# Supporting Information

## Isolation and Biomimetic Total Synthesis of Tomentodiones A-B, Terpenoid-conjugated Phloroglucinols from the Leaves of *Rhodomyrtus tomentosa*

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**Computational Details**

**1. Methods**

Conformational search and DFT/TDDFT were performed with MacroModel 2010 and G09.[1] Mixed torsional/low-mode conformational searches[2] and truncated Newton conjugate gradient (TNCG) optimizations were carried out using the OPLS_2005 force field.[3] All conformations within 10 kcal/mol above the most stable minimum were further optimized at B3LYP/6-31G(d) theoretical level.[4] For the geometries of each configuration in an energy window of 3 kcal/mol relative to the lowest energy conformer after DFT optimization, the electronic transition and rotational strength were determined by time-dependent density functional theory (TDDFT) at the same theoretical level. The solvent effect in MeOH solution was included during DFT/TDDFT calculations using SMD solvent model.[5] The Boltzmann-population-weighted calculated ECD curves were generated via SpecDis.[6]

**References:**

(1) Frisch, M. J.; Trucks, G. W.; Schlegel, H. B.; Scuseria, G. E.; Robb, M. A.; Cheeseman, J. R.; Scalmani, G.; Barone, V.; Mennucci, B.; Petersson, G. A.; Nakatsuji, H.; Caricato, M.; Li, X.; Hratchian, H. P.; Izmaylov, A. F.; Bloino, J.; Zheng, G.; Sonnenberg, J. L.; Hada, M.; Ehara, M.; Toyota, K.; Fukuda, R.; Hasegawa, J.; Ishida, M.; Nakajima, T.; Honda, Y.; Kitao, O.; Nakai, H.; Vreven, T.; Montgomery Jr., J. A.; Peralta, J. E.; Ogliaro, F.; Bearpark, M. J.; Heyd, J.; Brothers, E. N.; Kudin, K. N.; Staroverov, V. N.; Kobayashi, R.; Normand, J.; Raghavachari, K.; Rendell, A. P.; Burant, J. C.; Iyengar, S. S.; Tomasi, J.; Cossi, M.; Rega, N.; Millam, N. J.; Klene, M.; Knox, J. E.; Cross, J. B.; Bakken, V.; Adamo, C.; Jaramillo, J.; Gomperts, R.; Stratmann, R. E.; Yazyev, O.; Austin, A. J.; Cammi, R.; Pomelli, C.; Ochterski, J. W.; Martin, R. L.; Morokuma, K.; Zakrzewski, V. G.; Voth, G. A.; Salvador, P.; Dannenberg, J. J.; Dapprich, S.; Daniels, A. D.; Farkas, Ö.; Foresman, J. B.; Ortiz, J. V.; Cioslowski, J.; Fox, D. J. *Gaussian 09*, Gaussian, Inc.: Wallingford, CT, USA, **2009**.

(2) Kolossváry, I.; Guida, W. C. *J. Comput. Chem.* **1999**, *20*, 1671−1684.

(3) Kaminski, G. A.; Friesner, R. A.; Tirado-Rives, J.; Jorgensen, W. L. *J. Phys. Chem. B* **2001**, *105*, 6474−6487.

(4) (a) Becke, A. D. *J. Chem. Phys.* **1993**, *98*, 5648-5652. (b) Lee, C.; Yang, W.; Parr, R. G. *Phys. Rev. B* **1988**, *37*, 785-789.

(5) Marenich, A. V.; Cramer, C. J.; Truhlar, D. G. *J. Phys. Chem. B*, **2009**, *113*, 6378−6396.

(6) Bruhn, T.; Schaumlöffel, A.; Hemberger, Y.; Bringmann, G.; SpecDis 1.53, University of Wuerzburg, Germany, **2012**.

**2. The most stable conformers of 1 and 2**

1) Cartesian coordinate of the most stable conformers of **1**

| | | | |
|---|---|---|---|
| C | 3.180673 | 0.655001 | 0.241028 |
| C | 1.782766 | 0.262847 | 0.265996 |
| C | 1.471607 | -1.063258 | 0.186616 |
| C | 2.355984 | -2.170463 | -0.349456 |
| C | 3.750523 | -1.657367 | -0.727667 |
| C | 4.280910 | -0.340956 | -0.166495 |
| C | 0.706664 | 1.304196 | 0.542581 |
| C | -0.666699 | 0.679915 | 0.970269 |
| C | -0.515091 | -0.744712 | 1.543537 |
| O | 0.274988 | -1.534710 | 0.566919 |
| O | 4.466908 | -2.351791 | -1.436502 |
| C | 2.543164 | -3.293119 | 0.706814 |
| C | 5.111982 | -0.680386 | 1.104017 |
| O | 3.545589 | 1.783780 | 0.605967 |
| C | 0.423252 | 2.173348 | -0.726106 |
| C | 1.410842 | 3.283225 | -1.140707 |
| C | 0.973785 | 3.870975 | -2.492041 |
| C | 1.517777 | 4.395555 | -0.088038 |
| C | 1.686585 | -2.764624 | -1.615312 |
| C | 5.196798 | 0.330420 | -1.211793 |
| C | -1.810837 | -1.568678 | 1.681096 |
| C | -2.636825 | -1.946631 | 0.433920 |
| C | -2.936731 | 1.568871 | 2.056162 |
| C | -3.338263 | -0.852395 | -0.376384 |
| C | -3.736298 | 1.549767 | 0.758136 |
| C | -4.278025 | 0.216903 | 0.291236 |
| C | -1.402575 | 1.685190 | 1.886780 |
| C | -3.965049 | 2.696446 | 0.102159 |
| C | -5.180882 | 0.124686 | -0.965138 |
| C | -4.534078 | -1.245216 | -1.326238 |
| C | -4.162878 | -1.449779 | -2.794829 |
| C | -5.386705 | -2.417938 | -0.828100 |
| C | 0.231434 | -0.782689 | 2.884641 |
| H | 2.992638 | -2.911888 | 1.629136 |
| H | 1.576299 | -3.740684 | 0.951955 |
| H | 3.195177 | -4.071591 | 0.298754 |
| H | 4.498568 | -1.143342 | 1.883699 |
| H | 5.926267 | -1.365707 | 0.847045 |
| H | 5.539617 | 0.242861 | 1.506725 |
| H | -0.555933 | 2.653698 | -0.586109 |
| H | 0.295568 | 1.480718 | -1.570097 |

| | | | |
|---|---|---|---|
| H | 2.406675 | 2.847144 | -1.277307 |
| H | 0.946296 | 3.101817 | -3.274405 |
| H | -0.028944 | 4.315473 | -2.427245 |
| H | 1.663724 | 4.657546 | -2.823058 |
| H | 1.878623 | 4.020225 | 0.875472 |
| H | 2.215051 | 5.176902 | -0.416510 |
| H | 0.542380 | 4.873305 | 0.079031 |
| H | 0.716949 | -3.200818 | -1.361780 |
| H | 1.533188 | -1.994497 | -2.379408 |
| H | 2.324379 | -3.546653 | -2.034855 |
| H | 5.611432 | 1.254523 | -0.802105 |
| H | 6.019862 | -0.337395 | -1.477722 |
| H | 4.643542 | 0.575559 | -2.125662 |
| H | -1.247529 | 0.571365 | 0.052212 |
| H | -3.396946 | -2.646994 | 0.801518 |
| H | -2.610821 | -0.320075 | -0.999074 |
| H | -3.245401 | 2.441205 | 2.646441 |
| H | -2.004368 | -2.529126 | -0.249326 |
| H | -3.195896 | 0.695299 | 2.661694 |
| H | -4.786866 | -0.257072 | 1.142635 |
| H | -1.514446 | -2.515541 | 2.152423 |
| H | -2.452261 | -1.070099 | 2.411736 |
| H | -4.534054 | 2.744897 | -0.822464 |
| H | -3.592243 | 3.647042 | 0.481126 |
| H | -6.265168 | 0.142195 | -0.803075 |
| H | -4.925963 | 0.884419 | -1.711014 |
| H | -5.059240 | -1.555033 | -3.421338 |
| H | -3.583366 | -0.602763 | -3.182351 |
| H | -3.559769 | -2.357992 | -2.930678 |
| H | -5.682321 | -2.305911 | 0.221940 |
| H | -6.308393 | -2.486888 | -1.421146 |
| H | -4.861429 | -3.376363 | -0.926327 |
| H | 0.488183 | -1.815977 | 3.139987 |
| H | 1.150713 | -0.190687 | 2.872910 |
| H | -0.409477 | -0.392095 | 3.680864 |
| H | -0.942715 | 1.678686 | 2.883140 |
| H | -1.205657 | 2.684043 | 1.479577 |
| H | 1.061325 | 1.953234 | 1.351858 |

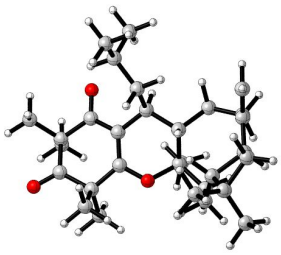
2) Cartesian coordinate of the most stable conformers of **2**

| | | | |
|---|---|---|---|
| C | -2.665768 | 0.021841 | 1.275835 |
| C | -1.711016 | 0.092332 | 0.180905 |
| C | -1.527047 | -0.953041 | -0.670198 |

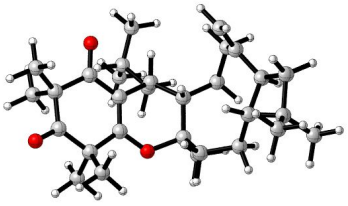
| | | | |
|---|---|---|---|
| C | -2.325574 | -2.242895 | -0.695160 |
| C | -3.297174 | -2.352010 | 0.495987 |
| C | -3.693730 | -1.124157 | 1.321372 |
| C | -0.865609 | 1.332041 | -0.022101 |
| C | 0.581356 | 0.869070 | -0.369783 |
| C | 0.642184 | -0.106216 | -1.571835 |
| O | -0.604082 | -0.928925 | -1.645443 |
| O | -3.795743 | -3.437082 | 0.748456 |
| C | -3.171212 | -2.294799 | -1.998723 |
| C | -5.009097 | -0.566720 | 0.699783 |
| O | -2.717813 | 0.894984 | 2.148277 |
| C | -1.531912 | 2.292488 | -1.045191 |
| C | -2.783538 | 3.051910 | -0.551390 |
| C | -3.446468 | 3.778481 | -1.731923 |
| C | -2.464372 | 4.043423 | 0.576656 |
| C | -1.376734 | -3.464122 | -0.658563 |
| C | -3.961374 | -1.540813 | 2.778800 |
| C | 1.728358 | -1.201520 | -1.405319 |
| C | 3.231181 | -0.828899 | -1.311946 |
| C | 2.144443 | 2.496065 | 0.876195 |
| C | 3.817445 | -0.621635 | 0.095170 |
| C | 2.964499 | 1.432363 | 1.581062 |
| C | 4.054806 | 0.788291 | 0.754187 |
| C | 1.589560 | 2.034282 | -0.485449 |
| C | 2.711643 | 1.092447 | 2.852466 |
| C | 5.327154 | 0.195728 | 1.413934 |
| C | 5.338733 | -0.937373 | 0.345252 |
| C | 5.646153 | -2.347333 | 0.846995 |
| C | 6.247833 | -0.586335 | -0.839979 |
| C | 0.732557 | 0.547662 | -2.952600 |
| H | -2.509948 | -2.277263 | -2.870107 |
| H | -3.756293 | -3.219487 | -2.020967 |
| H | -3.857776 | -1.444982 | -2.069634 |
| H | -5.782209 | -1.342318 | 0.708050 |
| H | -5.355796 | 0.282389 | 1.297628 |
| H | -4.866280 | -0.228205 | -0.331141 |
| H | -1.813352 | 1.719040 | -1.937085 |
| H | -0.804405 | 3.043819 | -1.379293 |
| H | -3.506012 | 2.321712 | -0.162293 |
| H | -2.768961 | 4.526245 | -2.166699 |
| H | -3.723632 | 3.078234 | -2.530116 |
| H | -4.357062 | 4.302296 | -1.415125 |
| H | -2.092146 | 3.534137 | 1.470945 |
| H | -1.708335 | 4.773686 | 0.256584 |

| | | | |
|---|---|---|---|
| H | -3.361962 | 4.603685 | 0.868624 |
| H | -1.966164 | -4.383823 | -0.654060 |
| H | -0.724668 | -3.465119 | -1.534560 |
| H | -0.751630 | -3.453368 | 0.241594 |
| H | -4.744979 | -2.300882 | 2.817608 |
| H | -3.059673 | -1.954204 | 3.245200 |
| H | -4.275666 | -0.669625 | 3.357547 |
| H | 0.886310 | 0.273021 | 0.499894 |
| H | -0.799131 | 1.849284 | 0.939667 |
| H | 3.768288 | -1.684161 | -1.743740 |
| H | 3.241817 | -1.223687 | 0.811356 |
| H | 1.331389 | 2.836280 | 1.529172 |
| H | 3.472520 | 0.017820 | -1.966064 |
| H | 2.787240 | 3.370620 | 0.692296 |
| H | 4.362536 | 1.489724 | -0.030678 |
| H | 1.462902 | -1.790837 | -0.518409 |
| H | 1.601558 | -1.869831 | -2.265501 |
| H | 3.298469 | 0.349884 | 3.388086 |
| H | 1.900329 | 1.556039 | 3.410472 |
| H | 6.204995 | 0.850901 | 1.465301 |
| H | 5.129584 | -0.204613 | 2.413660 |
| H | 5.448093 | -3.098274 | 0.069735 |
| H | 6.701691 | -2.445132 | 1.135728 |
| H | 5.035074 | -2.602662 | 1.721607 |
| H | 6.060422 | 0.422488 | -1.226267 |
| H | 7.301016 | -0.630075 | -0.532802 |
| H | 6.118603 | -1.290853 | -1.671048 |
| H | -0.051360 | 1.292008 | -3.109003 |
| H | 0.634651 | -0.221721 | -3.726261 |
| H | 1.700313 | 1.037608 | -3.091336 |
| H | 2.434190 | 1.744130 | -1.114538 |
| H | 1.132866 | 2.890926 | -0.990978 |

Structures of the calculated most stable conformers (Left: **1**, Right: **2**, picture generated by CYLview v1.0 BETA)



**1**



**2**

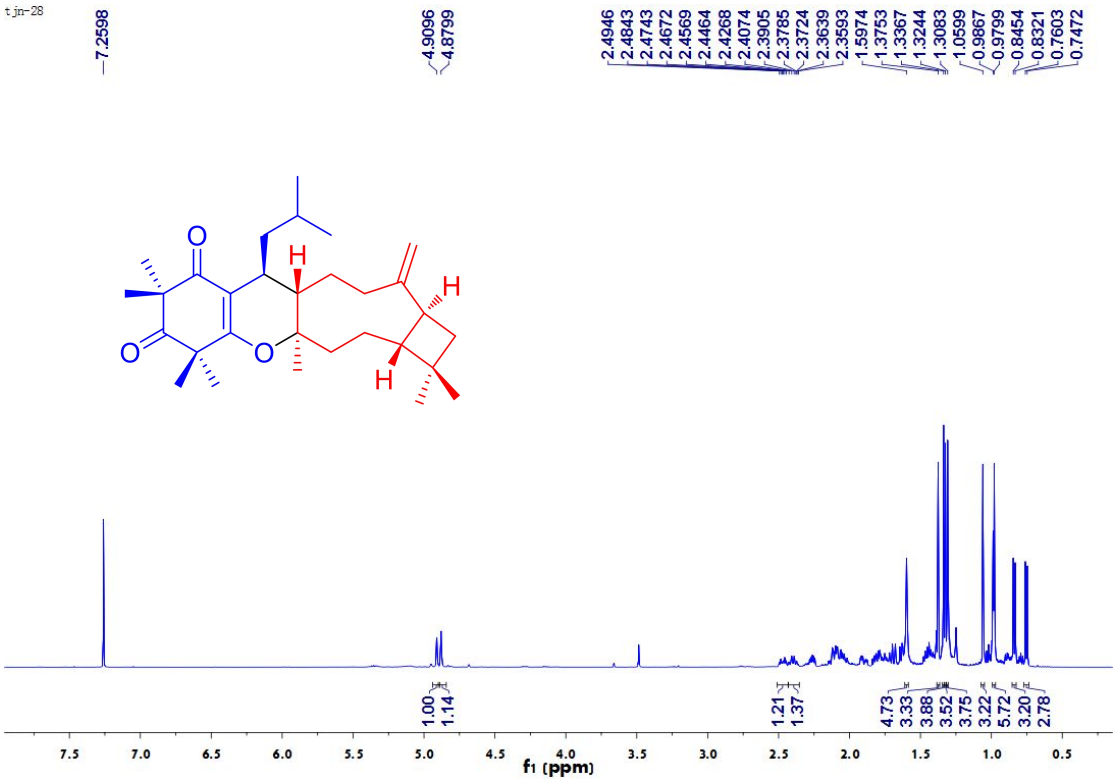



**Figure S2.** $^{1}$H NMR spectrum (500 MHz, $CDCl_3$) of tomentodione A (**1**).

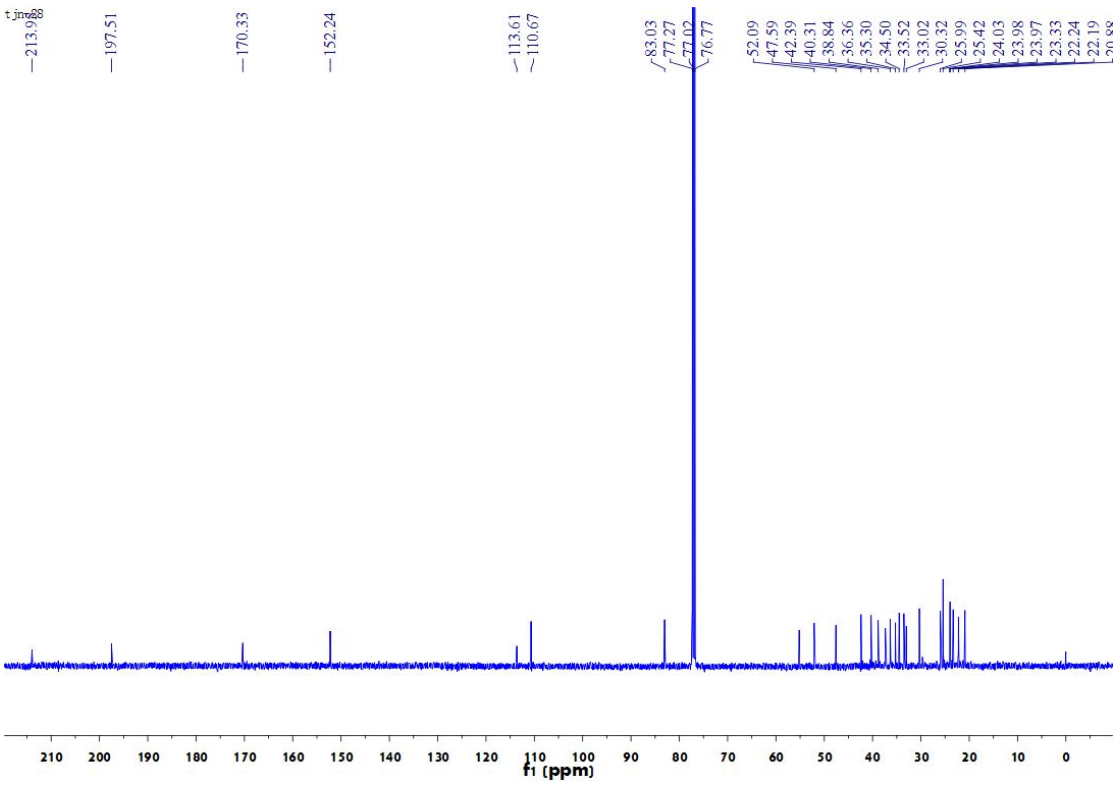



**Figure S3.** $^{13}$C NMR spectrum (125 MHz, $CDCl_3$) of tomentodione A (**1**).

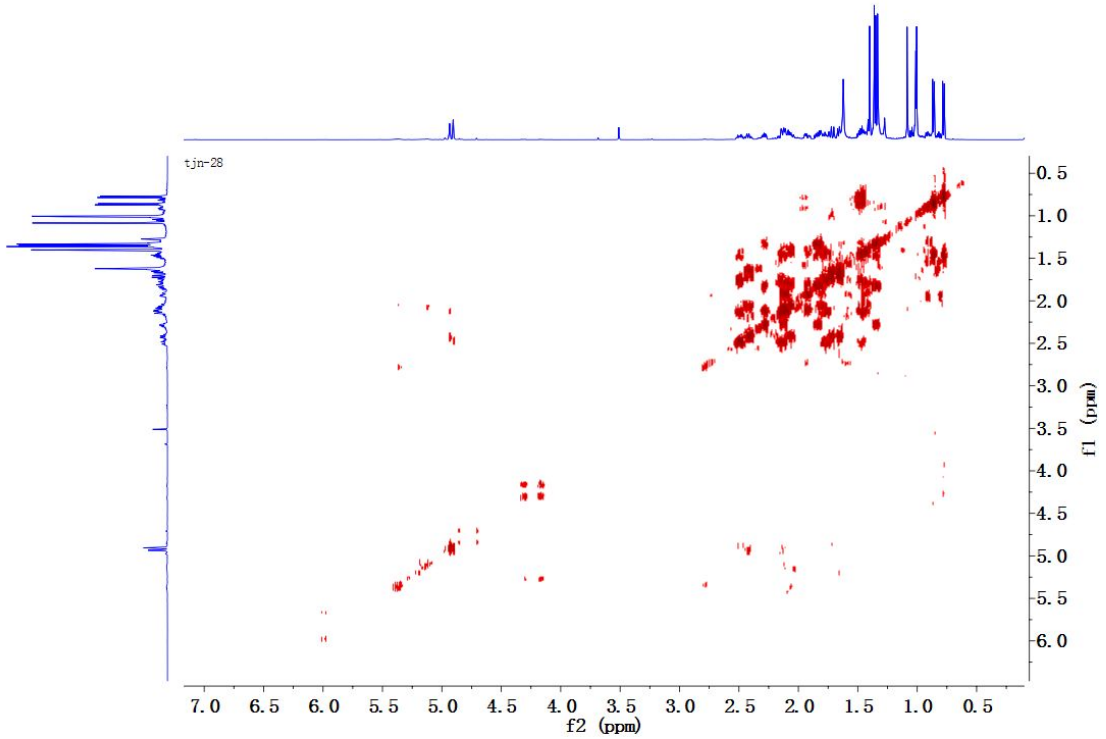



**Figure S4.** $^{1}$H-$^{1}$H COSY spectrum (500 MHz, $CDCl_3$) of tomentodione A (**1**).

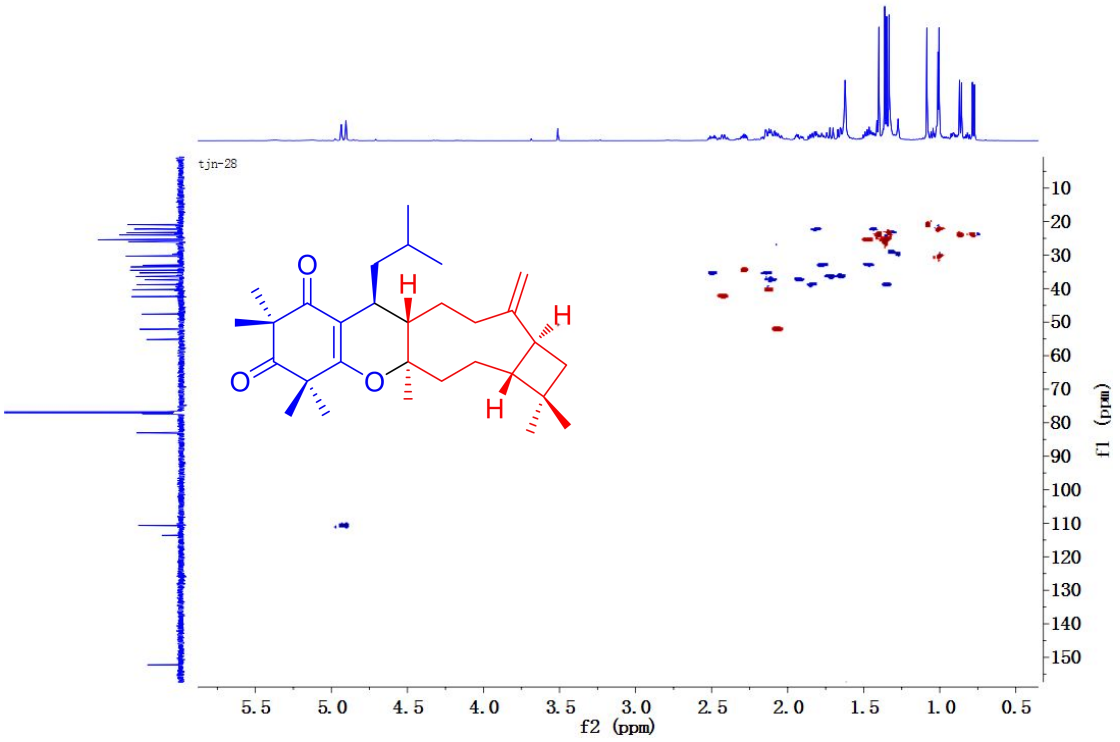



**Figure S5.** HSQC spectrum of tomentodione A (**1**).

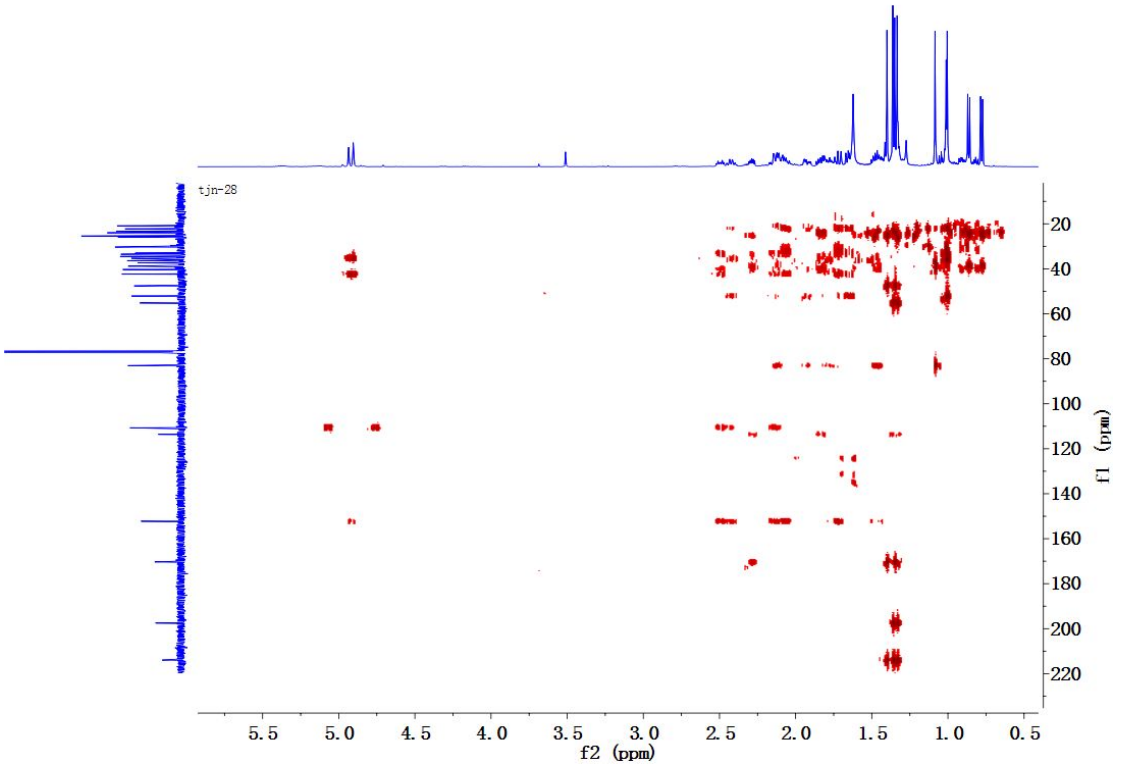



**Figure S6.** HMBC spectrum of tomentodione A (**1**).

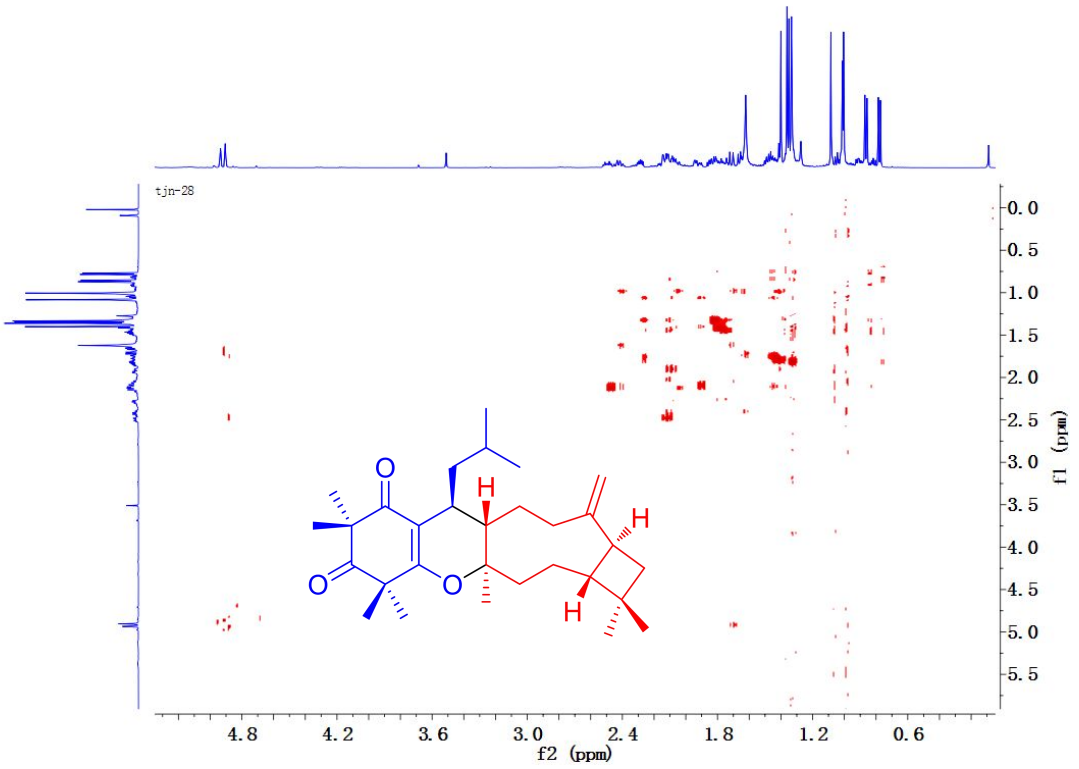



**Figure S7.** NOESY spectrum of tomentodione A (**1**).

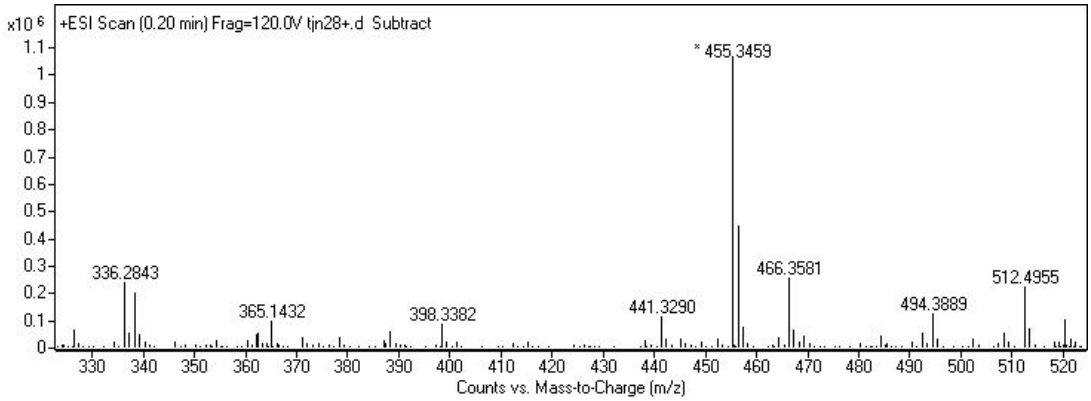



**Figure S8.** HRESIMS spectrum of tomentodione A (**1**).

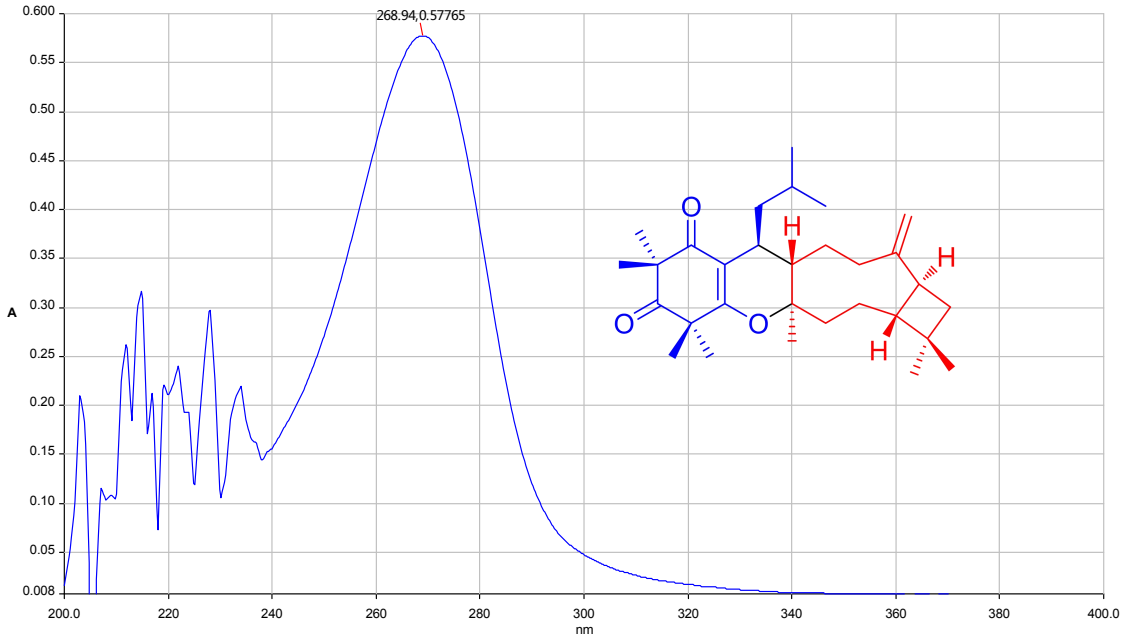



**Figure S9.** UV spectrum of tomentodione A (**1**).

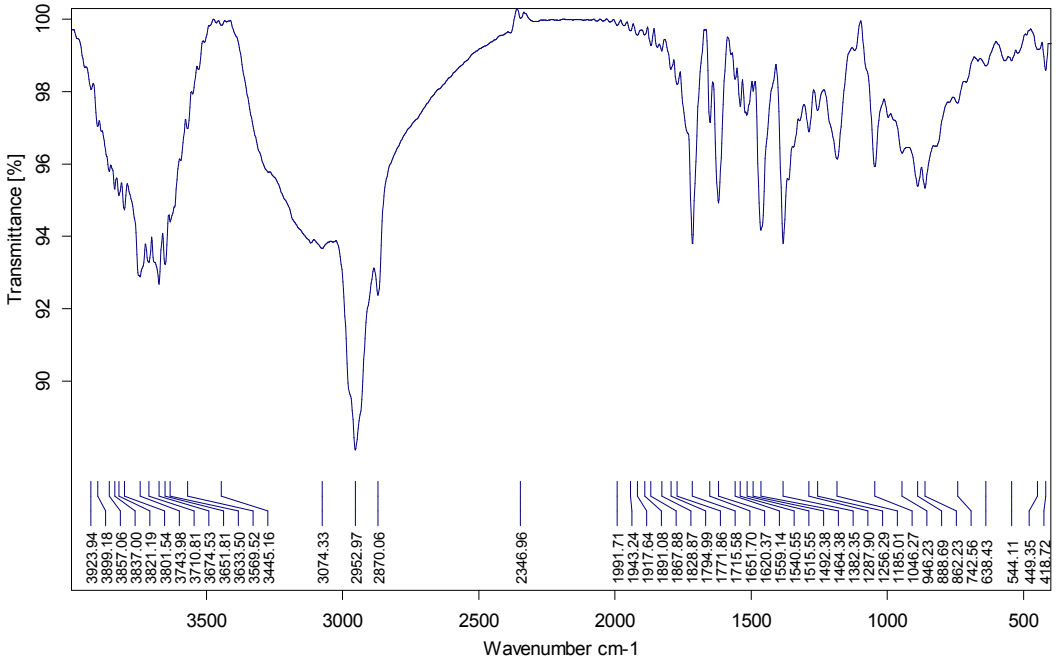



**Figure S10.** IR spectrum of tomentodione A (**1**)

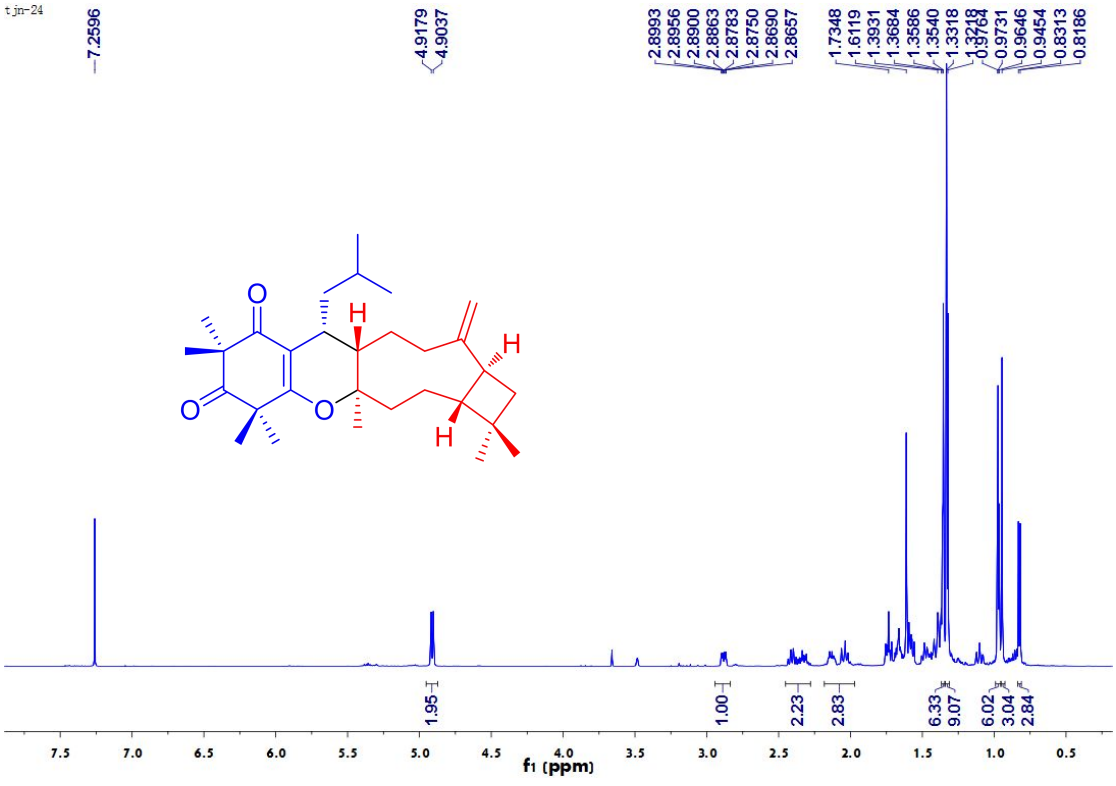



**Figure S11.** $^{1}$H NMR spectrum (500 MHz, $CDCl_3$) of tomentodione B (**2**).

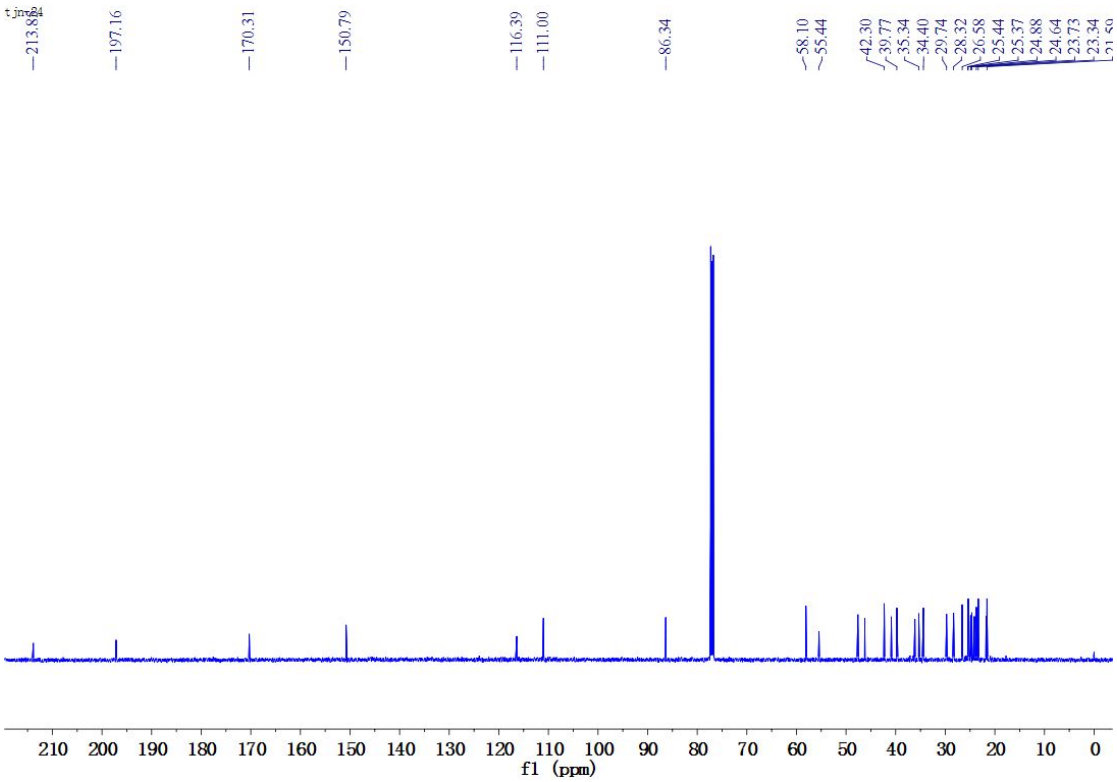



**Figure S12.** $^{13}C$ NMR spectrum (125 MHz, $CDCl_3$) of tomentodione B (**2**).

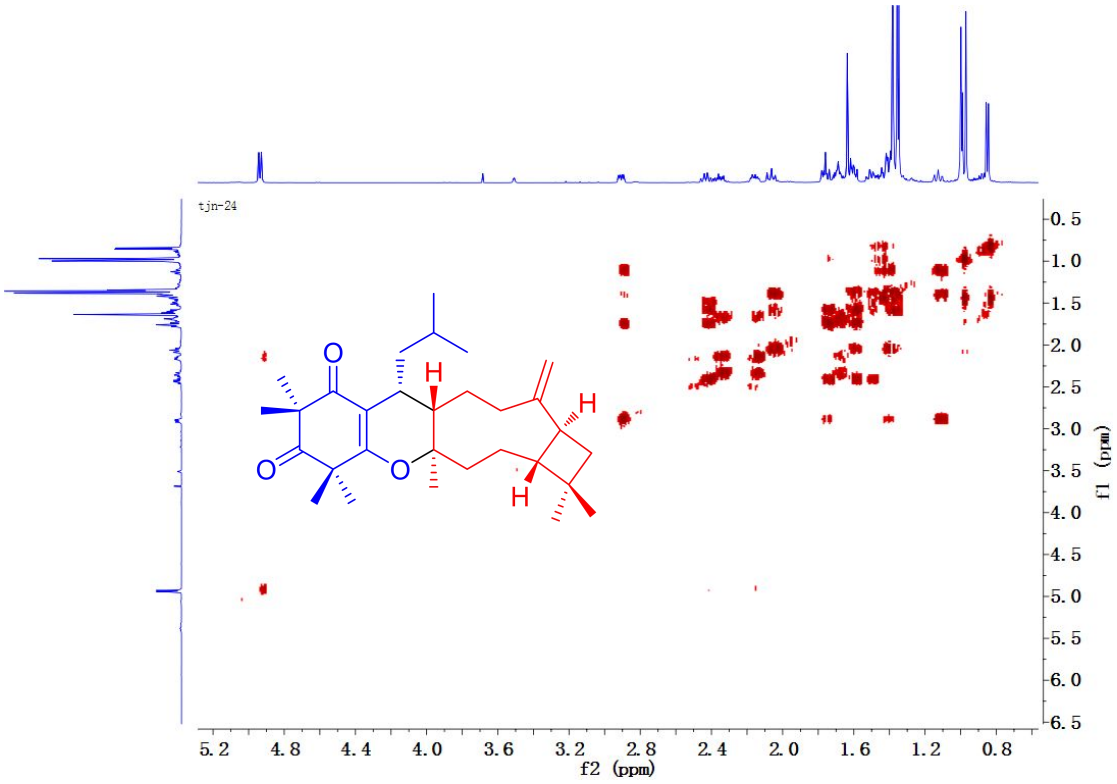



**Figure S13.** $^{1}H$-$^{1}H$ COSY spectrum (500 MHz, $CDCl_3$) of tomentodione B (**2**).

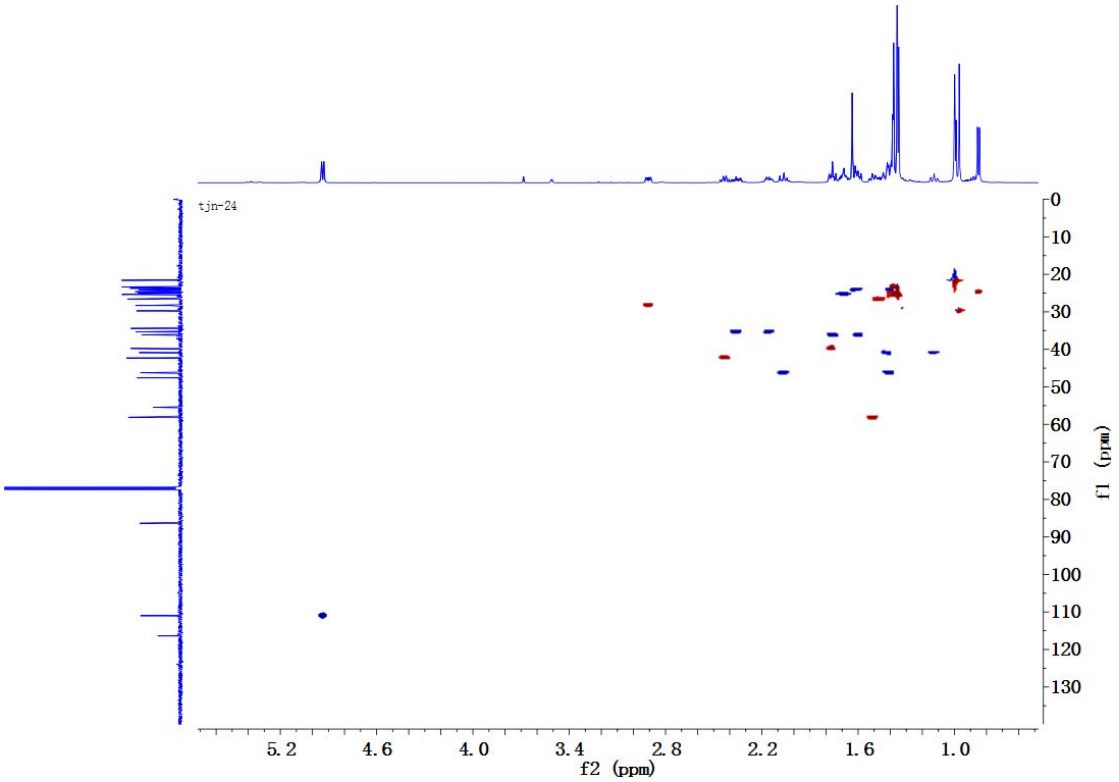



**Figure S14.** HSQC spectrum of tomentodione B (**2**).

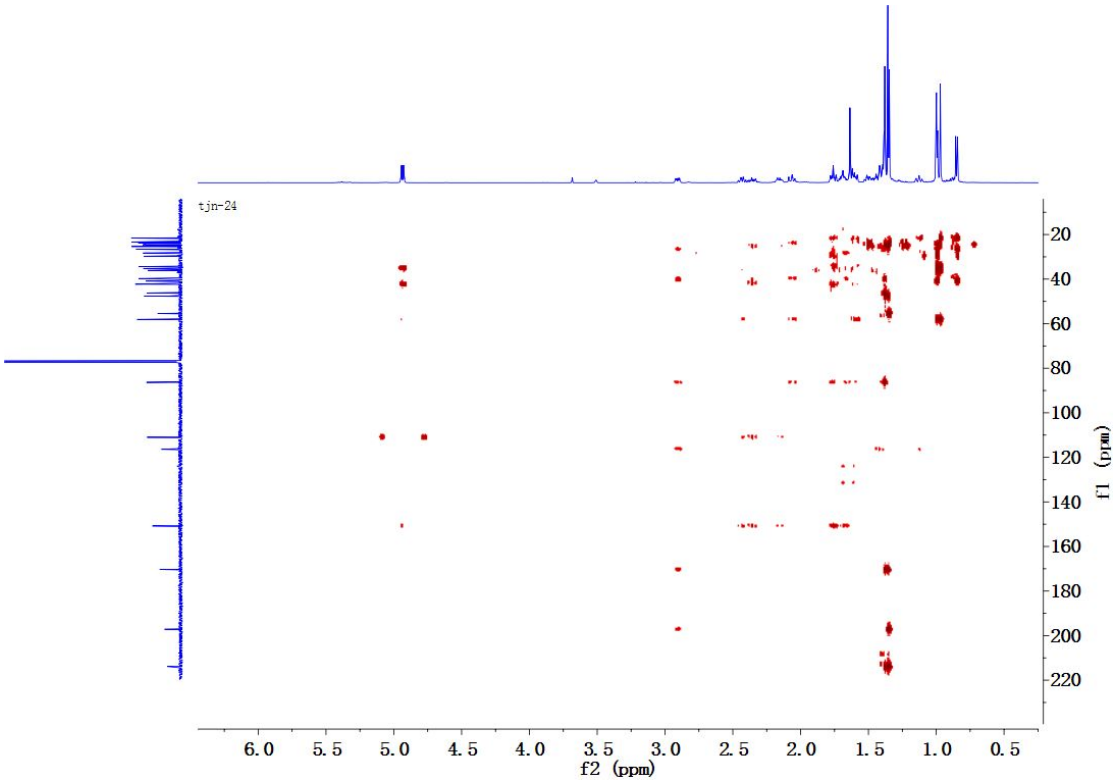



**Figure S15.** HMBC spectrum of tomentodione B (**2**).

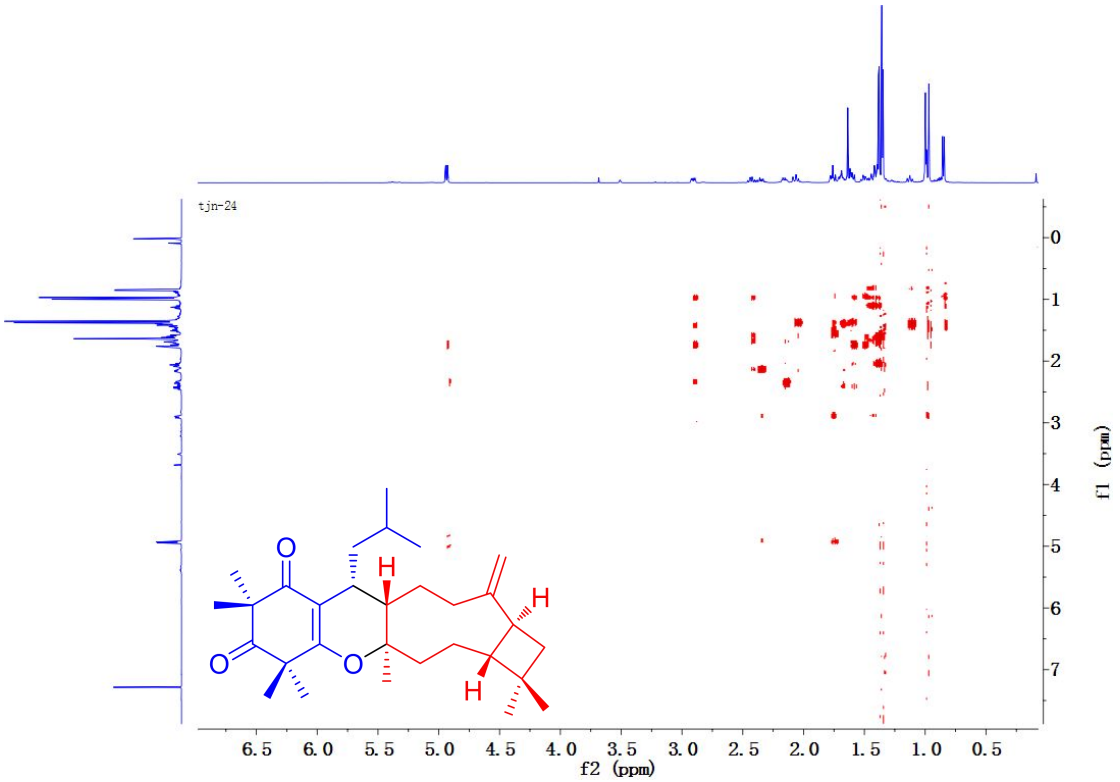



**Figure S16.** ROESY spectrum of tomentodione B (**2**).

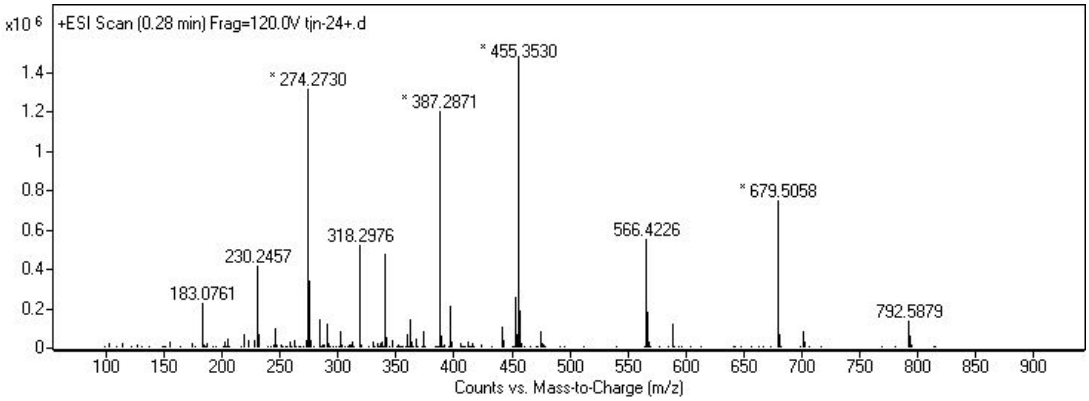



**Figure S17.** HRESIMS spectrum of tomentodione B (**2**).

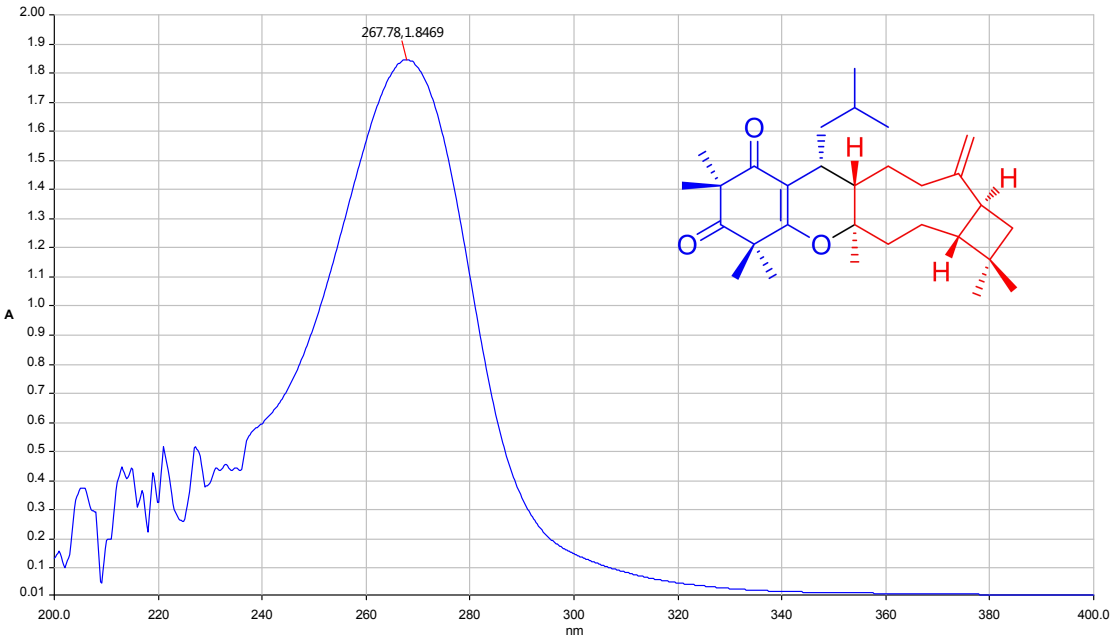



**Figure S18.** UV spectrum of tomentodione B (**2**).

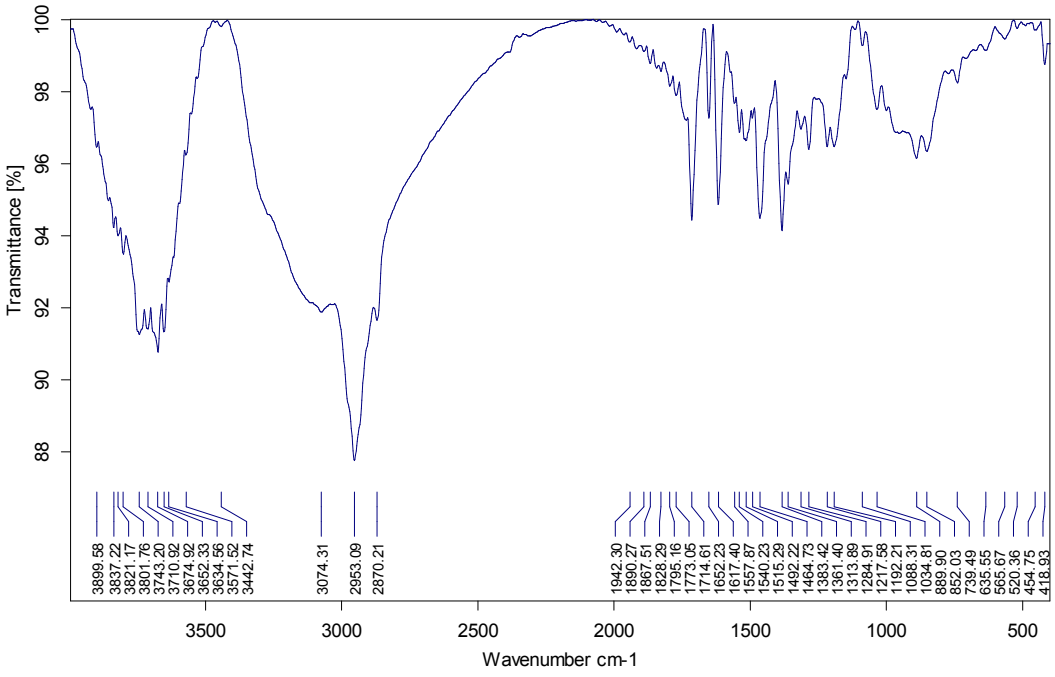



**Figure S19.** IR spectrum of tomentodione B (**2**).

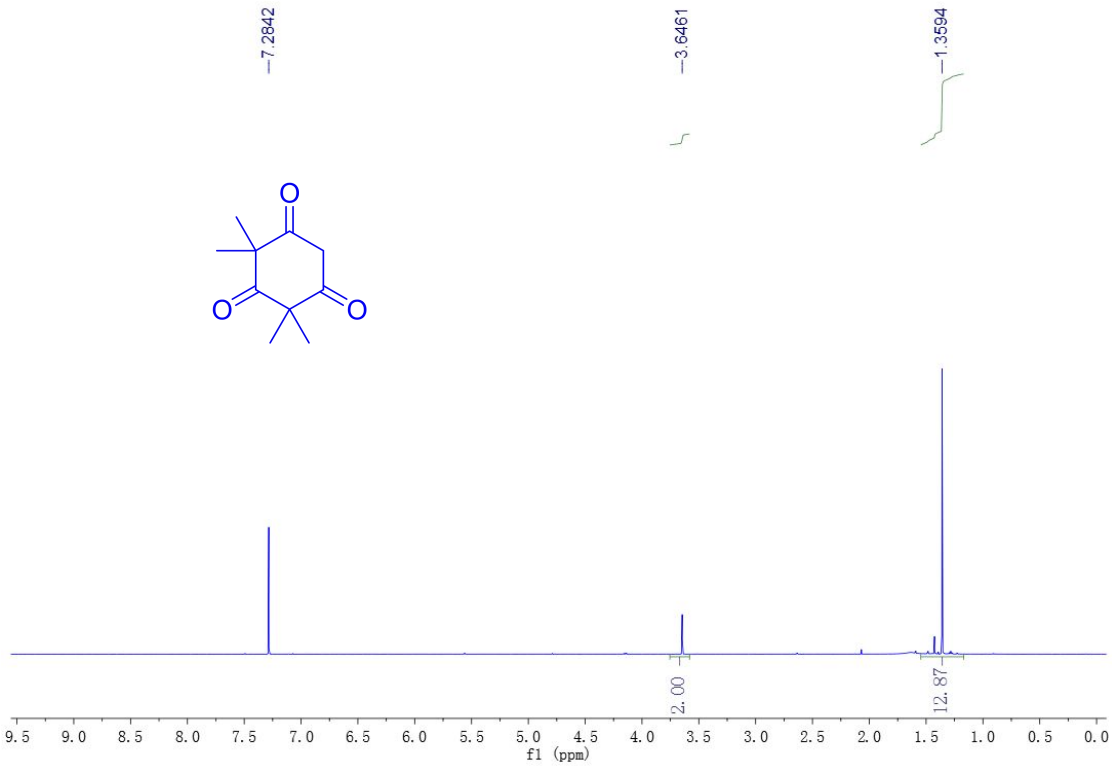



**Figure S20**. $^{1}$H NMR spectrum (500 MHz, $CDCl_3$) of **4**.

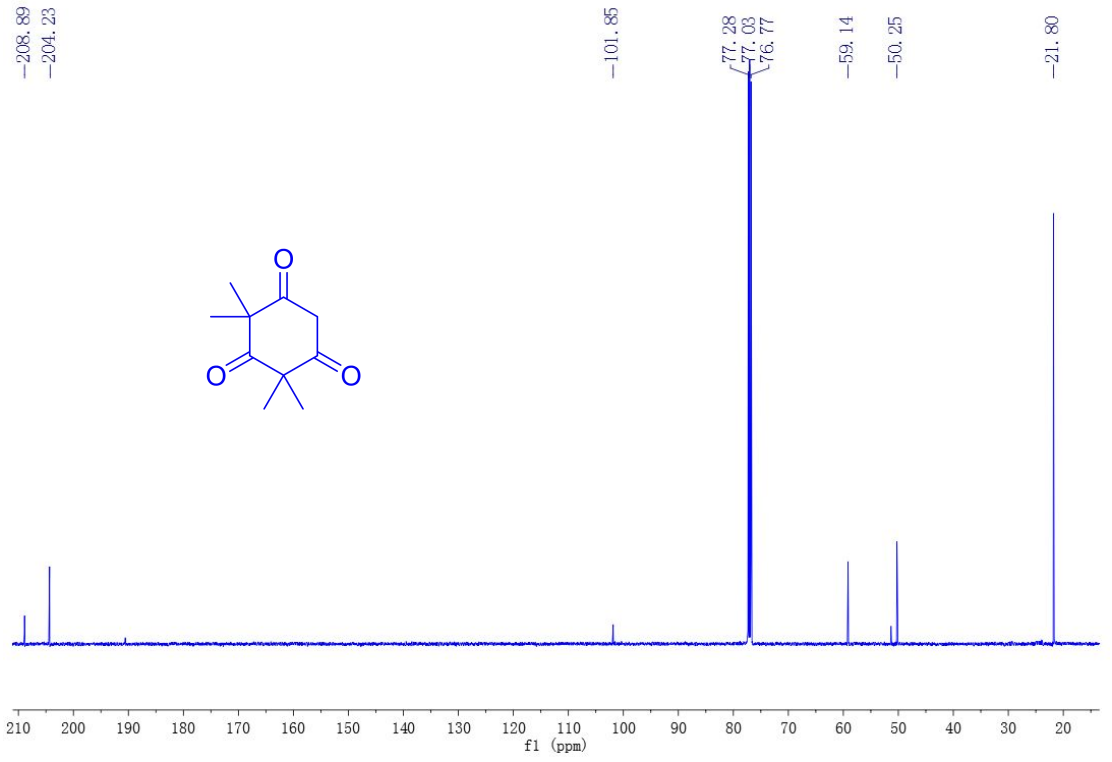



**Figure S21**. $^{13}$C NMR spectrum (125 MHz, $CDCl_3$) of key **4**.

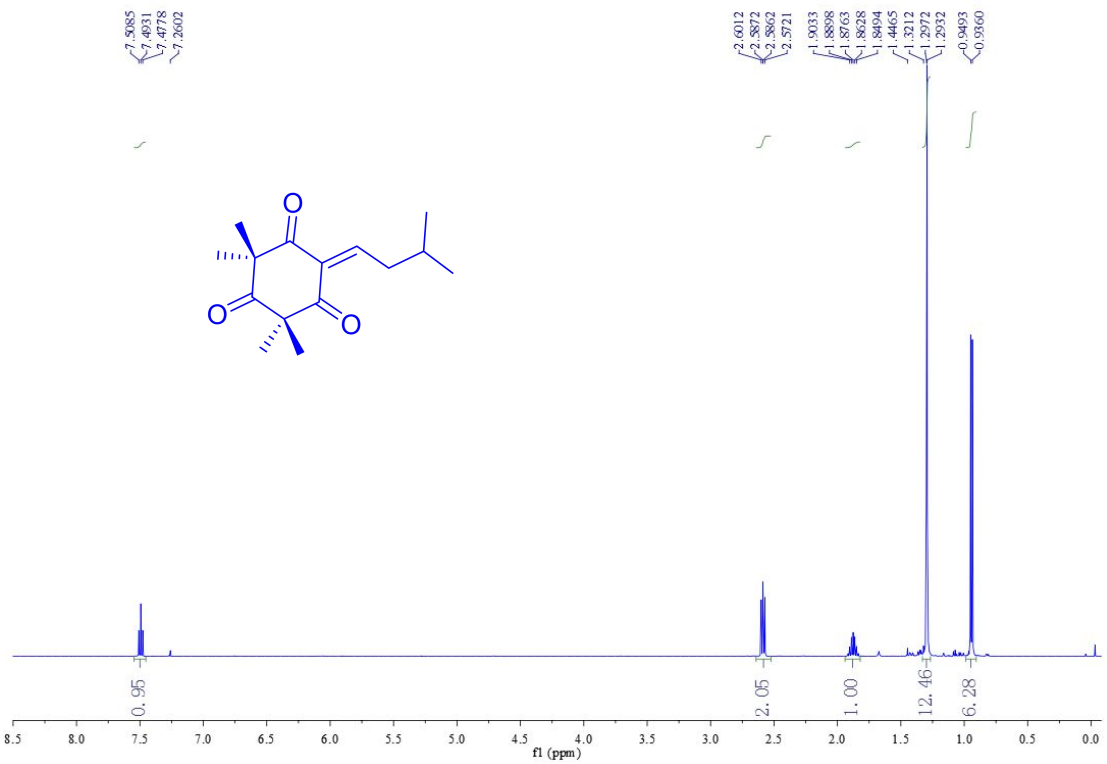



**Figure 22**. $^{1}H$ NMR spectrum (500 MHz, $CDCl_3$) of key intermediate **5**.

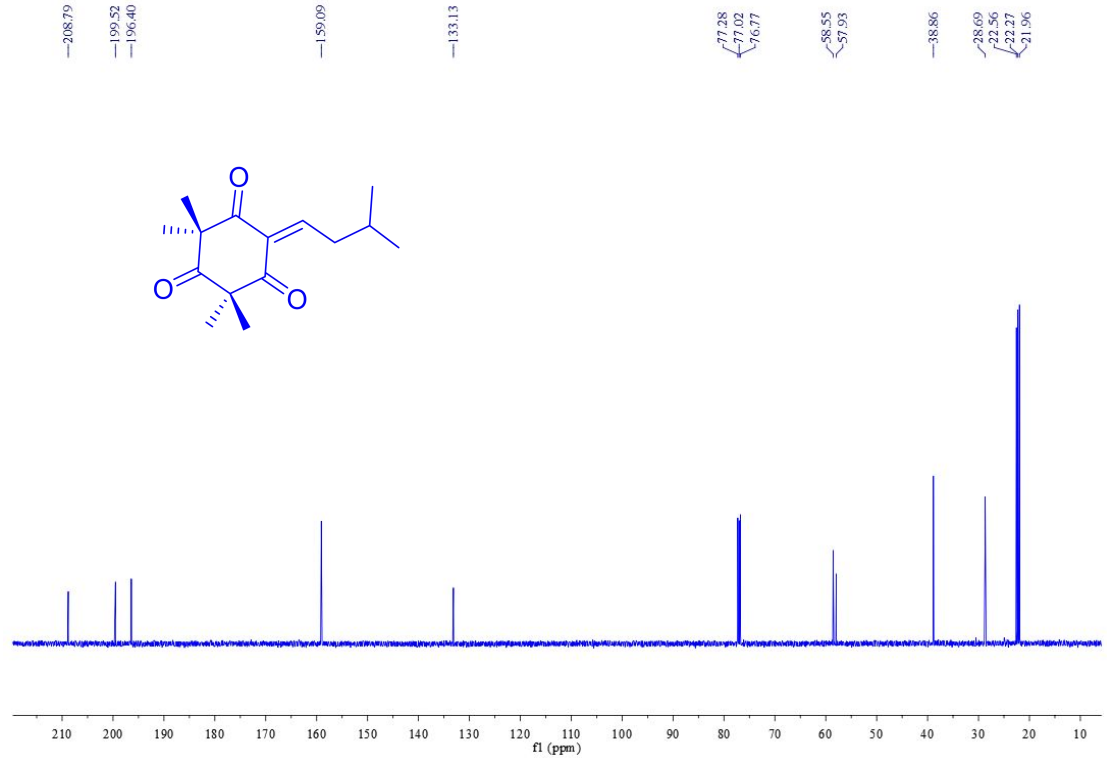



**Figure 23**. $^{13}C$ NMR spectrum (125 MHz, $CDCl_3$) of key intermediate **5**.

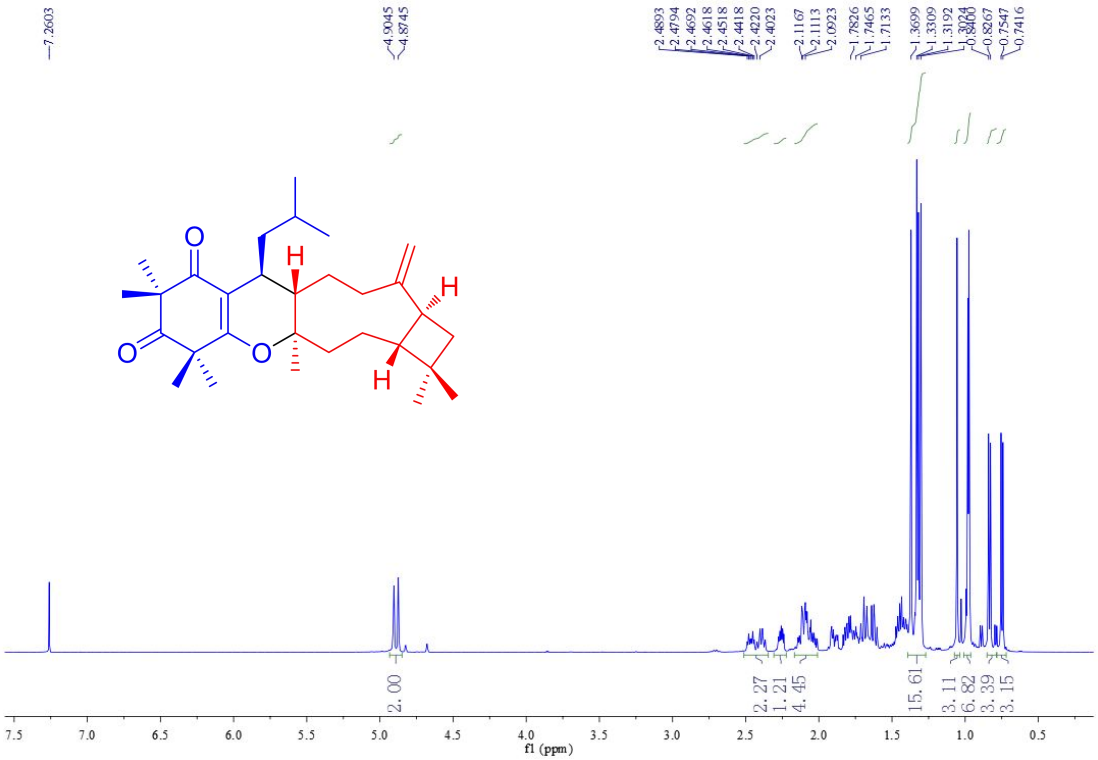



**Figure 24**. $^{1}H$ NMR spectrum (500 MHz, $CDCl_3$) of synthetic compound **1**.

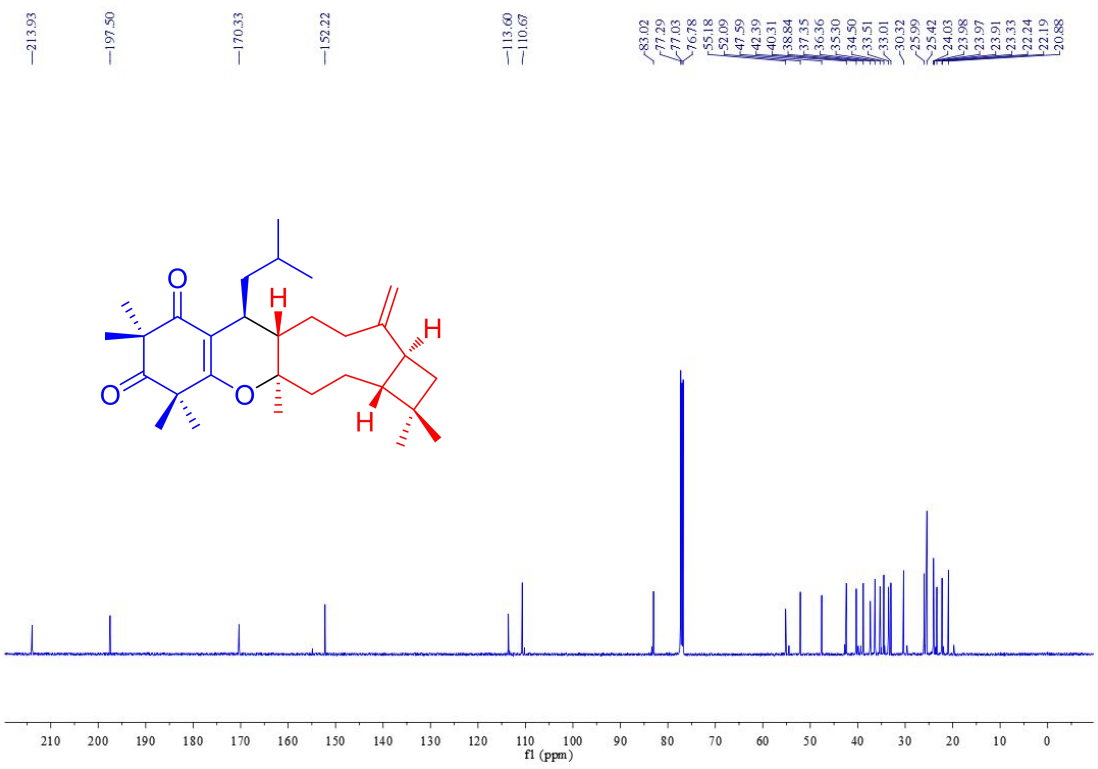



**Figure 25**. $^{13}C$ NMR spectrum (125 MHz, $CDCl_3$) of synthetic compound **1**.

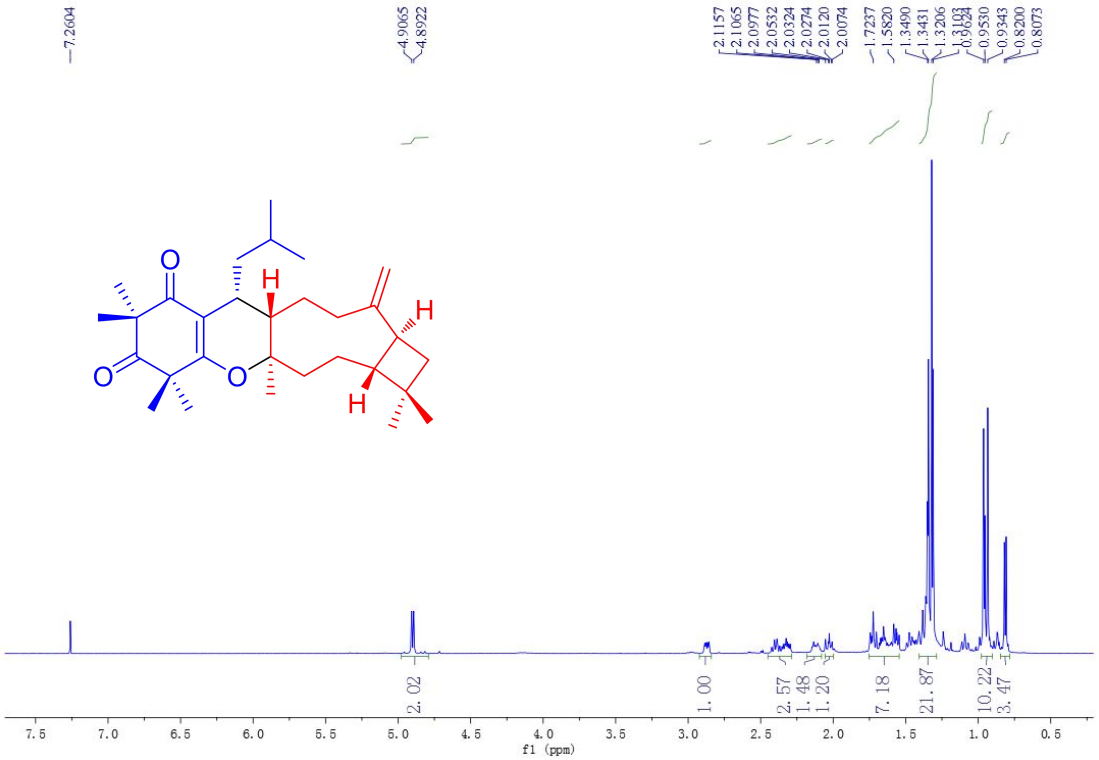



**Figure 26**. $^{1}H$ NMR spectrum (500 MHz, $CDCl_3$) of synthetic compound **2**.

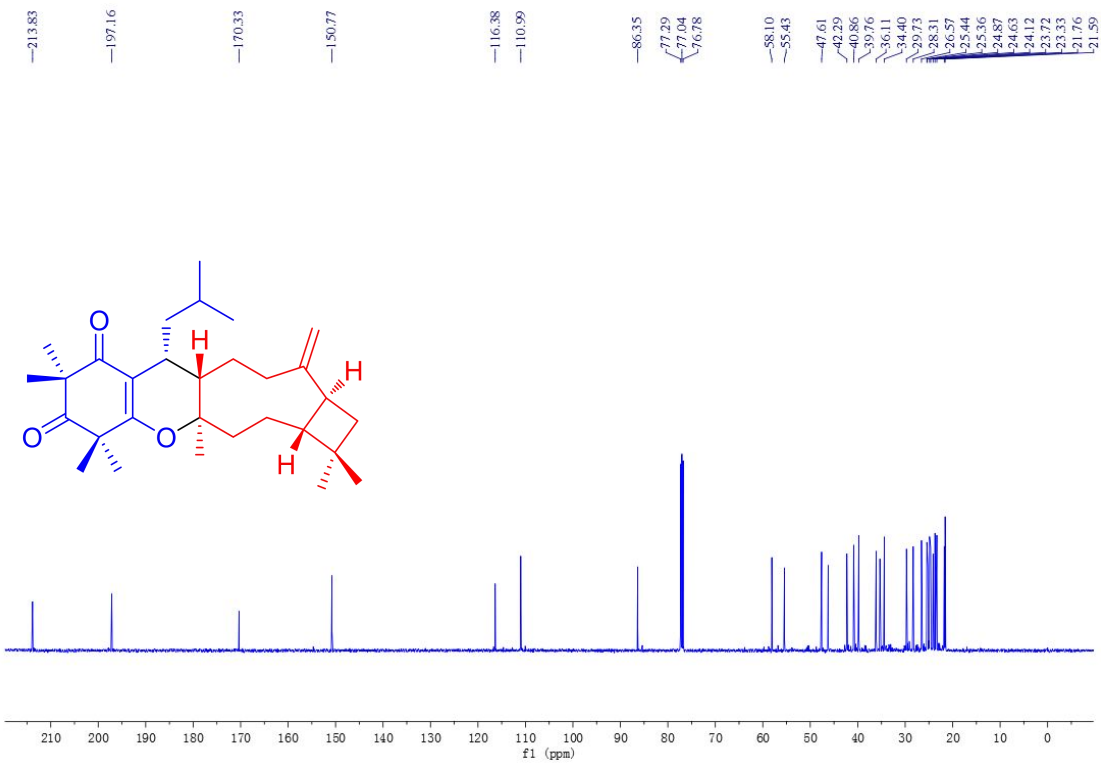



**Figure 27**. $^{13}C$ NMR spectrum (125 MHz, $CDCl_3$) of synthetic compound **2**.