**Supporting information for**

## Chemical constituents from culture of the fungus *Hericium alpestre*

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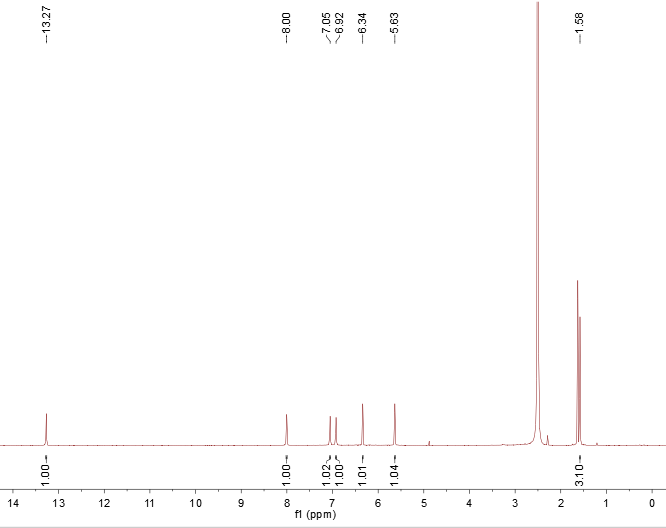
**Figure S46. Chemical structure of compound 12**

**Figure S47.** **Crystal Structure of compound 13**

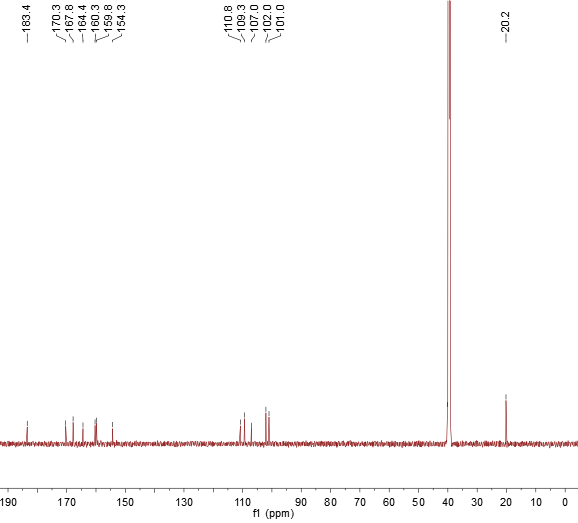
**Table S5. Crystallographic Data for compound 13**

**Figure S48.** **Chemical structure of compound 13**

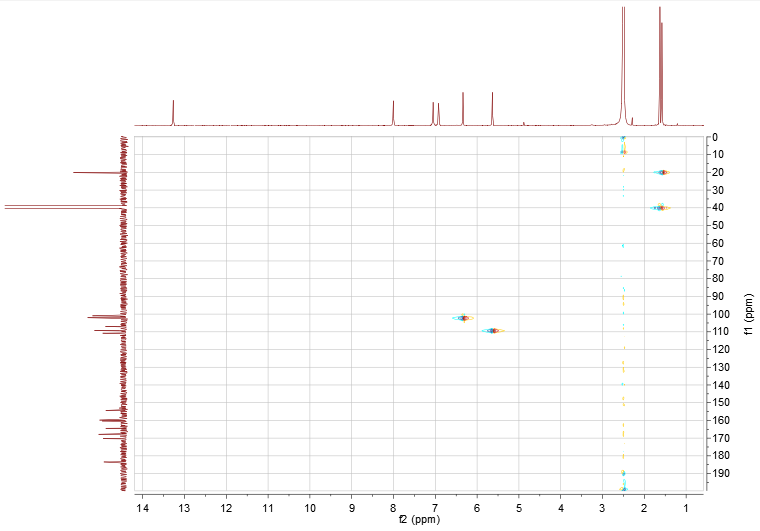
**Figure S1. The 1 H NMR spectrum for compound 1**



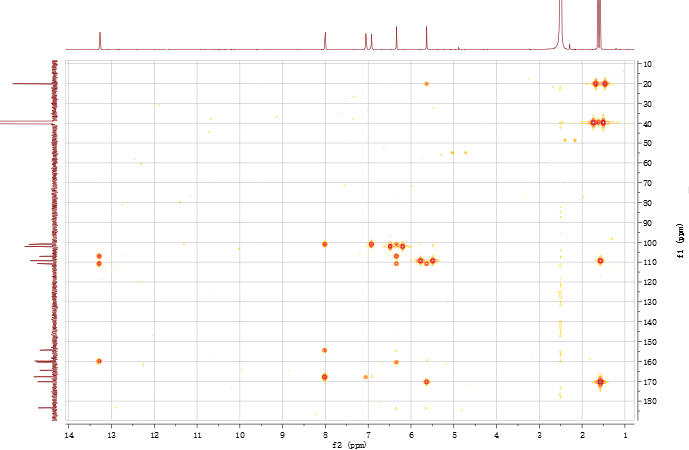
**Figure S2. The** **13C NMR spectrum for 1**



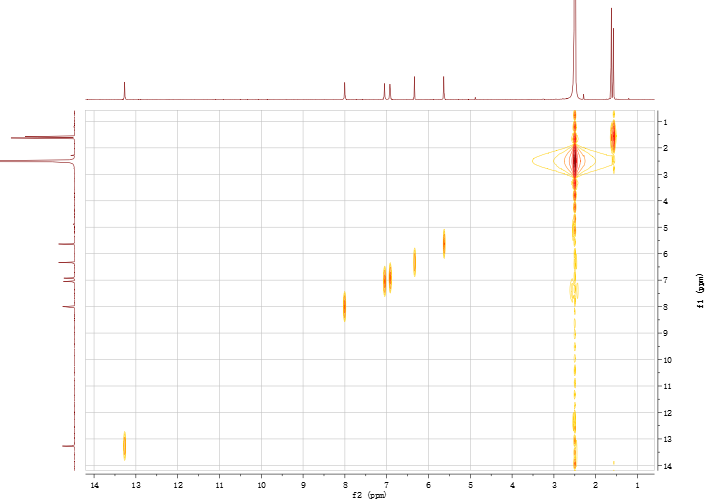
**Figure S3. The HMQC spectrum for 1**



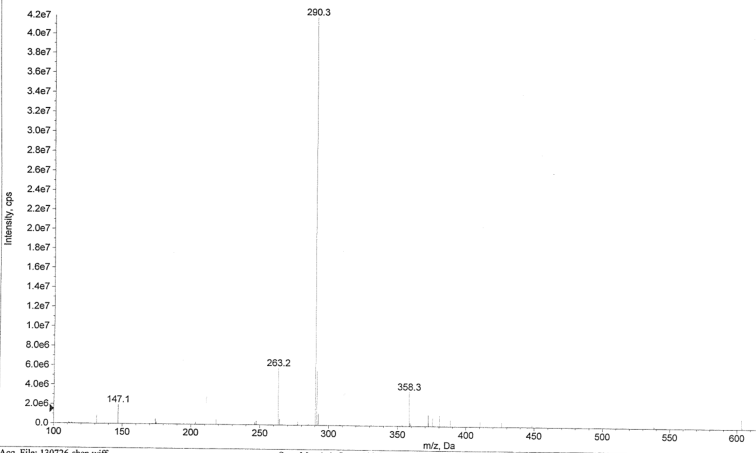
**Figure S4. The HMBC spectrum for 1**



**Figure S5. The 1 H- 1 H COSY spectrum for 1**



**Figure S6. The EIS-MS (-Q1) for compound 1**

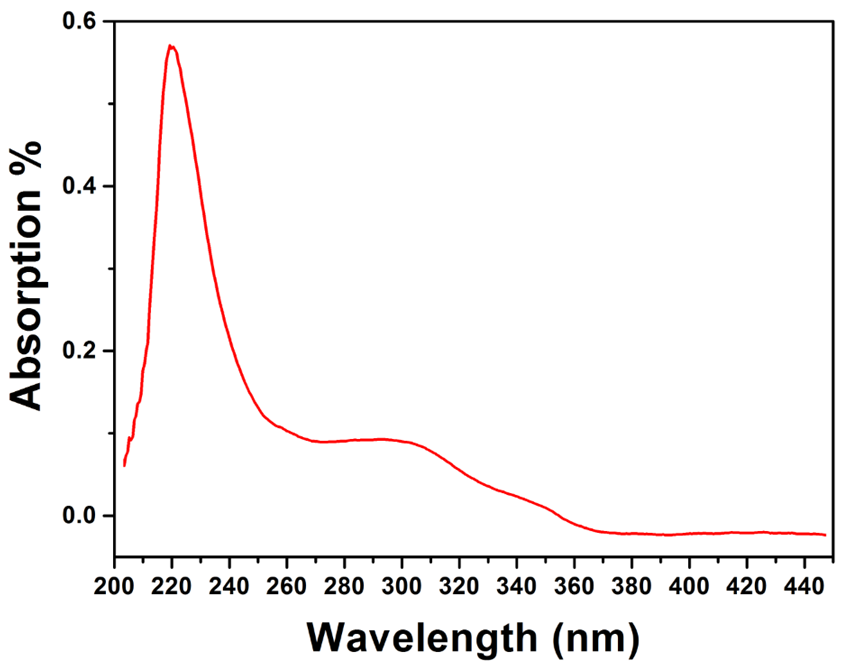


**Table S1.** 1H (600 MHz) and 13C NMR (150 MHz) spectral data of **1** in DMSO-*d* 6.

|  |
| --- |
| Position δ H (*J*, Hz) δ C HMBC\* |
| 2 170.3  3 5.63 (1H, s) 109.3 C-2, C-4, C-11, C-1′  4 183.4  5 159.8  6 107.0  7 154.3  8 6.34 (1H, s) 102.0 C-8, C-10, C-11, C-12  9 160.3  10 110.8  11 164.4  12 8.00 (1H, s) C-8, C-13, C-1″  13 101.0  1′ 1.58 (3H, s) 20.2 C-2, C-3  1″ 167.8  OH-5 4.91 (1H, s) C-5, C-11, C-12  OH-13 6.92 (1H, s) C-8, C-1″  OH-1″ 13.27 (1H, s) C-1″ |

\* HMBC correlations are from proton(s) stated to the indicated carbon

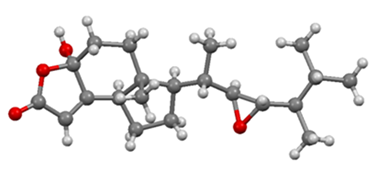
**Figure S7. The absorption spectrum compound 1**



**Figure S8. Chemical structure of compound 1**

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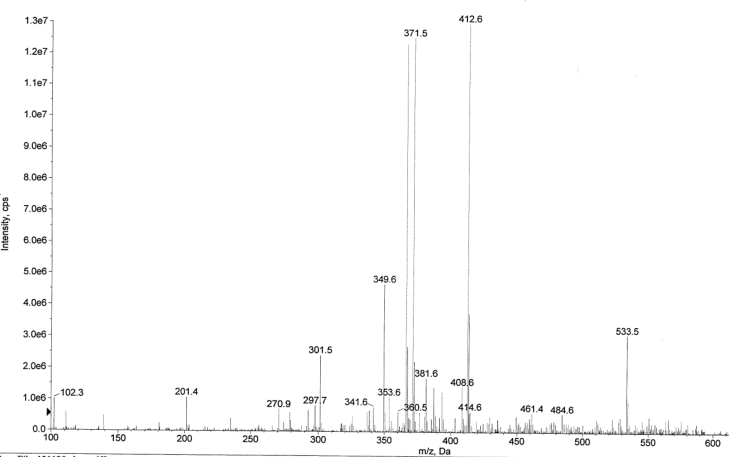
**Figure S9.** **Crystal structure of compound 2. Atom colors, O = Red, gray = C, light gray = H**

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**Table S2**. Crystallographic Data for compound **2**

|  |  |
| --- | --- |
| Sample | **compound 2** |
| Formula | C21H32O4 |
| *M*r [g·mol−1] | 348.47 |
| Crystal system | Monoclinic |
| Space group | P2 (1) |
| *a* (Å) | 8.4702 (8) |
| *b* (Å) | 8.2636 (6) |
| *c* (Å) | 14.0379 (11) |
| *V* (Å3) | 973.66 (14) |
| *Z* | 2 |
| *Dχ*(Mg cm−3) | 1.189 |
| *μ* (mm-1) | 0.642 |
| *F* (000) | 380 |
| Crystal size(mm3) | 0.27 × 0.18 × 0.12 |
| R,wR2 | 0.0891, 0.2888 (2230) |

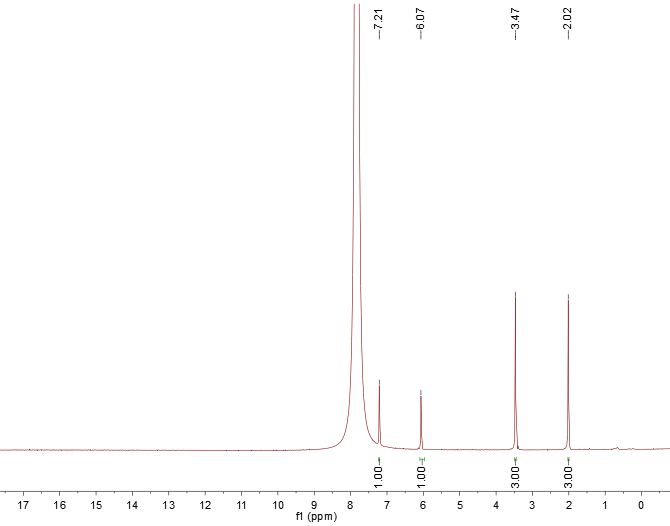
**Figure S10. The EIS-MS (+Q1) for compound 2**



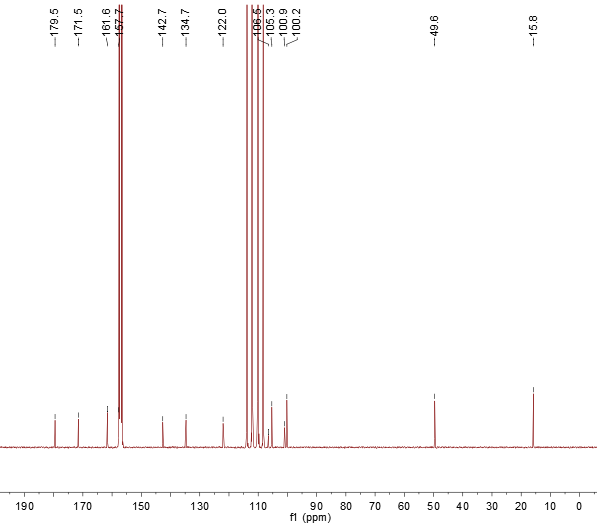
**Figure S11. Chemical structure of compound 2**

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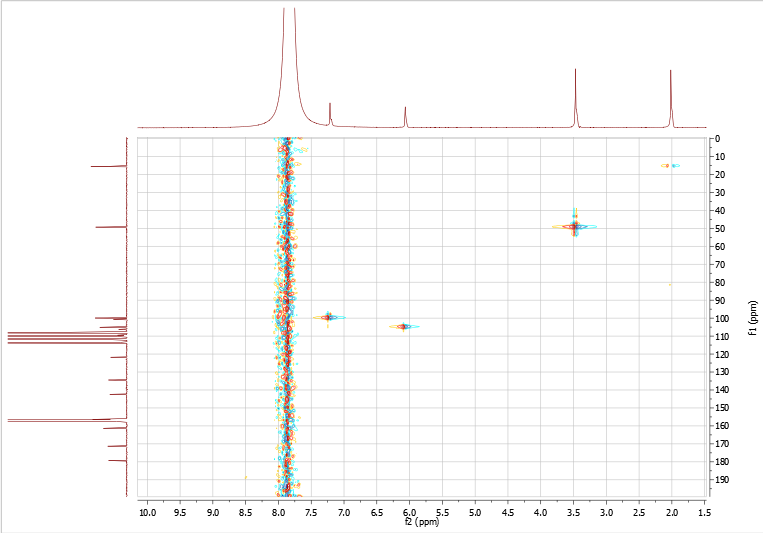
**Figure S12. The 1 H NMR spectrum for 3**



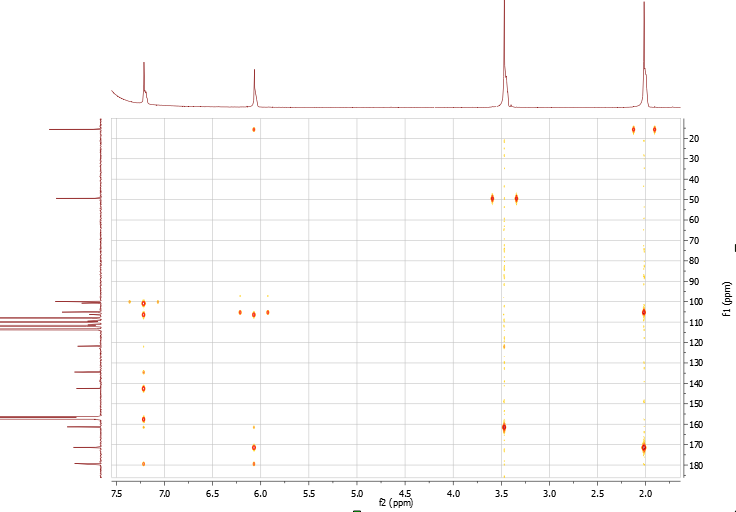
**Figure S13. The 13 C NMR spectrum for 3**



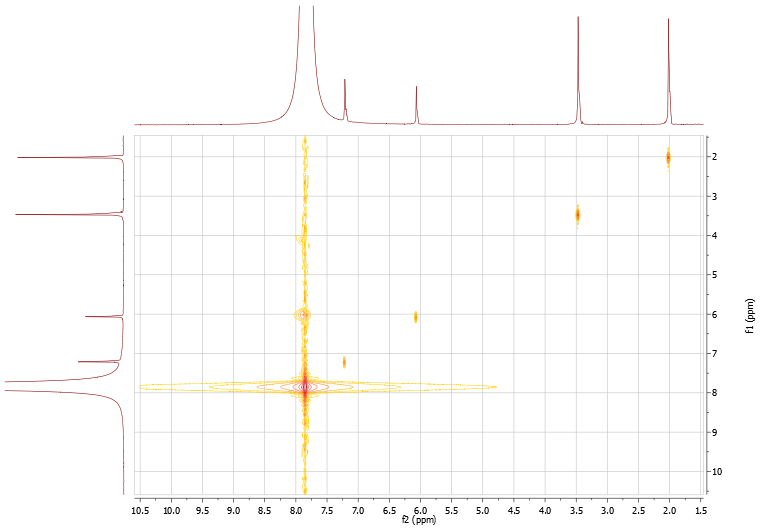
**Figure S14. The HMQC spectrum for 3**



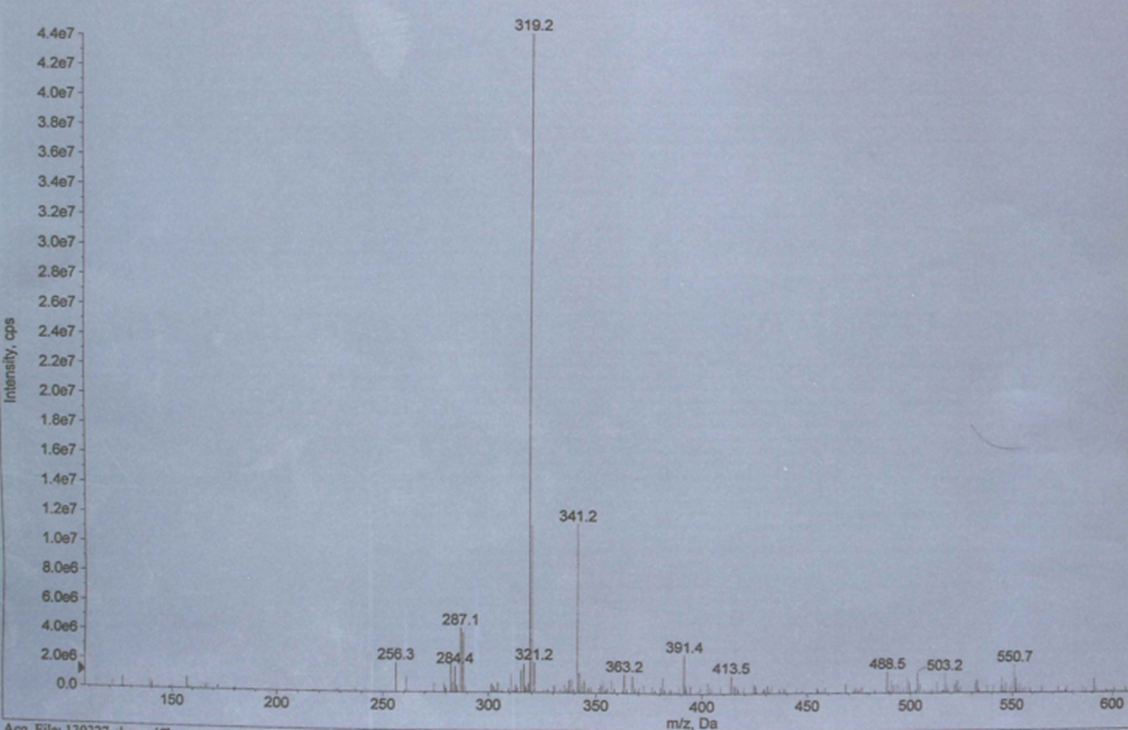
**Figure S15. The HMBC spectrum for 3**



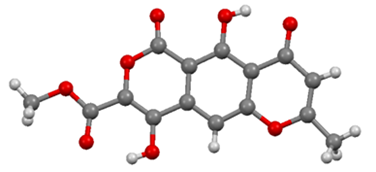
**Figure S16. The 1 H- 1 H COSY spectrum for 3**



**Figure S17.** **The ESI-MS (+Q1) for compound 3**

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**Figure S18. Crystal structure of compound 3**

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**Table S3**. Crystallographic Data for compound **3**

|  |  |
| --- | --- |
| Sample | **compound 3** |
| Formula | C5H10O8 |
| *M*r [g·mol−1] | 318.04 |
| Crystal system | Orthorhombic |
| Space group | P2(1)2(1)2(1) |
| *a* (Å) | 3.8376 (3) |
| *b* (Å) | 14.8469 (11) |
| *c* (Å) | 22.1559 (18) |
| *V* (Å3) | 1262.36 (17) |
| *Z* | 2 |
| *Dχ*(Mg cm−3) | 1.674 |
| *μ* (mm-1) | 0.139 |
| *F* (000) | 656 |
| Crystal size(mm3) | 0.38 × 0.09 × 0.06 |
| R,wR2 | 0.0521, 0.1039 (2234) |

**Table S4. 1H (600 MHz) and 13C NMR (150 MHz) spectral data of 3 in CF3COOH + D2O**

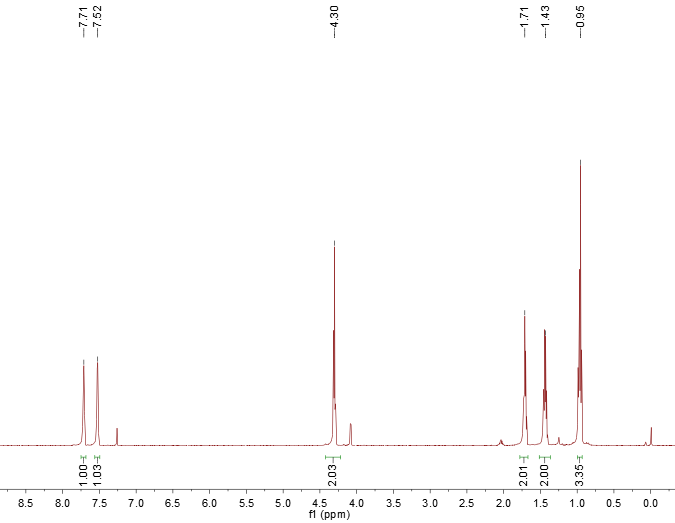
|  |
| --- |
| Position δ H (*J*, Hz) δ C HMBC\* |
| 2 171.5  3 6.07 (1H, s) 105.3 C-1′, C-2, C-4, C-12  4 179.5  5 122.0  9 142.6  10 7.21 (1H, s) 100.2  C-9, C-11, C-12, C-13  11 157.7  12 106.5  13 100.9  14 134.7  1′ 2.02 (3H, s) 15.8 C-2, C-3  1″ 161.5  3″ 3.47 (3H, s) 49.6 C-1″ |

\* HMBC correlations are from proton(s) stated to the indicated carbon

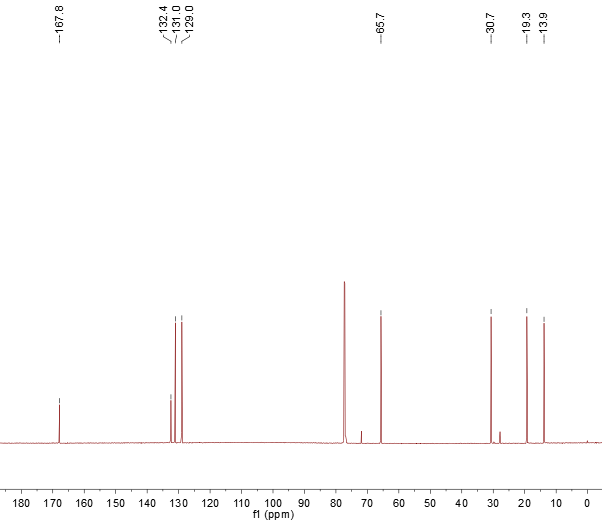
**Figure S19. Chemical structure of compound 3**

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**Figure S20. The 1 H NMR spectrum for 4**



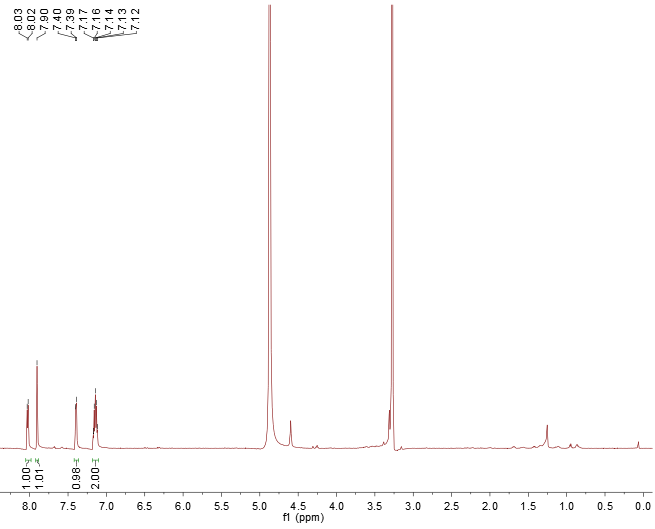
**Figure S21. The 13 C NMR spectrum for 4**



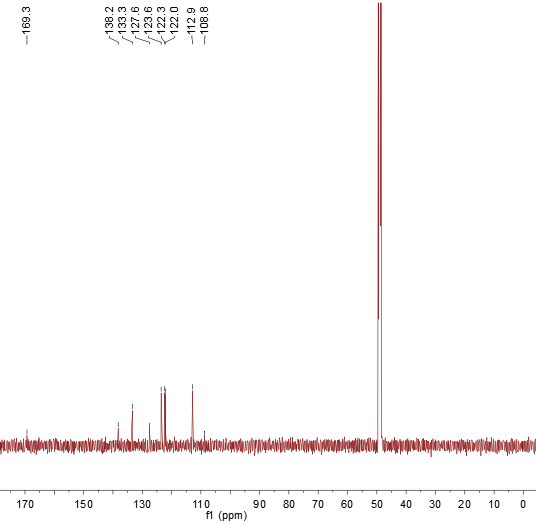
**Figure S22. Chemical structure of compound 4**

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**Figure S23. The 1 H NMR spectrum for 5**



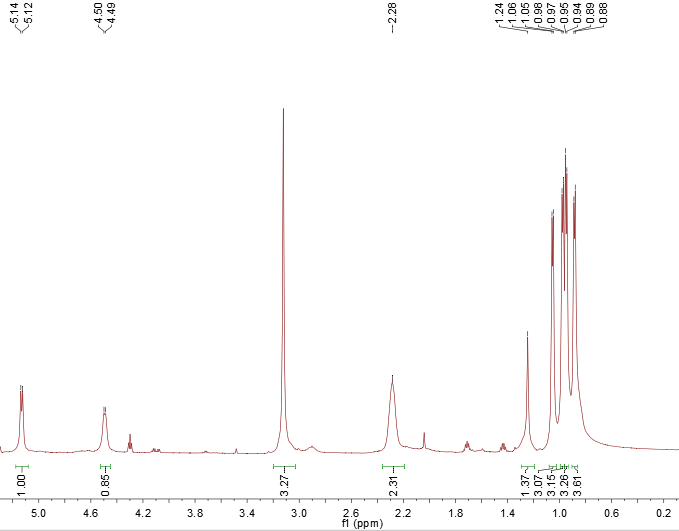
**Figure S24. The 13 C NMR spectrum for 5**



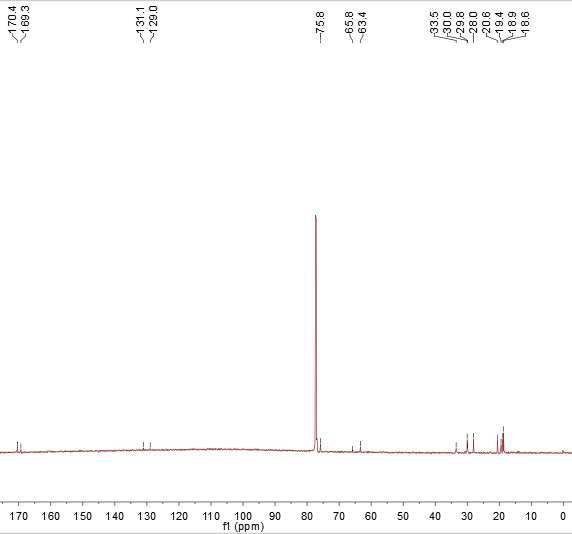
**Figure S25. Chemical structure of compound 5**

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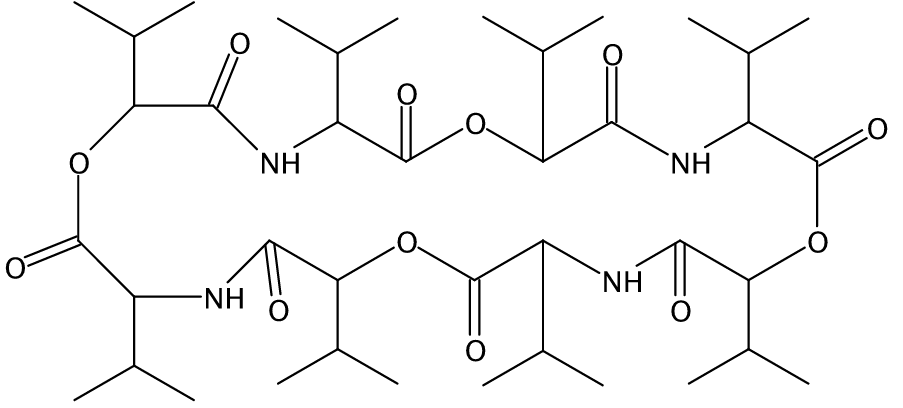
**Figure S26. The 1 H NMR spectrum for 6**



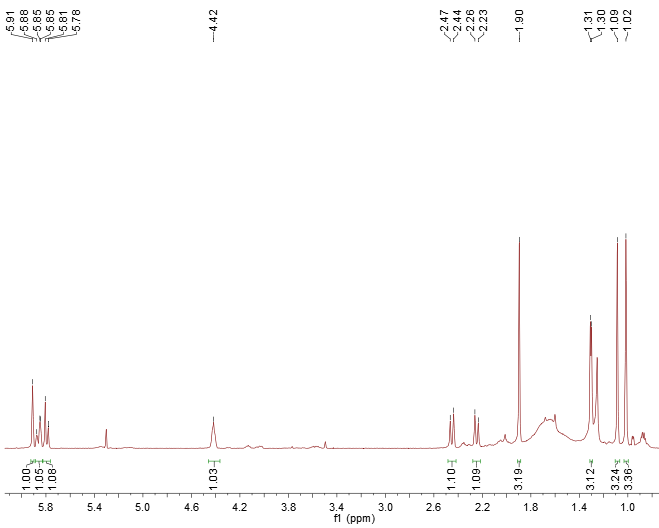
**Figure S27. The 13 C NMR spectrum for 6**



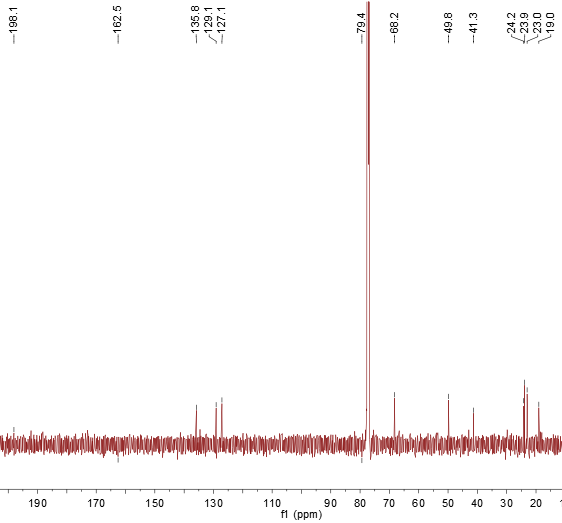
**Figure S28. Chemical structure of compound 6**

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**Figure S29. The 1 H NMR spectrum for 7**



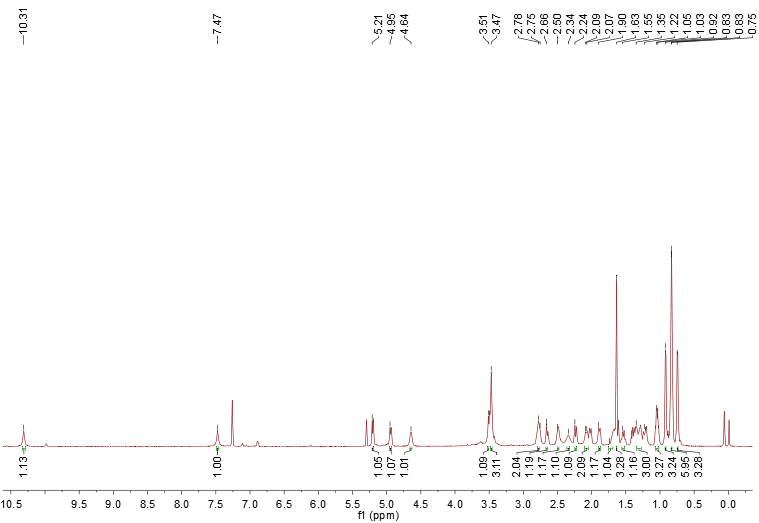
**Figure S30. The 13 C NMR spectrum for 7**



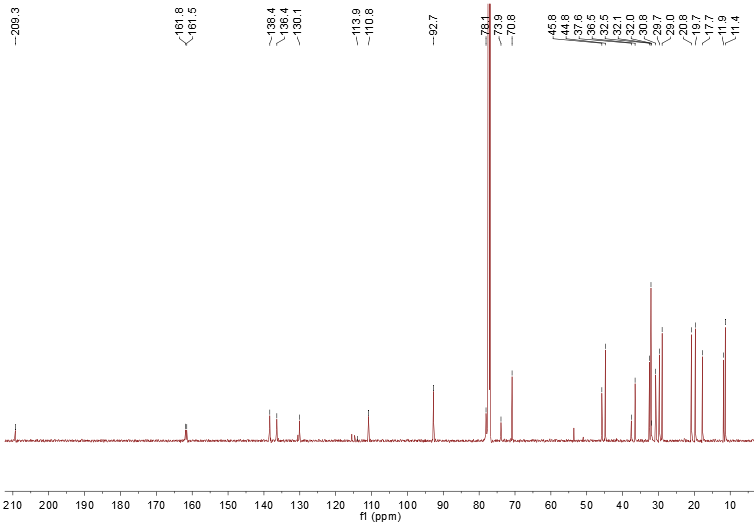
**Figure S31. Chemical structure of compound 7**

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**Figure S32. The 1 H NMR spectrum for 8**



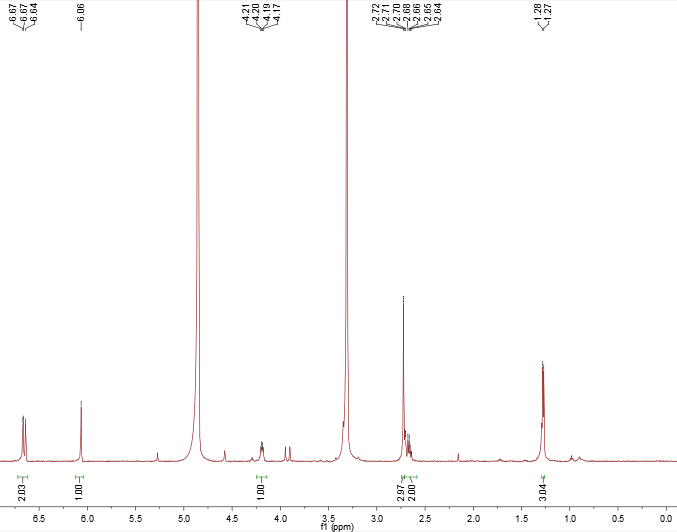
**Figure S33. The 13 C NMR spectrum for 8**



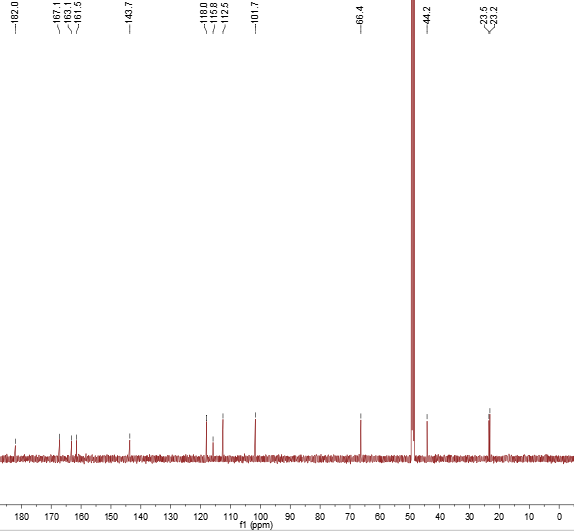
**Figure S34. Chemical structure of compound 8**

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**Figure S35. The 1 H NMR spectrum for 9**



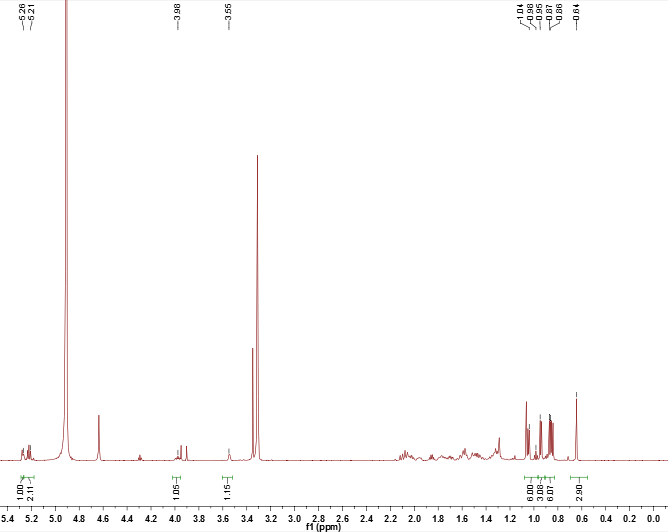
**Figure S36. The 13 C NMR spectrum for 9**



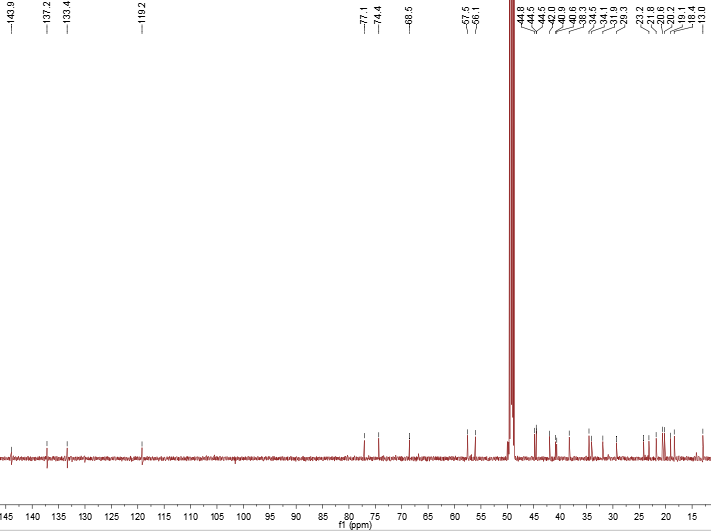
**Figure S37. Chemical structure of compound 9**

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**Figure S38. The 1 H NMR spectrum for 10**



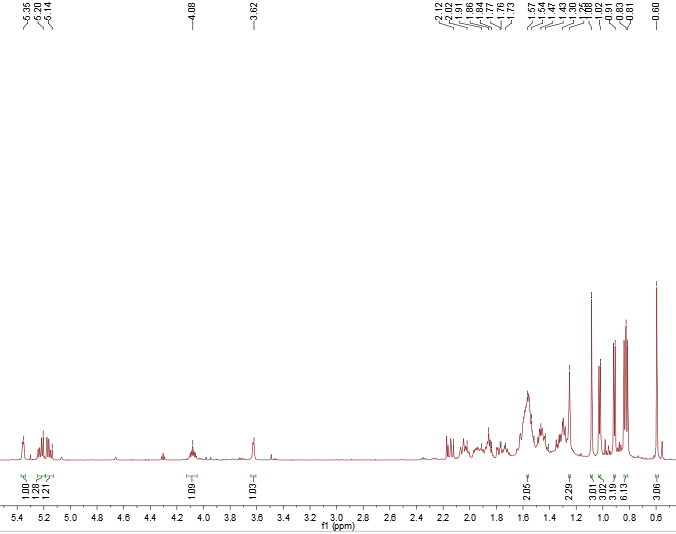
**Figure S39. The 13 C NMR spectrum for 10**



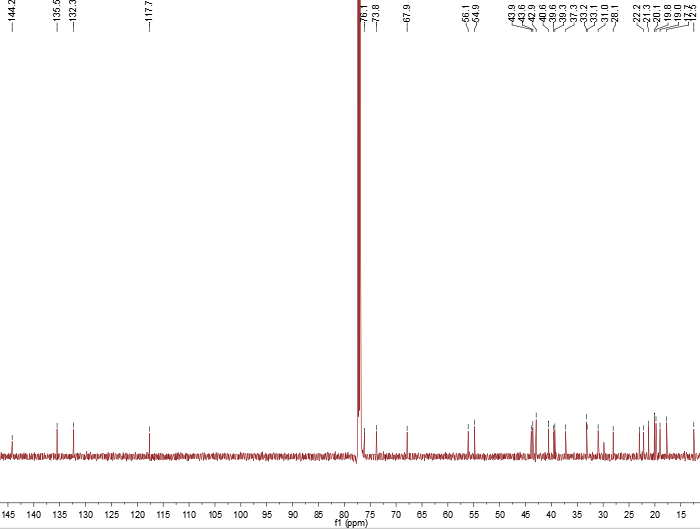
**Figure S40. Chemical structure of compound 10**

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**Figure S41. The 1 H NMR spectrum for 11**



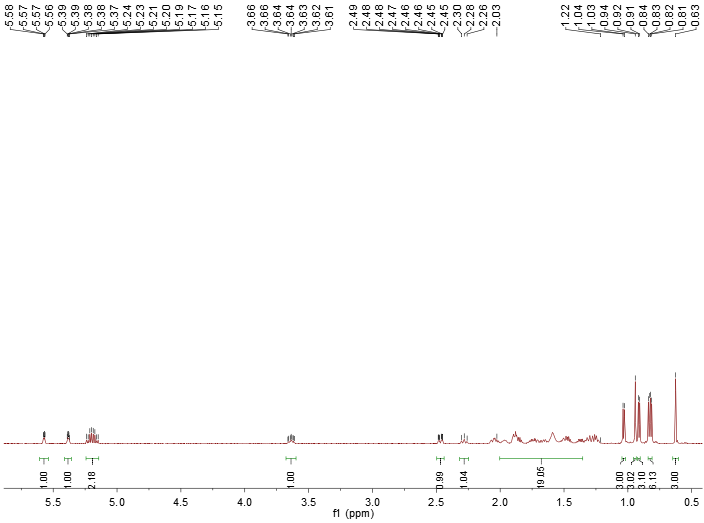
**Figure S42. The 13 C NMR spectrum for 11**



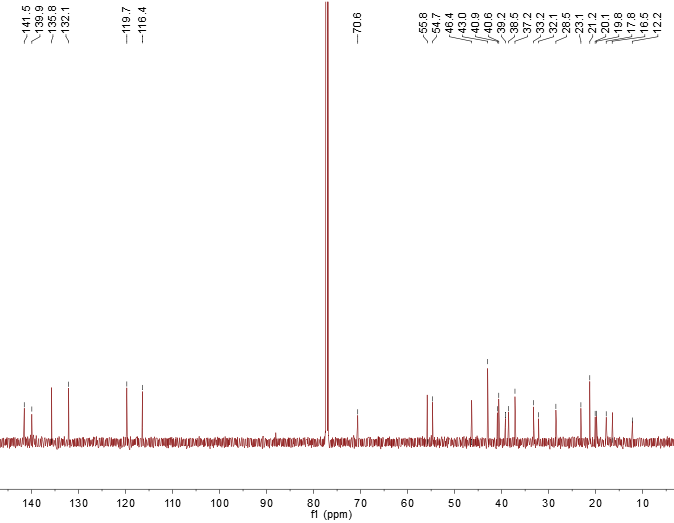
**Figure S43. Chemical structure of compound 11**

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**Figure S44. The 1 H NMR spectrum for 12**



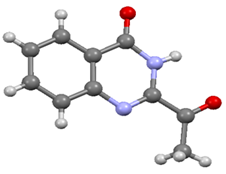
**Figure S45. The 13 C NMR spectrum for 12**



**Figure S46. Chemical structure of compound 12**

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**Figure S47.** **Crystal structure of compound 13. Atom colors, O = Red, gray = C, light gray = H, light blue = N.**

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**Table S5**. Crystallographic Data for compound **13**

|  |  |
| --- | --- |
| Sample | compound **13** |
| Formula | C10H8N2O2 |
| *M*r [g·mol−1] | 188.18 |
| Crystal system | Triclinic |
| Space group | P-1 |
| *a* (Å) | 5.2891 (6) |
| *b* (Å) | 8.5464 (9) |
| *c* (Å) | 10.2537 (9) |
| *V* (Å3) | 443.44 (8) |
| *Z* | 2 |
| *Dχ*(Mg cm−3) | 1.409 |
| *μ* (mm-1) | 0.101 |
| *F* (000) | 196 |
| Crystal size(mm3) | 0.41 × 0.17 × 0.08 |
| R,wR2 | 0.0467, 0.1404 (1534) |

**Figure S48. Chemical structure of compound 13**

