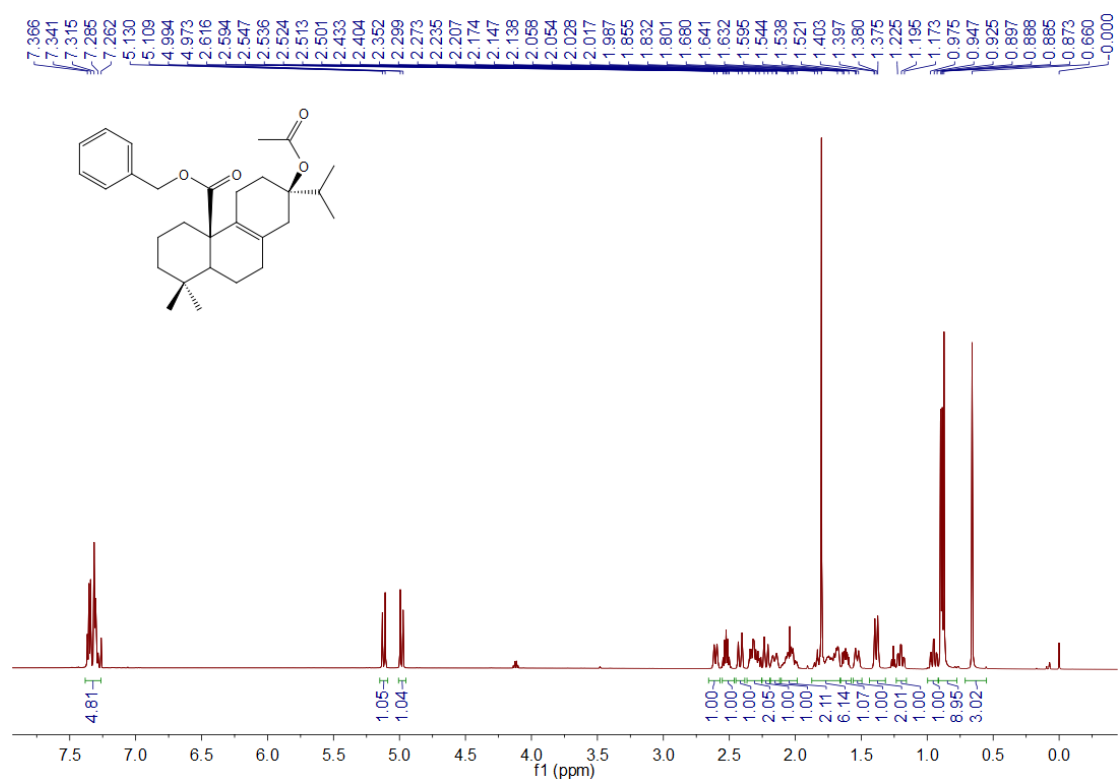


Figure S73.  $^1\text{H}$  NMR spectrum of the compound 6b.

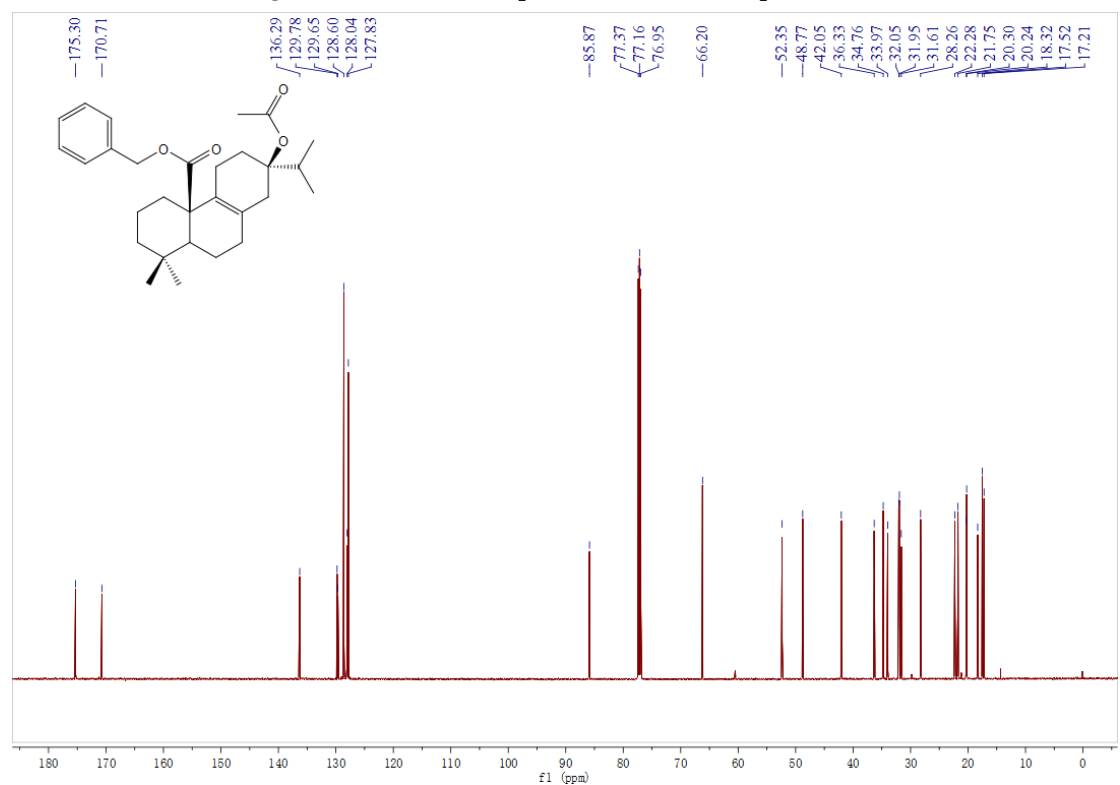


Figure S74.  $^{13}\text{C}$  NMR spectrum of the compound 6b.

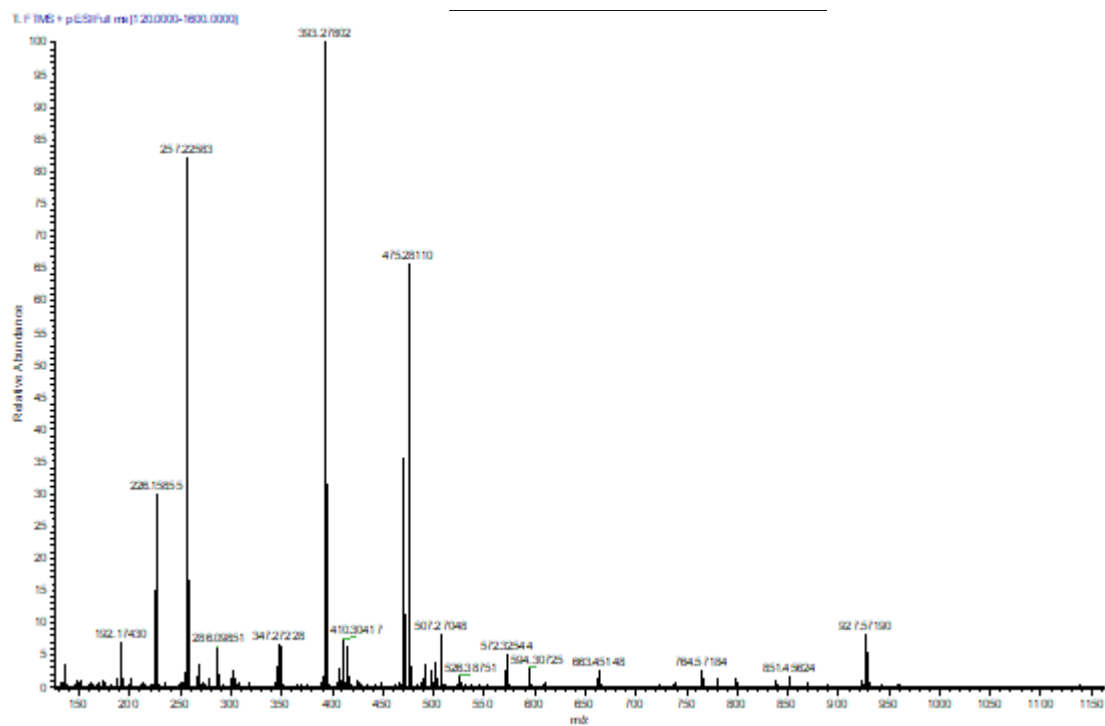


Figure S75. HRMS spectrum of the compound 6b.

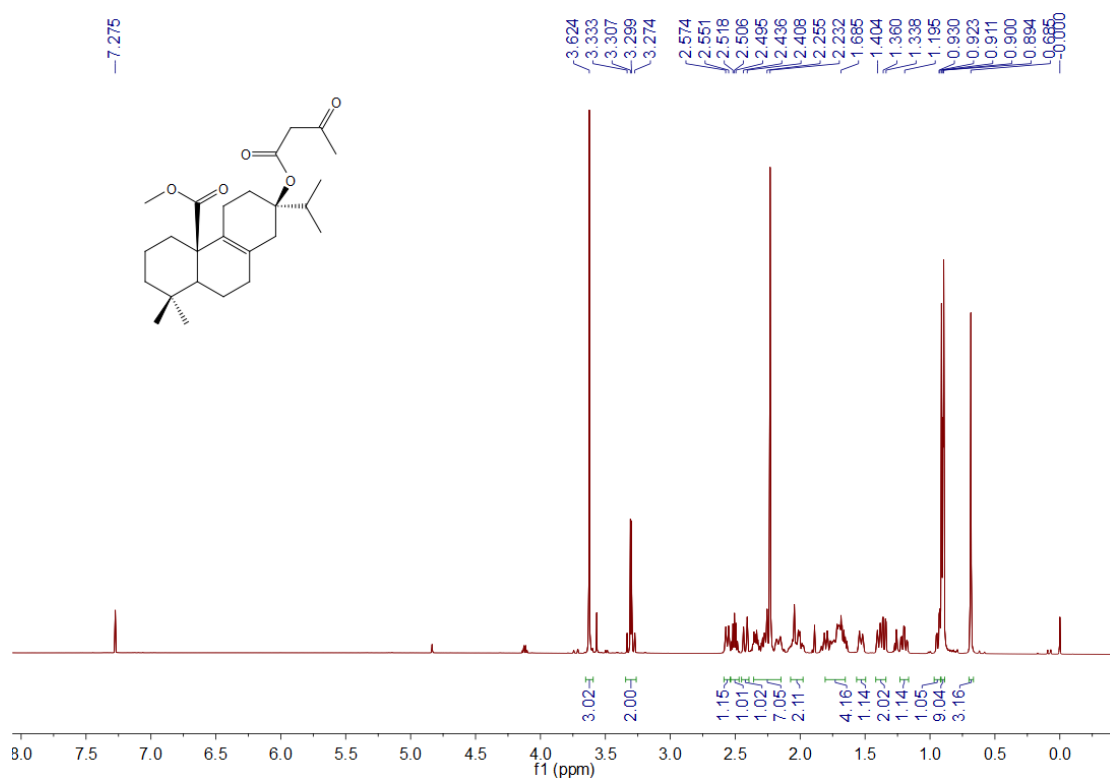


Figure S76. <sup>1</sup>H NMR spectrum of the compound 6c.

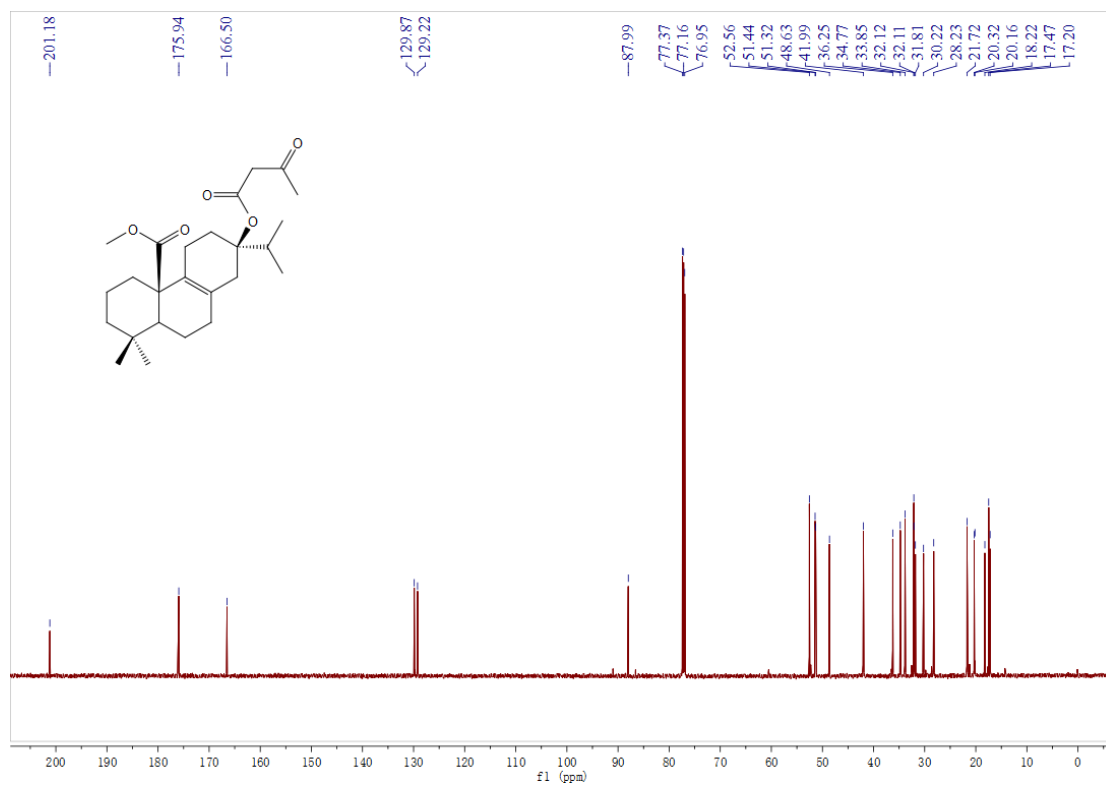


Figure S77. <sup>13</sup>C NMR spectrum of the compound 6c.

ZY-30d #41 RT: 0.18 AV: 1 NL: 3.33E8  
T: FTMS + p ESI Full ms [120.0000-1600.0000]

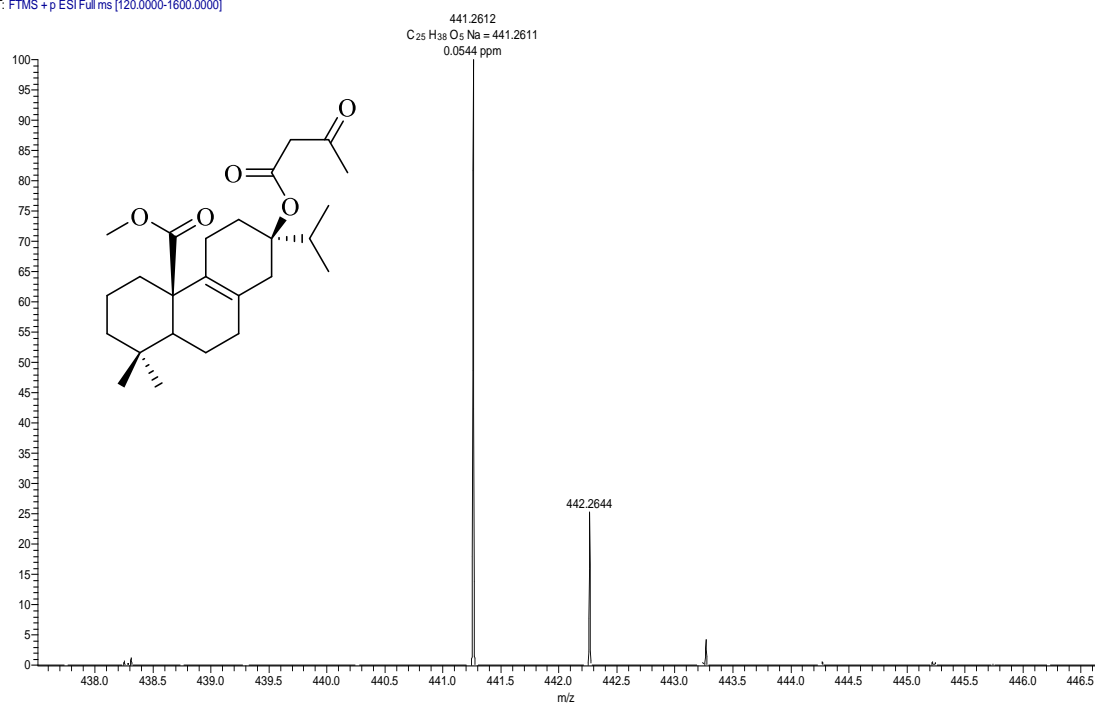


Figure S78. HRMS spectrum of the compound 6c.