

Supplementary Information

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Figure S1. ESI (+) MS (top) and fragmentation MS/MS spectra on m/z 353 $[M + Na]^+$ (bottom) of compound **13**.

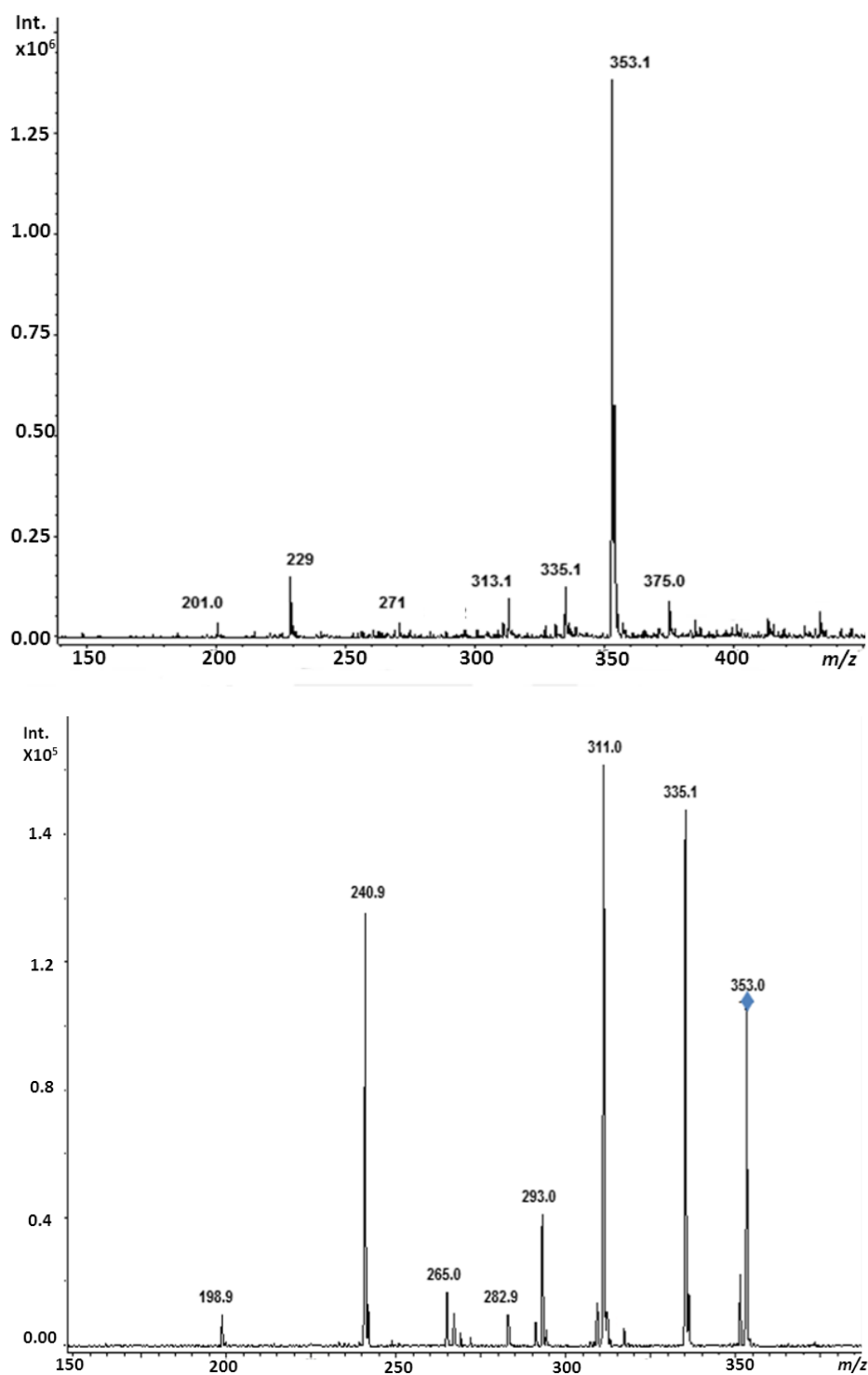


Figure S2. ESI (-) MS (top) and MS/MS spectra on m/z 329 $[M - H]^-$ (bottom) of compound **13**.

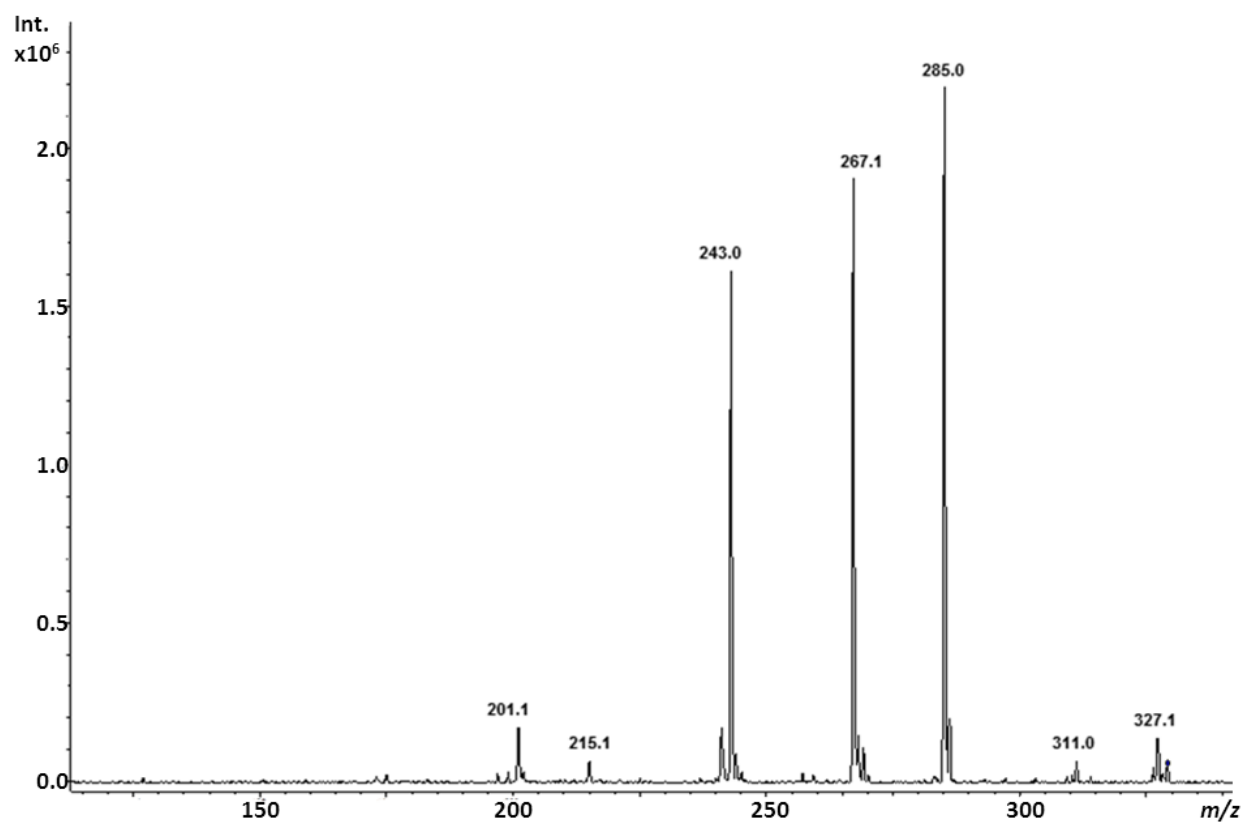
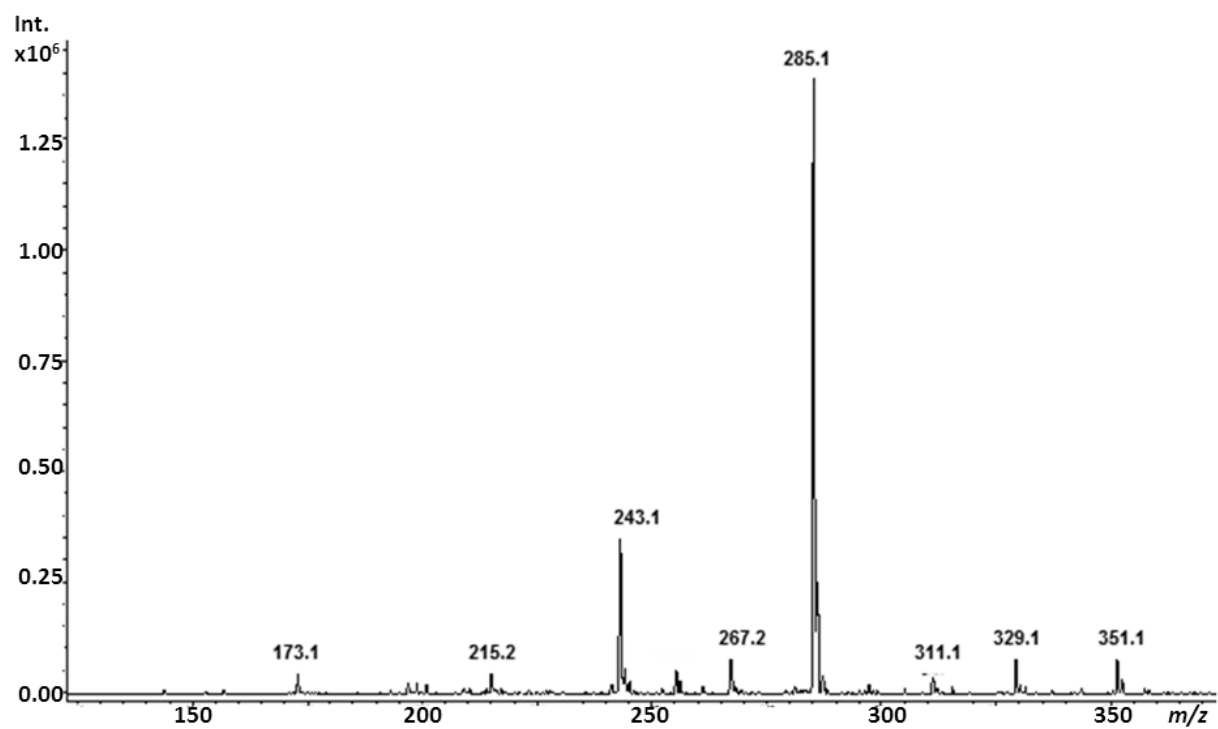


Figure S3. $^1\text{H-NMR}$ spectrum of **13** (400 MHz, in CDCl_3).

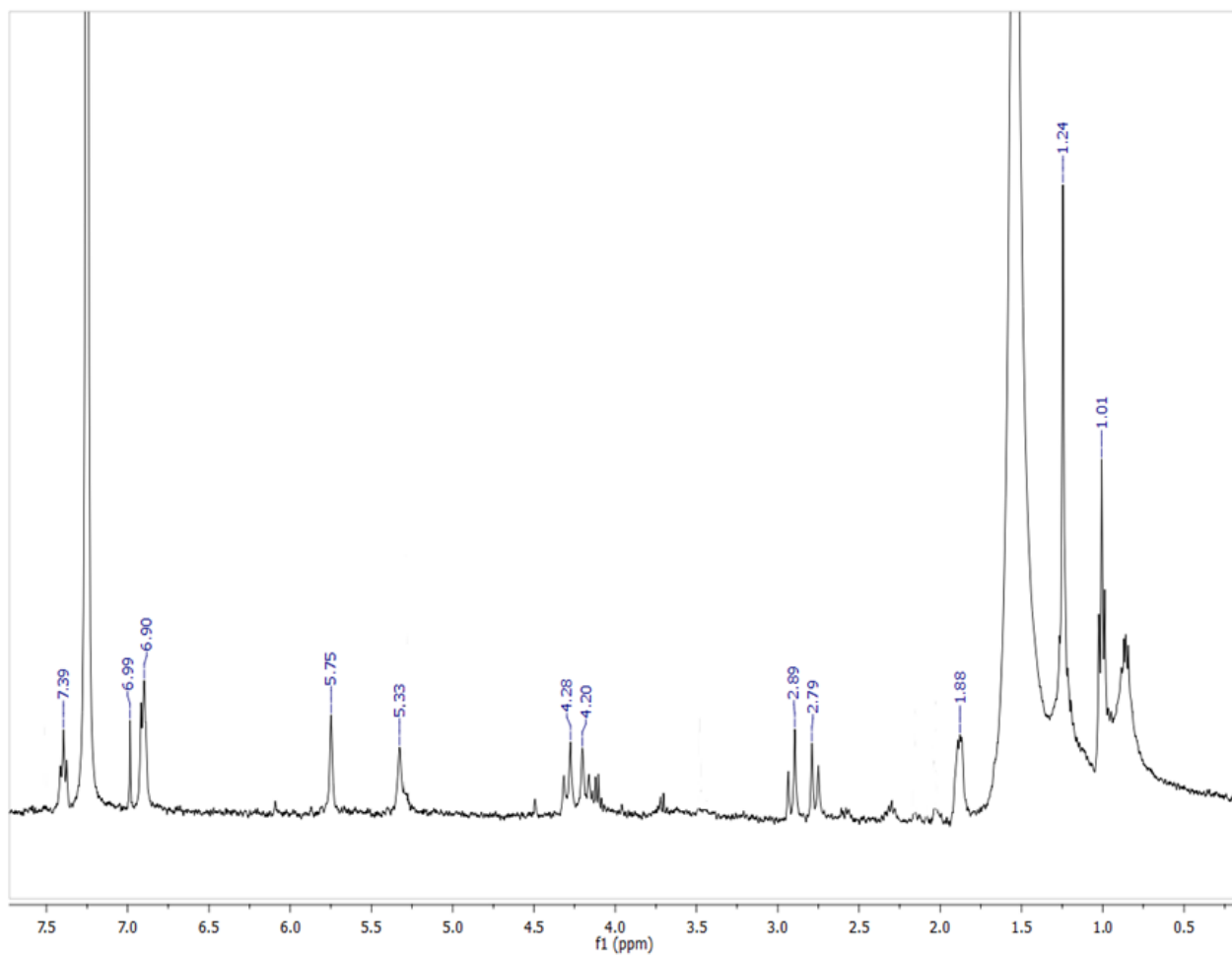


Figure S4. ^1H -NMR spectrum of **13** (400 MHz, in CD_3OD).

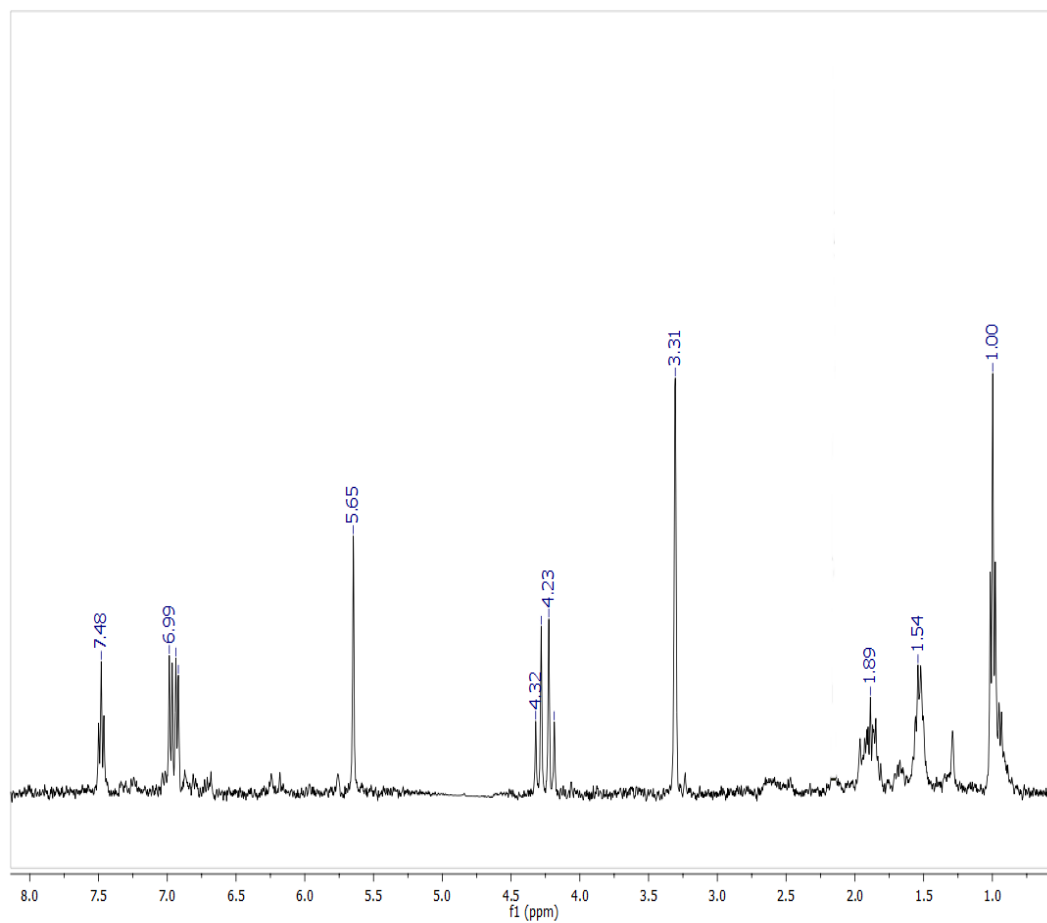


Figure S5. HSQC spectrum of 13 in CD₃OD.

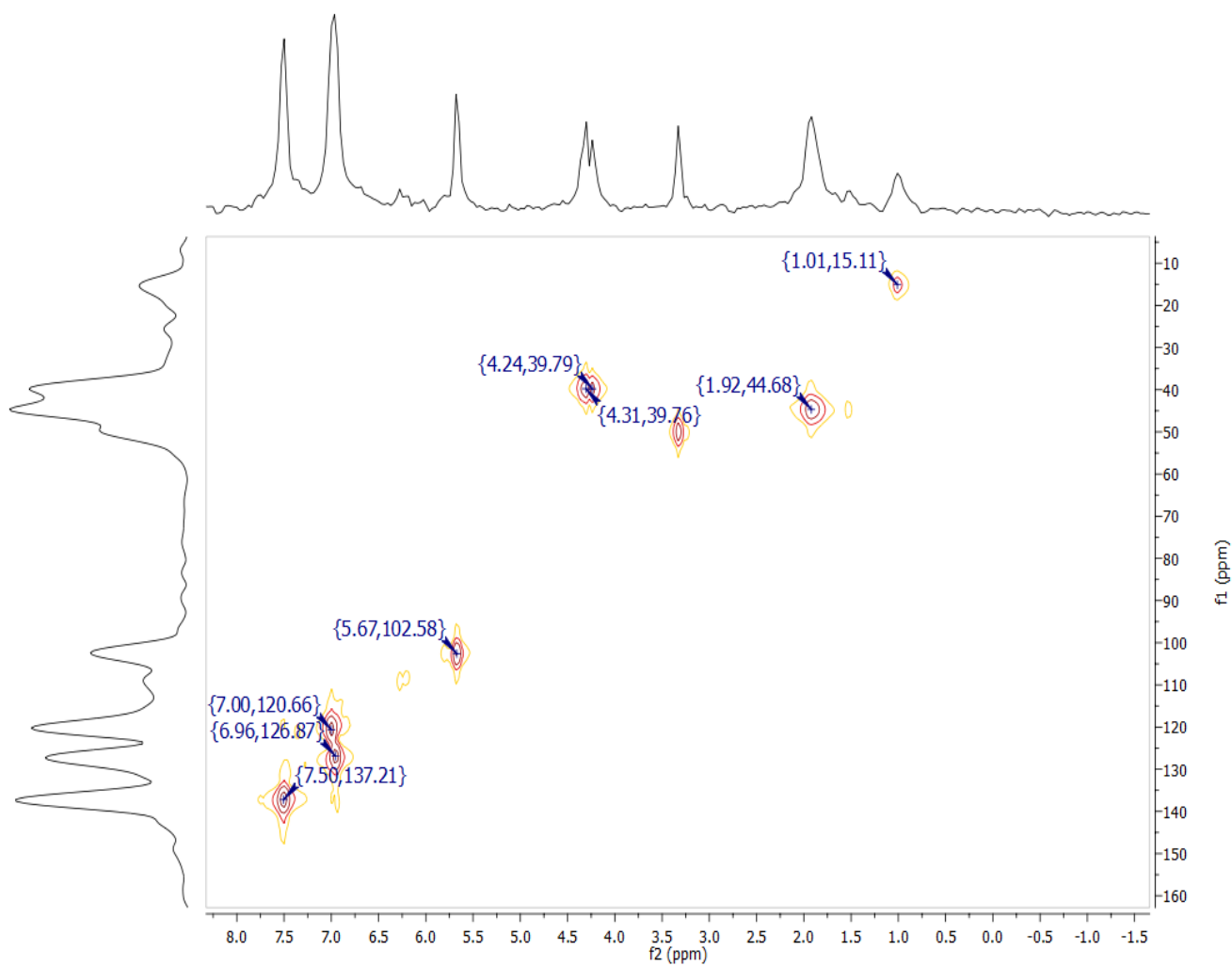


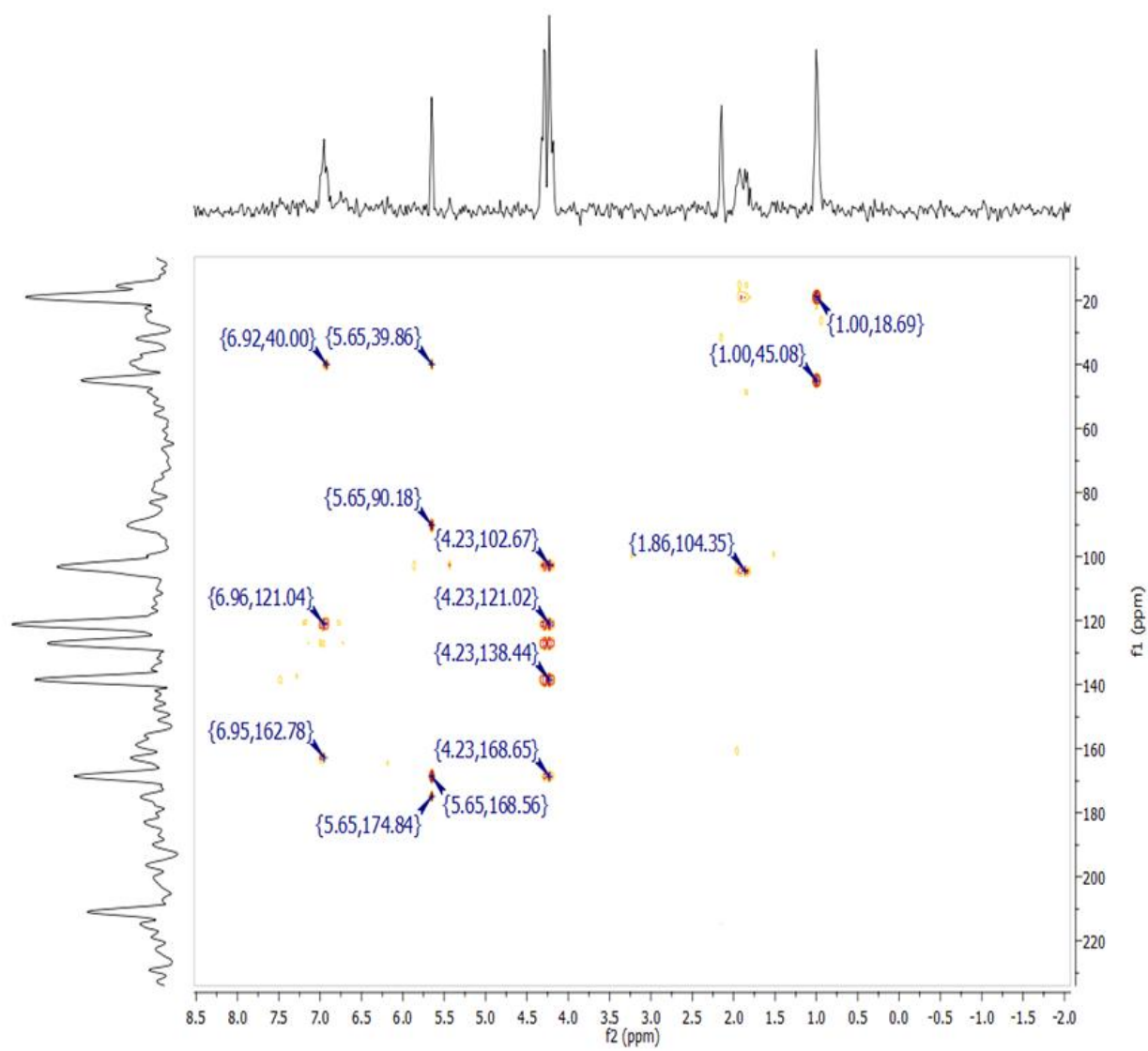
Figure S6. HMBC spectrum of **13** in CD₃OD.

Figure S7. ESI (+) MS and MS/MS spectra on m/z 358 $[M + Na]^+$ of deuterated **13** from a CD_3OD solution.

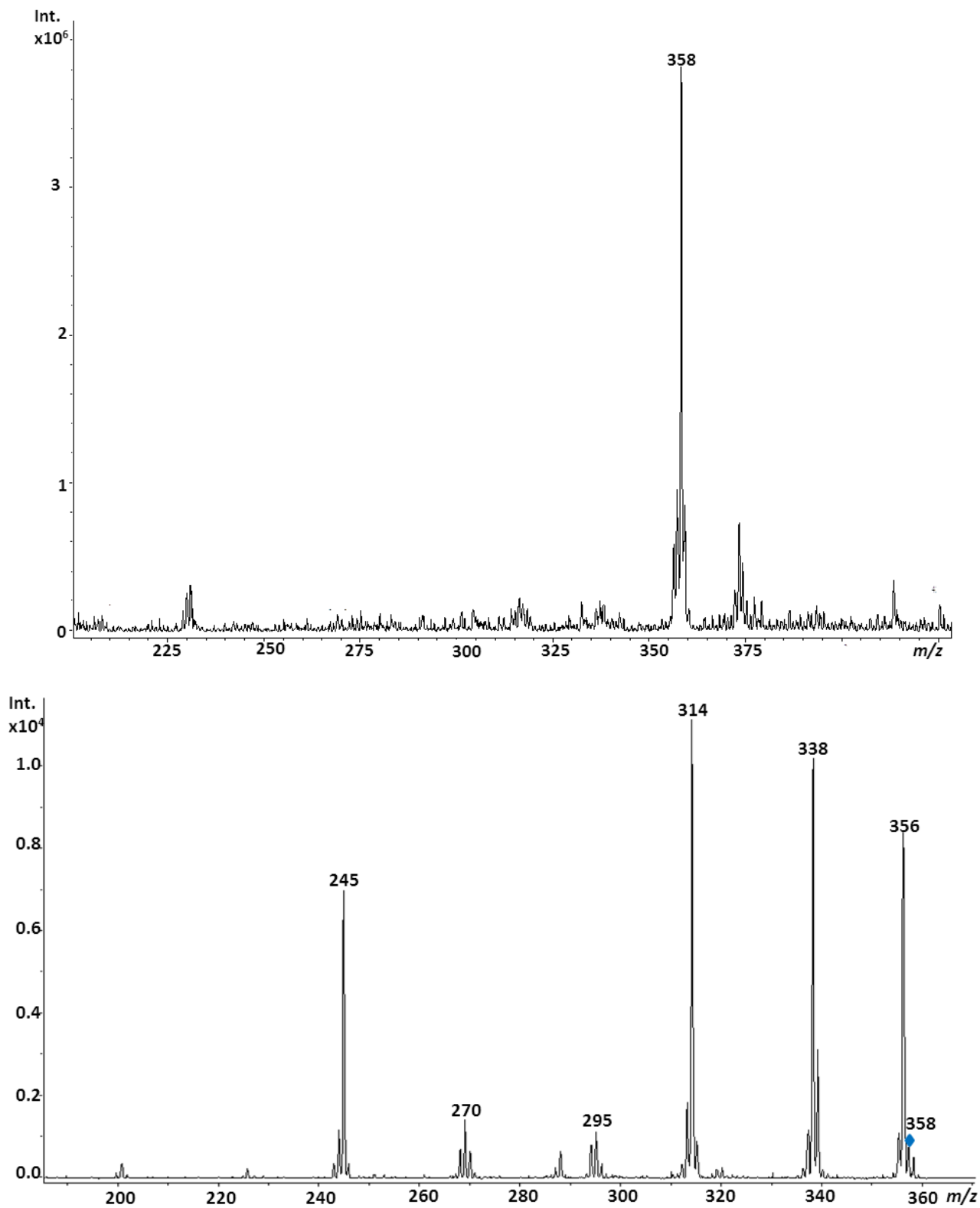


Figure S8. ESI (-) MS and MS/MS spectra on m/z 332 $[M - H]^-$ of deuterated **13** from a CD_3OD solution.

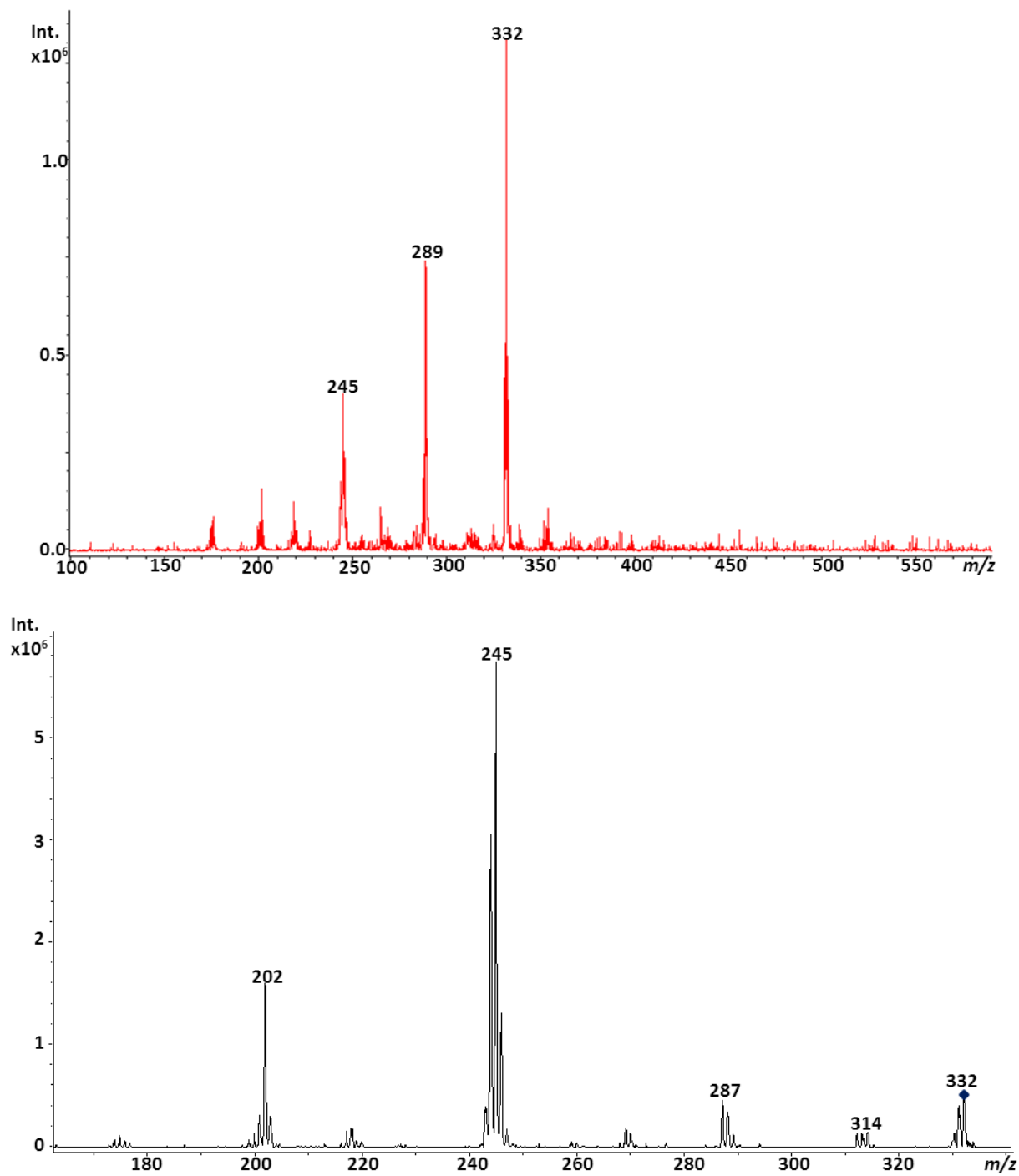


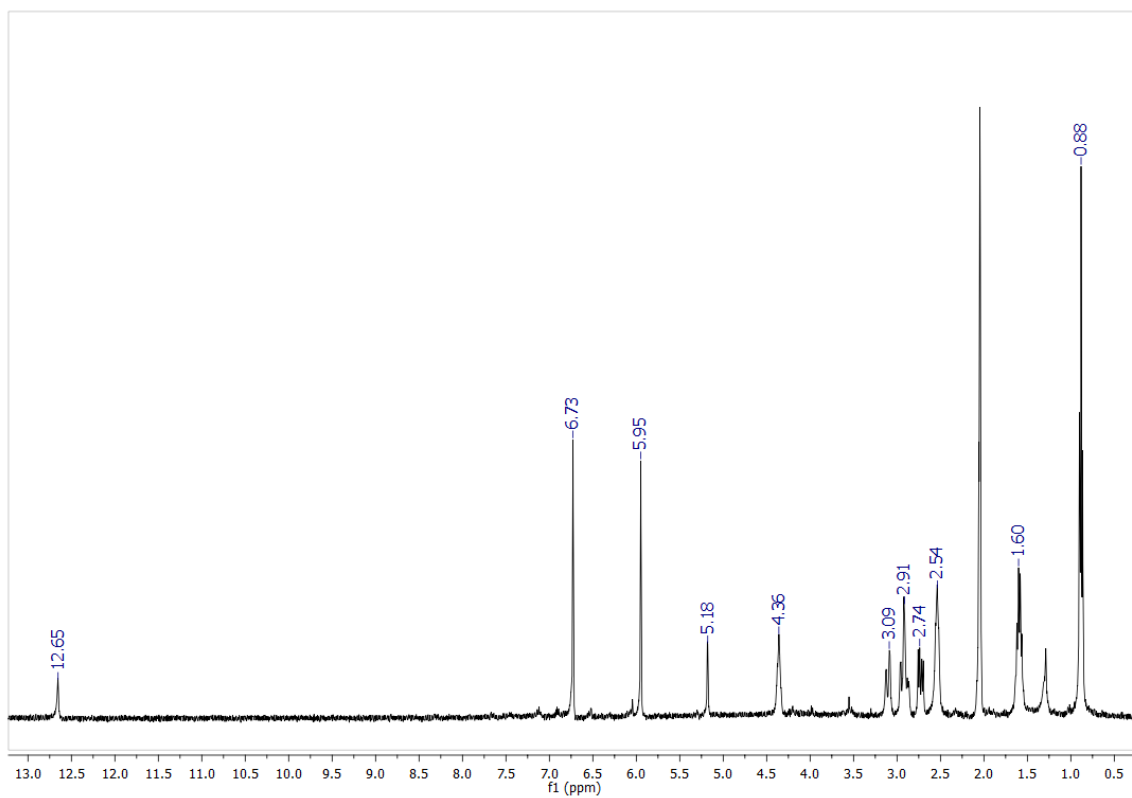
Figure S9. ^1H -NMR spectrum of **7** (400 MHz, in acetone- d_6).

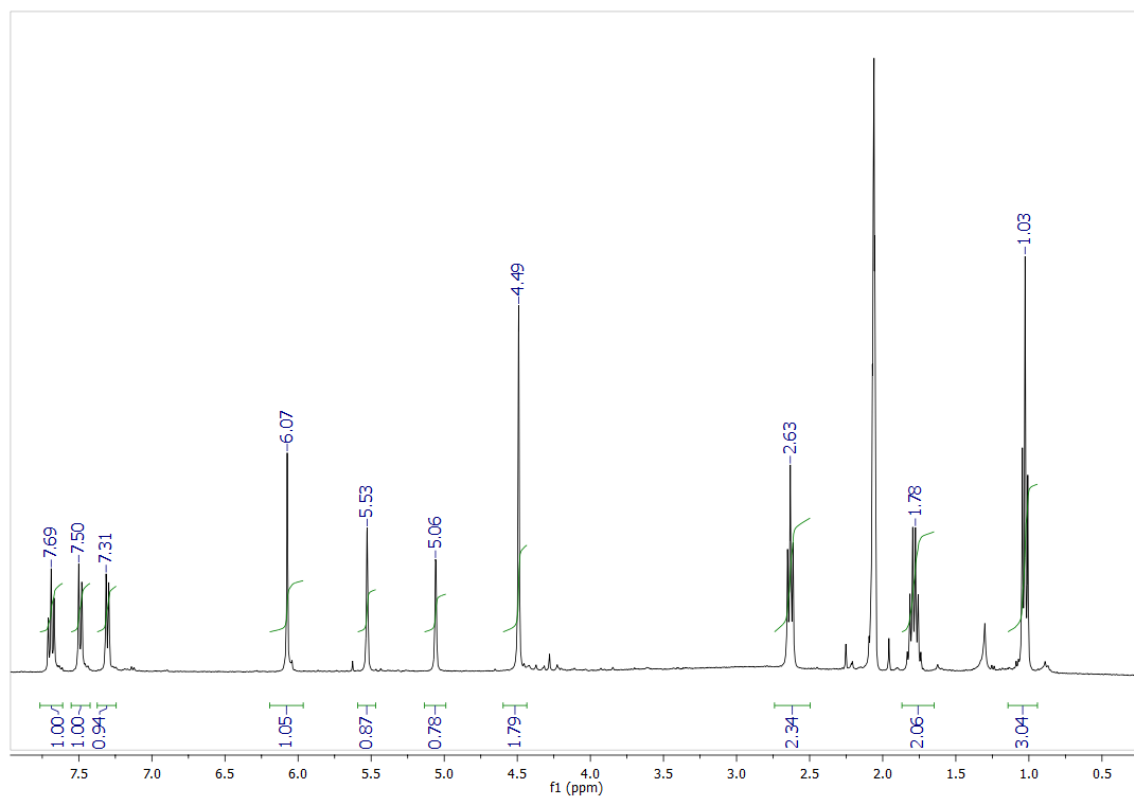
Figure S10. ^1H -NMR spectrum of **9** (400 MHz, in acetone- d_6).

Figure S11. ^1H -NMR spectrum of **11** (400 MHz, in CD_3OD).

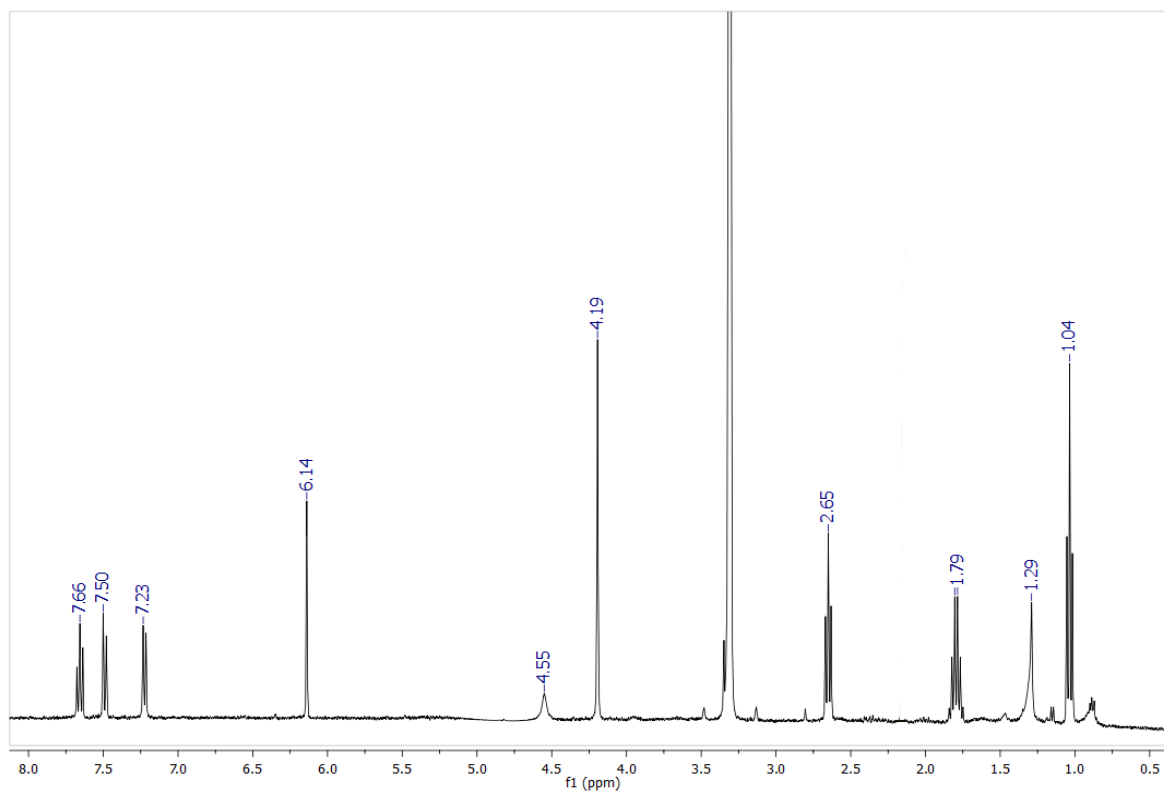


Figure S12. DFTcalculated IR spectra of 4-hydroxy α -pyrone form (A) and 2-hydroxy γ -pyroneform (B) of the compound 7.

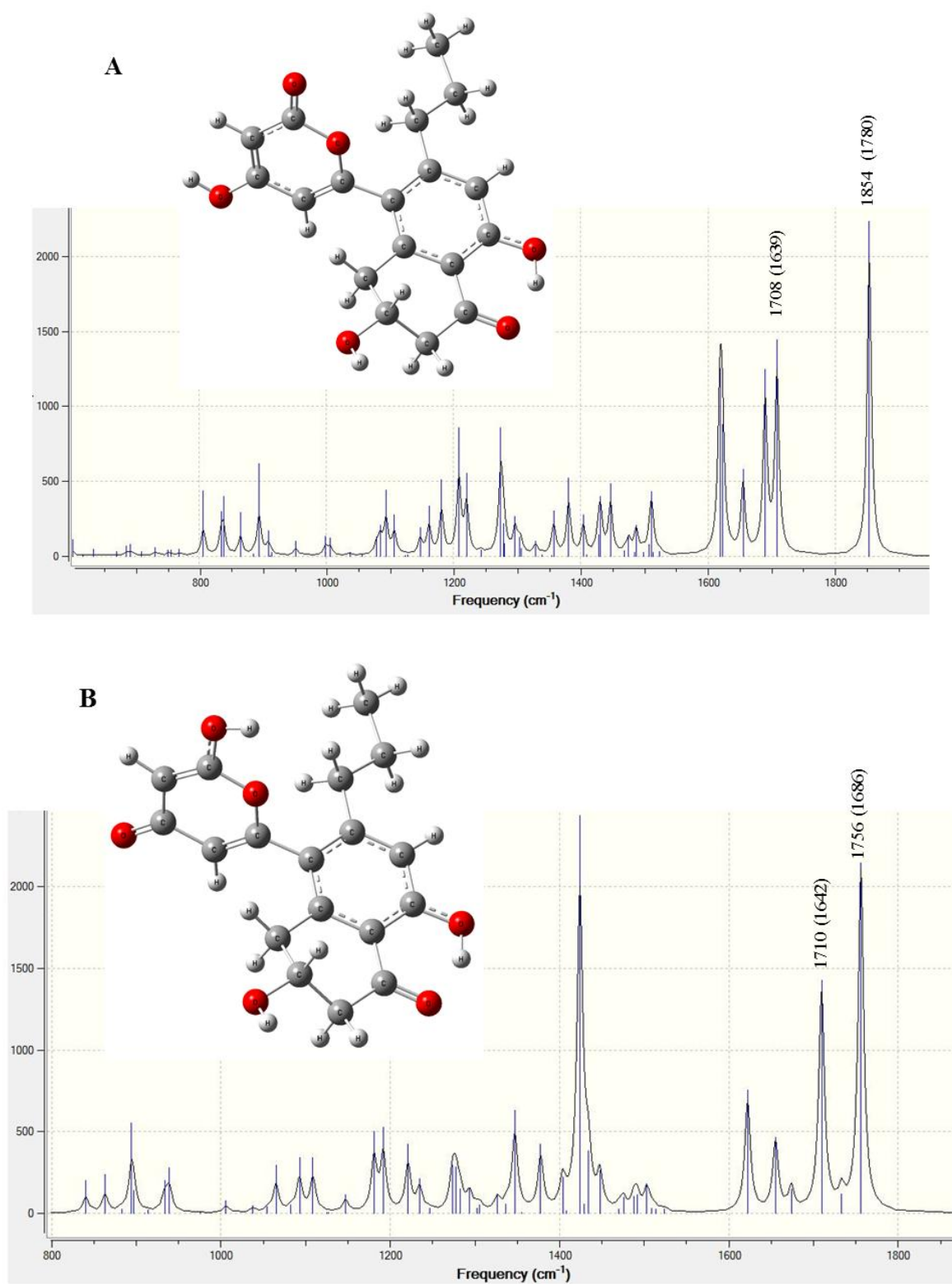


Figure S13. Experimental FT-IR spectrum of compound 7.

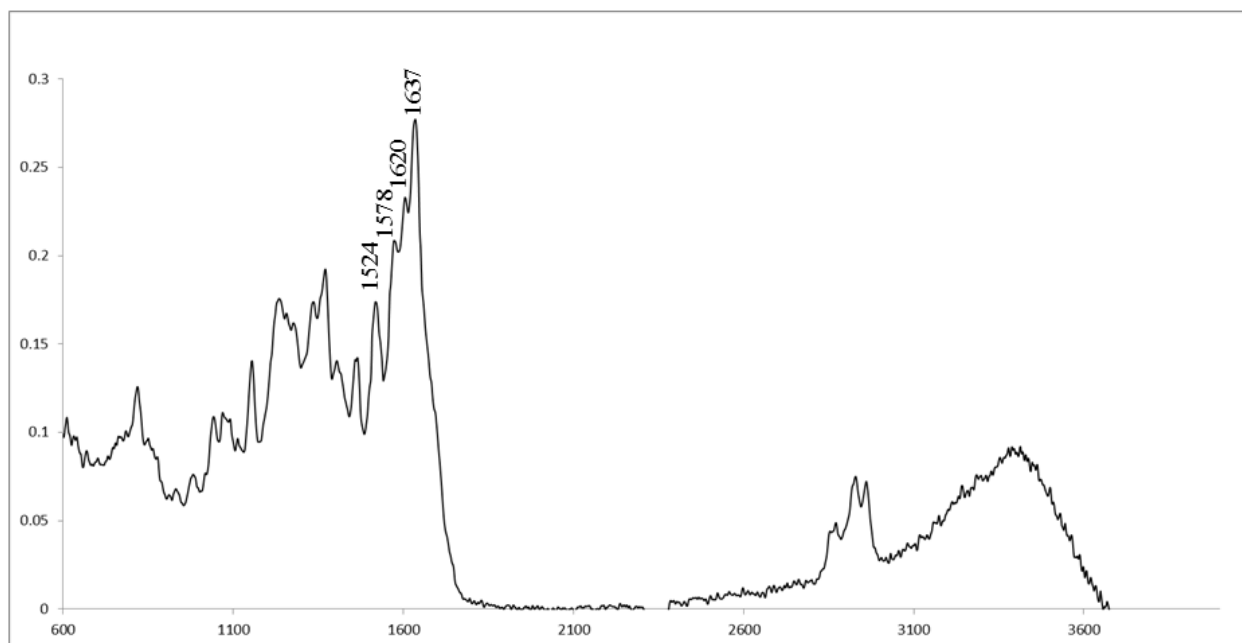


Figure S14. DFT calculated IR spectra of the compound **9** in 4-hydroxy α -pyrone form (A) and 2-hydroxy γ -pyroneform (B).

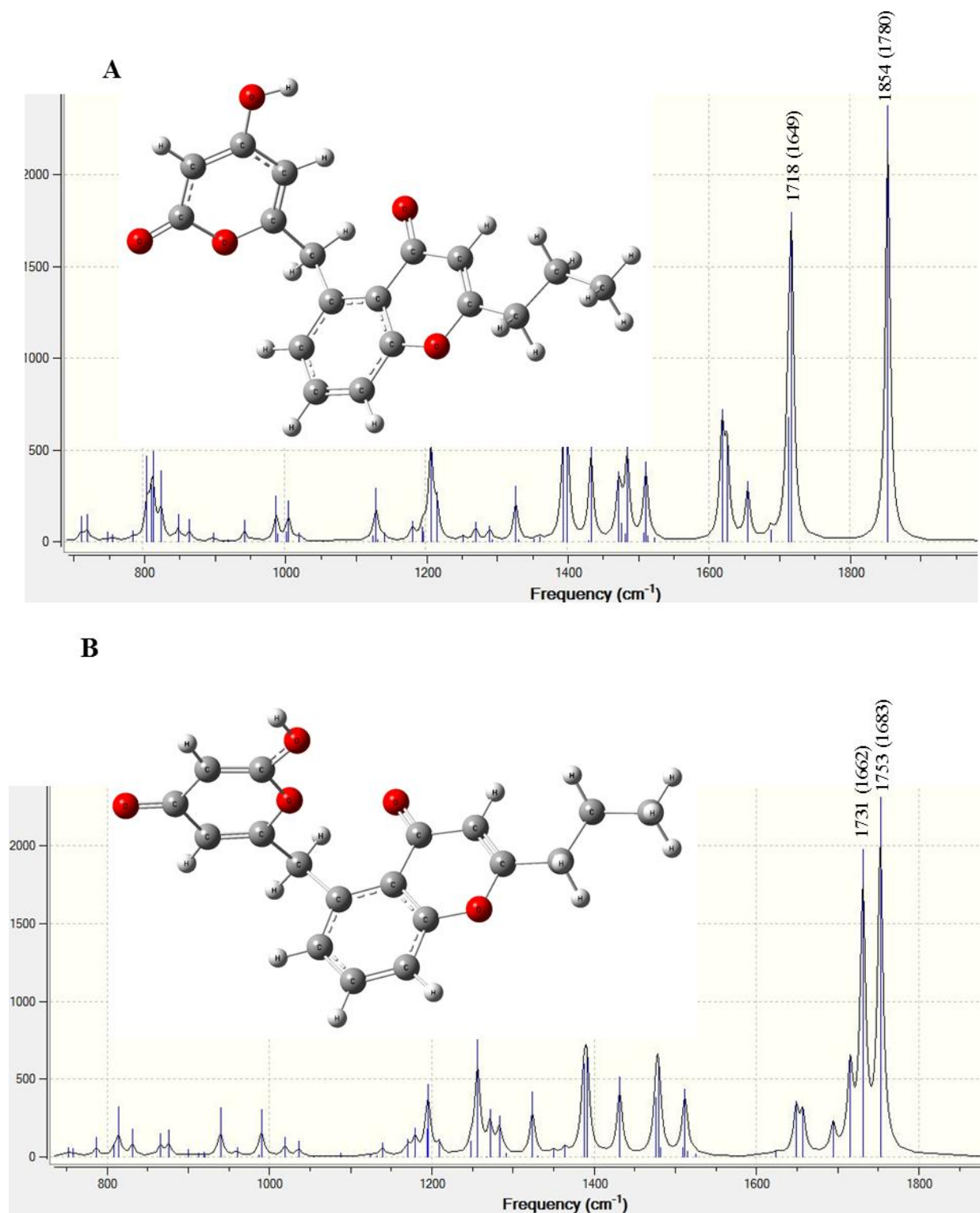


Figure S15. Experimental FT-IR spectrum of compound 9.

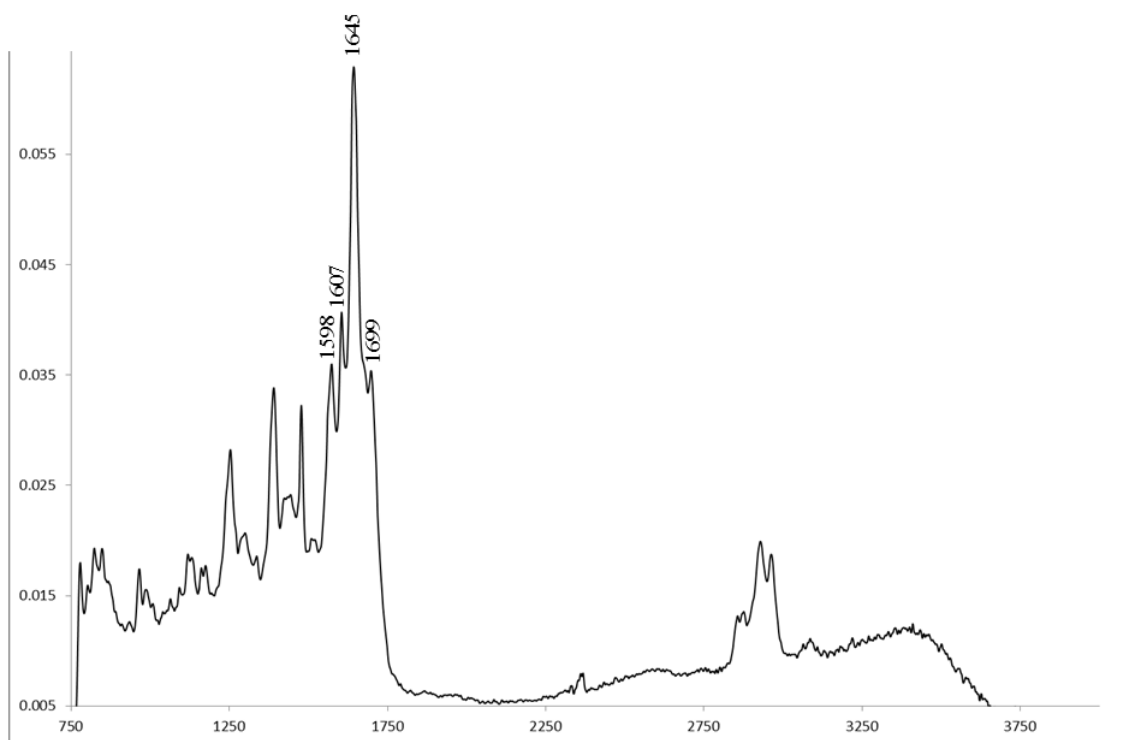


Figure S16. DFT calculated IR spectra of the compound **13** in 4-hydroxy α -pyrone form (A) and 2-hydroxy γ -pyrone form (B).

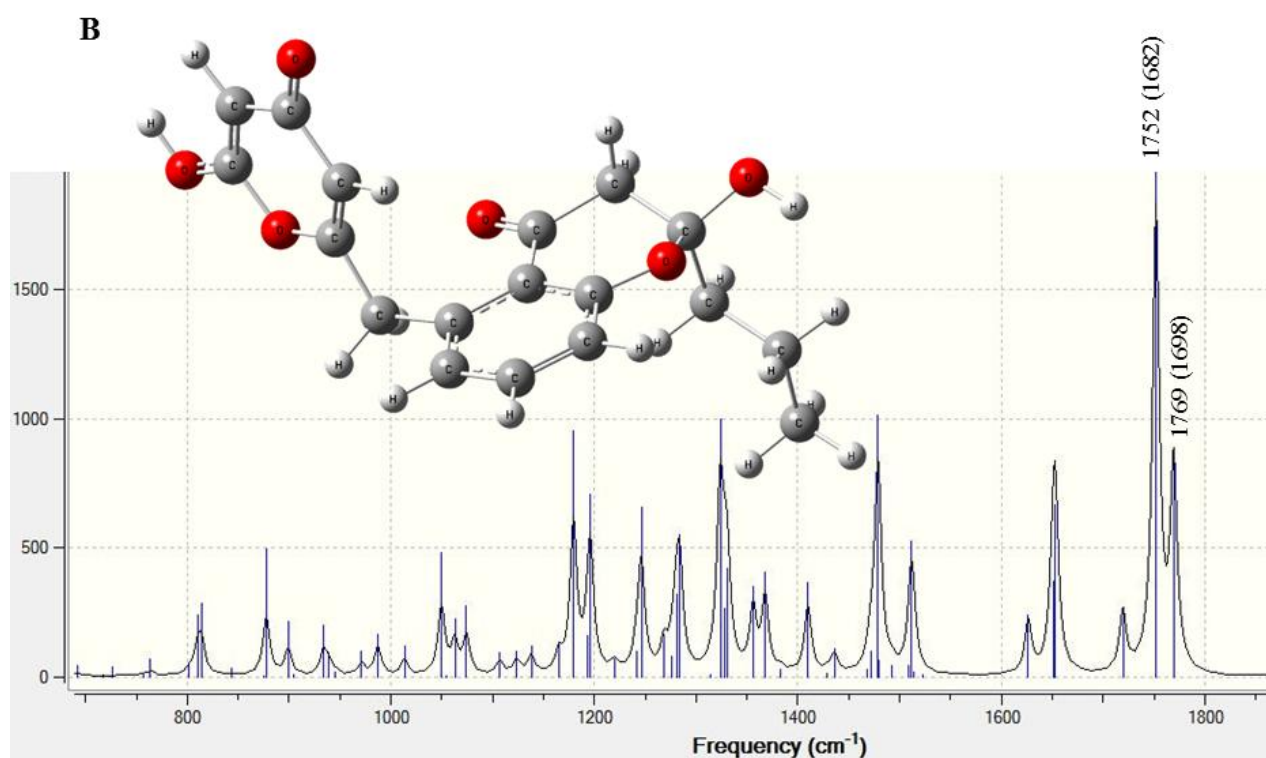
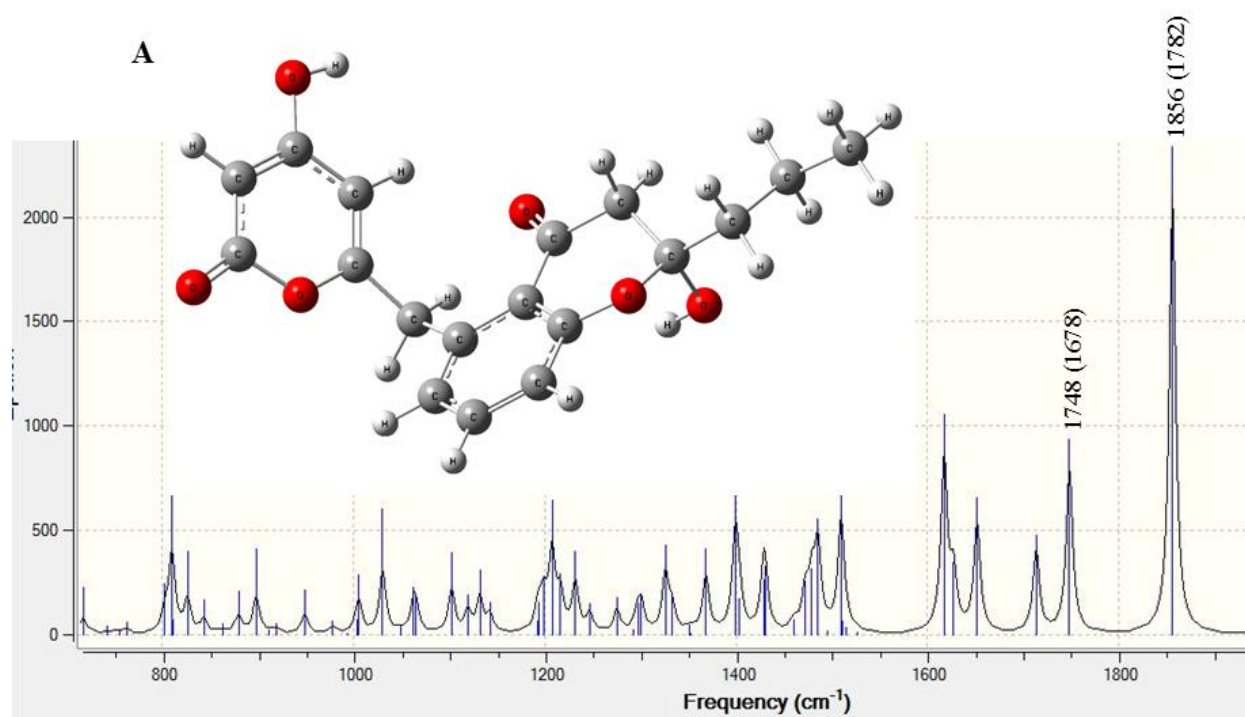
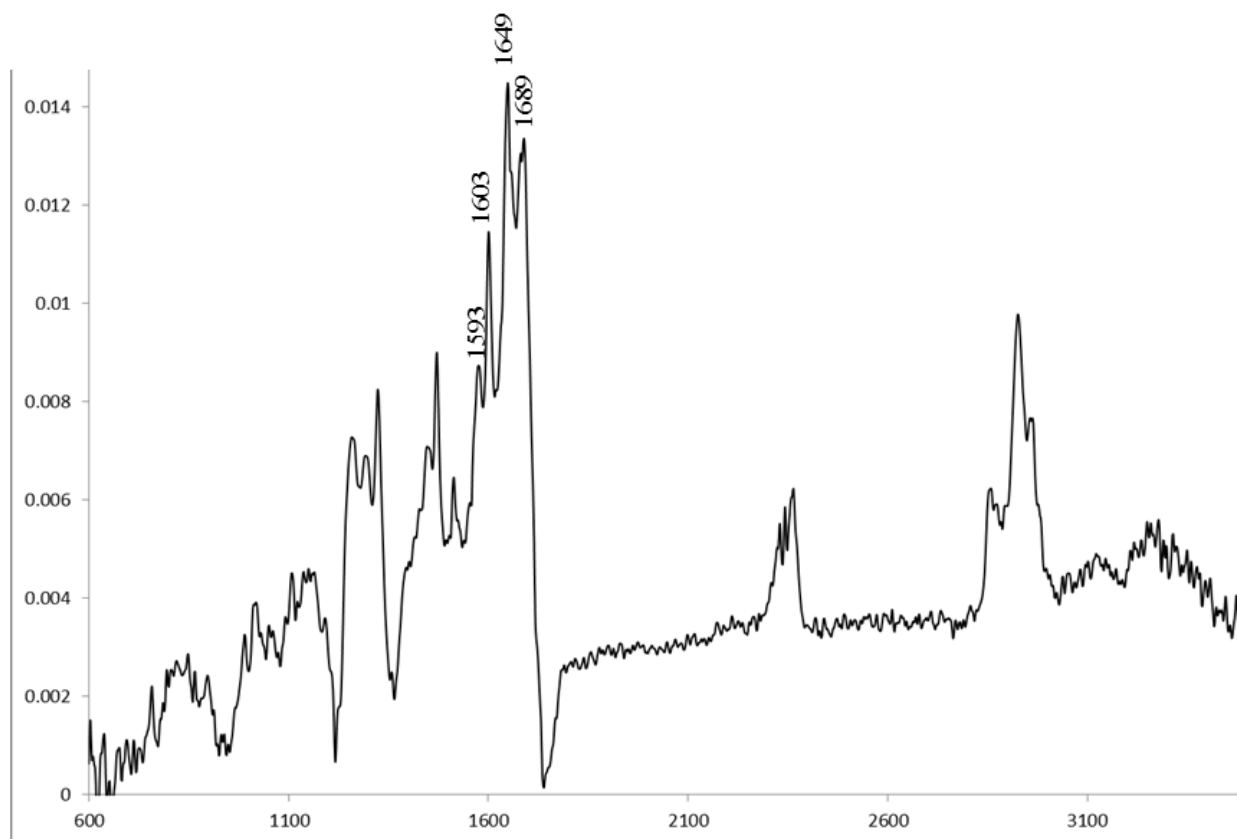


Figure S17. Experimental FT-IR spectrum of compound **13**.**Table S1.** Antibacterial activities at 100 μ L/well of compounds **9**, **11** and **13**.

Compounds	Inhibition Zone \pm SD (mm)				
	<i>E. coli</i> ATCC 25922	<i>S. aureus</i> ATCC 25923	<i>MRSA</i> ATCC 43300	<i>B. subtilis</i> ATCC 6633	<i>P. aeruginosa</i> ATCC 27853
9	-	-	08.34 \pm 1.04	-	11.07 \pm 1.23
11	08.08 \pm 0.41	-	08.27 \pm 0.38	-	07.61 \pm 0.71
13	12.44 \pm 0.84	-	15.033 \pm 0.57	-	13.56 \pm 0.84
Vancomycin (30 μ g/disc)	ND	20.05 \pm 0.60	ND	ND	ND
Erythromycin(15 μ g/disc)	ND	25.26 \pm 0.64	14.63 \pm 0.27	ND	ND
Gentamicin (10 μ g/disc)	23.37 \pm 0.5	25.78 \pm 0.30	ND	ND	18.88 \pm 0.27

-: No activity observed; ND: not determined.