

SUPPORTING INFORMATION for

7,7-Dimethylaporphine and Other Alkaloids from the bark of *Guatteria friesiana*

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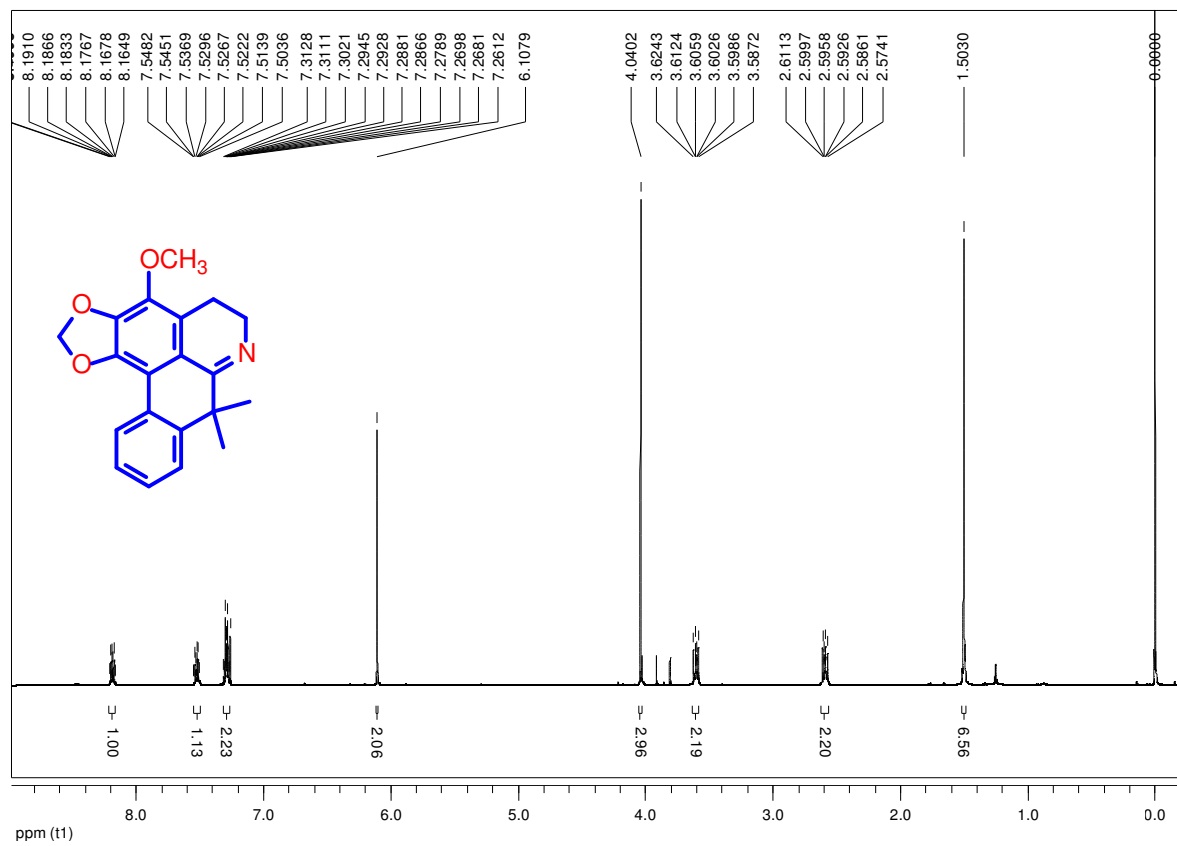


Figure S1. ¹H NMR spectrum of alkaloid 1 in CDCl₃ at 400 MHz.

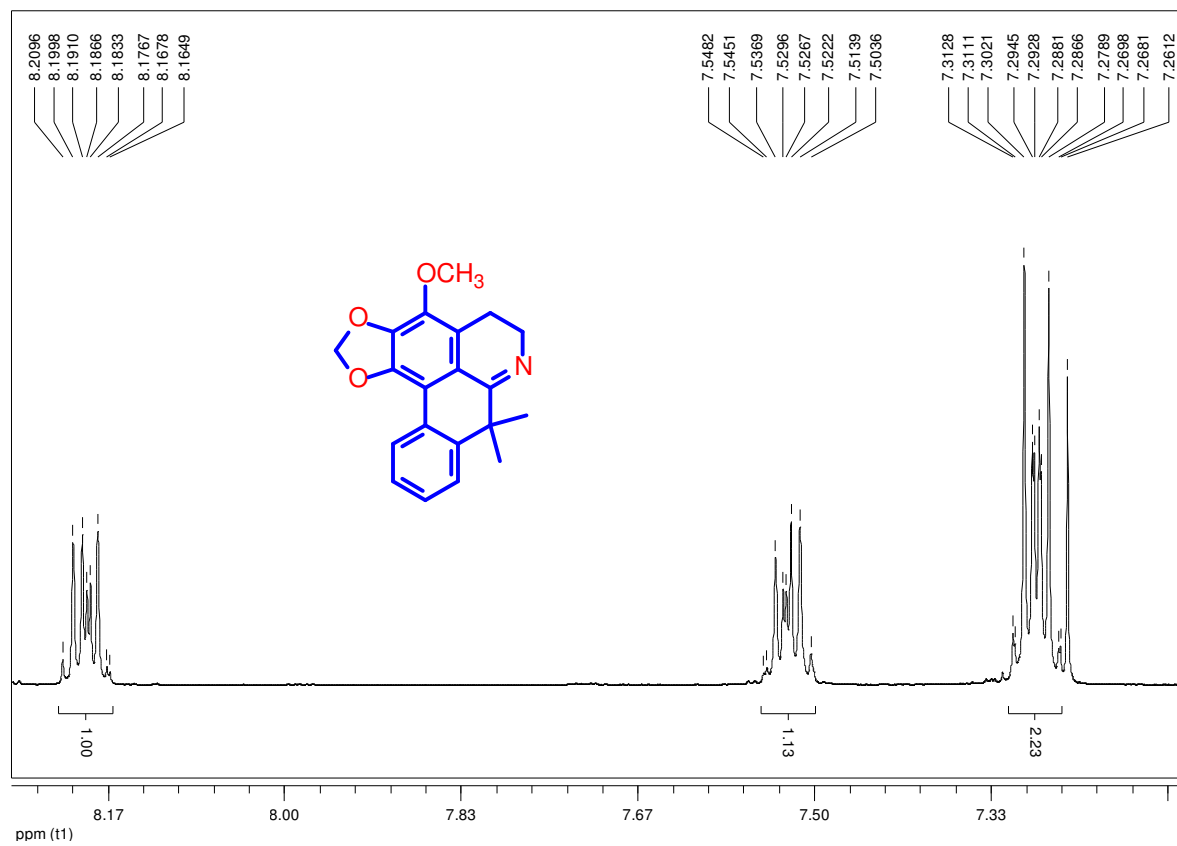


Figure S2. Enlargement of ^1H NMR spectrum of alkaloid **1** in CDCl_3 at 400 MHz.

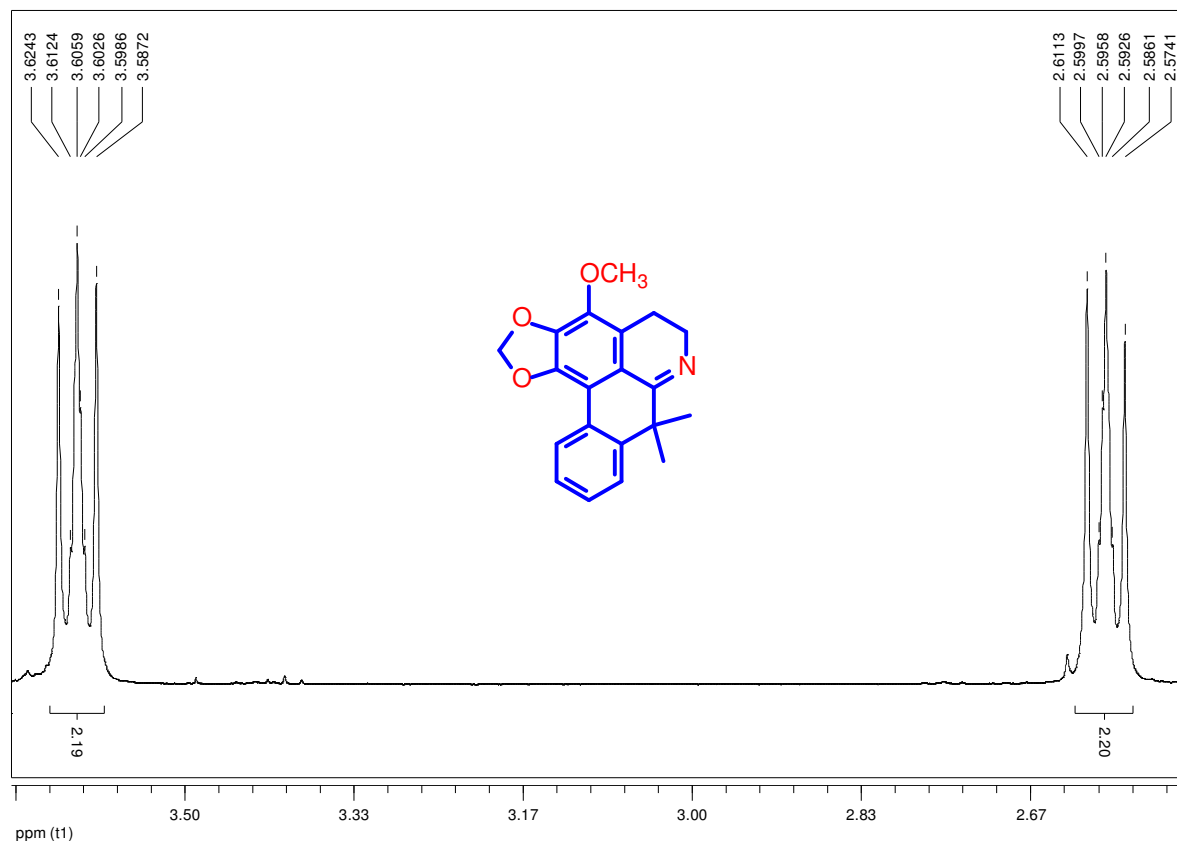


Figure S3. Enlargement of ¹H NMR spectrum of alkaloid **1** in CDCl₃ at 400 MHz.

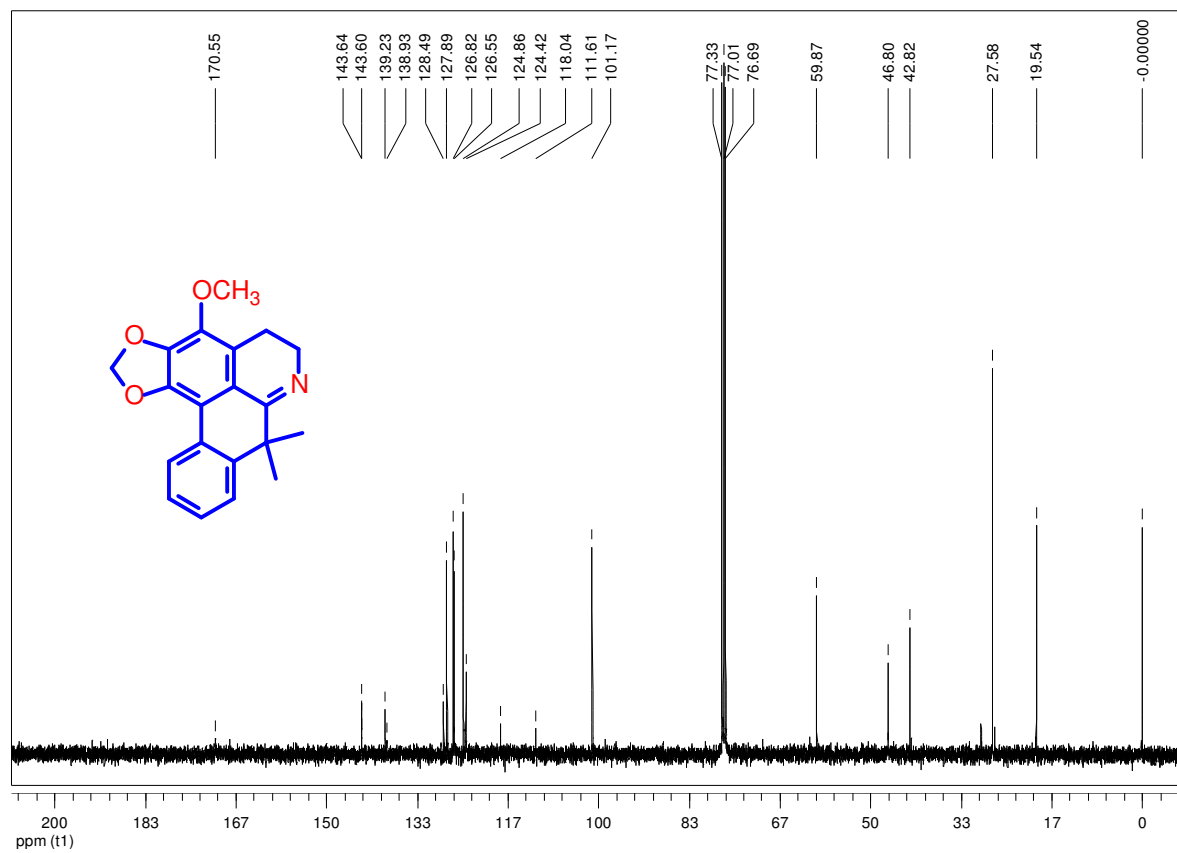


Figure S4. ¹³C NMR spectrum of alkaloid 1 in CDCl₃ at 100 MHz.

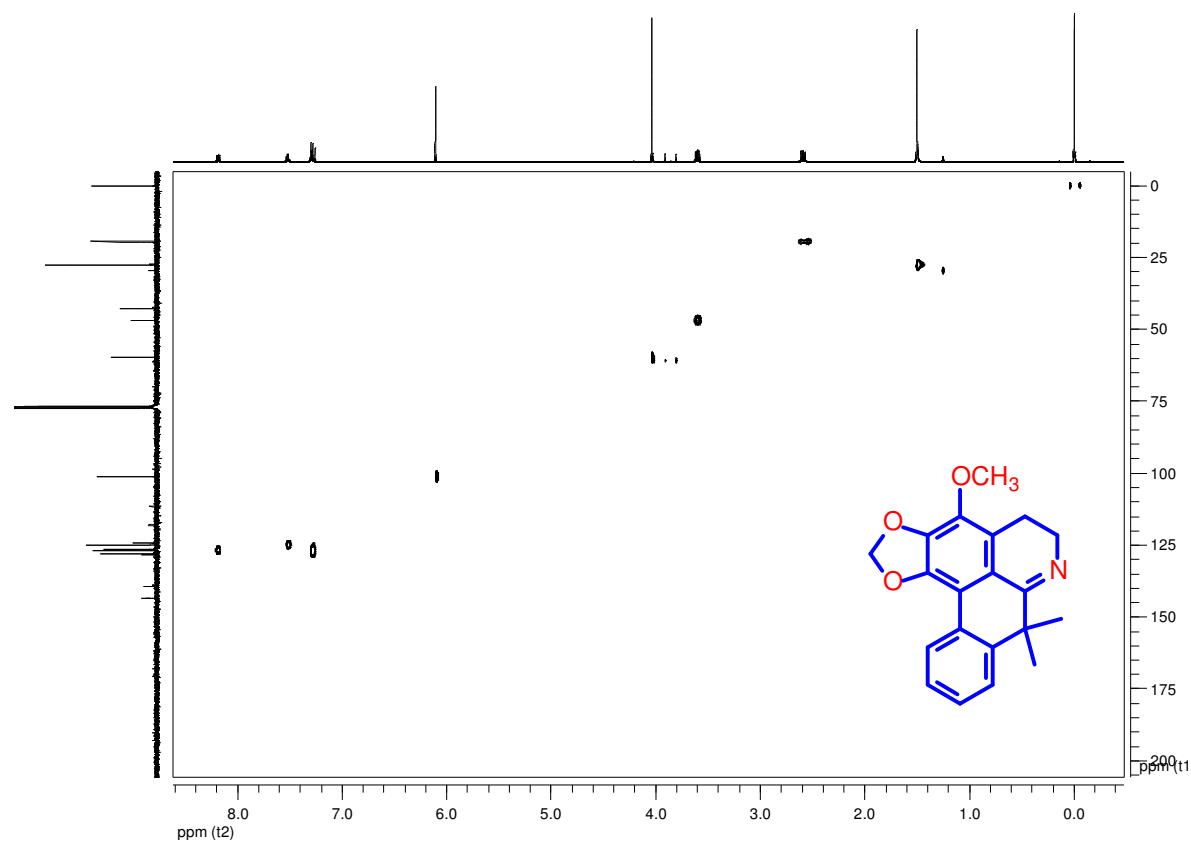


Figure S5. ^1H - ^{13}C one-bond correlation map from HSQC NMR experiment of alkaloid **1** in CDCl_3 at 400 and 100 MHz.

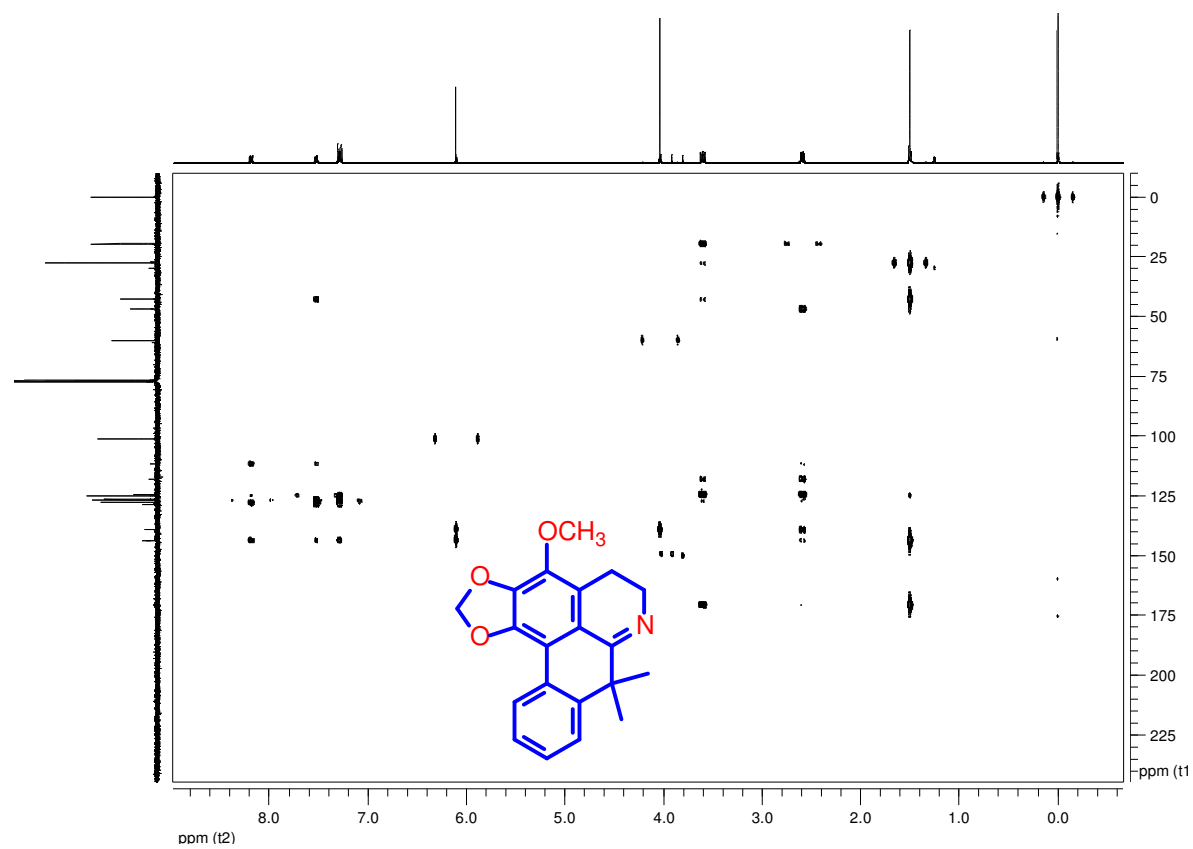


Figure S6. ^1H - ^{13}C long-range correlation map from HMBC NMR experiment of alkaloid **1** in CDCl_3 at 400 and 100 MHz.

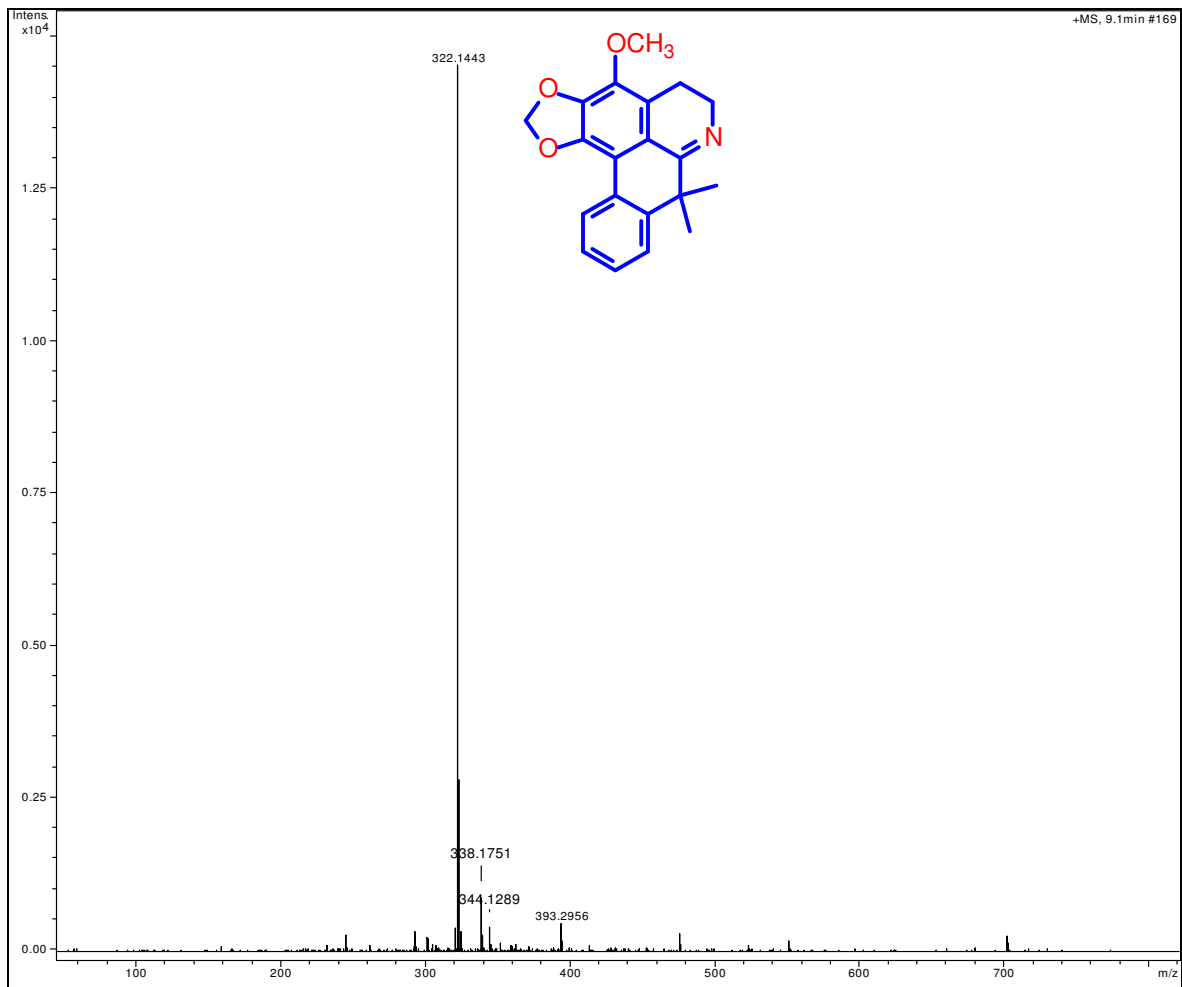


Figure S7. HR-ESI(+)-MS spectrum of alkaloid **1** (m/z 322.1443 $[\text{M}+\text{H}]^+$).

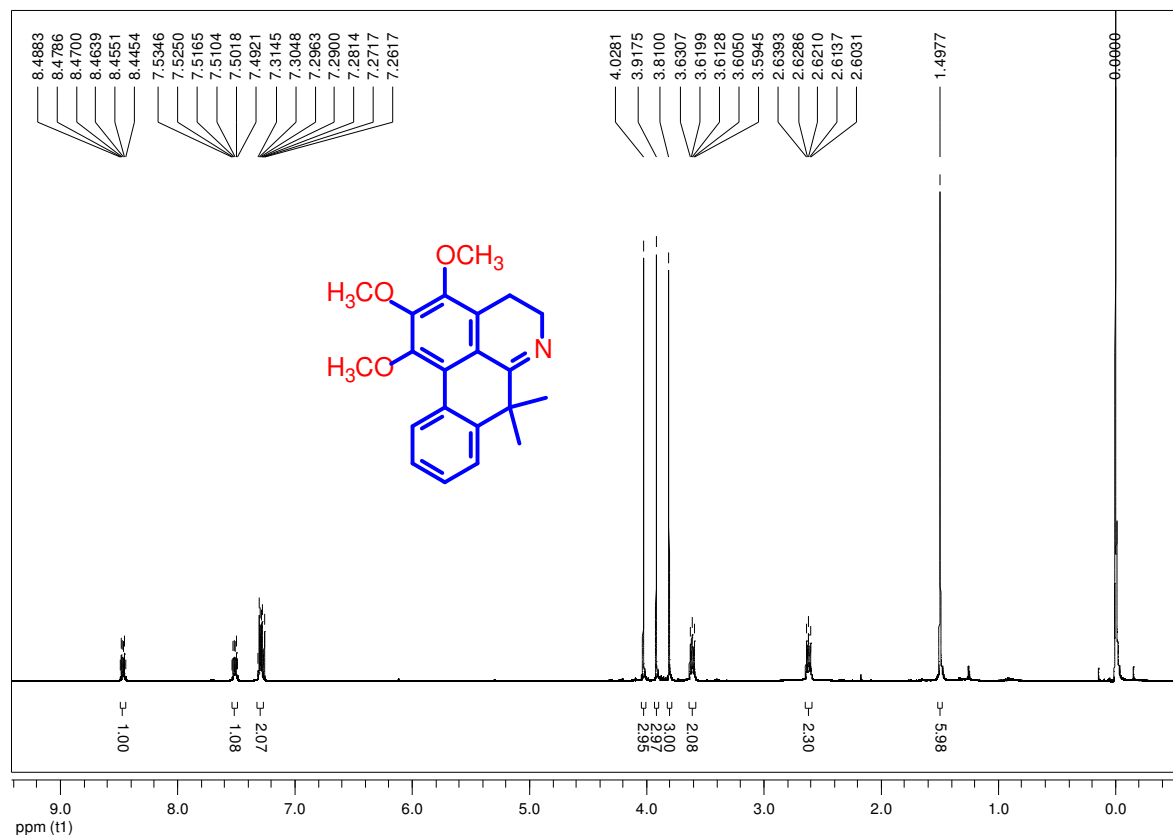


Figure S8. ^1H NMR spectrum of alkaloid **2** in CDCl_3 at 400 MHz.

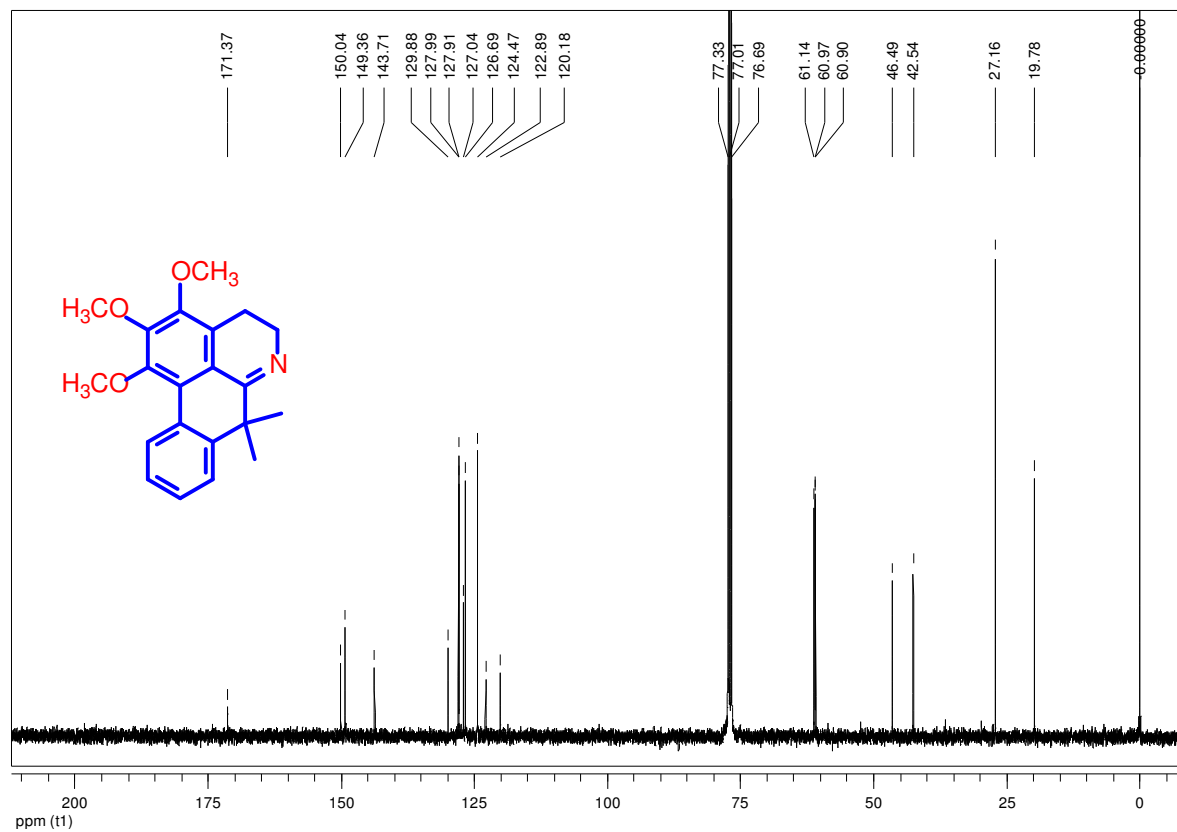


Figure S9. ^{13}C NMR spectrum of alkaloid **2** in CDCl_3 at 100 MHz.

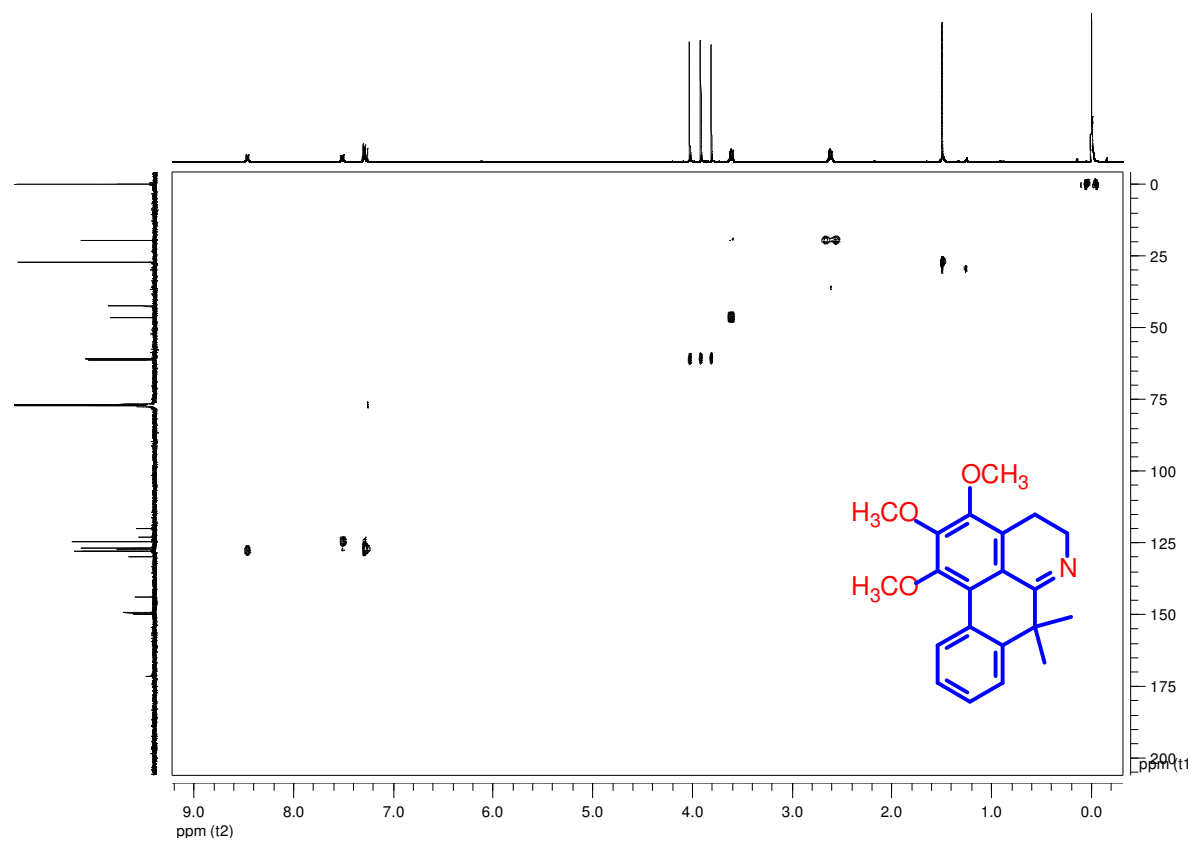


Figure S10. ^1H - ^{13}C one-bond correlation map from HSQC NMR experiment of alkaloid **2** in CDCl_3 at 400 and 100 MHz.

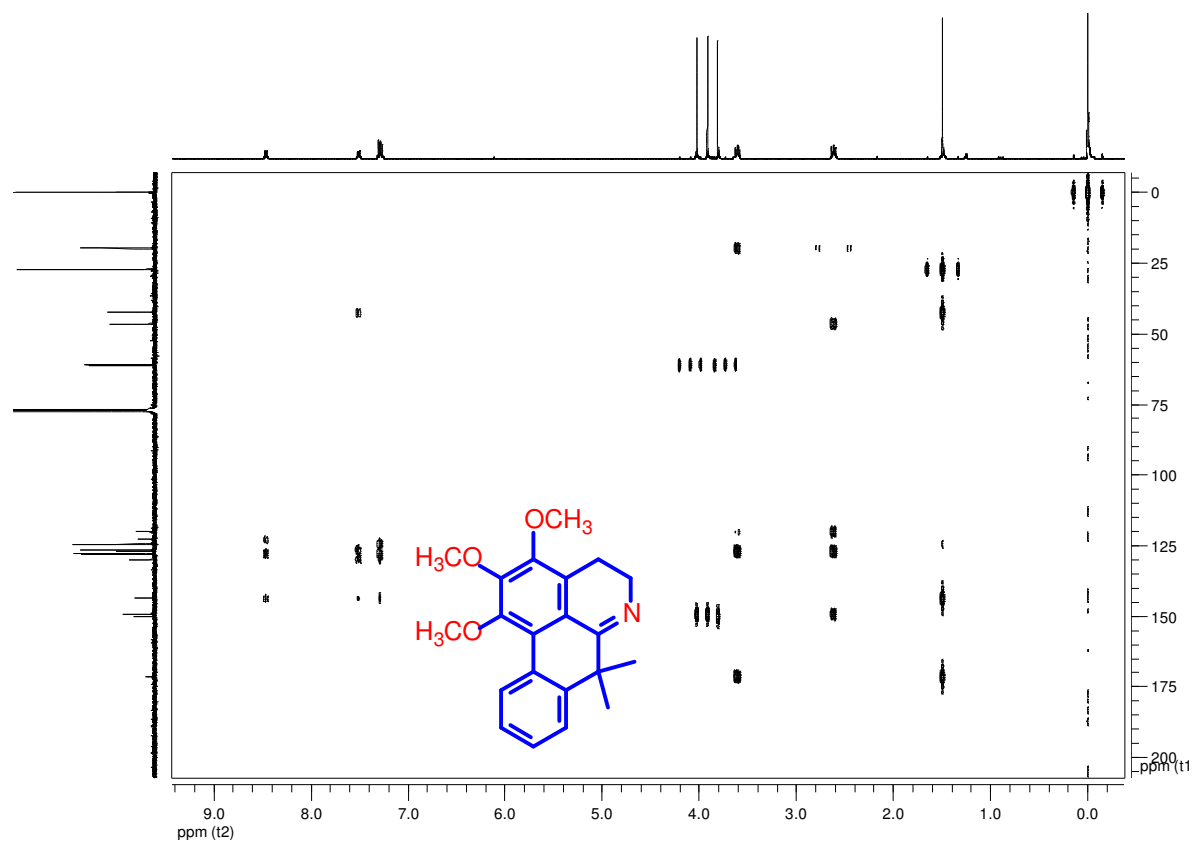


Figure S11. ^1H - ^{13}C long-range correlation map from HMBC NMR experiment of alkaloid **2** in CDCl_3 at 400 and 100 MHz.

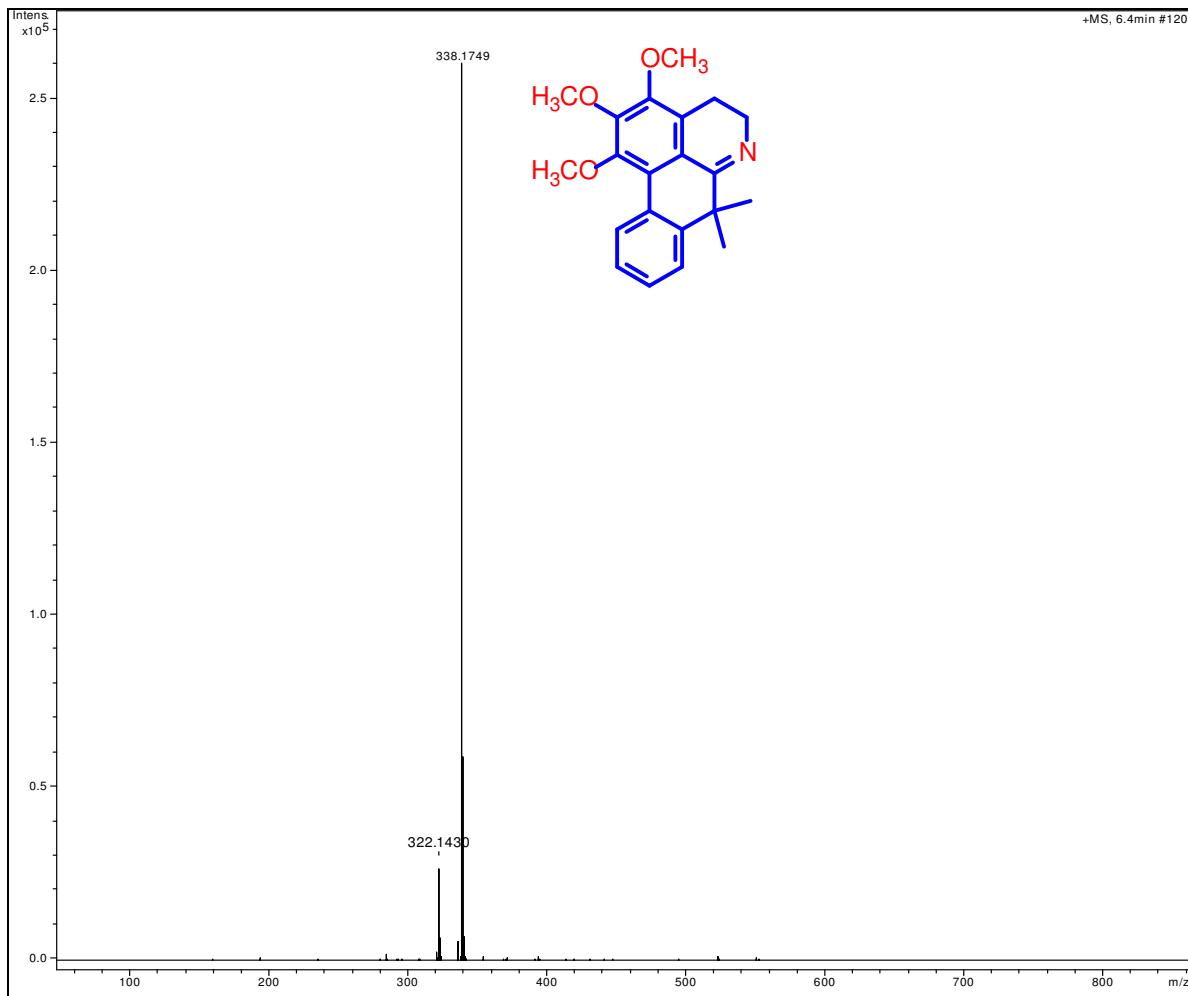


Figure S12. HR-ESI(+)-MS spectrum of alkaloid **2** (m/z 338.1749 $[\text{M}+\text{H}]^+$).

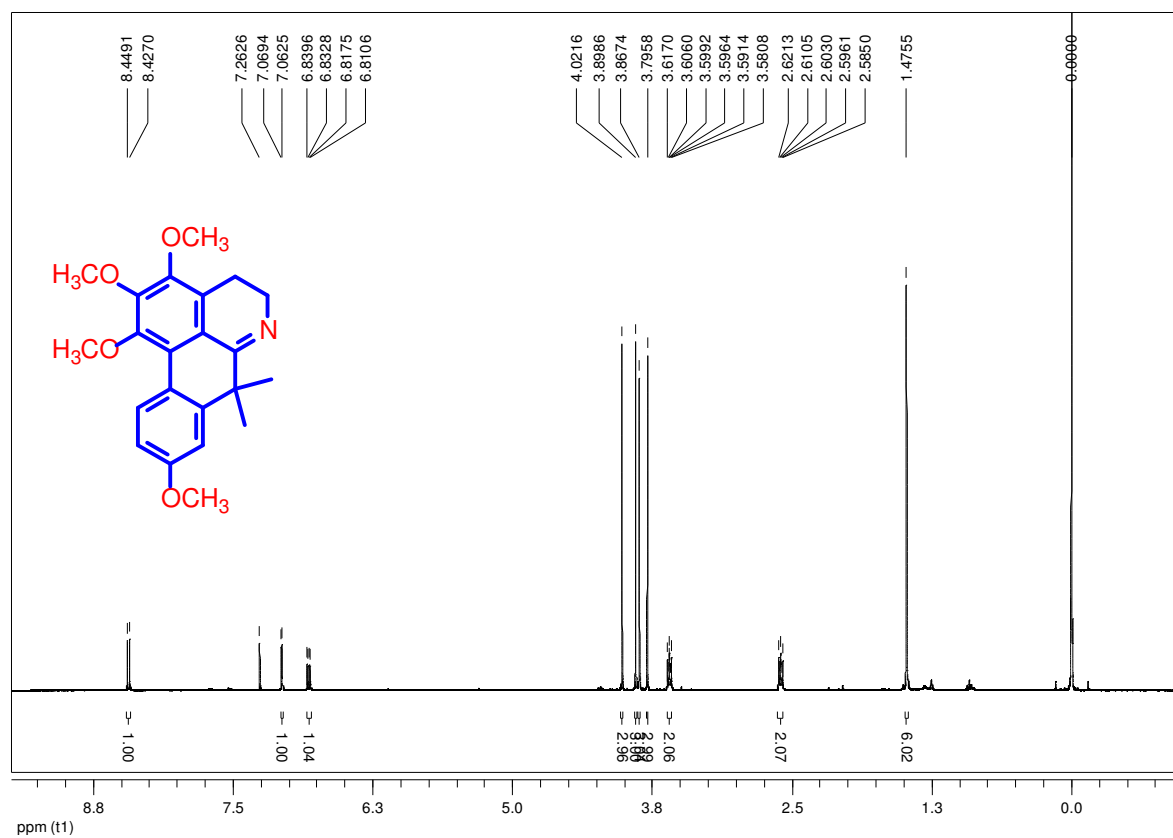


Figure S13. ¹H NMR spectrum of alkaloid **3** in CDCl₃ at 400 MHz.

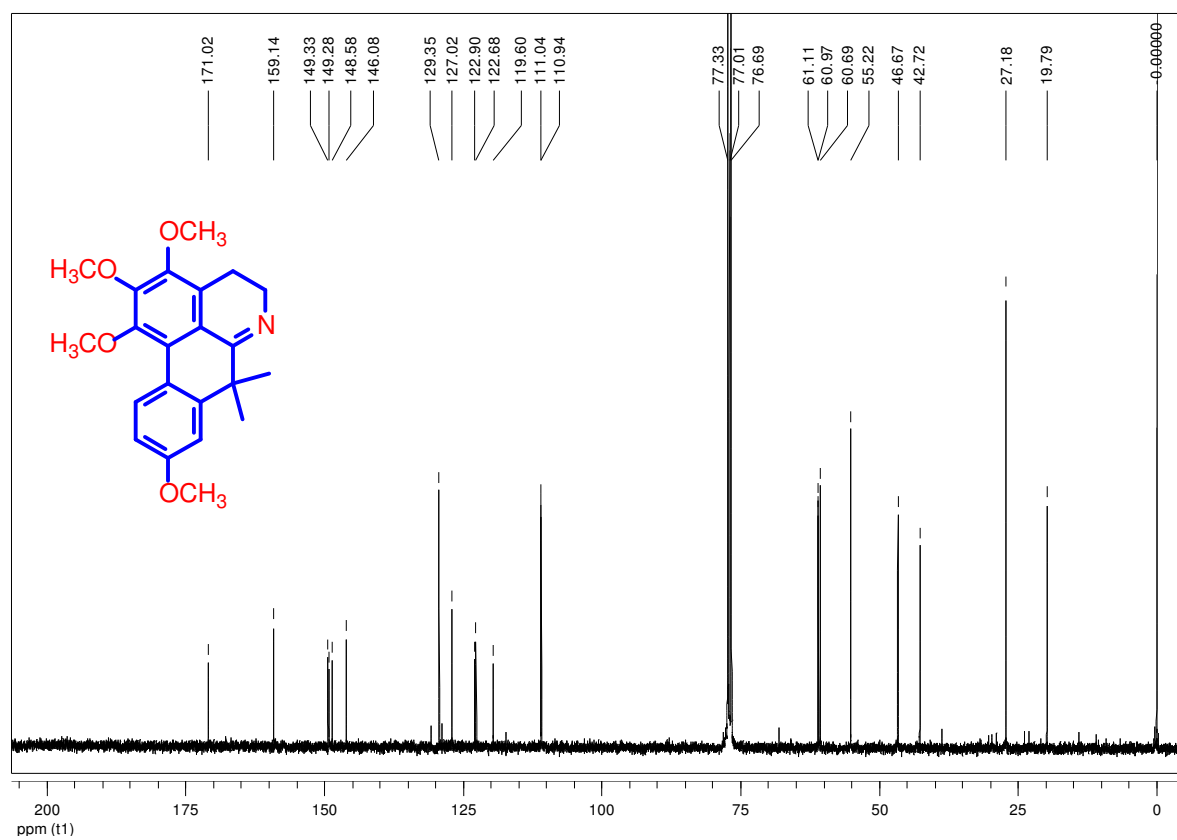


Figure S14. ¹³C NMR spectrum of alkaloid **3** in CDCl₃ at 100 MHz.

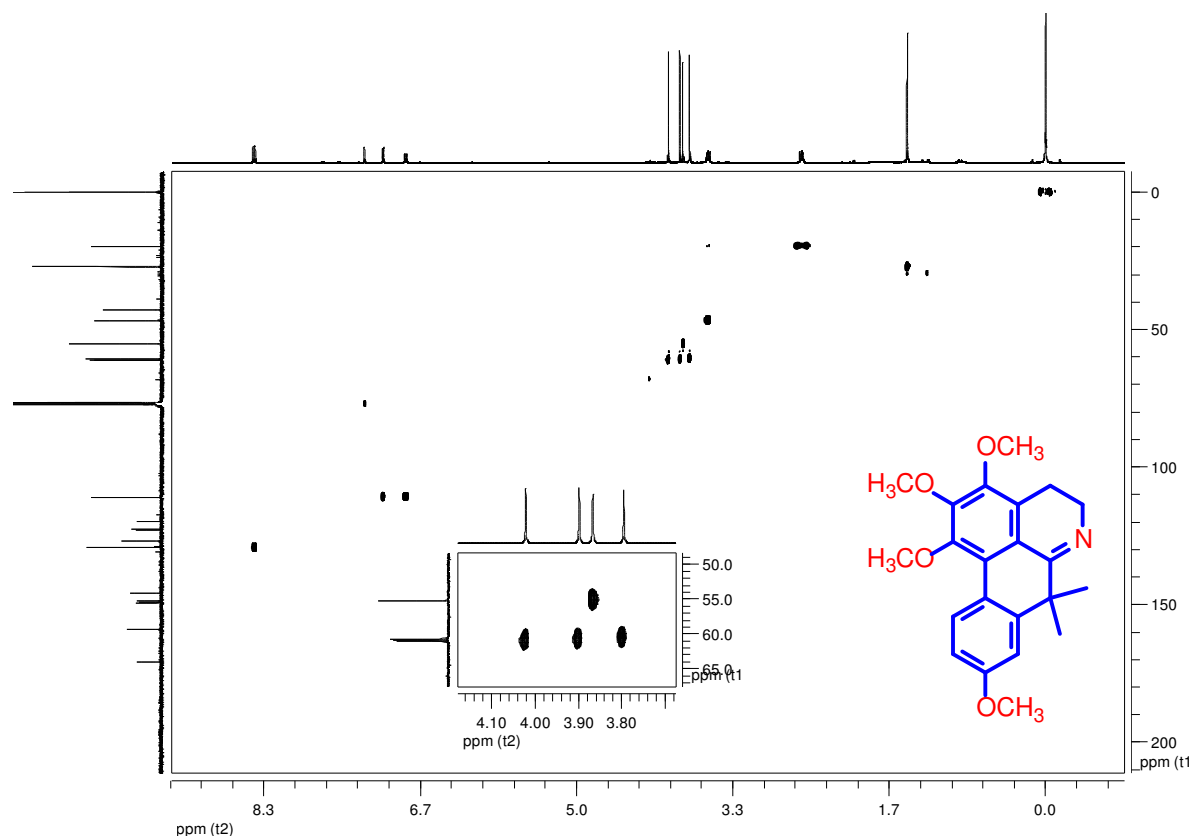


Figure S15. ^1H - ^{13}C one-bond correlation map from HSQC NMR experiment of alkaloid **3** in CDCl_3 at 400 and 100 MHz.

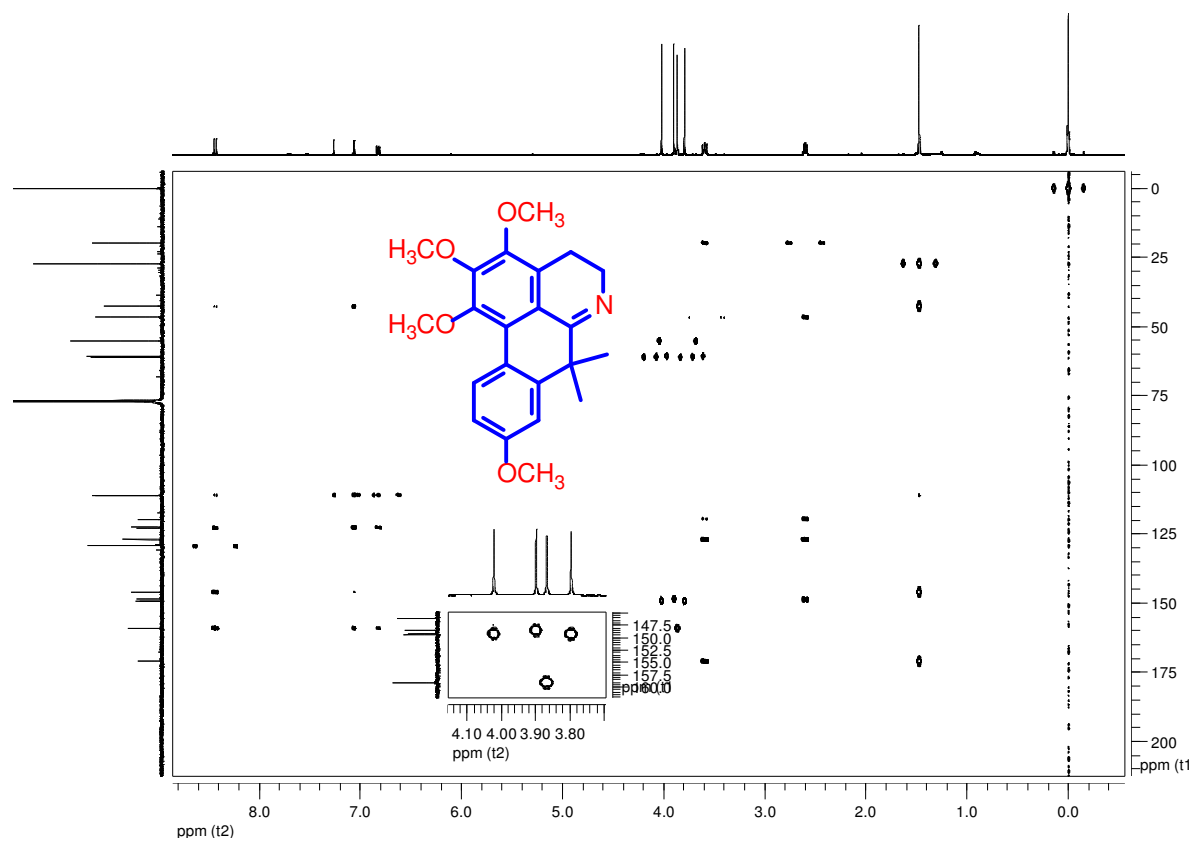


Figure S16. ¹H-¹³C long-range correlation map from HMBC NMR experiment of alkaloid **3** in CDCl₃ at 400 and 100 MHz.

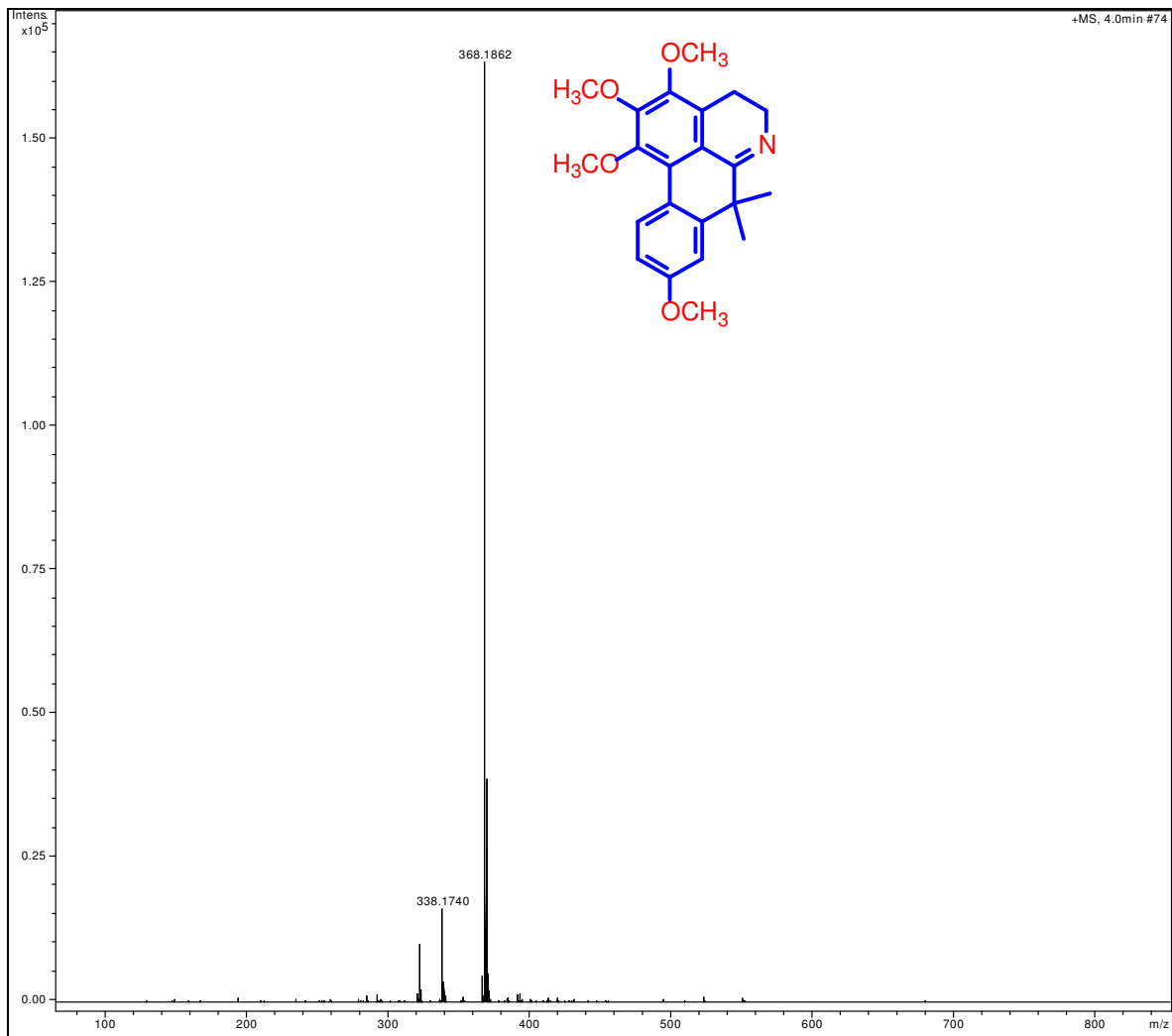


Figure S17. HR-ESI(+)-MS spectrum of alkaloid **3** (m/z 368.1862 $[\text{M}+\text{H}]^+$).

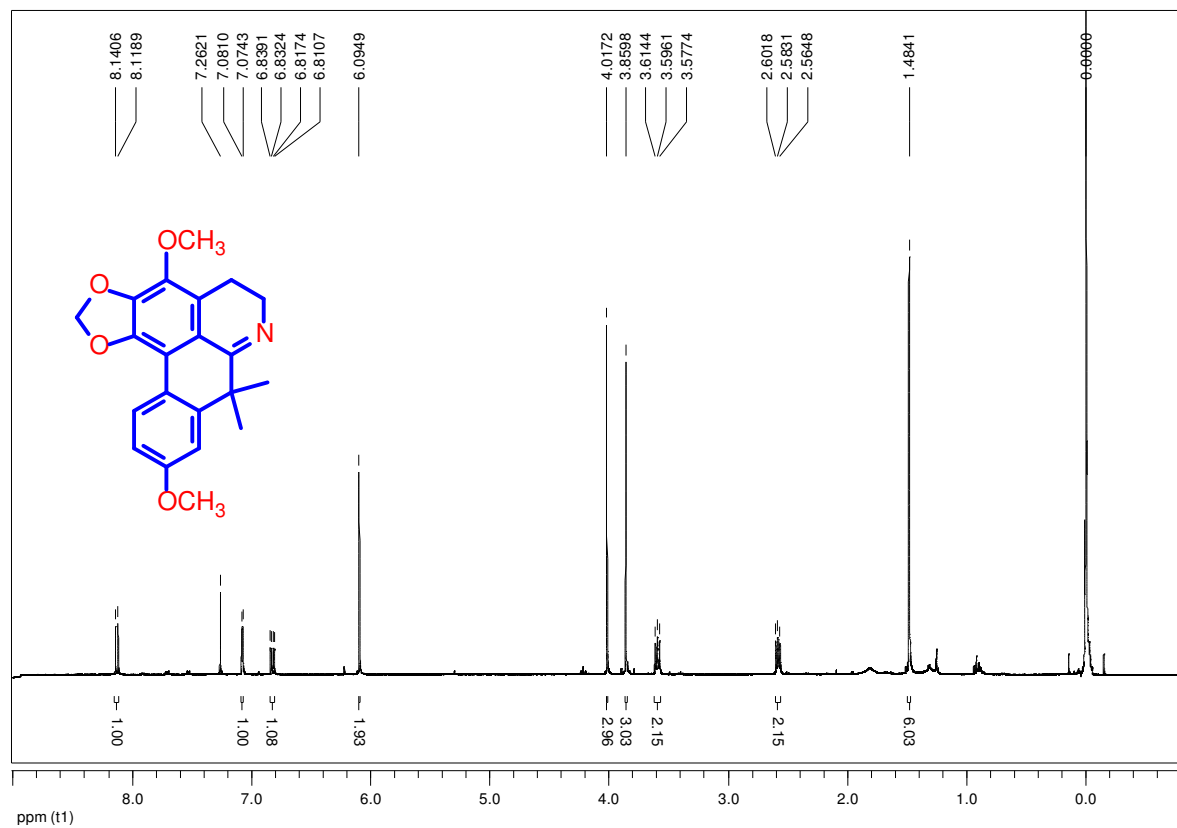


Figure S18. ¹H NMR spectrum of alkaloid **4** in CDCl₃ at 400 MHz.

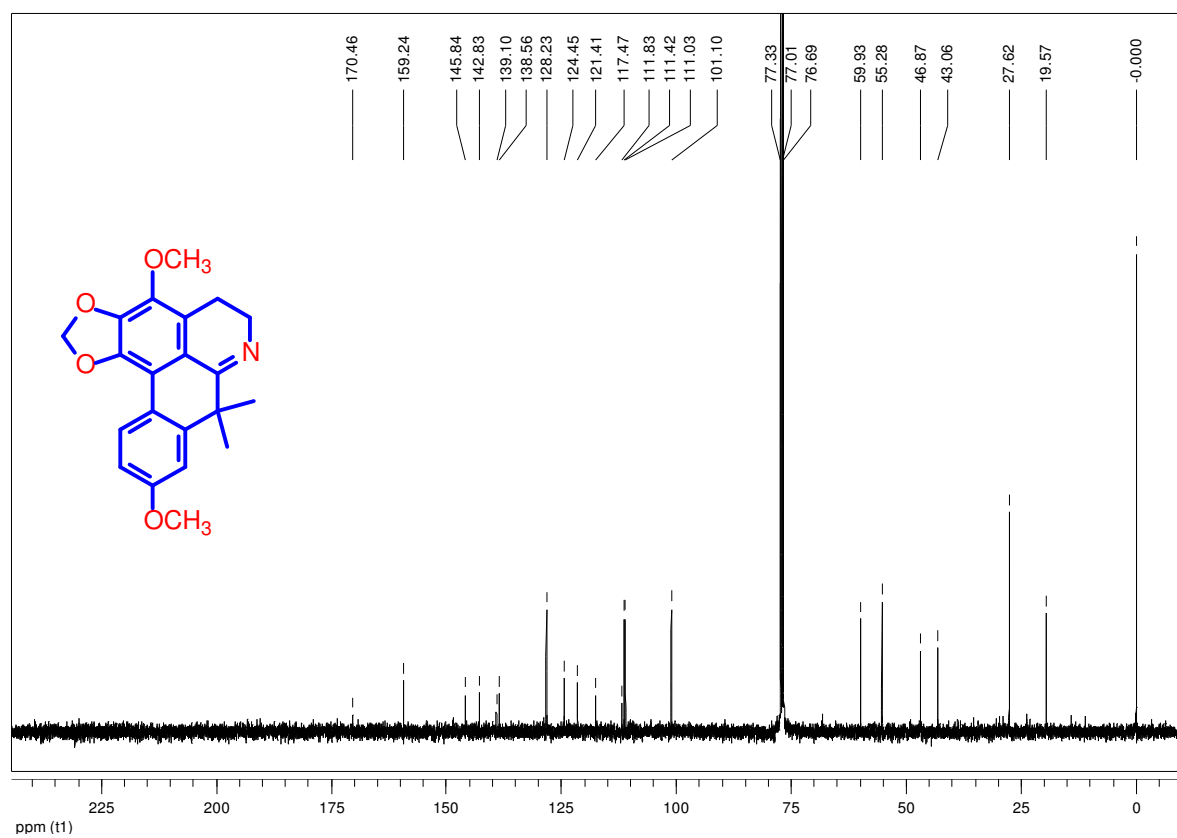


Figure S19. ^{13}C NMR spectrum of alkaloid **4** in CDCl_3 at 100 MHz.

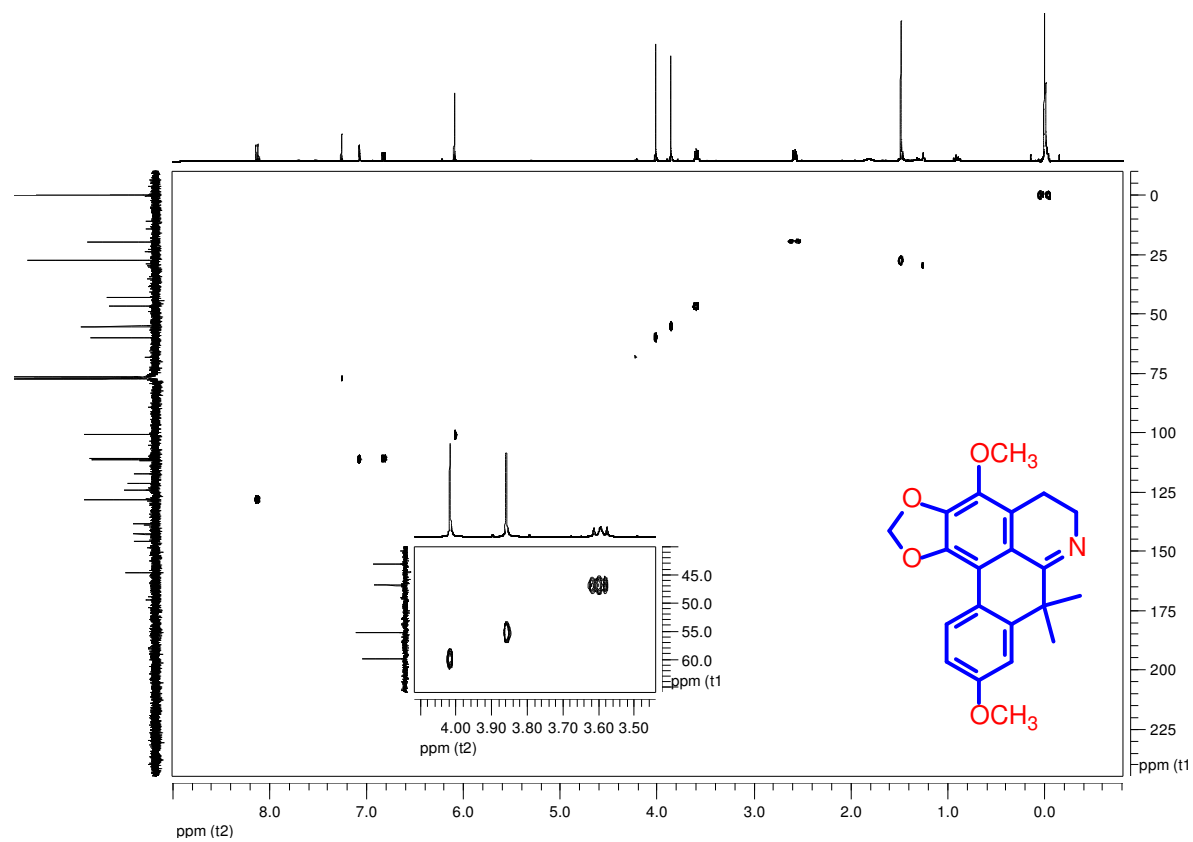


Figure S20. ^1H - ^{13}C one-bond correlation map from HSQC NMR experiment of alkaloid **4** in CDCl_3 at 400 and 100 MHz.

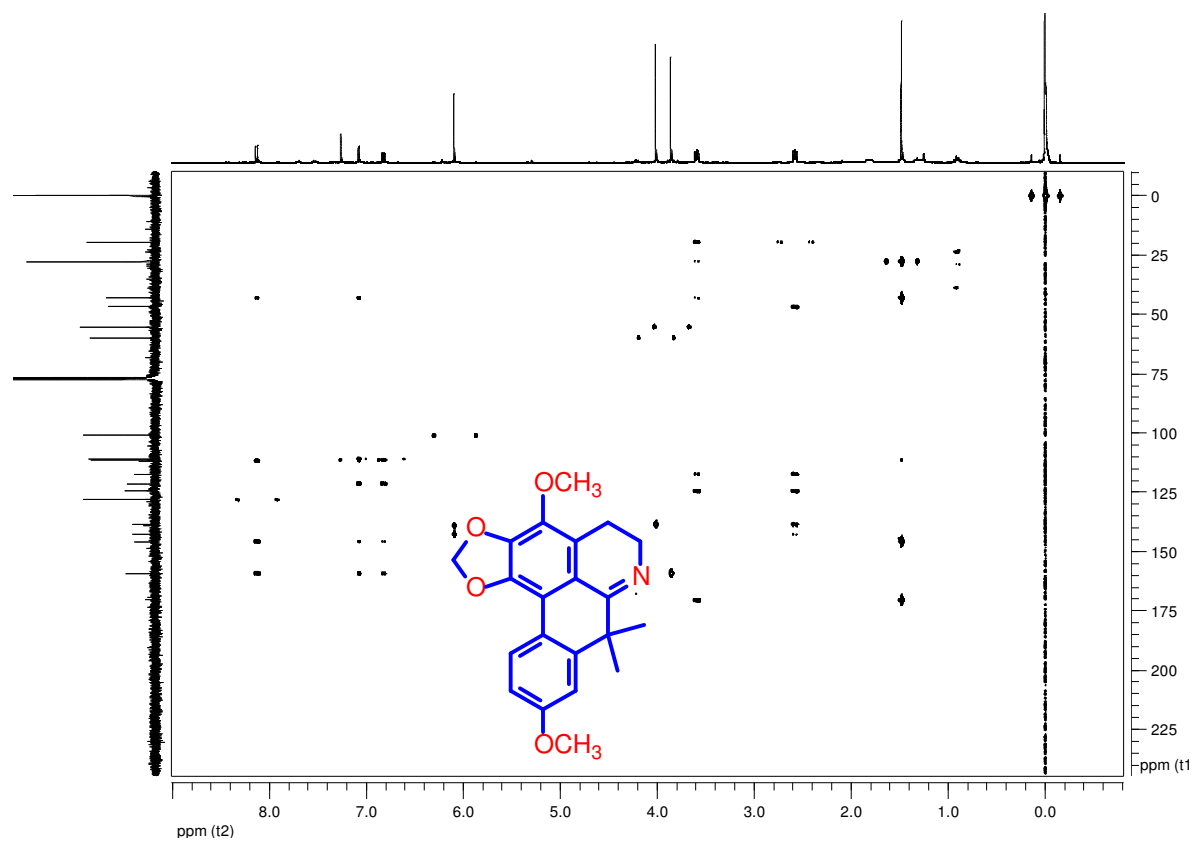


Figure S21. ^1H - ^{13}C long-range correlation map from HMBC NMR experiment of alkaloid **4** in CDCl_3 at 400 and 100 MHz.

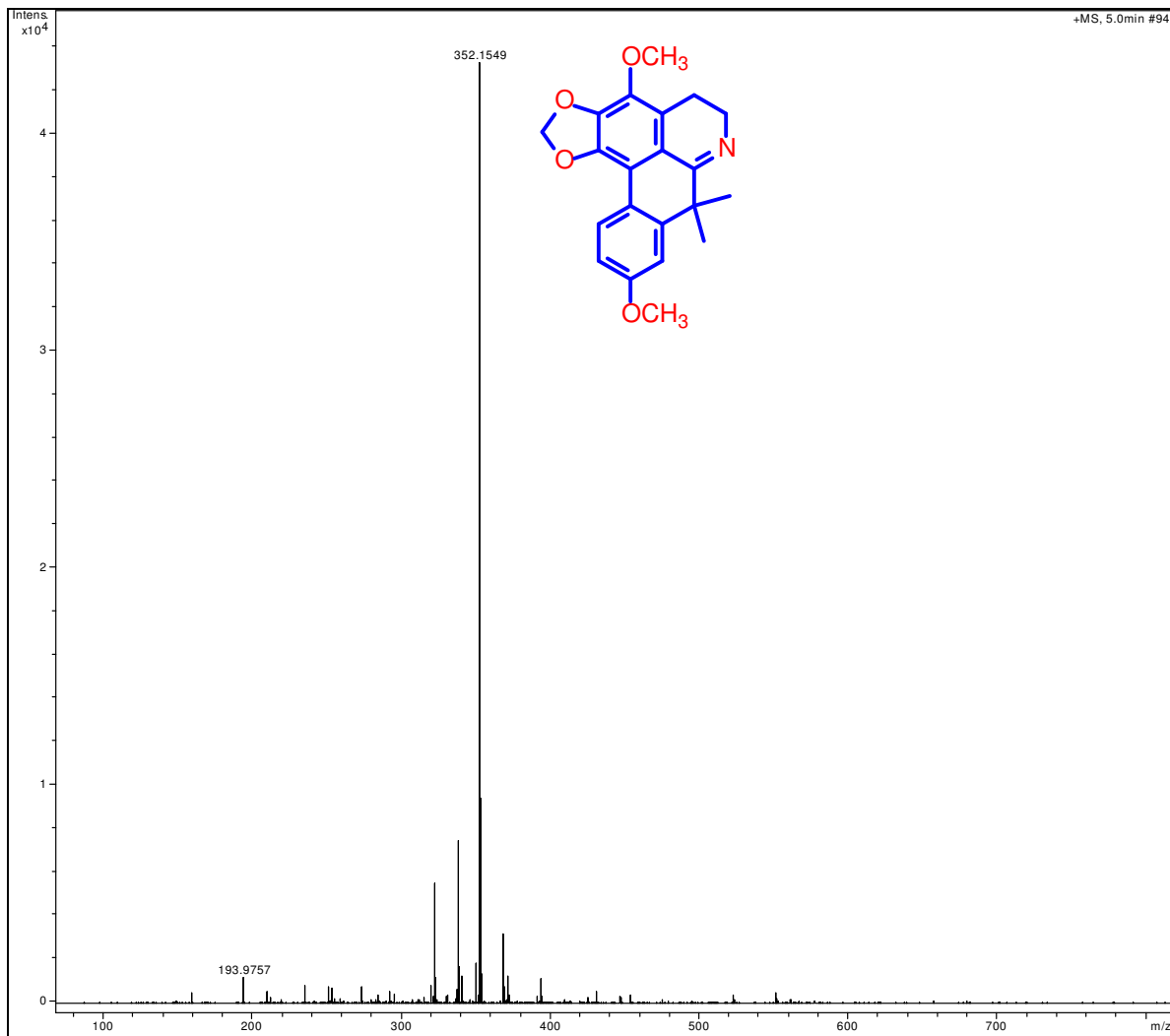


Figure S22. HR-ESI(+)-MS spectrum of alkaloid **4** (m/z 352.1549 $[M+H]^+$).

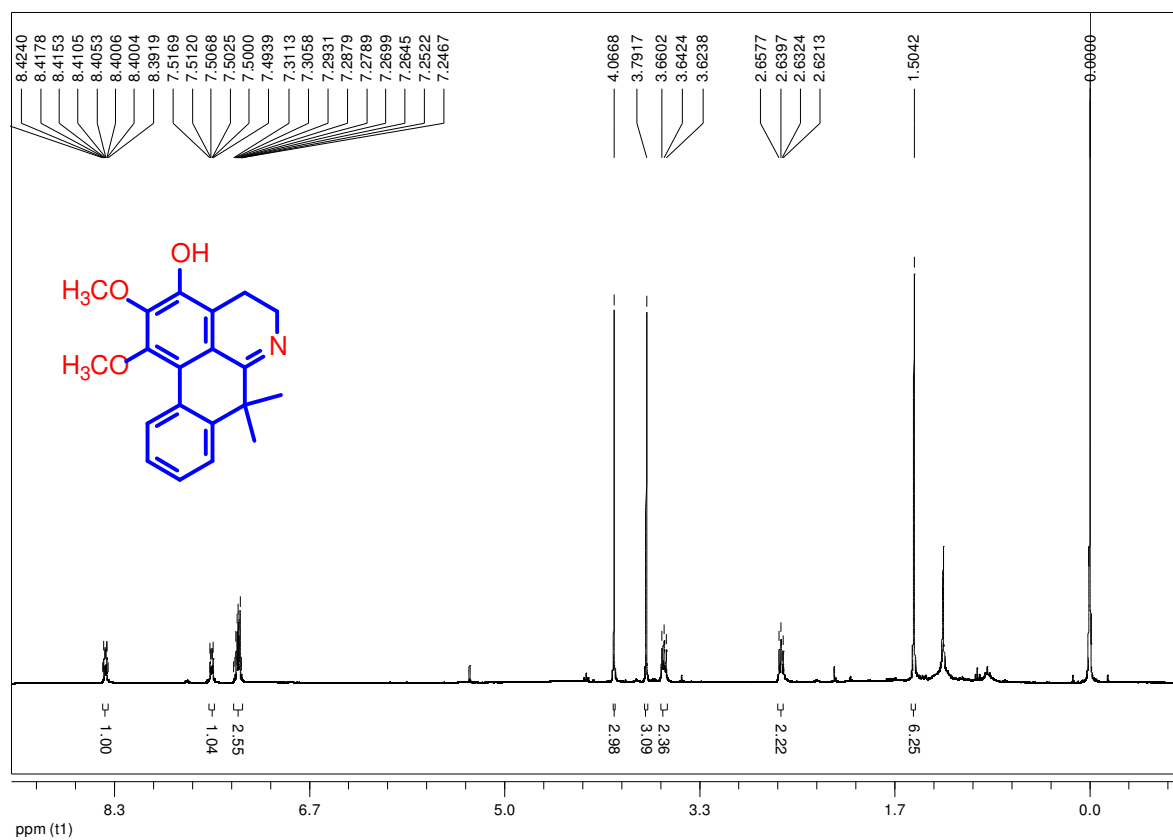


Figure S23. ^1H NMR spectrum of alkaloid 5 in CDCl_3 at 400 MHz.

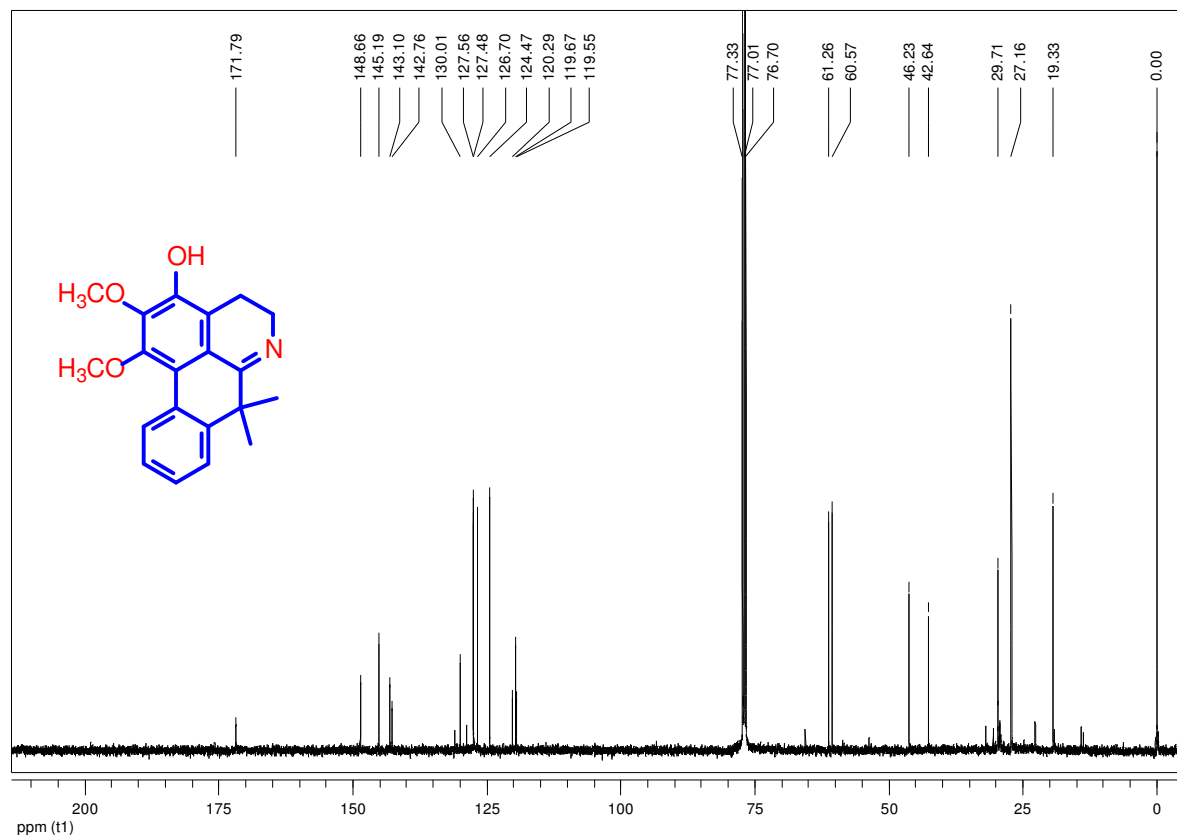


Figure S24. ¹³C NMR spectrum of alkaloid **5** in CDCl₃ at 100 MHz.

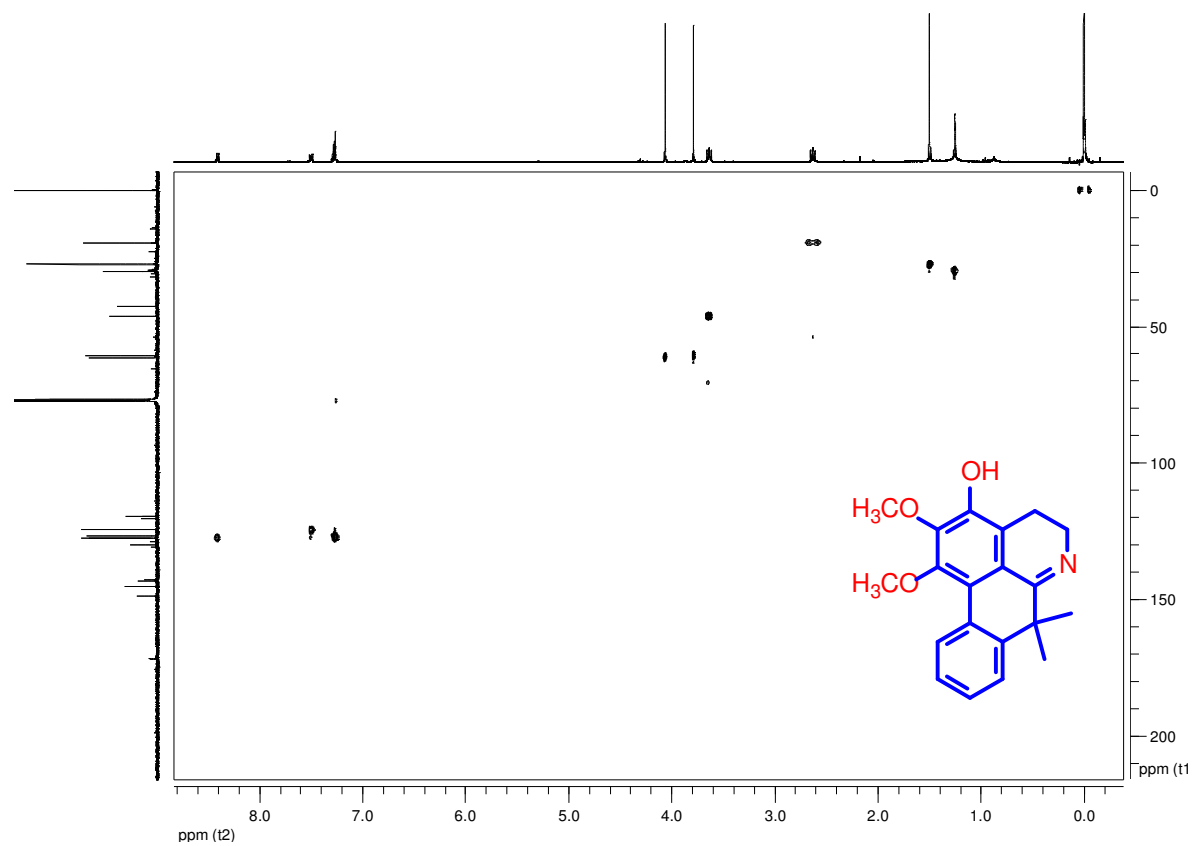


Figure S25. ^1H - ^{13}C one-bond correlation map from HSQC NMR experiment of alkaloid **5** in CDCl_3 at 400 and 100 MHz.

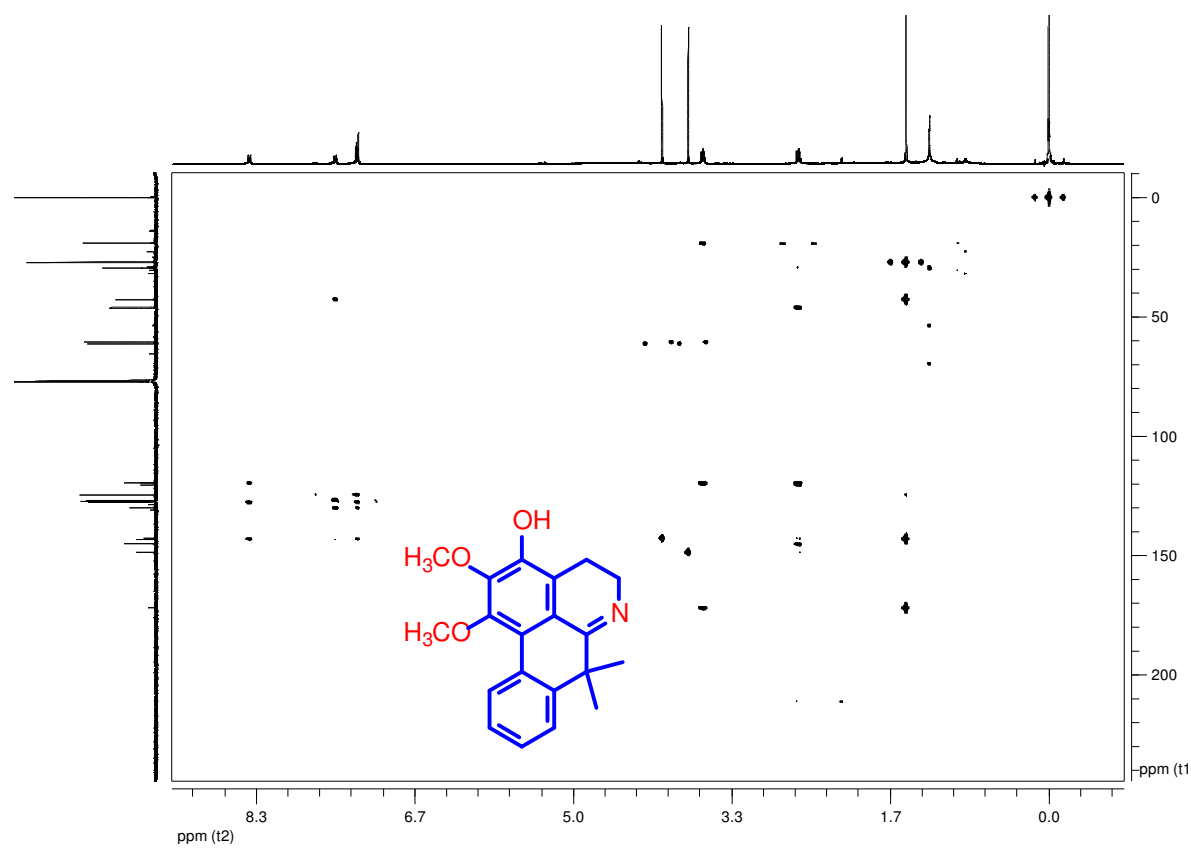


Figure S26. ^1H - ^{13}C long-range correlation map from HMBC NMR experiment of alkaloid **5** in CDCl_3 at 400 and 100 MHz.

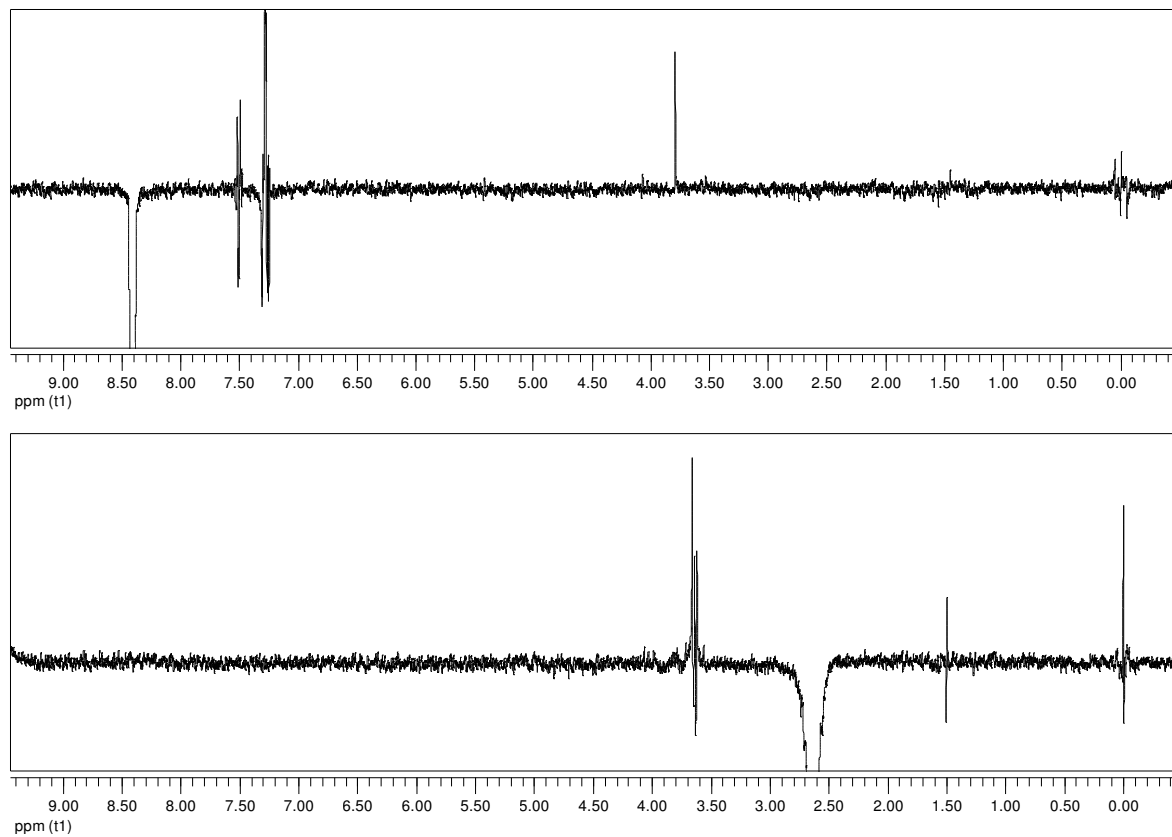


Figure S27. NOE experiments of alkaloid **5** in CDCl₃ at 400 MHz.

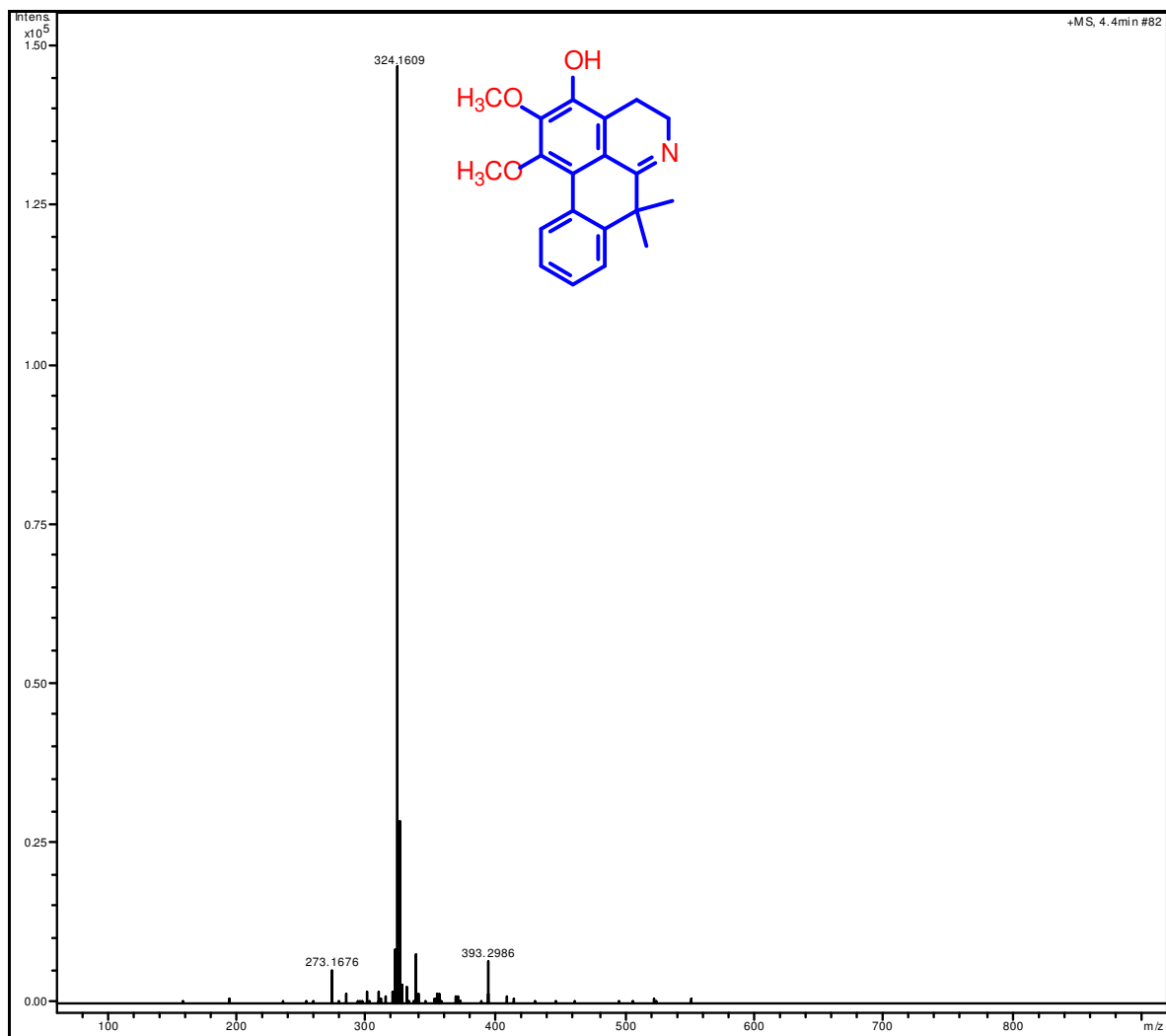


Figure S28. HR-ESI(+)-MS spectrum of alkaloid **5** (m/z 324.1609 $[M+H]^+$).

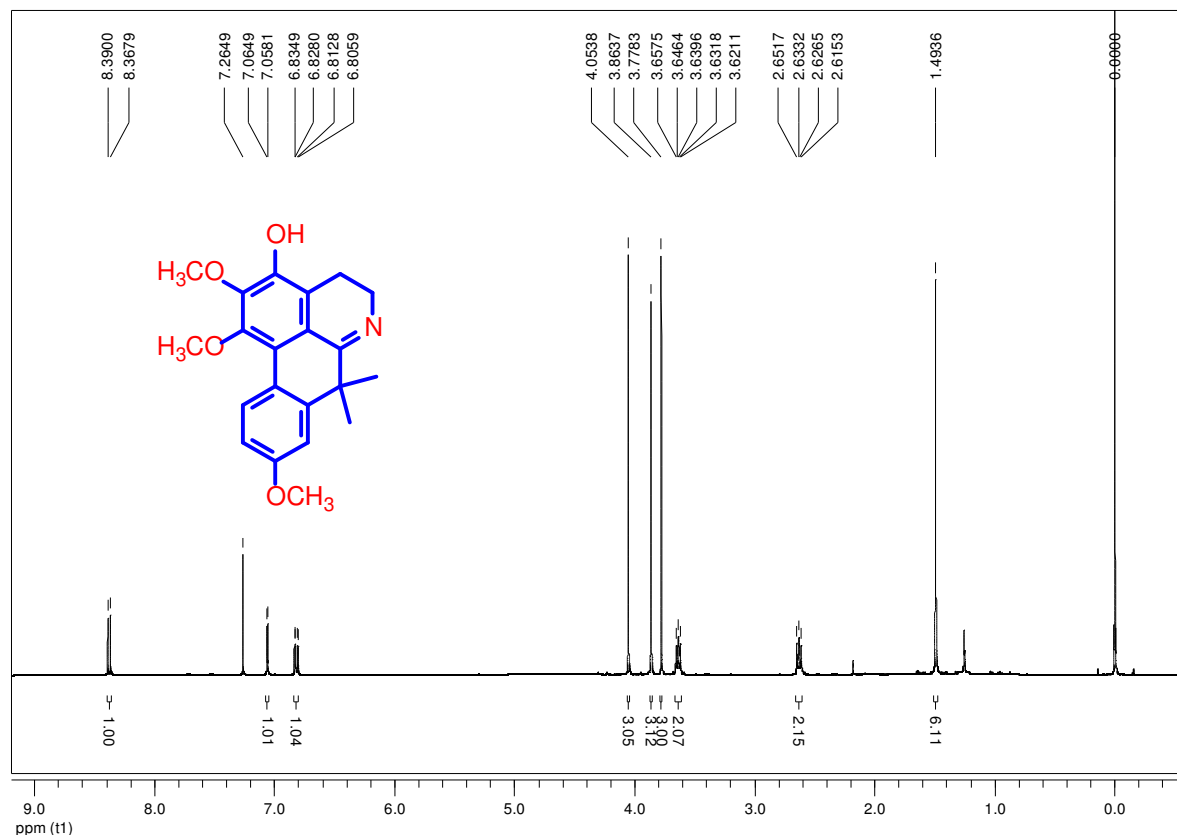


Figure S29. ¹H NMR spectrum of alkaloid **6** in CDCl₃ at 400 MHz.

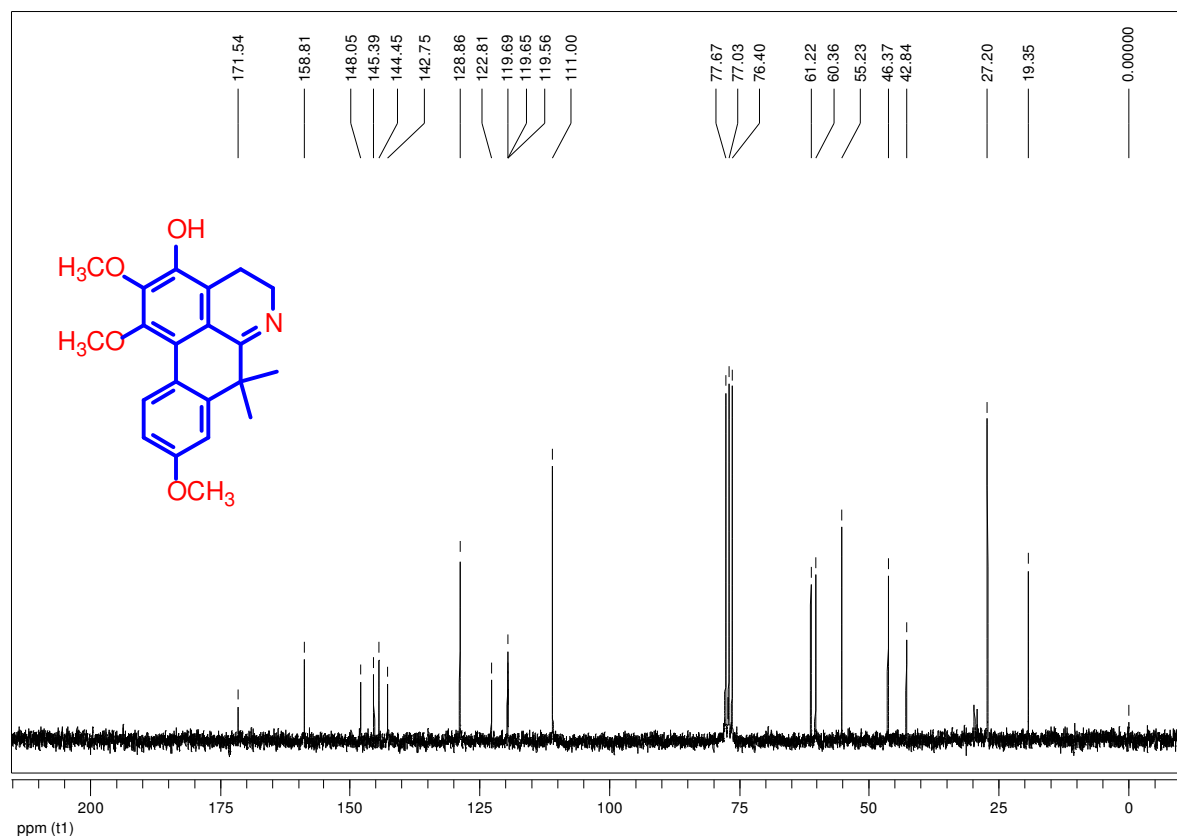


Figure S30. ¹³C NMR spectrum of alkaloid **6** in CDCl₃ at 100 MHz.

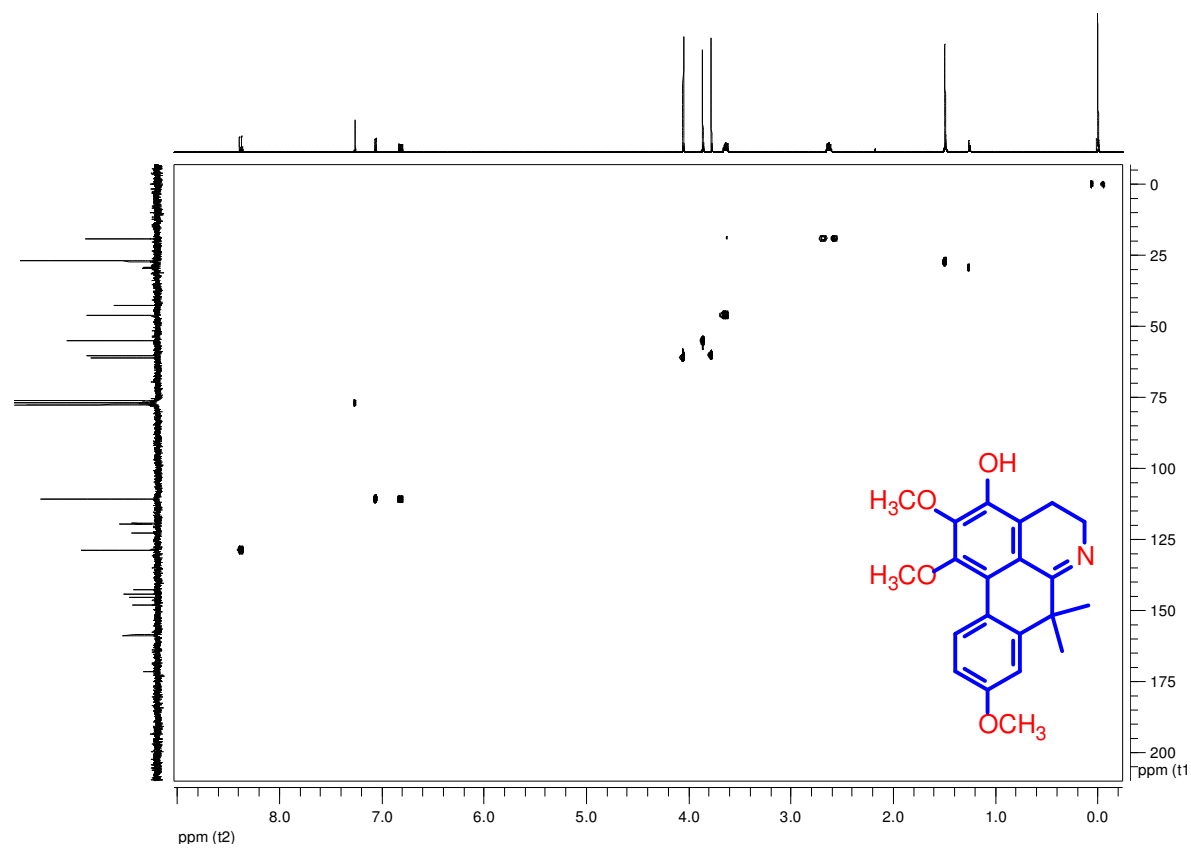


Figure S31. ^1H - ^{13}C one-bond correlation map from HSQC NMR experiment of alkaloid **6** in CDCl_3 at 400 and 100 MHz.

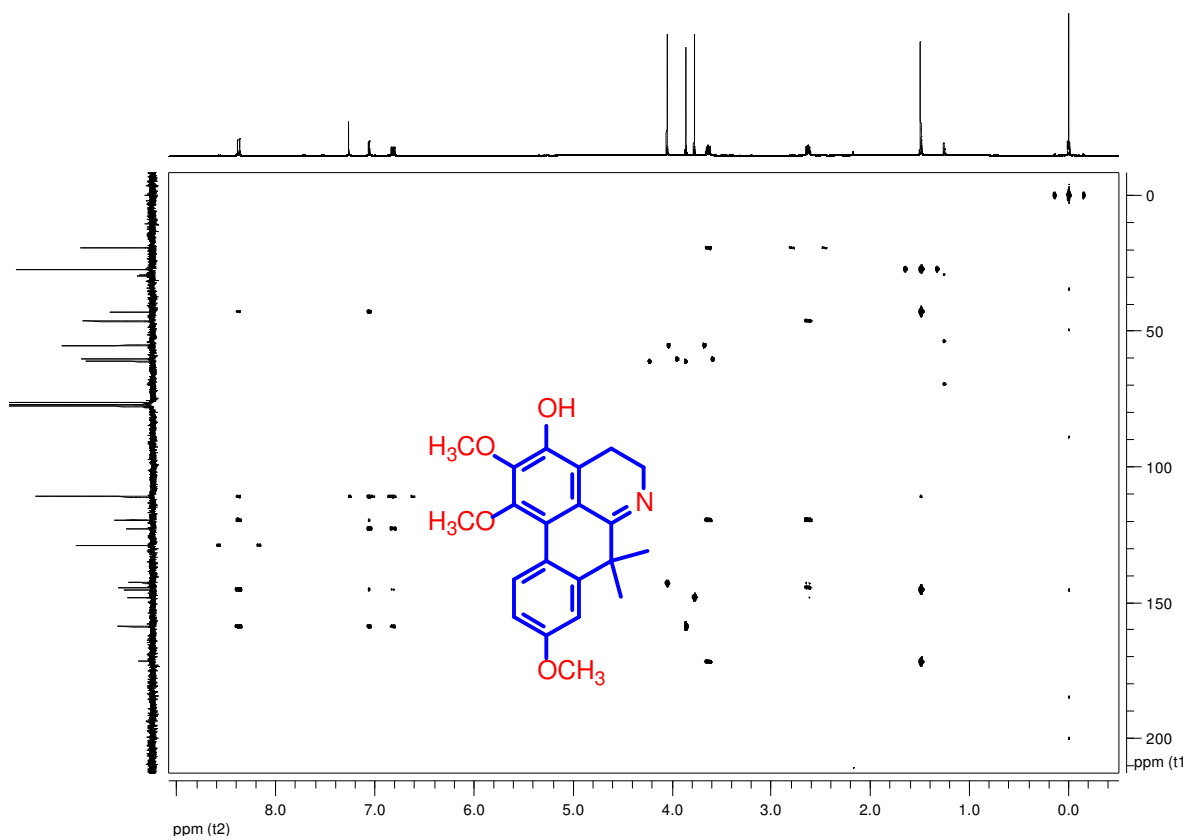


Figure S32. ^1H - ^{13}C long-range correlation map from HMBC NMR experiment of alkaloid **6** in CDCl_3 at 400 and 100 MHz.

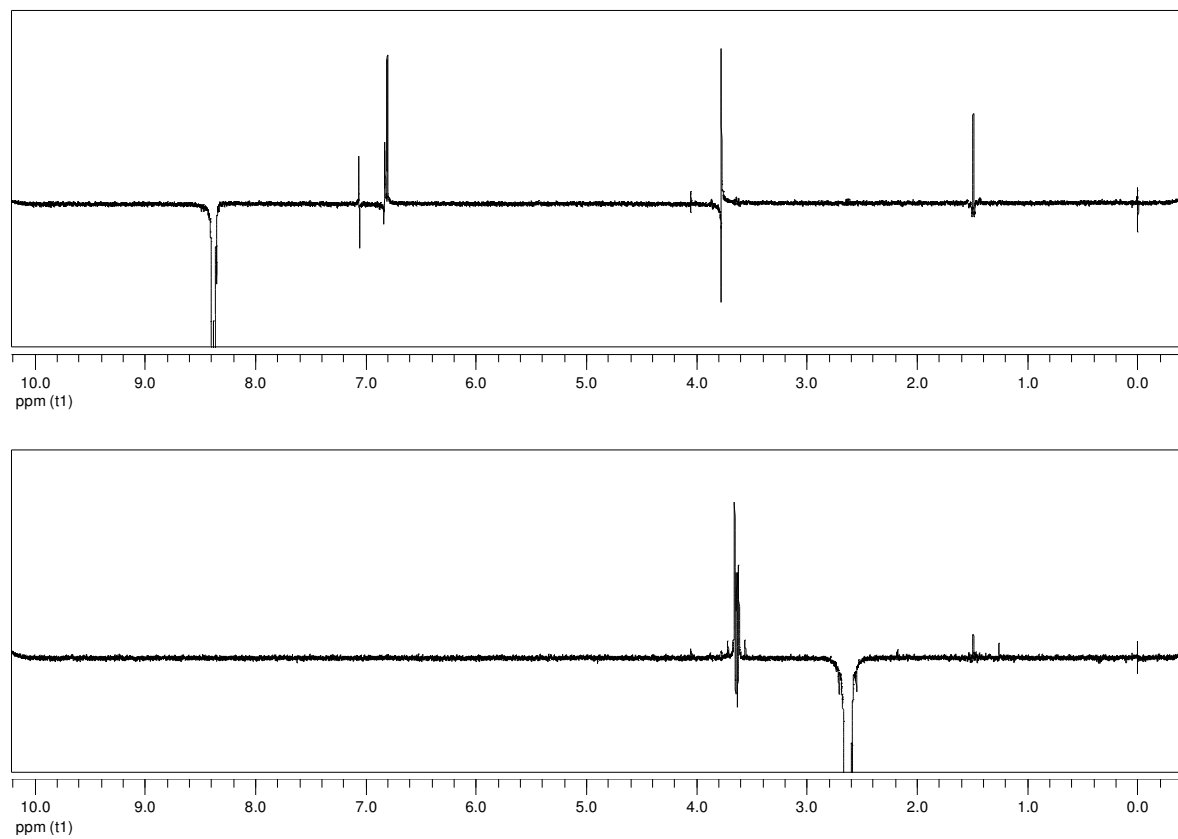


Figure S33. NOE experiments of alkaloid **6** in CDCl₃ at 400 MHz.

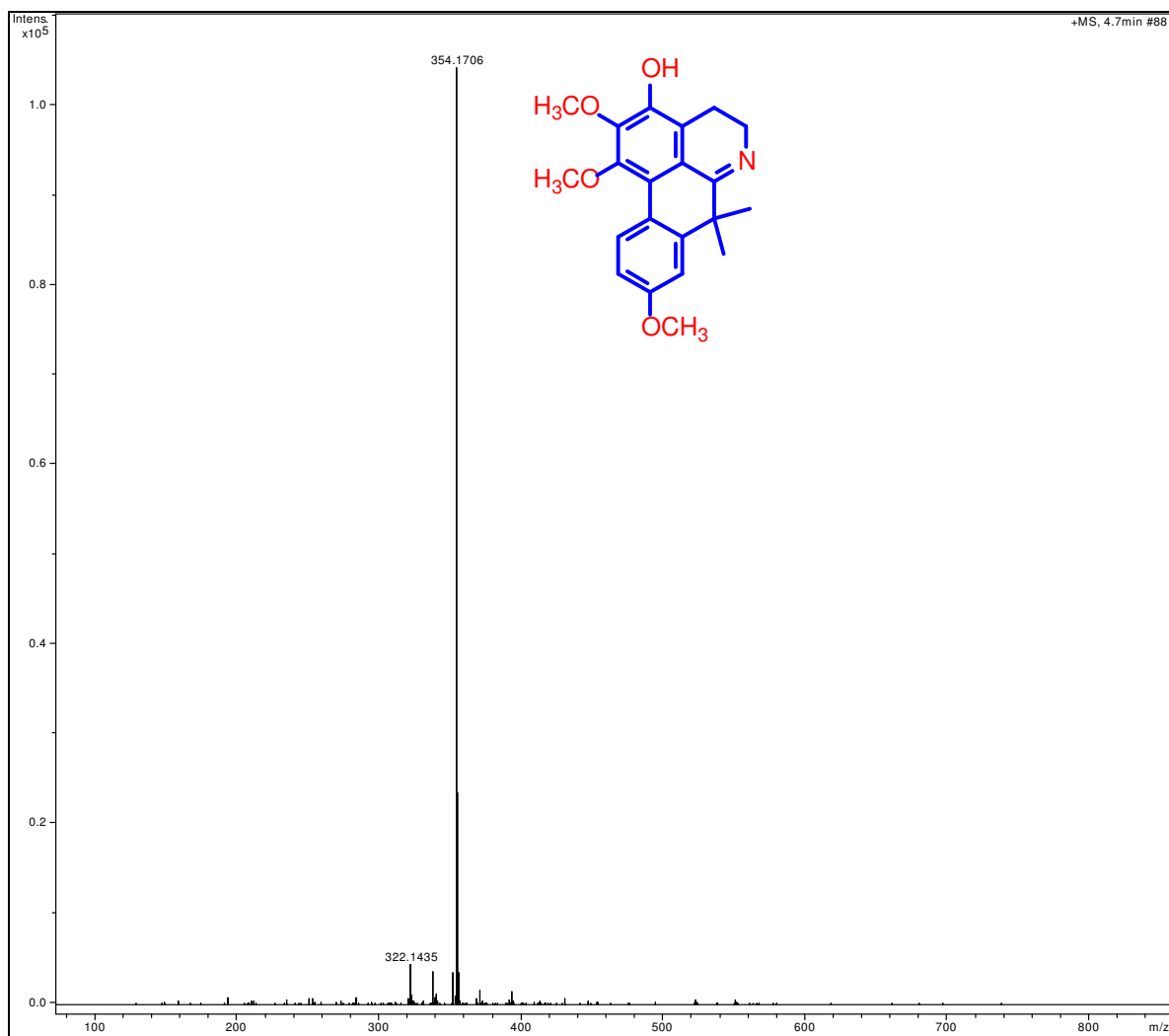


Figure S34. HR-ESI(+)-MS spectrum of alkaloid **6** (m/z 354.1706 $[M+H]^+$).

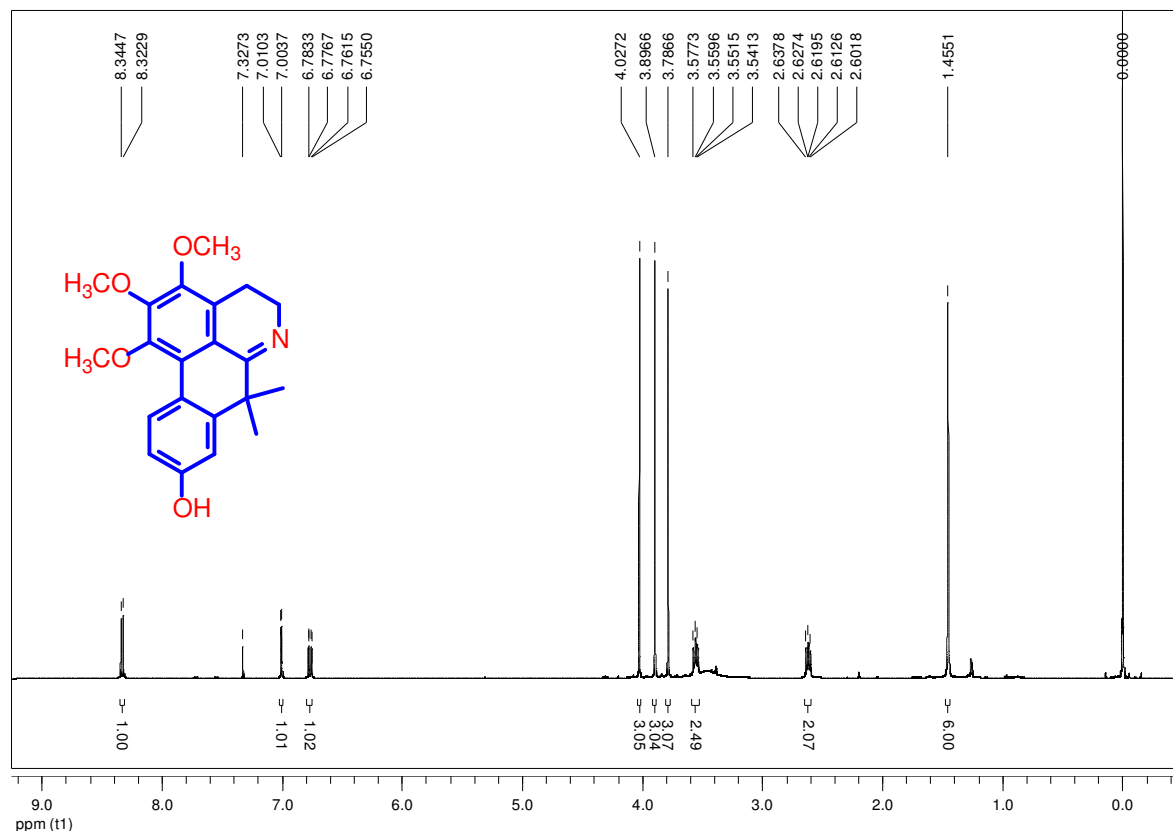


Figure S35. ^1H NMR spectrum of alkaloid **7** in CDCl_3 + drops of CD_3OD at 400 MHz.

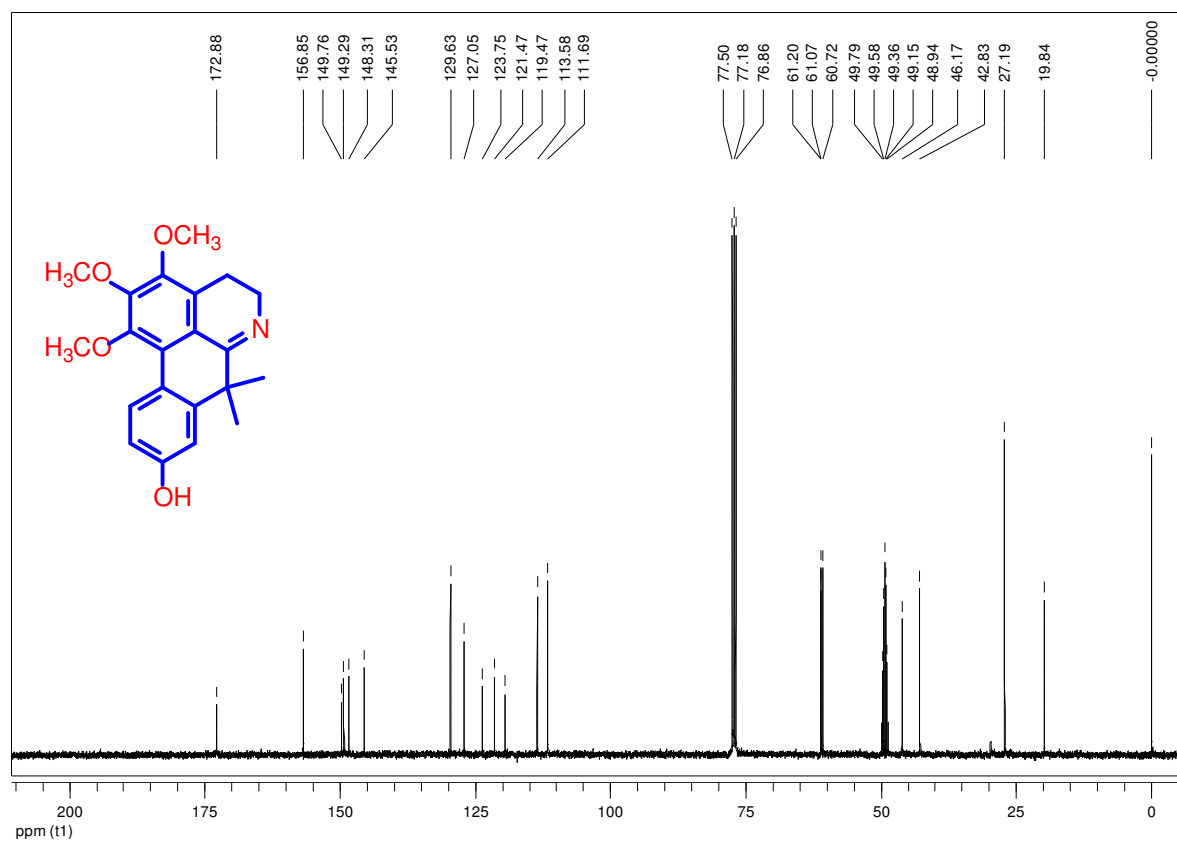


Figure S36. ¹³C NMR spectrum of alkaloid 7 in CDCl₃ + drops of CD₃OD at 100 MHz.

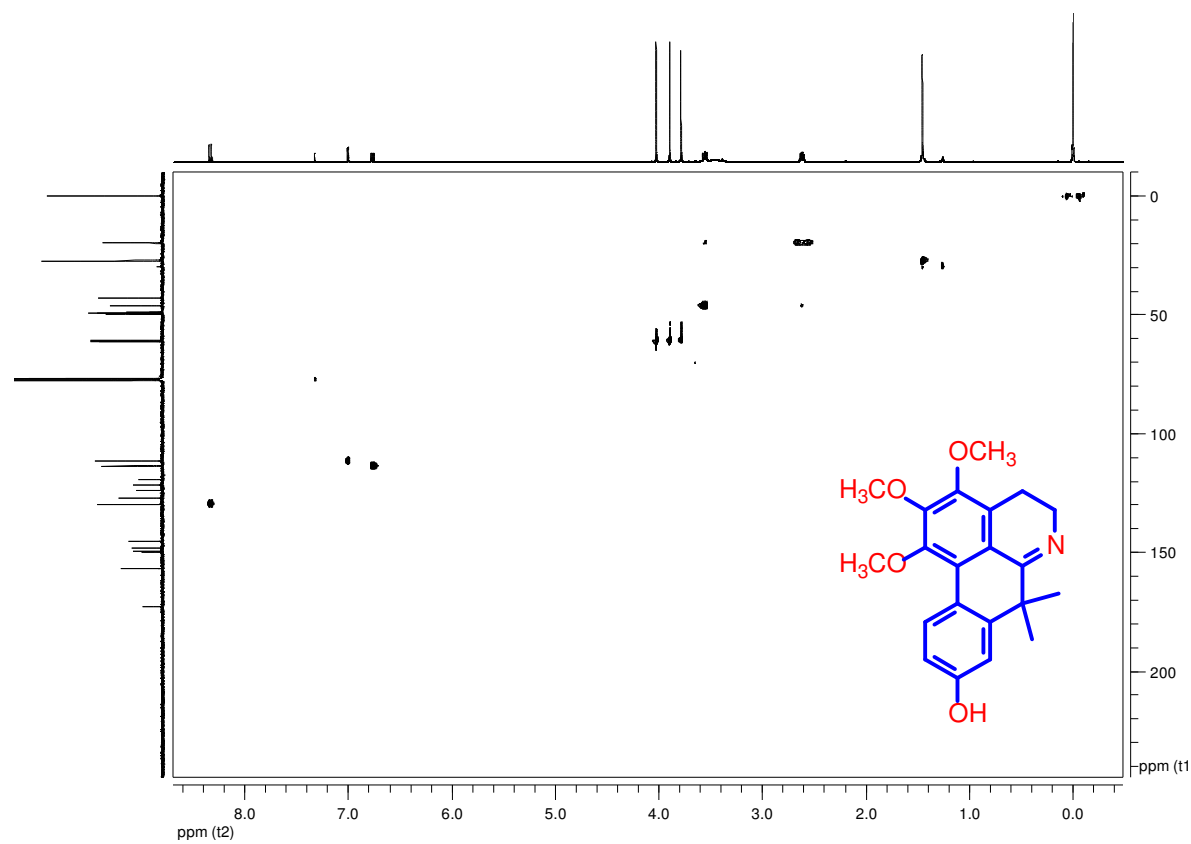


Figure S37. ^1H - ^{13}C one-bond correlation map from HSQC NMR experiment of alkaloid **7** in CDCl_3 + drops of CD_3OD at 400 and 100 MHz.

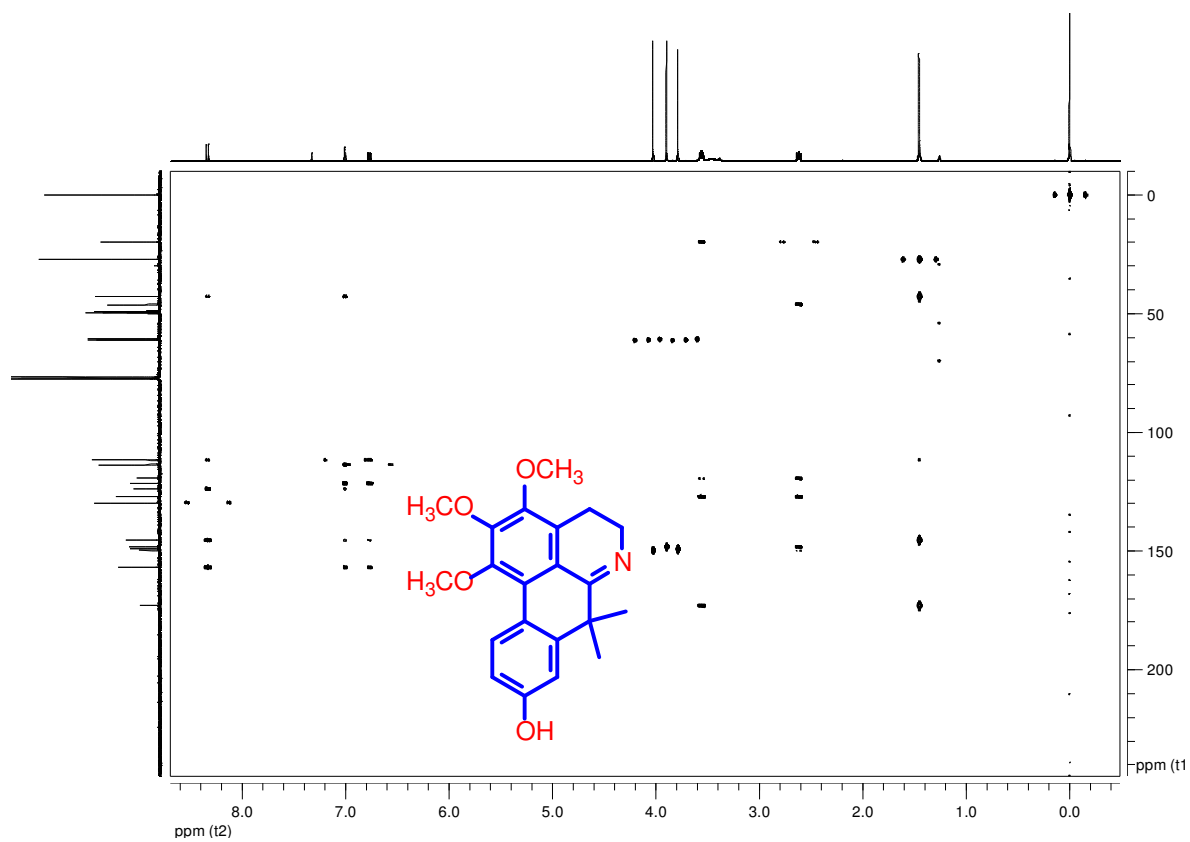


Figure S38. ^1H - ^{13}C long-range correlation map from HMBC NMR experiment of alkaloid **7** in CDCl_3 + drops of CD_3OD at 400 and 100 MHz.

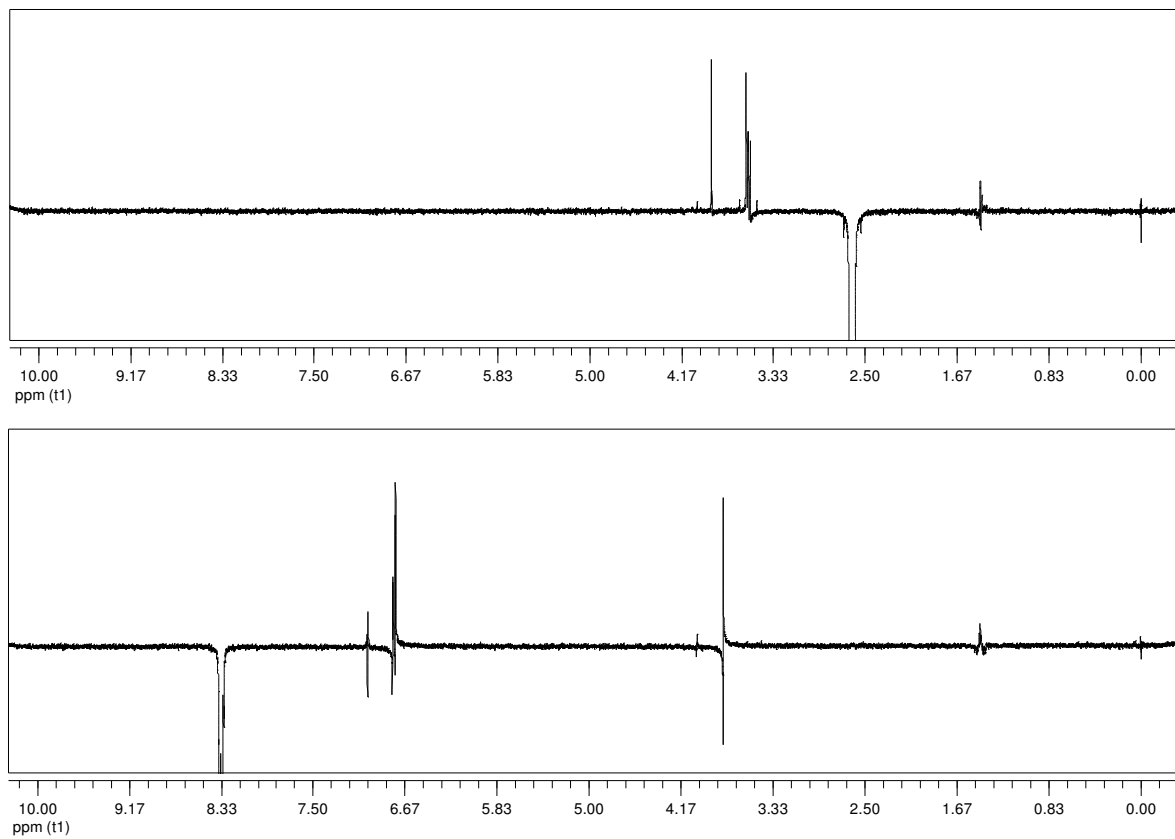


Figure S39. NOE experiments of alkaloid **7** in CDCl₃ + drops of CD₃OD at 400 and 100 MHz.

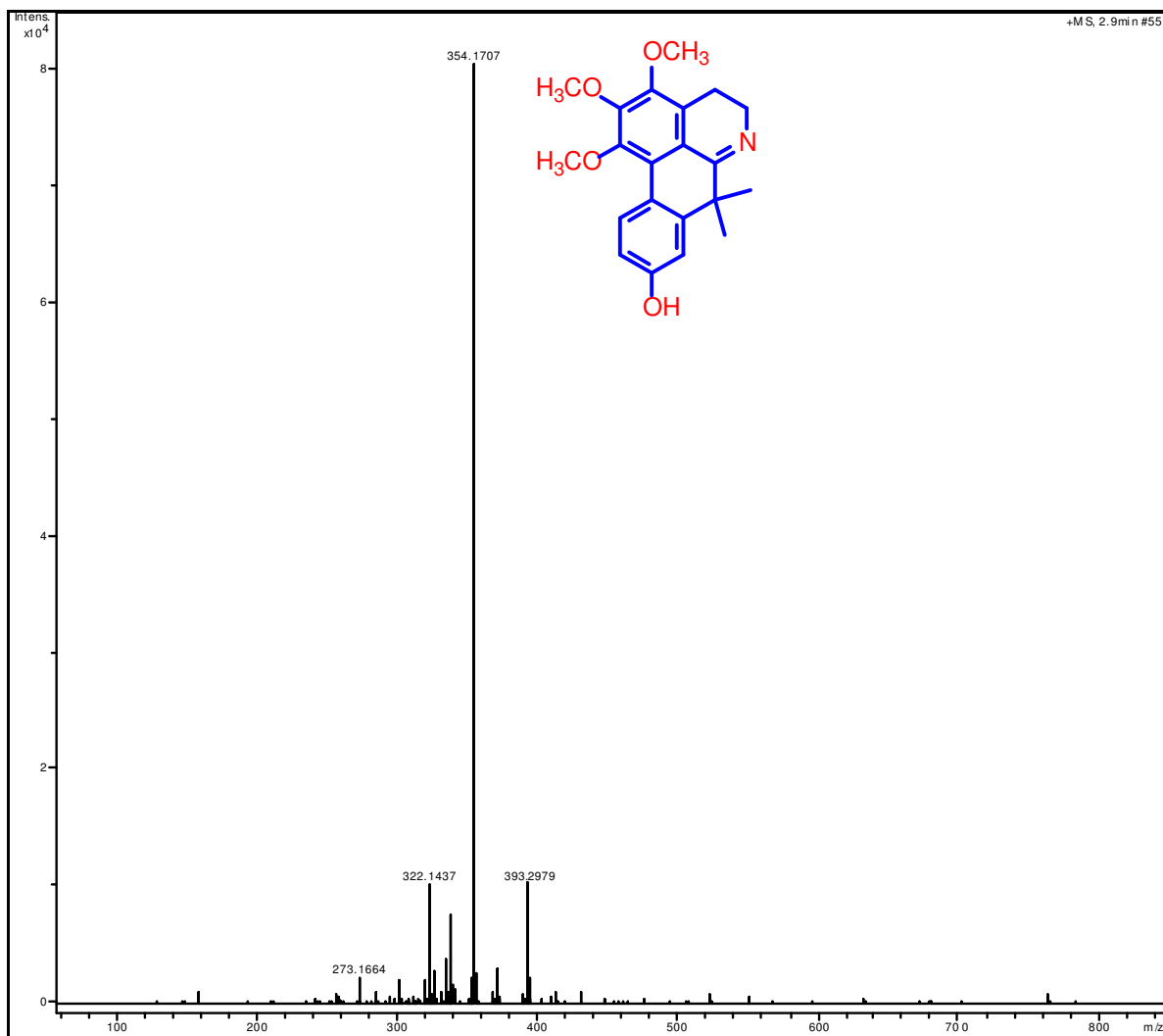


Figure S40. HR-ESI(+)-MS spectrum of alkaloid 7 (m/z 354.1707 $[M+H]^+$)

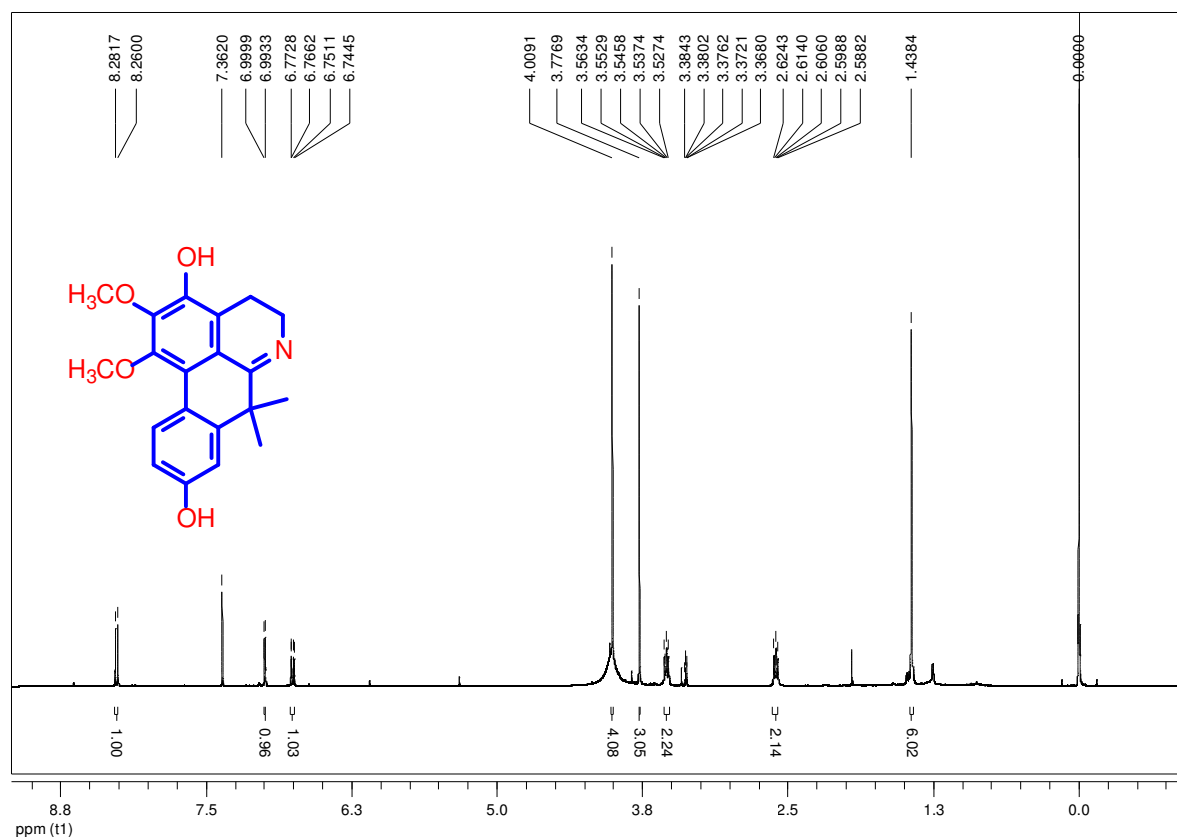


Figure S41. ¹H NMR spectrum of alkaloid 8 in CDCl₃ + drops of CD₃OD at 400 MHz.

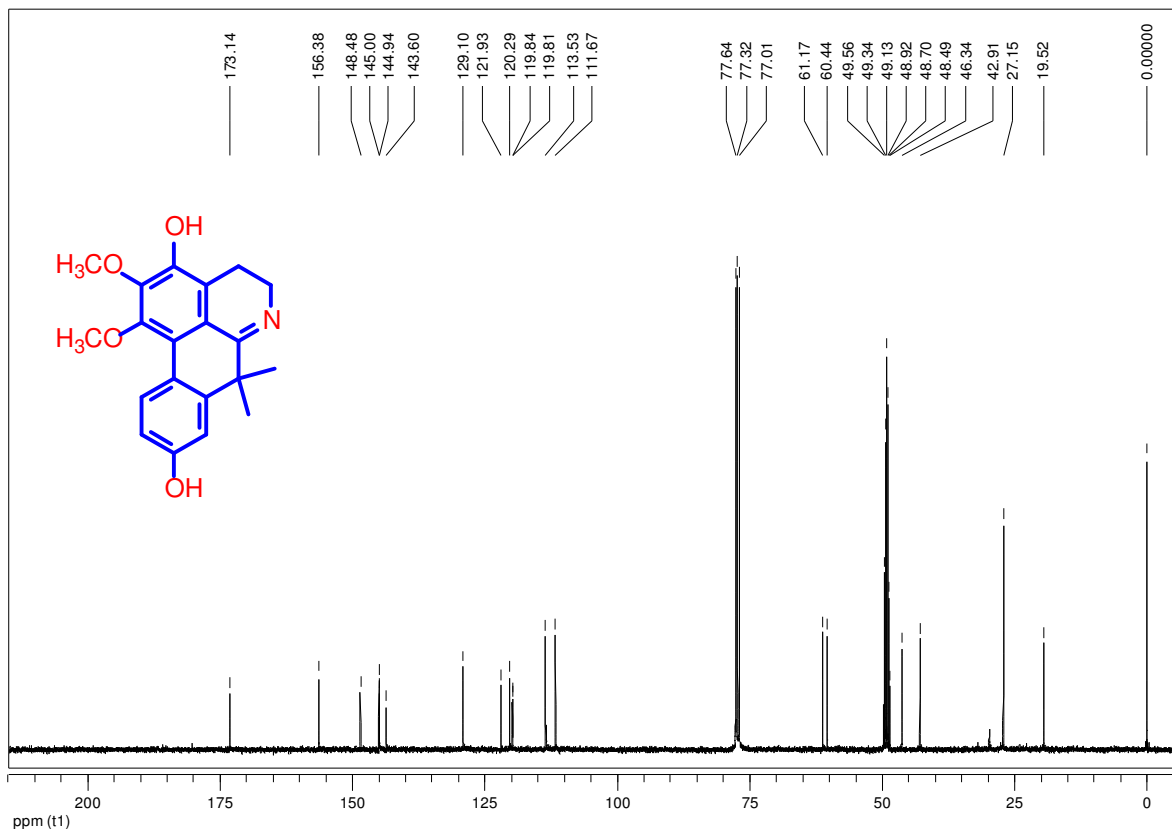


Figure S42. ¹H NMR spectrum of alkaloid 8 in CDCl₃ + drops of CD₃OD at 100 MHz.

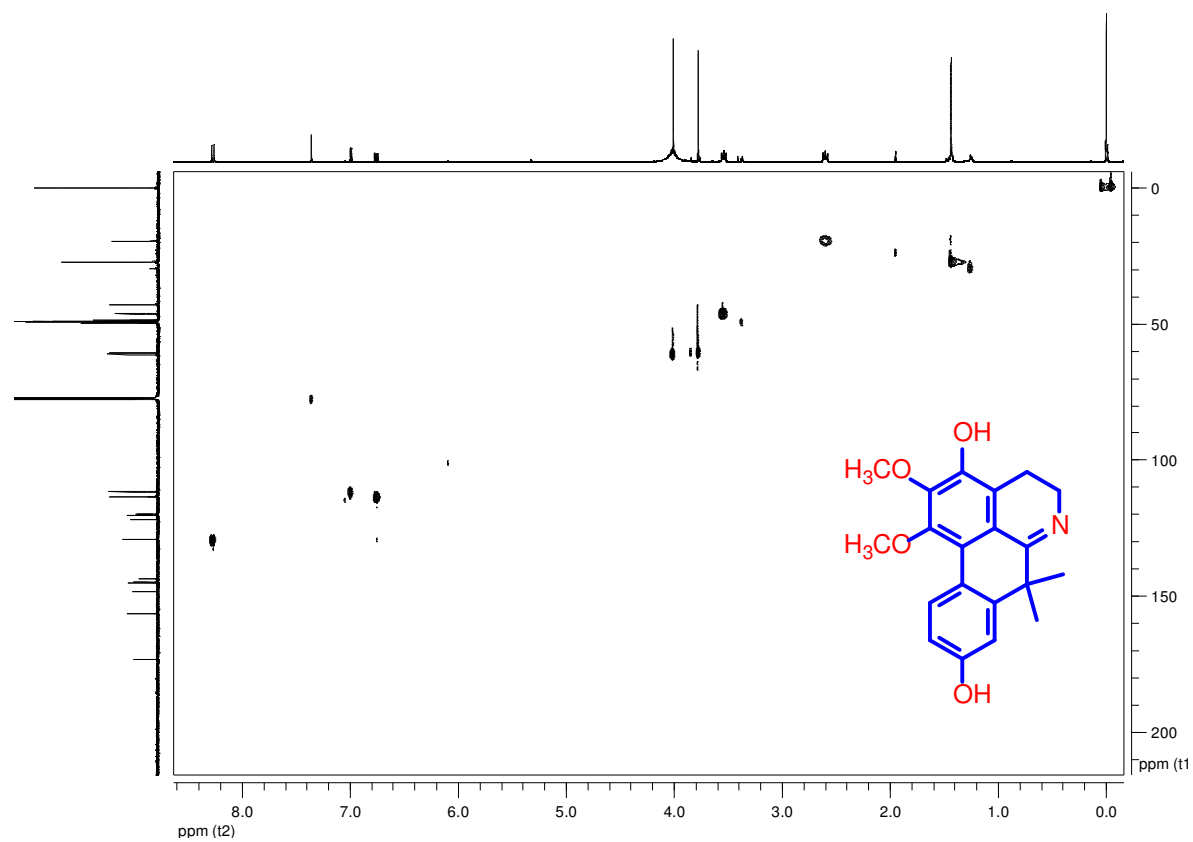


Figure S43. ^1H - ^{13}C one-bond correlation map from HSQC NMR experiment of alkaloid **8** in CDCl_3 + drops of CD_3OD at 400 MHz.

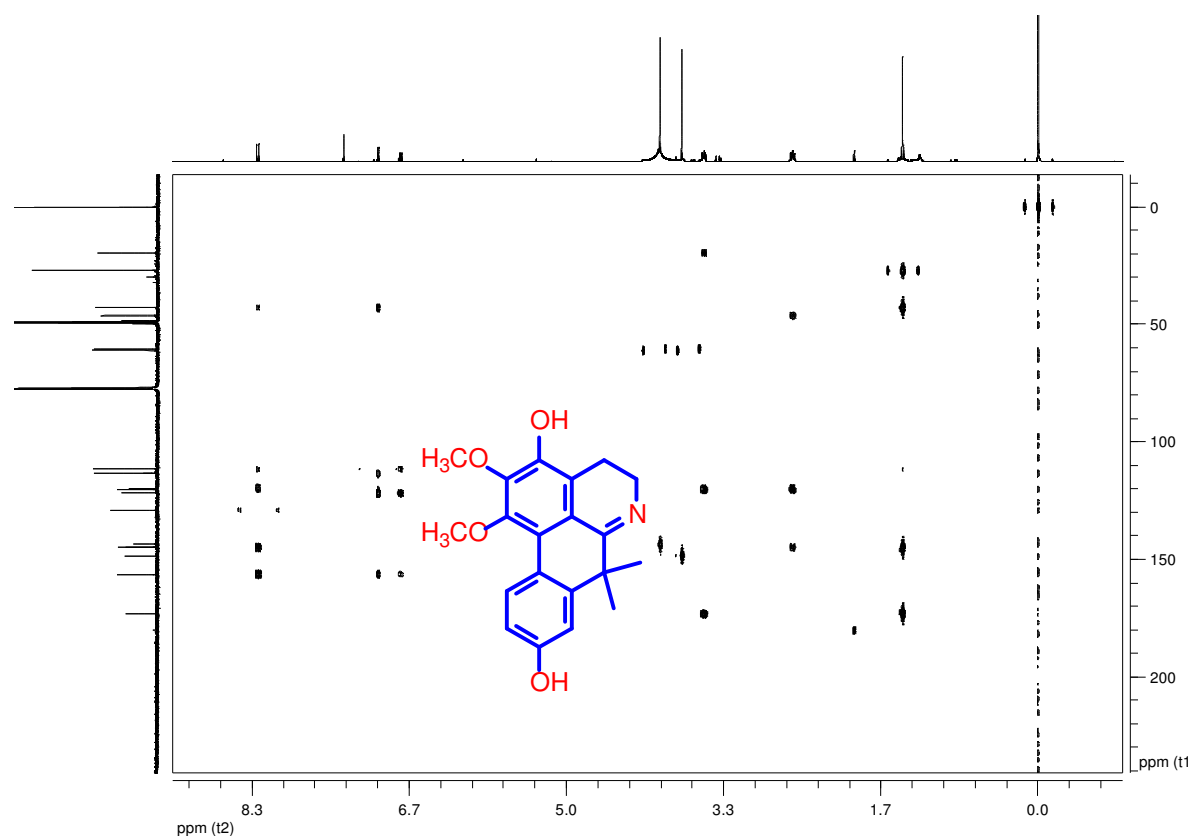


Figure S44. ^1H - ^{13}C long-range correlation map from HMBC NMR experiment of alkaloid **8** in CDCl_3 + drops of CD_3OD at 400 MHz.

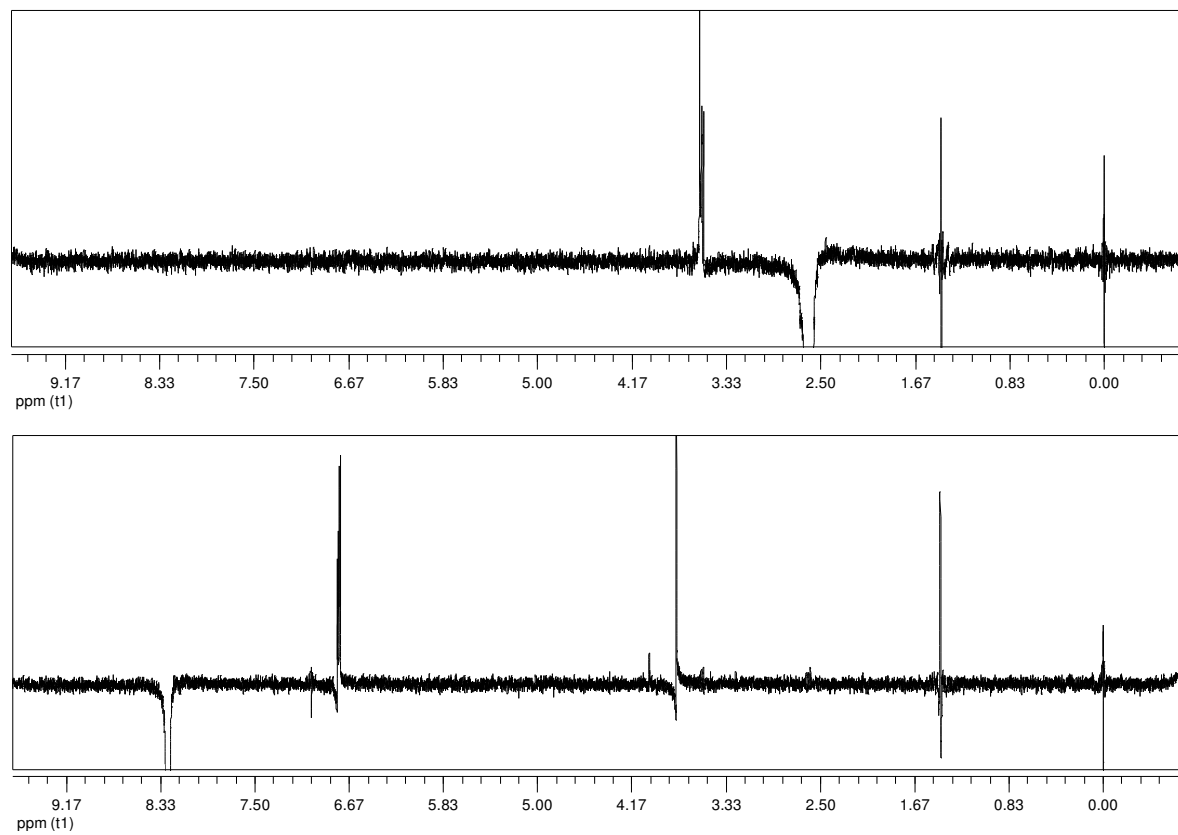


Figure S45. NOE experiments of alkaloid **8** in CDCl_3 + drops of CD_3OD at 400 and 100 MHz.

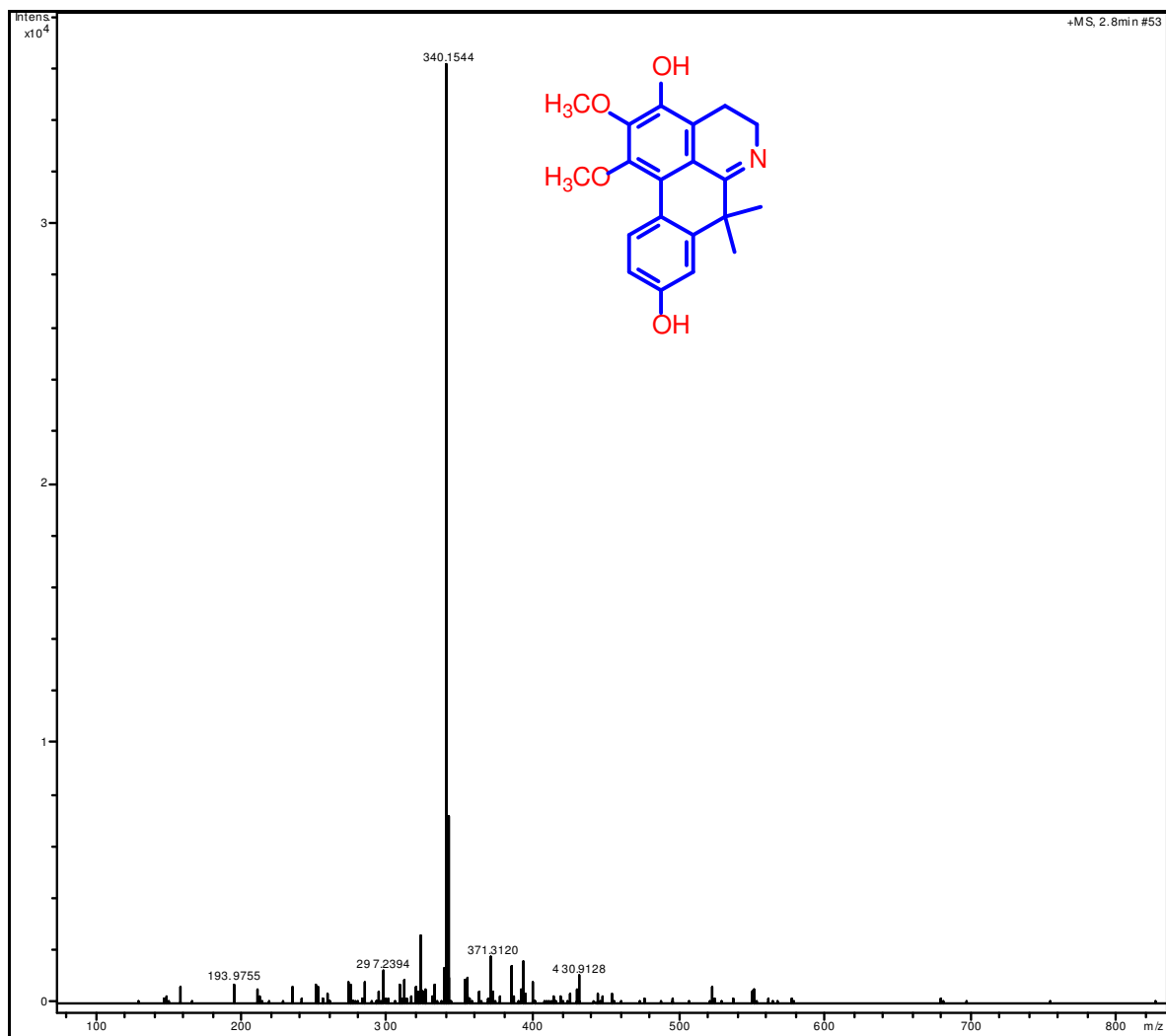


Figure S46. HR-ESI(+)-MS spectrum of alkaloid **8** (m/z 340.1544 $[M+H]^+$).

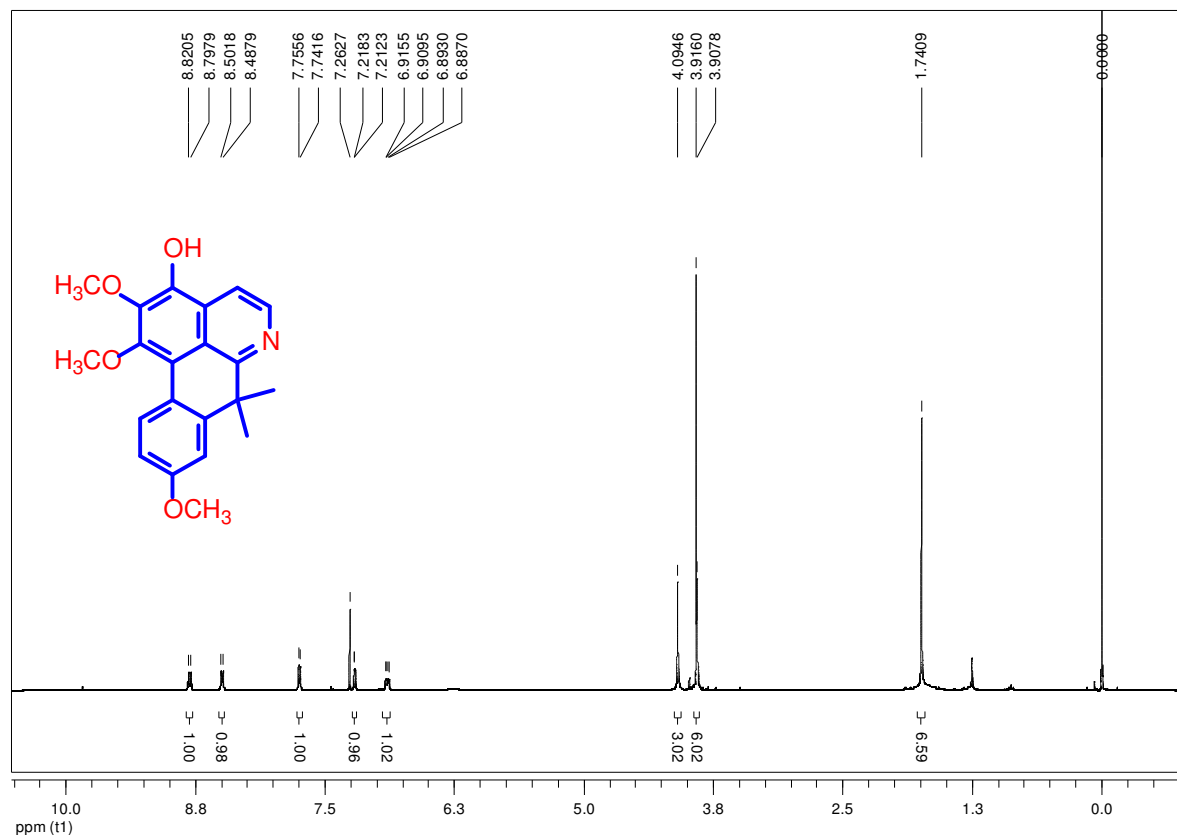


Figure S47. ¹H NMR spectrum of alkaloid **9** in CDCl₃ at 400 MHz.

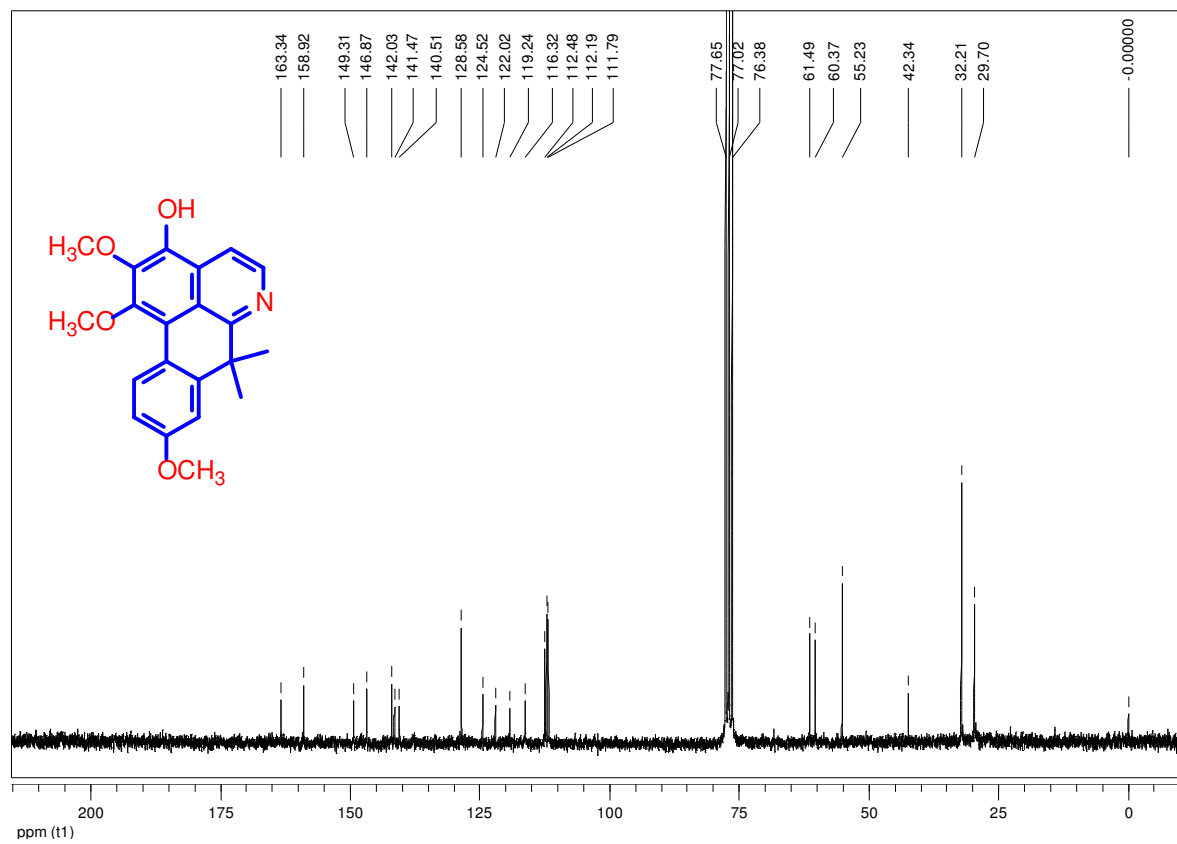


Figure S48. ¹³C NMR spectrum of alkaloid **9** in CDCl₃ at 100 MHz.

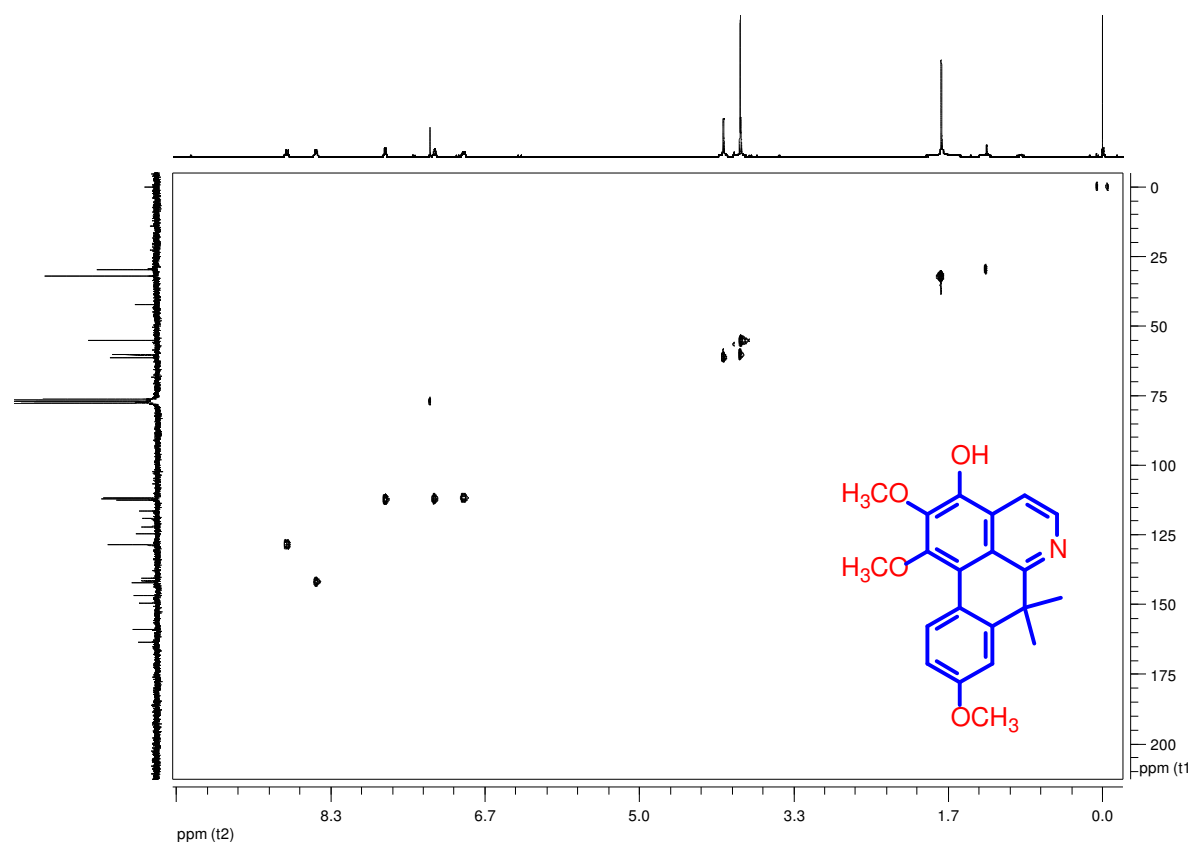


Figure S49. ^1H - ^{13}C one-bond correlation map from HSQC NMR experiment of alkaloid **9** in CDCl_3 at 400 and 100 MHz.

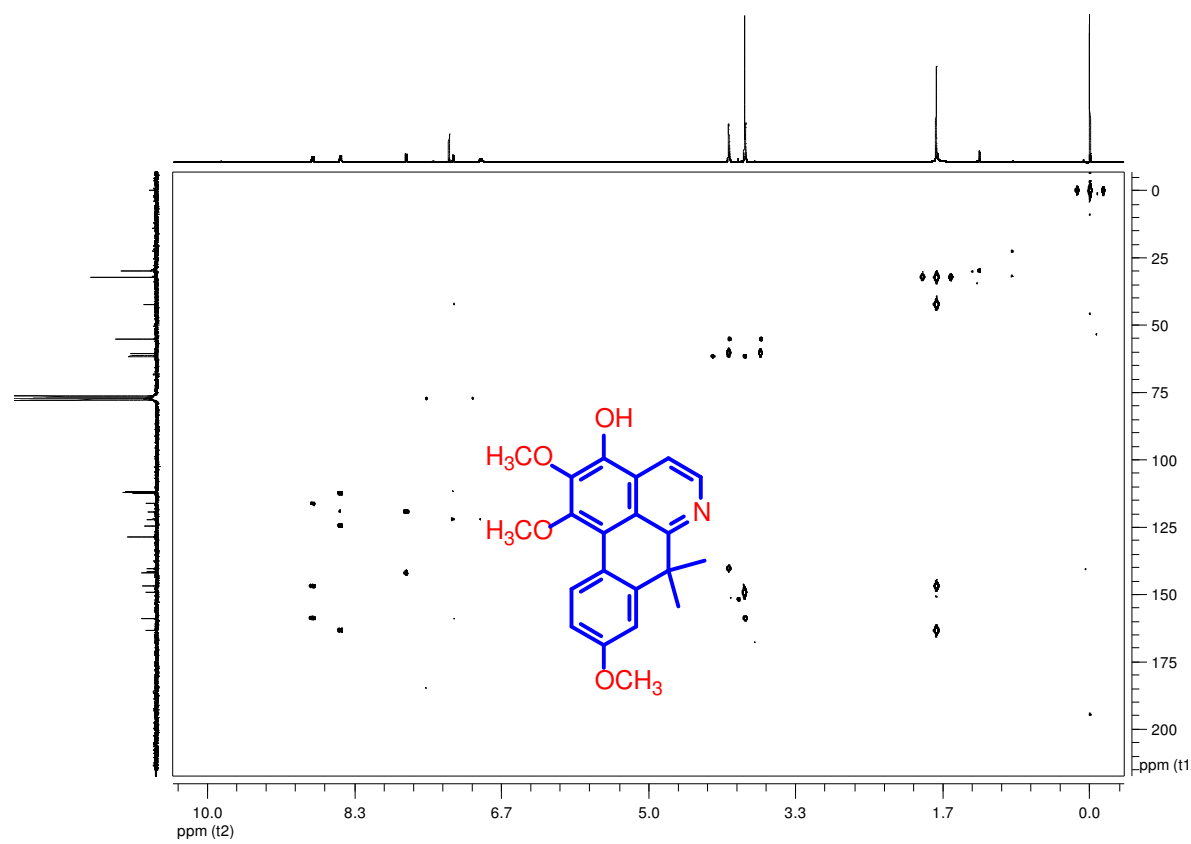


Figure S50. ^1H - ^{13}C long-range correlation map from HMBC NMR experiment of alkaloid **9** in CDCl_3 at 400 and 100 MHz.

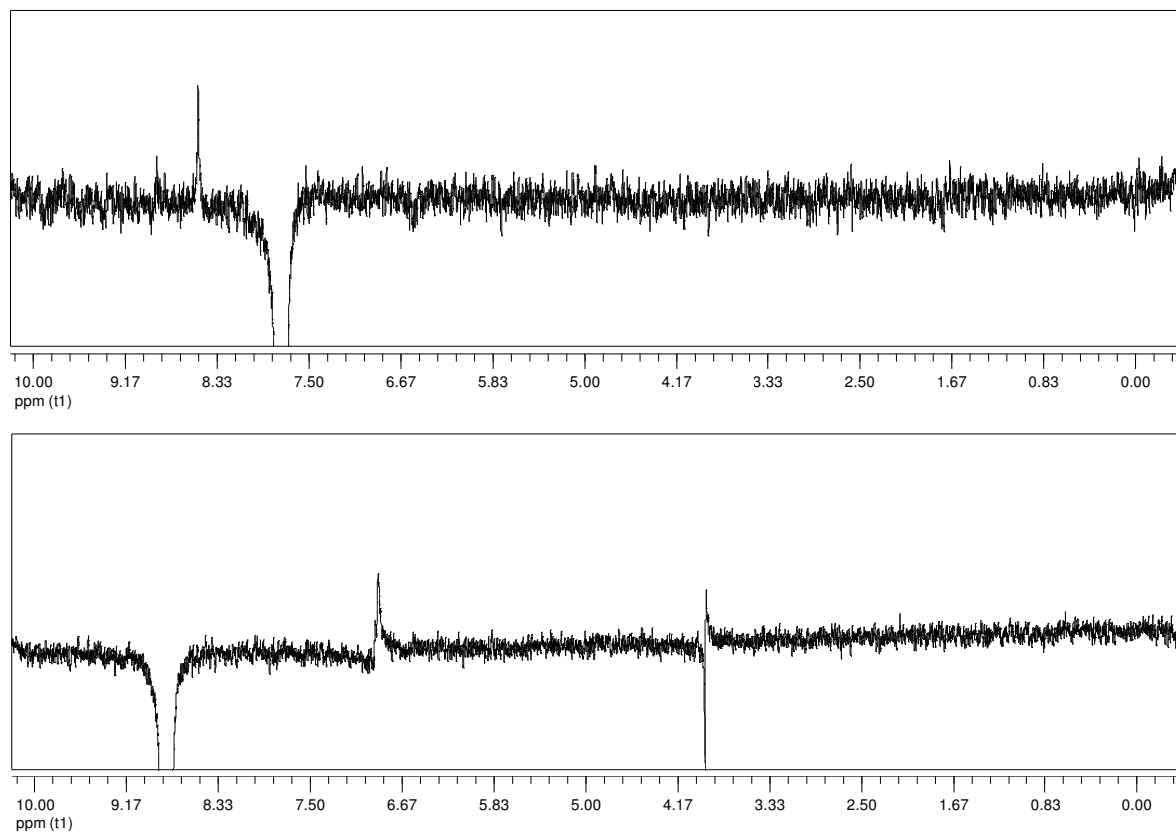


Figure S51. NOE experiments of alkaloid **9** in CDCl₃ at 400 MHz.

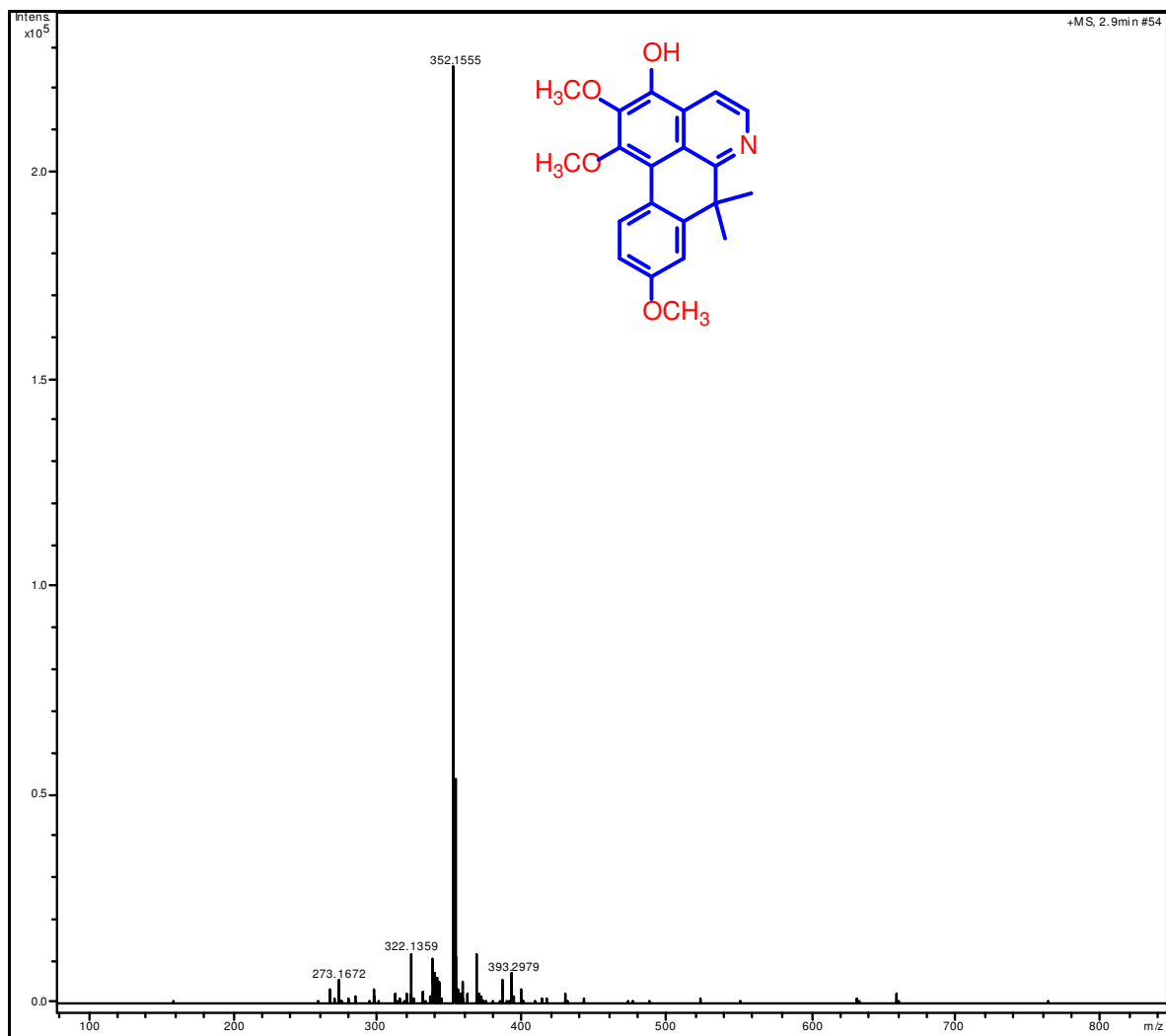


Figure S52. HR-ESI(+)-MS spectrum of alkaloid **9** (m/z 352.1555 $[M+H]^+$).

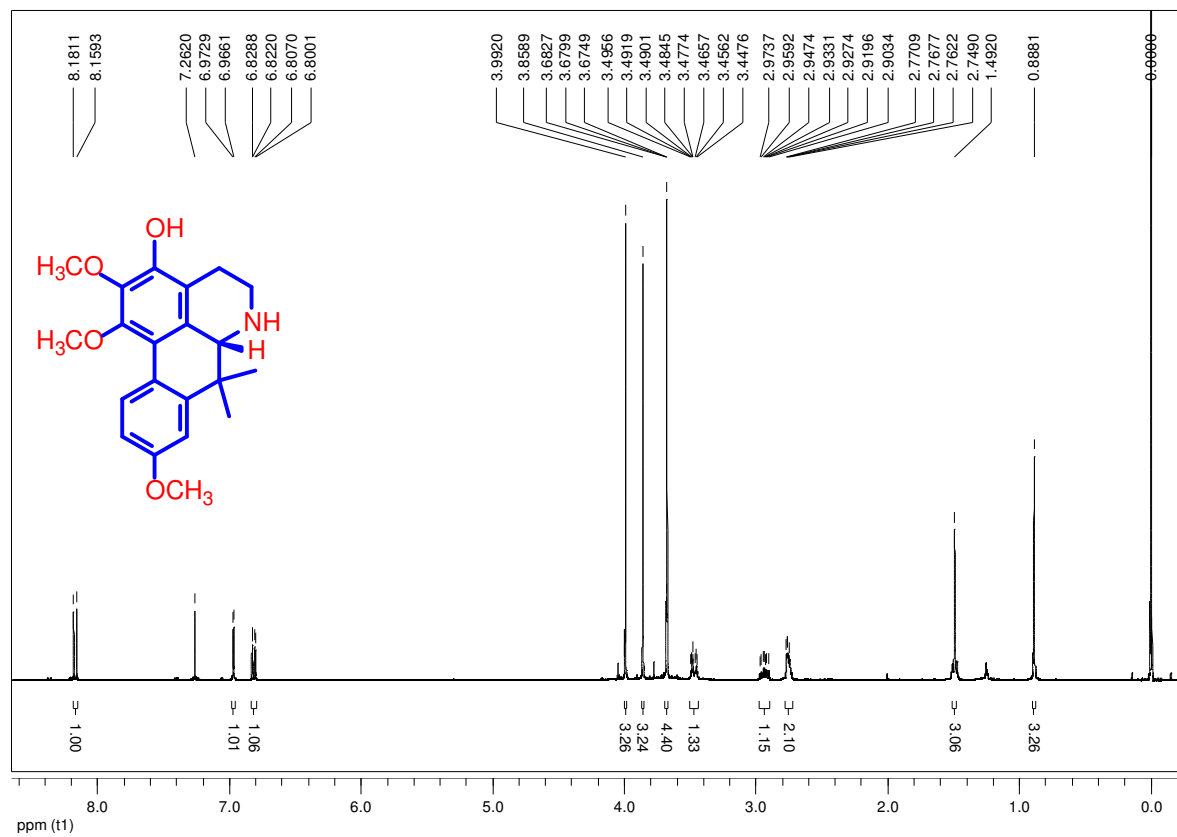


Figure S53. ^1H NMR spectrum of alkaloid **10** in CDCl_3 at 400 MHz.

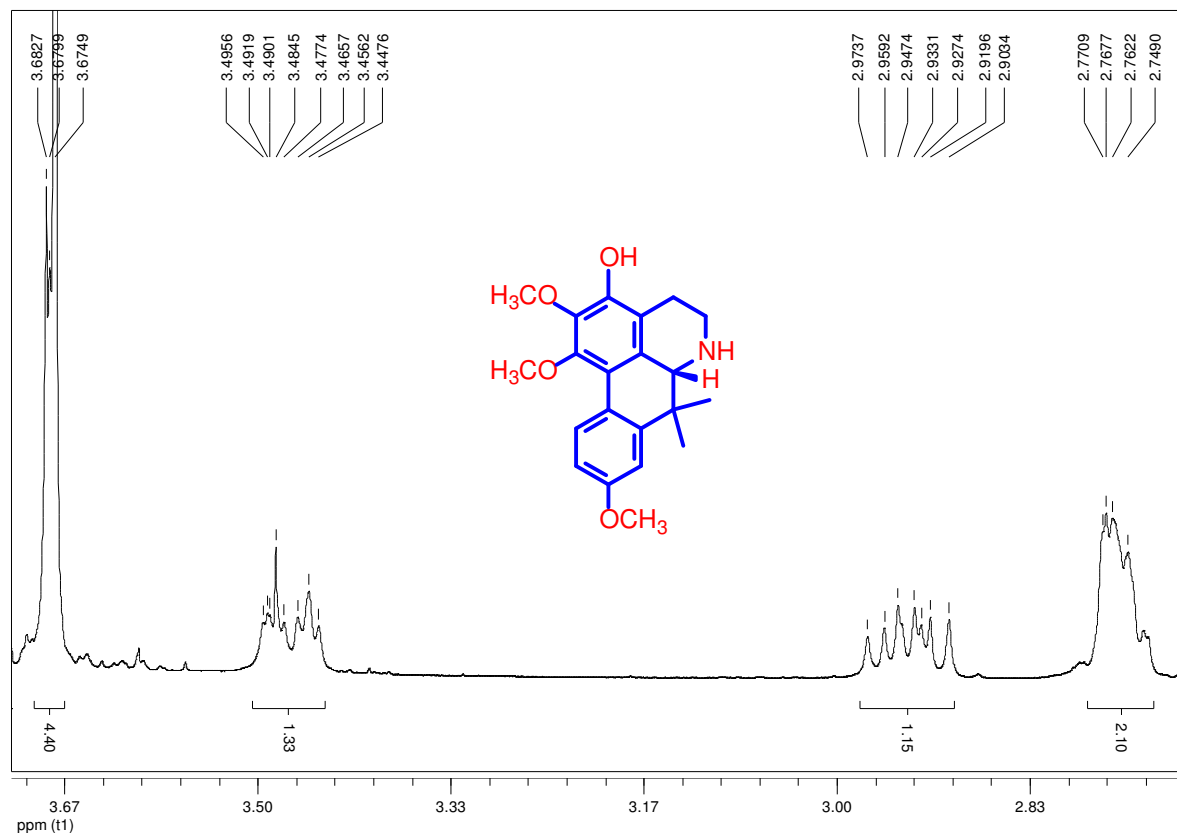


Figure S54. Enlargement of ^1H NMR spectrum of alkaloid **10** in CDCl_3 at 400 MHz.

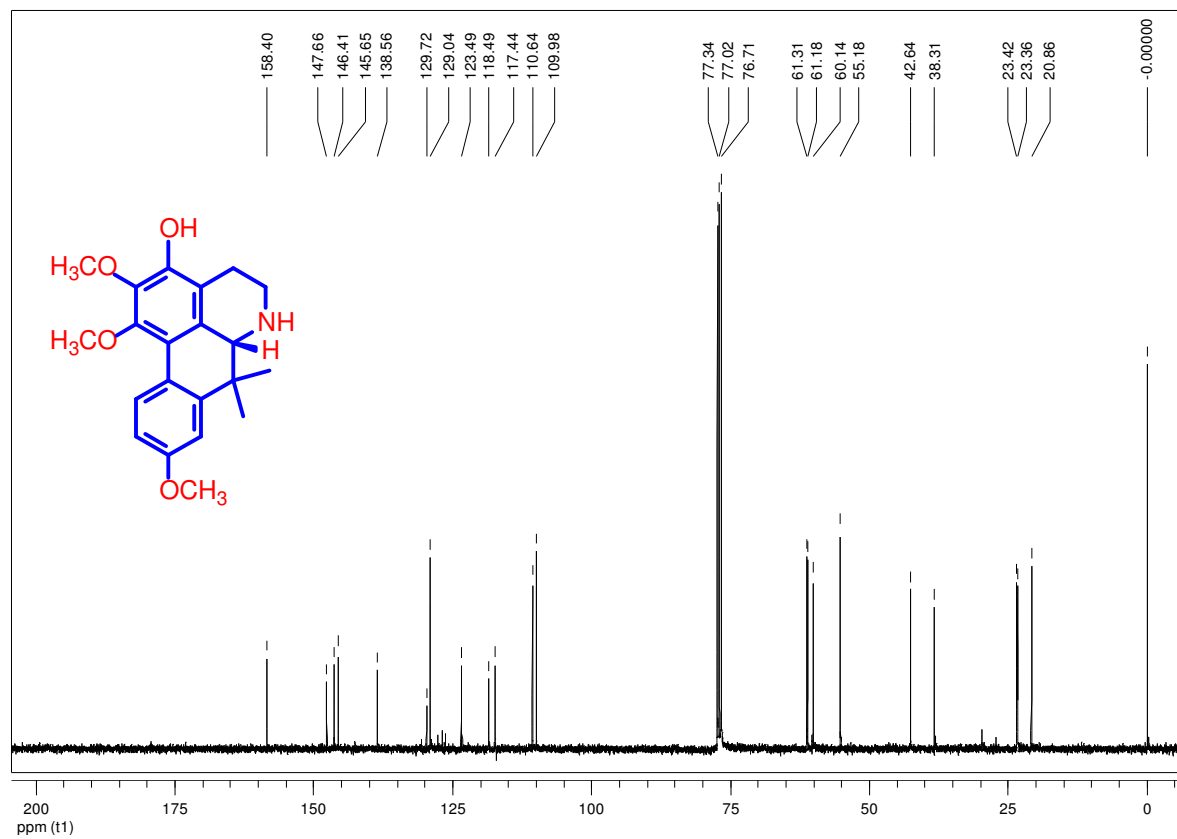


Figure S55. ¹³C NMR spectrum of alkaloid **10** in CDCl₃ at 100 MHz.

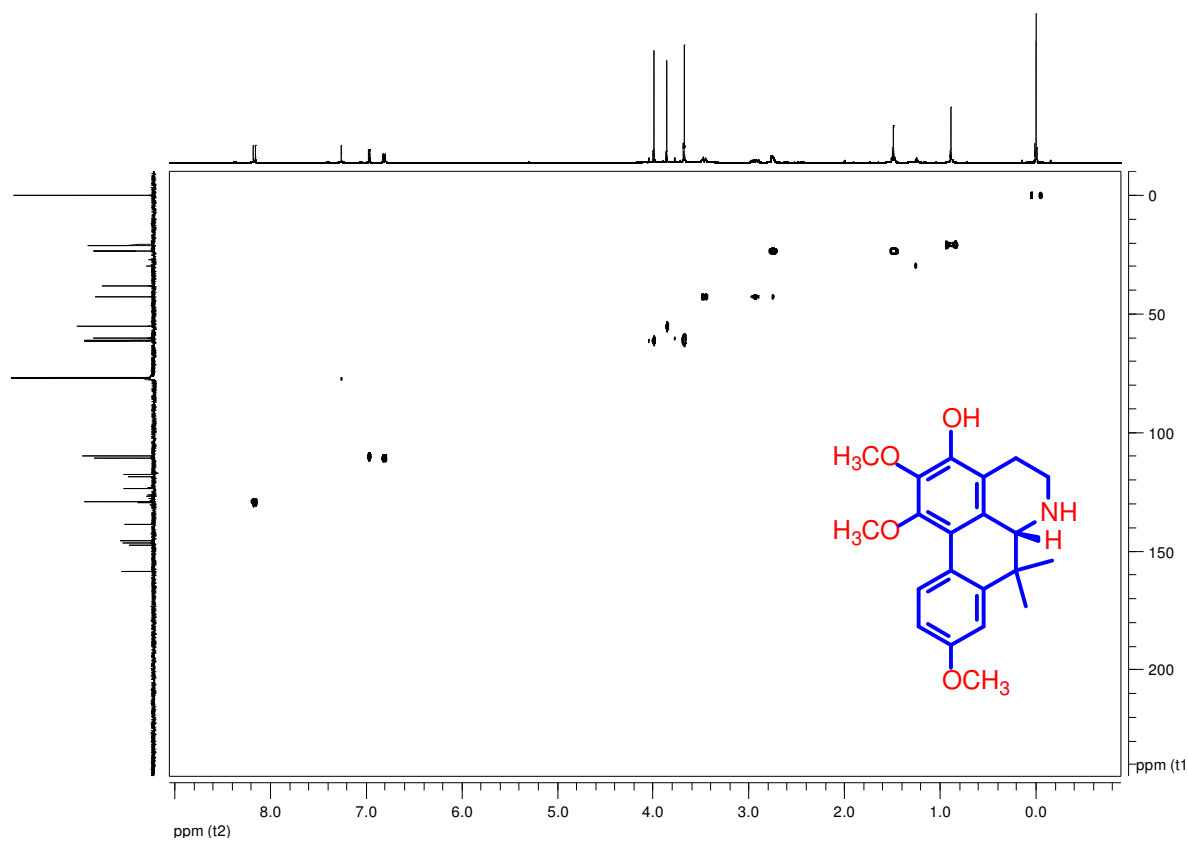


Figure S56. ^1H - ^{13}C one-bond correlation map from HSQC NMR experiment of alkaloid **10** in CDCl_3 at 400 and 100 MHz.

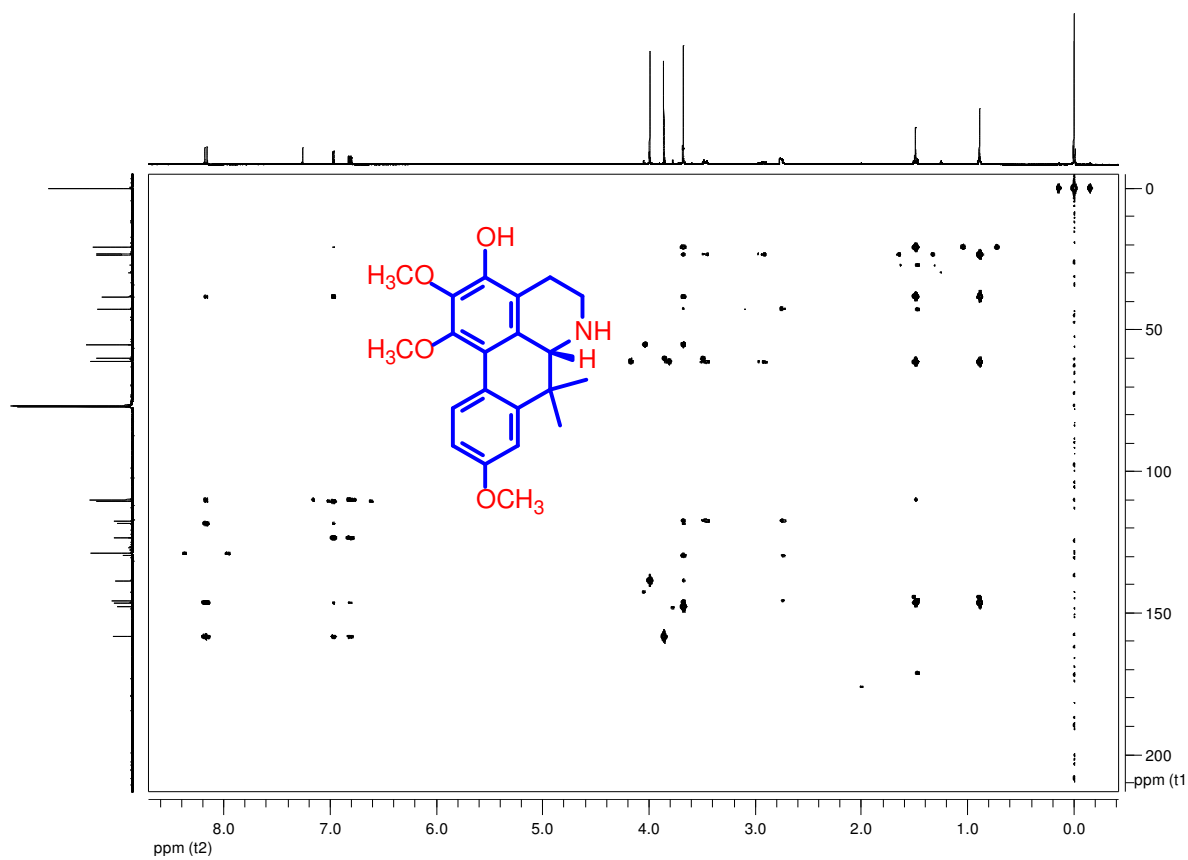


Figure S57. ^1H - ^{13}C long-range correlation map from HMBC NMR experiment of alkaloid **10** in CDCl_3 at 400 and 100 MHz.

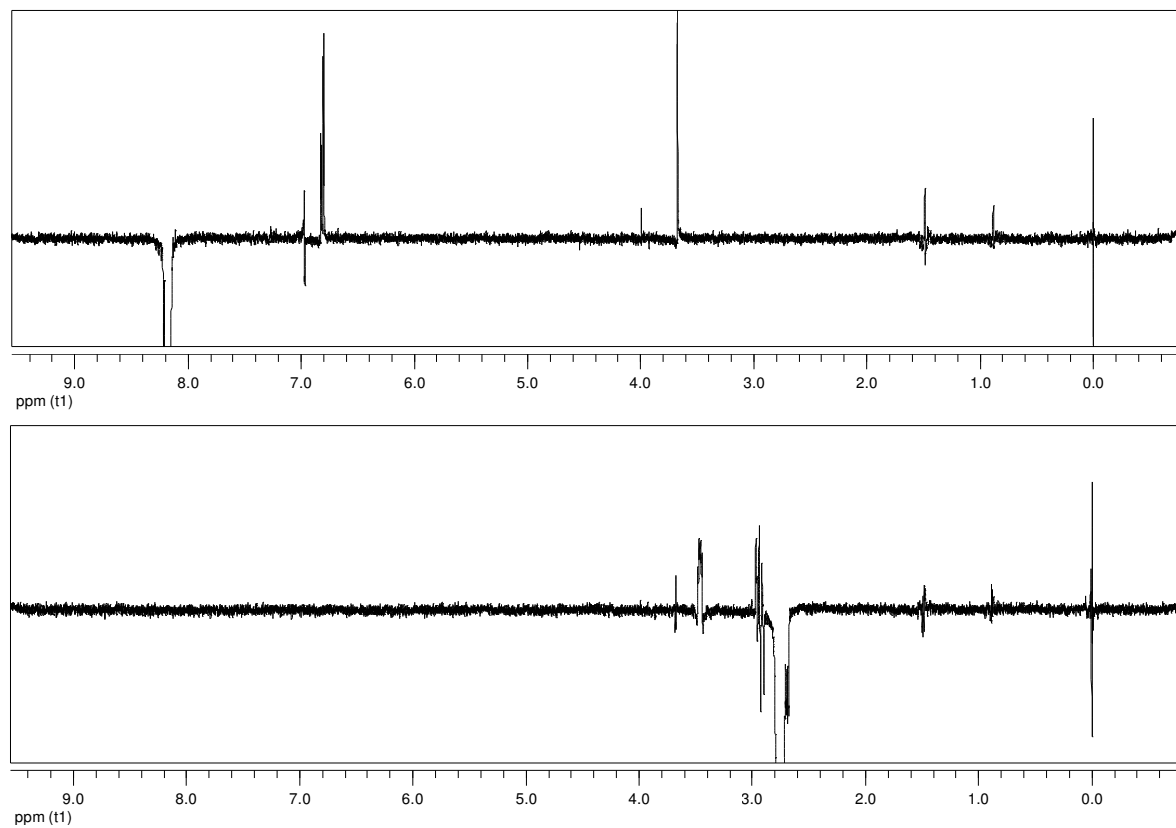


Figure S58. NOE experiments of alkaloid **10** in CDCl₃ at 400 MHz.

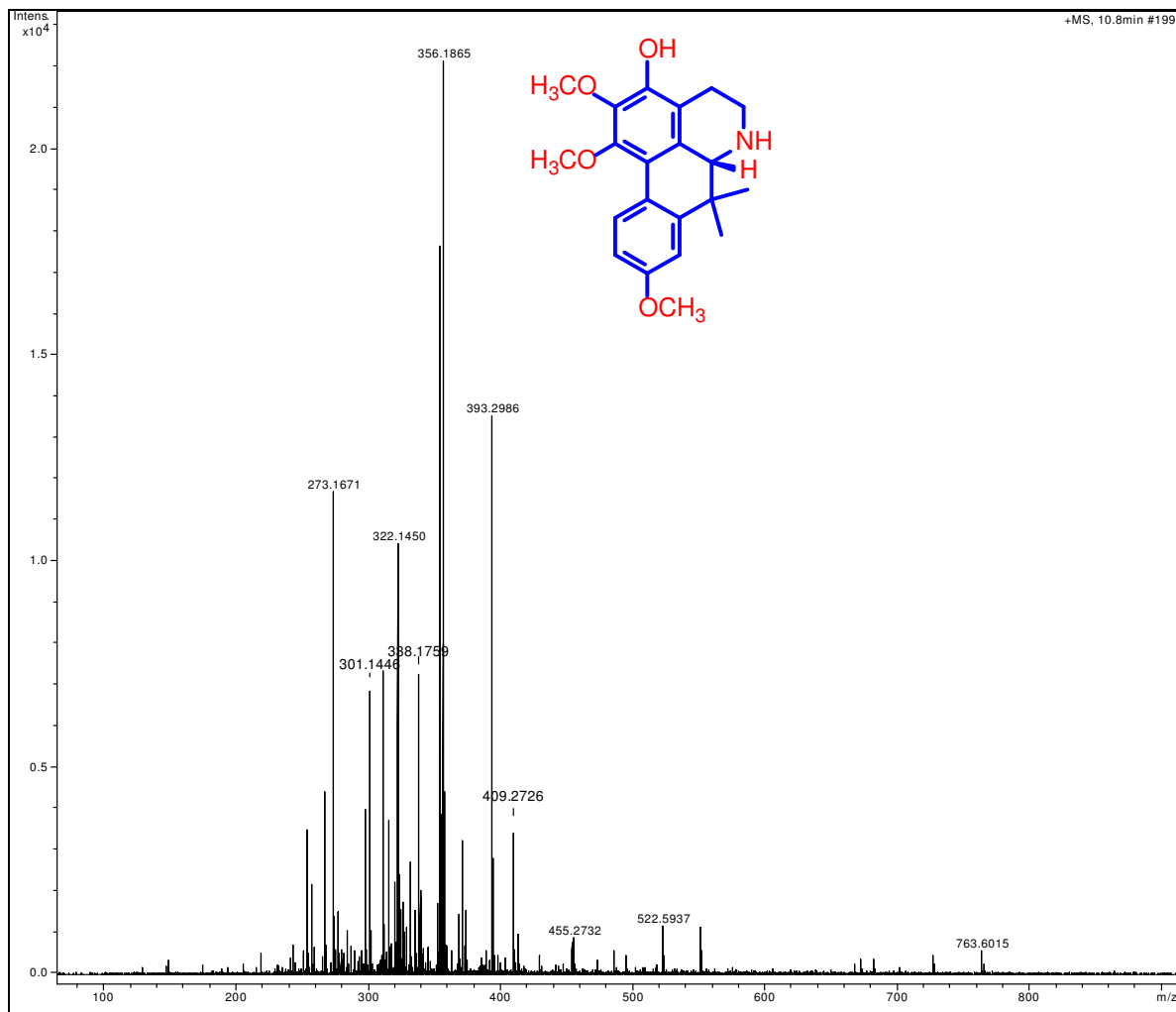


Figure S59. HR-ESI(+)-MS spectrum of alkaloid **10** (m/z 356.1865 $[M+H]^+$).

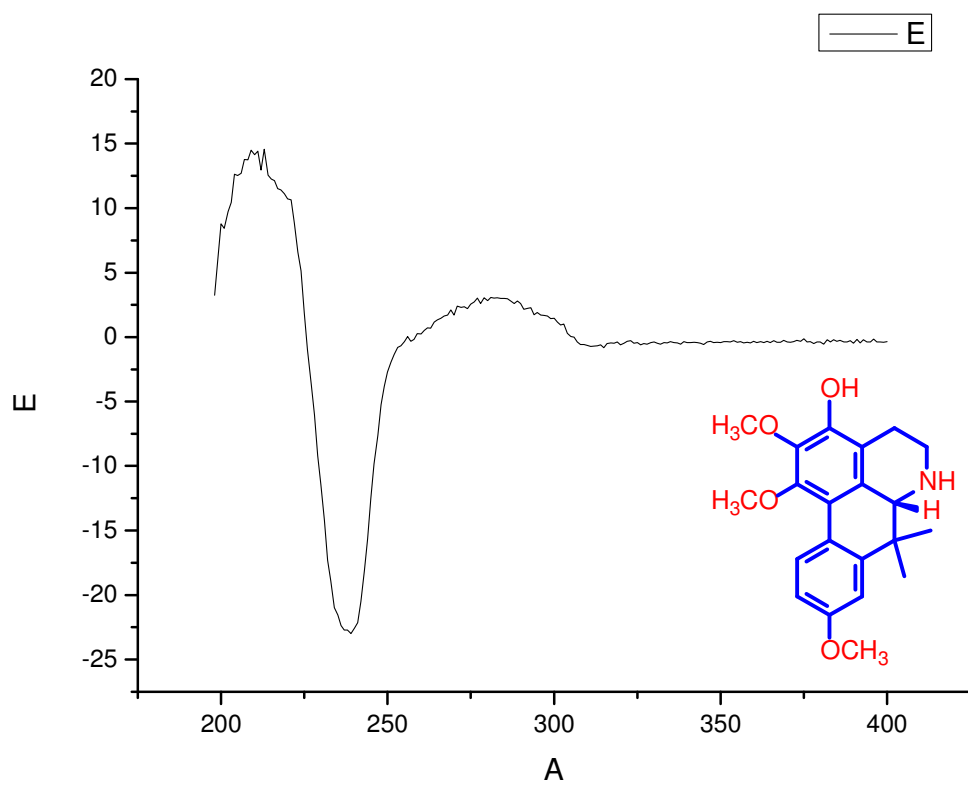


Figure S60. ECD spectrum of alkaloid **10**.

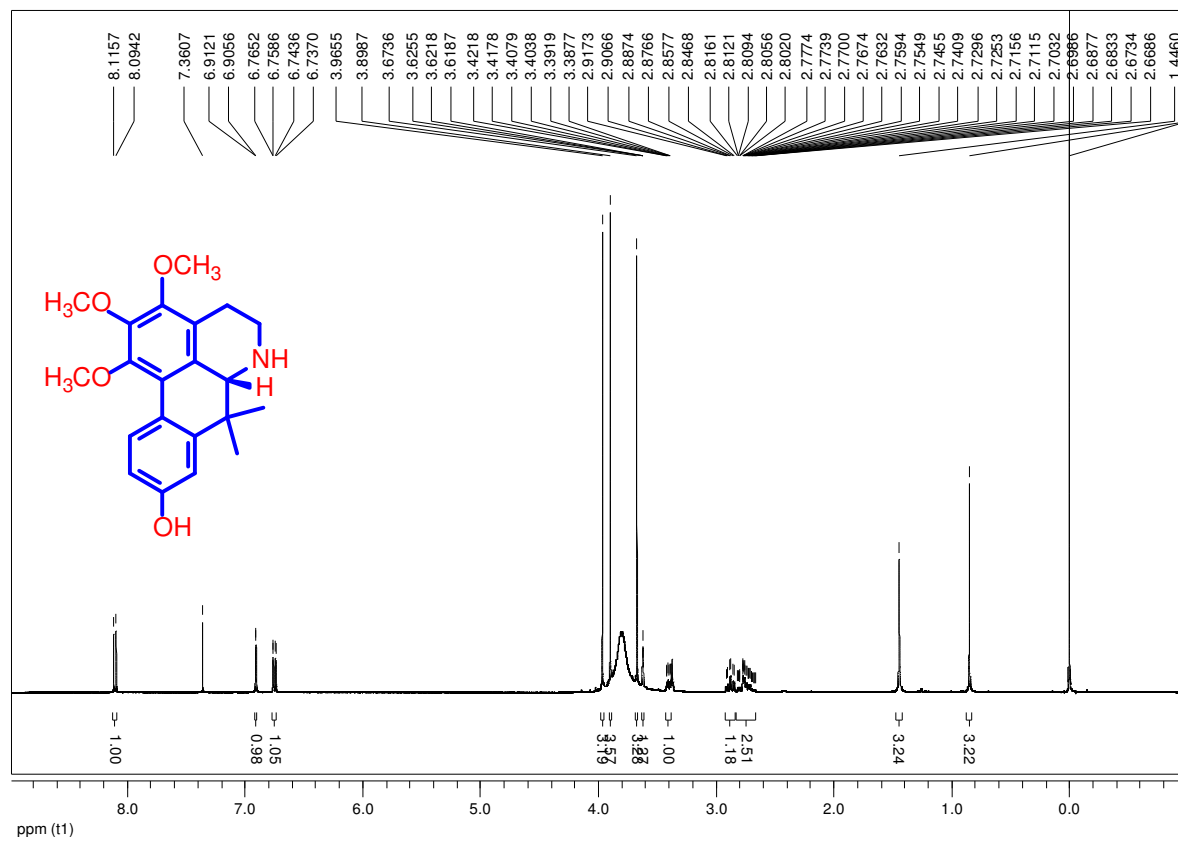


Figure S61. ¹H NMR spectrum of alkaloid **11** in CDCl₃ + drops of CD₃OD at 400 MHz.

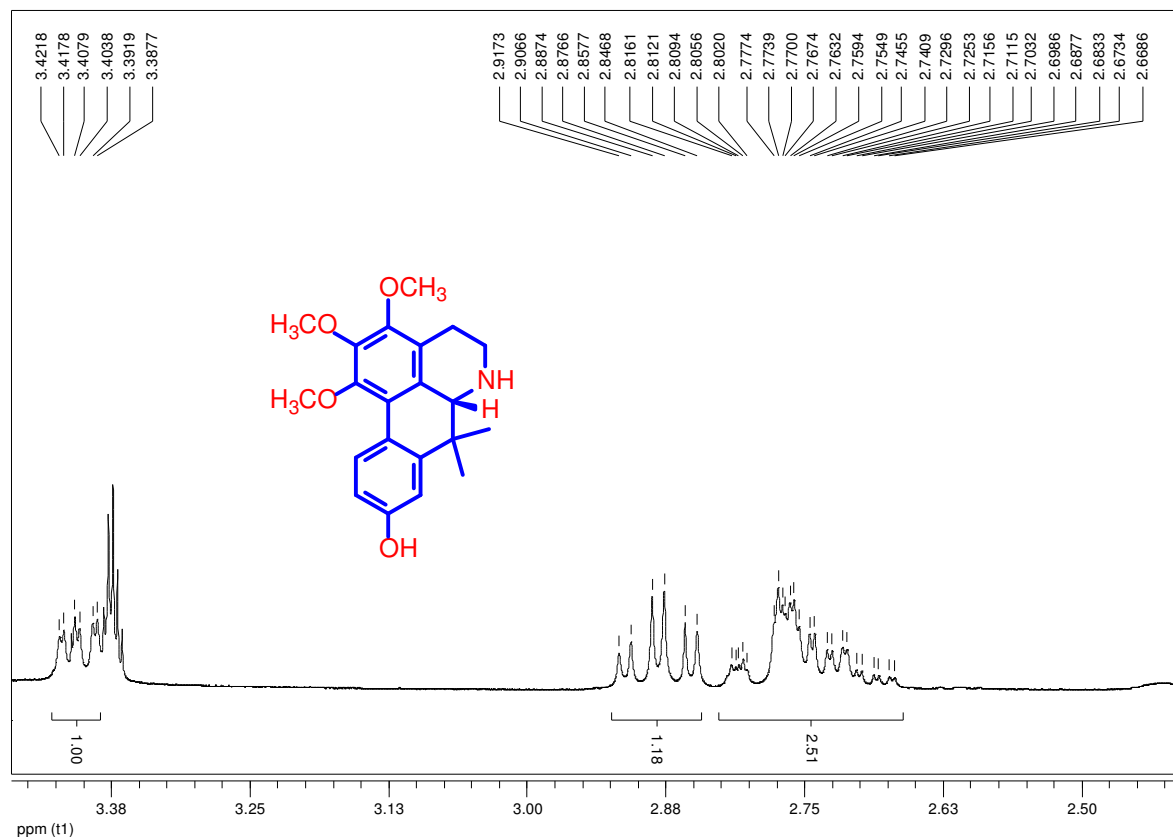


Figure S62. Enlargement of ¹H NMR spectrum of alkaloid **11** in CDCl₃ + drops of CD₃OD at 400 MHz.

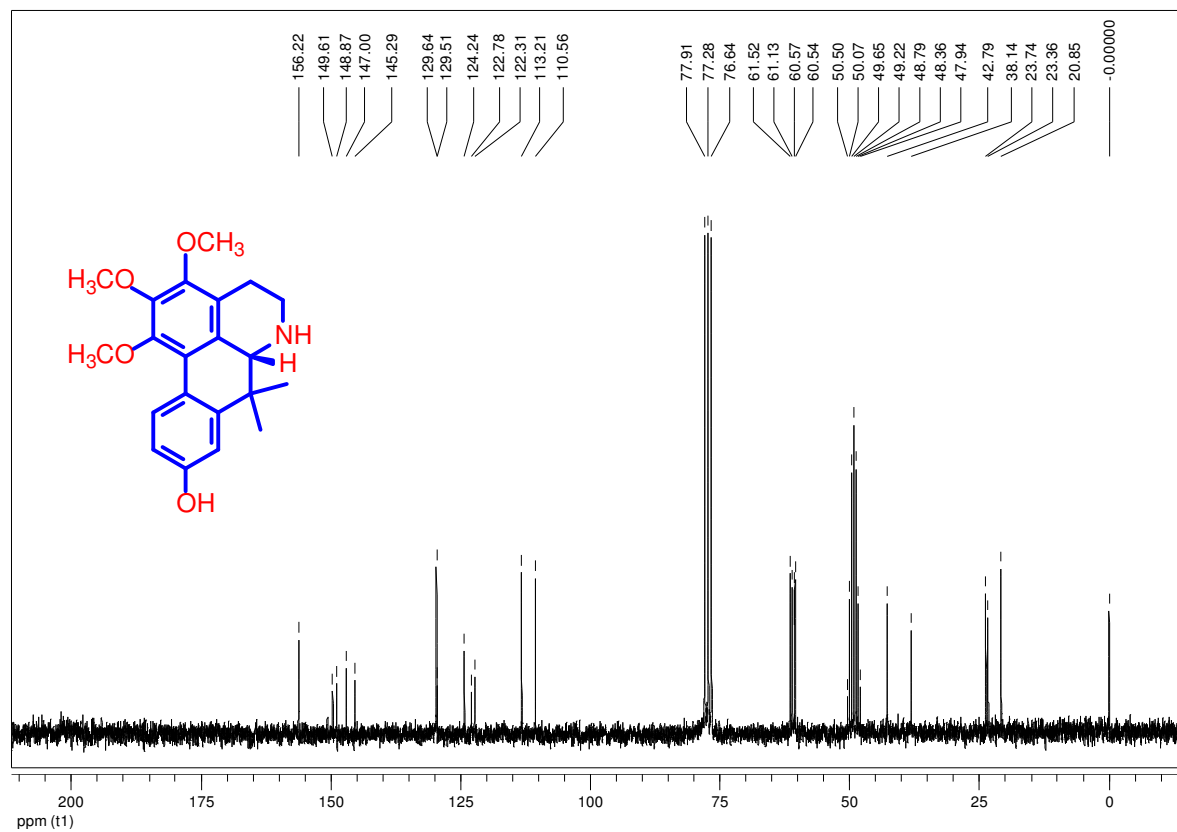


Figure S63. ¹³C NMR spectrum of alkaloid **11** in CDCl₃ + drops of CD₃OD at 100 MHz.

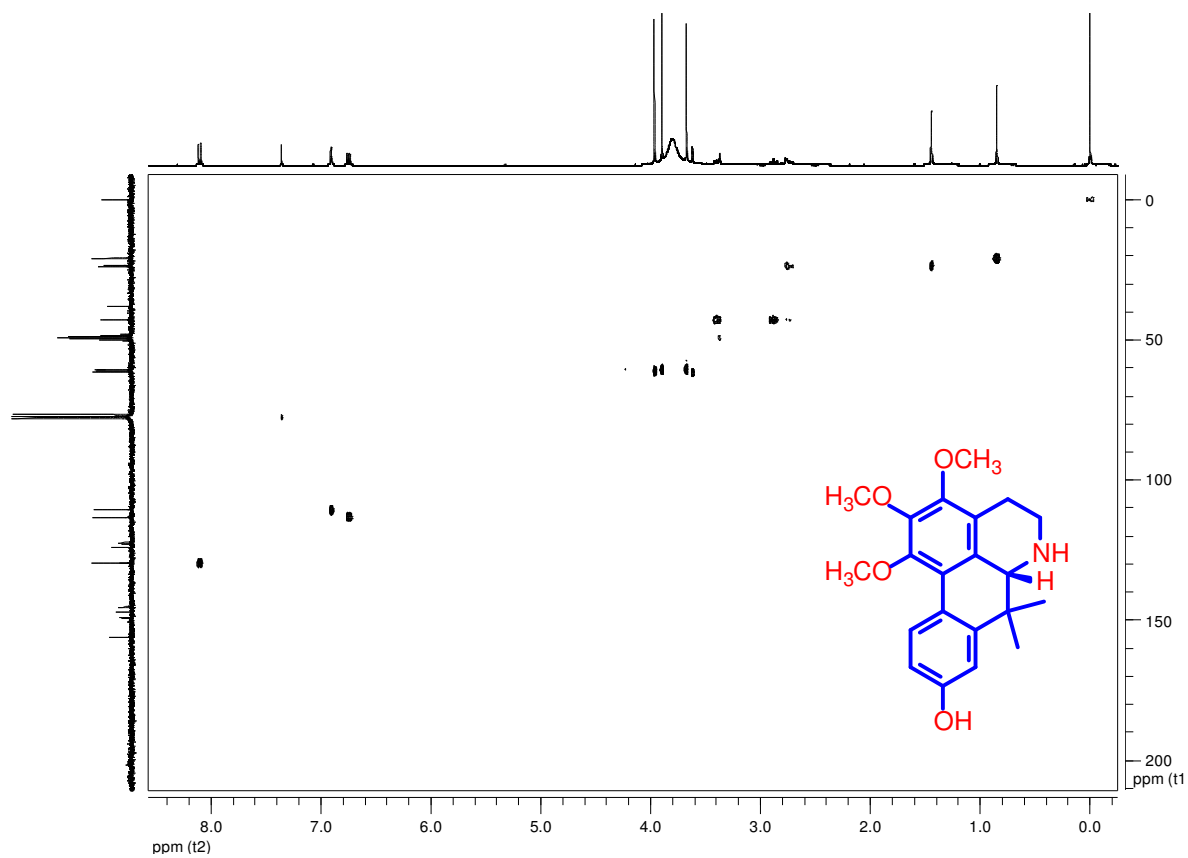


Figure S64. ^1H - ^{13}C one-bond correlation map from HSQC NMR experiment of alkaloid **11** in CDCl_3 + drops of CD_3OD at 400 MHz.

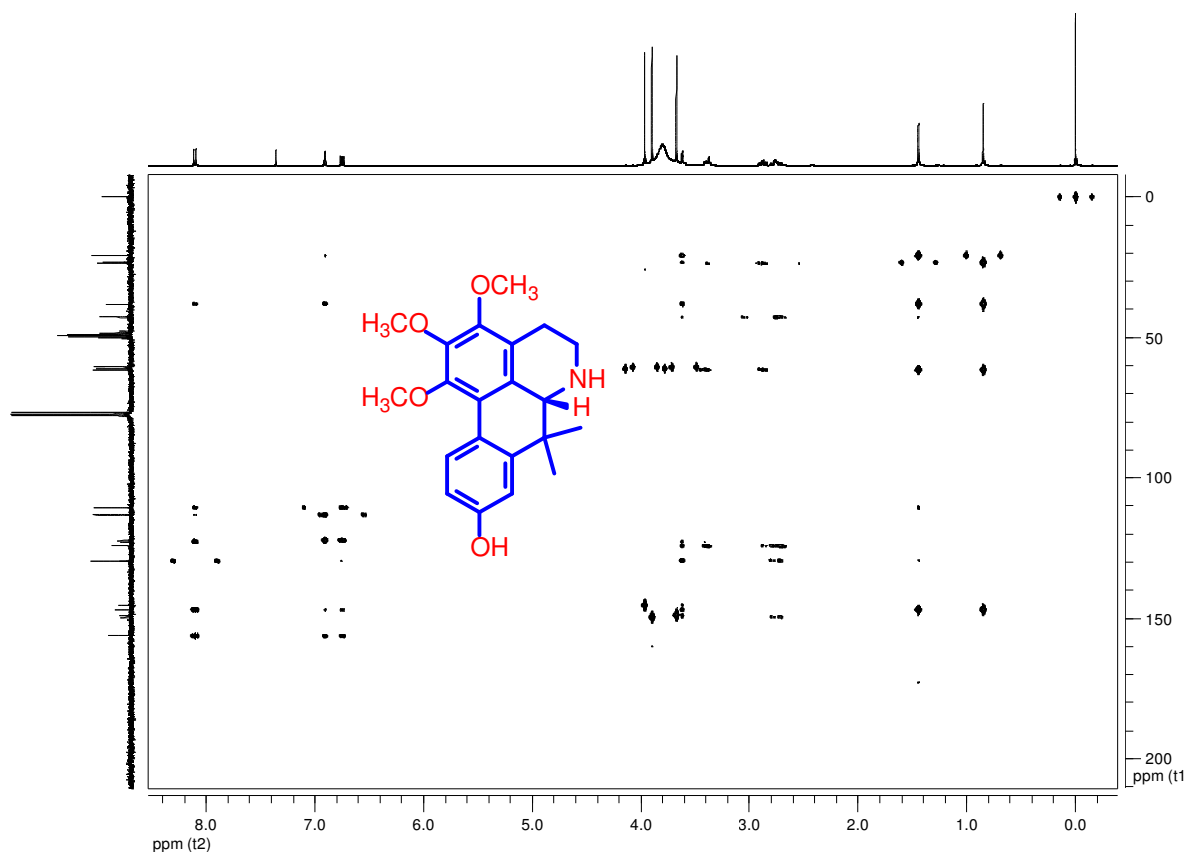


Figure S65. ^1H - ^{13}C long-range correlation map from HMBC NMR experiment of alkaloid **11** in CDCl_3 + drops of CD_3OD at 400 MHz.

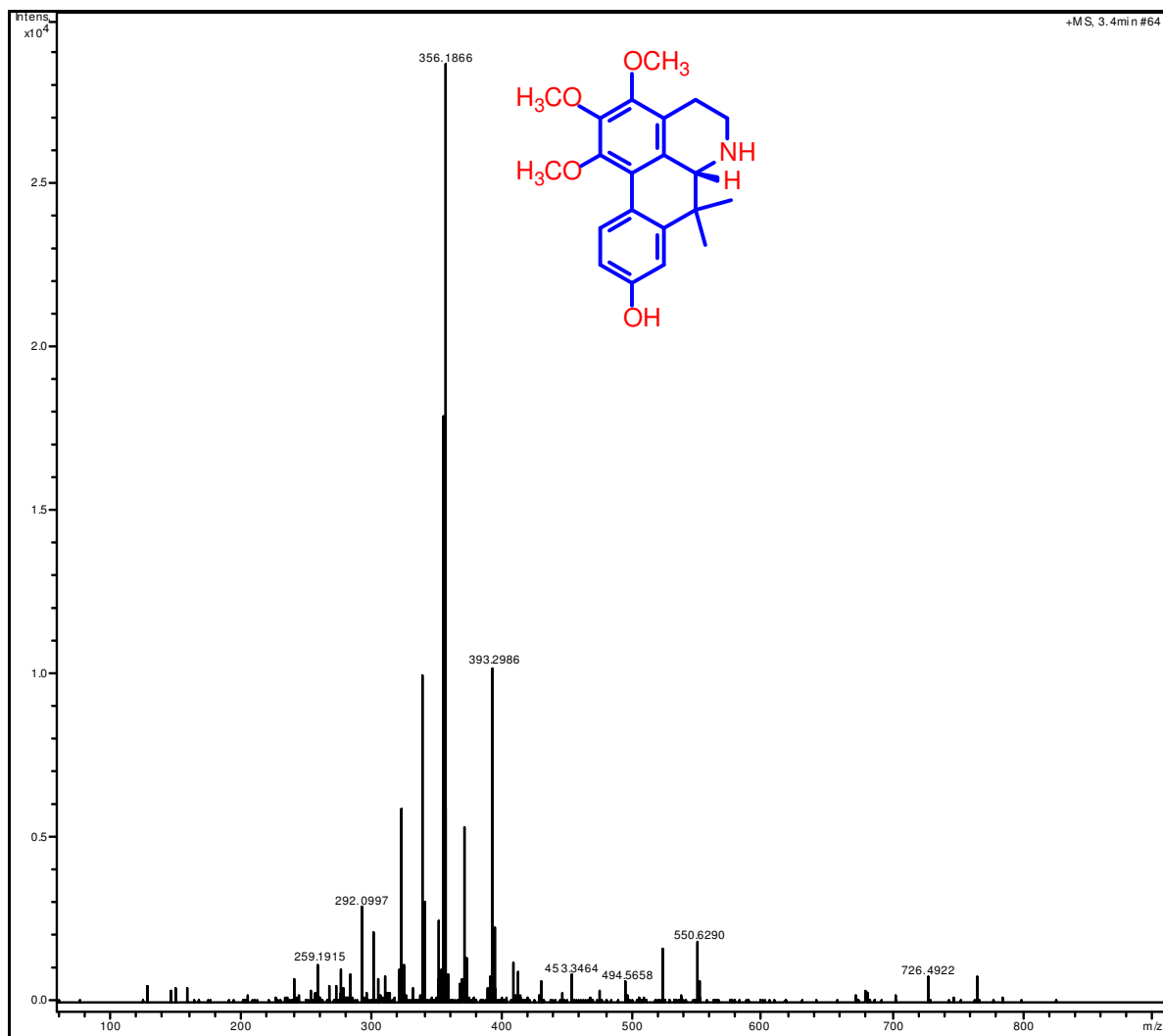


Figure S66. HR-ESI(+)-MS spectrum of alkaloid **11** (m/z 356.1866 $[M+H]^+$).

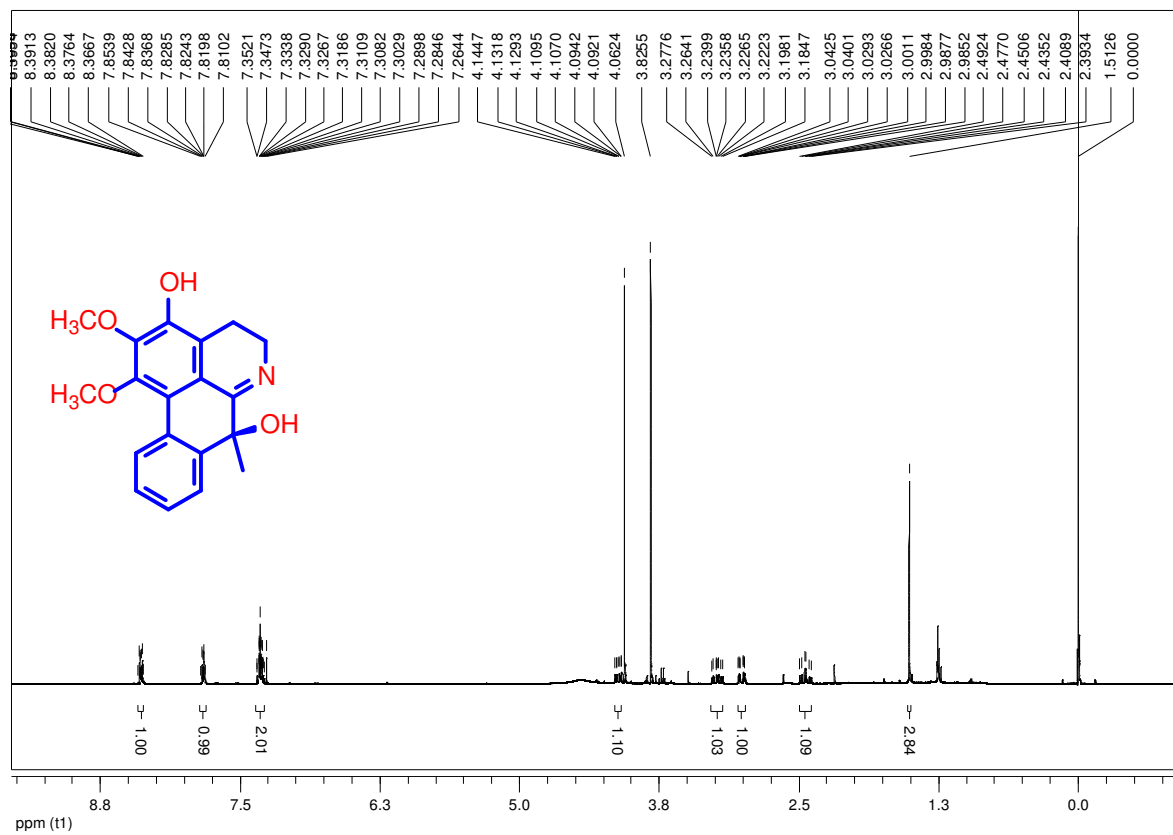


Figure S67. ¹H NMR spectrum of alkaloid **12** in CDCl₃ at 400 MHz.

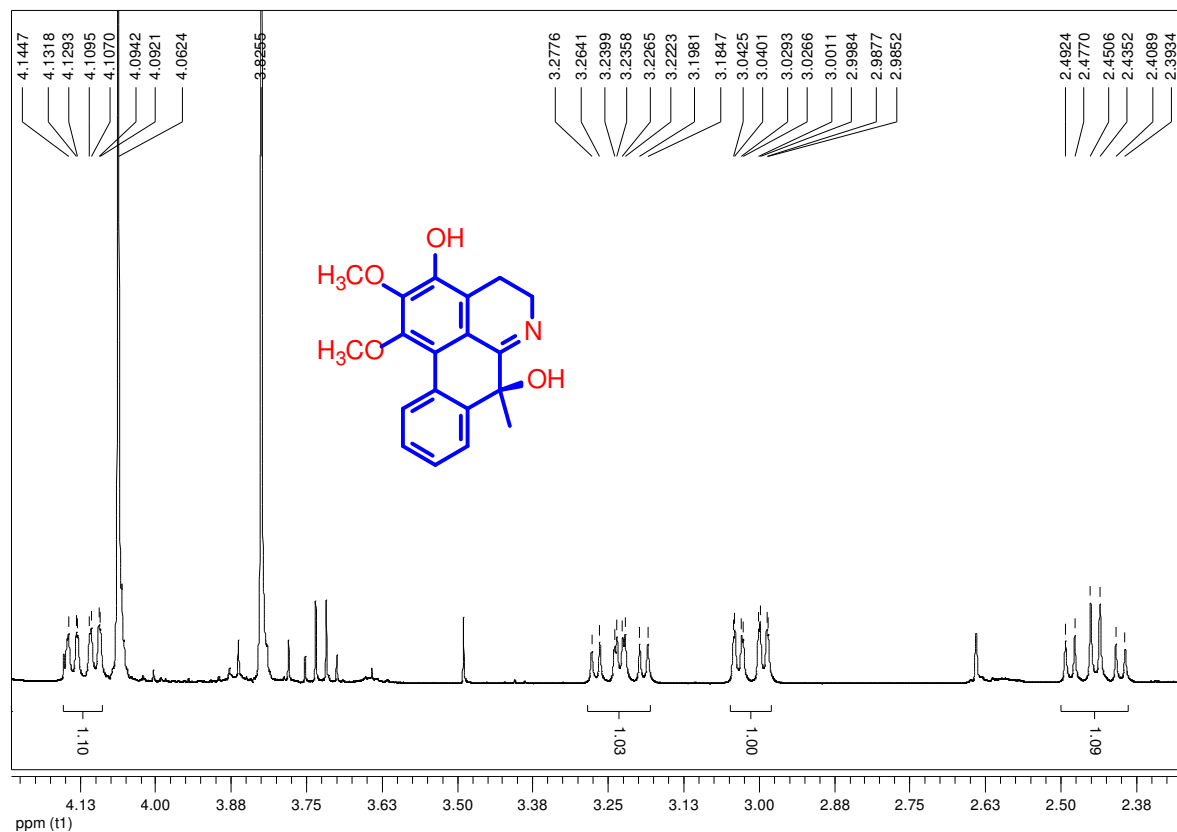


Figure S68. Enlargement of ^1H NMR spectrum of alkaloid **12** in CDCl_3 at 400 MHz.

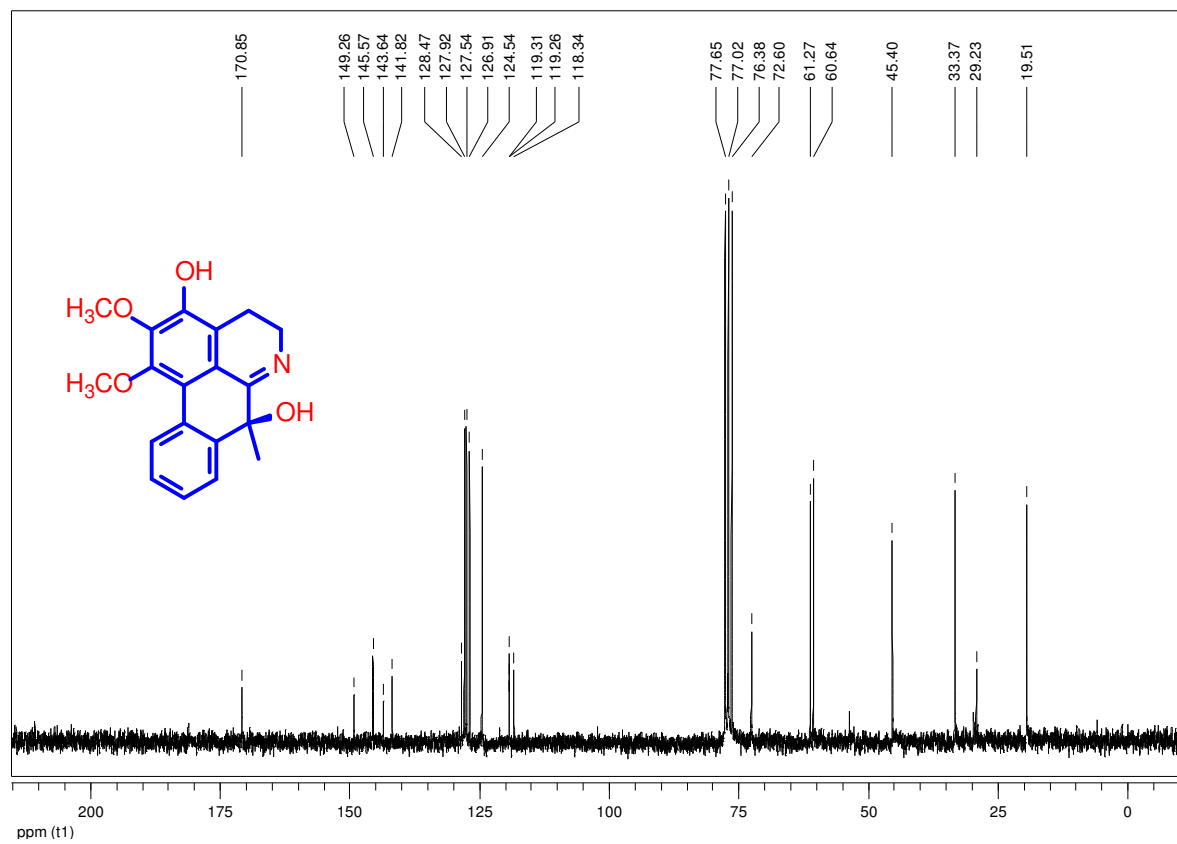


Figure S69. ^1H NMR spectrum of alkaloid **12** in CDCl_3 at 100 MHz.

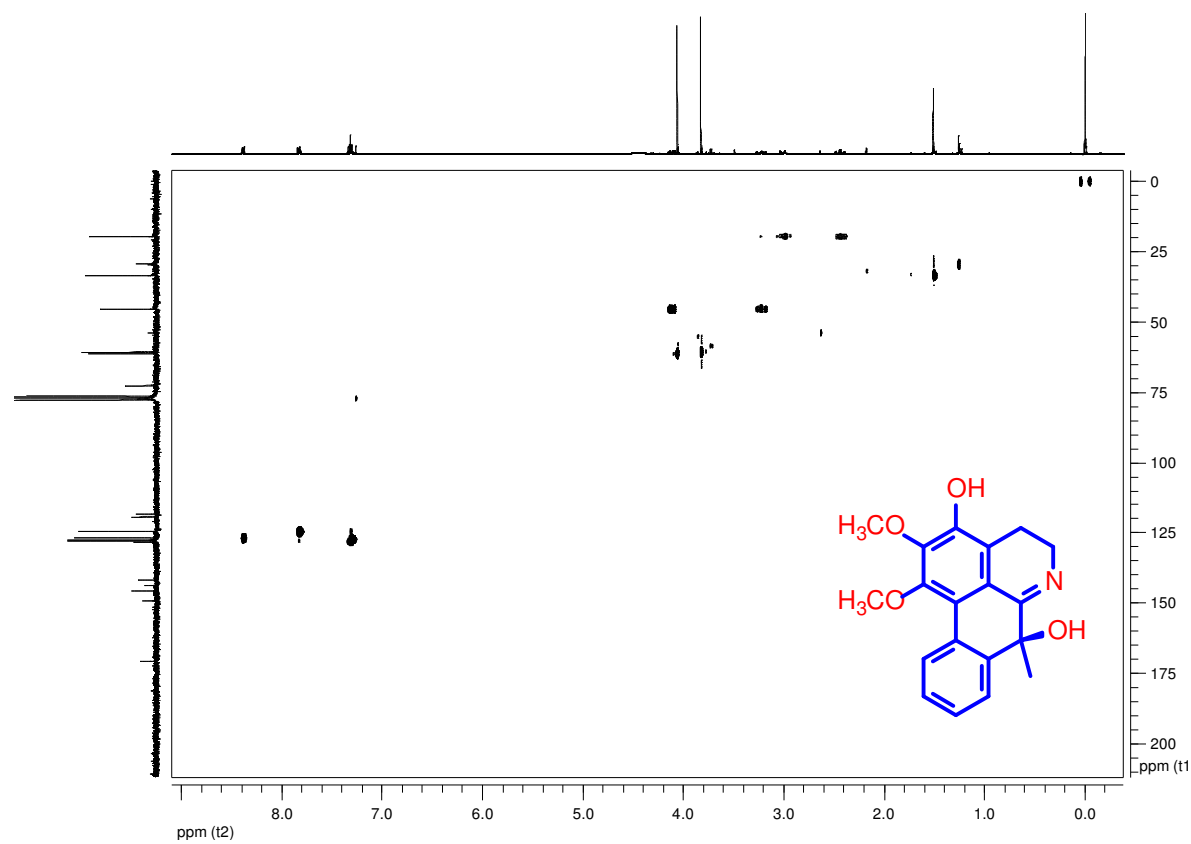


Figure S70. ^1H - ^{13}C one-bond correlation map from HSQC NMR experiment of alkaloid **12** in CDCl_3 at 400 and 100 MHz.

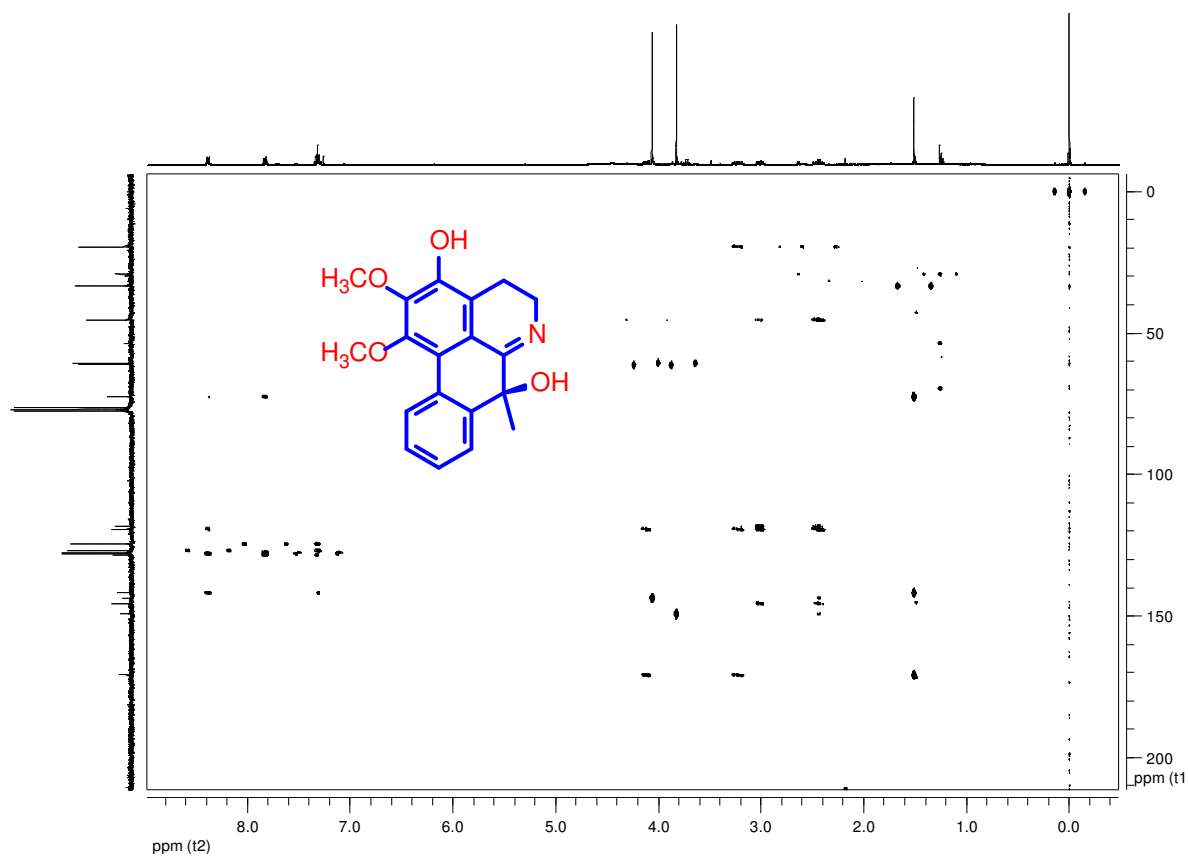


Figure S71. ^1H - ^{13}C long-range correlation map from HMBC NMR experiment of alkaloid **12** in CDCl_3 at 400 and 100 MHz.

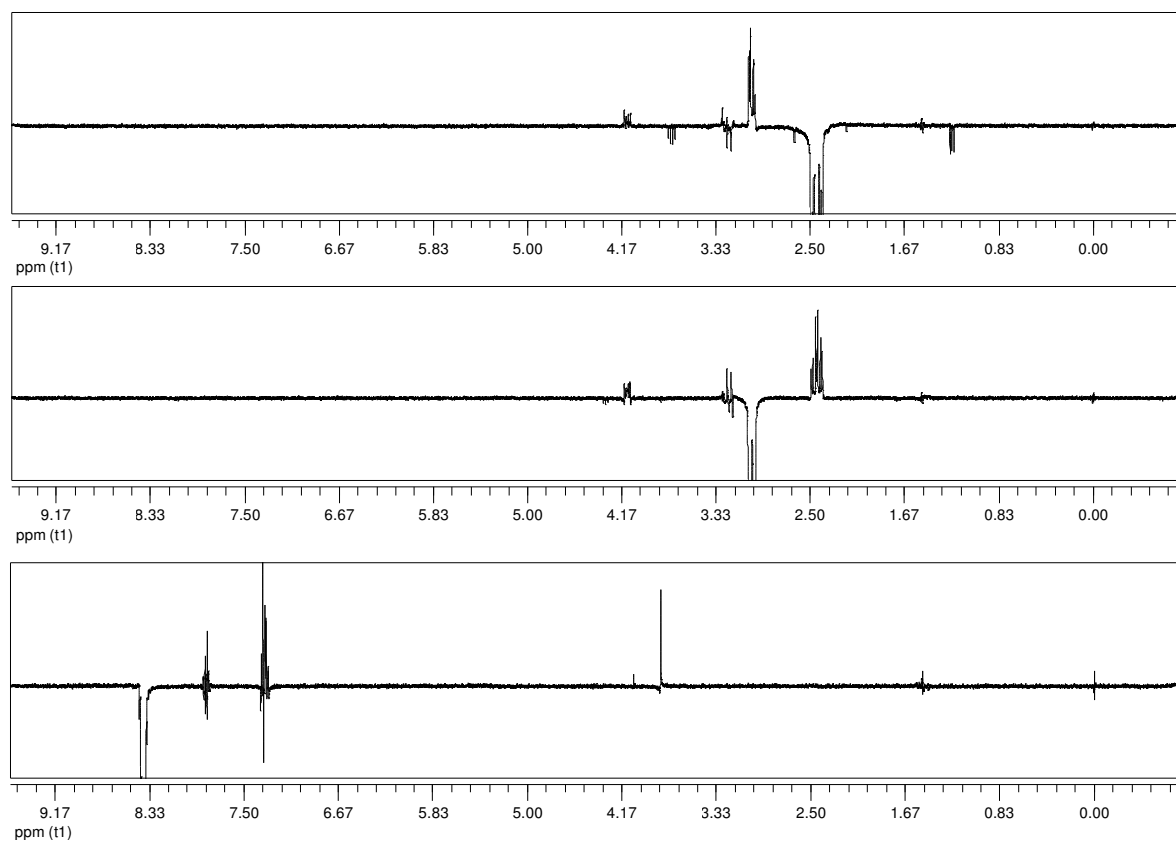


Figure S72. NOE experiments of alkaloid **12** in CDCl₃ at 400 MHz.

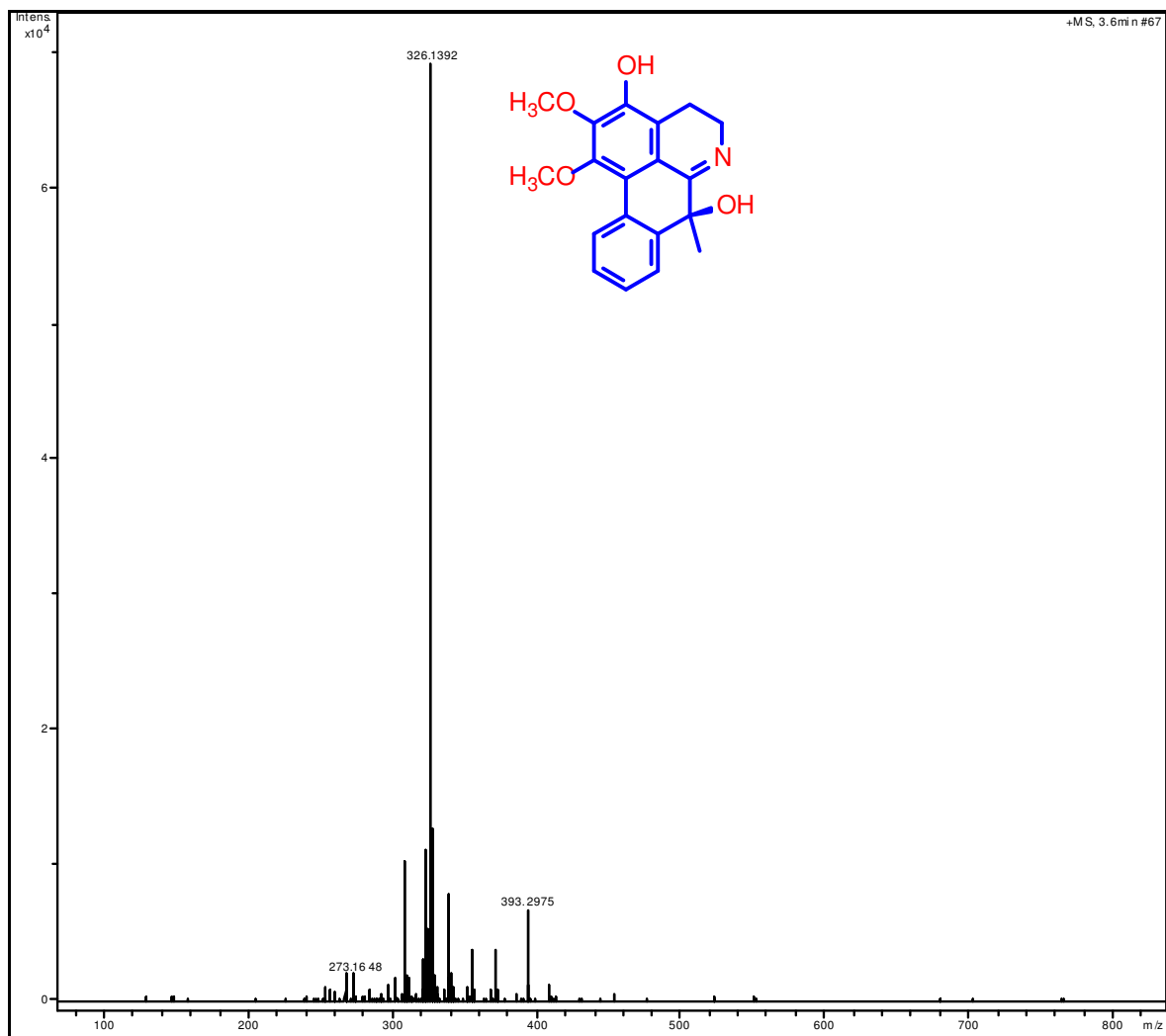


Figure S73. HR-ESI(+)-MS spectrum of alkaloid **12** (m/z 326.1392 $[M+H]^+$).

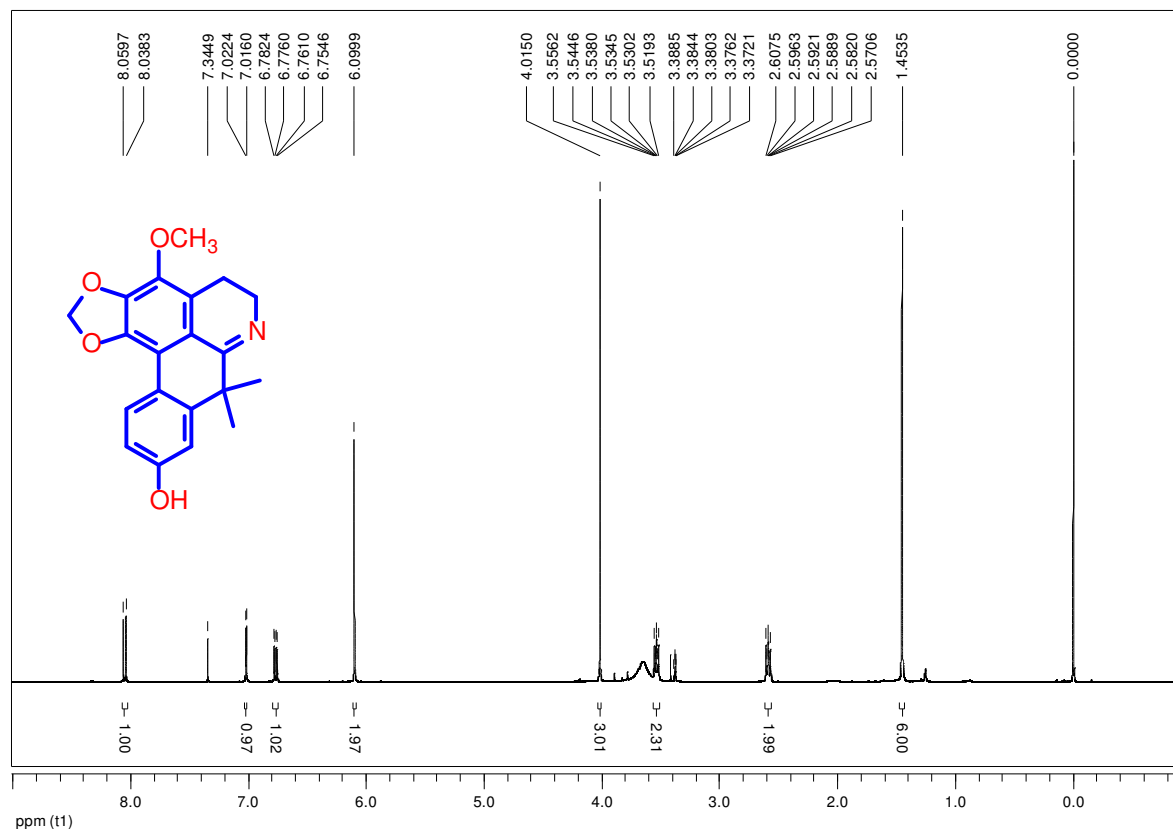


Figure S74. ^1H NMR spectrum of alkaloid **13** in CDCl_3 + drops of CD_3OD at 400 MHz.

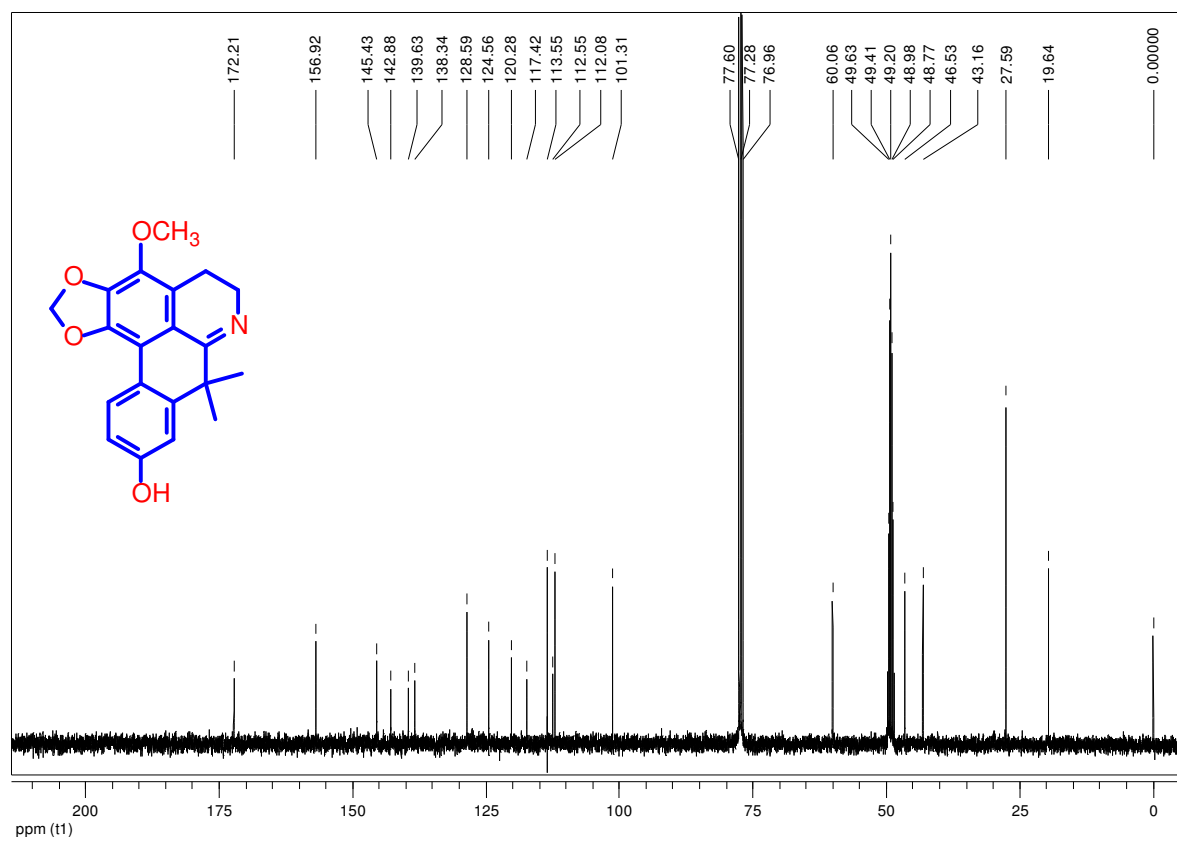


Figure S75. ¹³C NMR spectrum of alkaloid **13** in CDCl₃ + drops of CD₃OD at 100 MHz.

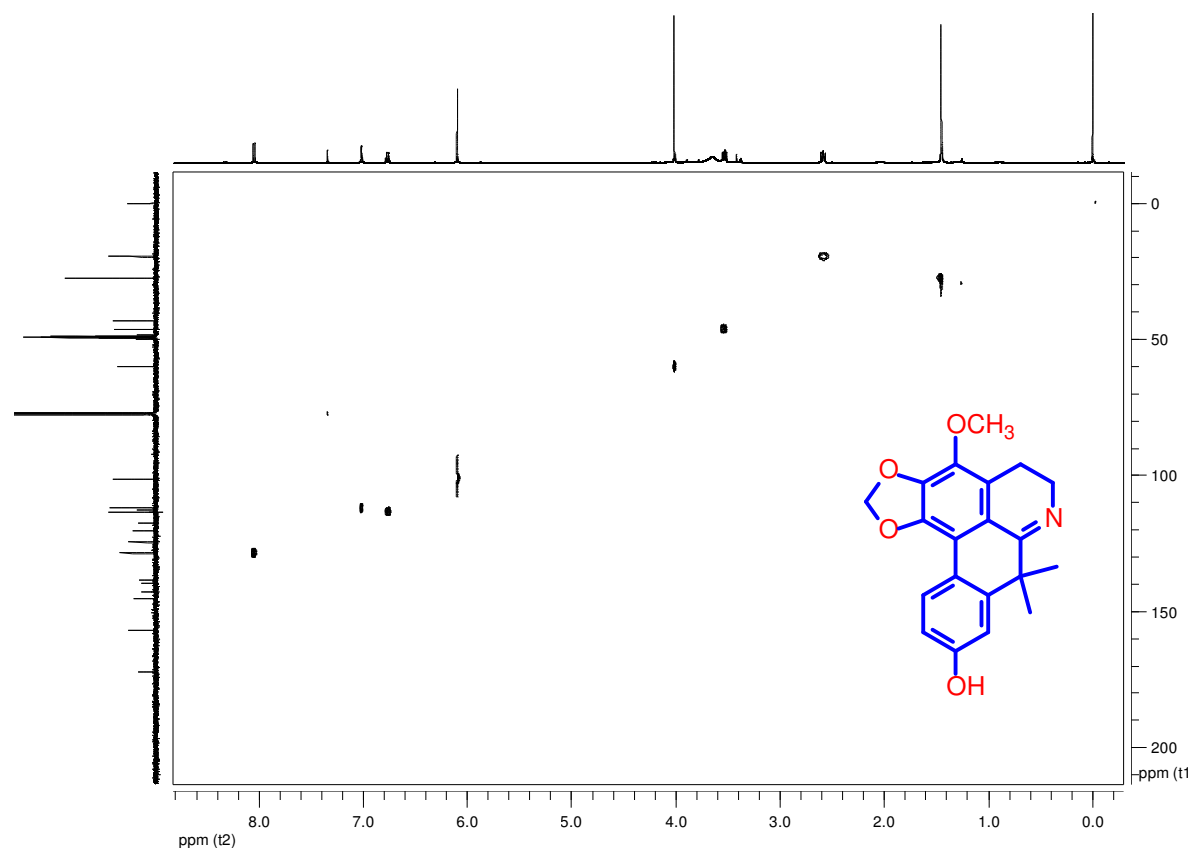


Figure S76. ^1H - ^{13}C one-bond correlation map from HSQC NMR experiment of alkaloid **13** in CDCl_3 + drops of CD_3OD at 400 MHz.

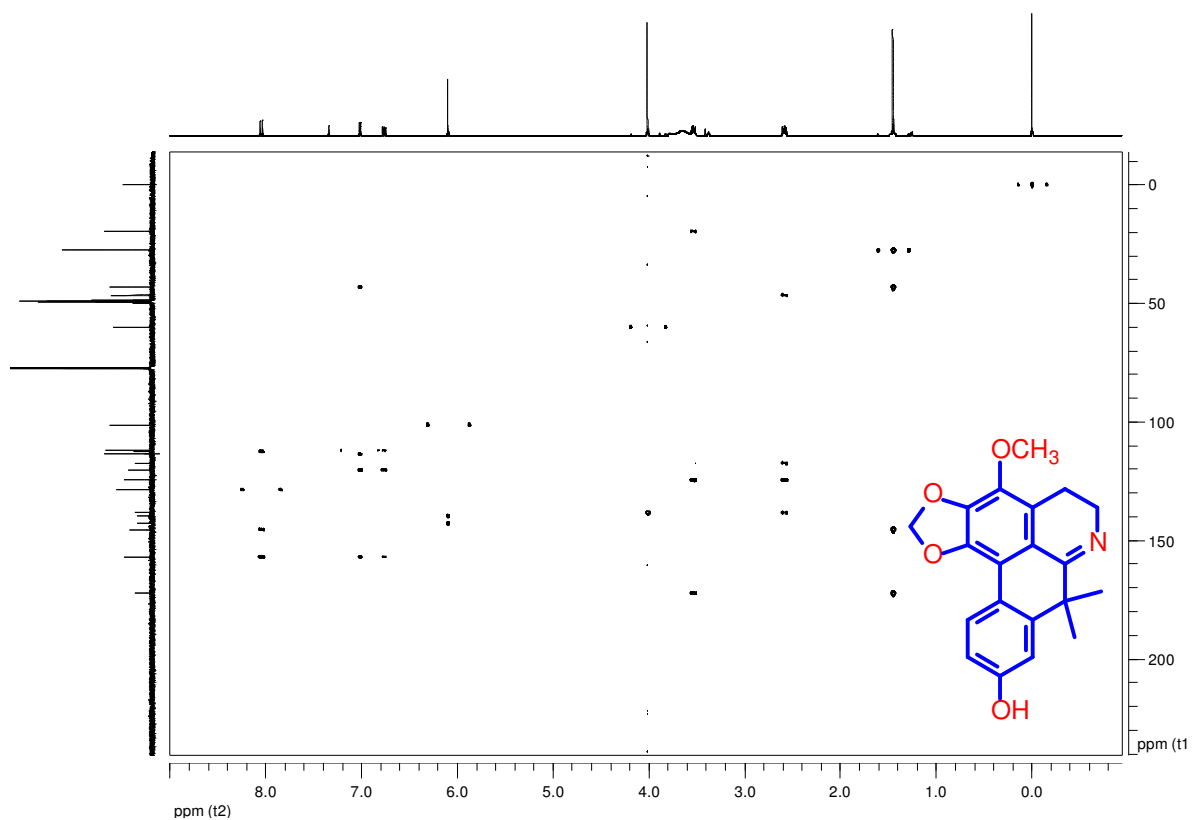


Figure S77. ^1H - ^{13}C long-range correlation map from HMBC NMR experiment of alkaloid **13** in CDCl_3 + drops of CD_3OD at 400 MHz.

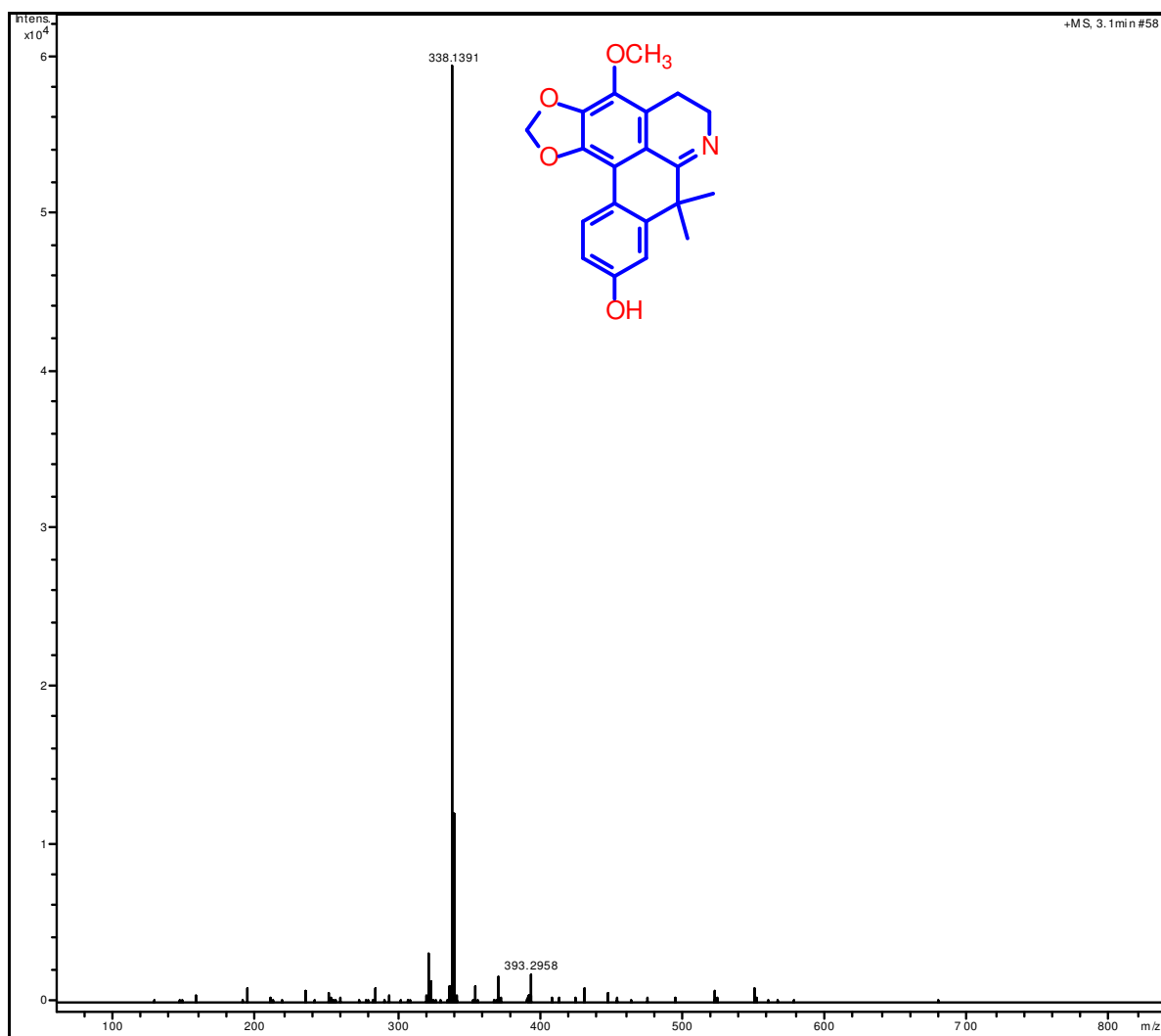


Figure S78. HR-ESI(+)-MS spectrum of alkaloid **13** (m/z 338.1391 $[M+H]^+$).

Table S1. Cytotoxic activity of major alkaloids isolated from the bark of *Guatteria friesiana*.

Alkaloids	IC ₅₀ (μM)				
	B16-F10	HepG2	HL60	K562	PBMC
1	>10	>10	>10	>10	>10
2	>10	>10	>10	>10	>10
3	>10	>10	>10	>10	>10
4	>10	>10	>10	>10	>10
6	>10	>10	>10	>10	>10
7	>10	>10	>10	>10	>10
8	>10	>10	>10	>10	>10
9	>10	>10	>10	>10	>10
10	>10	>10	>10	>10	>10
12	>10	>10	>10	>10	>10
13	>10	>10	>10	>10	>10
14	>10	>10	>10	>10	>10
15	>10	>10	>10	>10	>10
17	>10	>10	>10	>10	>10
19	>10	>10	>10	>10	>10
20	>10	8.32	5.52	5.02	>10
21	>10	>10	>10	>10	>10
Doxorubicin	0.04	0.07	0.02	0.31	0.83

Data are presented as IC₅₀ values (μM) obtained by nonlinear regression from three independent experiments performed in duplicate measured using alamar blue assay after 72 h incubation. Tumor cells: B16-F10 (mouse melanoma), HepG2 (human hepatocellular carcinoma), HL-60 (human promyelocytic leukemia), and K562 (human chronic myelocytic leukemia). Normal cell: PBMC (human peripheral blood mononuclear cells activated with concanavalin A – human lymphoblast). Doxorubicin was used as a positive control.