Design, synthesis and mechanism of novel dihydroartemisinin-coumarin hybrids as potential anti-cancer and anti-inflammatory agents

Haonan Yu[1#], Zhuang Hou[1#], Xiaoguang Yang[1], Yanhua Mou[2*] and Chun Guo[1*]

[1]School of Pharmaceutical Engineering, Shenyang Pharmaceutical University, Shenyang 110016, China;

[2] School of life sciences and biological pharmacy, Shenyang Pharmaceutical University, Shenyang 110016, China;

[#]Haonan Yu and Zhuang Hou contributed equally to this work.

***Correspondence to**

Chun Guo, Key Laboratory of Structure-Based Drug Design and Discovery of Ministry of Education, School of Pharmaceutical Engineering, Shenyang Pharmaceutical University, No. 103 Wenhua Road, Shenyang, 110016, Liaoning Province, China. Tel: +86-24-4352-0226, Email: chunguo@syphu.edu.cn; Yanhua Mou, School of life sciences and biological pharmacy, Shenyang Pharmaceutical University, No. 103 Wenhua Road, Shenyang 110016, Liaoning Province, China. Email: mu_hua_jj@sina.com

Authors' emails

yhna380@hotmail.com (HY)

houzhuang8@sina.com (ZH)

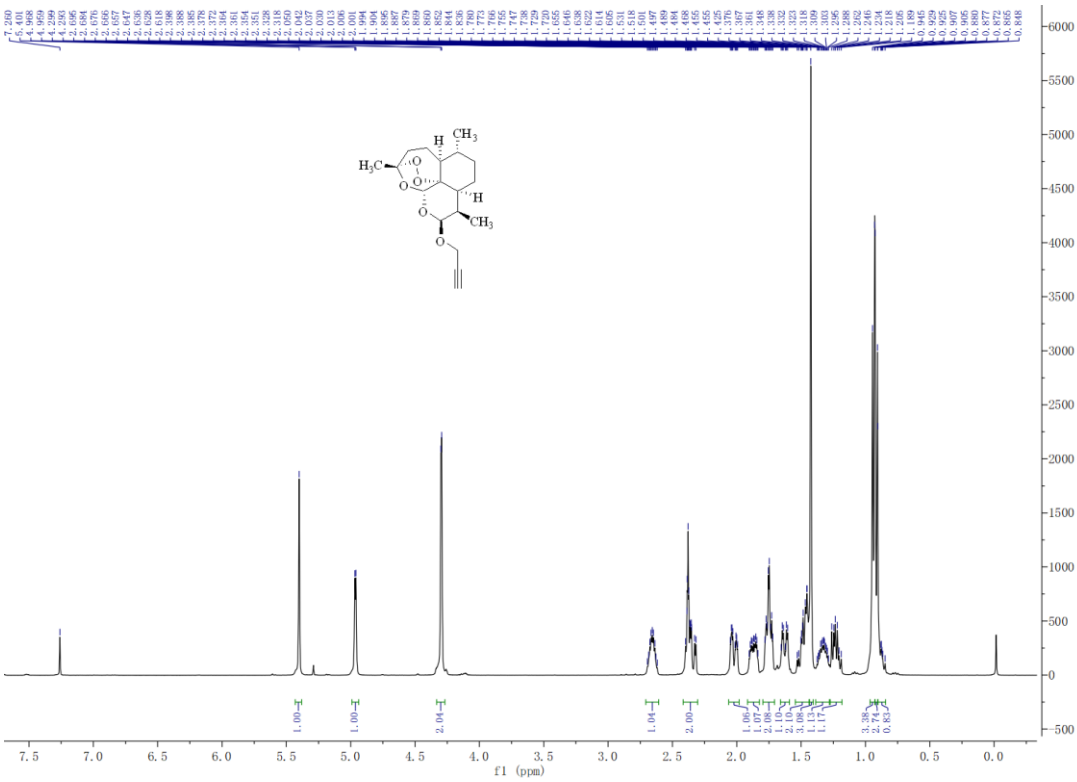
1012041601@qq.com (XY);

mu_hua_jj@sina.com (YM)

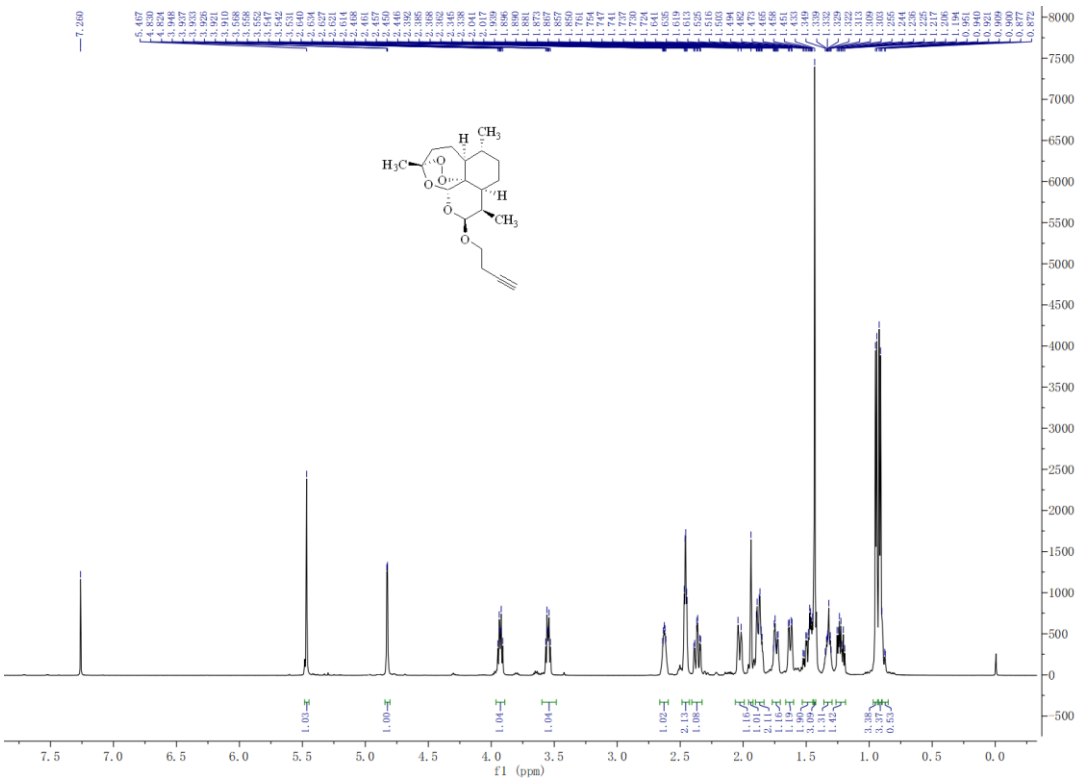
chunguo@syphu.edu.cn (CG)

^{1}H and ^{13}C NMR Spectrum of intermediates and new compounds

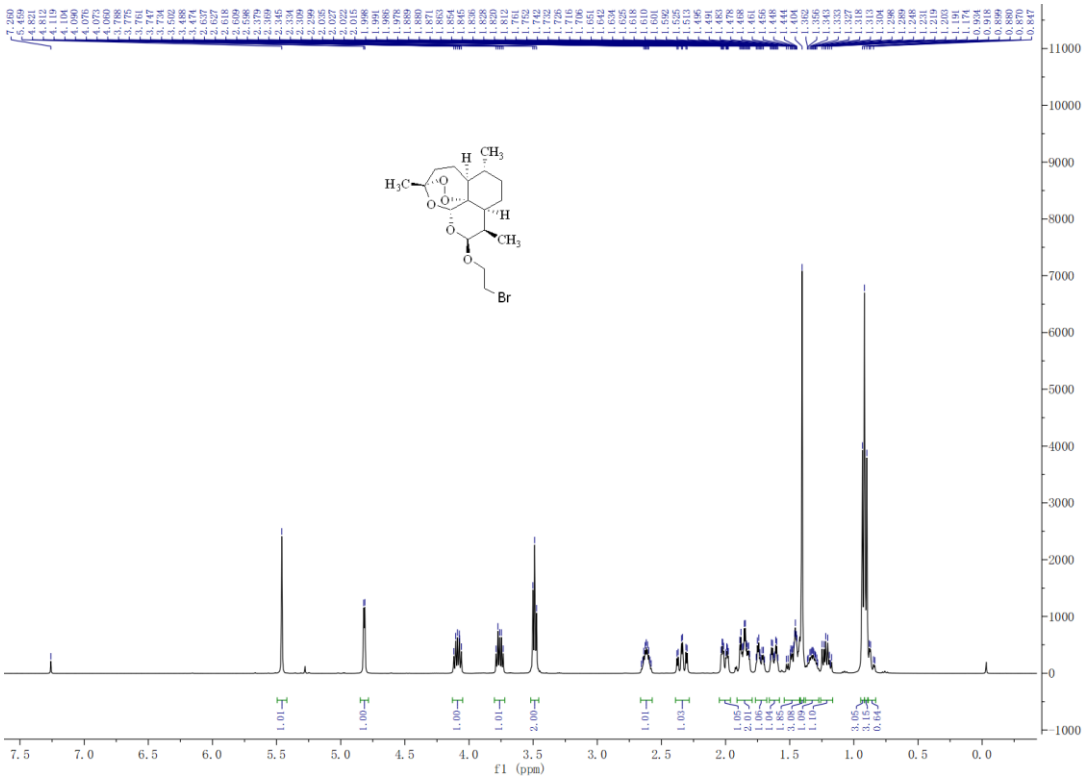
Intermediates



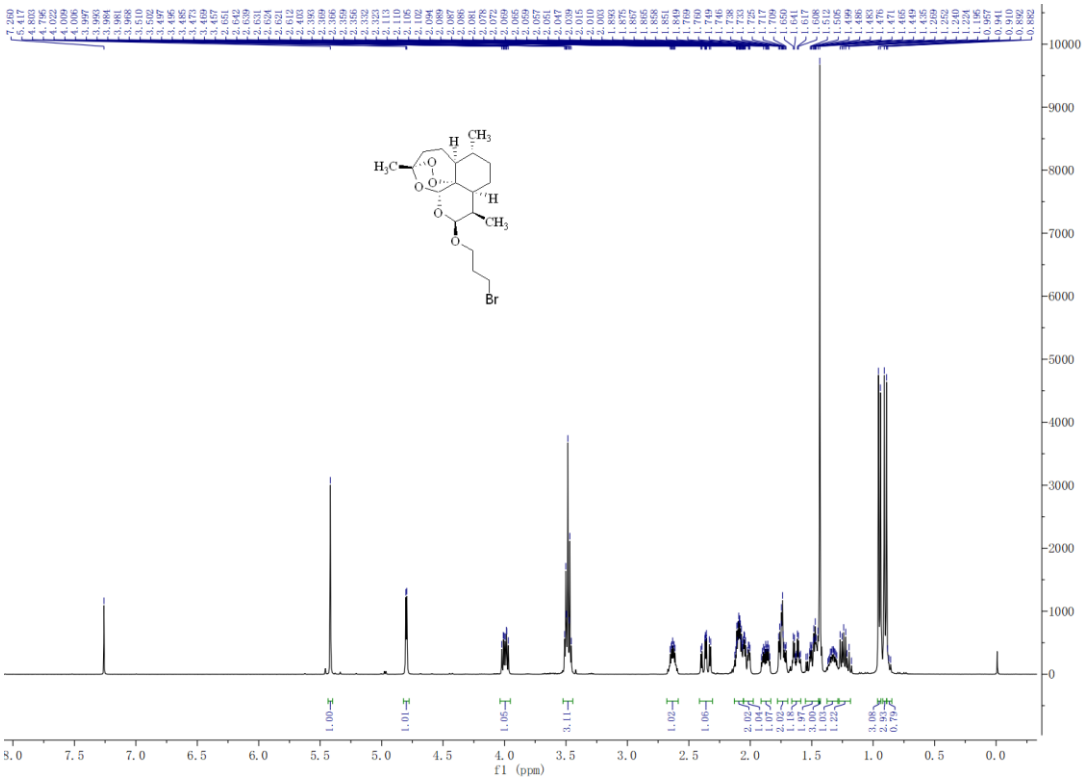
^{1}H NMR (600 MHz, Chloroform-d) δ 5.40 (s, 1H), 4.96 (d, J = 3.5 Hz, 1H), 4.30 (d, J = 2.3 Hz, 2H), 2.70-2.62 (m, 1H), 2.41-2.30 (m, 2H), 2.05-1.99 (m, 1H), 1.90-1.84 (m, 1H), 1.79-1.71 (m, 2H), 1.63 (dd, J = 13.2, 3.4 Hz, 1H), 1.53-1.46 (m, 2H), 1.42 (s, 3H), 1.38-1.29 (m, 1H), 1.26-1.19 (m, 1H), 0.94 (d, J = 6.4 Hz, 3H), 0.92 (d, J = 7.3 Hz, 3H), 0.90-0.83 (m, 1H).



^{1}H NMR (600 MHz, Chloroform-d) δ 5.47 (s, 1H), 4.83 (d, J = 3.5 Hz, 1H), 3.95-3.91 (m, 1H), 3.57-3.53 (m, 1H), 2.64-2.61 (m, 1H), 2.47-2.45 (m, 2H), 2.37 (td, J = 14.1, 4.0 Hz, 1H), 2.03 (d, J = 14.6 Hz, 1H), 1.94 (s, 1H), 1.90-1.85 (m, 2H), 1.77-1.71 (m, 1H), 1.63 (dd, J = 13.3, 3.5 Hz, 1H), 1.53-1.45 (m, 2H), 1.43 (s, 3H), 1.35-1.30 (m, 1H), 1.26-1.19 (m, 1H), 0.95 (d, J = 6.3 Hz, 3H), 0.91 (d, J = 7.3 Hz, 3H), 0.90-0.87 (m, 1H).

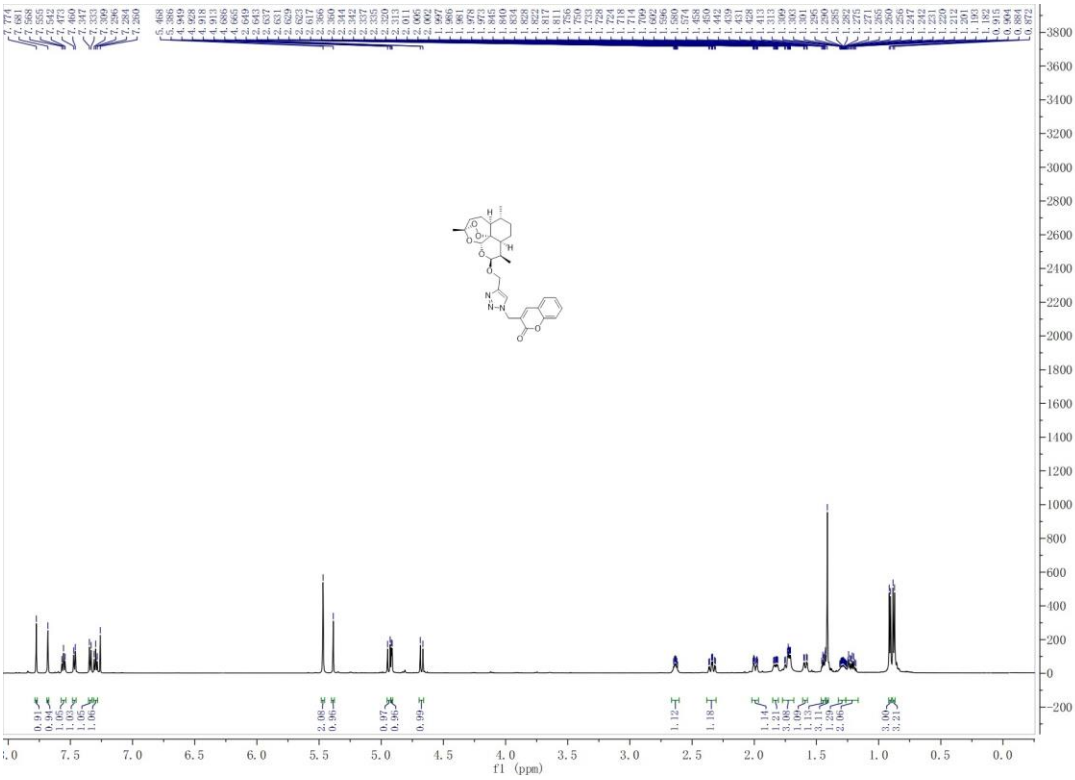


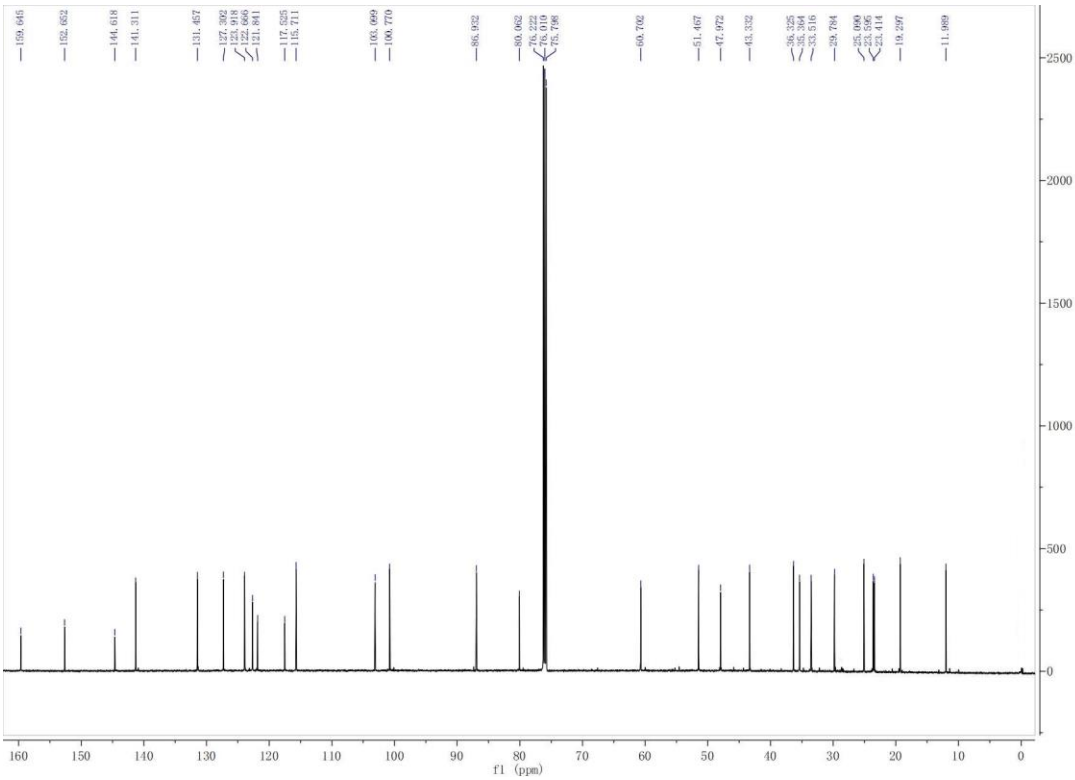
^{1}H NMR (600 MHz, Chloroform-d) δ 5.46 (s, 1H), 4.82 (d, J = 3.5 Hz, 1H), 4.12-4.06 (m, 1H), 3.79-3.73 (m, 1H), 3.49 (t, J = 5.6 Hz, 2H), 2.66-2.58 (m, 1H), 2.34 (td, J = 14.0, 3.9 Hz, 1H), 2.04-1.98 (m, 1H), 1.89-1.81 (m, 2H), 1.76-1.70 (m, 1H), 1.65-1.59 (m, 1H), 1.54-1.42 (m, 2H), 1.40 (s, 3H), 1.36-1.28 (m, 1H), 1.25-1.17 (mi, 1H), 0.92 (t, J = 6.9 Hz, 6H), 0.88-0.84 (m, 1H).



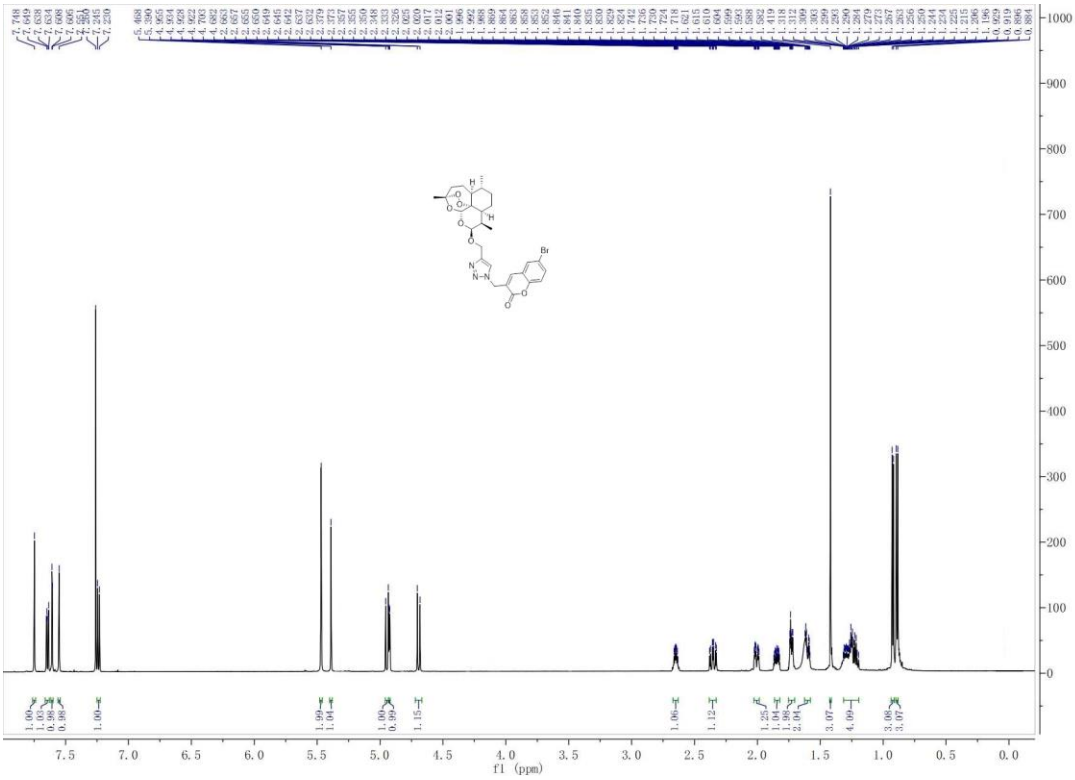
^{1}H NMR (600 MHz, Chloroform-d) δ 5.42 (s, 1H), 4.80 (d, J = 3.4 Hz, 1H), 4.02-3.97 (m, 1H), 3.52-3.45 (m, 3H), 2.65-2.61 (m, 1H), 2.40-2.32 (m, 4.0 Hz, 1H), 2.13-2.00 (m, 2H), 2.05-1.98 (m, 1H), 1.91-1.83 (m, 1H), 1.77-1.71 (m, 2H), 1.65-1.59 (m, 1H), 1.55-1.44 (m, 2H), 1.44 (s, 3H), 1.37-1.30 (m, 1H), 1.27-1.18 (m, 1H), 0.95 (d, J = 6.3 Hz, 3H), 0.90 (d, J = 7.4 Hz, 3H), 0.89-0.86 (m, 1H).

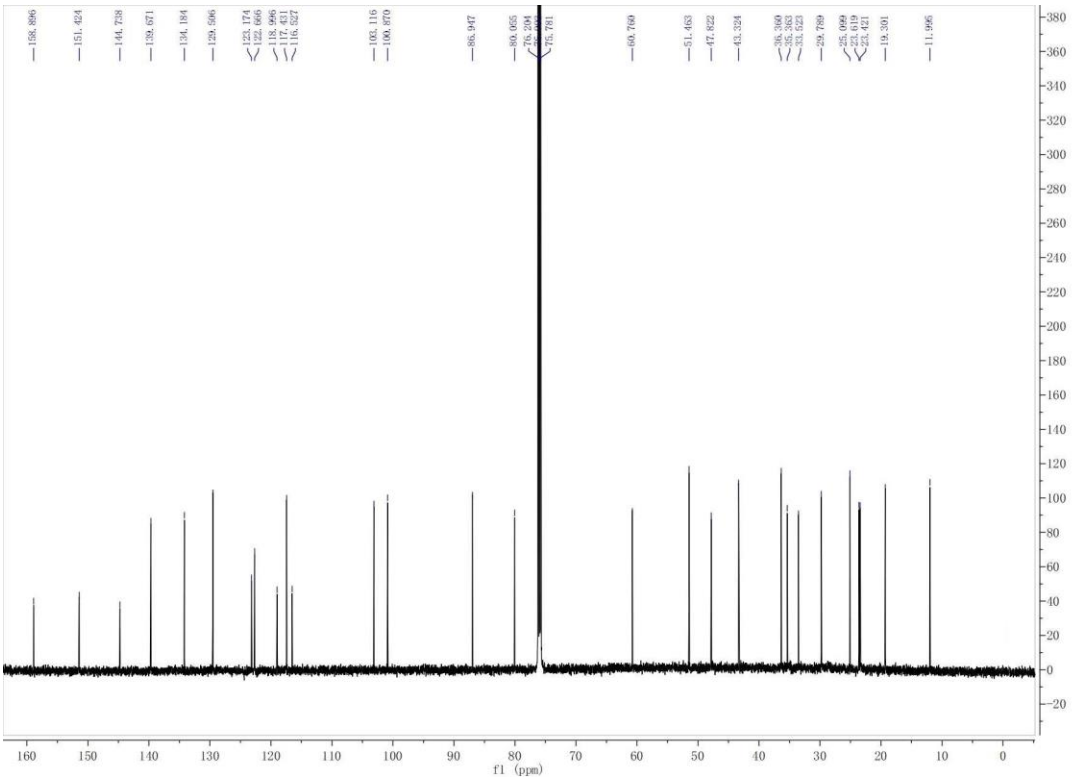
Compound **1a**



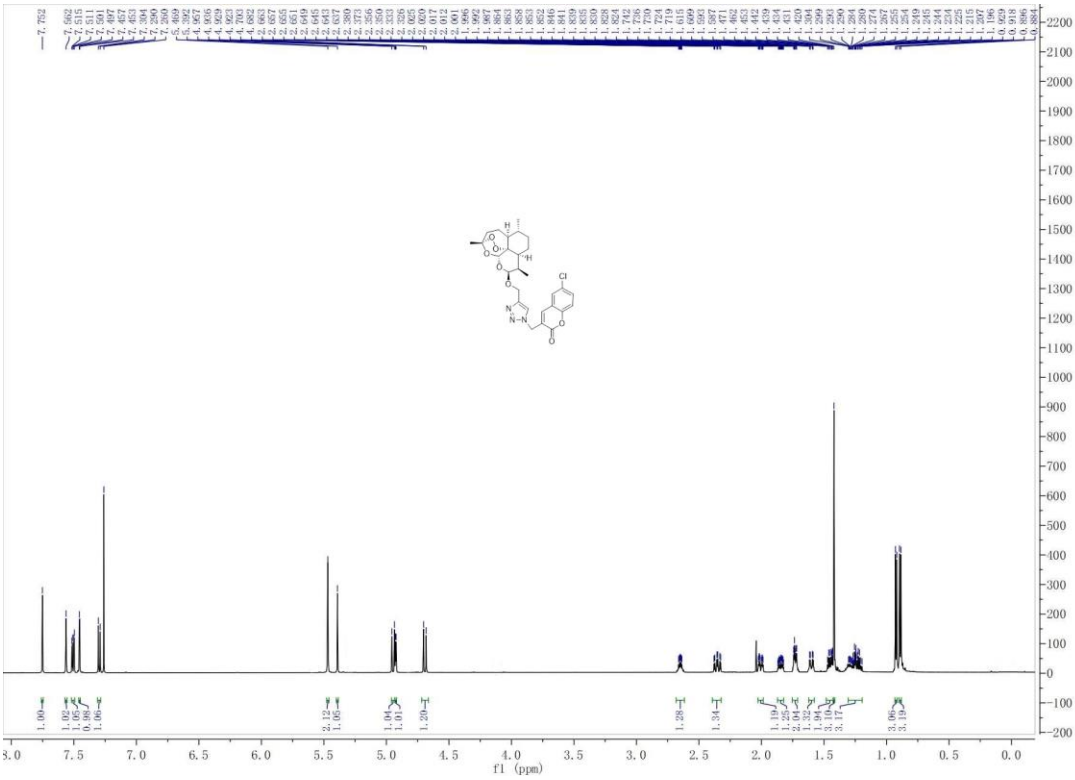


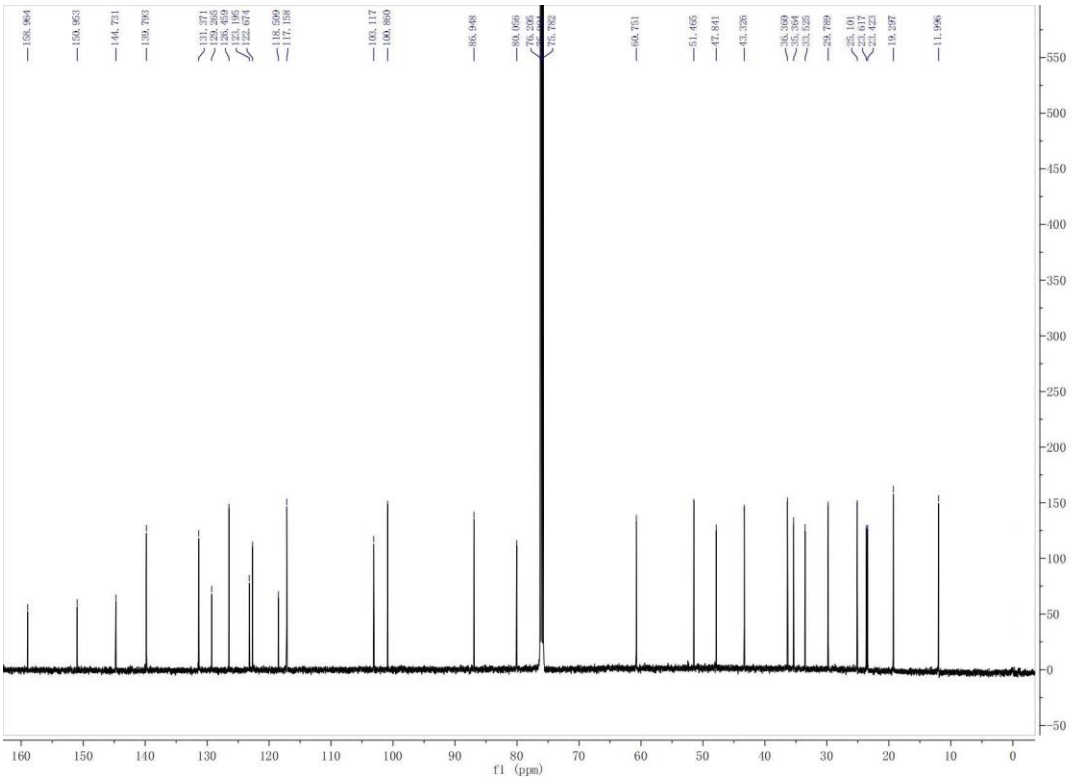
Compound **1b**



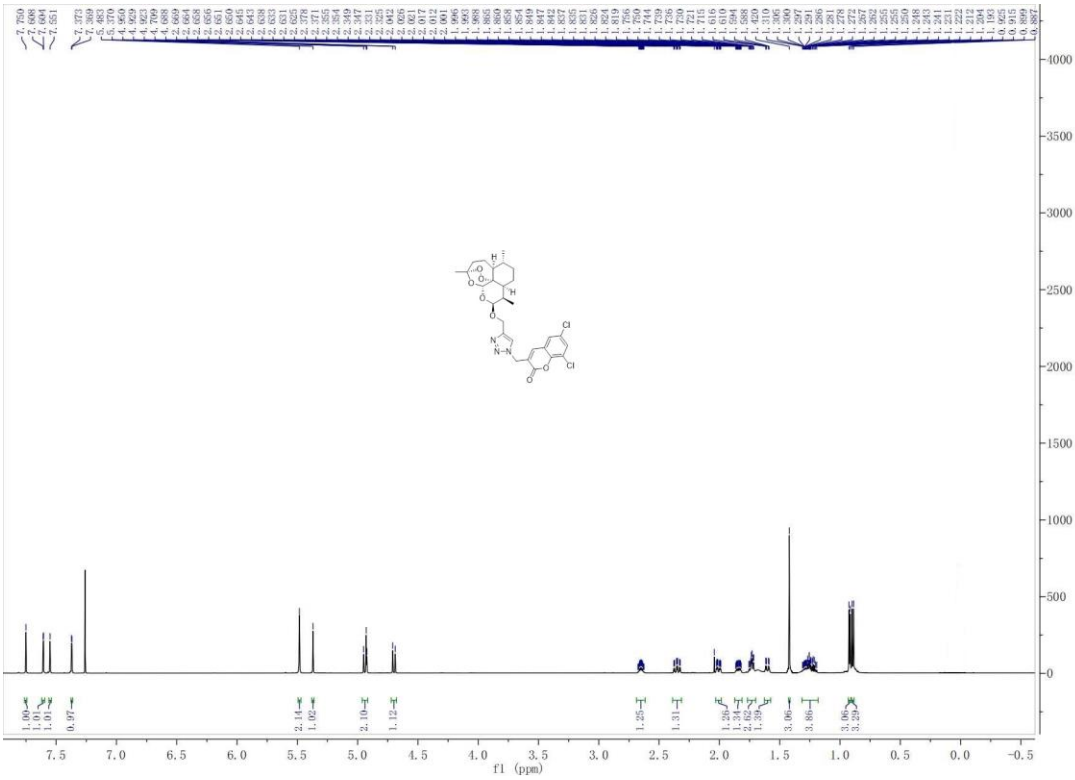


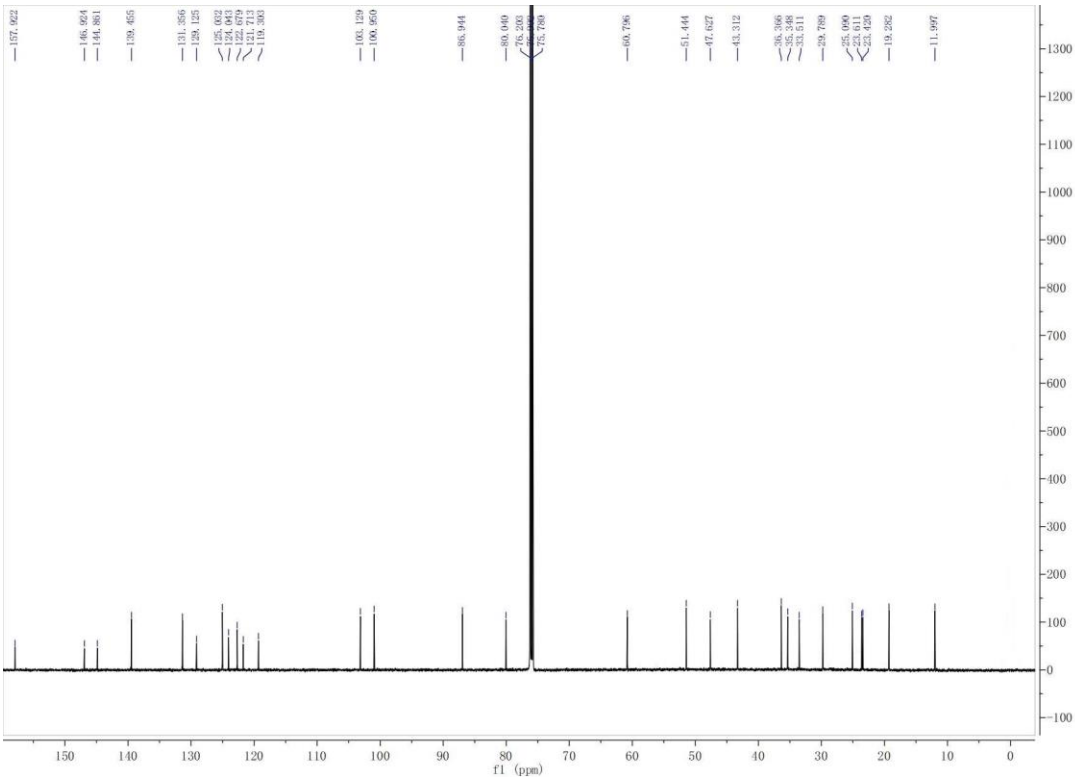
Compound **1c**



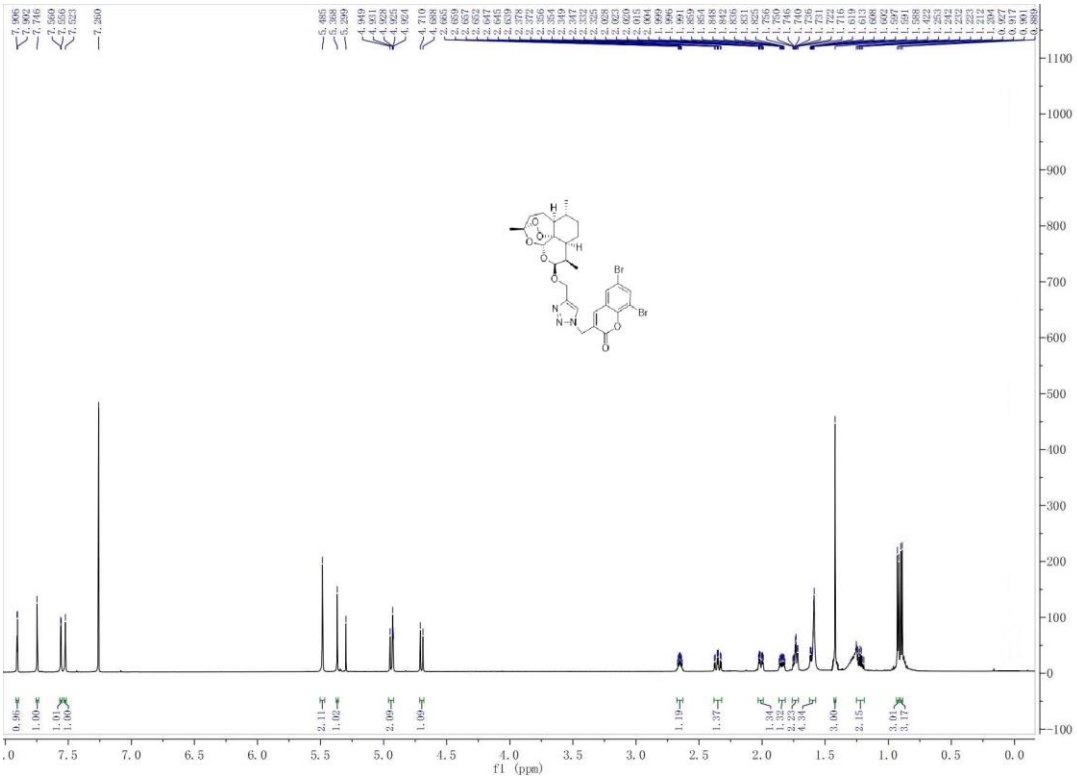


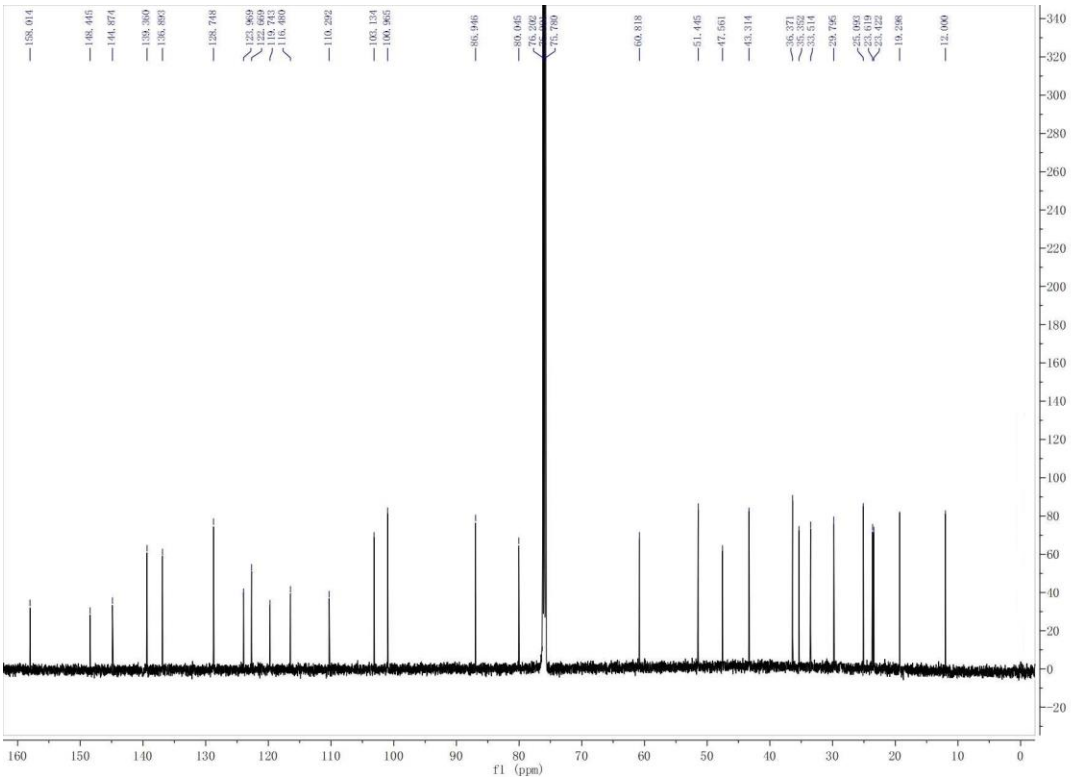
Compound **1d**



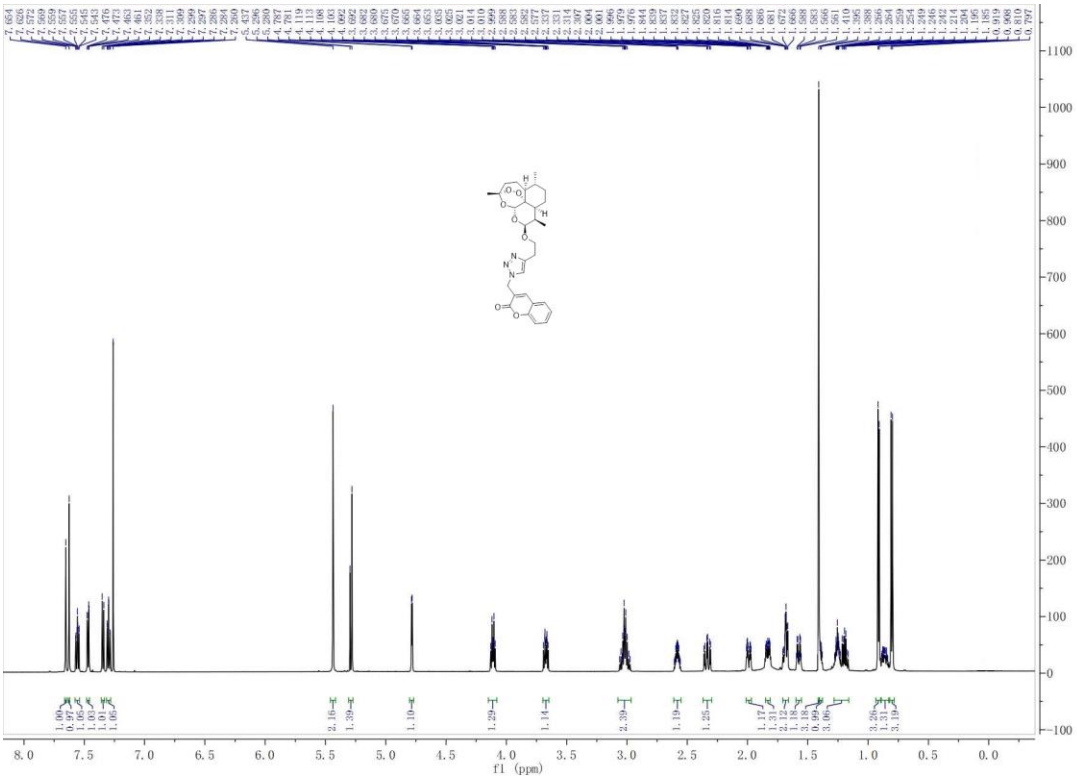


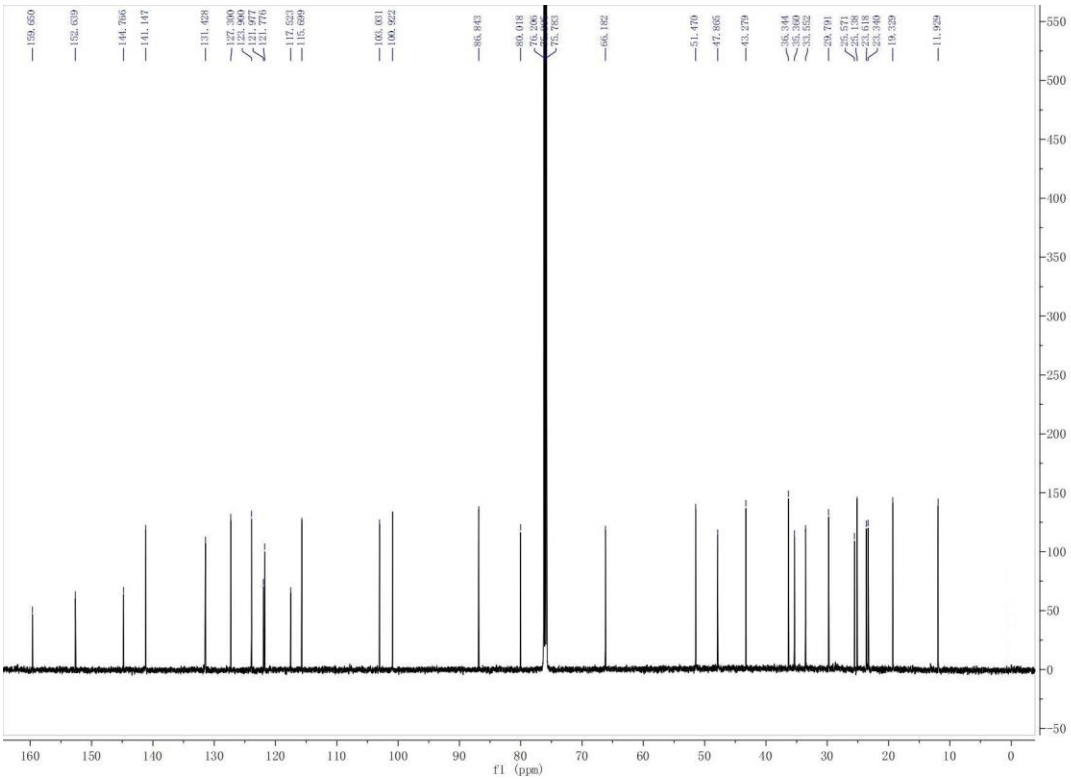
Compound **1e**



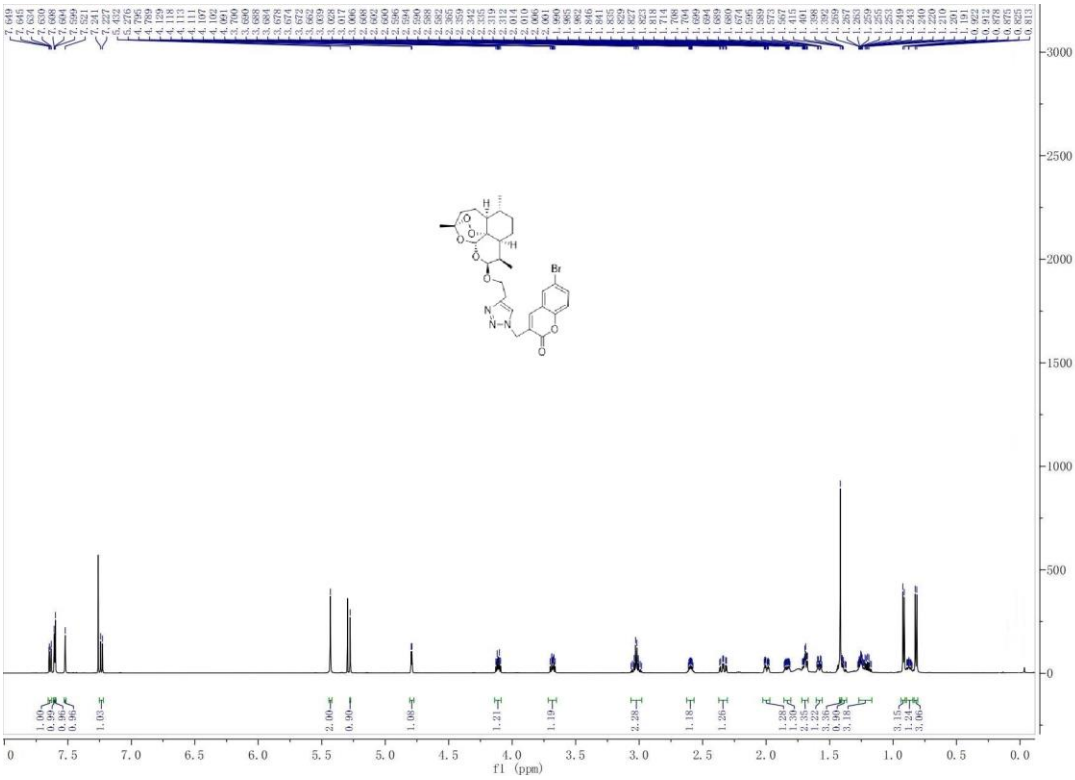


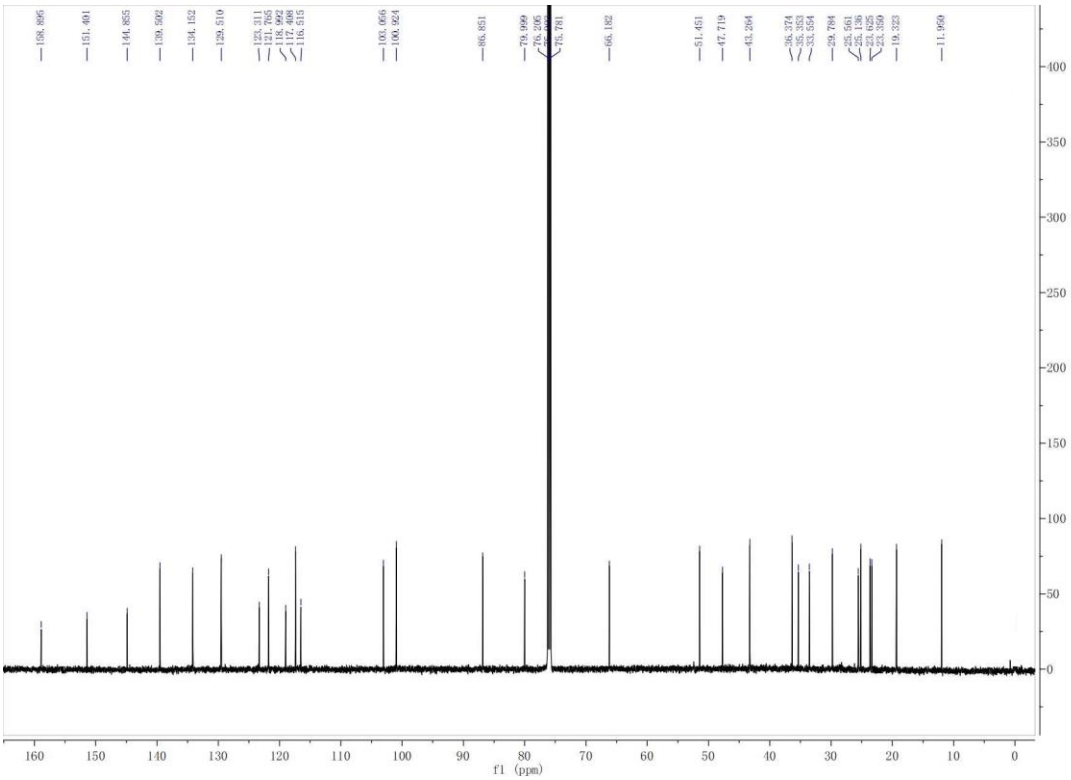
Compound **2a**



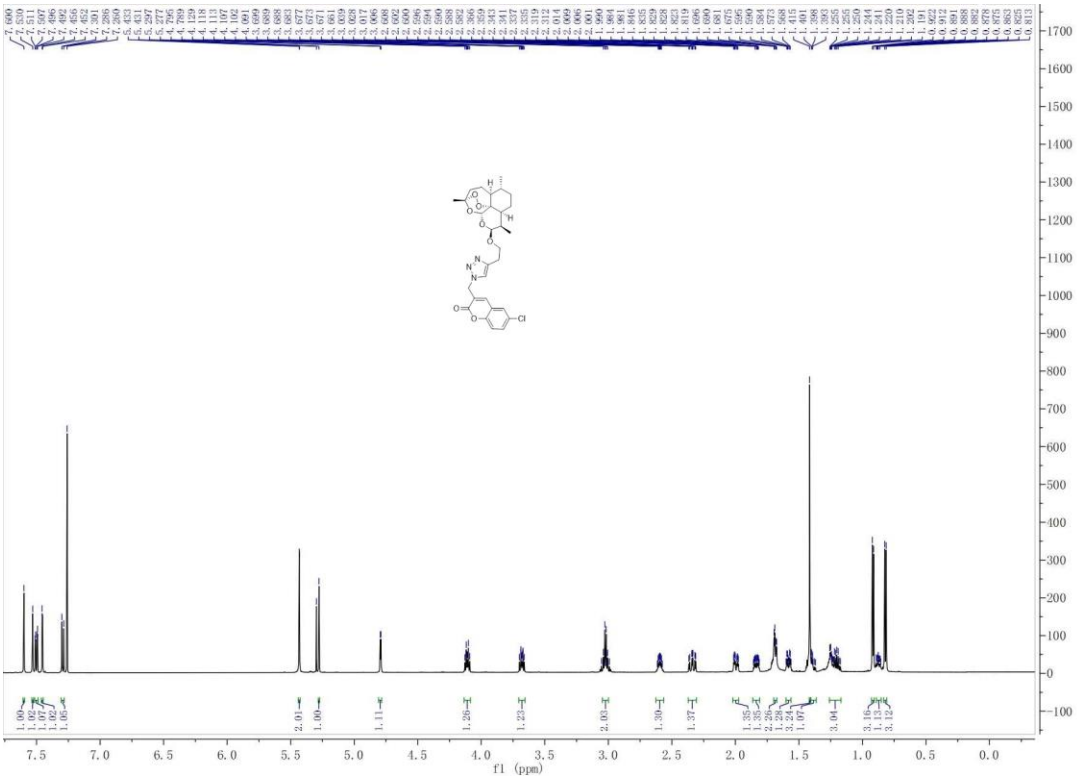


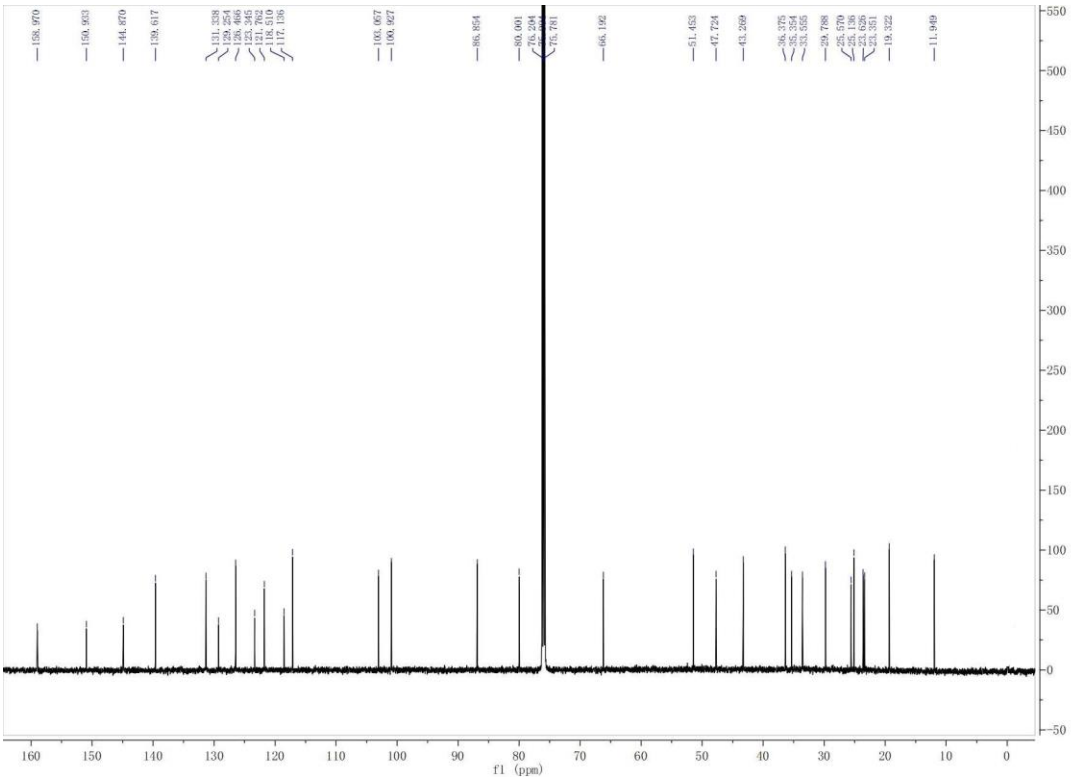
Compound **2b**



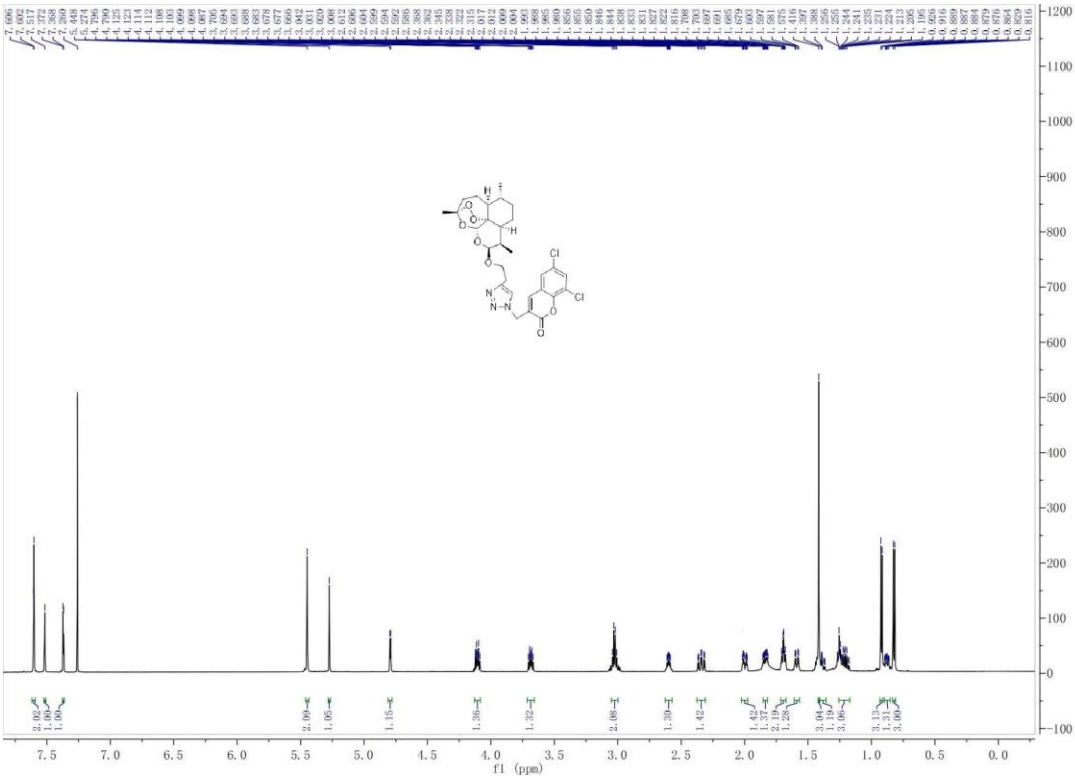


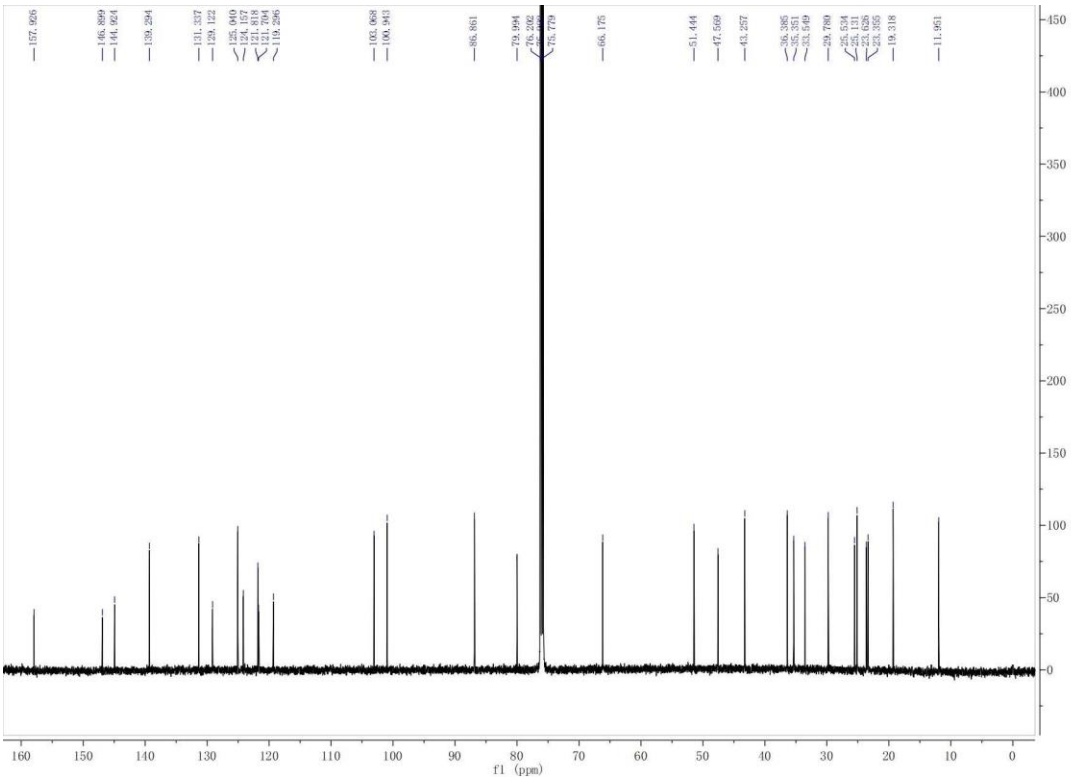
Compound **2c**



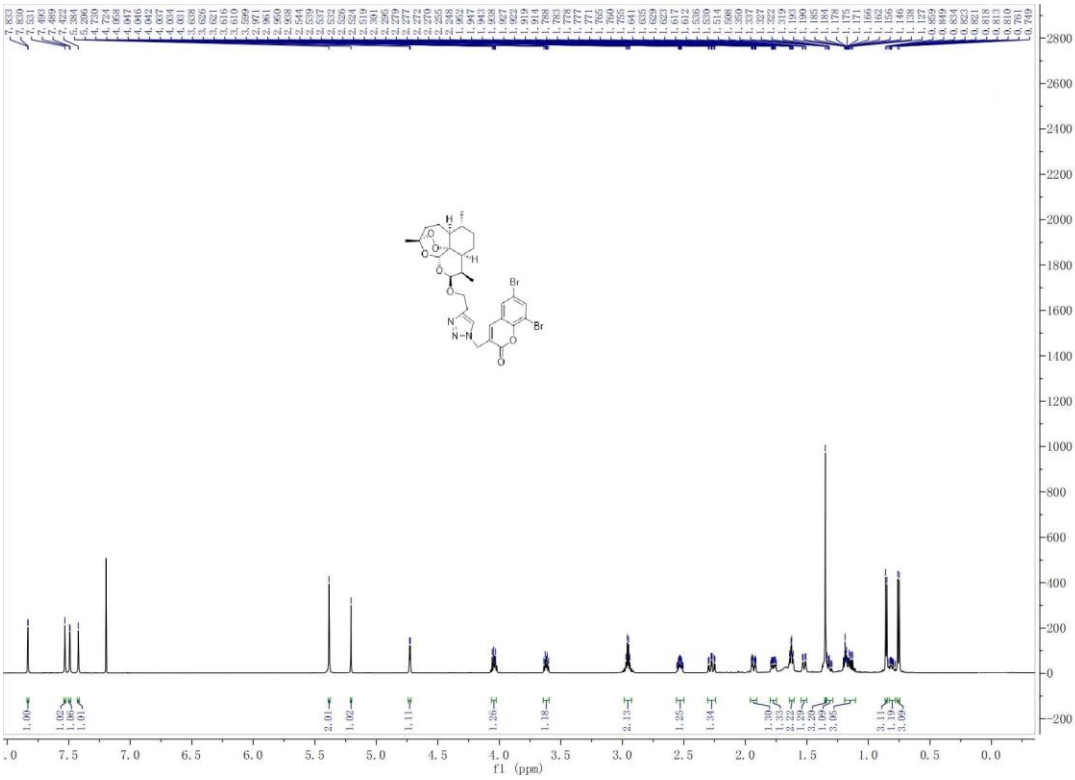


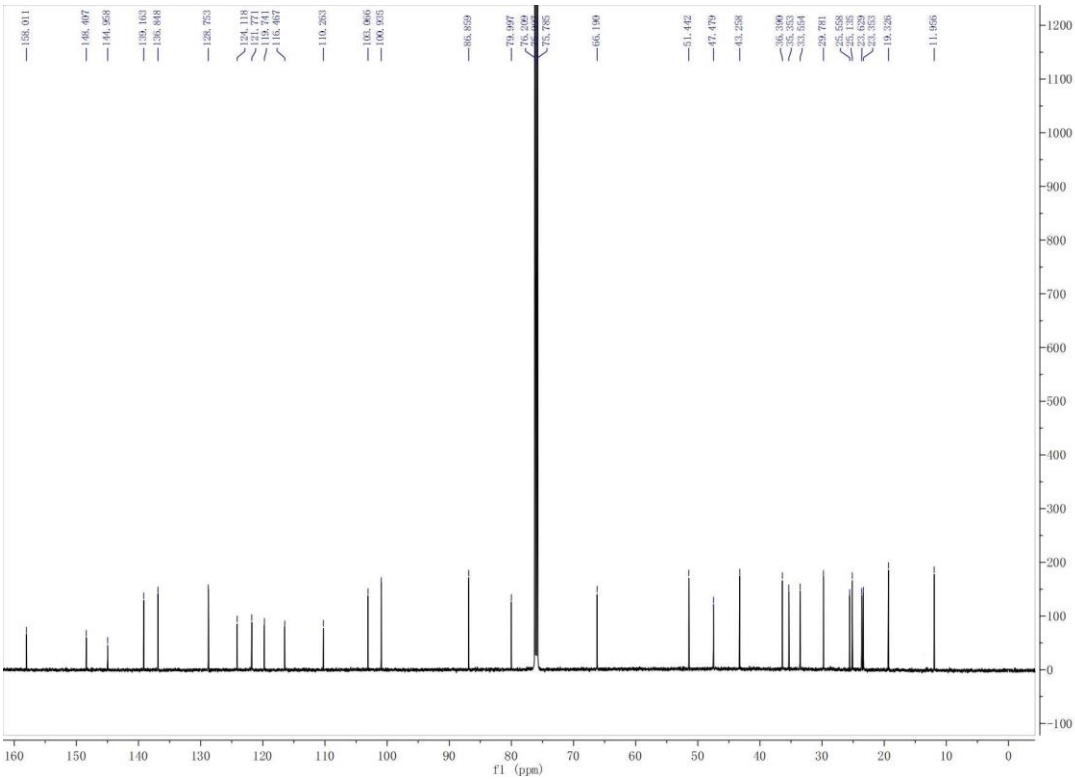
Compound **2d**



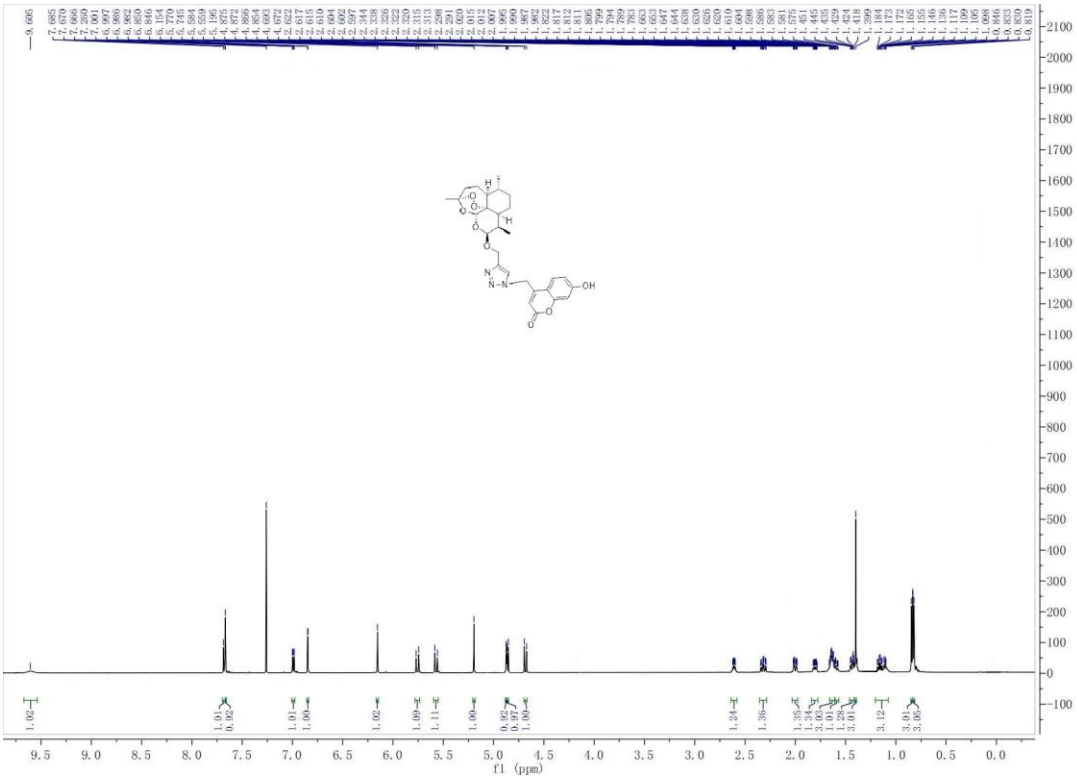


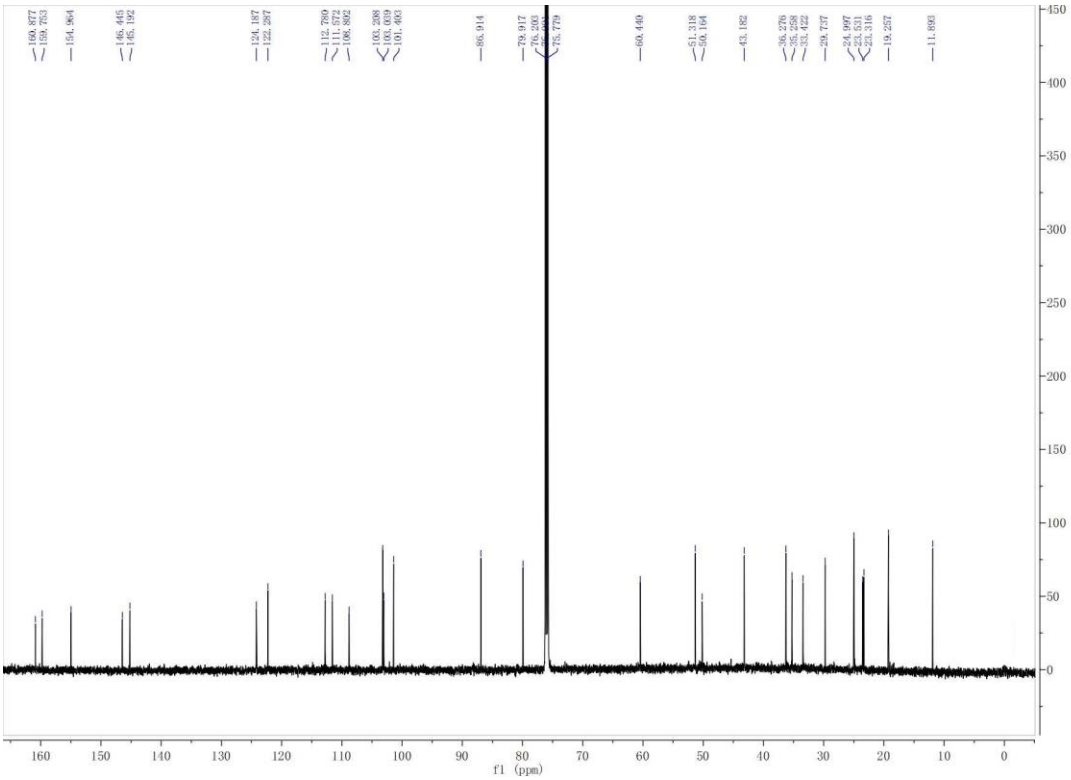
Compound **2e**



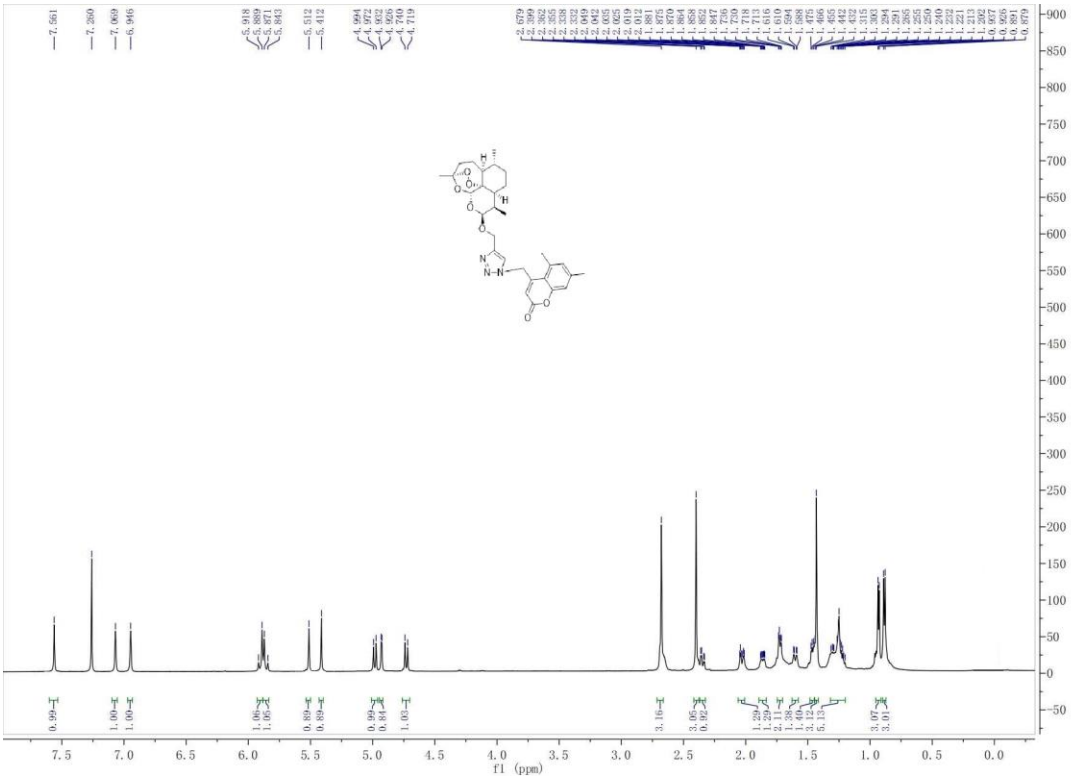


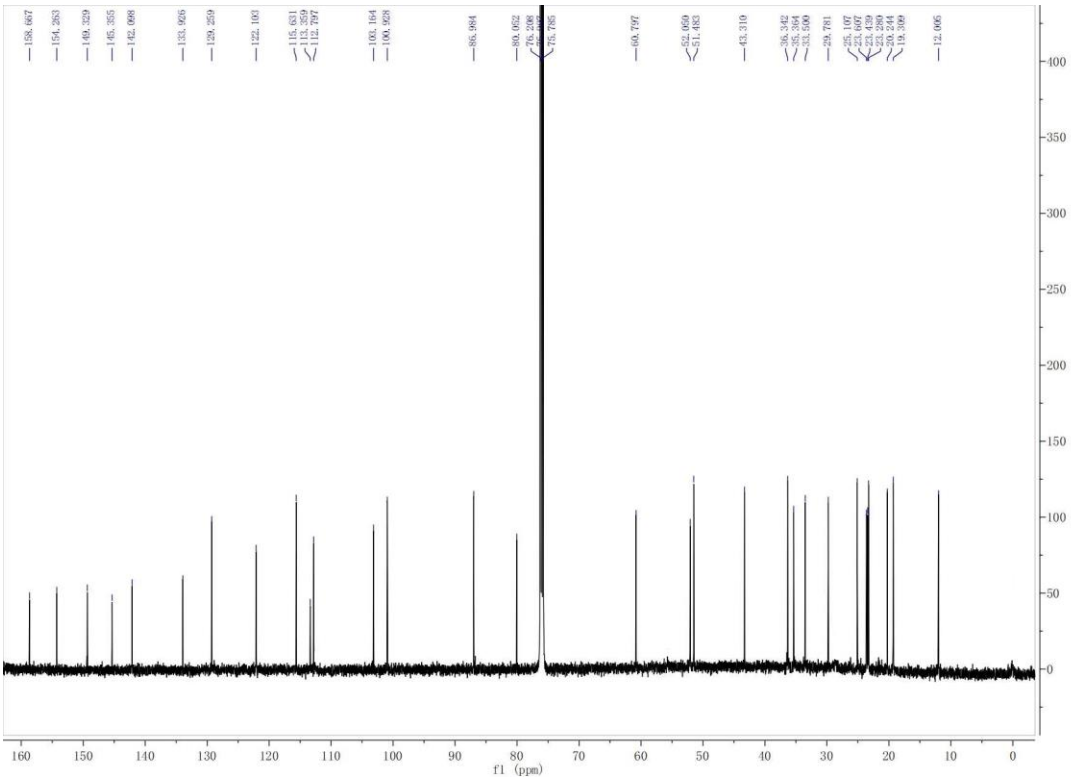
Compound **3f**



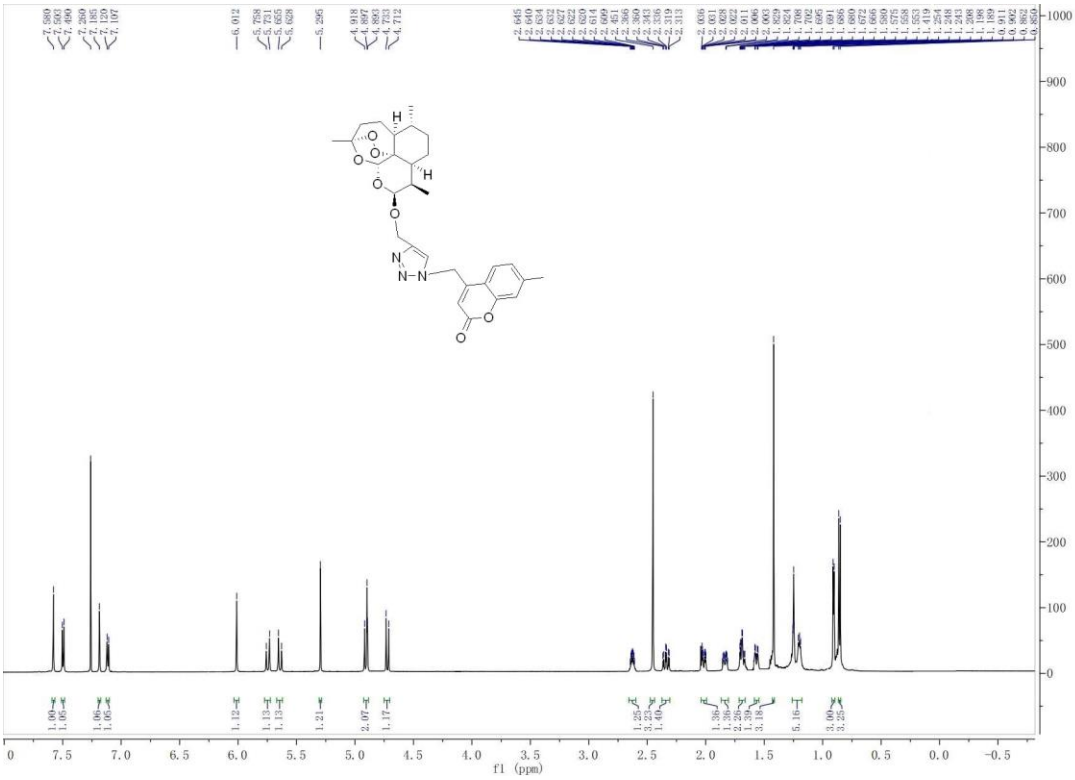


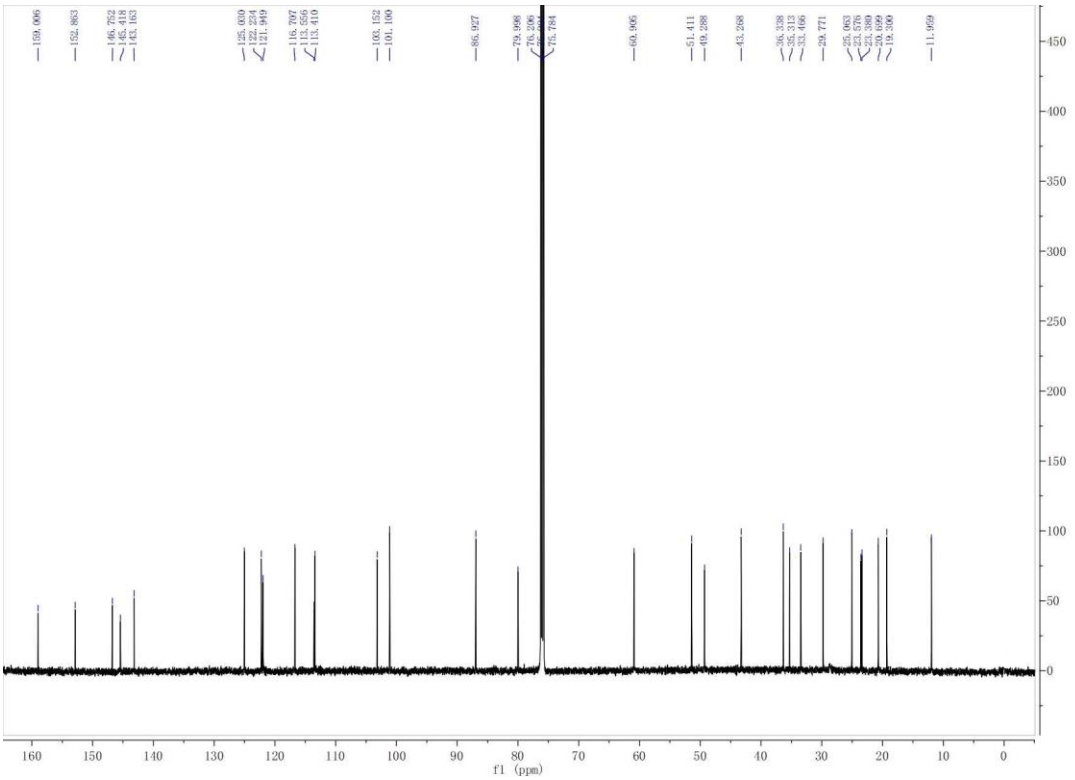
Compound **3g**



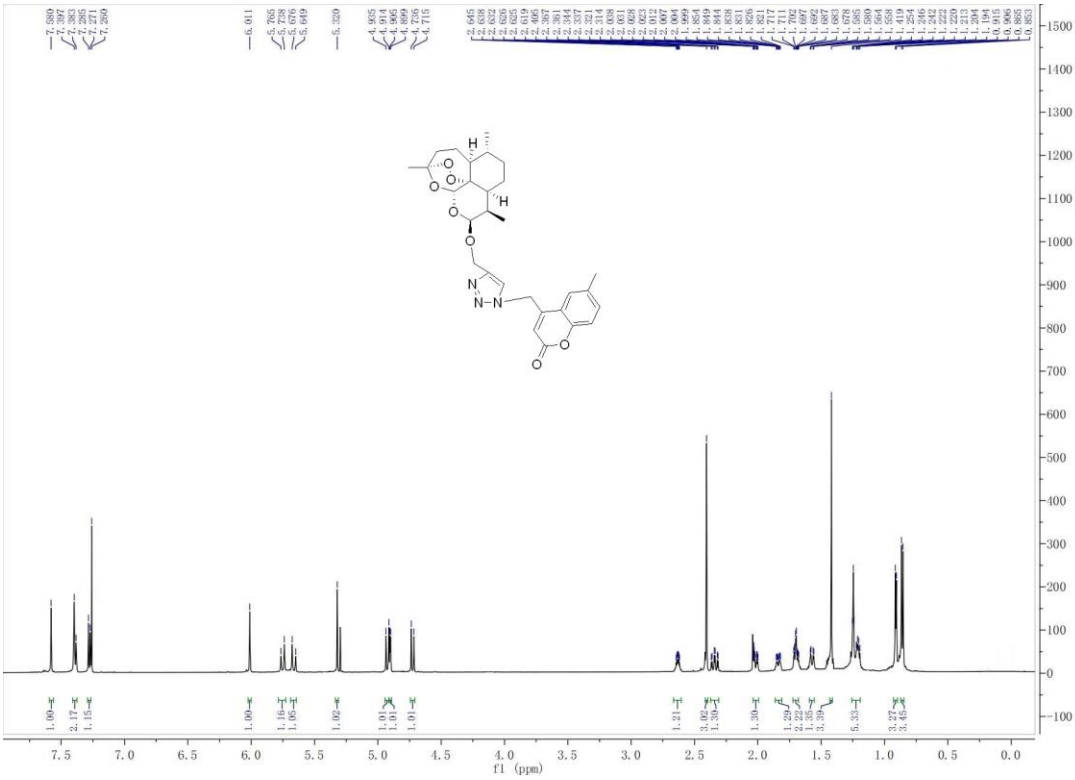


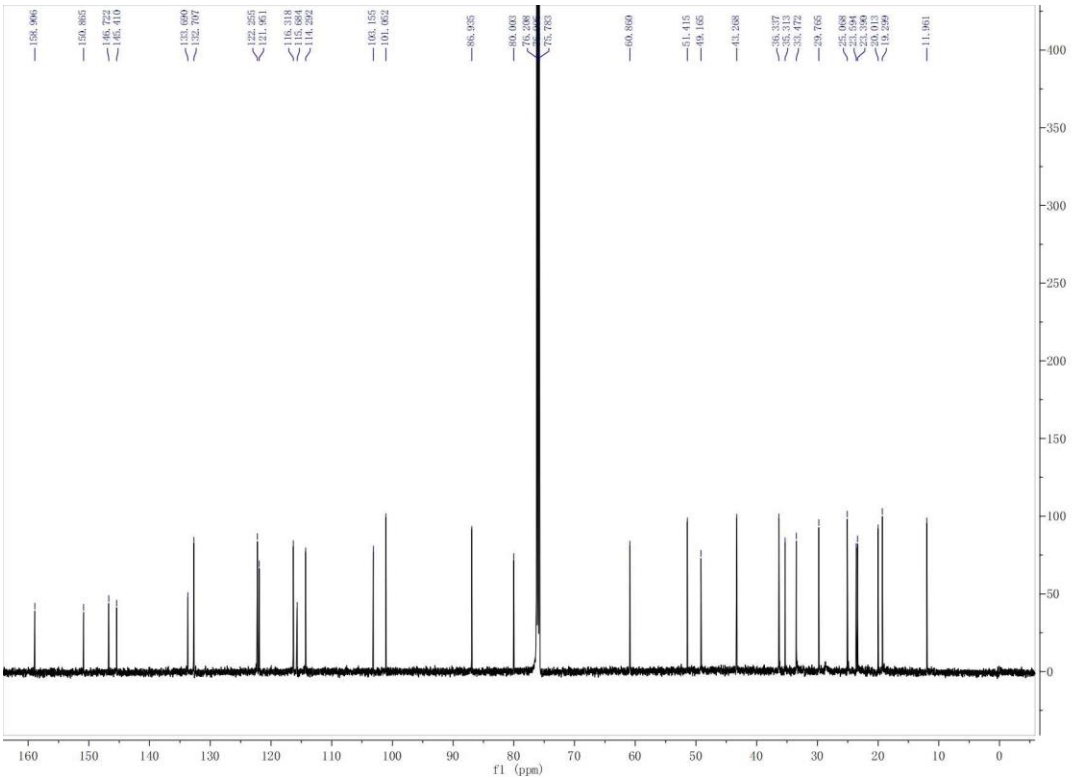
Compound **3h**





Compound **3i**





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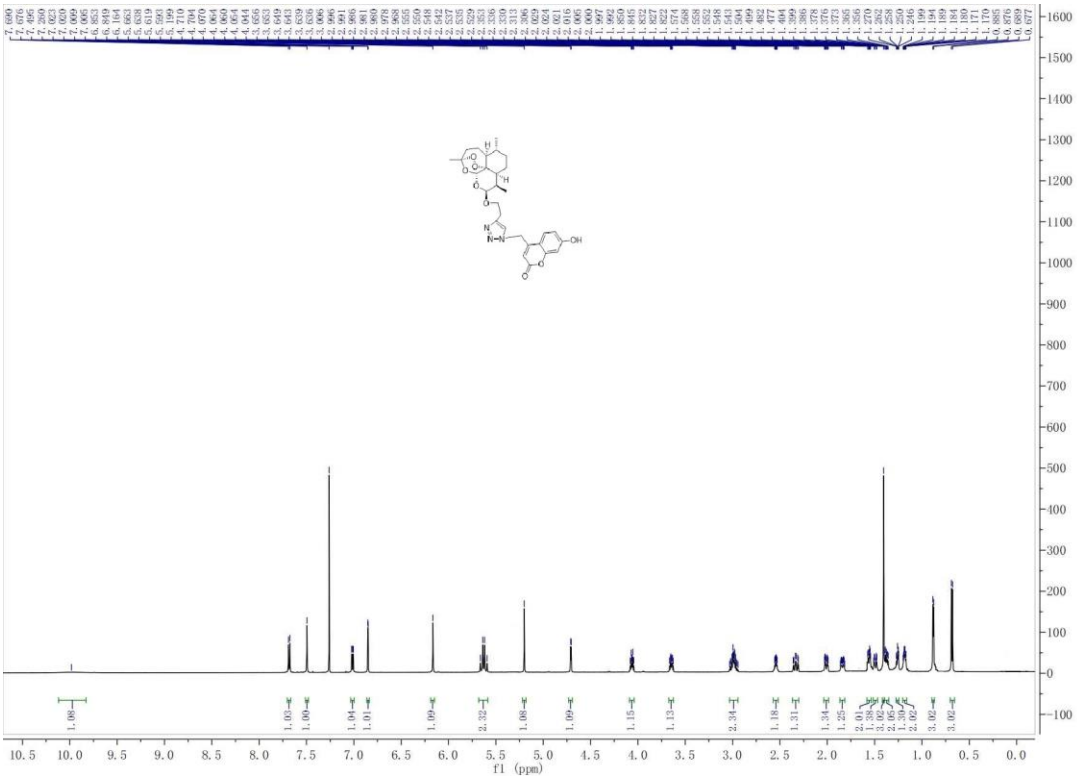
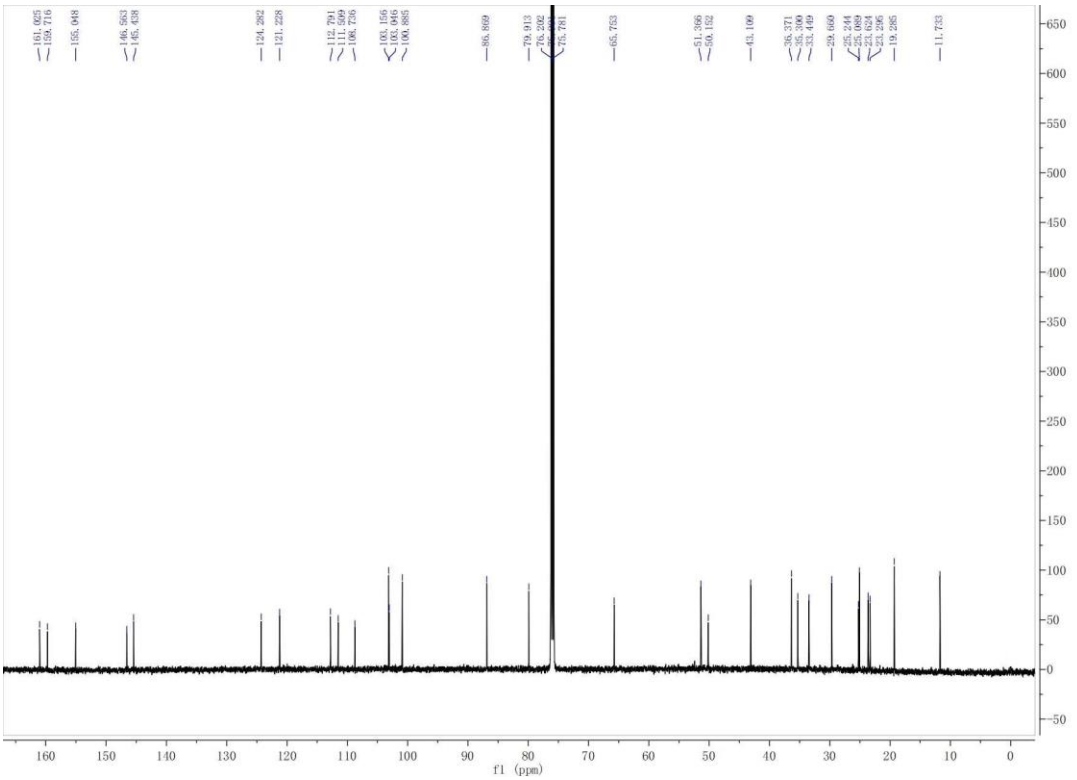
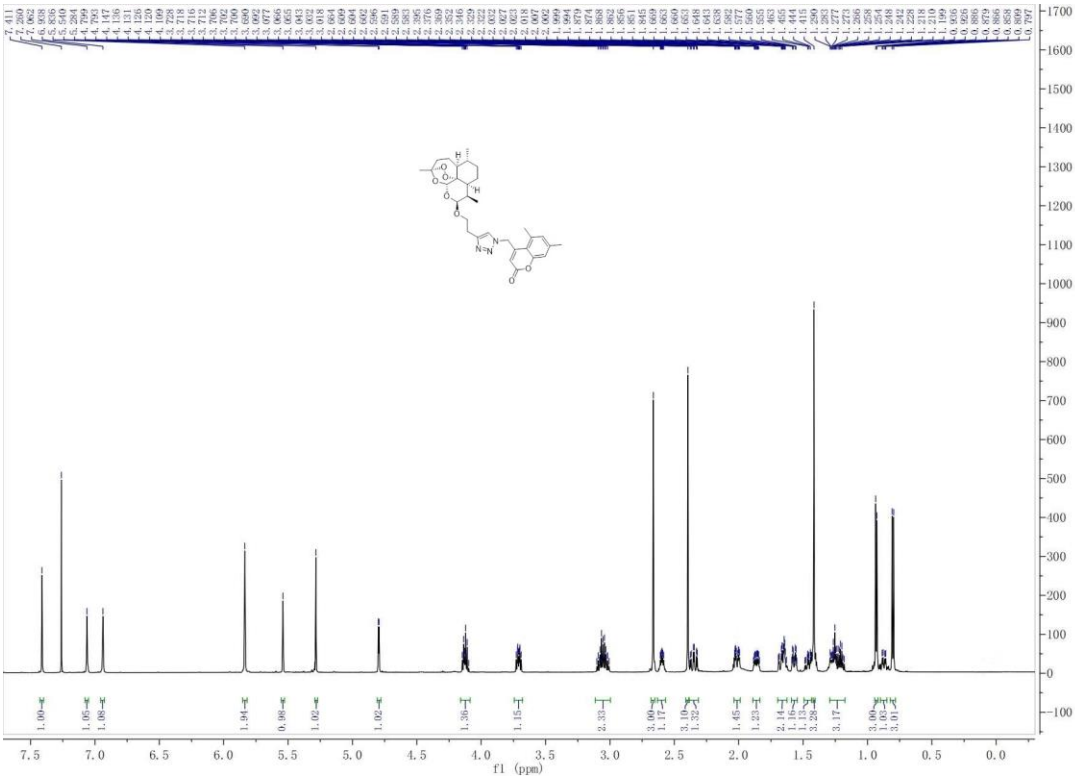
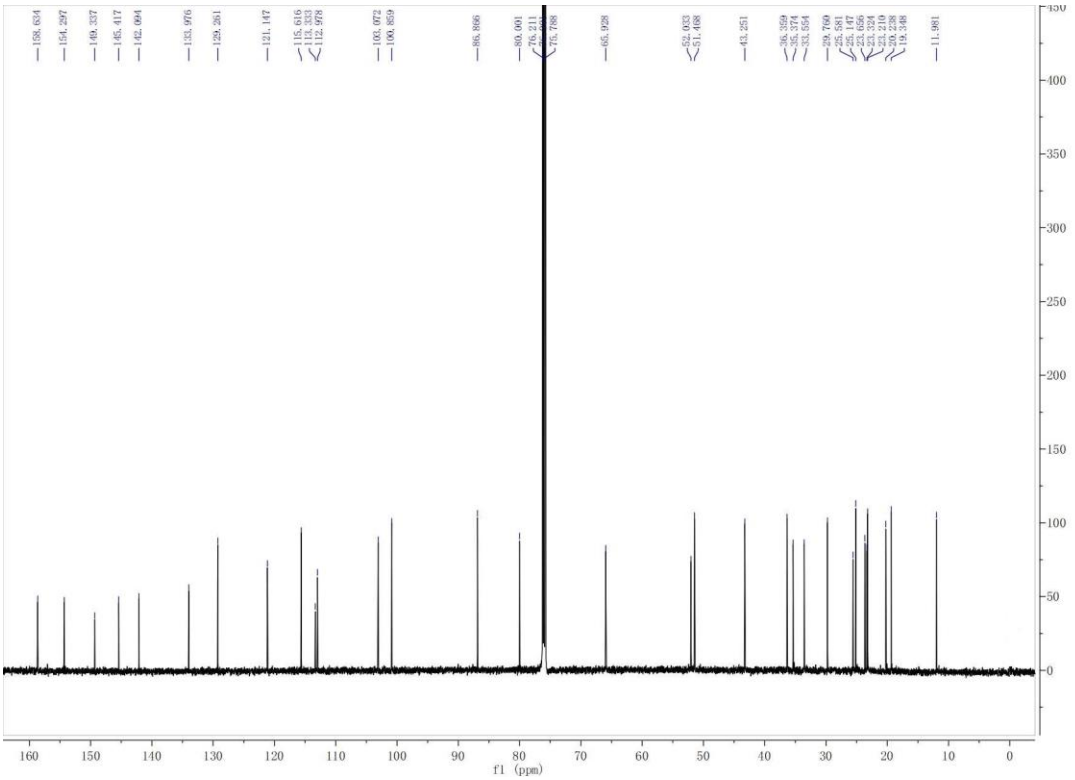


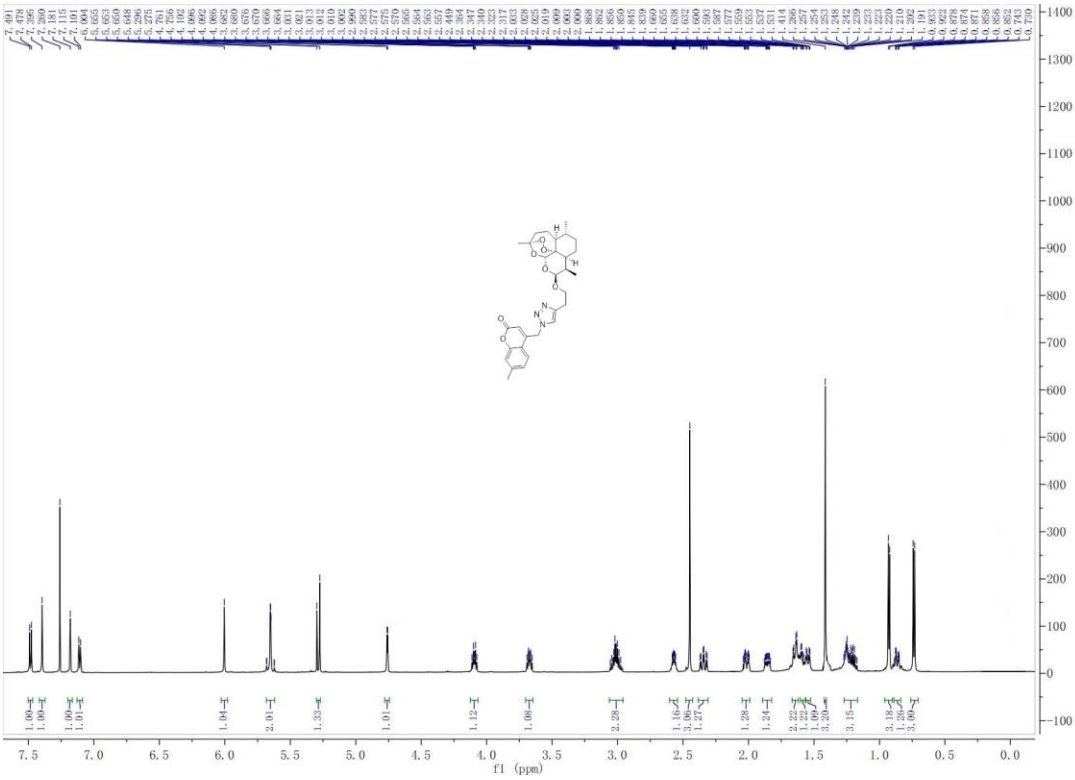


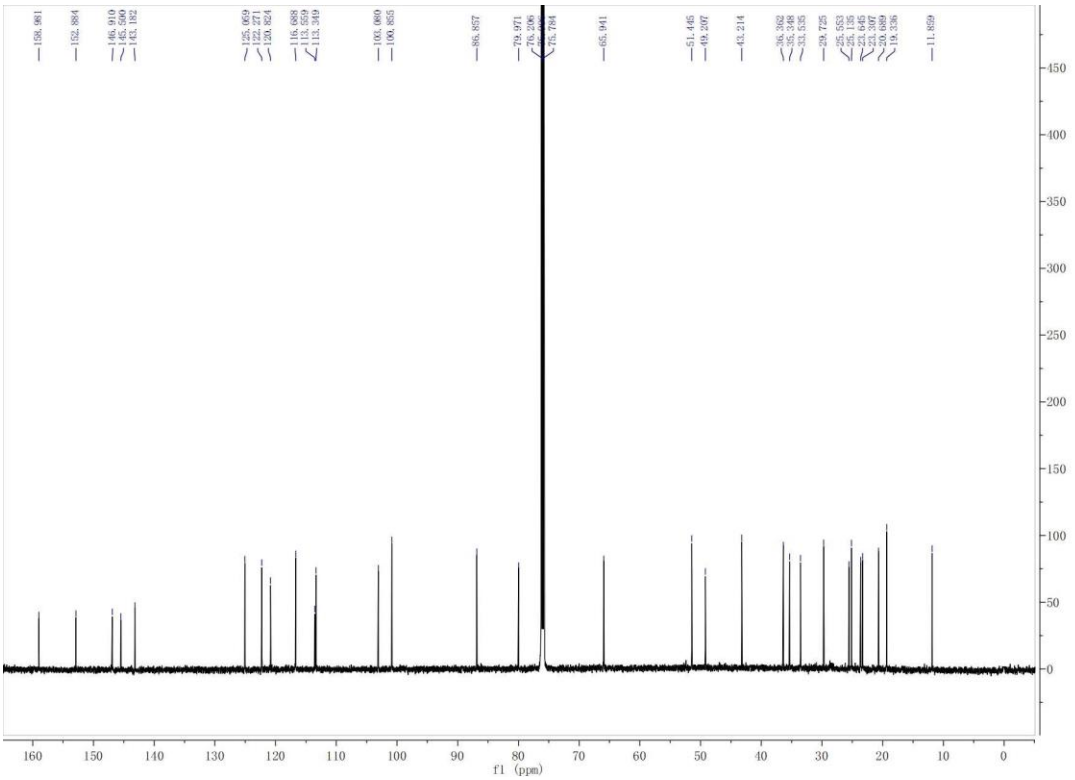
Compound **4g**



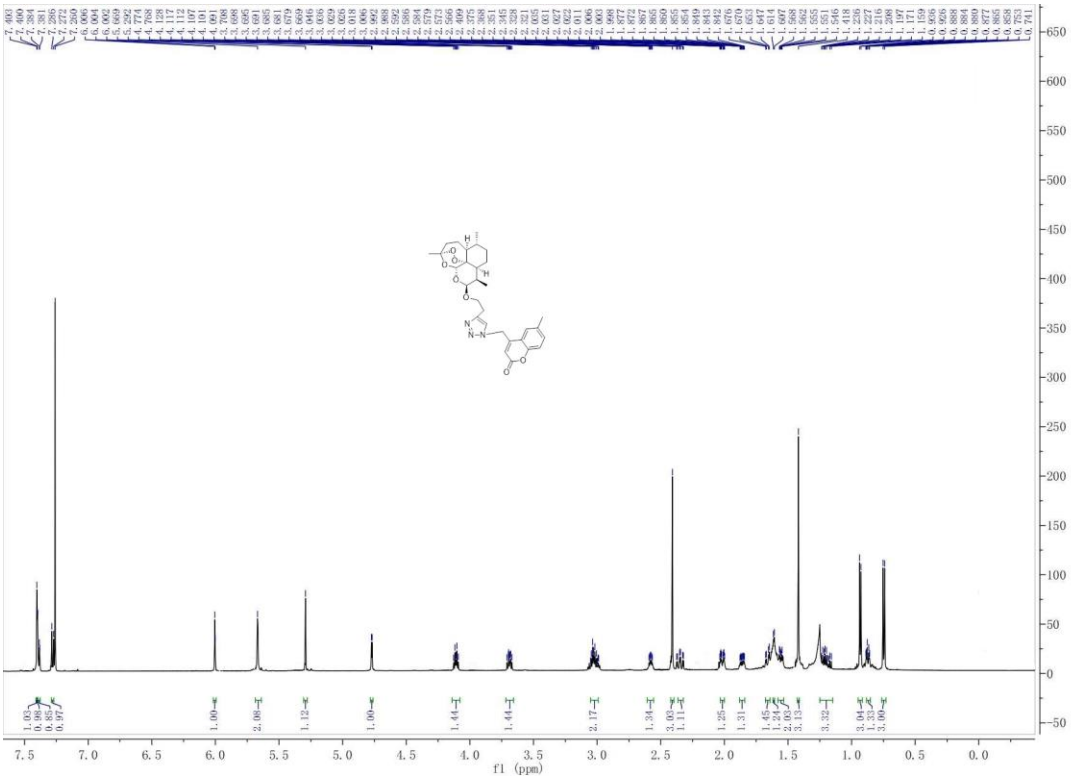


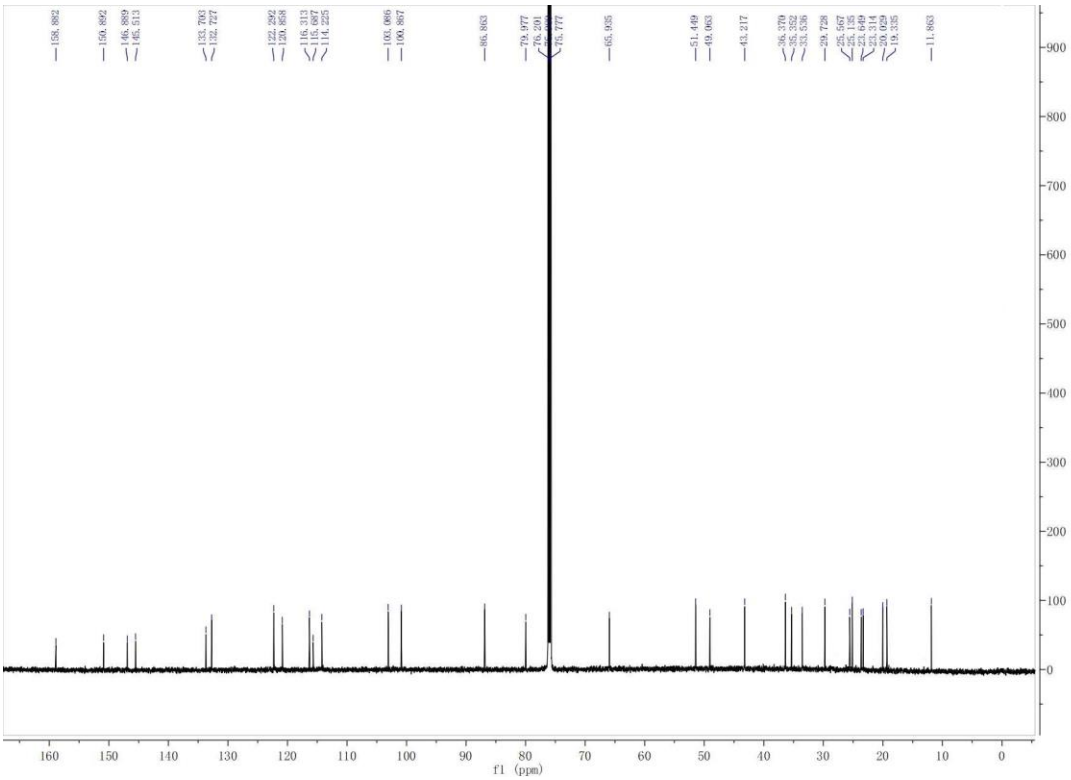
Compound **4h**



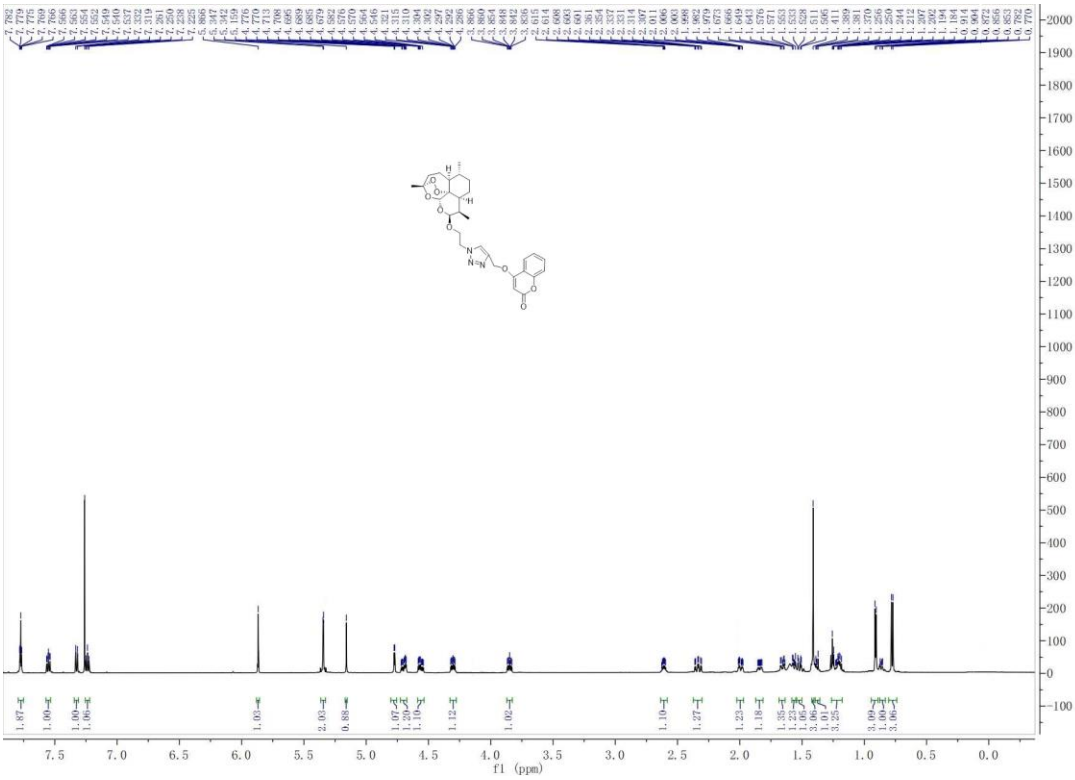


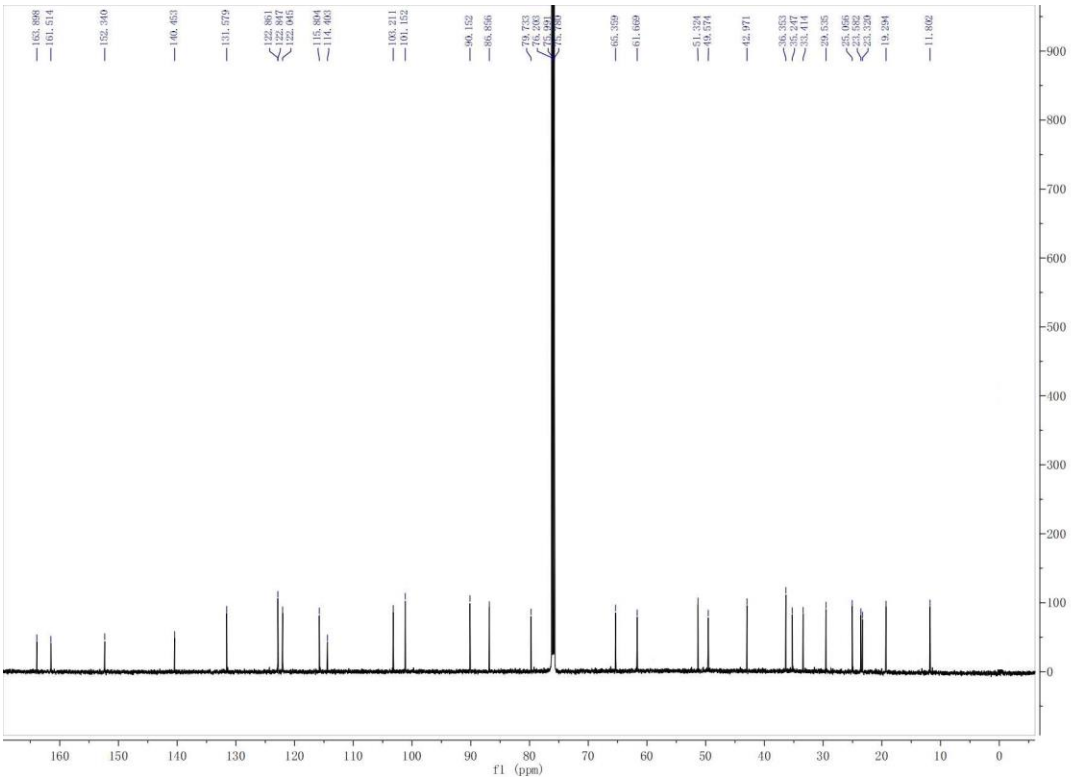
Compound **4i**



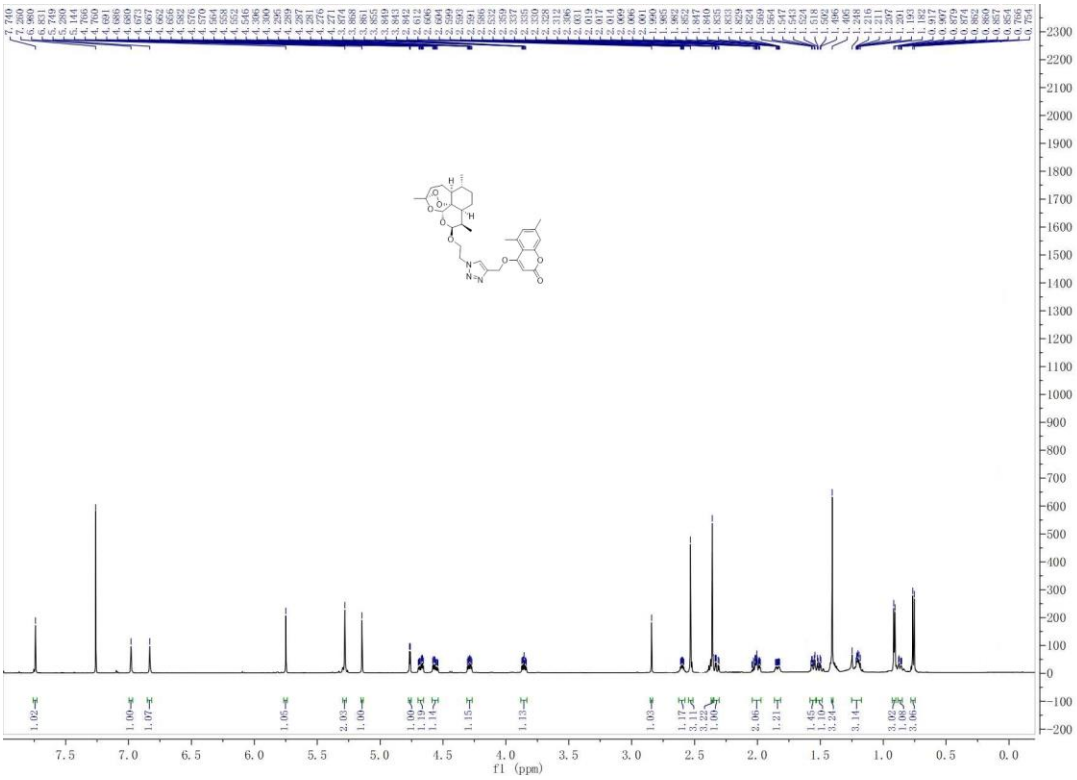


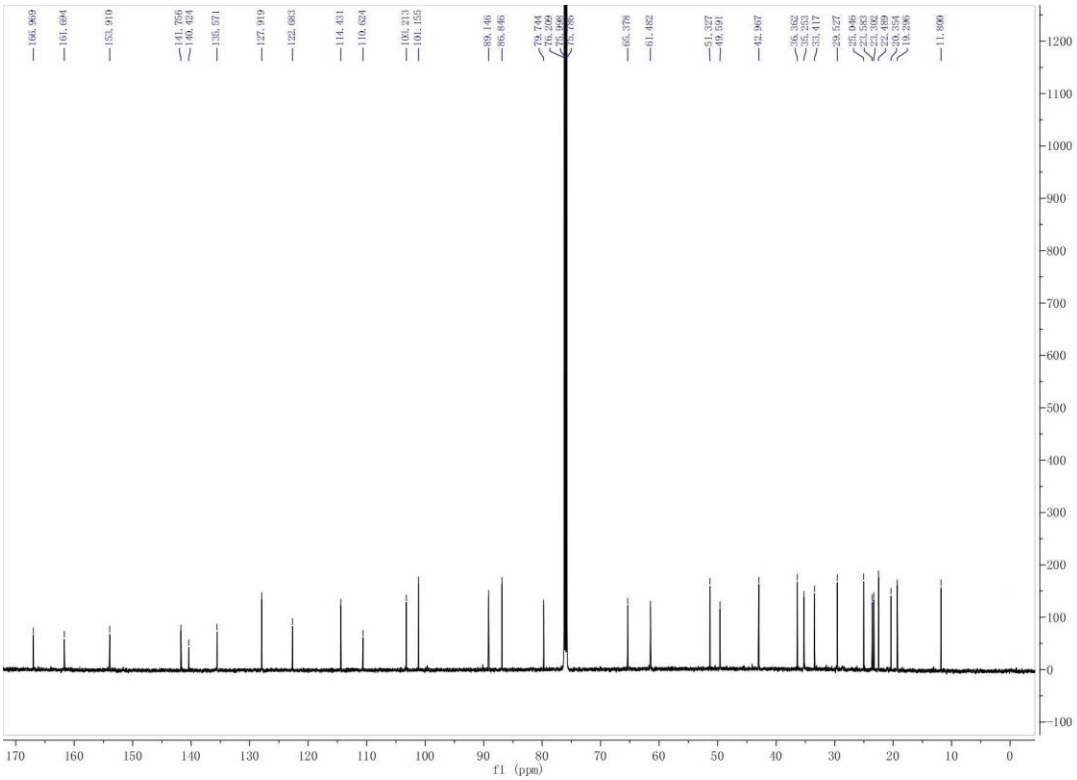
Compound **5j**



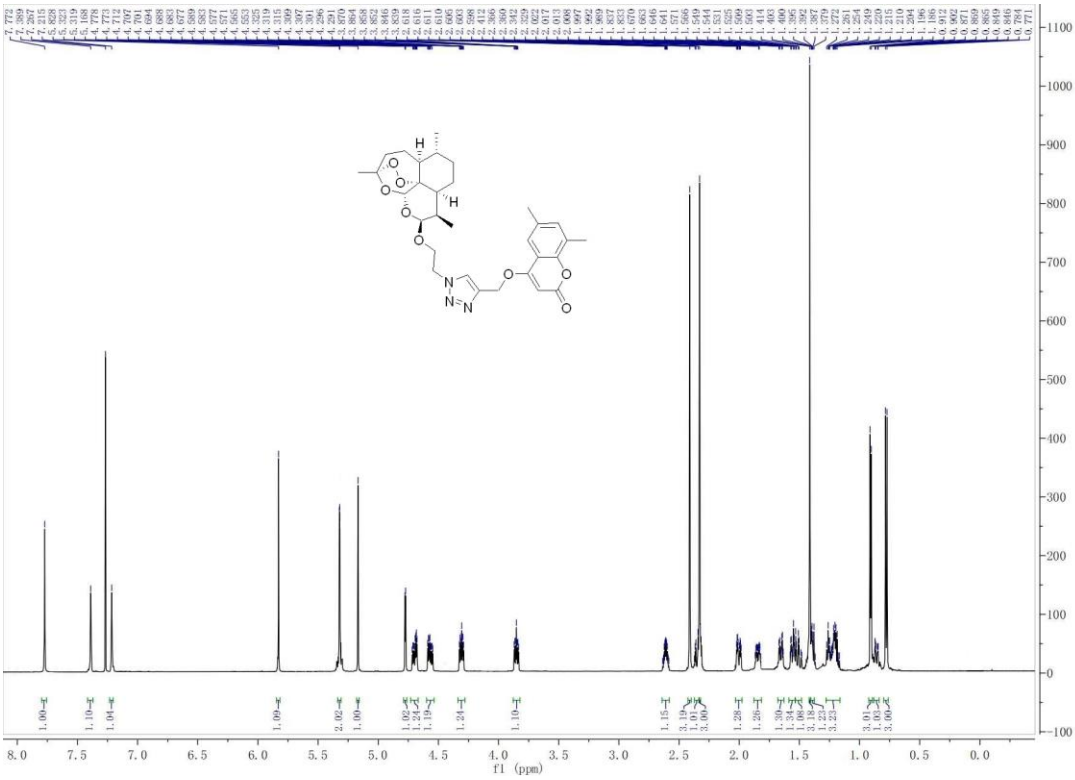


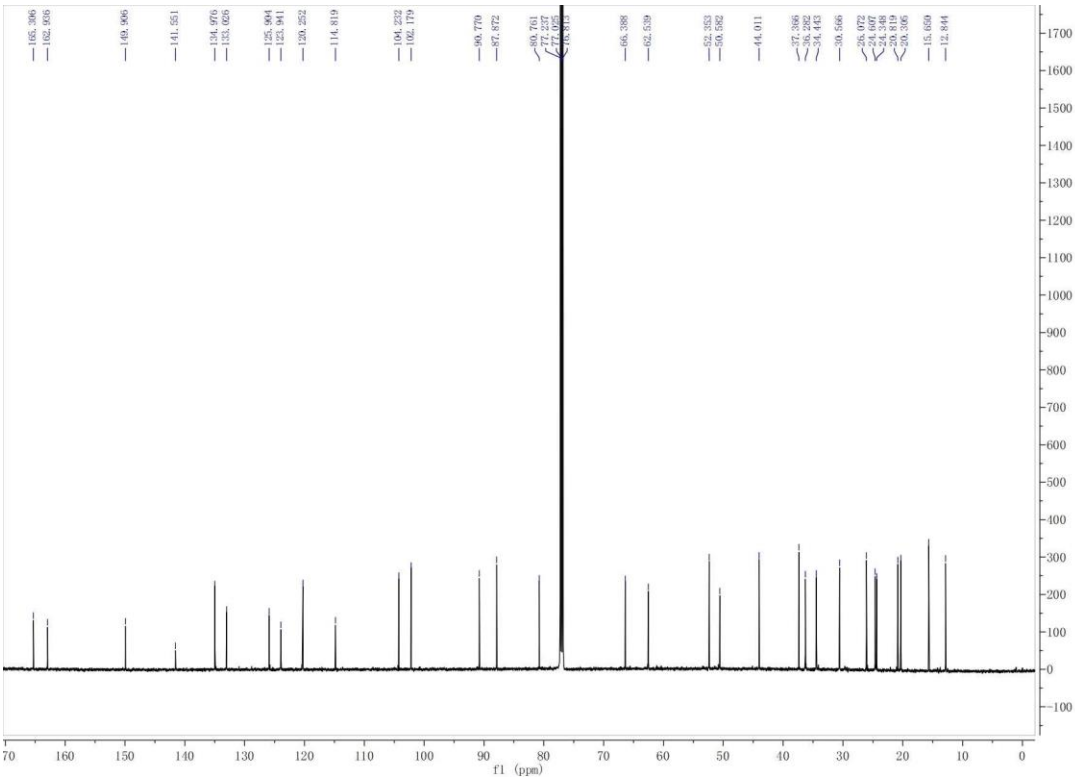
Compound **5l**



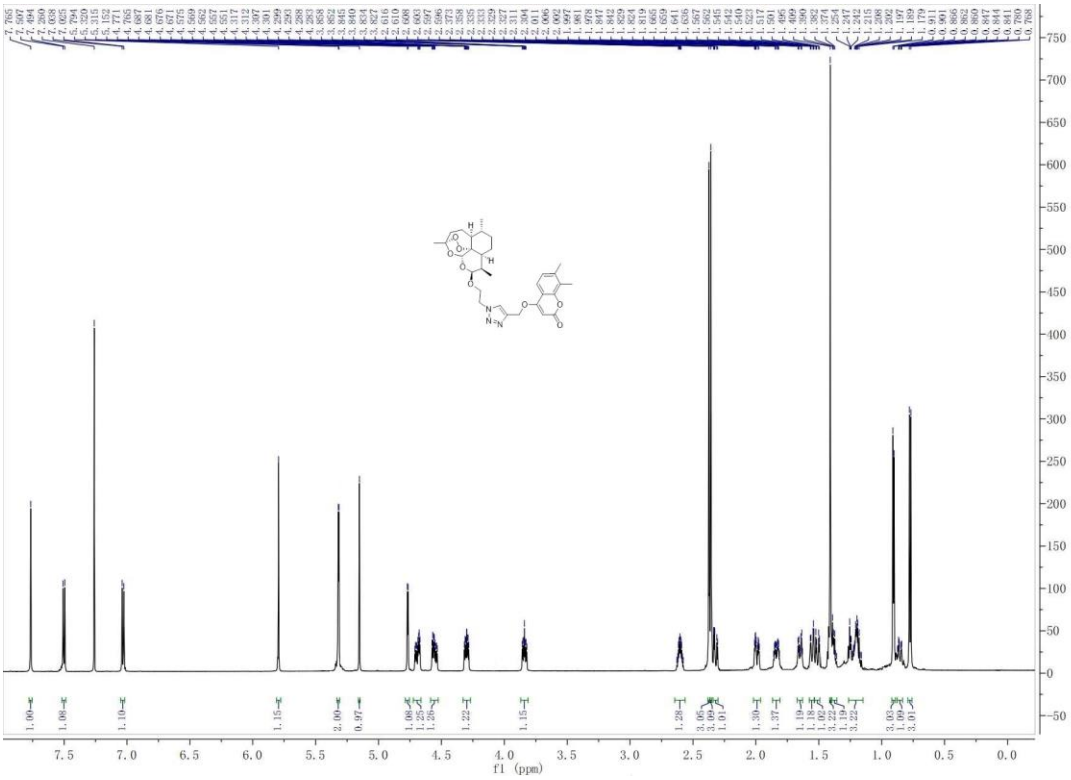


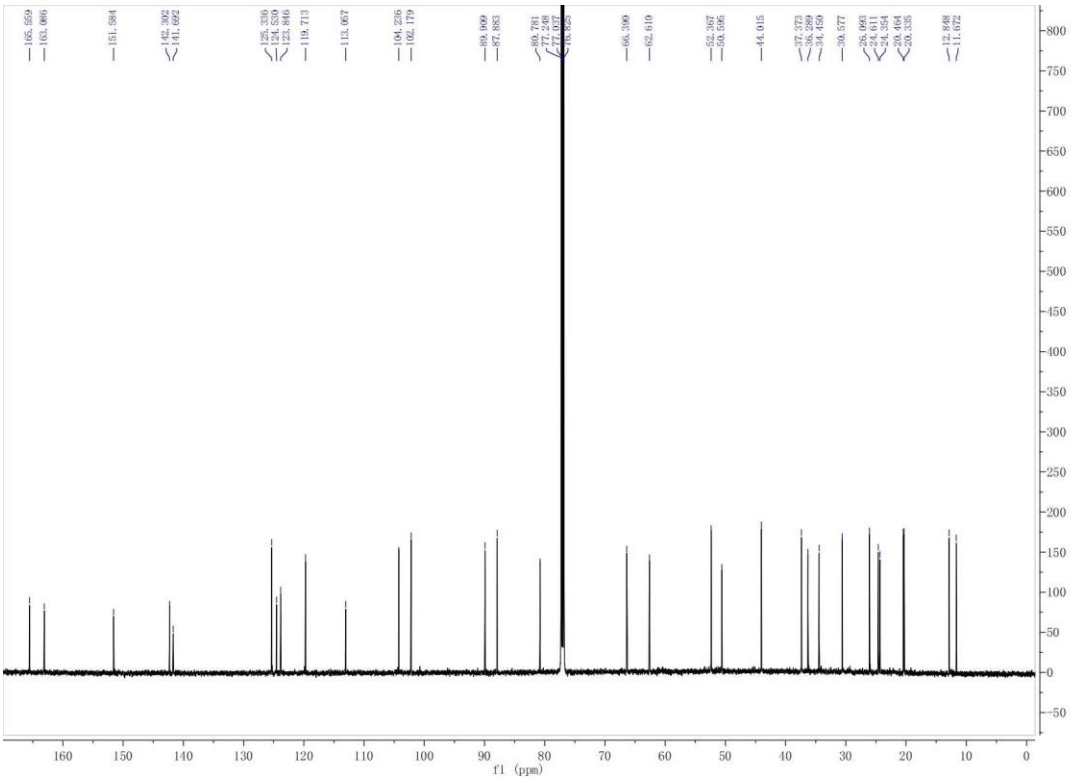
Compound **5m**



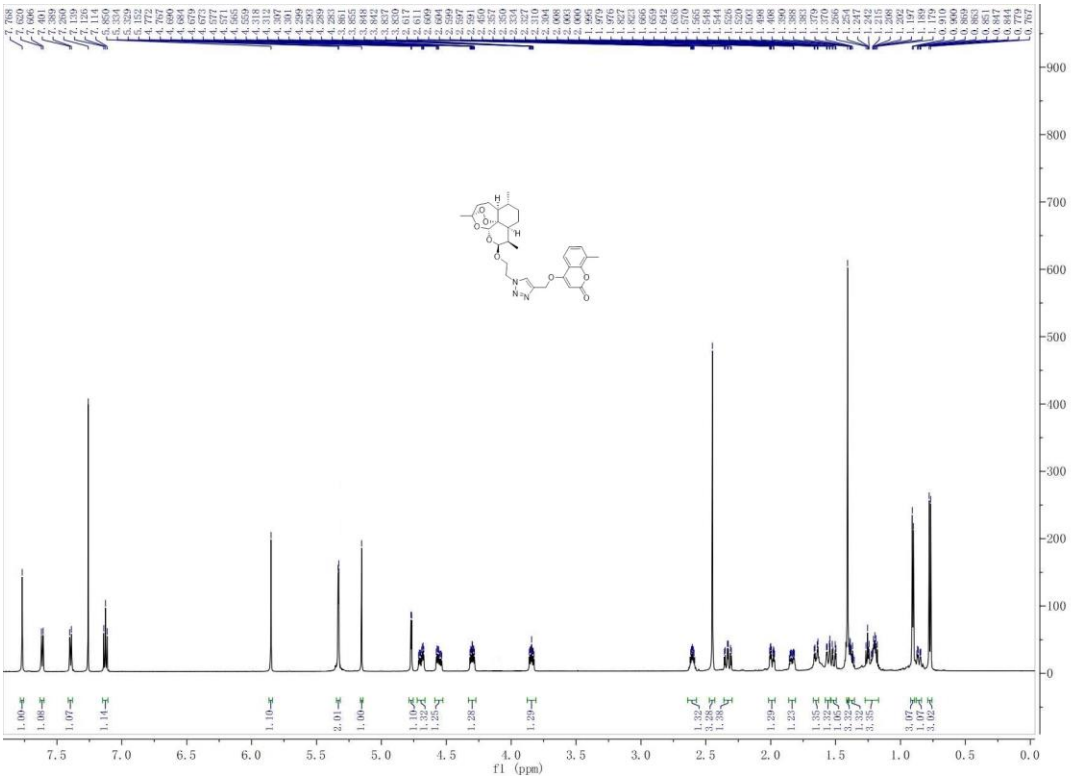


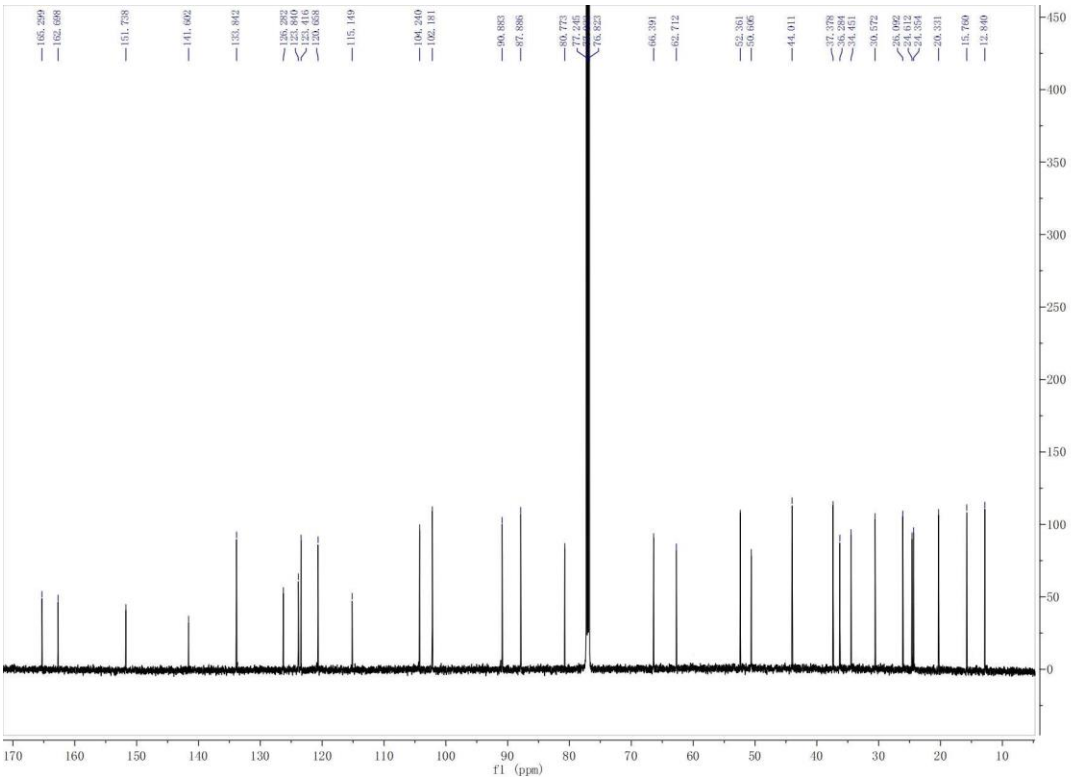
Compound **5n**



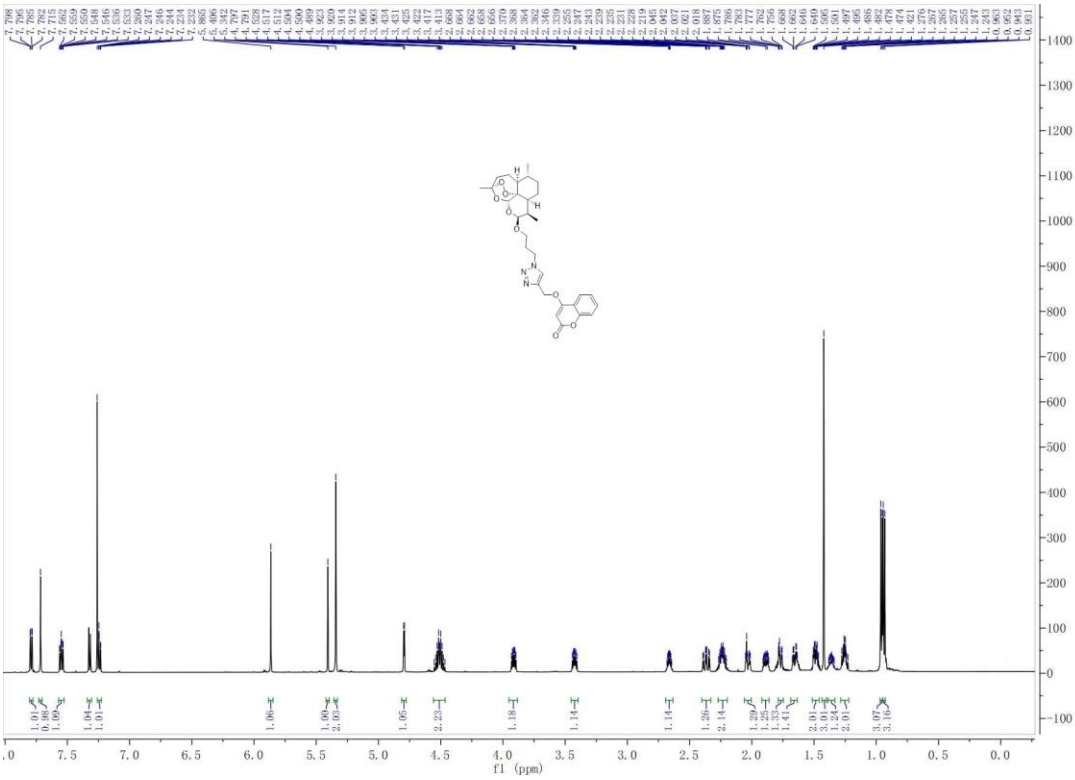


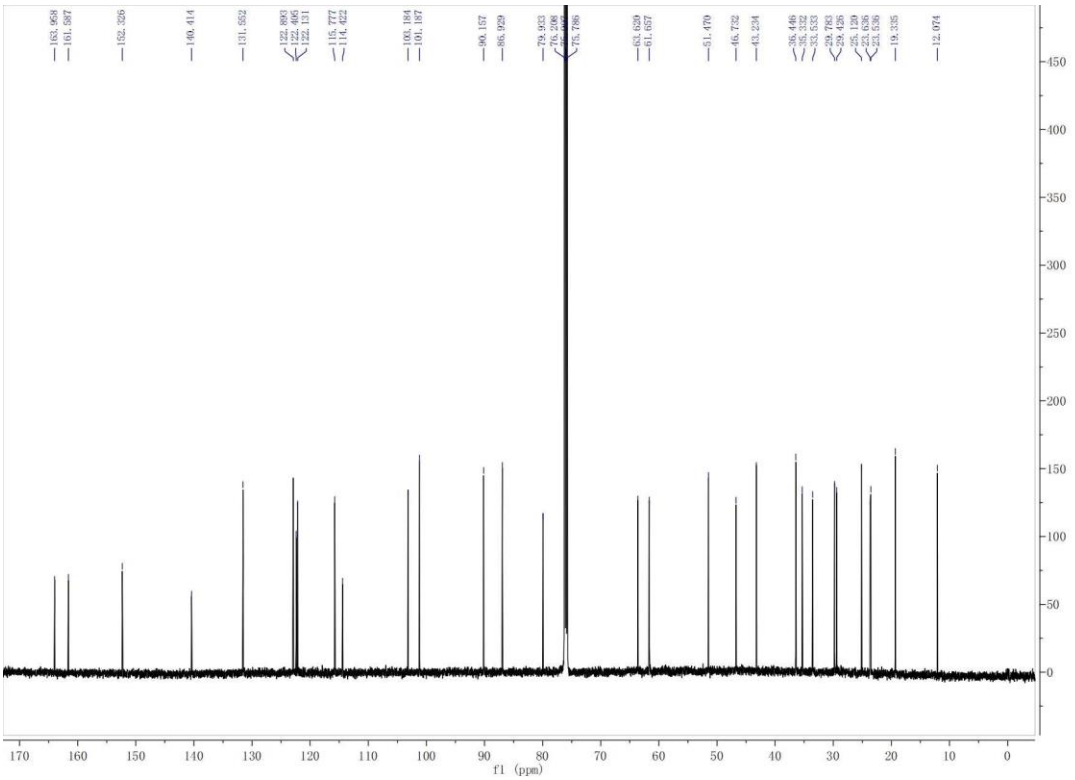
Compound **5o**





Compound **6j**





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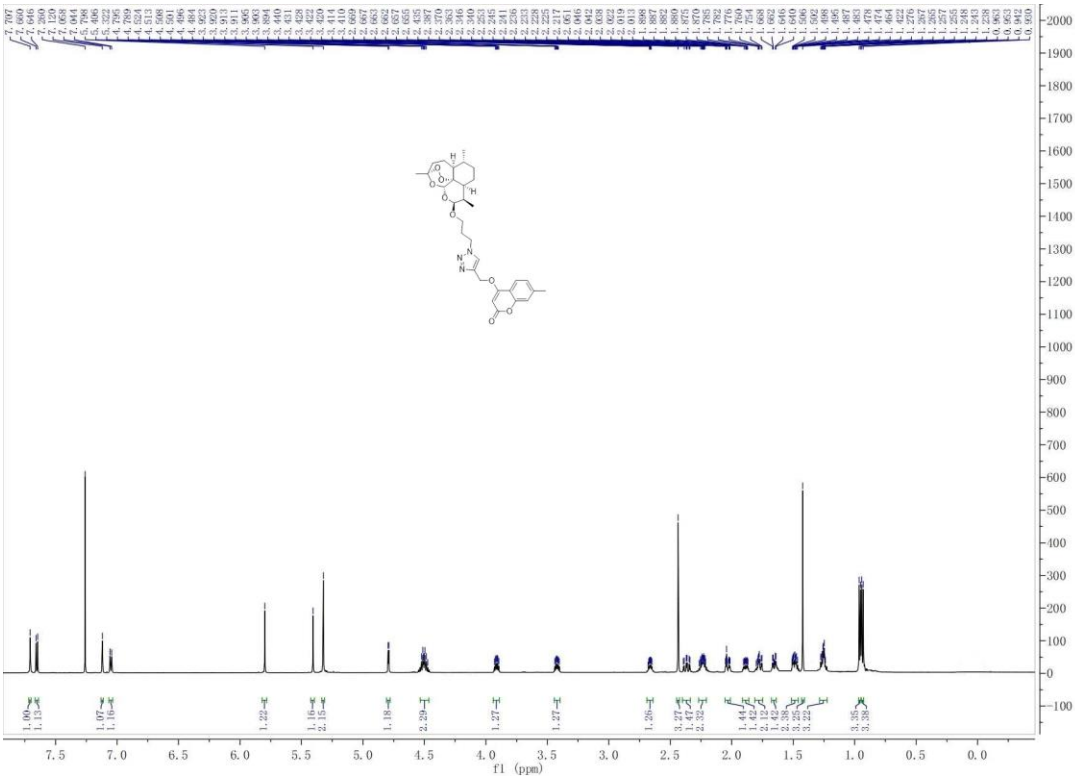
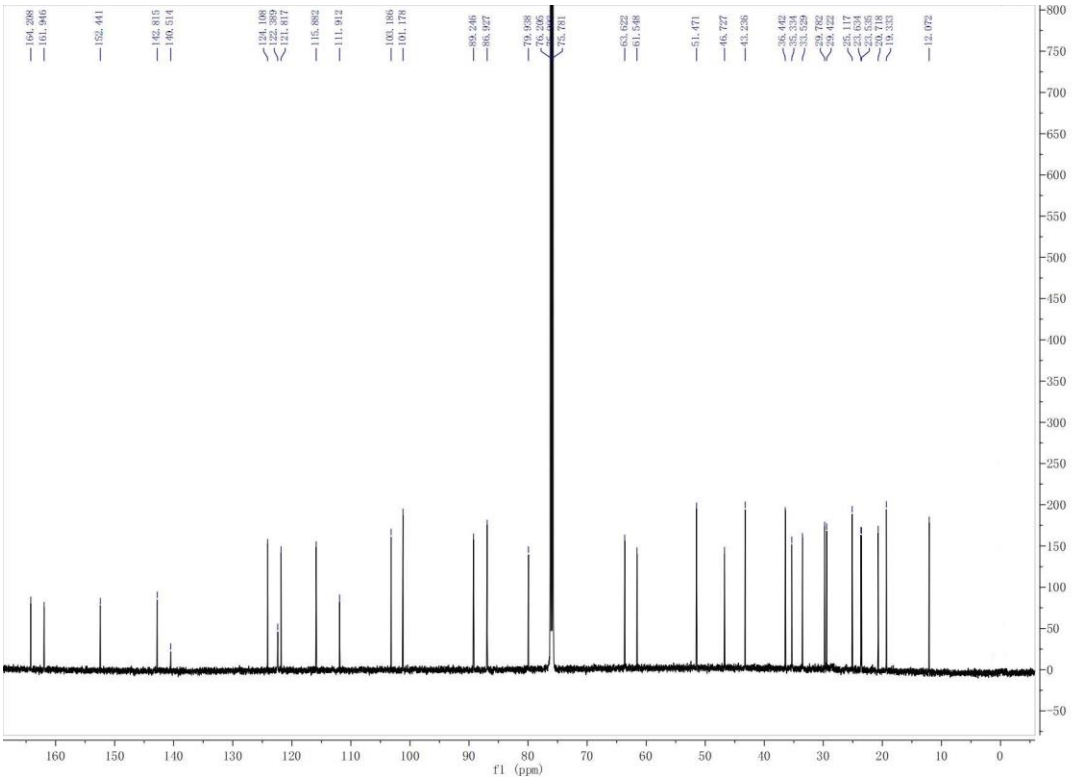
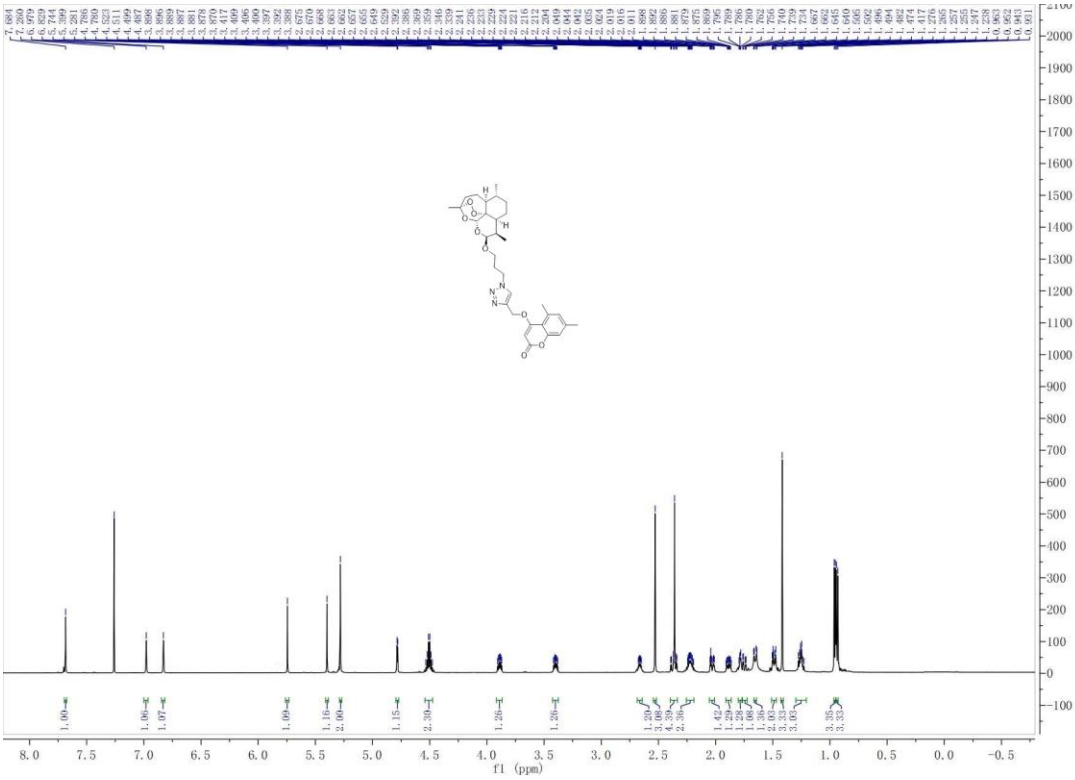
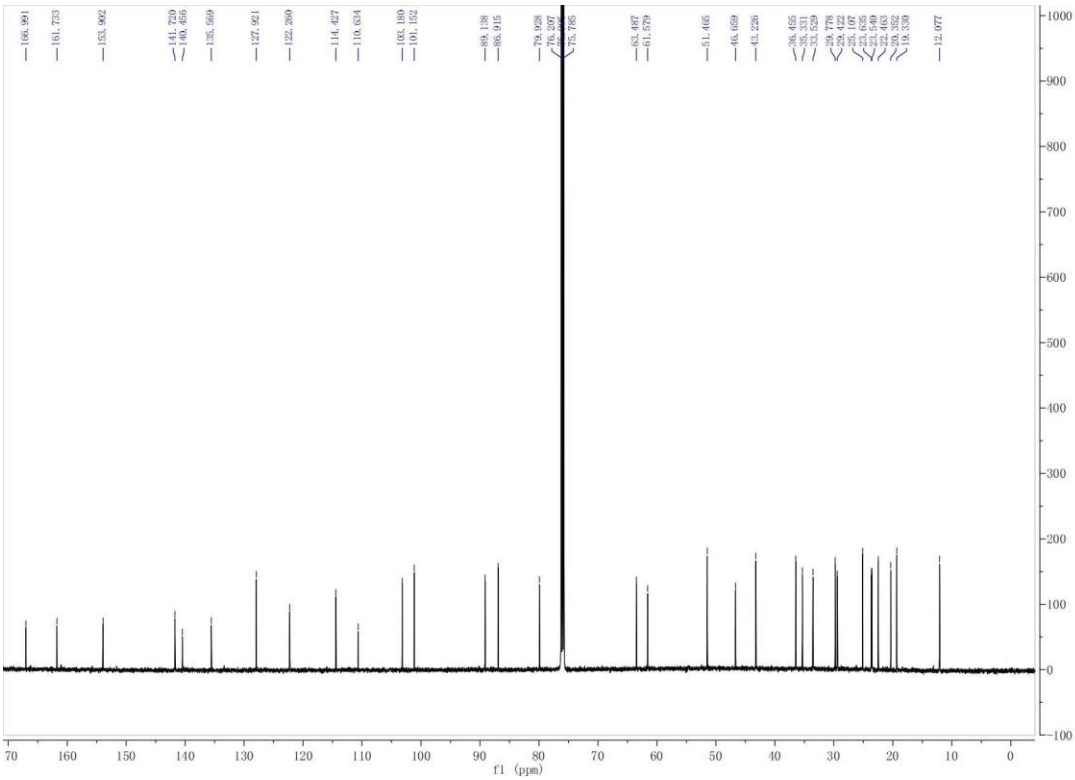


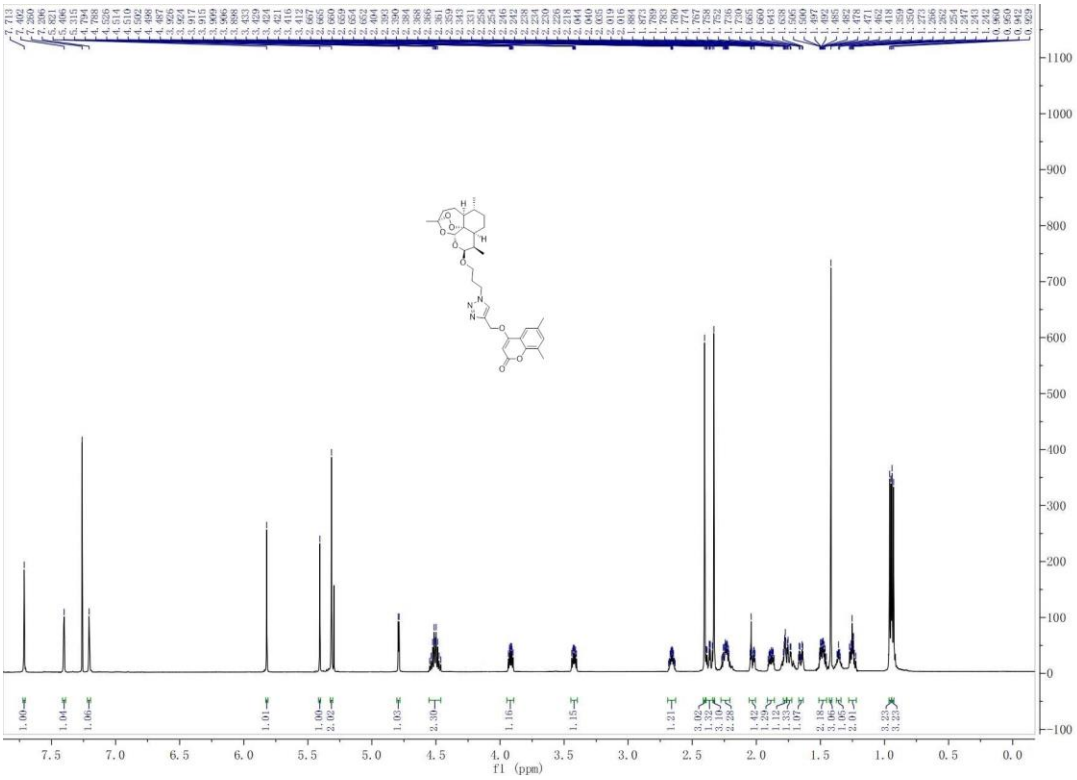


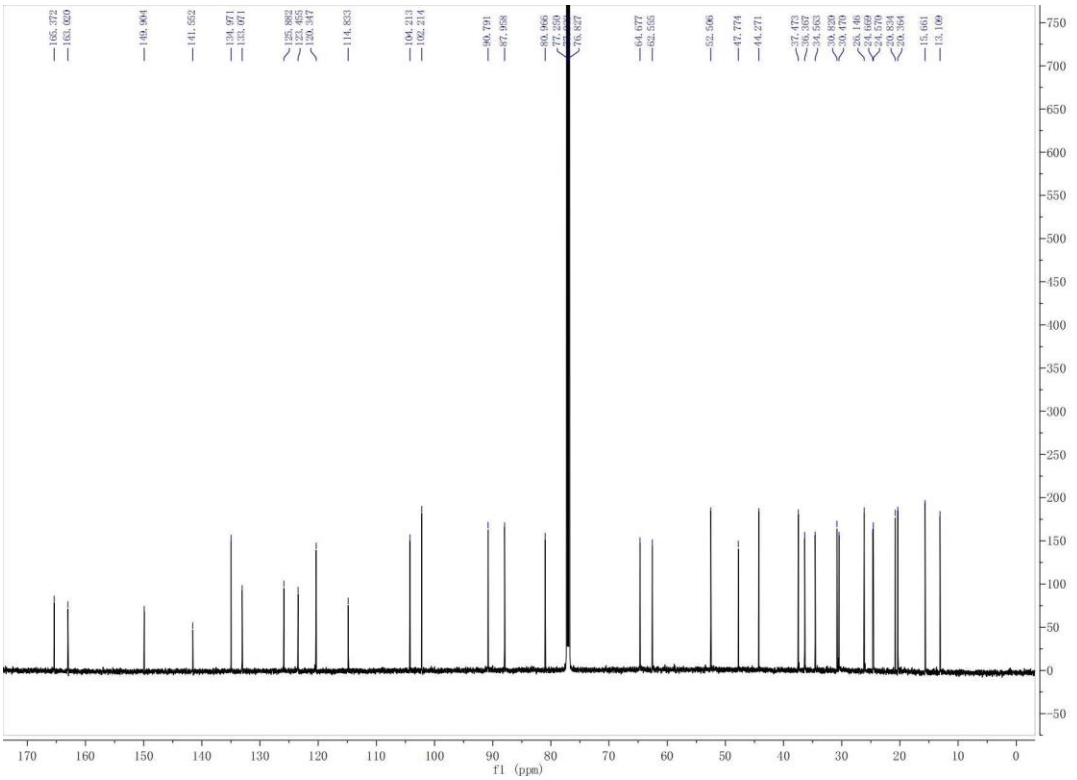
Compound **6l**



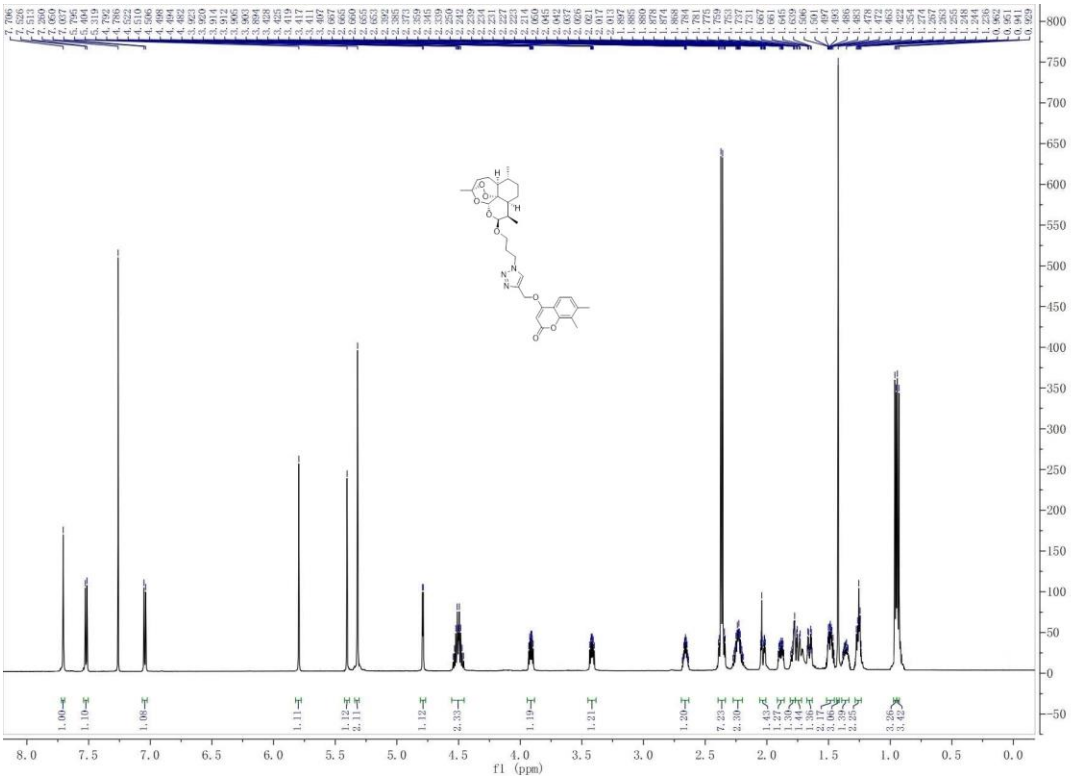


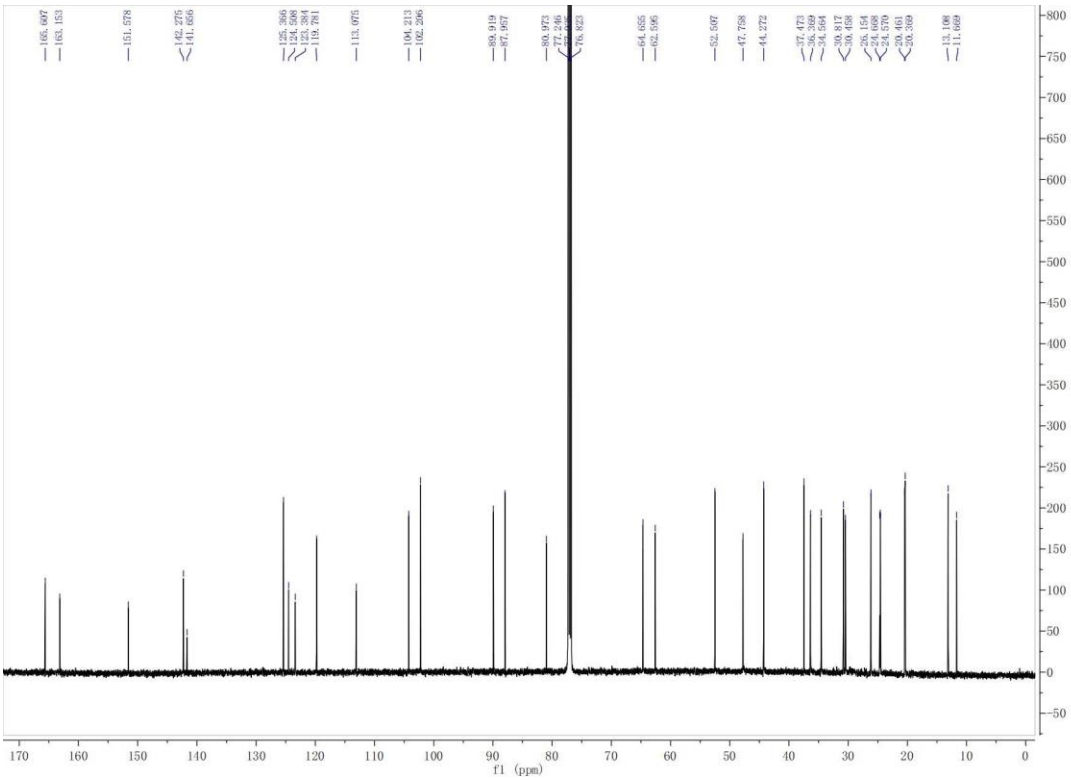
Compound **6m**



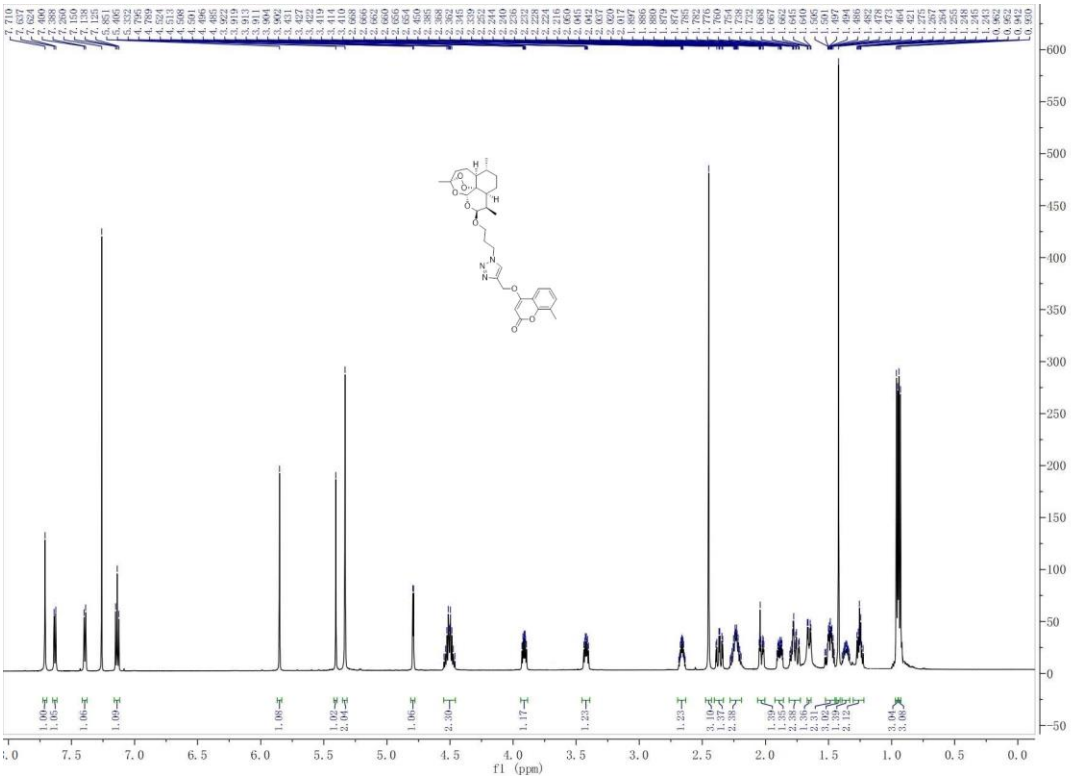


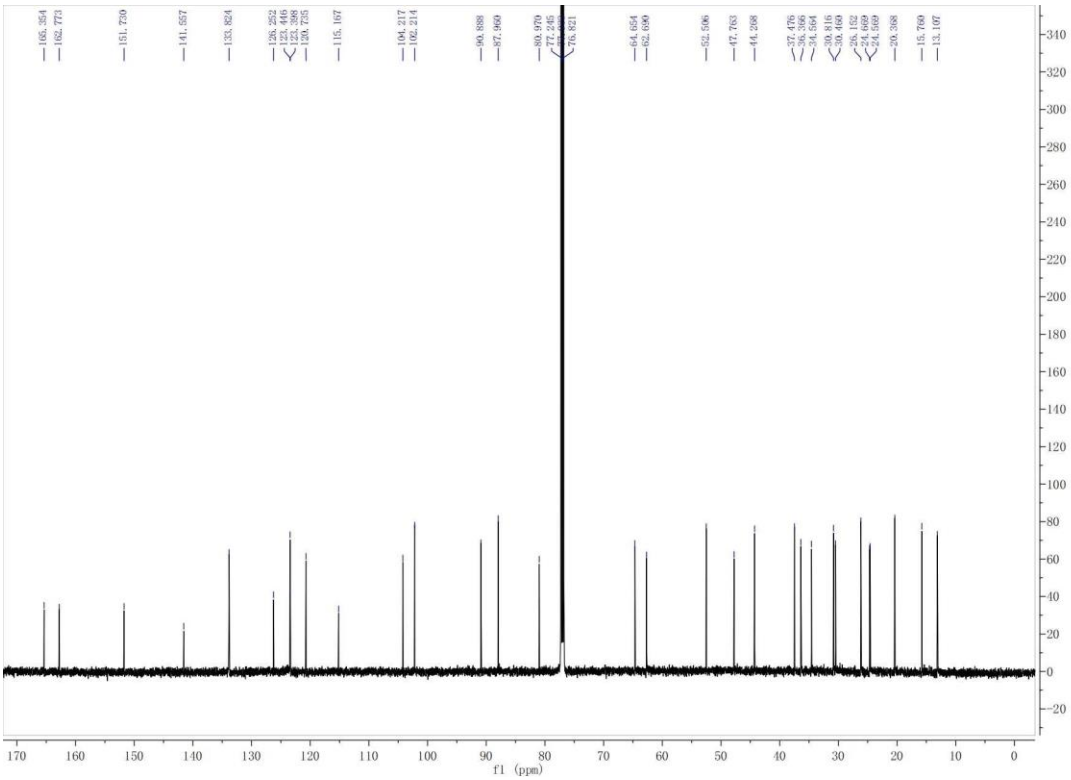
Compound **6n**





Compound **6o**





Compound **6p**