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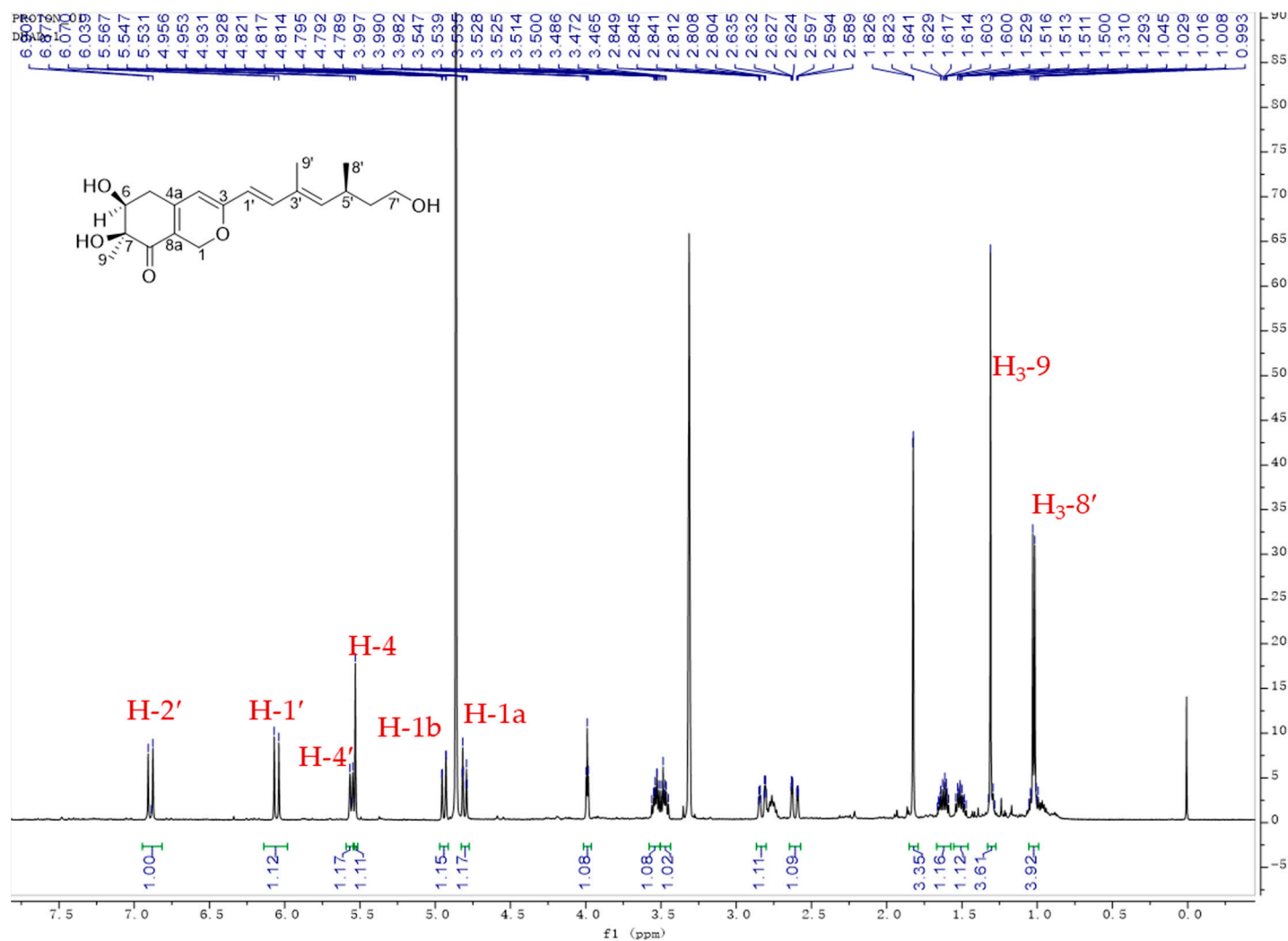


Figure S1. ^1H NMR spectrum of compound **1** in methanol- d_4 (500 MHz).

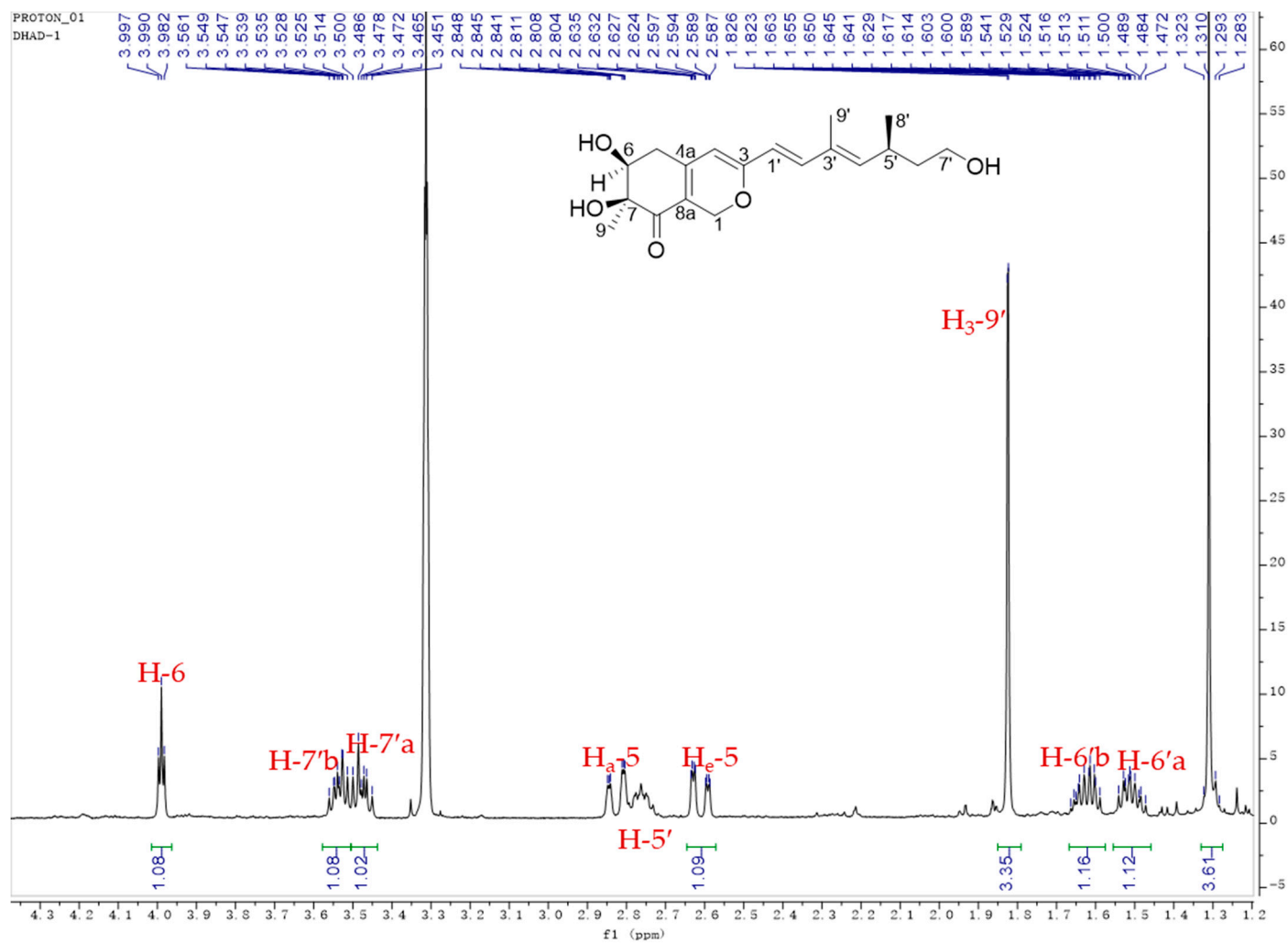


Figure S2. Partial ^1H NMR spectrum of compound **1** in methanol- d_4 (500 MHz).

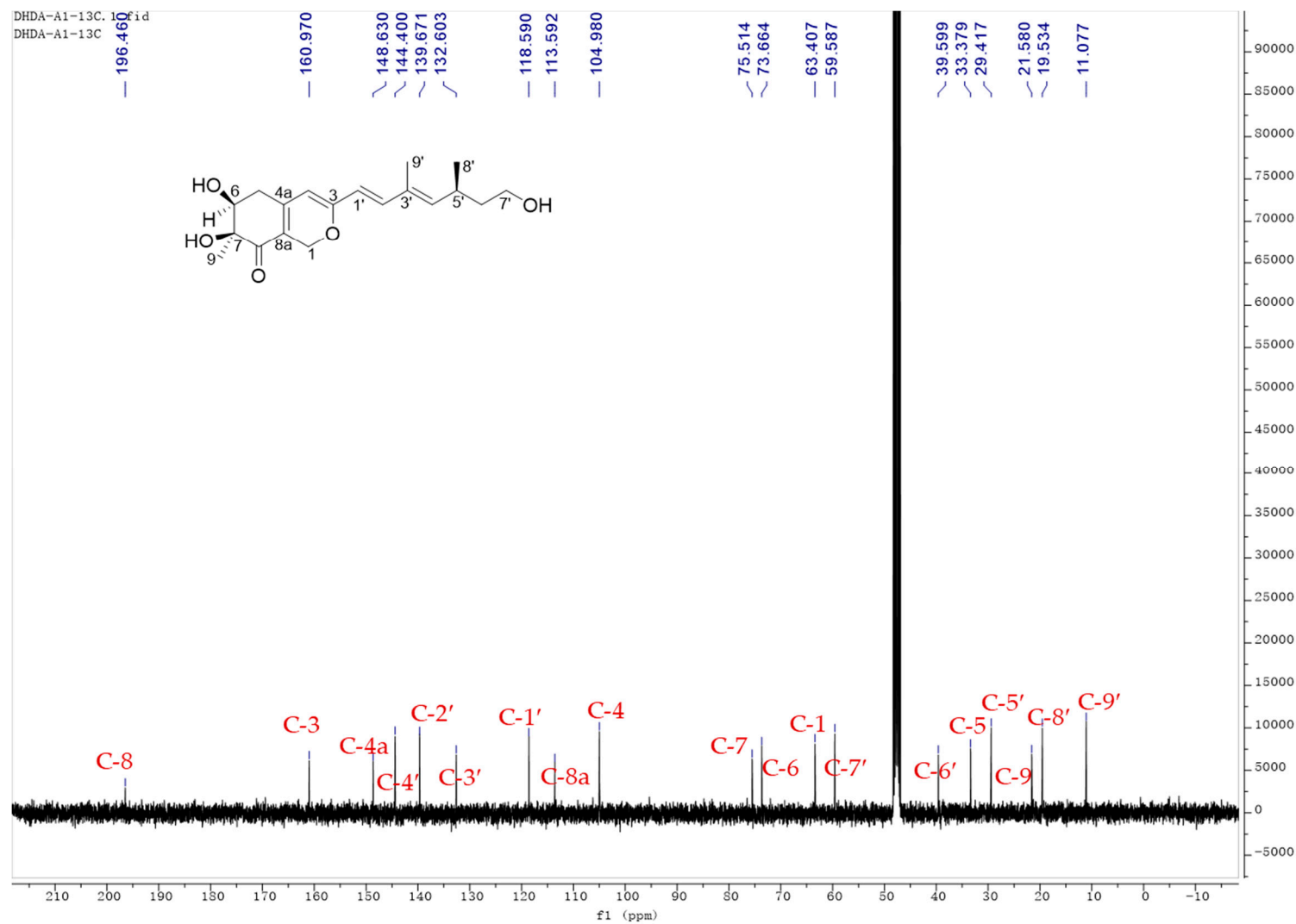


Figure S3. ^{13}C NMR spectrum of compound **1** in methanol- d_4 (125 MHz).

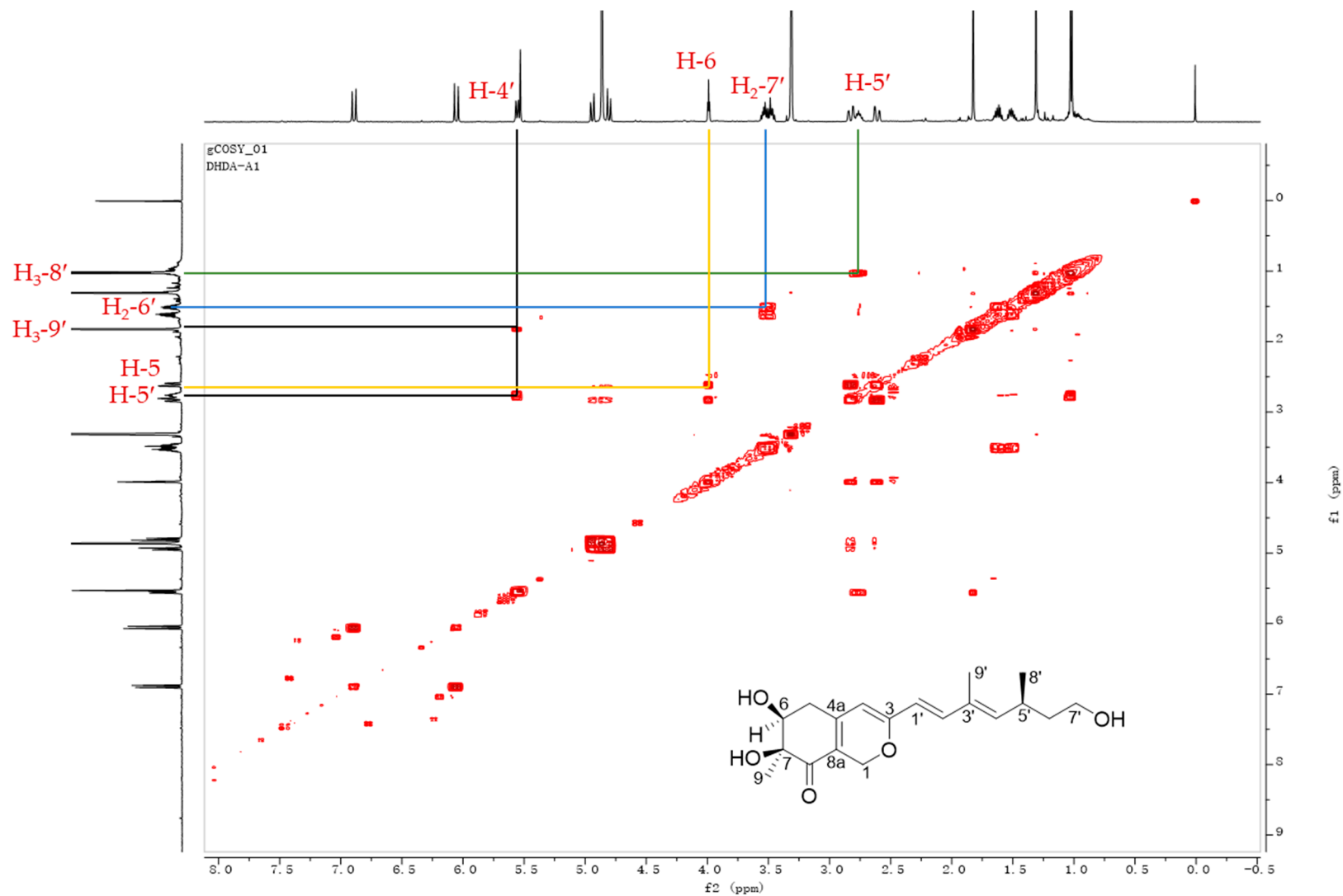
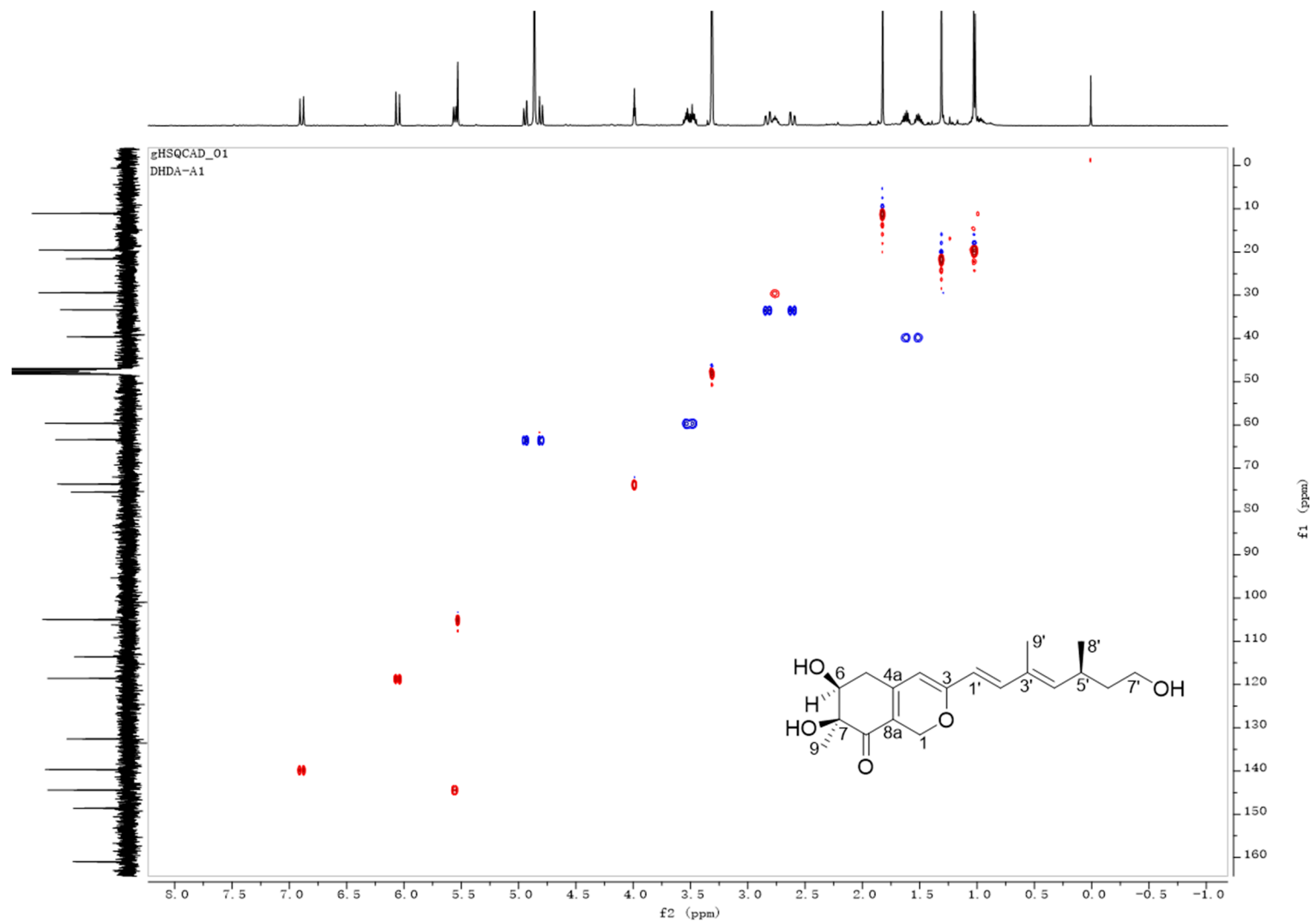


Figure S4. ^1H - ^1H COSY spectrum of compound **1** in methanol- d_4 .



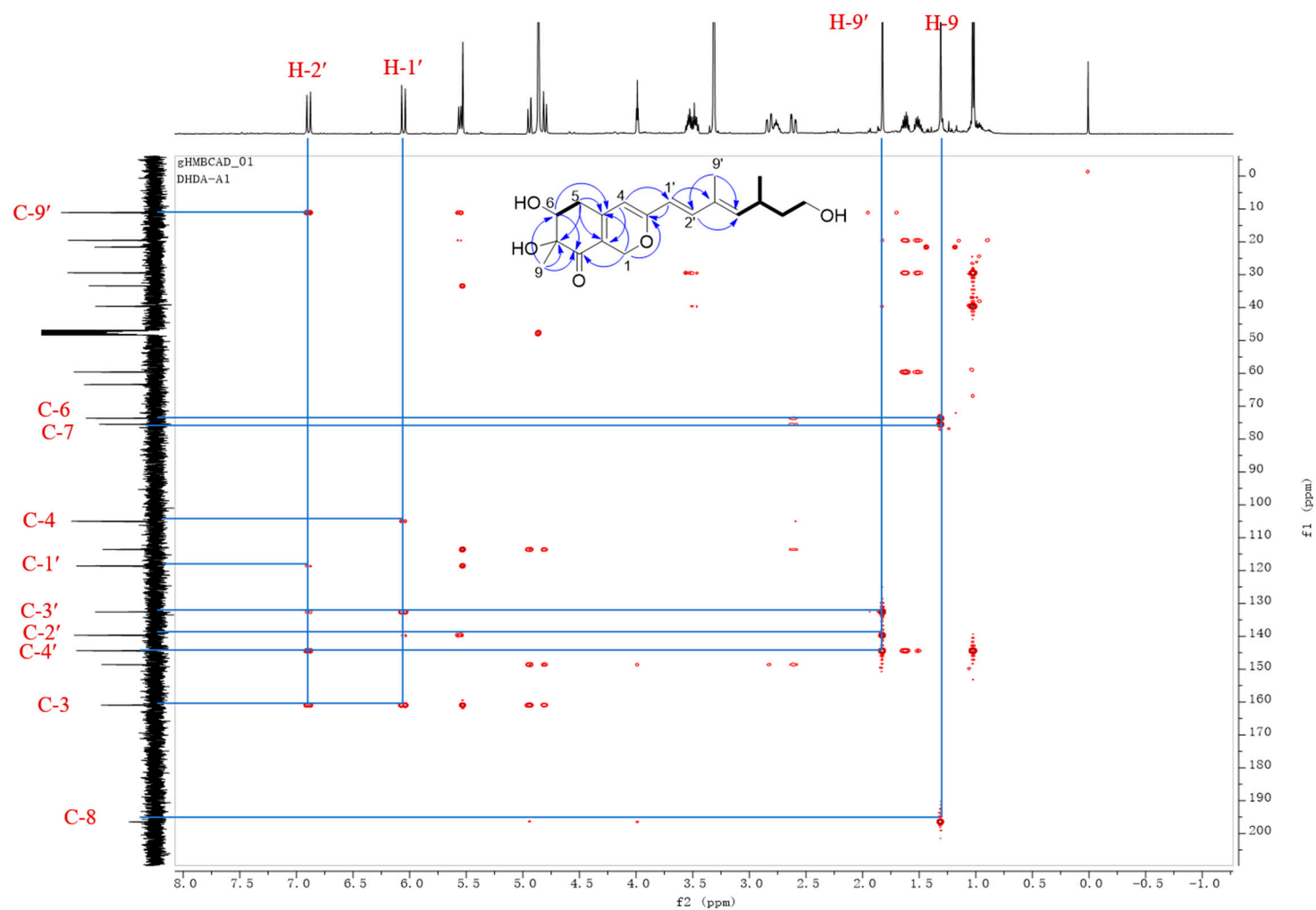


Figure S6. HMBC spectrum of compound 1 in methanol- d_4 .

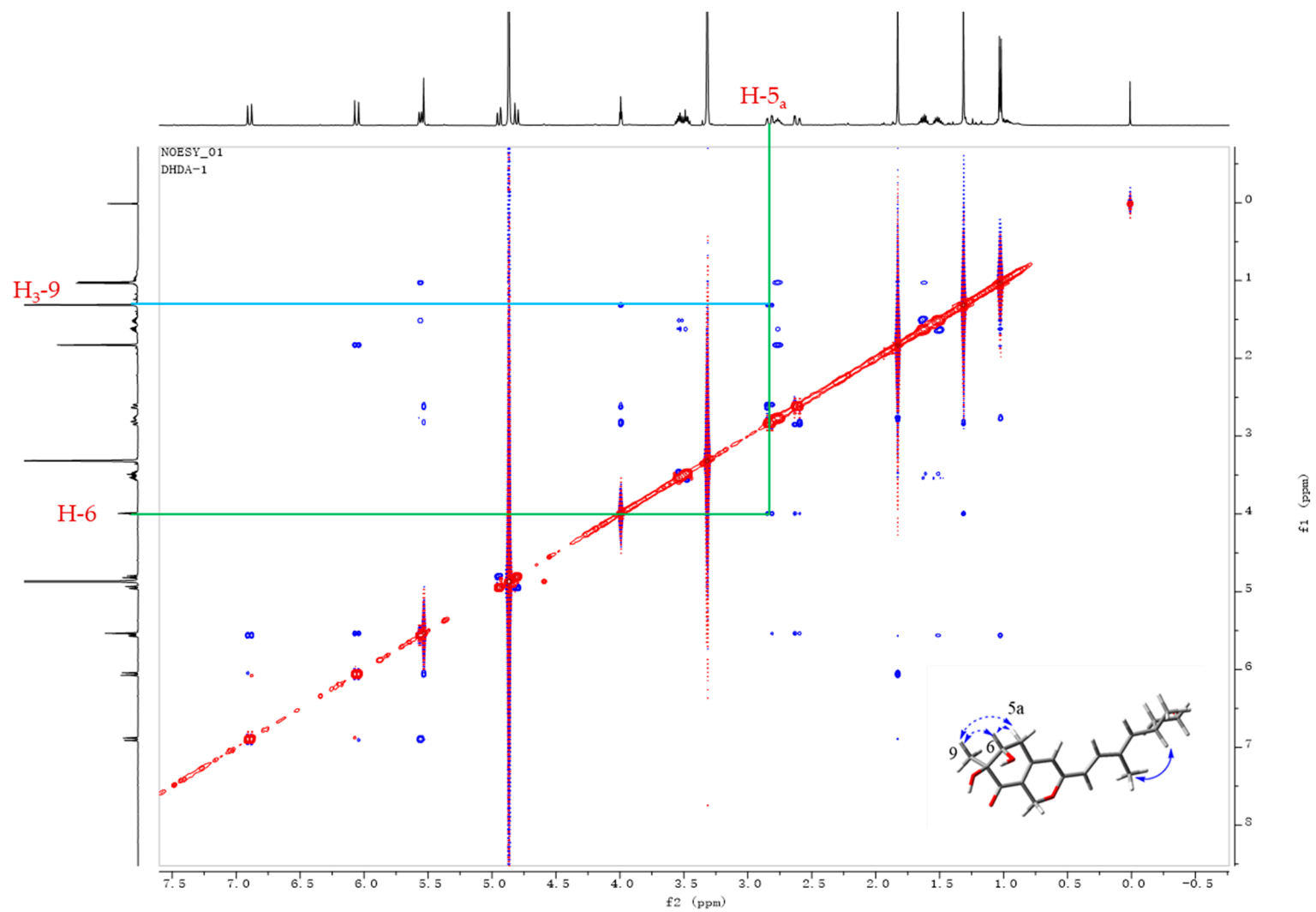


Figure S7. NOESY spectrum of compound **1** in methanol-*d*₄.

20201112-DHDA1_201112144855 #65 RT: 0.59 AV: 1 NL: 1.99E7
T: FTMS + p ESI Full ms [150.00-2000.00]

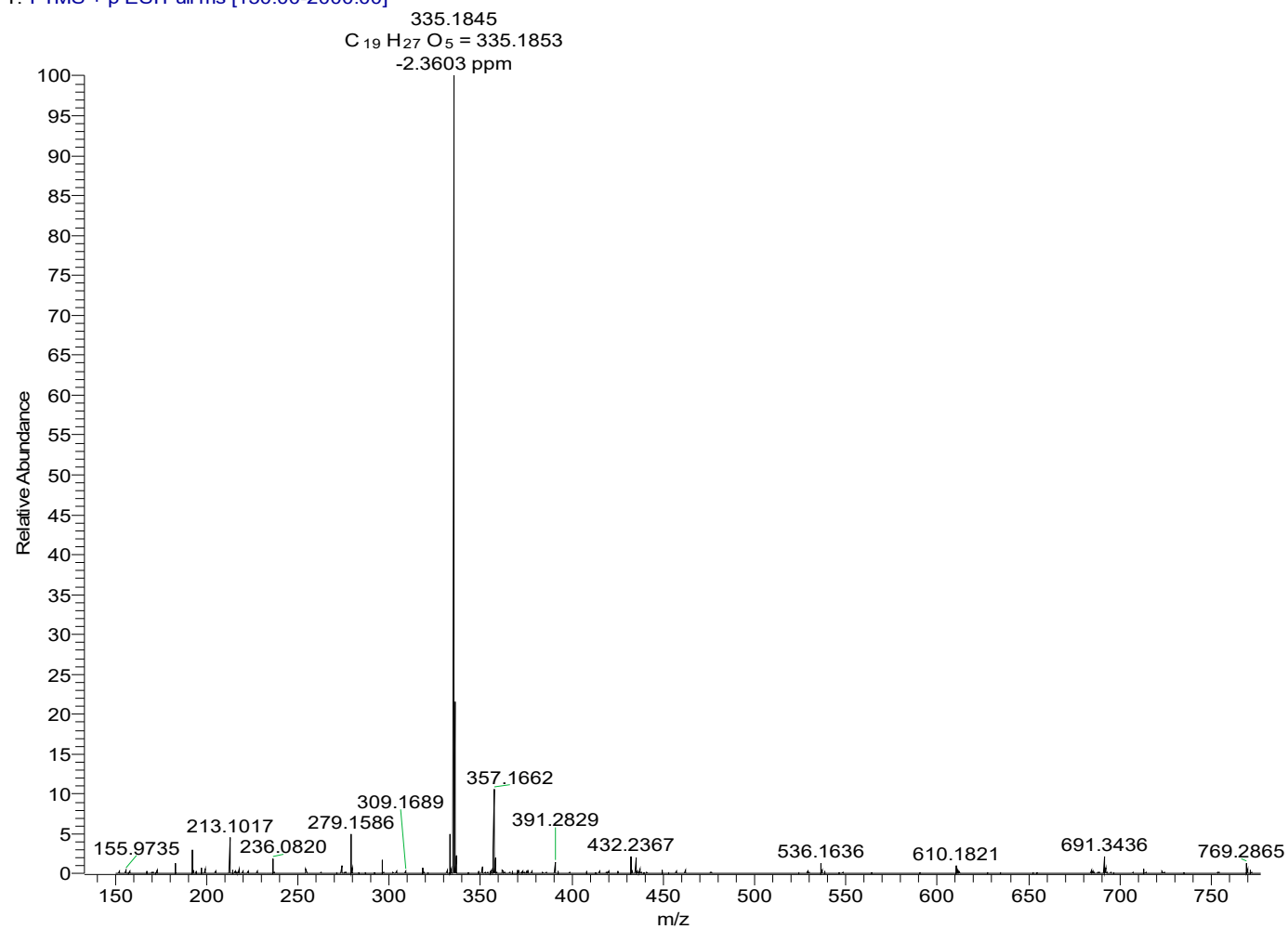
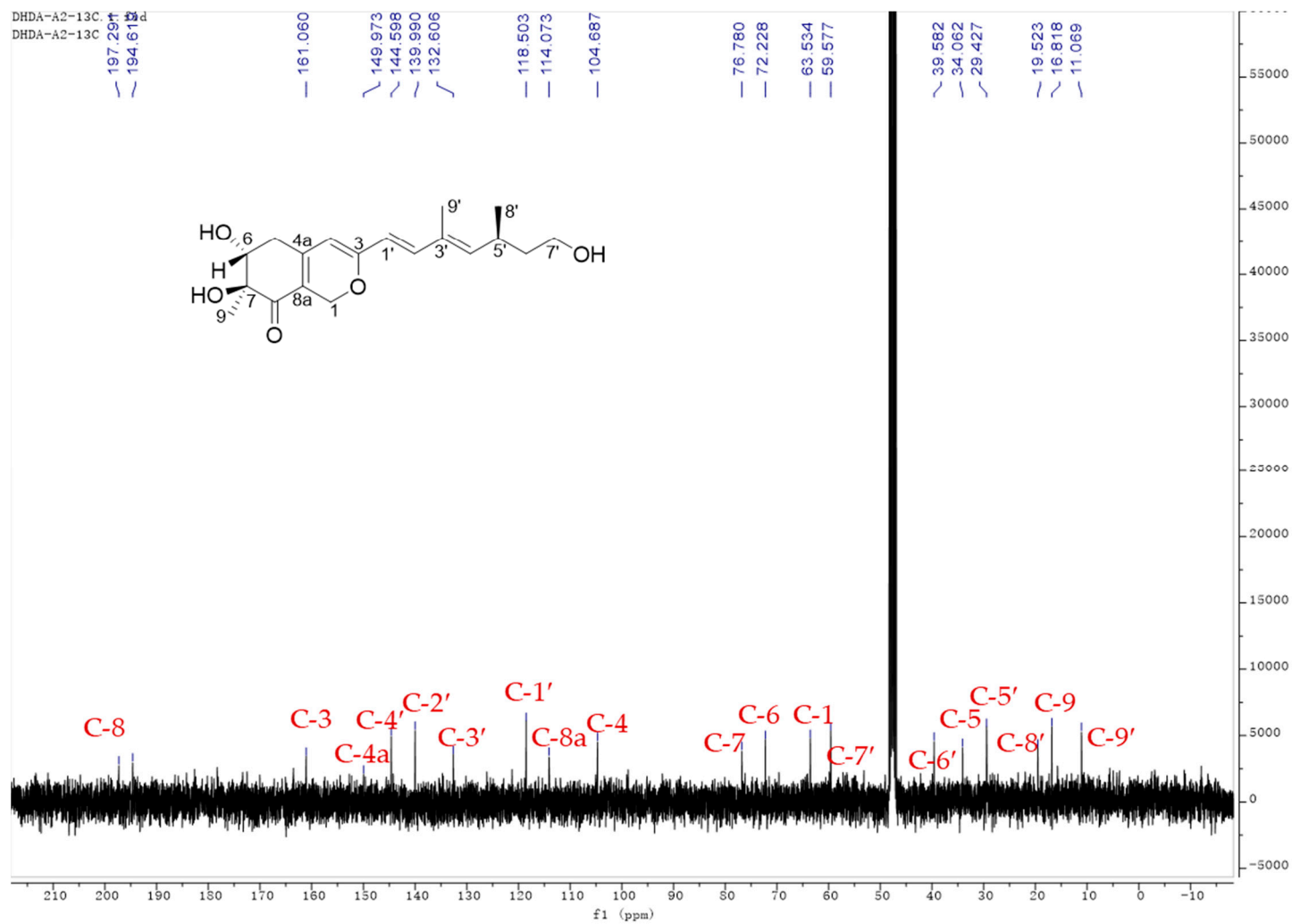


Figure S8. HRESIMS spectrum (positive ion mode) of compound **1**.



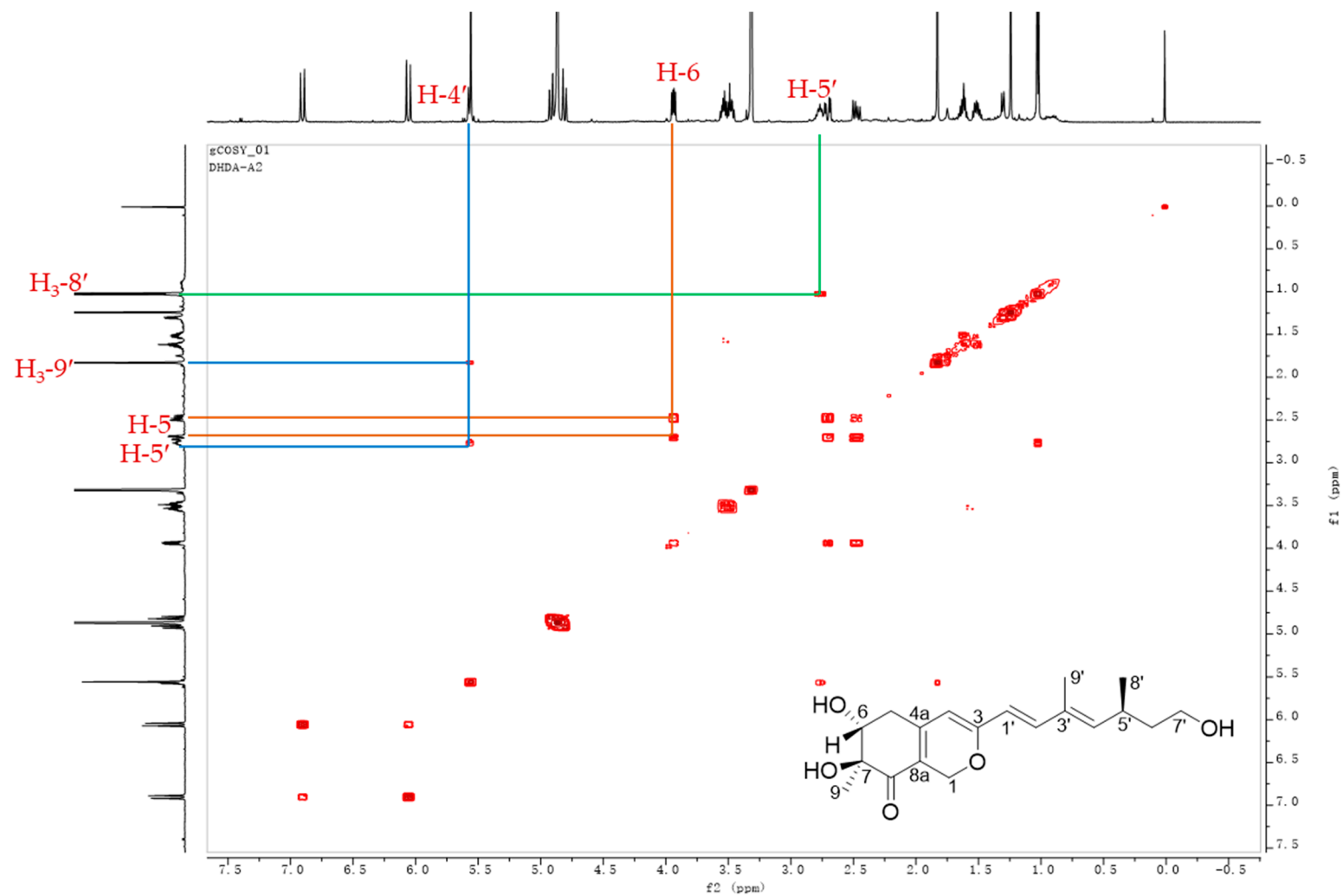


Figure S12. ^1H - ^1H COSY spectrum of compound **2** in methanol- d_4 .

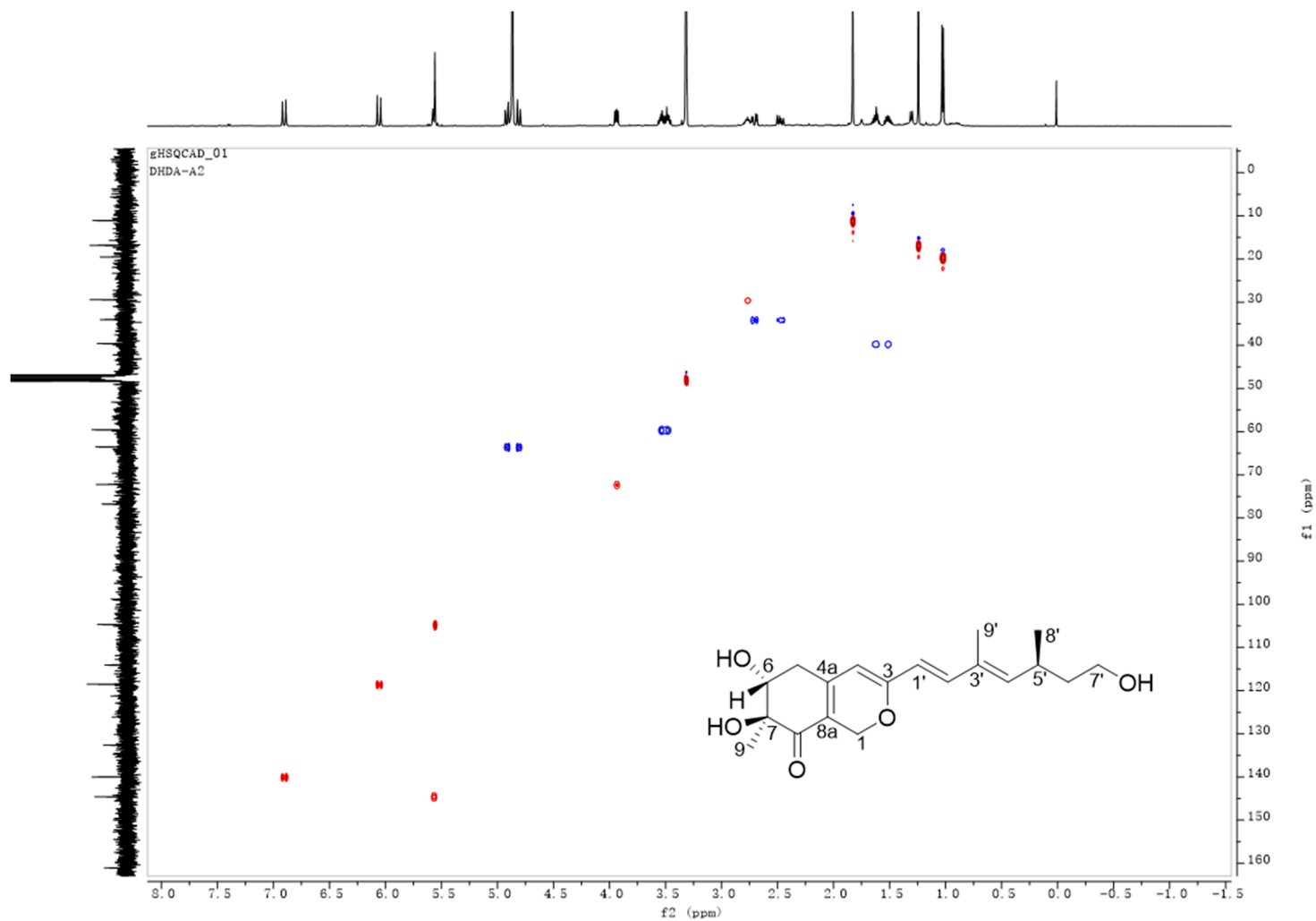


Figure S13. HSQC spectrum of compound **2** in methanol- d_4 .

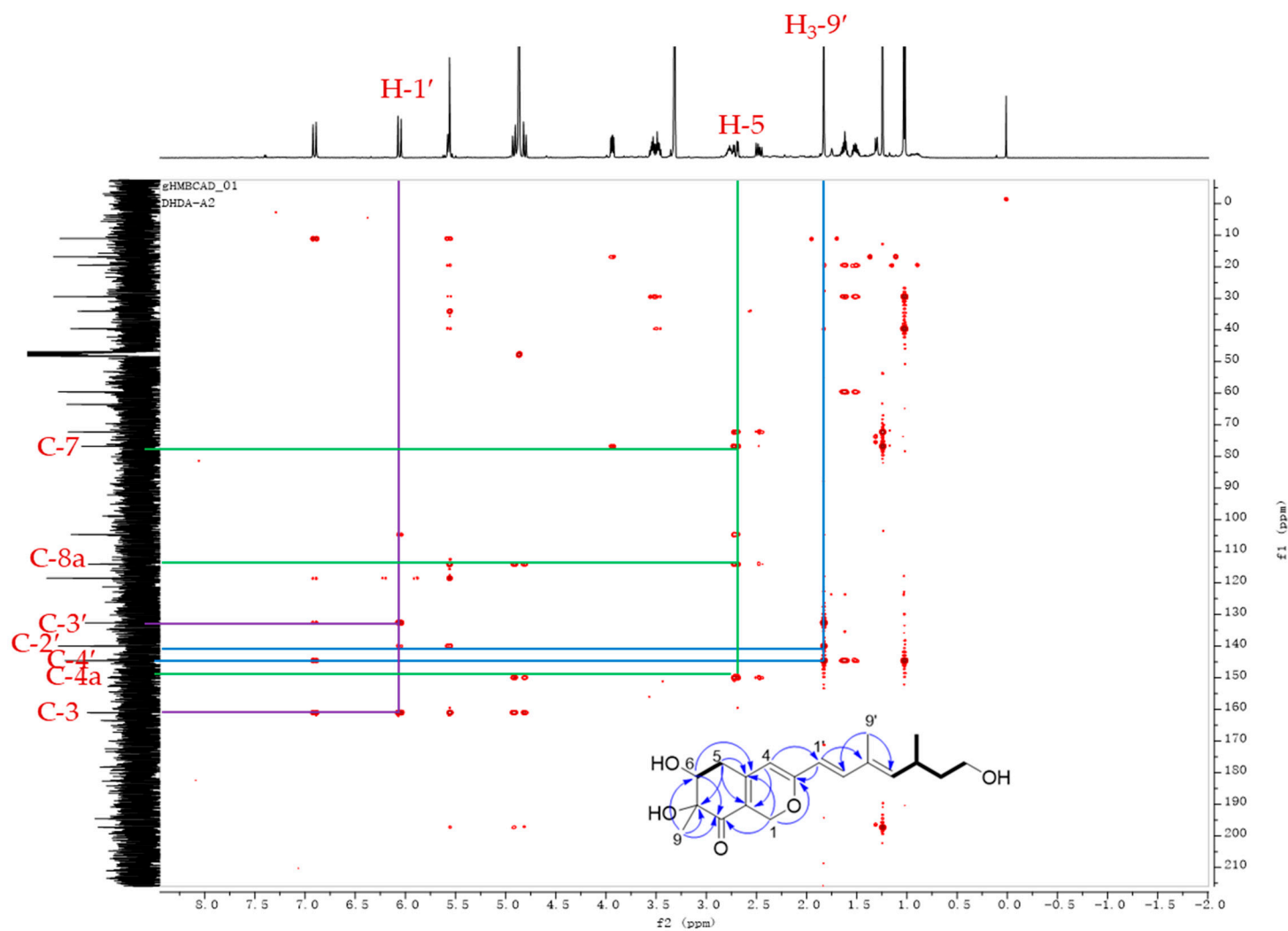


Figure S14. HMBC spectrum of compound **2** in methanol-*d*₄.

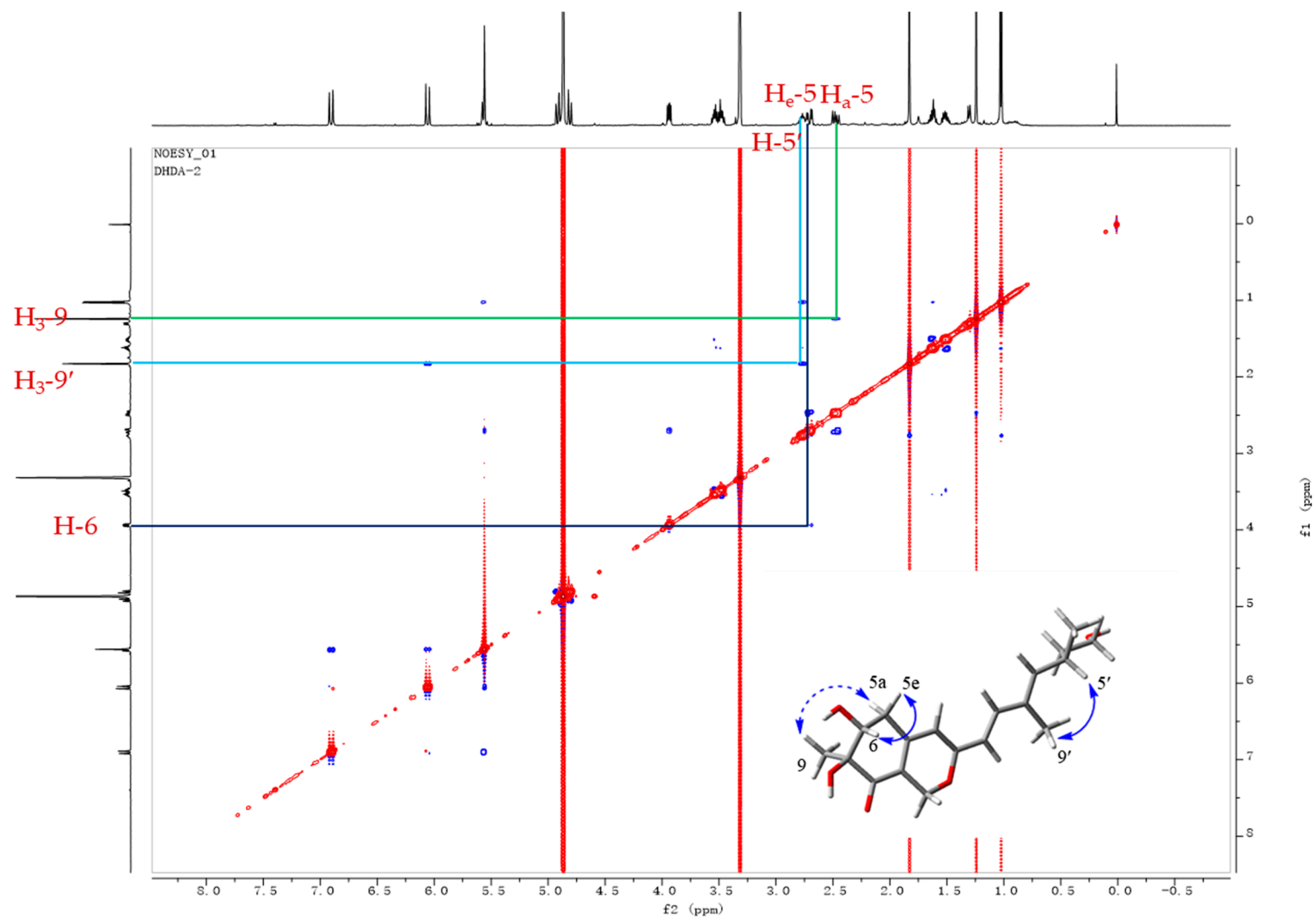


Figure S15. NOESY spectrum of compound **2** in methanol-*d*₄.

20201112-DHDA2_201112144855 #85-86 RT: 0.76-0.77 AV: 2 NL: 1.84E7
T: FTMS + p ESI Full ms [150.00-2000.00]

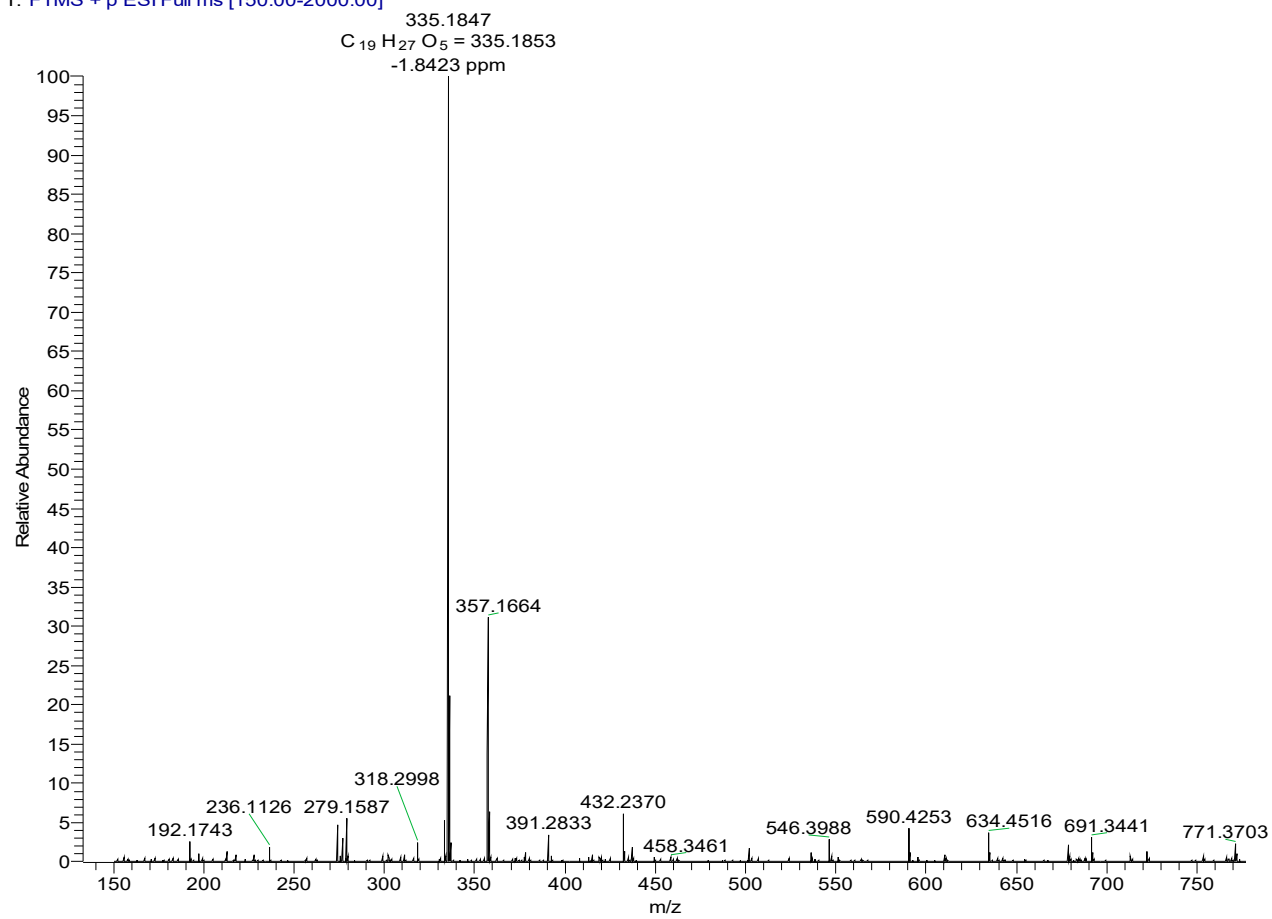


Figure S16. HRESIMS spectrum (positive ion mode) of compound **2**.

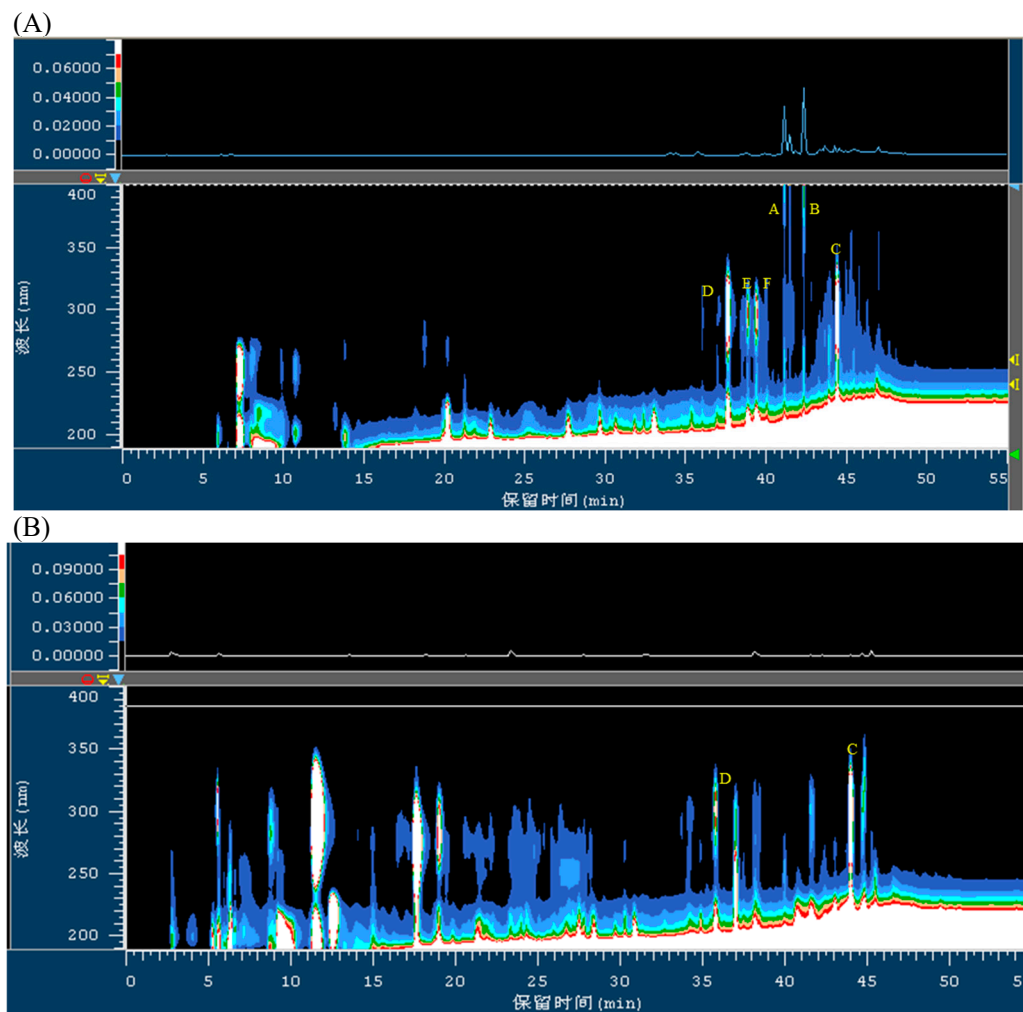


Figure S17. HPLC detection on ethyl acetate (EtOAc) extracts of $\Delta hdaA$ strain (A) and WT strain (B). (The compounds were marked with yellow letter, A: asperterilone A; B: asperterilone B; C: butyrolactone I; D: butyrolactone II; E: butyrolactone III; F: butyrolactone V.)

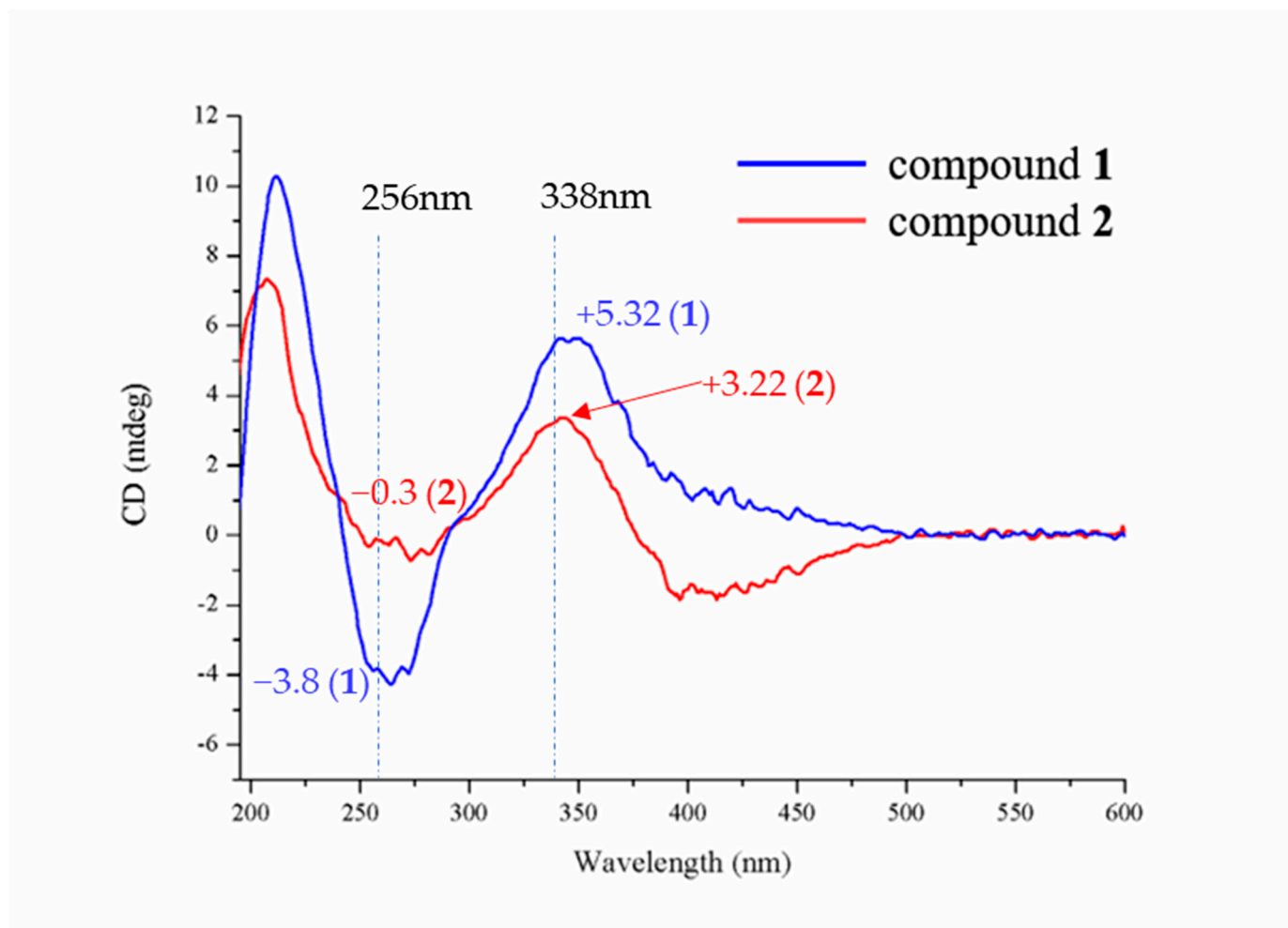


Figure S18. CD curves of compounds **1** and **2**. (The CD spectra of **1** and **2** showed positive [+5.32 (**1**), +3.22 (**2**) at 338nm] and negative [−3.80 (**1**), −0.30 (**2**) at 256nm] Cotton effects)

General PCR process

Pre-denaturation	95 °C	2 min	1 cycle
Denaturation	95 °C	20 sec	} 30 cycles
Annealling	58 °C	20 sec	
Extension	72 °C	1 min	
Extension	72 °C	5 min	1 cycle

Fusion PCR process

Pre-denaturation	95 °C	2 min	1 cycle
Denaturation	95 °C	20 sec	} 12 cycles
Annealling	58 °C	10 min	
Extension	72 °C	5 min	
Extension	72 °C	5 min	1 cycle

Figure S19. The PCR conditions for construction of mutant. (The homologous arms of *hdaA* (upstream and downstream) and *hph* marker gene were amplified through general PCR process, the *hdaA* deletion cassette with three DNA fragments was constructed by fusion PCR.).