**Anticancer Effects of New Ceramides Isolated from the Red Sea Red Algae *Hypnea musciformis* In a Model of Ehrlich Ascites Carcinoma: LC-HRMS Analysis Profile and Molecular Modeling**

## Additional Experimental Detail

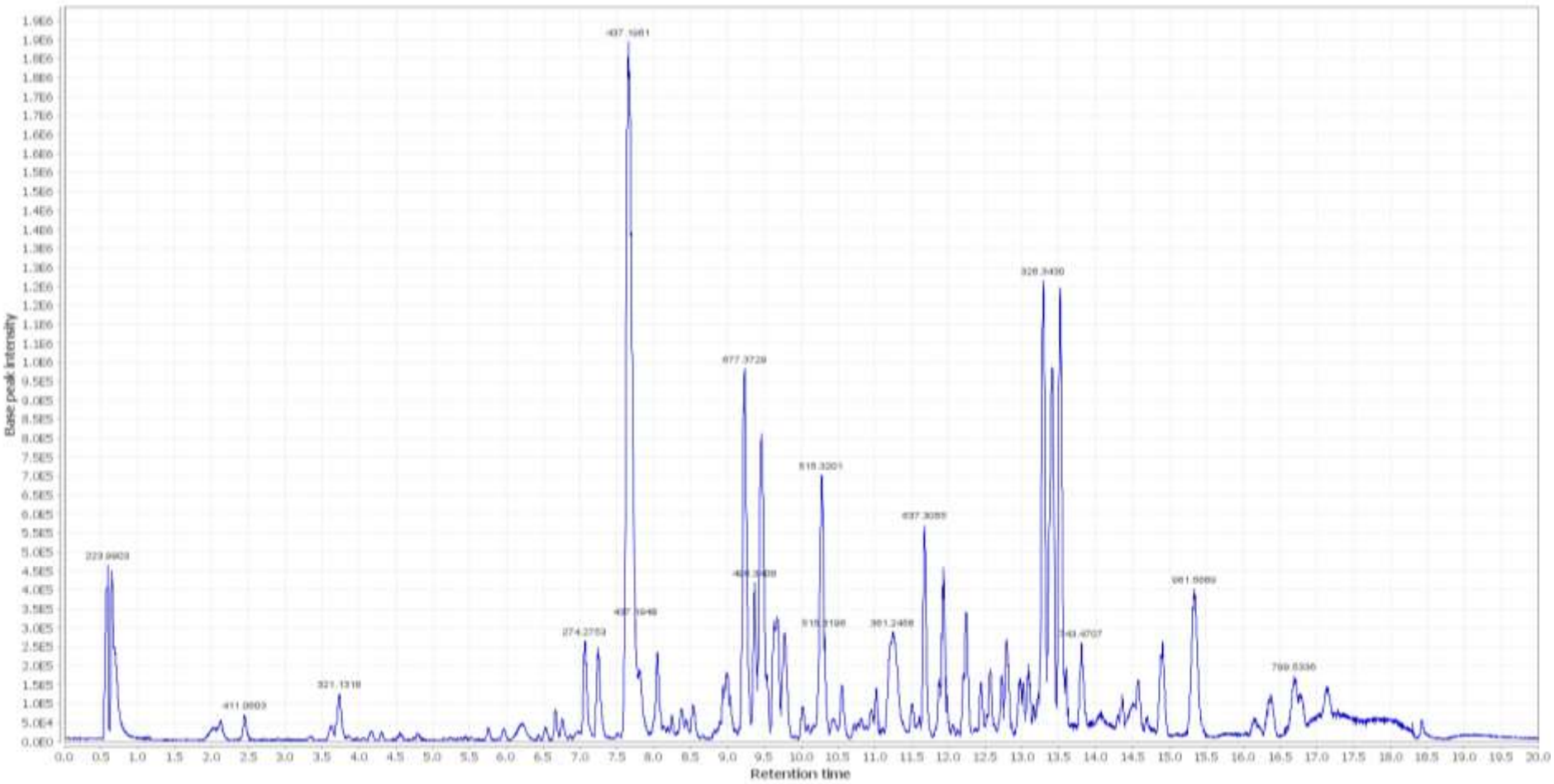


Figure S1. LC-ESI-HRMS chromatogram of crude extract of *Hypnea musciformis* (positive mode).

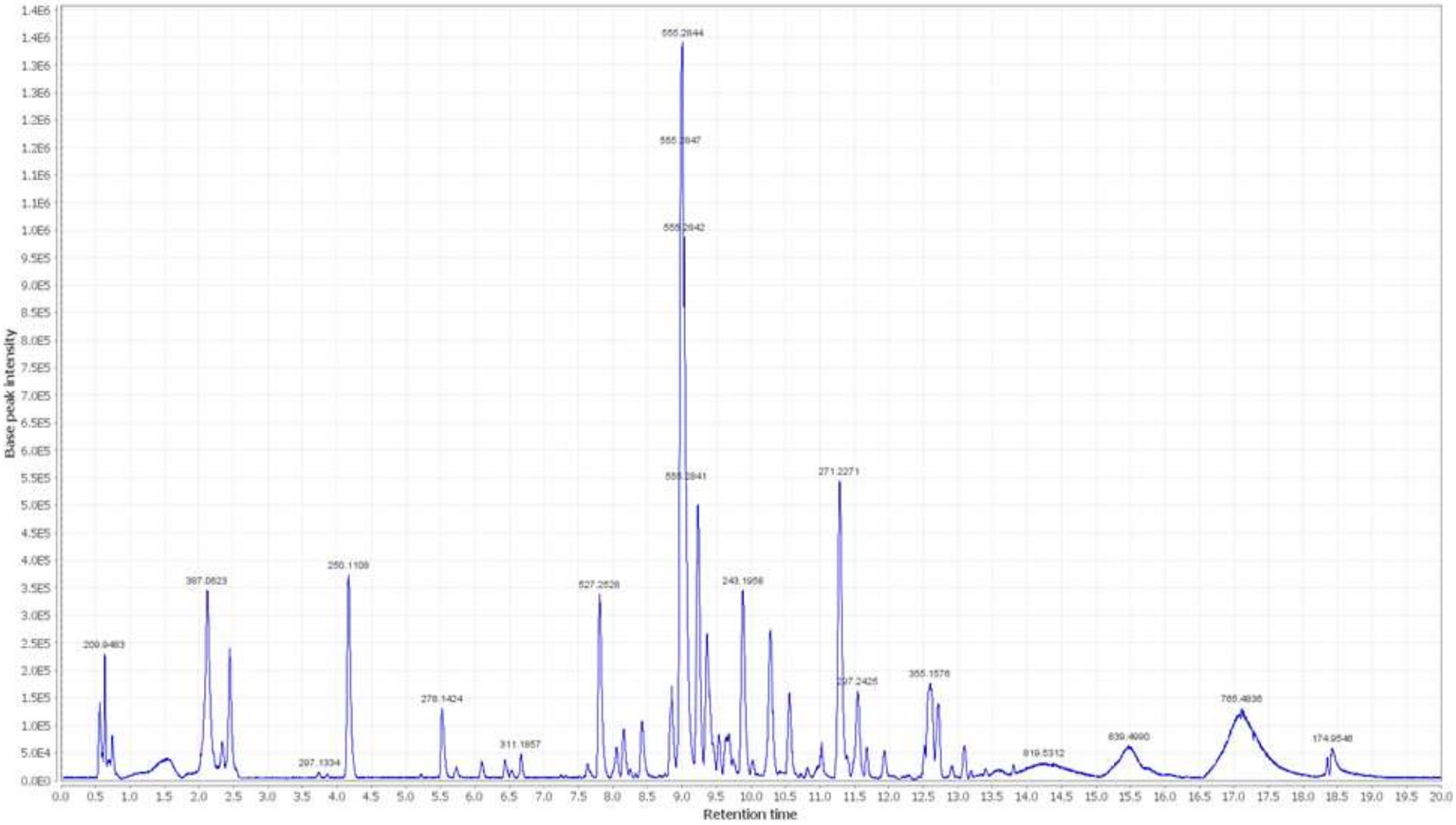


Figure S2. LC-ESI-HRMS chromatogram of crude extract of *Hypnea musciformis* (negative mode).

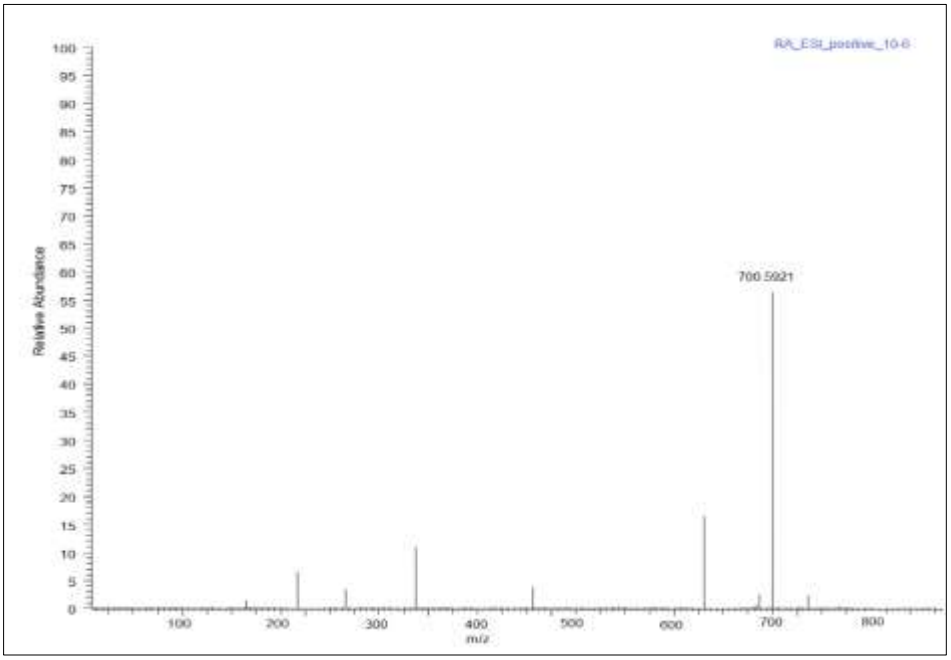


Figure S3. ESI-HRMS chromatogram of ceramide **A** (**1**)

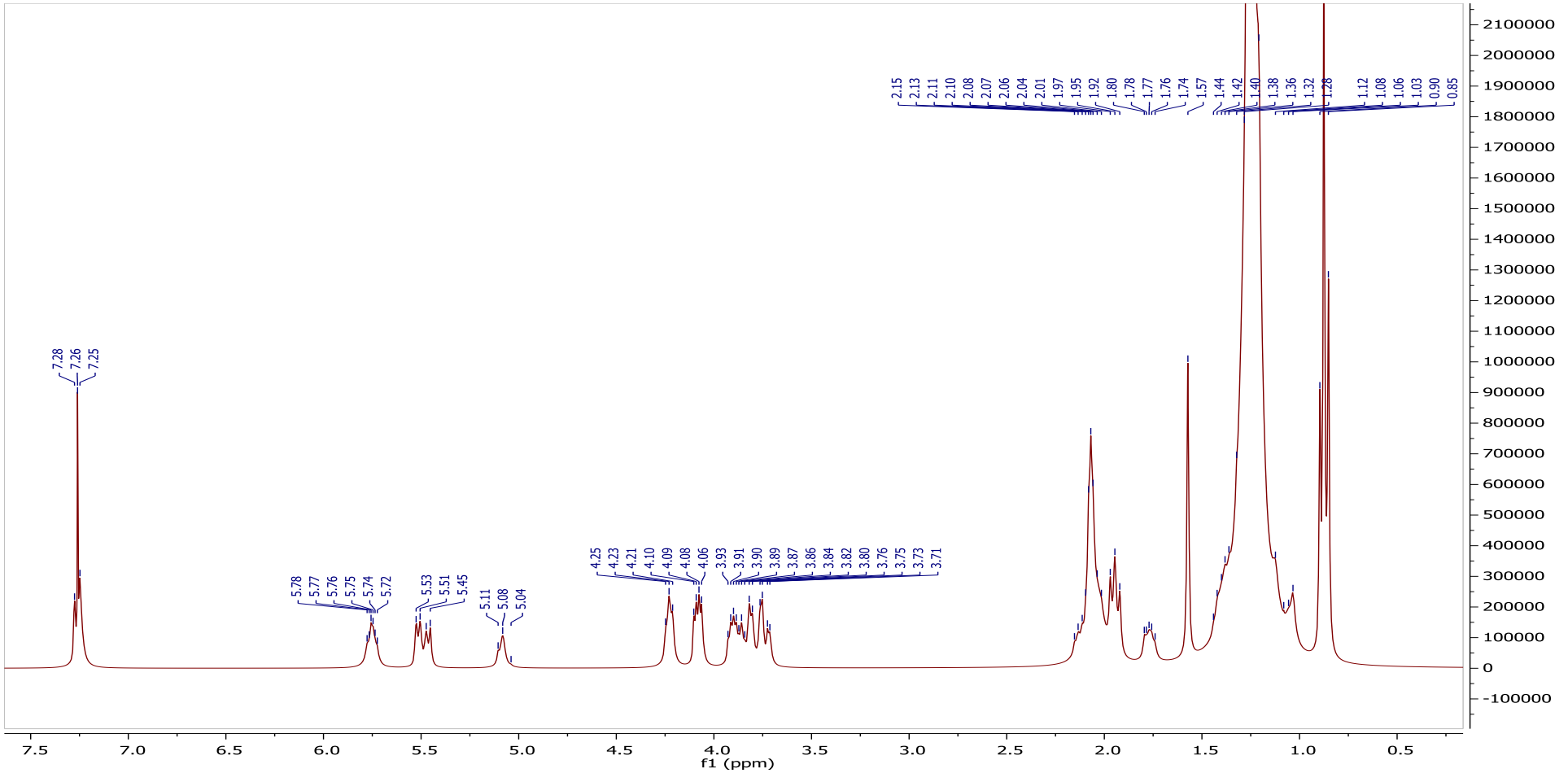


Figure S4. $^{1}$H NMR spectra of ceramide **A** (**1**)

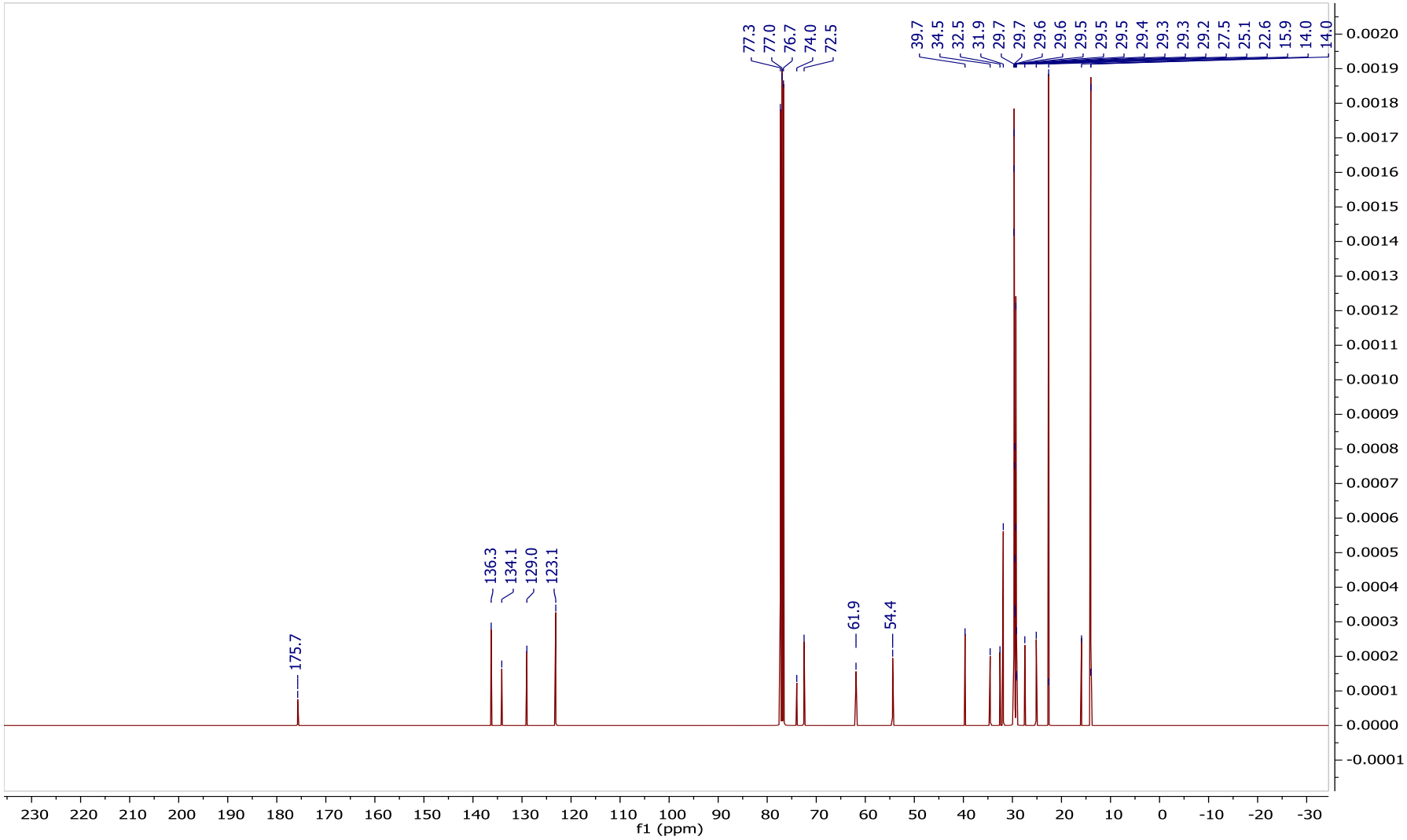


Figure S5. $^{13}$C NMR spectra of ceramide **A** (**1**)

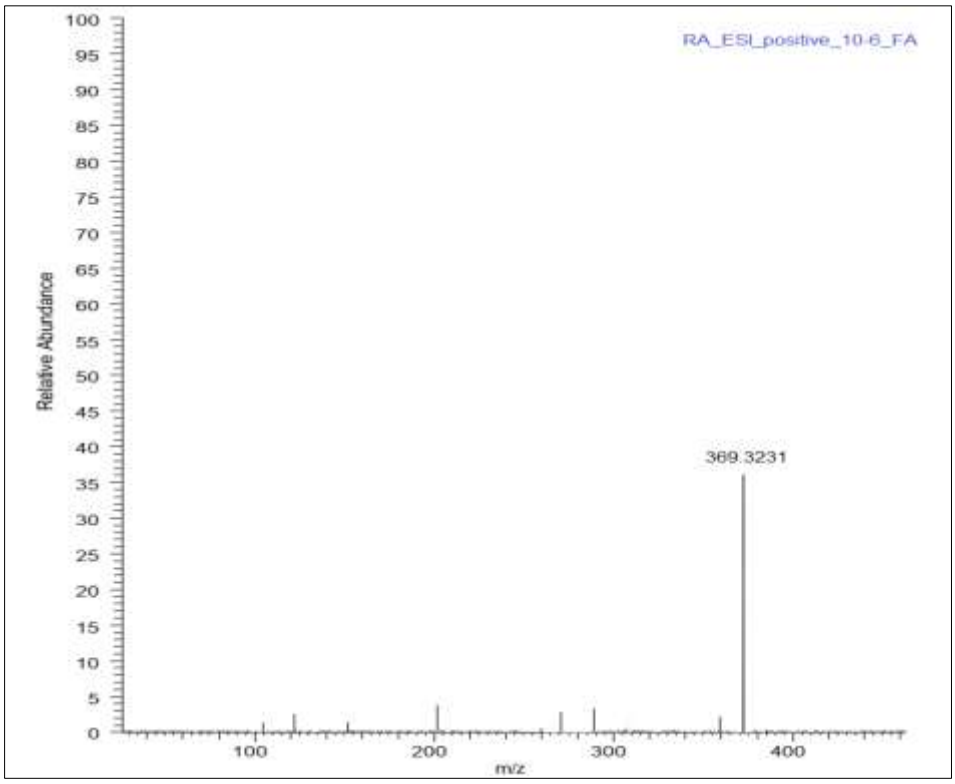


Figure S6. ESI-HRMS chromatogram of fatty acid methyl ester of ceramide **A** (**1**)

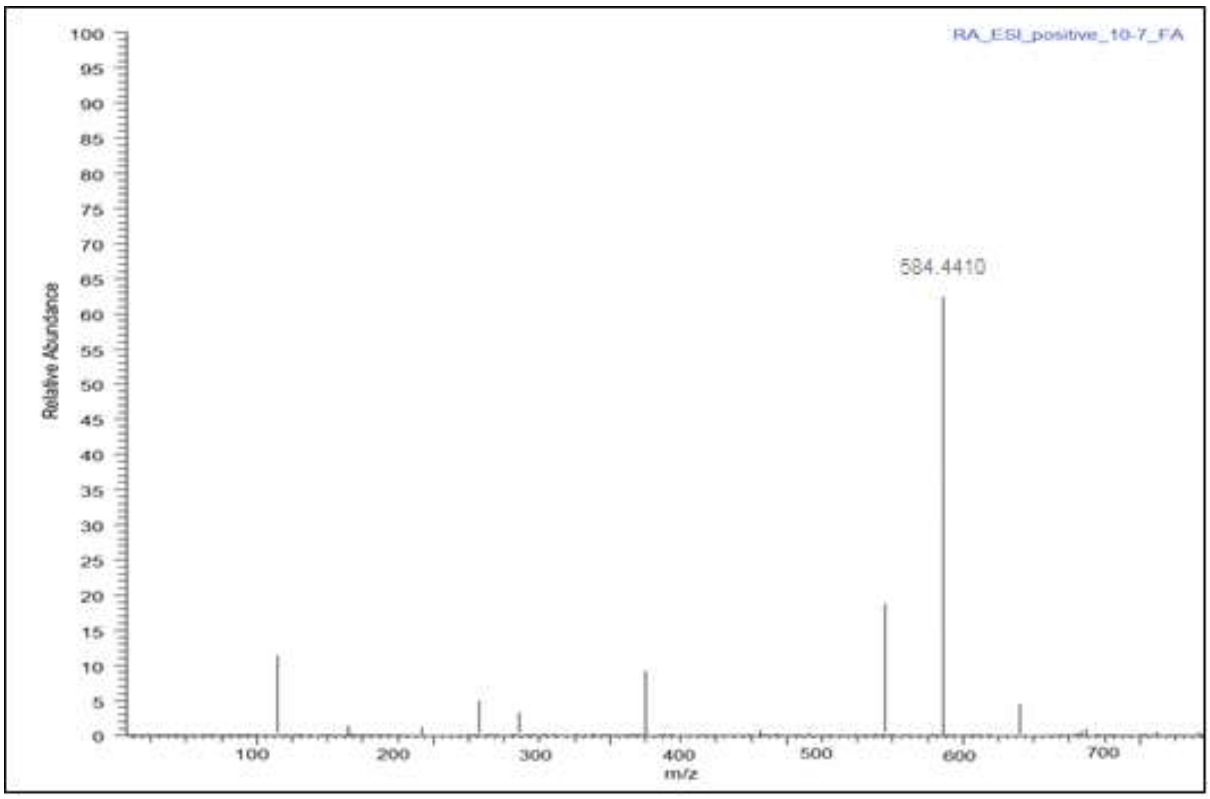


Figure S7. ESI-HRMS chromatogram of ceramide **B** (**2**)

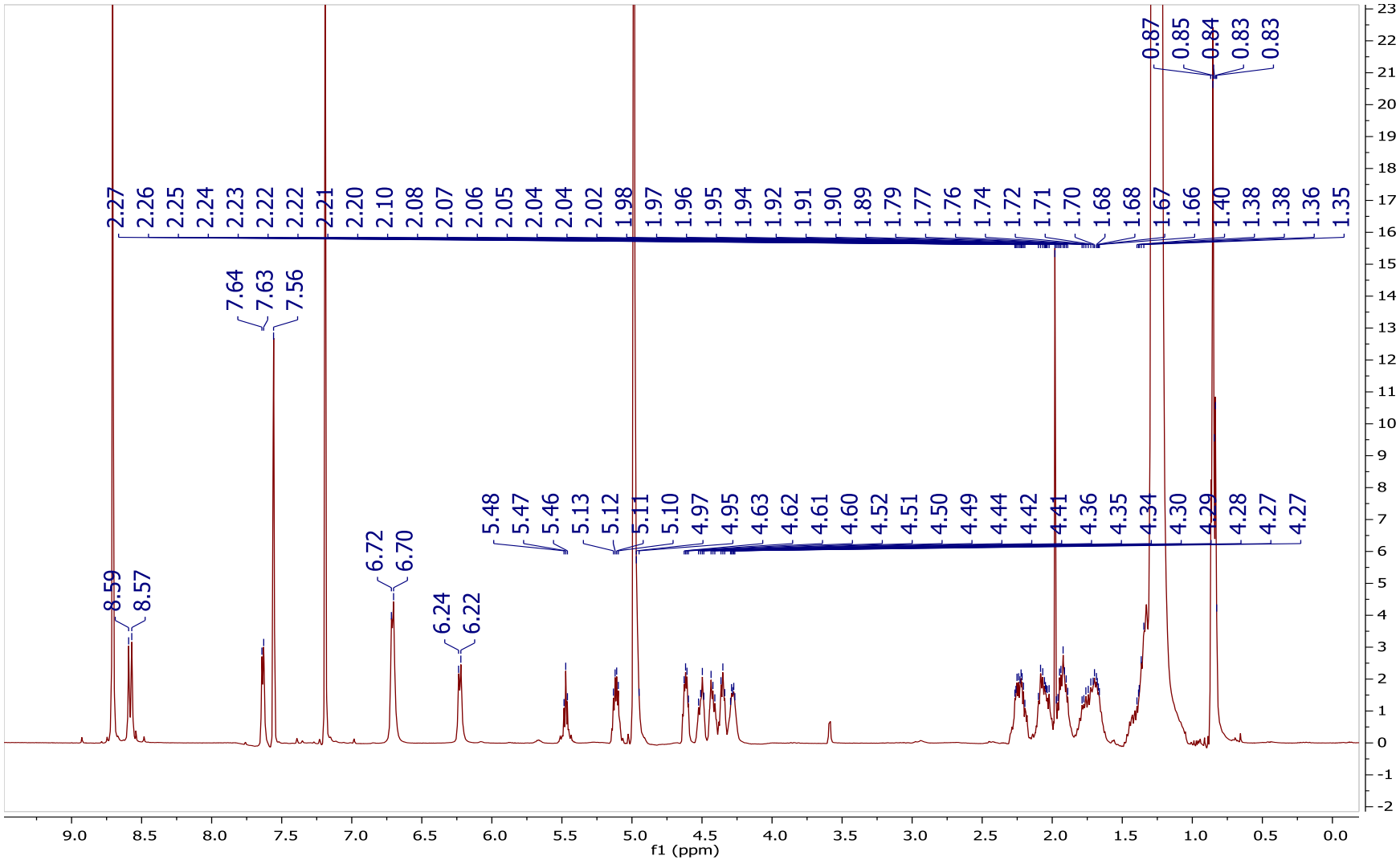


Figure S8. $^{1}$H NMR spectra of ceramide **B** (**2**)

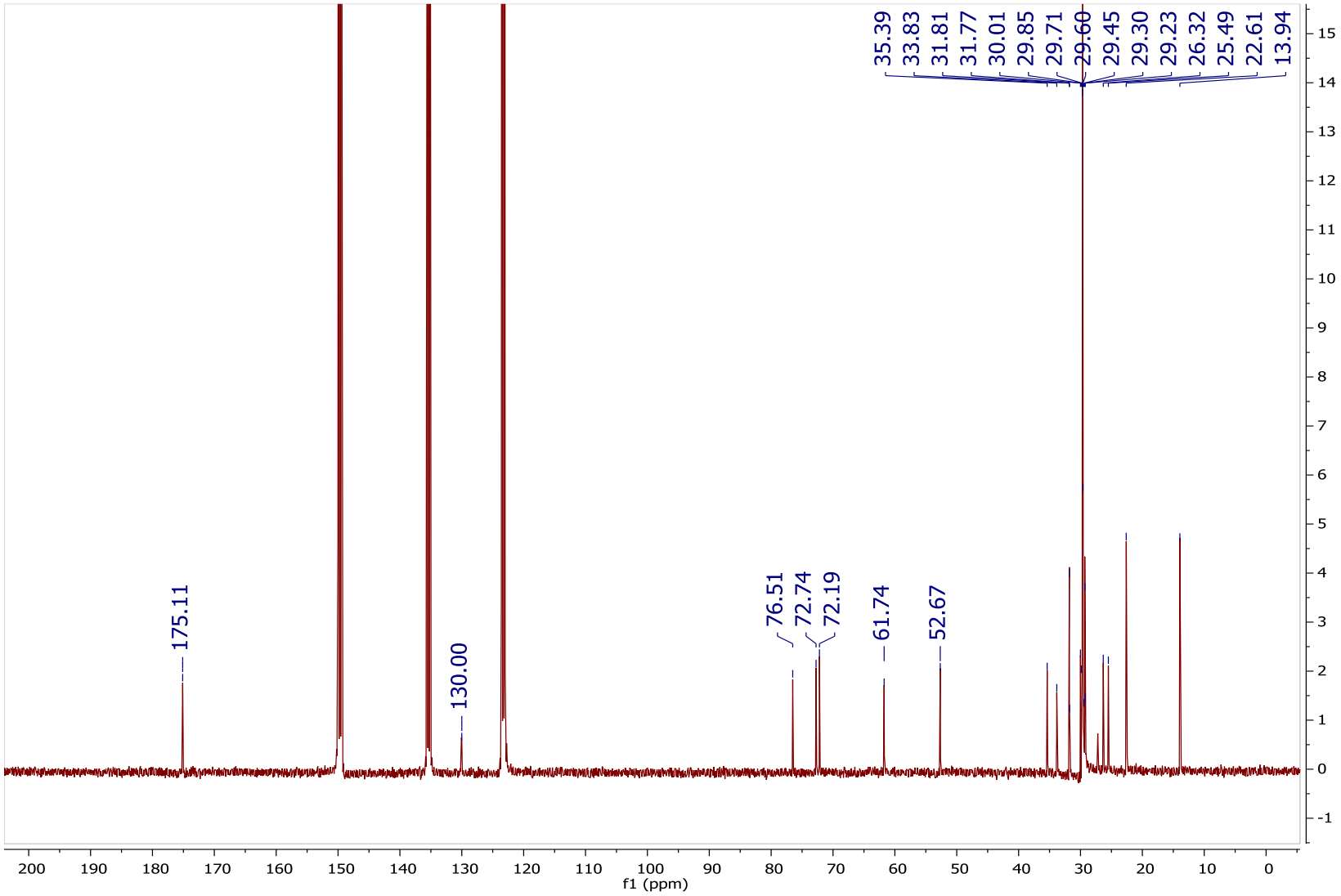


Figure S9. $^{13}$C NMR spectra of ceramide **B** (**2**)

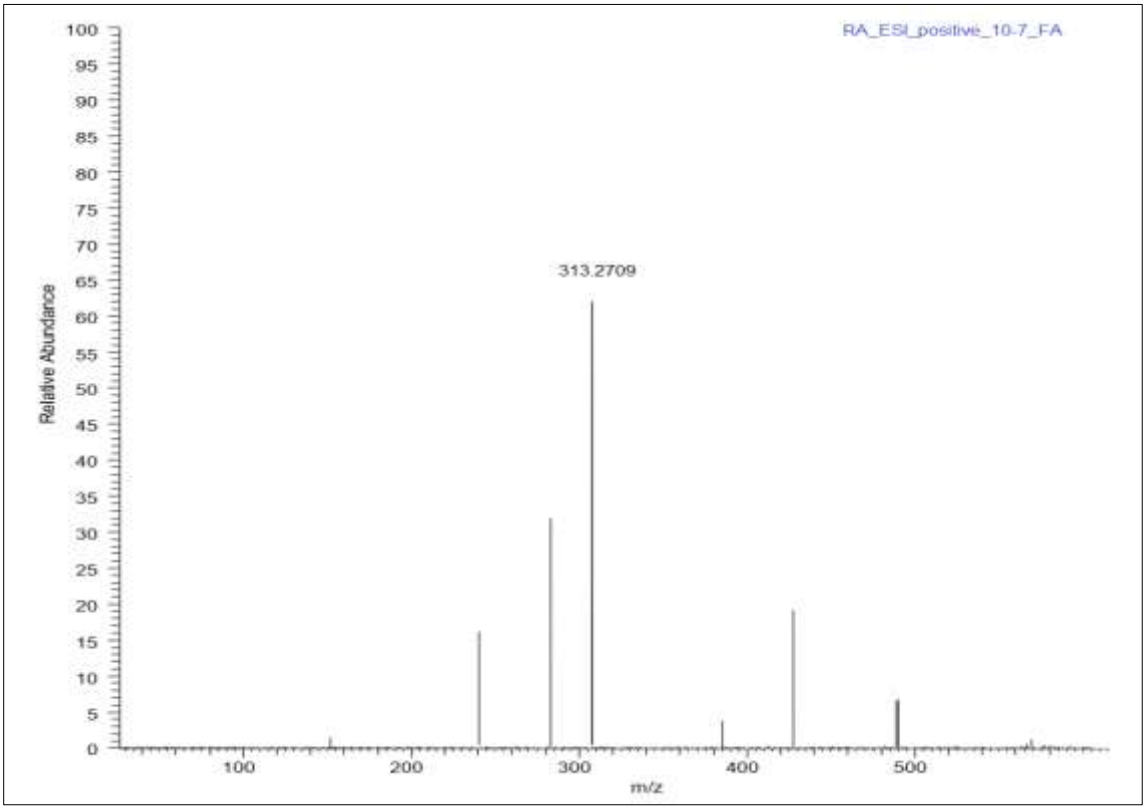


Figure S10. ESI-HRMS chromatogram of fatty acid methyl ester of ceramide **B** (**2**)

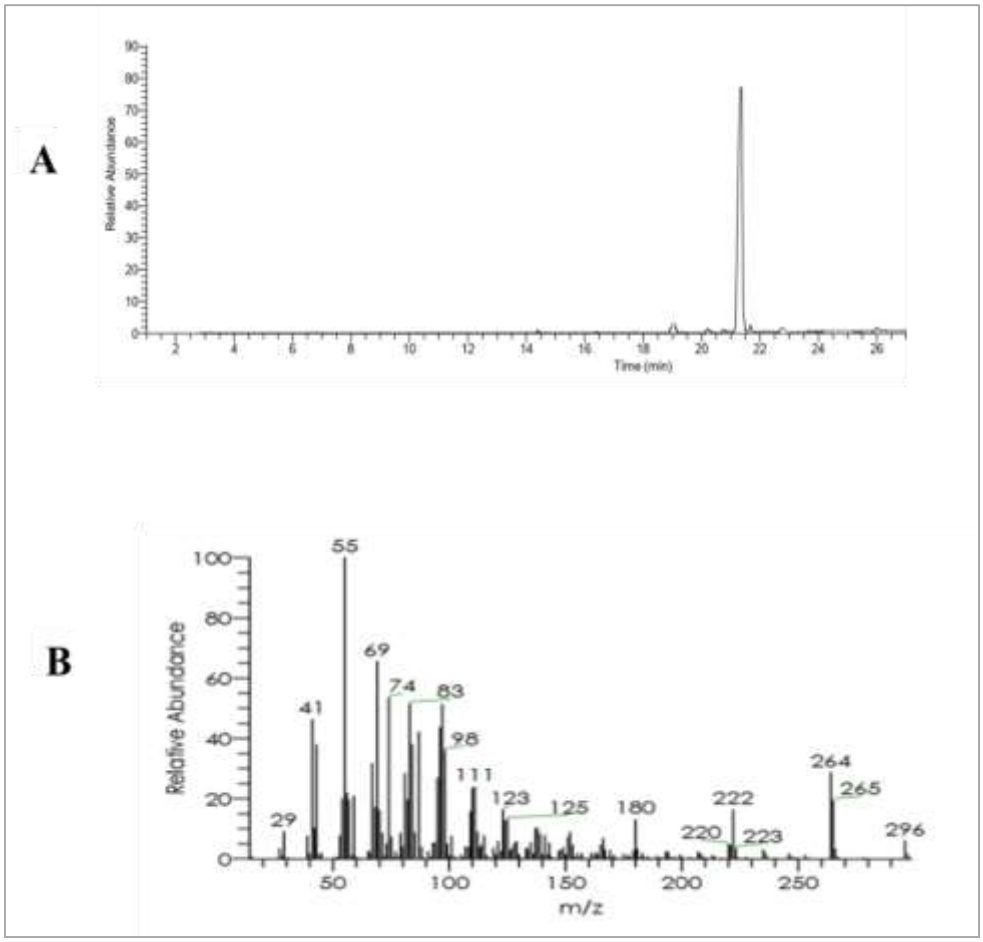


Figure S11. GC-MS analysis, GC-MS chromatogram (**A**) and fragmentation pattern (**B**), of fatty acid methyl ester of ceramide **B** (**2**)

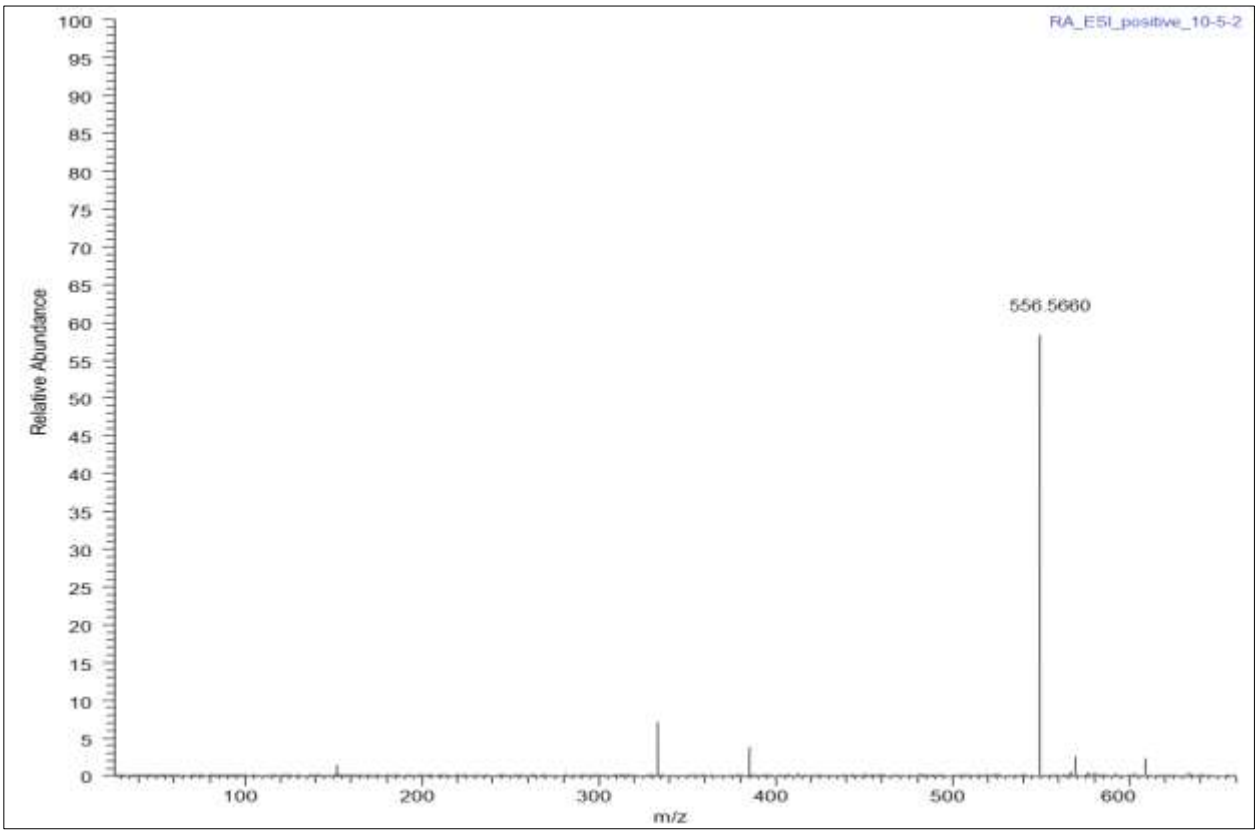


Figure S12. ESI-HRMS chromatogram of ceramide **C** (**3**)

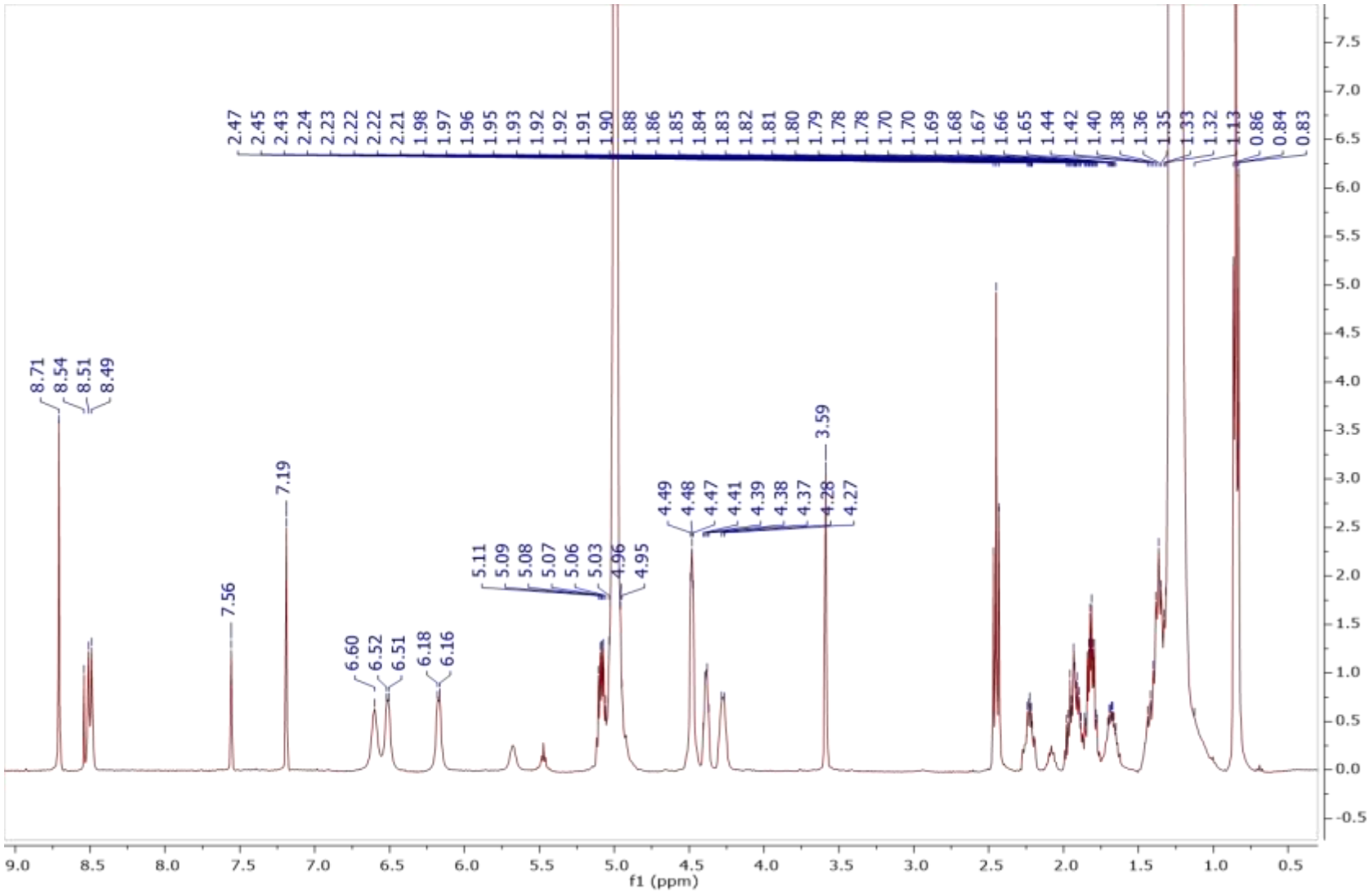


Figure S13. $^{1}$H NMR spectra of ceramide **C** (**3**)

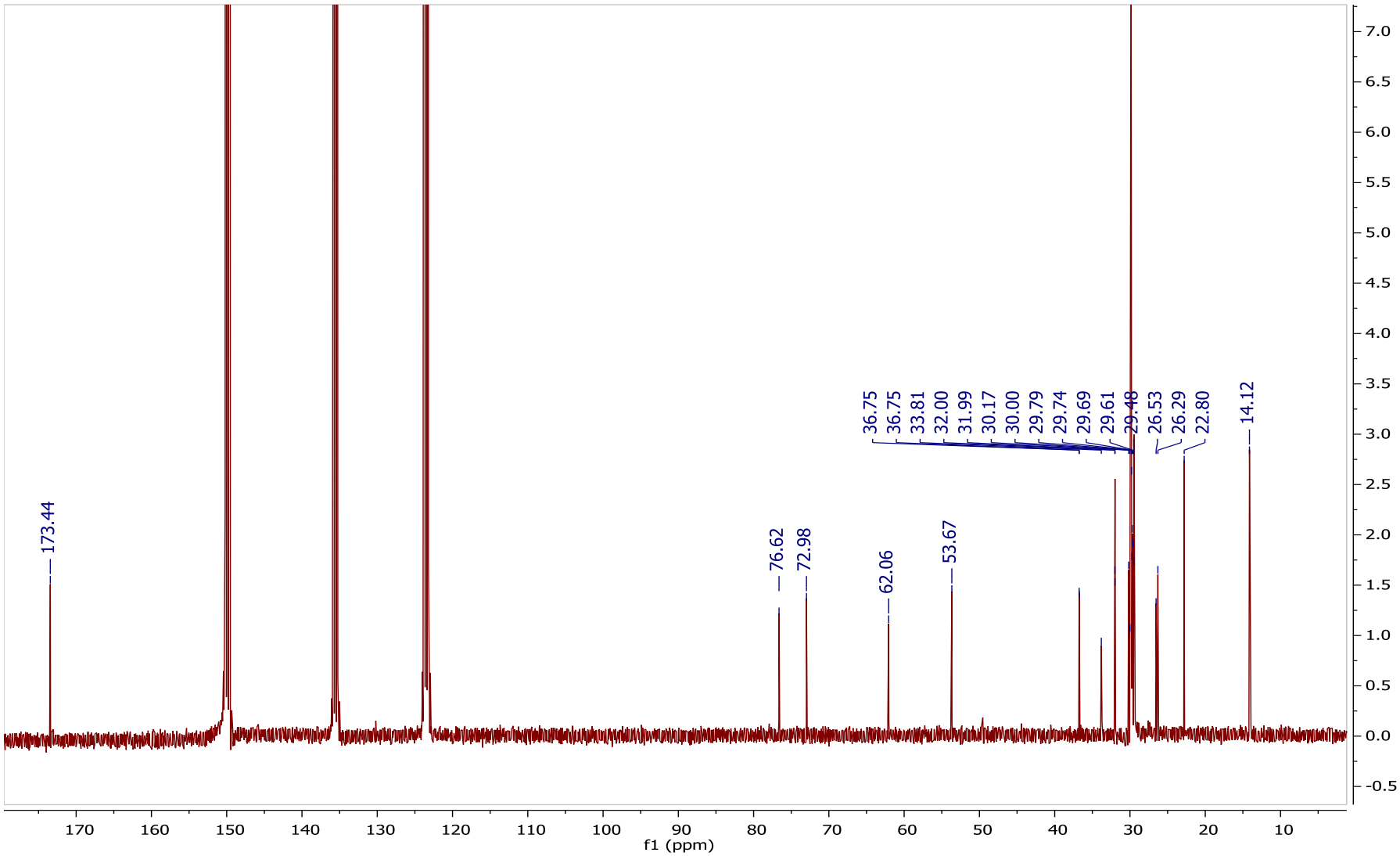


Figure S14. $^{13}$C NMR spectra of ceramide **C** (**3**)

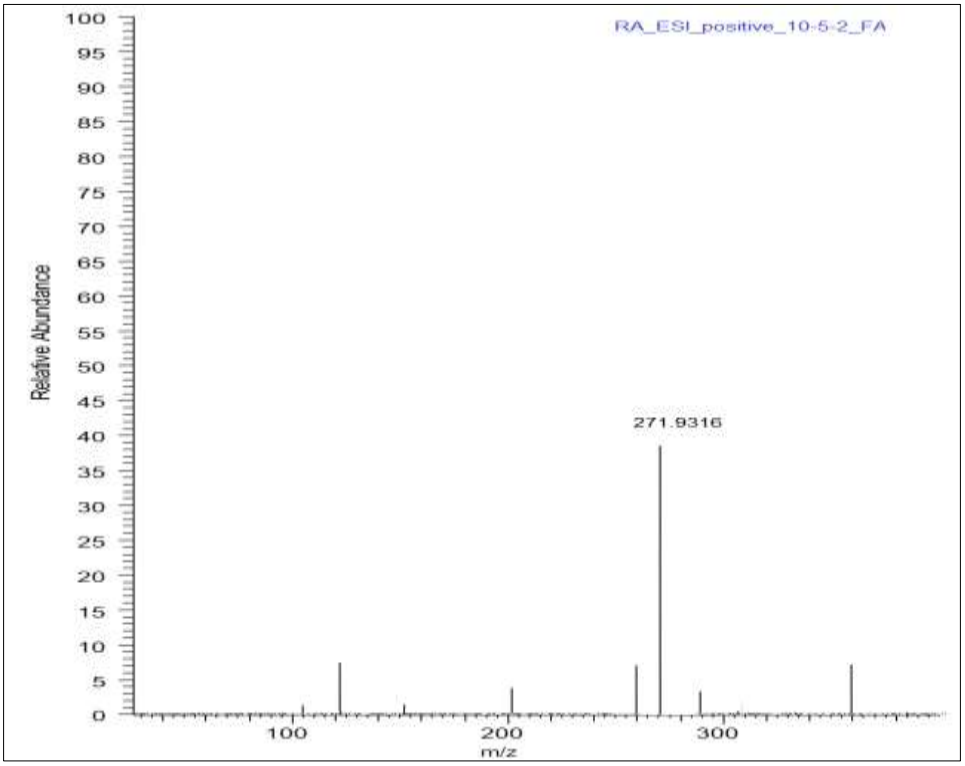


Figure S15. ESI-HRMS chromatogram of fatty acid methyl ester of ceramide **C** (**3**)

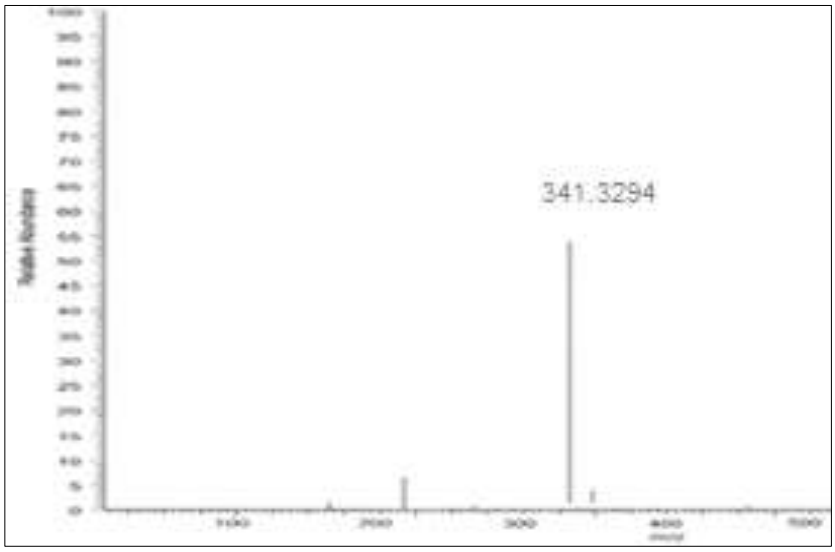


Figure S16. ESI-HRMS chromatogram of compound **4**.

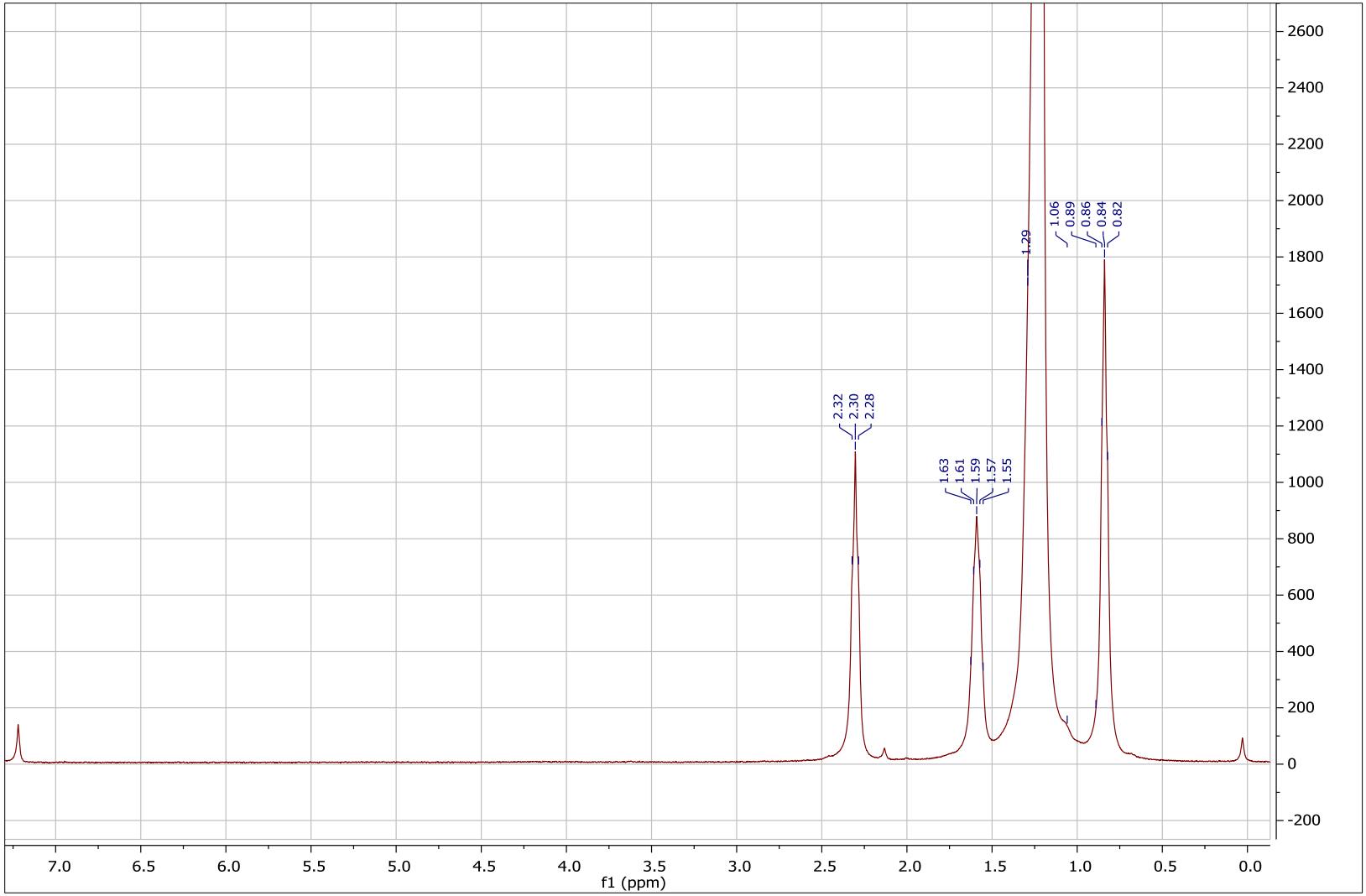


Figure S17. $^{1}$H NMR spectra of compound **4**.

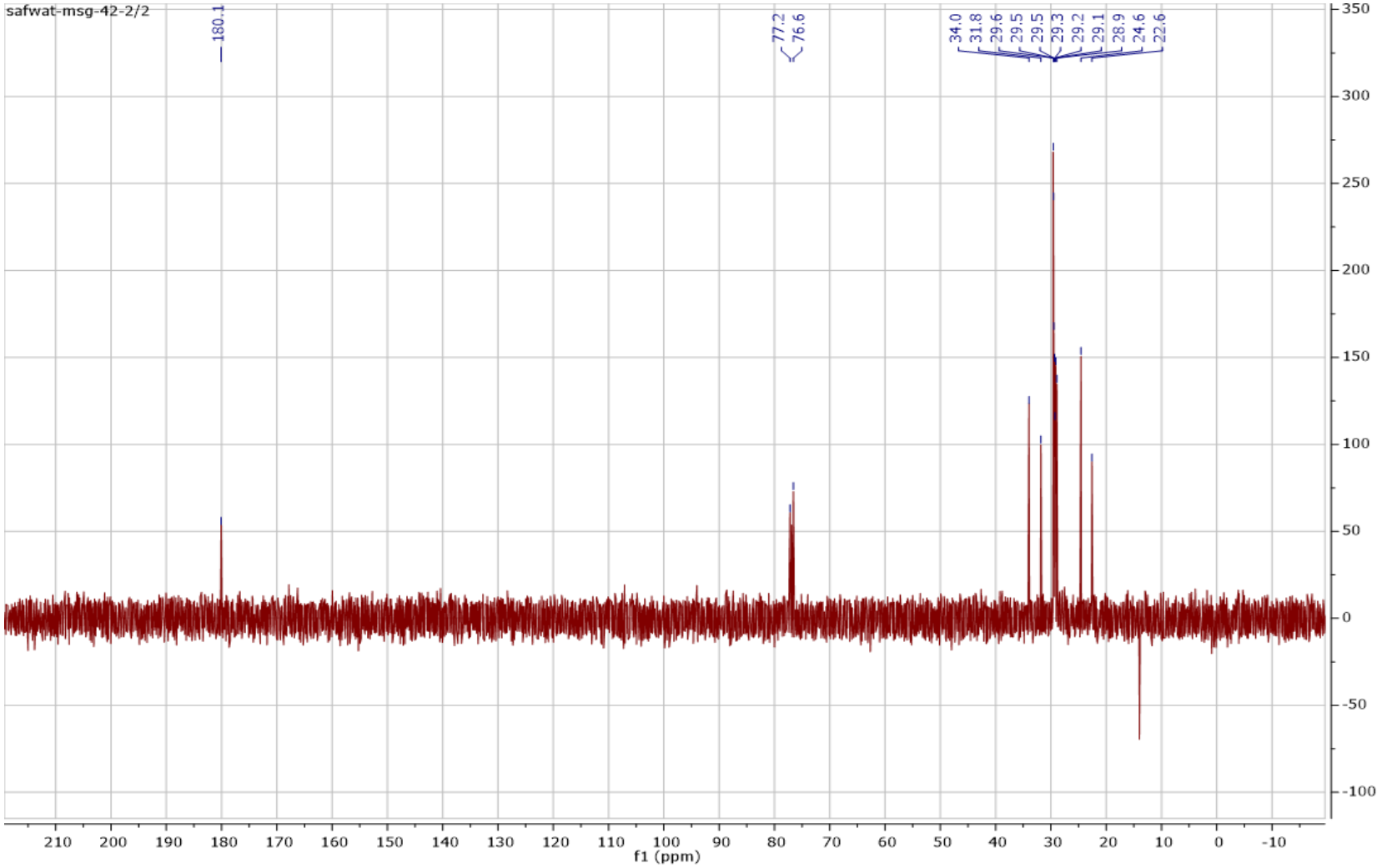


Figure S18. $^{13}$C APT NMR spectra of compound **4**.

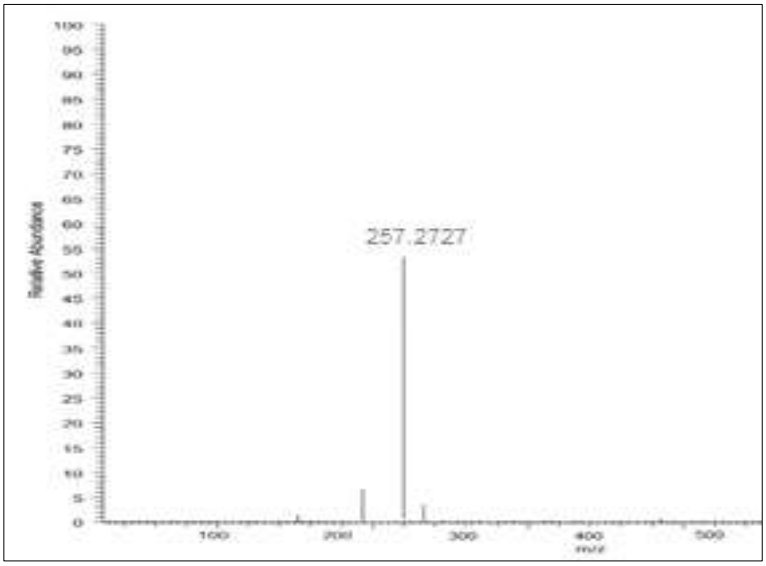


Figure S19. ESI-HRMS chromatogram of compound **5**.

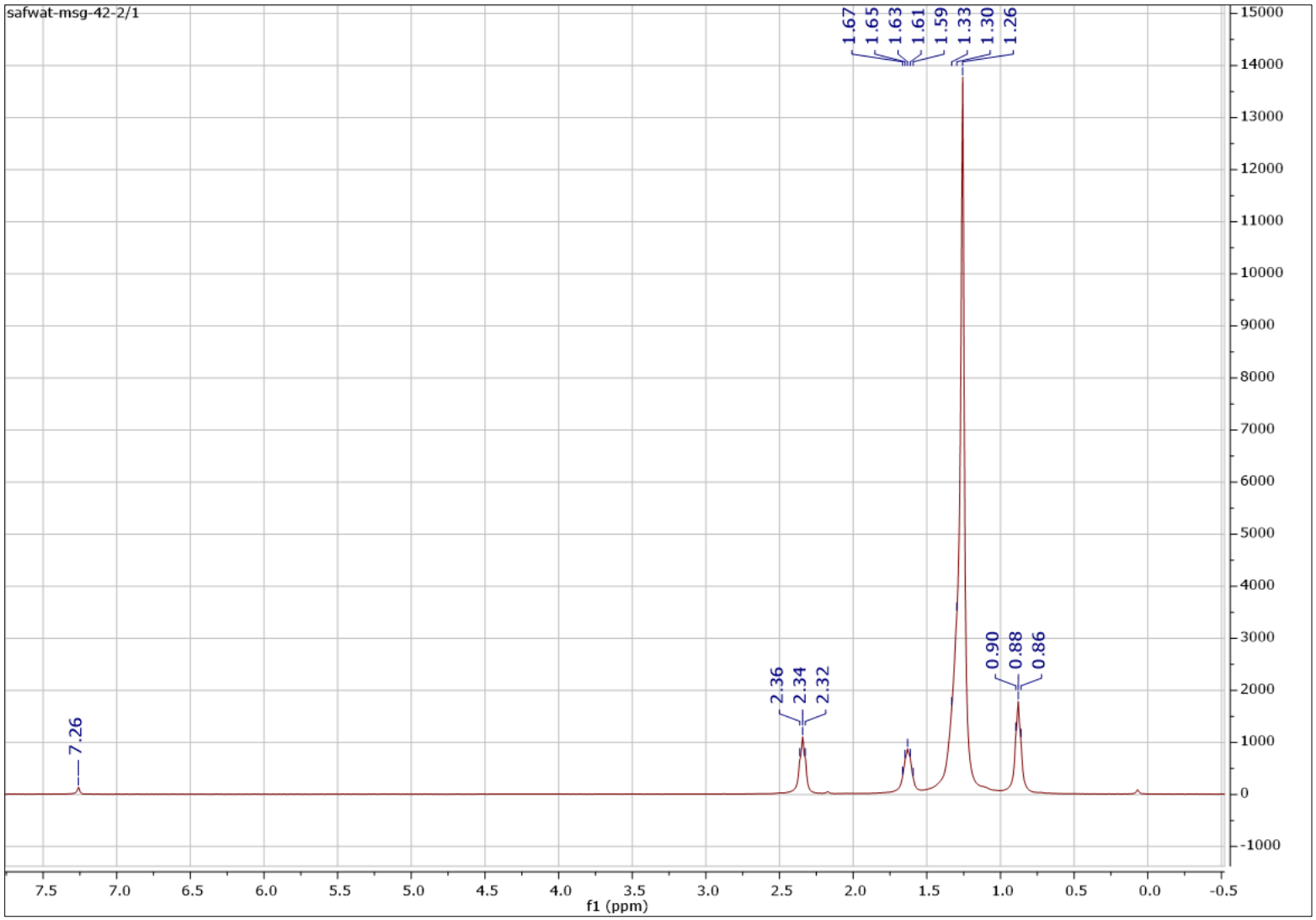


Figure S20. $^{1}$H NMR spectra of compound **5**.

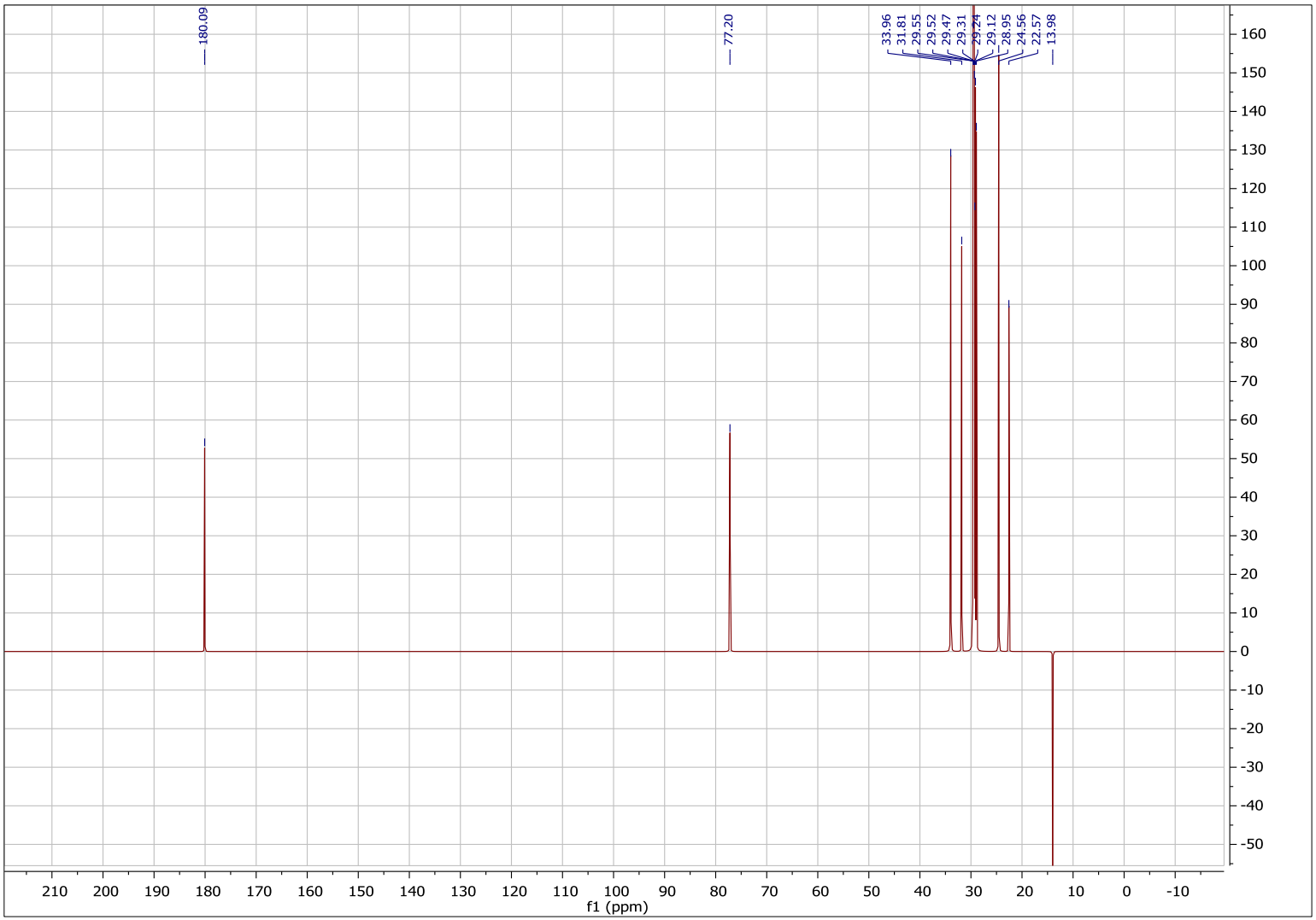


Figure S21. $^{13}$C APT NMR spectra of compound **5**.

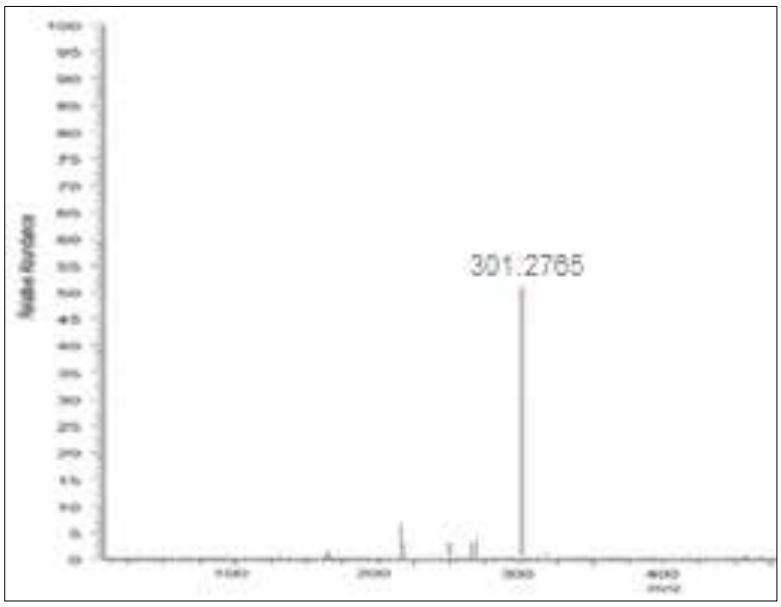


Figure S22. ESI-HRMS chromatogram of compound **6**.

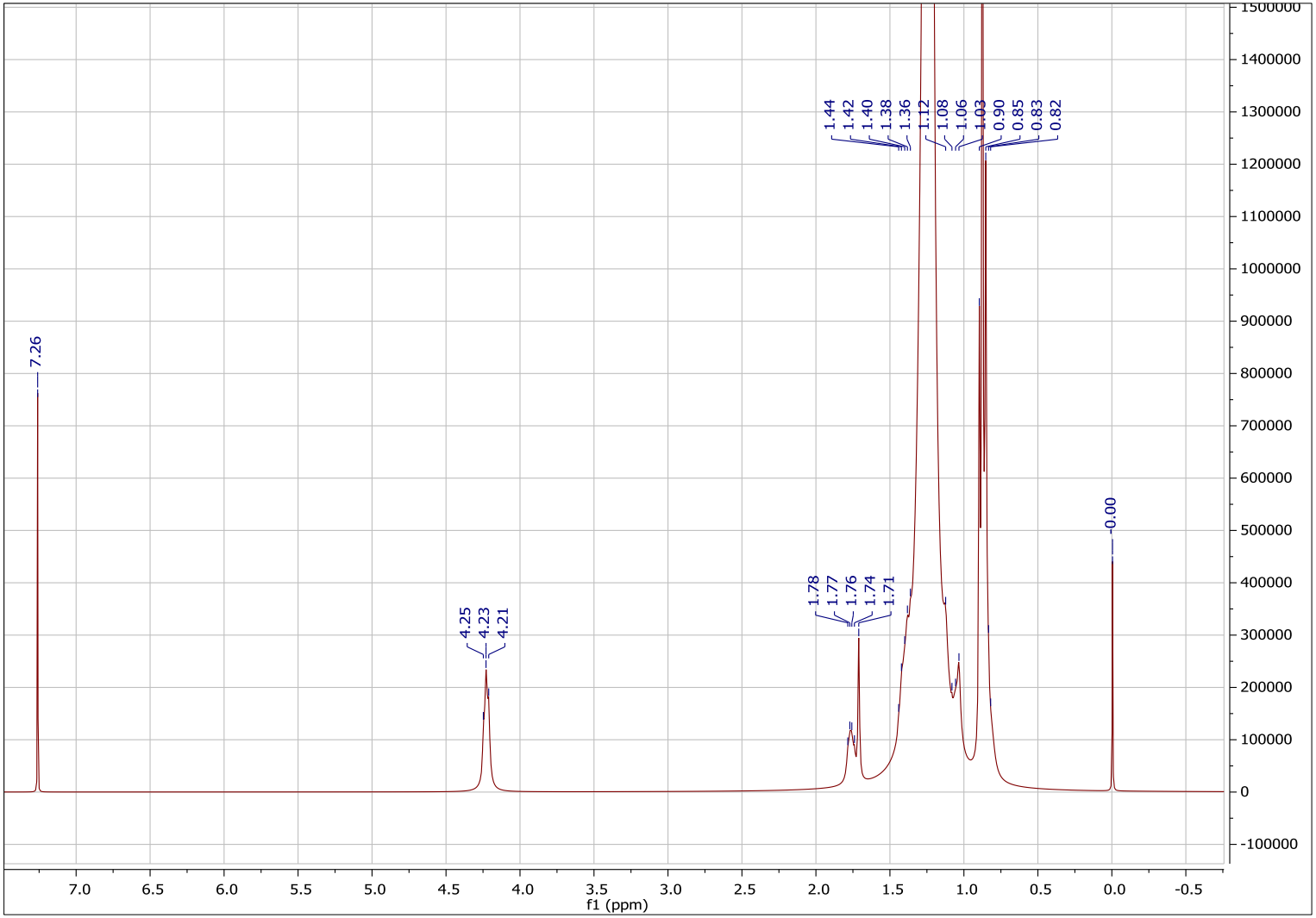


Figure S23. $^{1}$H NMR spectra of compound **6**.

Table S1. Liver enzymes and kidney markers in the study groups.

| | ALT (IU/L) | AST (IU/L) | Urea (mg/dL) | Creatinine (mg/dL) |
|---|---|---|---|---|
| Normal | 44.60 ± 4.29 | 53.78 ± 6.31 | 18.52 ± 3.22 | 0.90 ± 0.15 |
| Control | 53.59 ± 6.11 | 63.61 ± 6.90 | 25.33 ± 5.60 | 1.30 ± 0.25 |
| Ceramide 1 (1 mg/kg) | 51.23 ± 4.10 | 62.31 ± 5.40 | 25.32 ± 6.66 | 1.25 ± 0.24 |
| Ceramide 1 (2 mg/kg) | 50.31 ± 5.91 | 60.40 ± 5.70 | 24.76 ± 6.87 | 1.22 ± 0.27 |
| Ceramide 2 (1 mg/kg) | 52.51 ± 5.10 | 61.33 ± 5.89 | 24.83 ± 6.50 | 1.24 ± 0.27 |
| Ceramide 2 (2 mg/kg) | 49.32 ± 6.90 | 60.32 ± 7.10 | 23.60 ± 6.98 | 1.21 ± 0.26 |

Values are expressed as mean ± SD. Data were analyzed using ANOVA followed by Bonferroni post hoc test.