

Chuktabularins E-T, 16-Norphragmalin Limonoids from *Chukrasia tabularis* var. *velutina*

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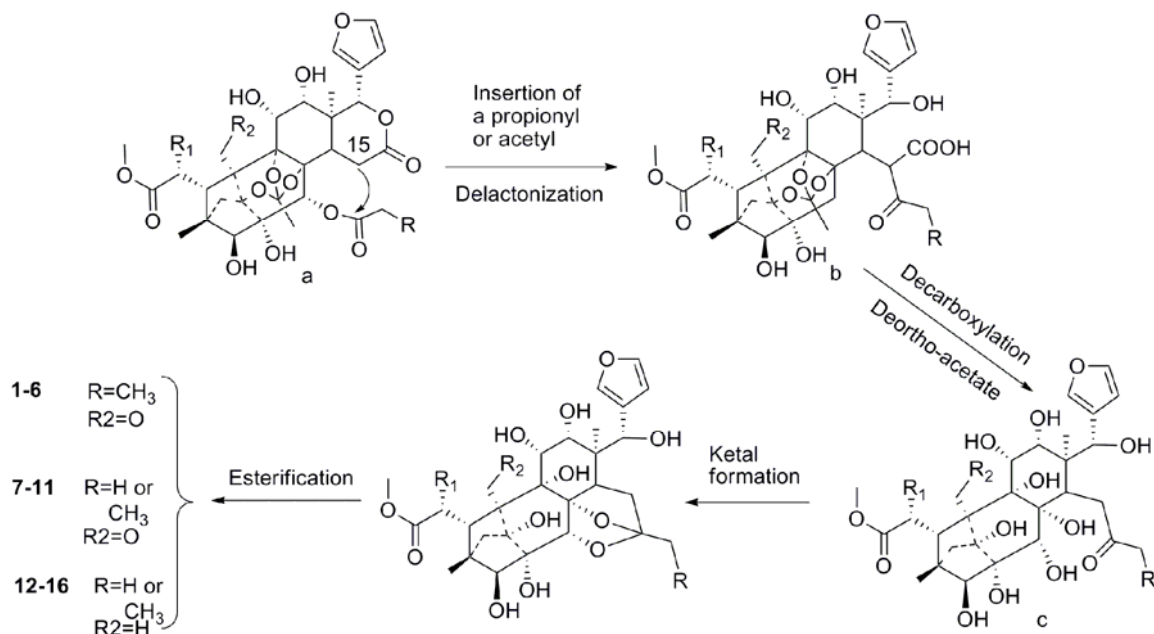
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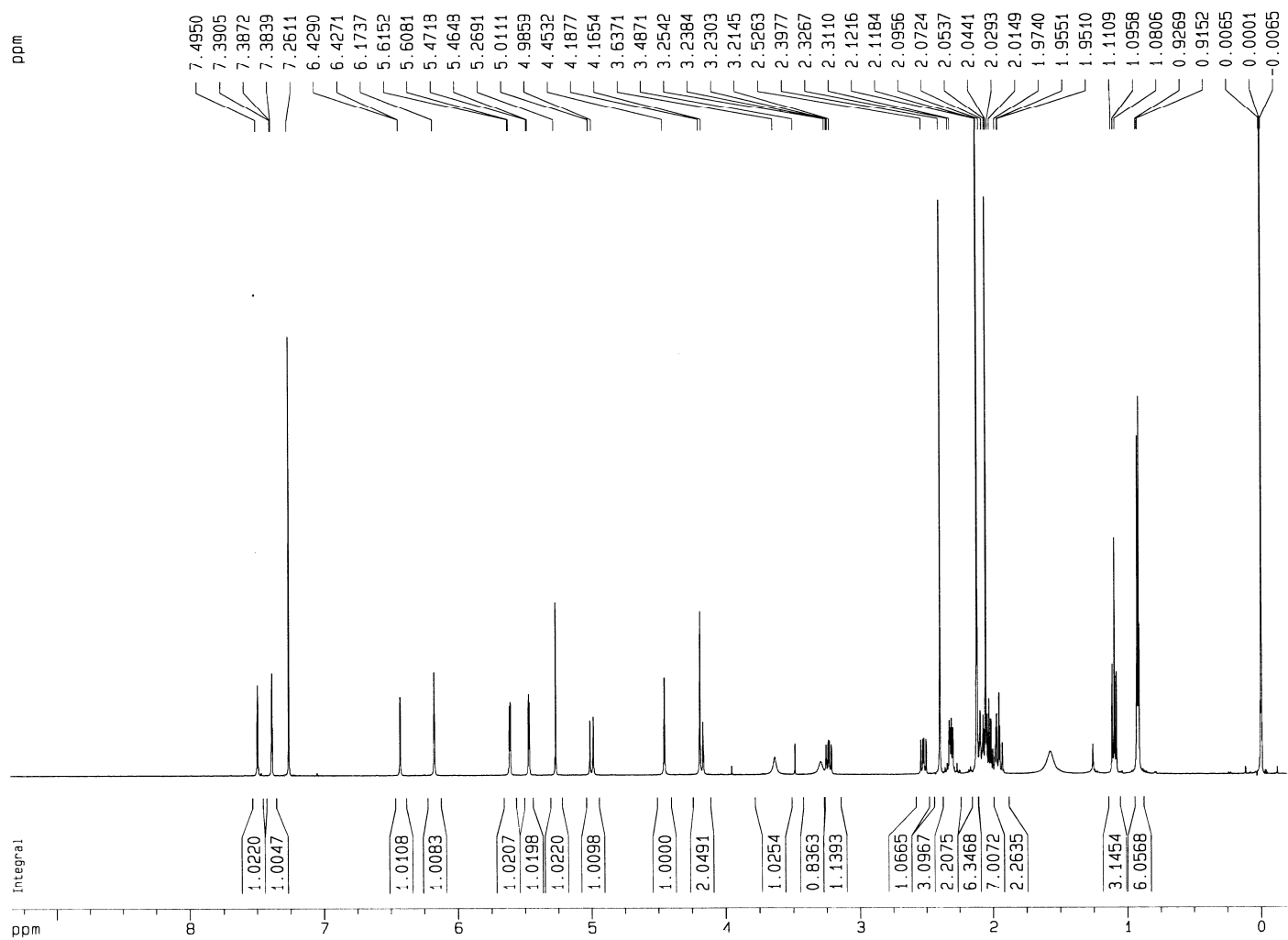
S31. ^1H NMR spectrum of Chuktabularin K (**7**) in $\text{DMSO}-d_6$ (303K)
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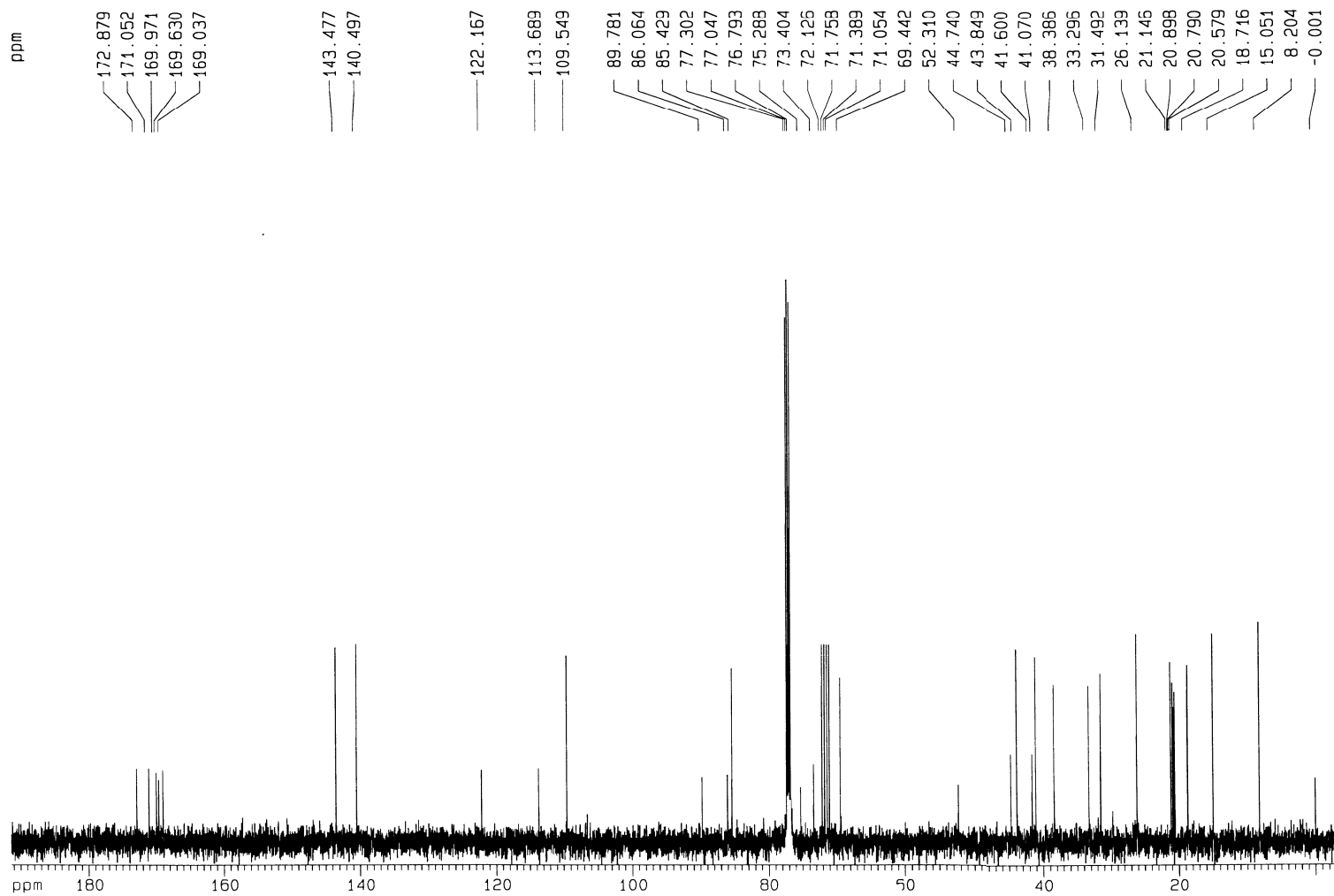
A biogenetic pathway for **1-16** may be proposed to be the same as for chuktabularins A-D^{7d} and chukvelutins A-C⁷ⁱ. An intermediate (**b**) may be produced by insertion of an propionyl or acetyl group to C-15 from C-30 through a Claisen reaction^{1a} and the cleavage of C-16/C-17 δ -lactone, that originates from the phragmalin-type limonoid^{7c} (**a**) with a 1,8,9-*ortho*-acetate and an propionyl or acetyl at C-30. Decarboxylation and deortho-acetation may yielded another intermediate (**c**), and give **1-16** after a series of ketal formation and esterification steps, respectively.



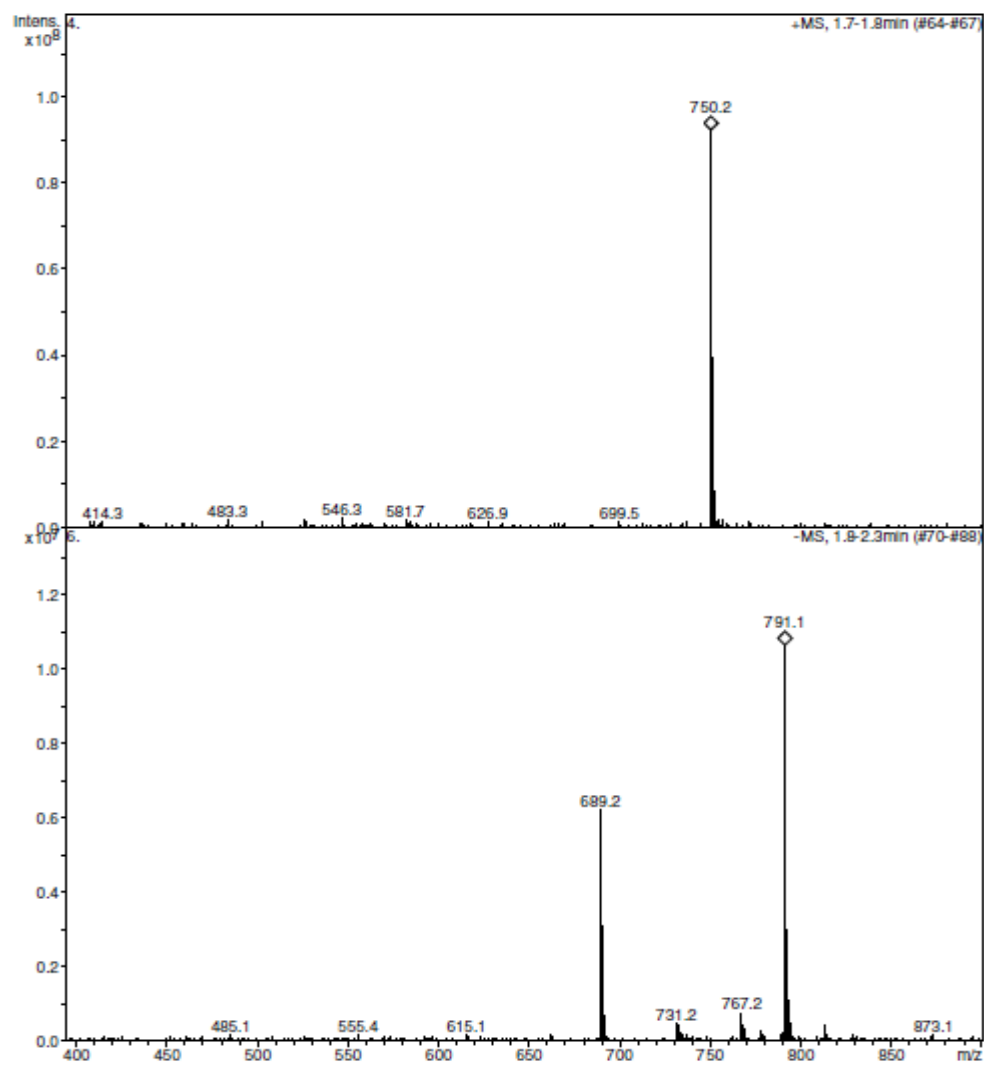
S1. The Biogenetic pathway for **1-16**



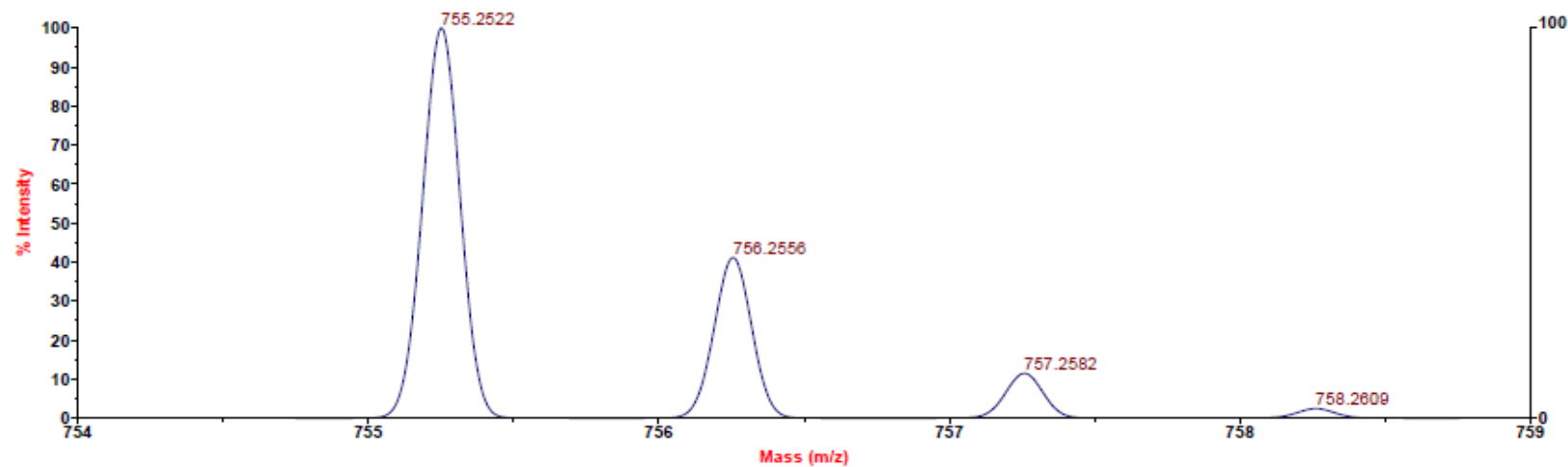
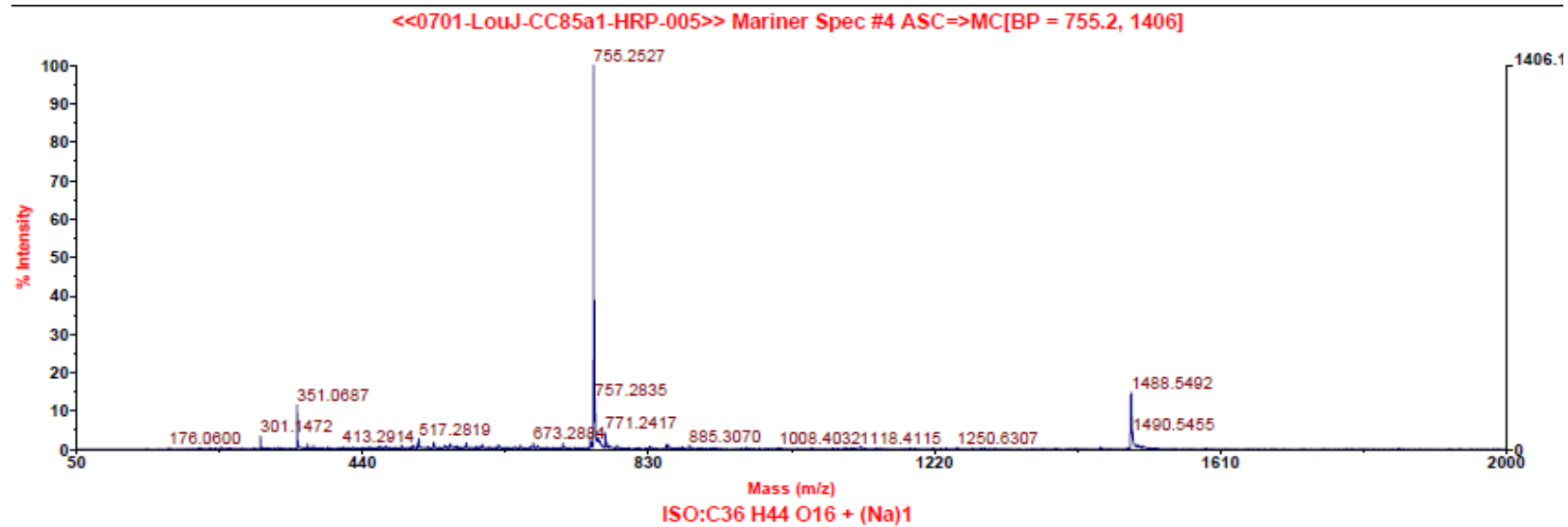
S2. ^1H NMR spectrum of Chuktabularin E (**1**) in CDCl_3



S3. ¹³C NMR spectrum of Chuktabularin E (1) in CDCl₃

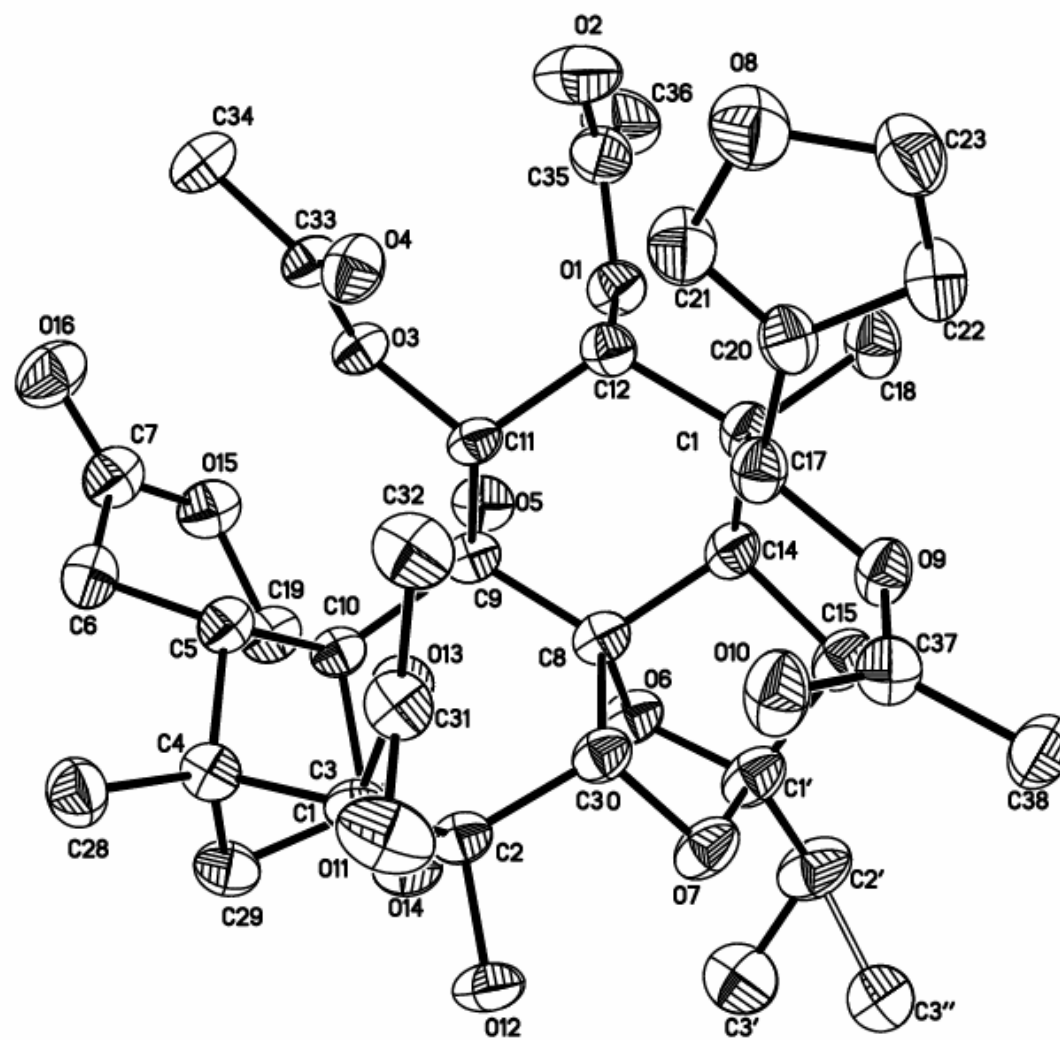


S4. ESIMS spectrum of Chuktabularin E (1)

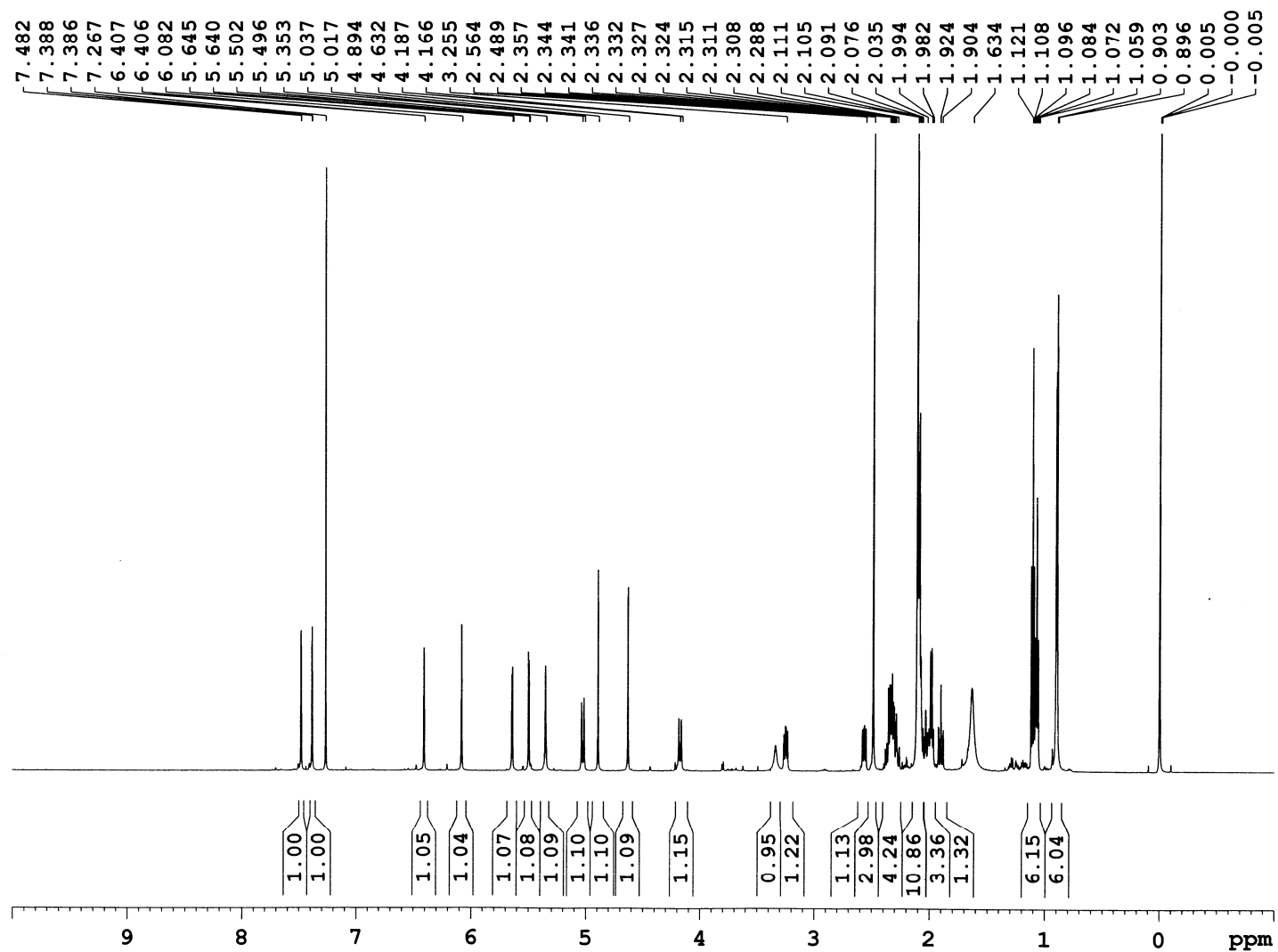


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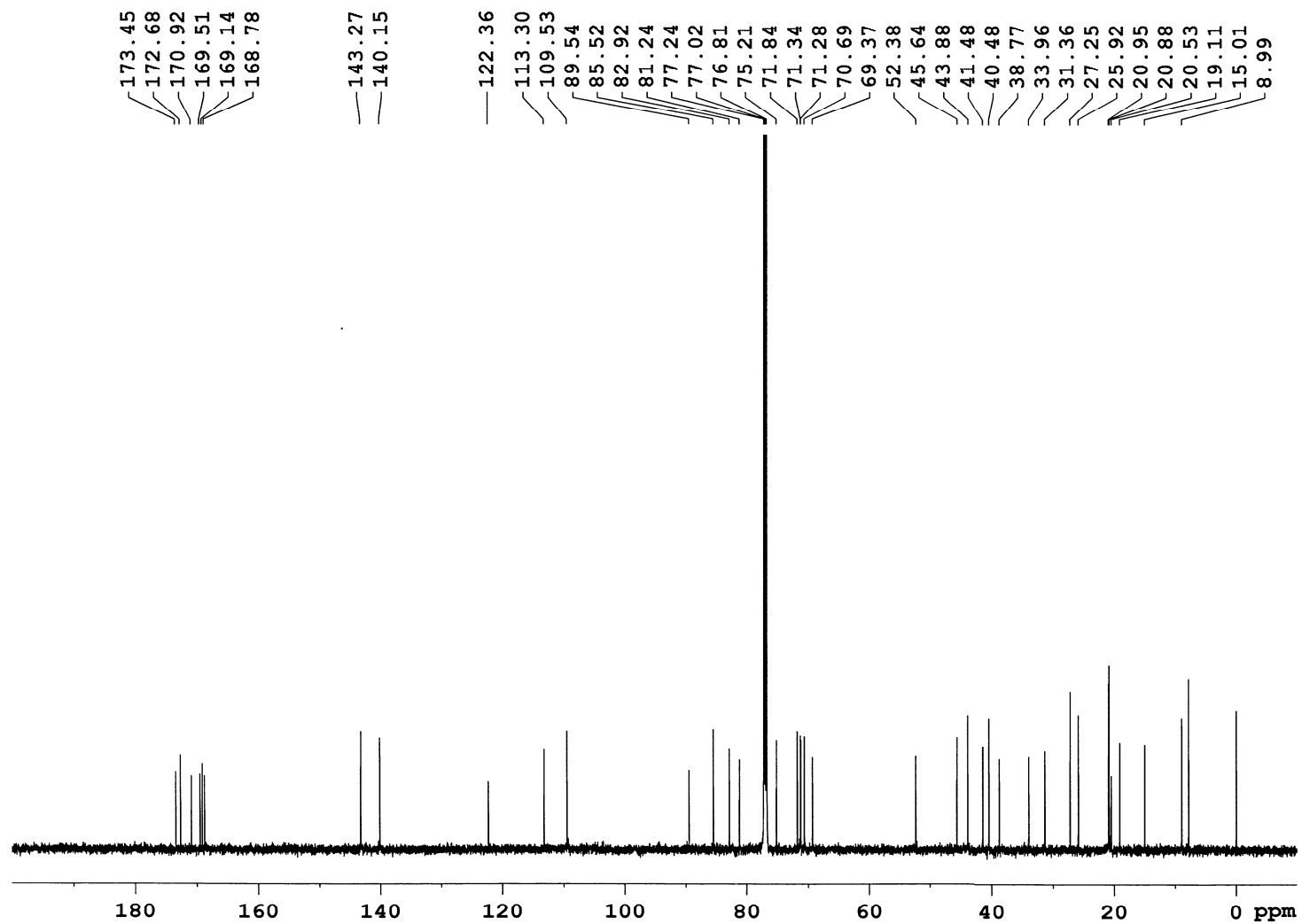
S5. HRESIMS spectrum of Chuktabularin E (1)



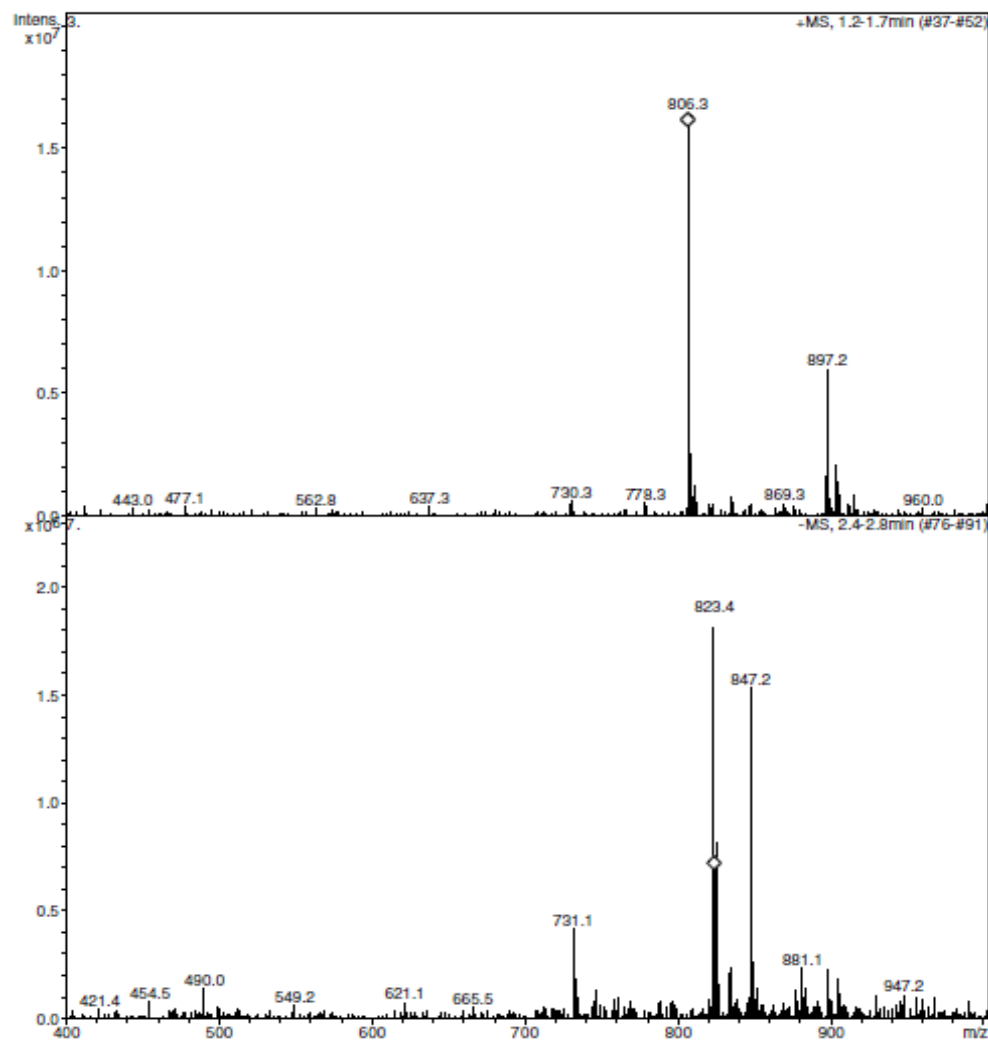
S6. X-ray structure of Chuktabularin E (**1**)



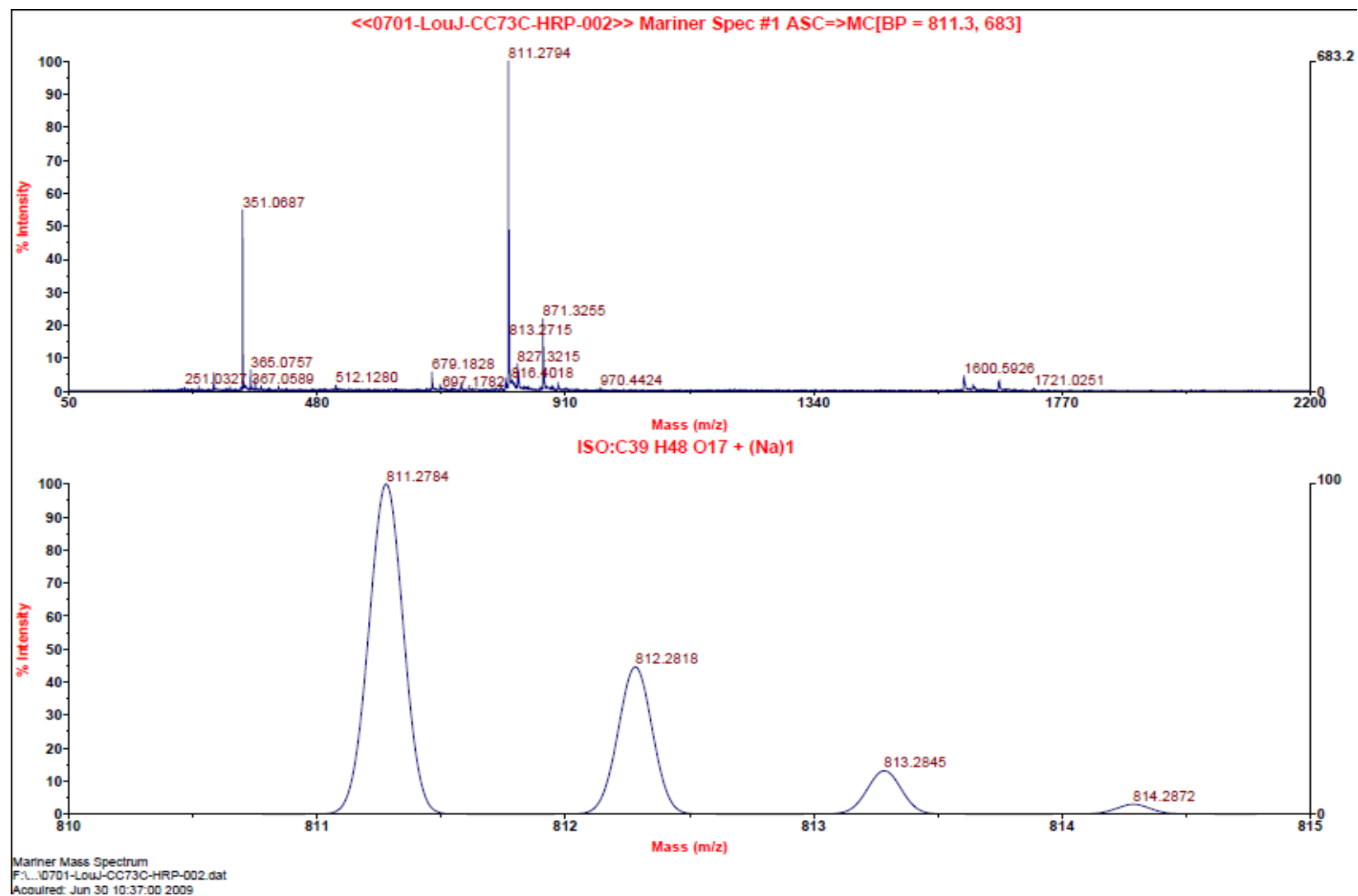
S7. ¹H NMR spectrum of Chuktabularin F (2) in CDCl₃



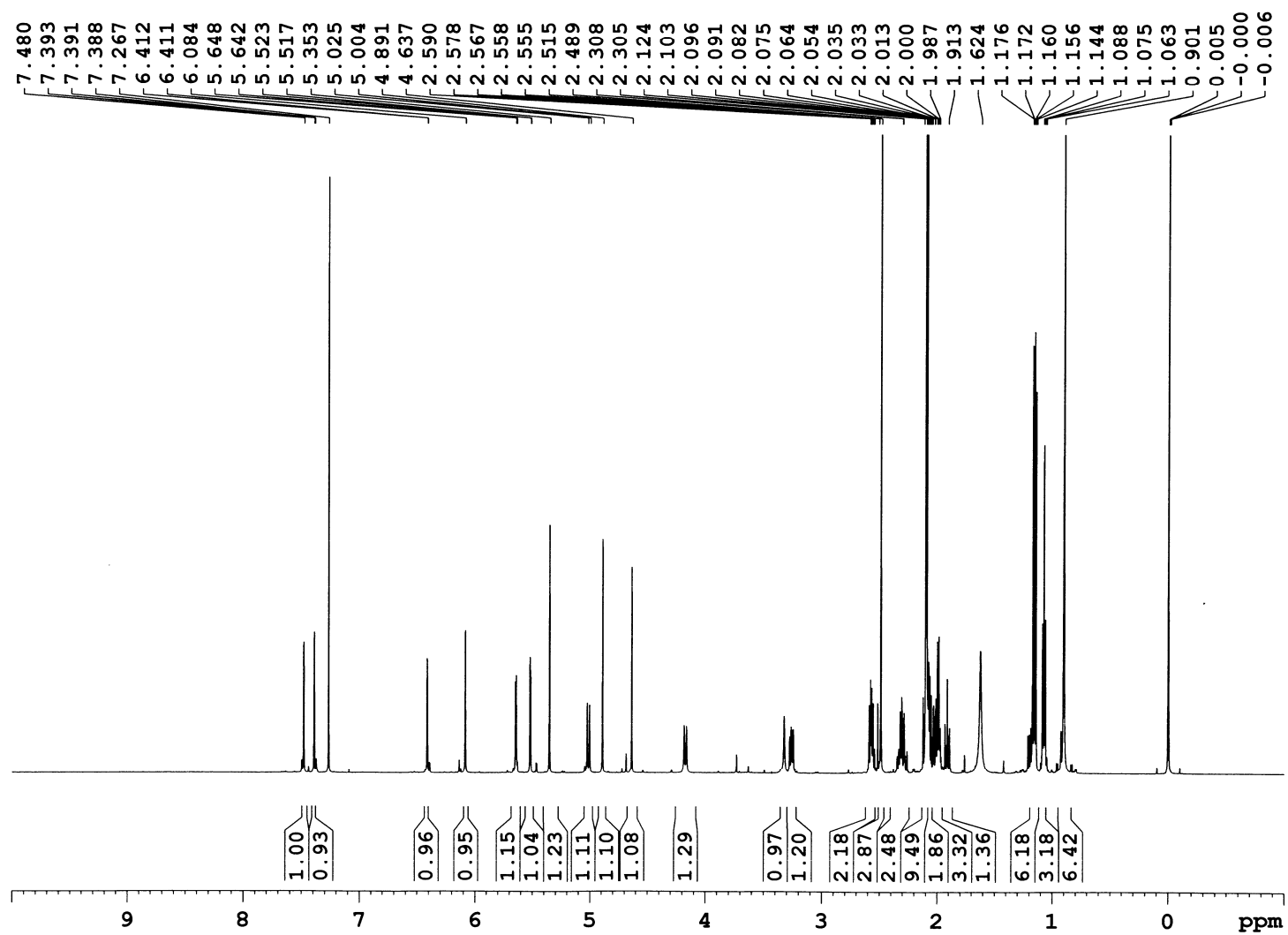
S8. ¹³C NMR spectrum of Chuktabularin F (2) in CDCl₃



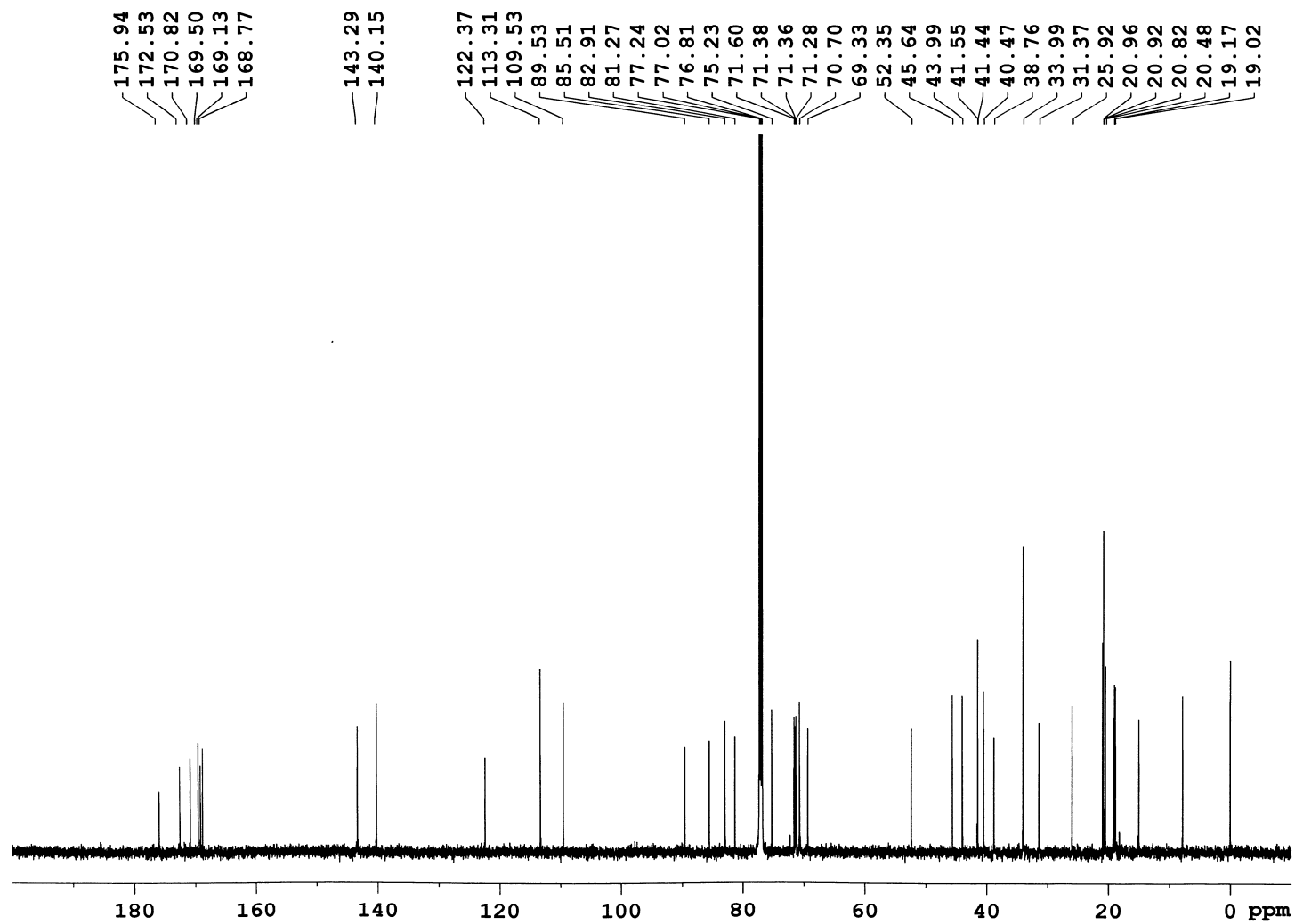
S9. ESI-MS spectrum of Chuktabularin F (2)



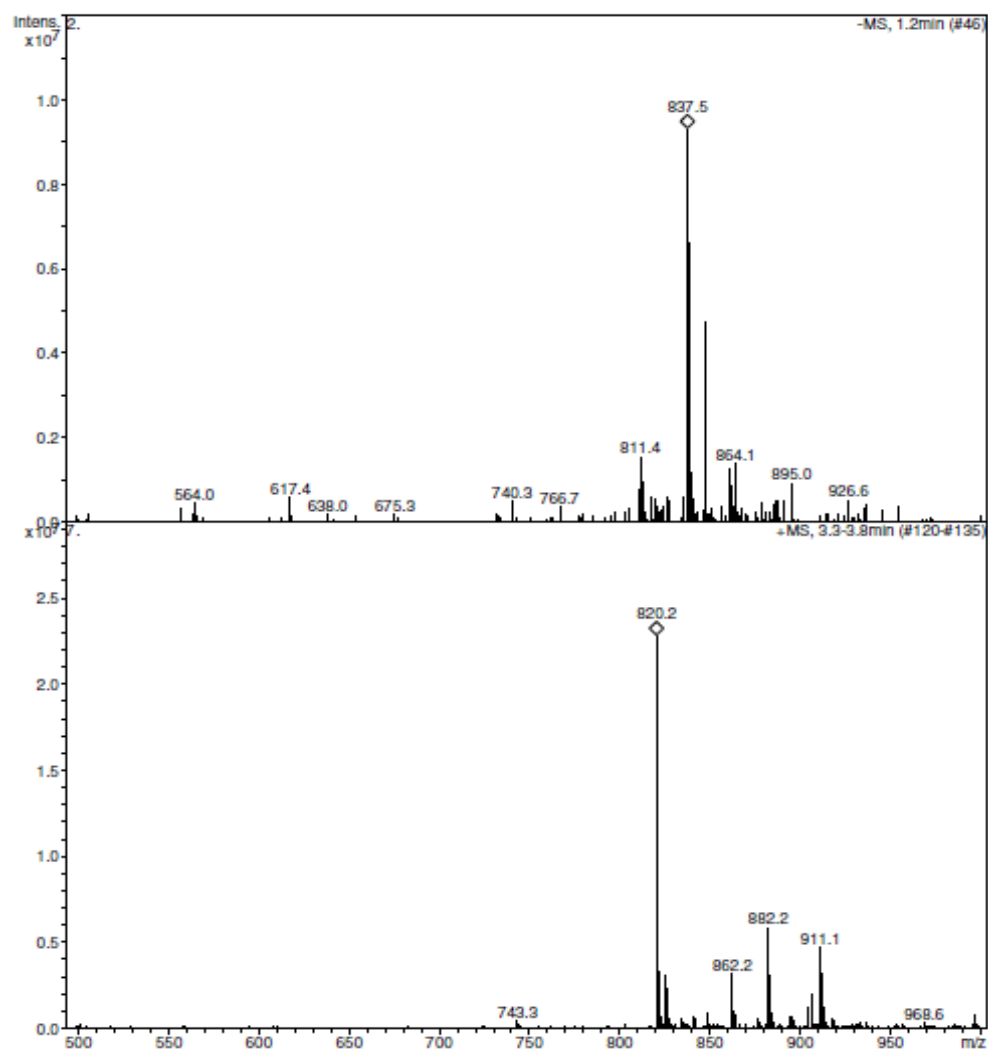
S10. HRESIMS spectrum of Chuktabularin F (2)



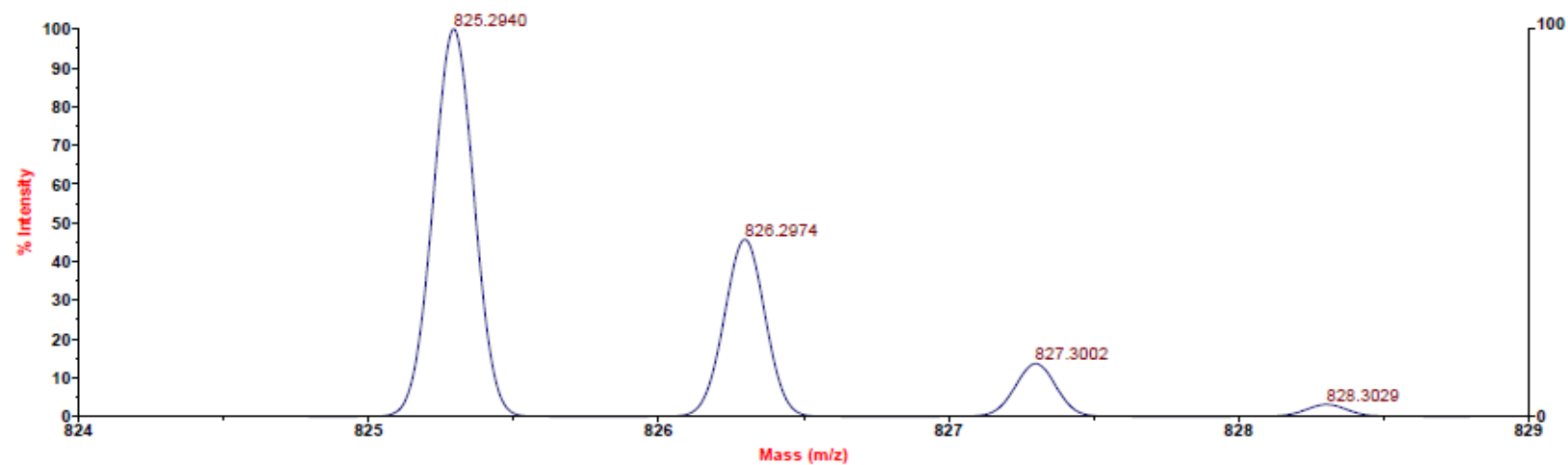
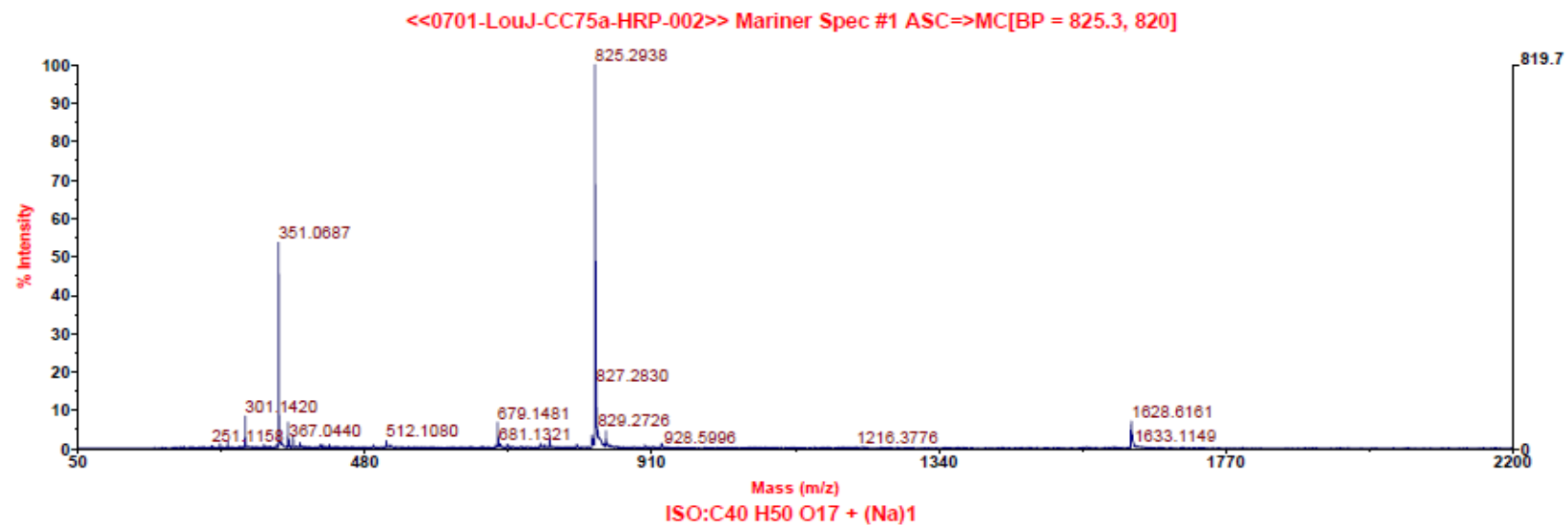
S11. ^1H NMR spectrum of Chuktabularin G (3) in CDCl_3



S12. ¹³C NMR spectrum of Chuktabularin G (3) in CDCl₃

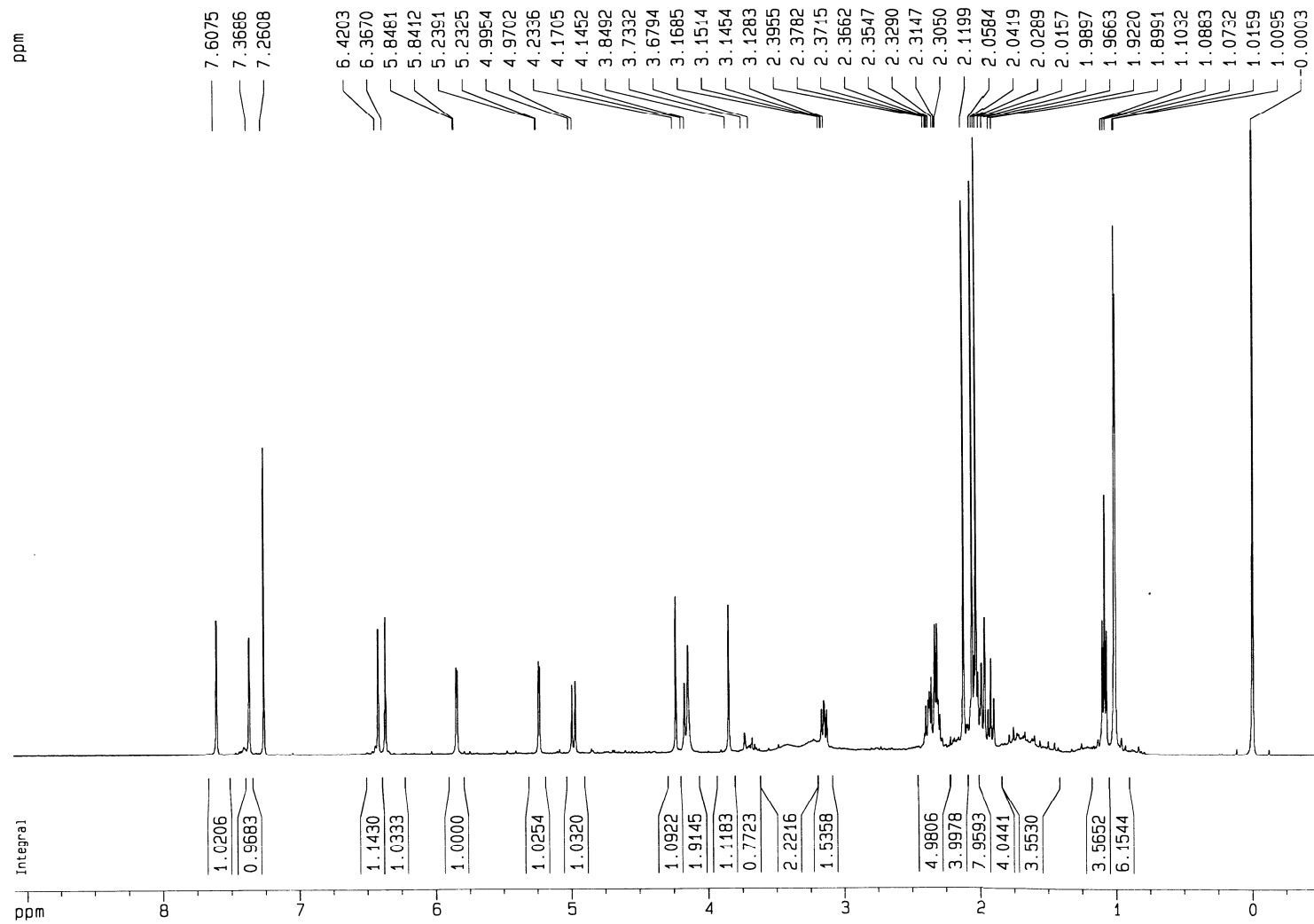


S13. ESIMS spectrum of Chuktabularin G (3)

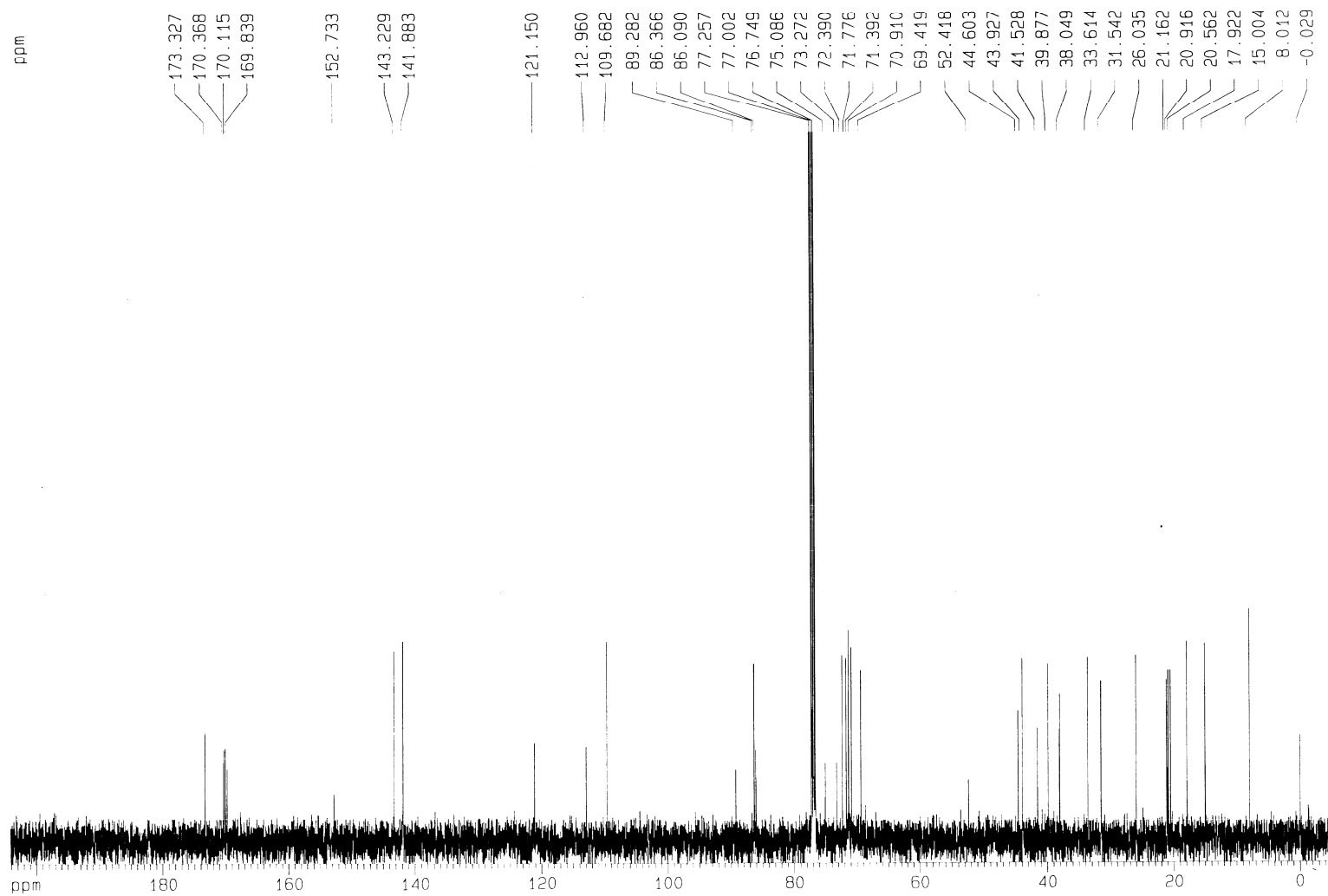


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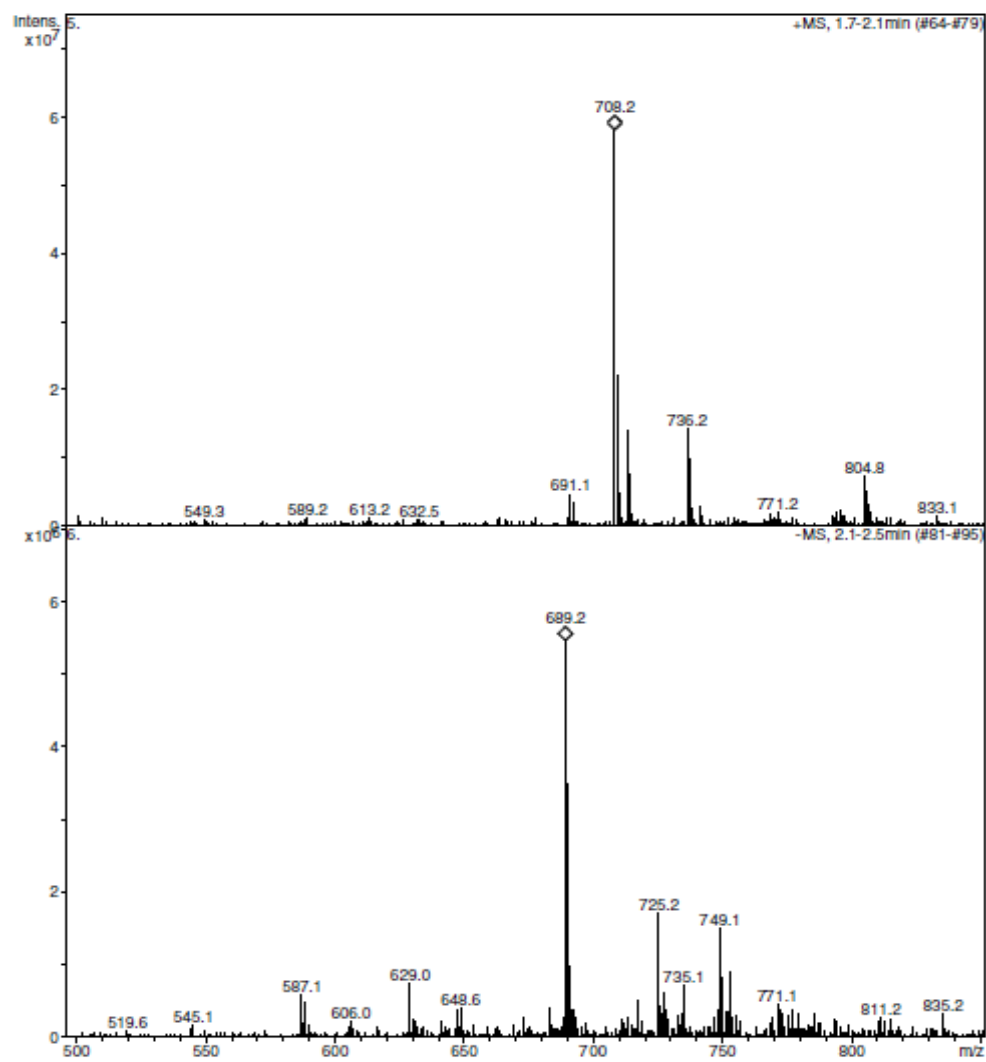
S14. HRESIMS spectrum of Chuktabularin G (3)



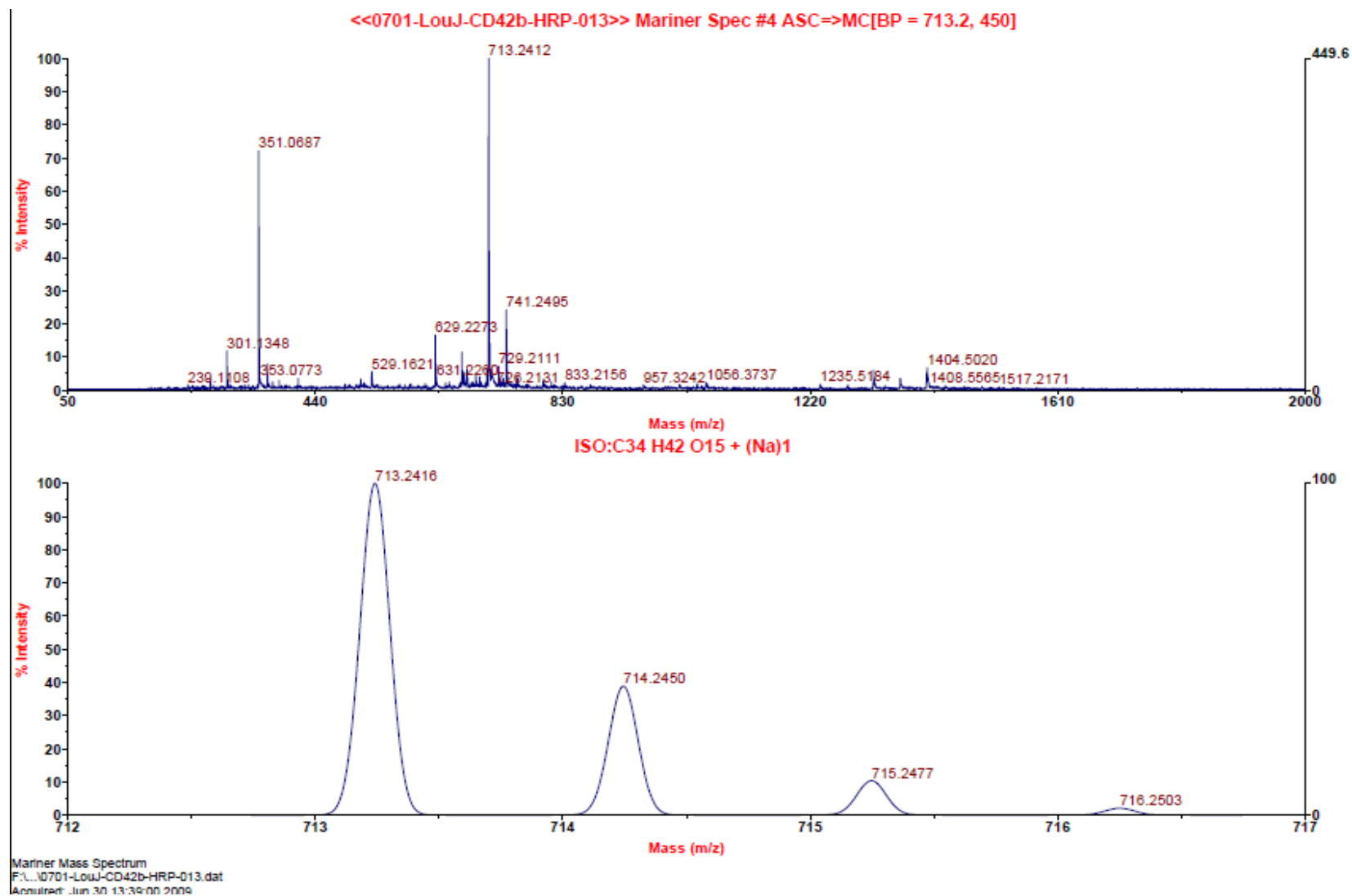
S15. ¹H NMR spectrum of Chuktabularin H (**4**) in CDCl₃



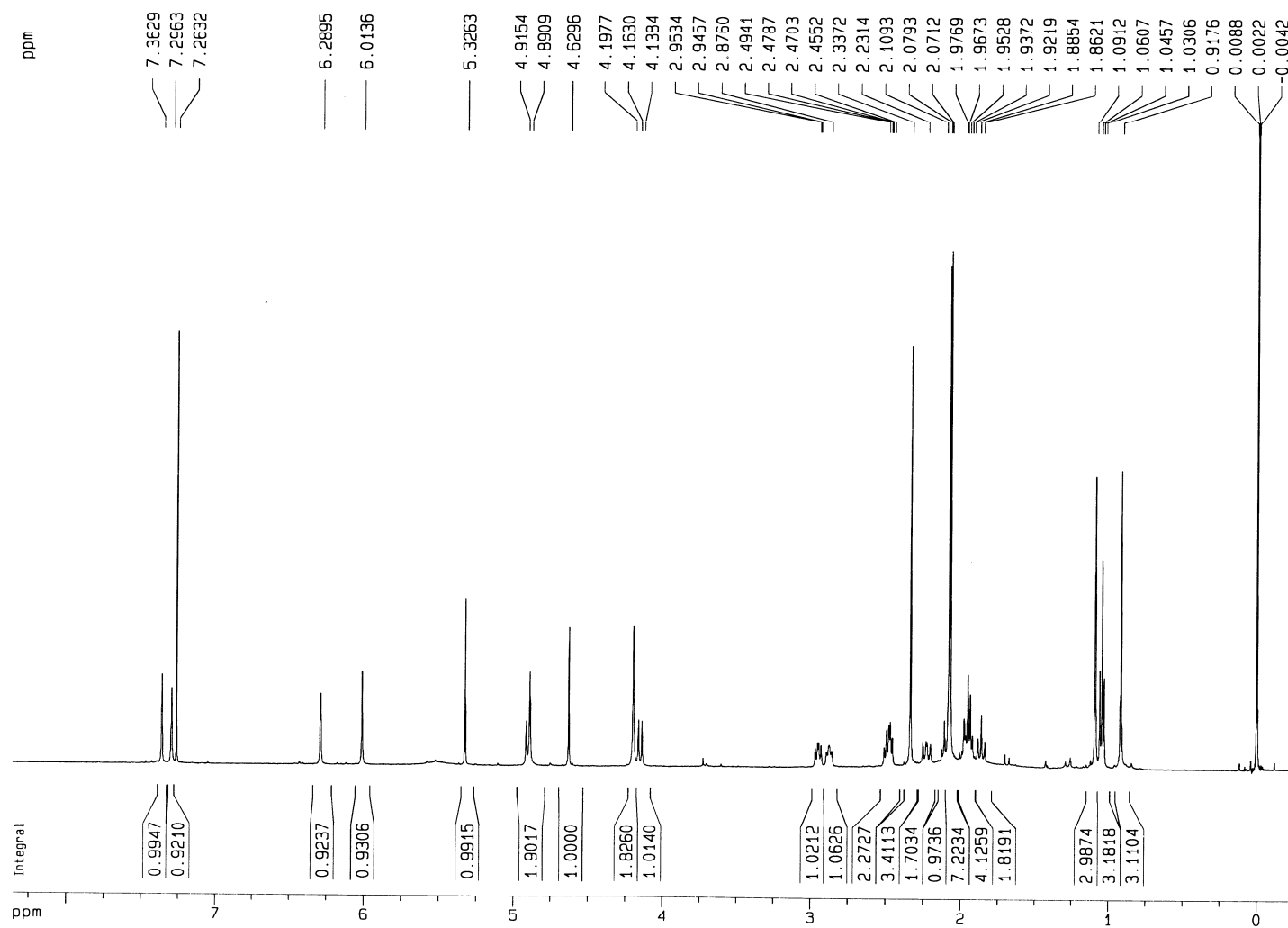
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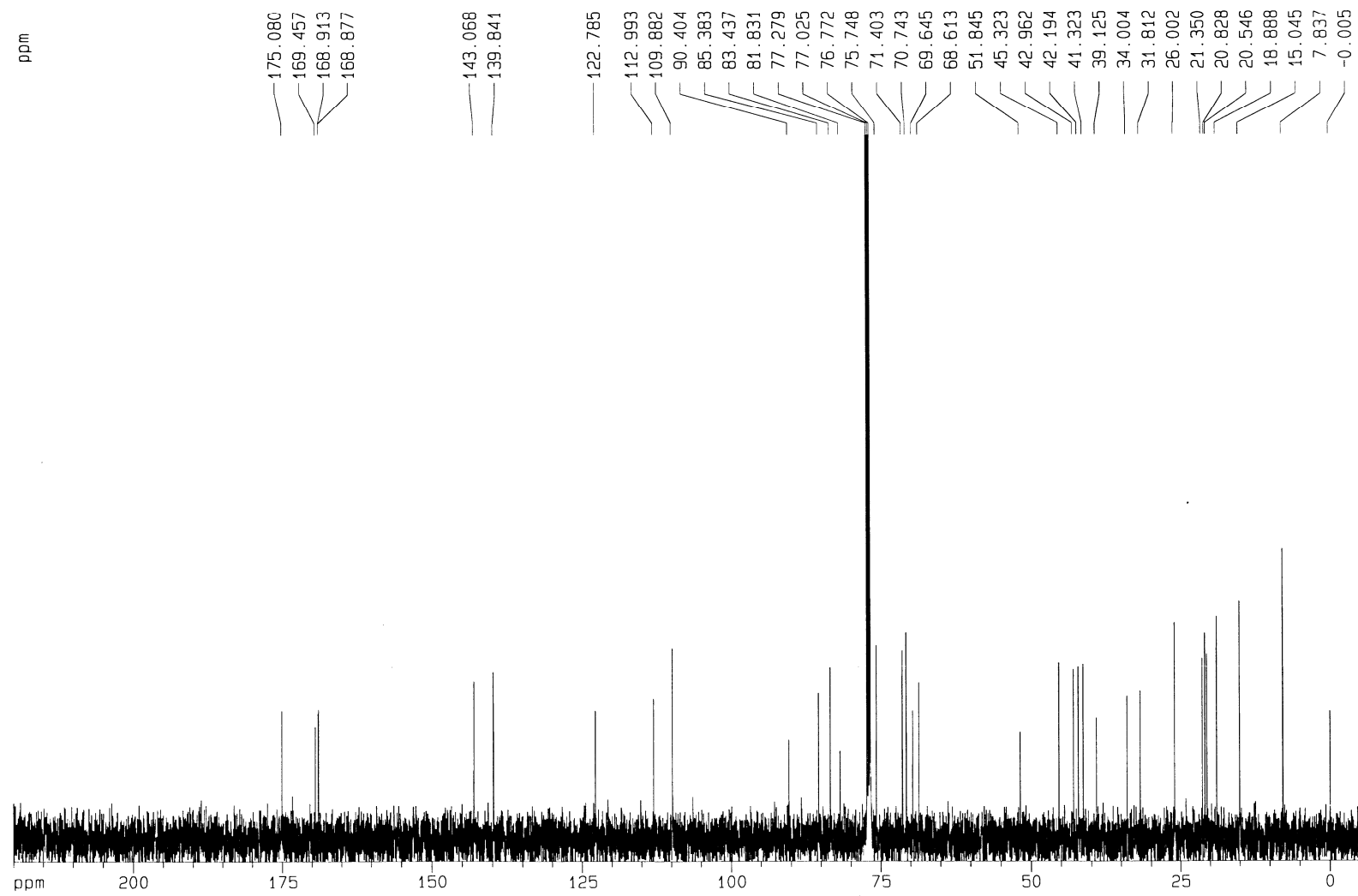
S17. ESIMS spectrum of Chuktabularin H (4)



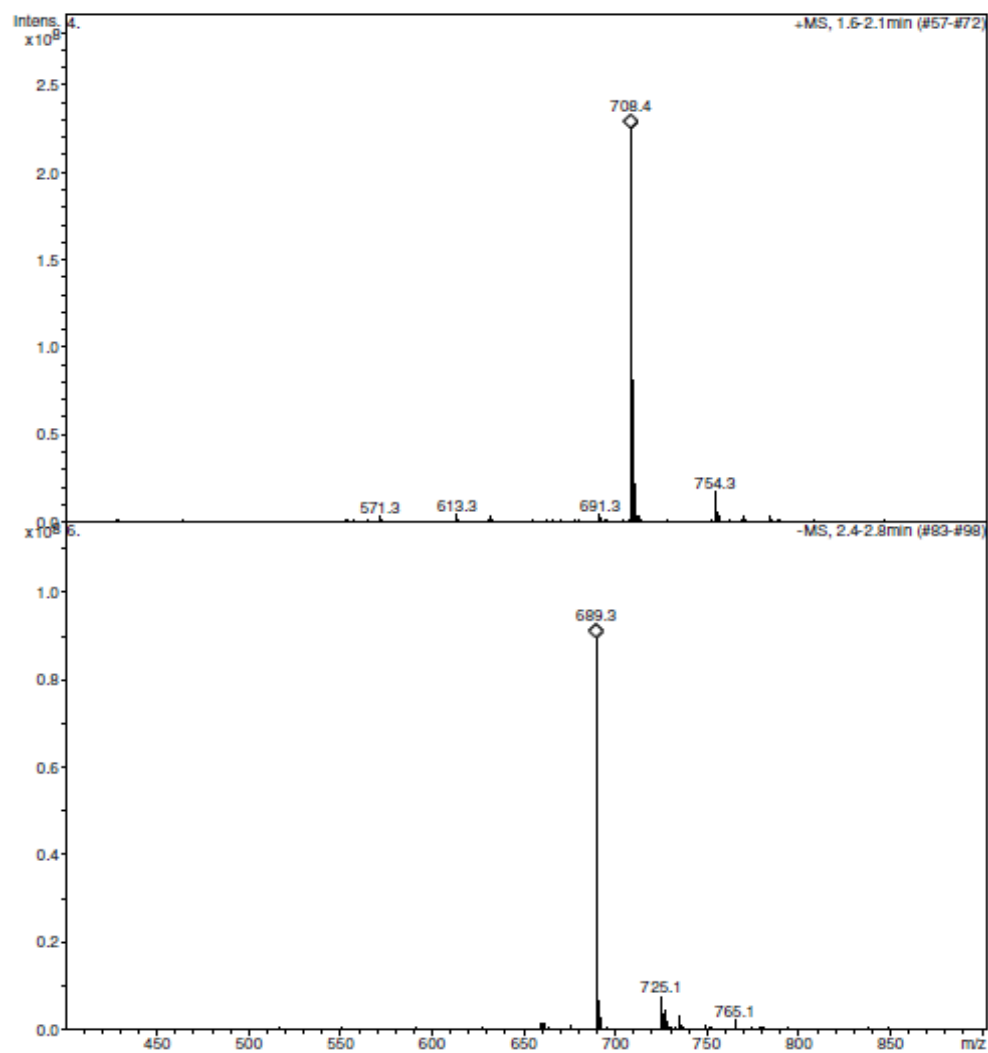
S18. HRESIMS spectrum of Chuktabularin H (4)



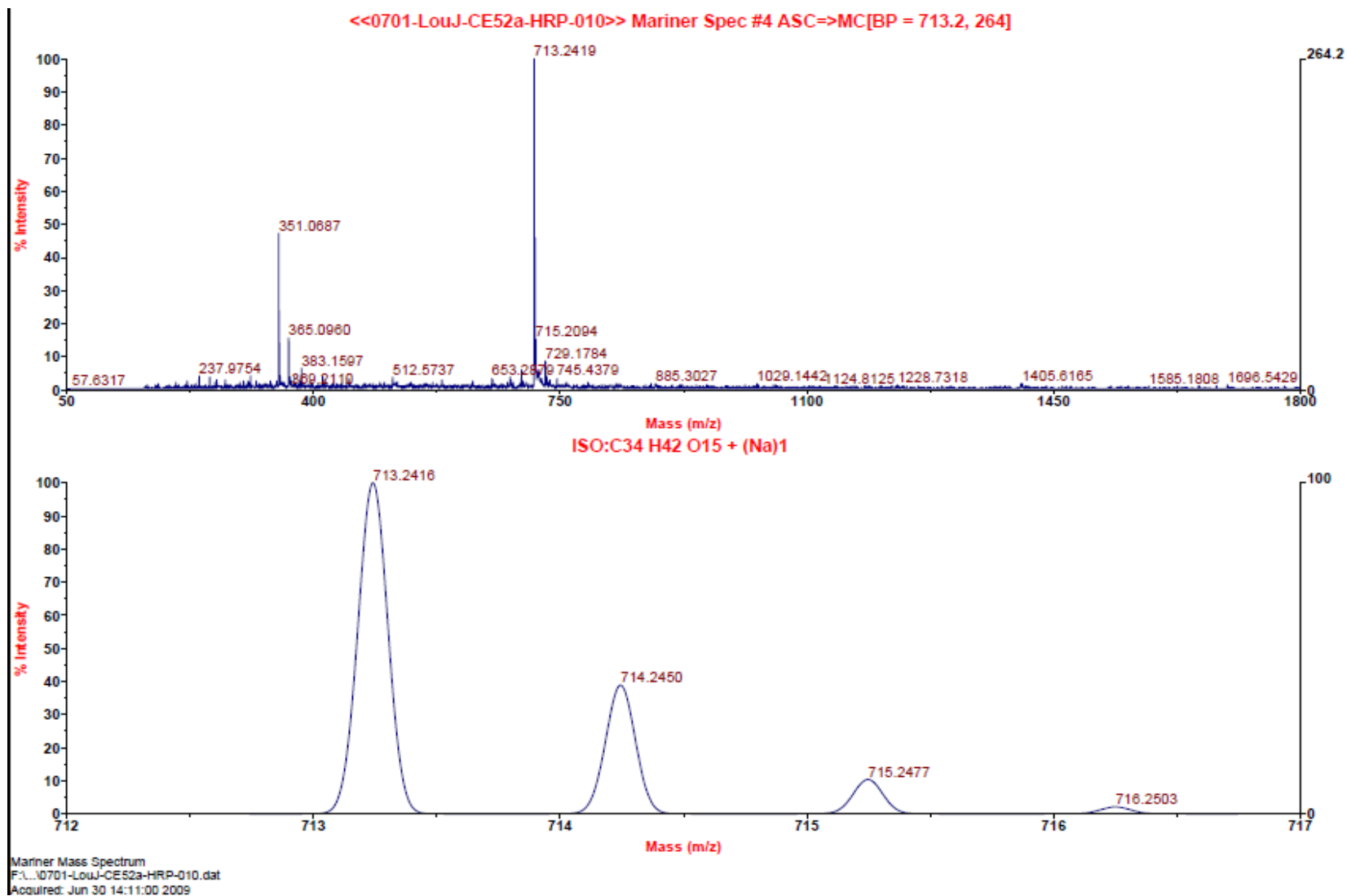
S19. ¹H NMR spectrum of Chuktabularin I (5) in CDCl₃



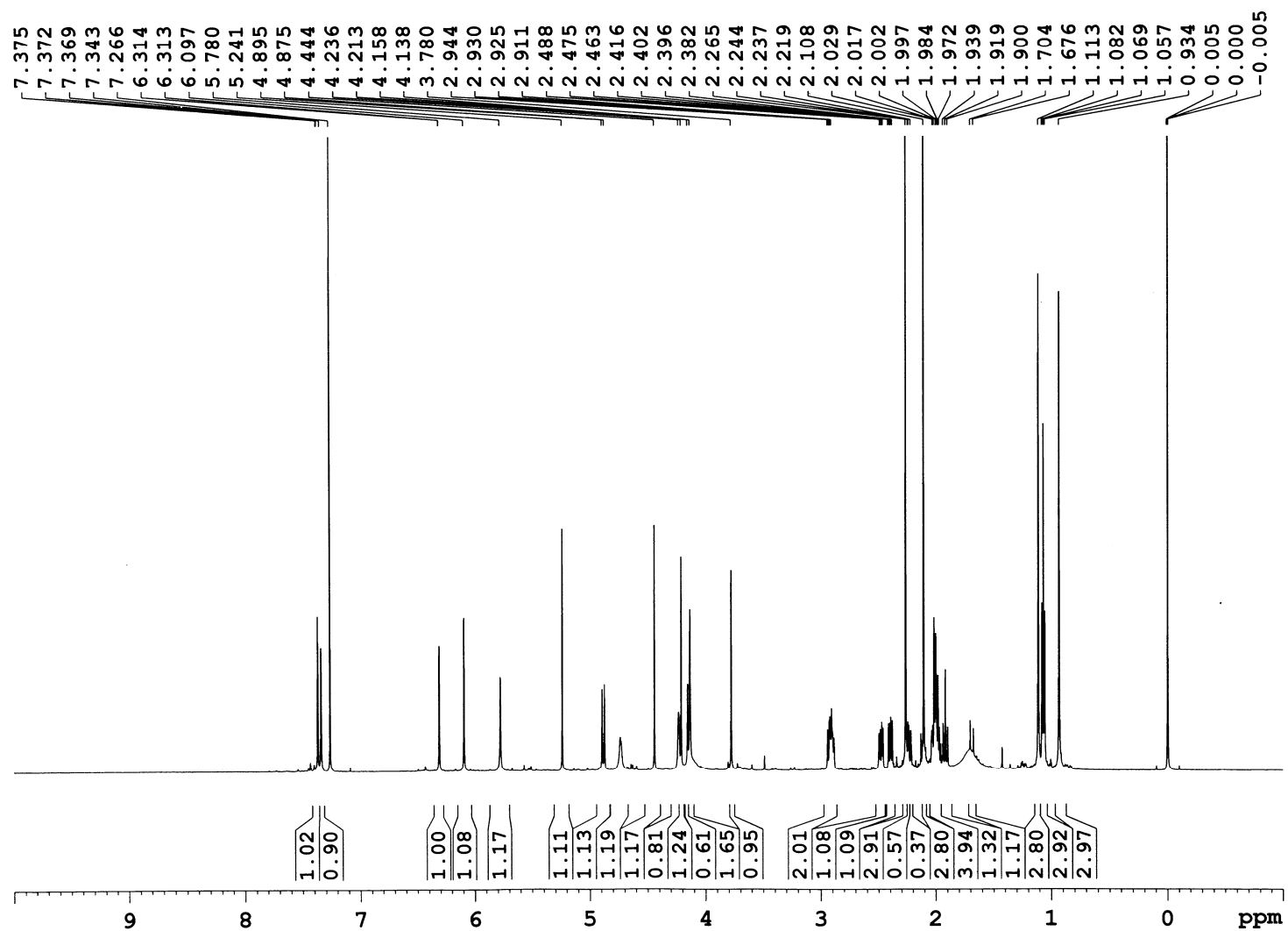
S20. ^{13}C NMR spectrum of Chuktabularin I (5) in CDCl_3



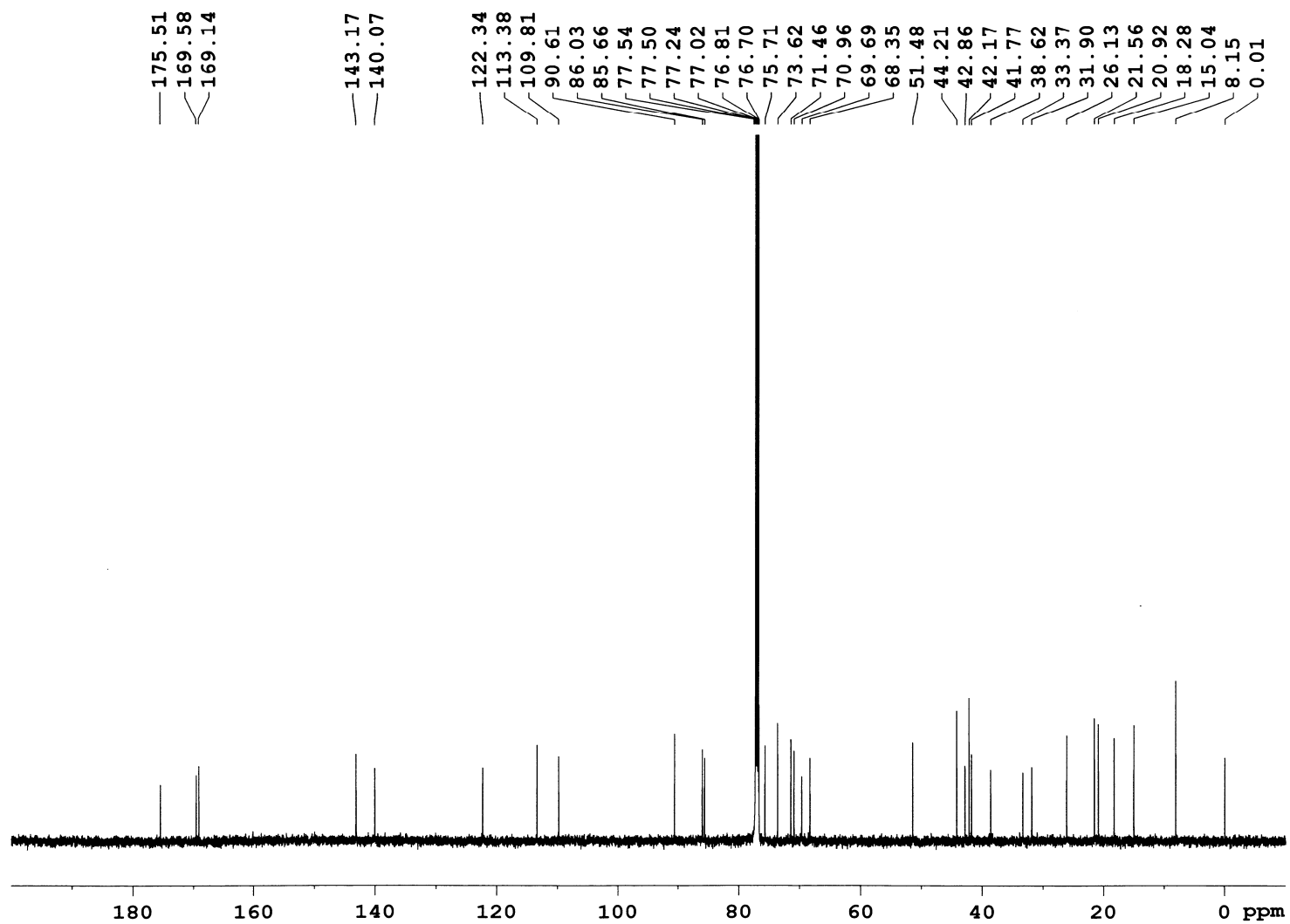
S21. ESIMS spectrum of Chuktabularin I (5)



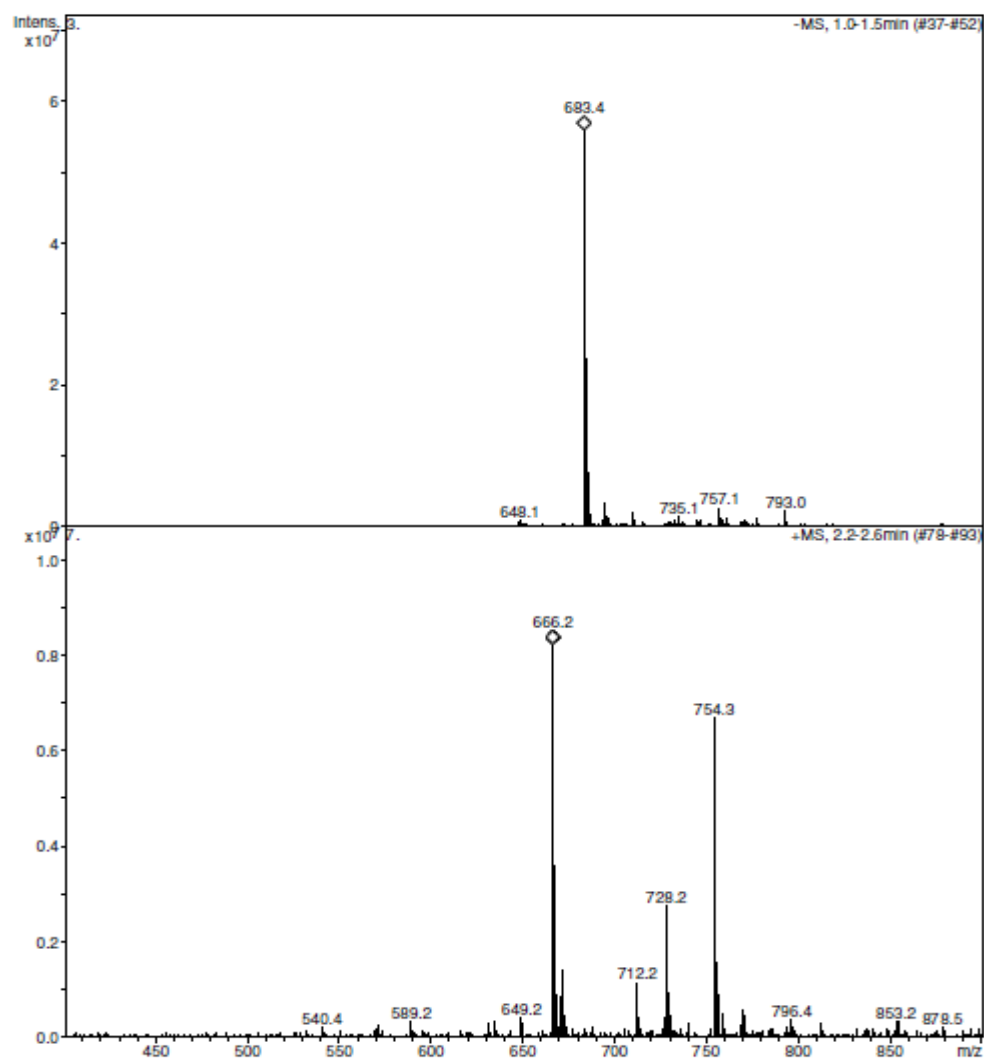
S22. HRESIMS spectrum of Chuktabularin I (5)



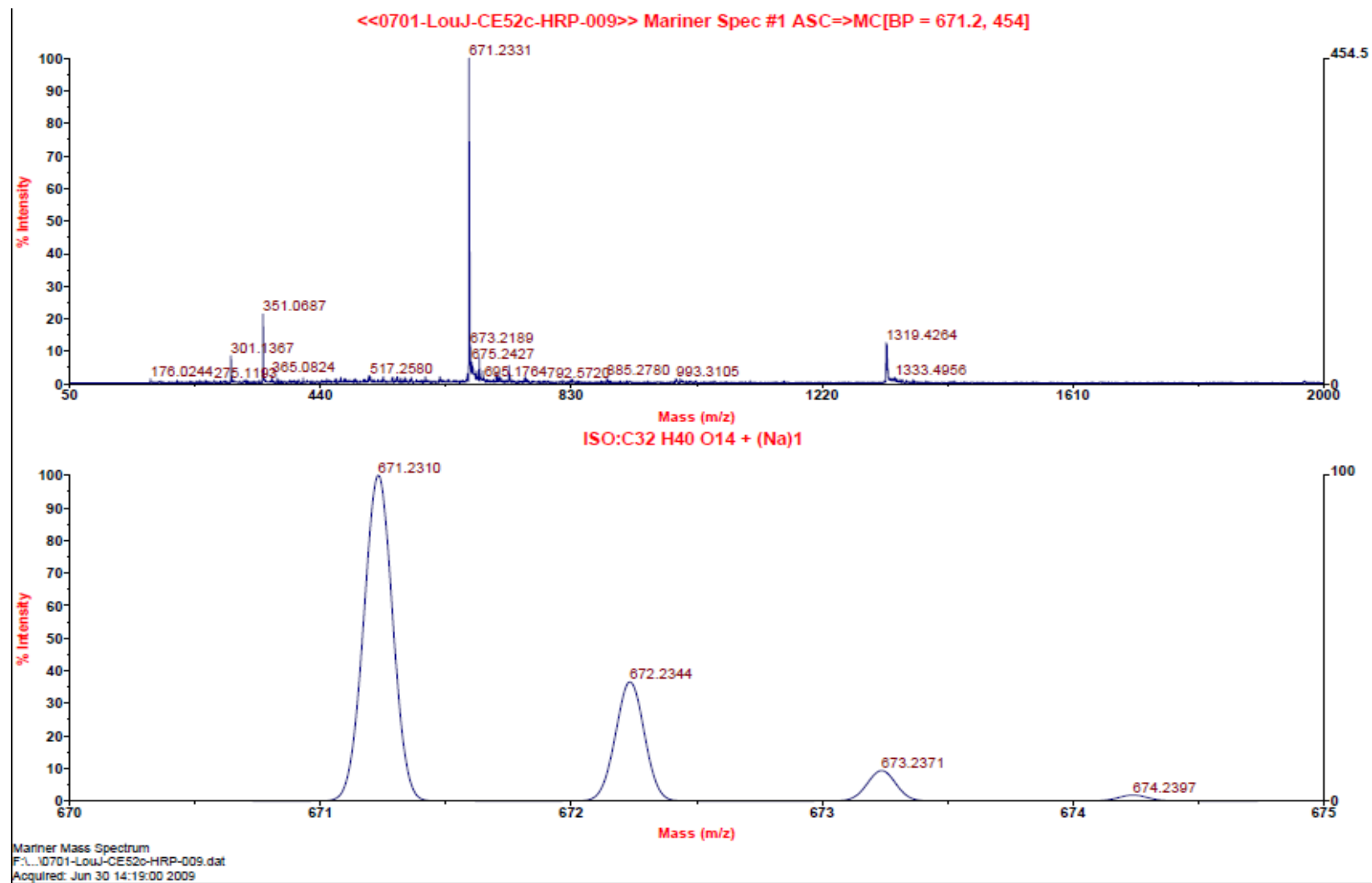
S23. ^1H NMR spectrum of Chuktabularin J (6) in CDCl_3



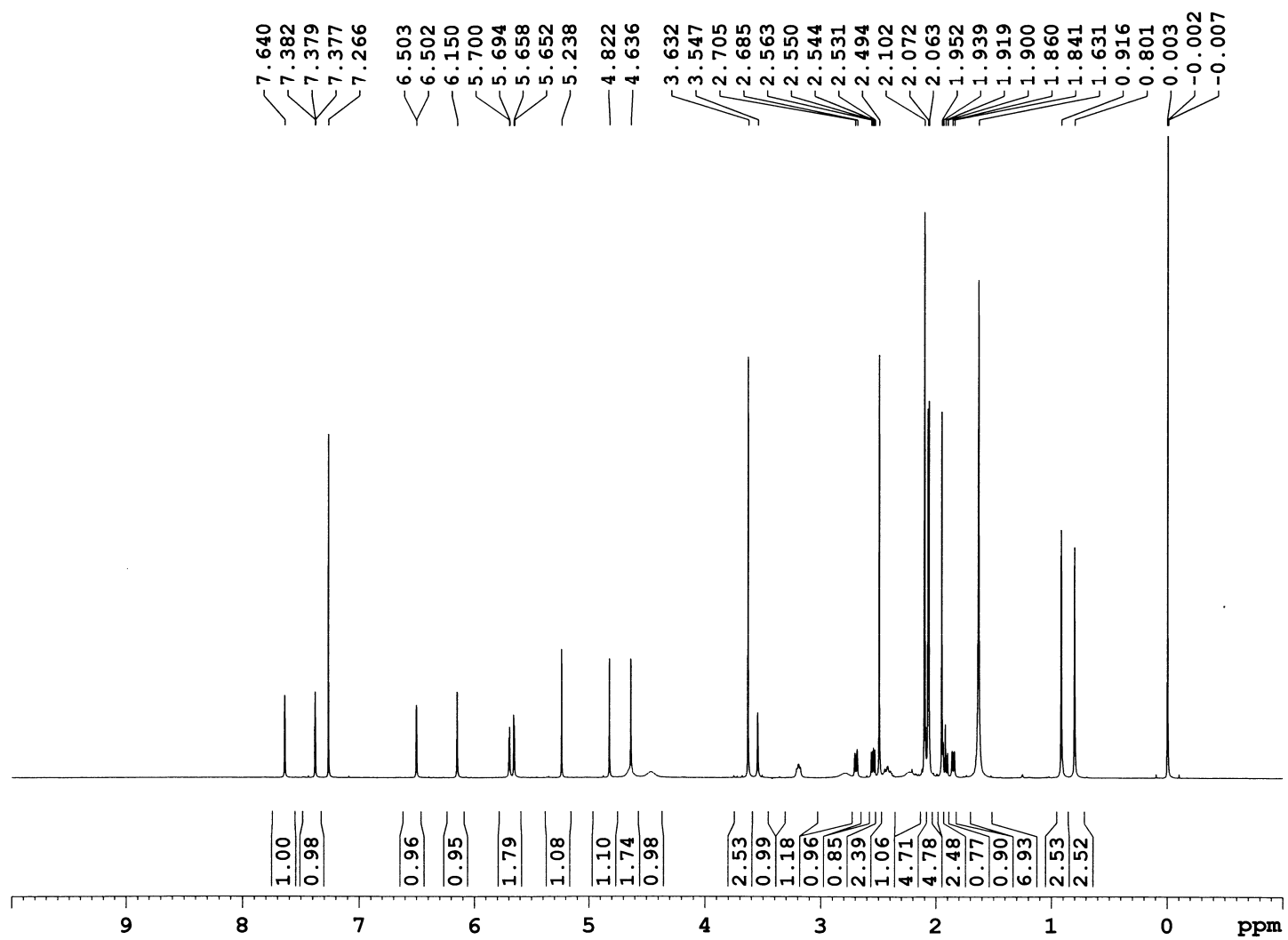
S24. ¹³C NMR spectrum of Chuktabularin J (6) in CDCl₃



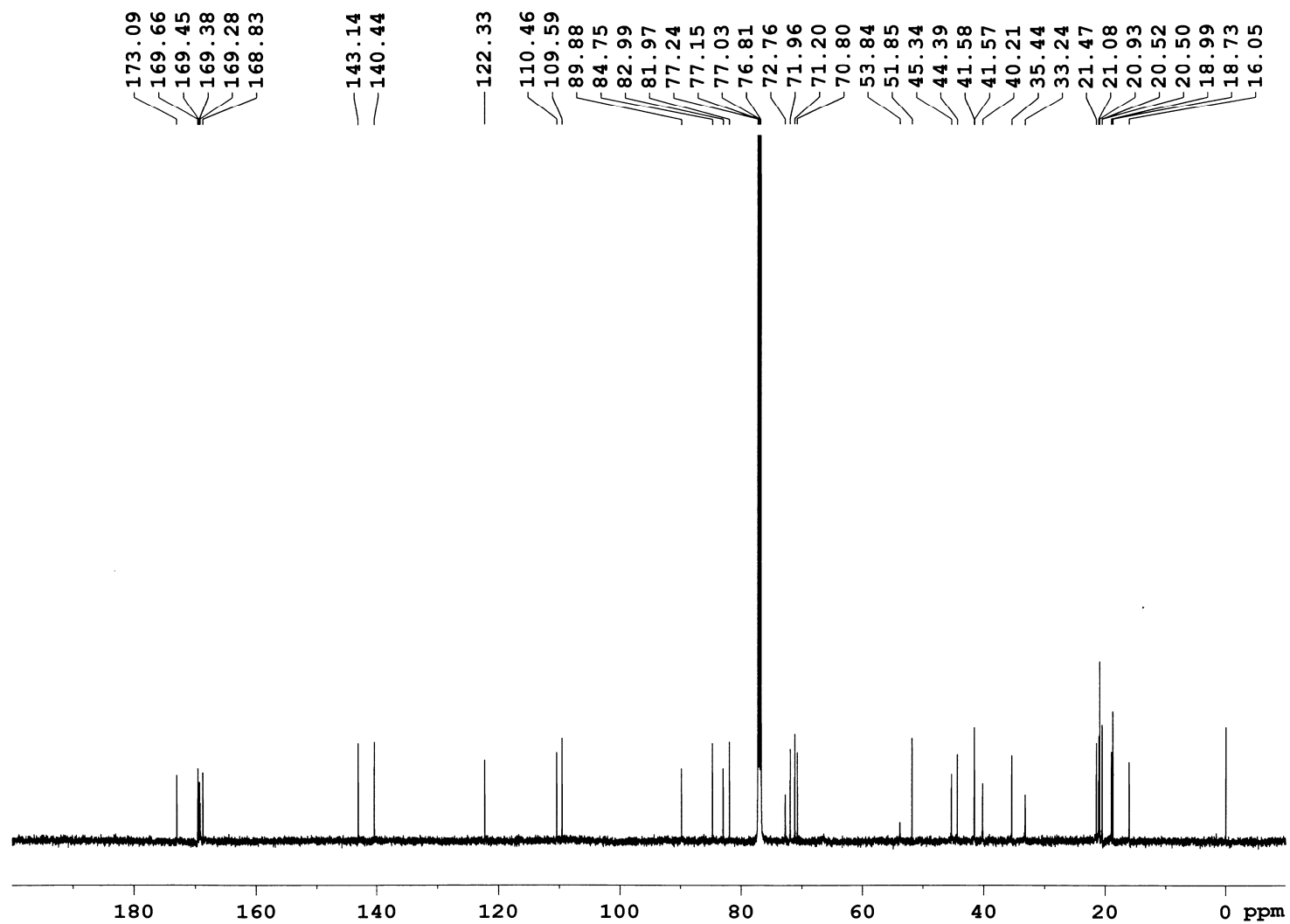
S25. ESIMS spectrum of Chuktabularin J (6)



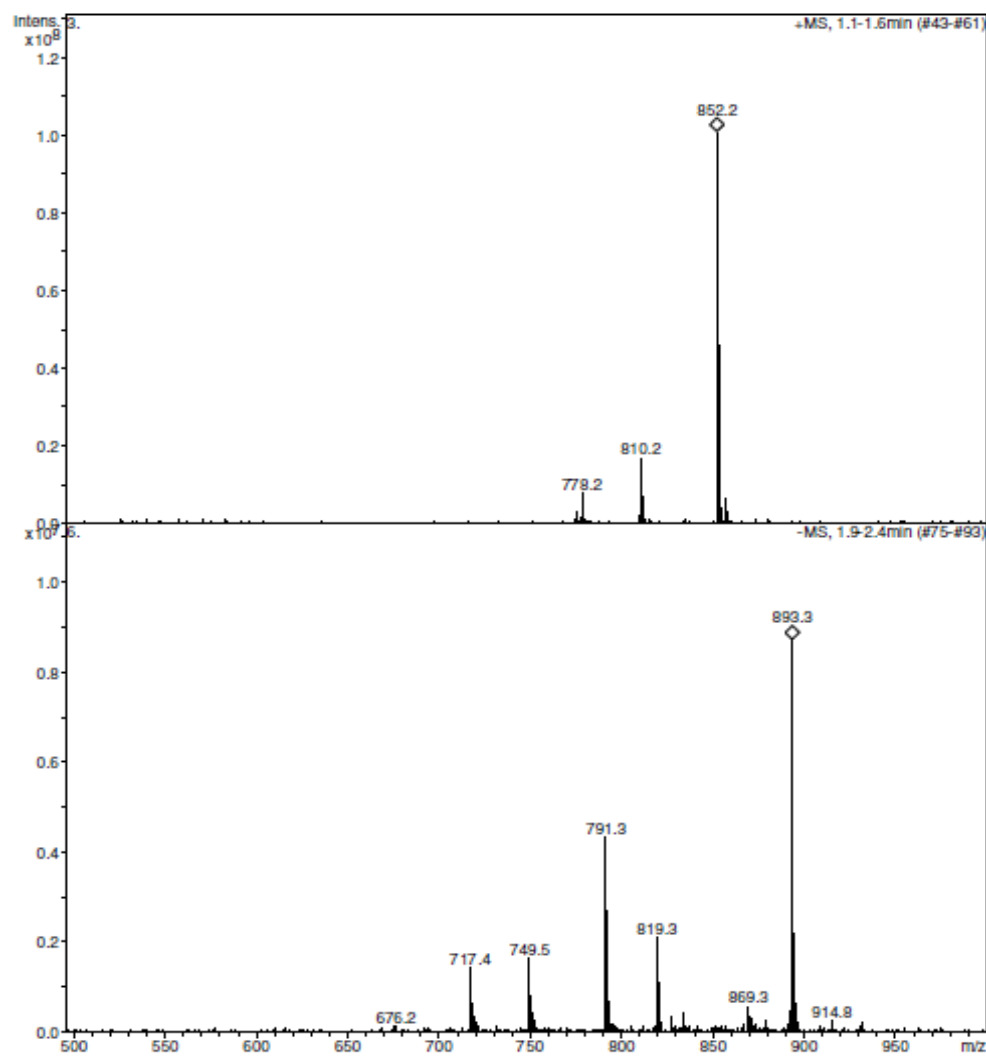
S26. HRESIMS spectrum of Chuktabularin J (6)



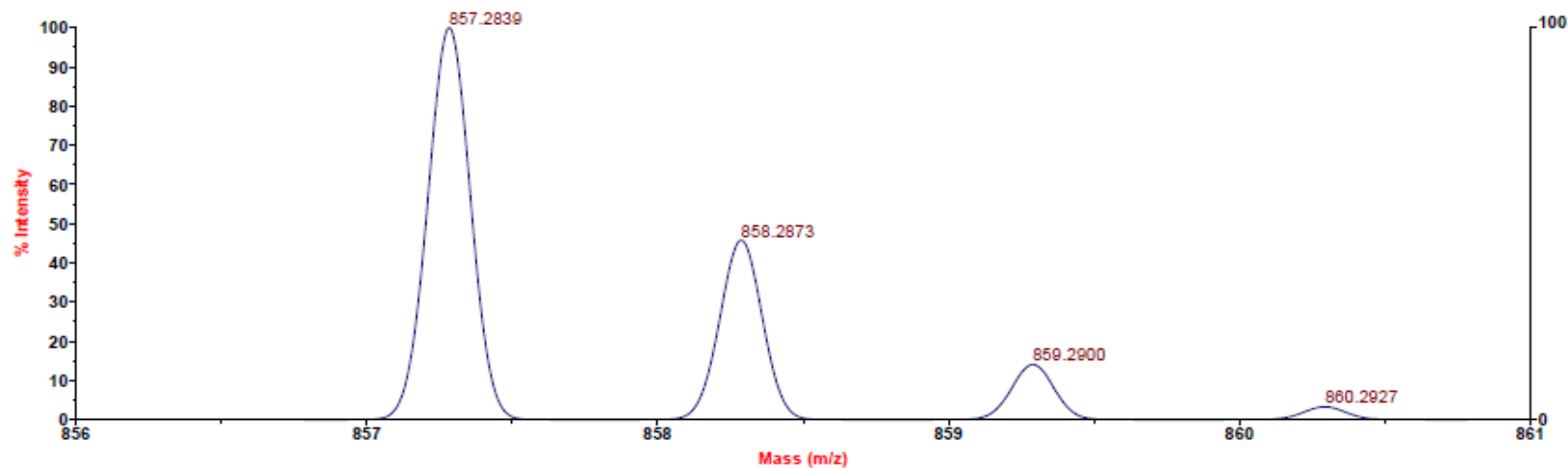
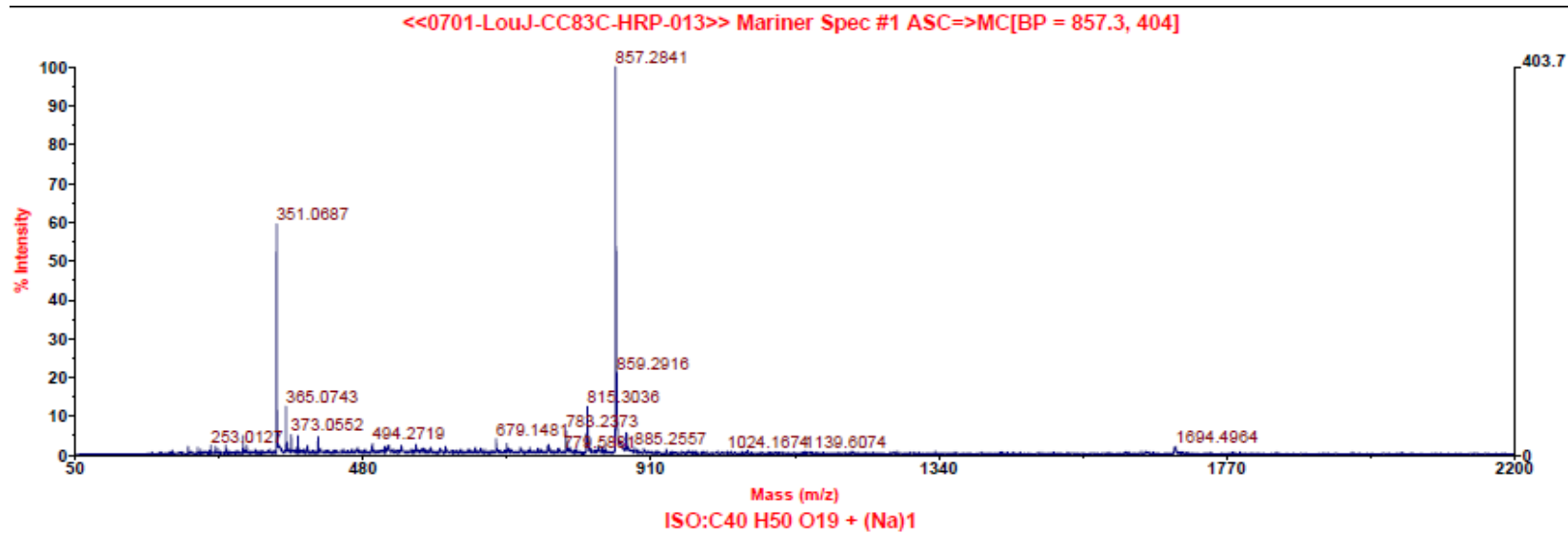
S27. ¹H NMR spectrum of Chuktabularin K (7) in CDCl₃



S28. ^{13}C NMR spectrum of Chuktabularin K (7) in CDCl_3

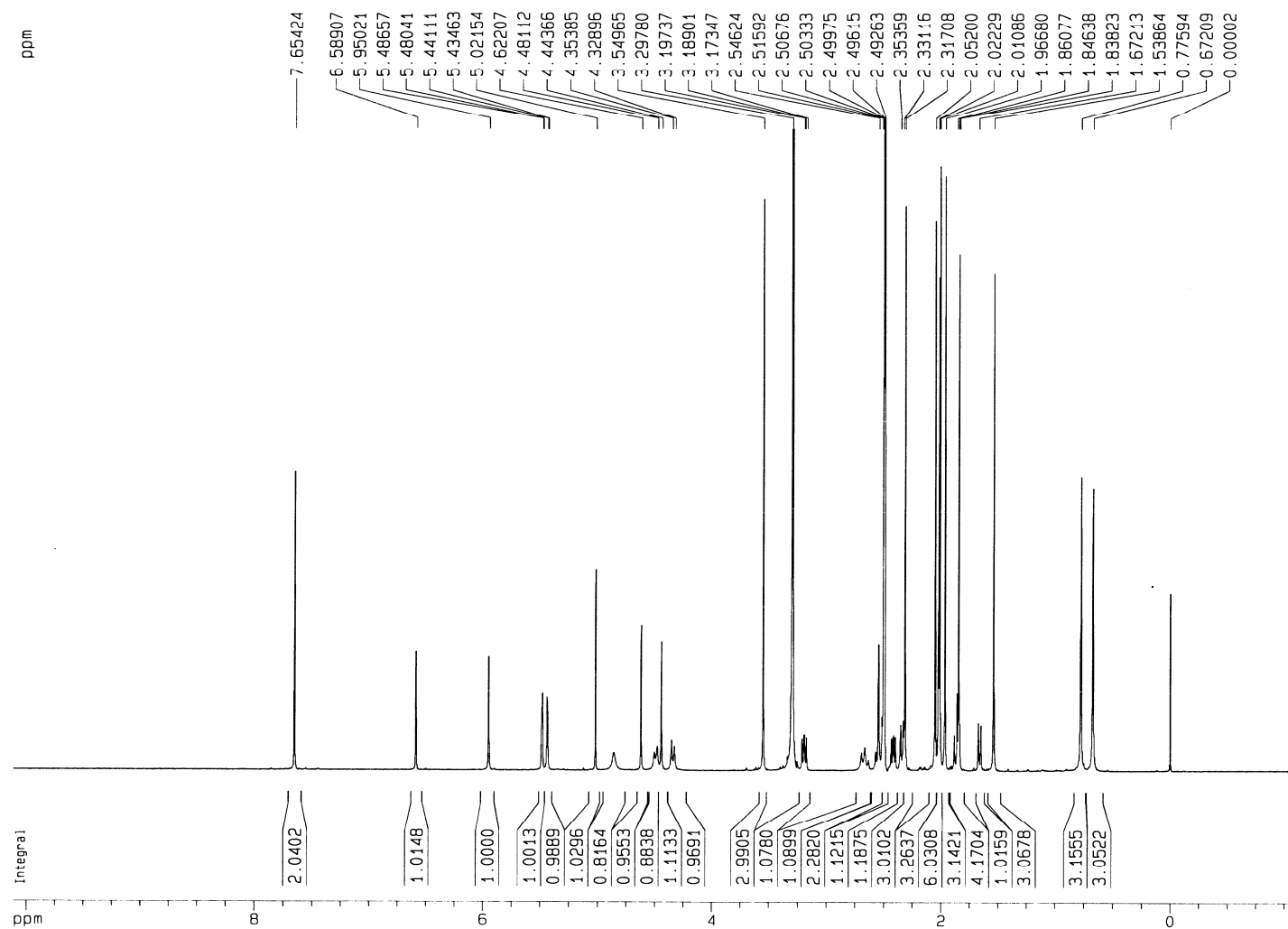


S29. ESIMS spectrum of Chuktabularin K (7)

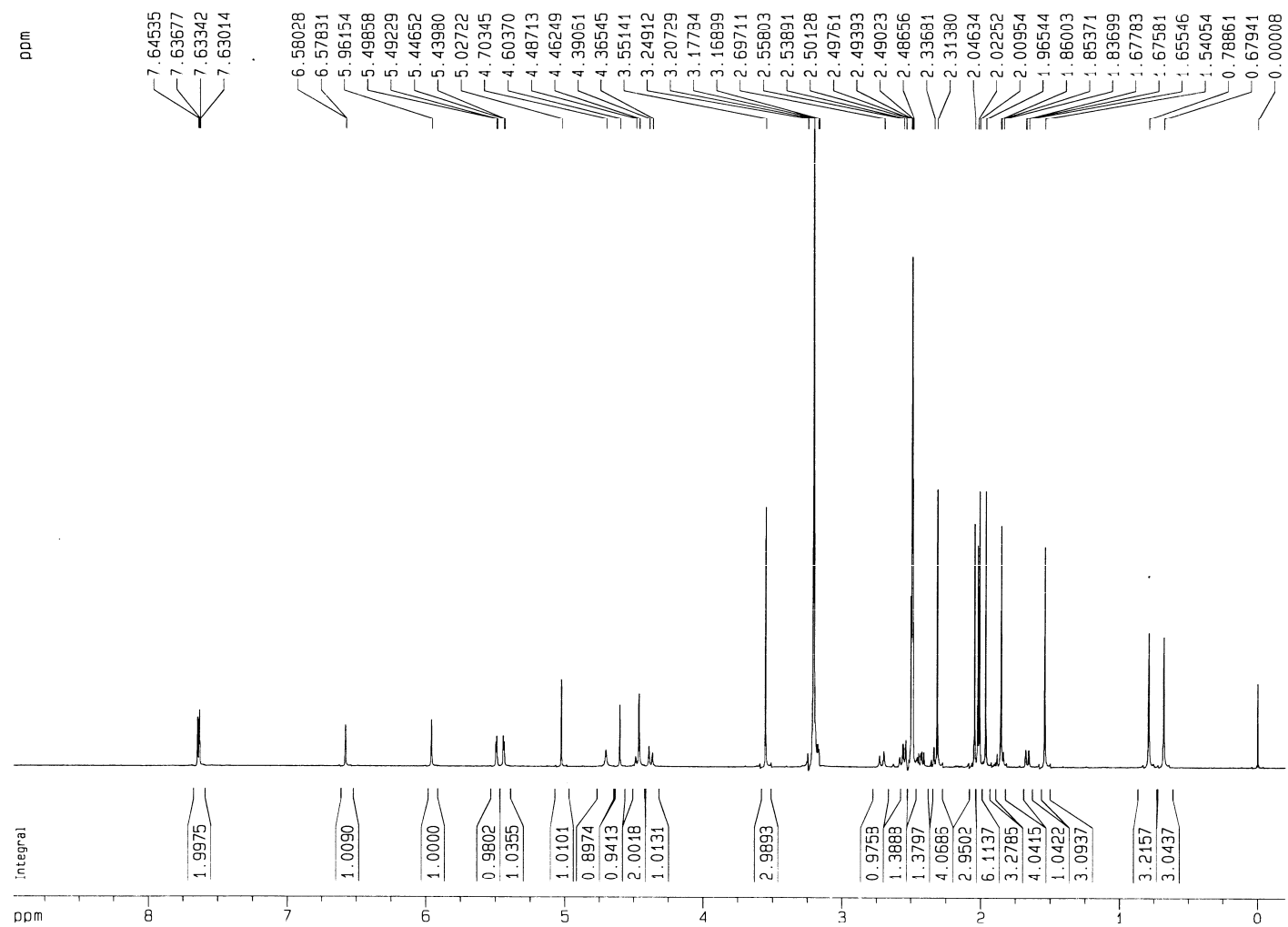


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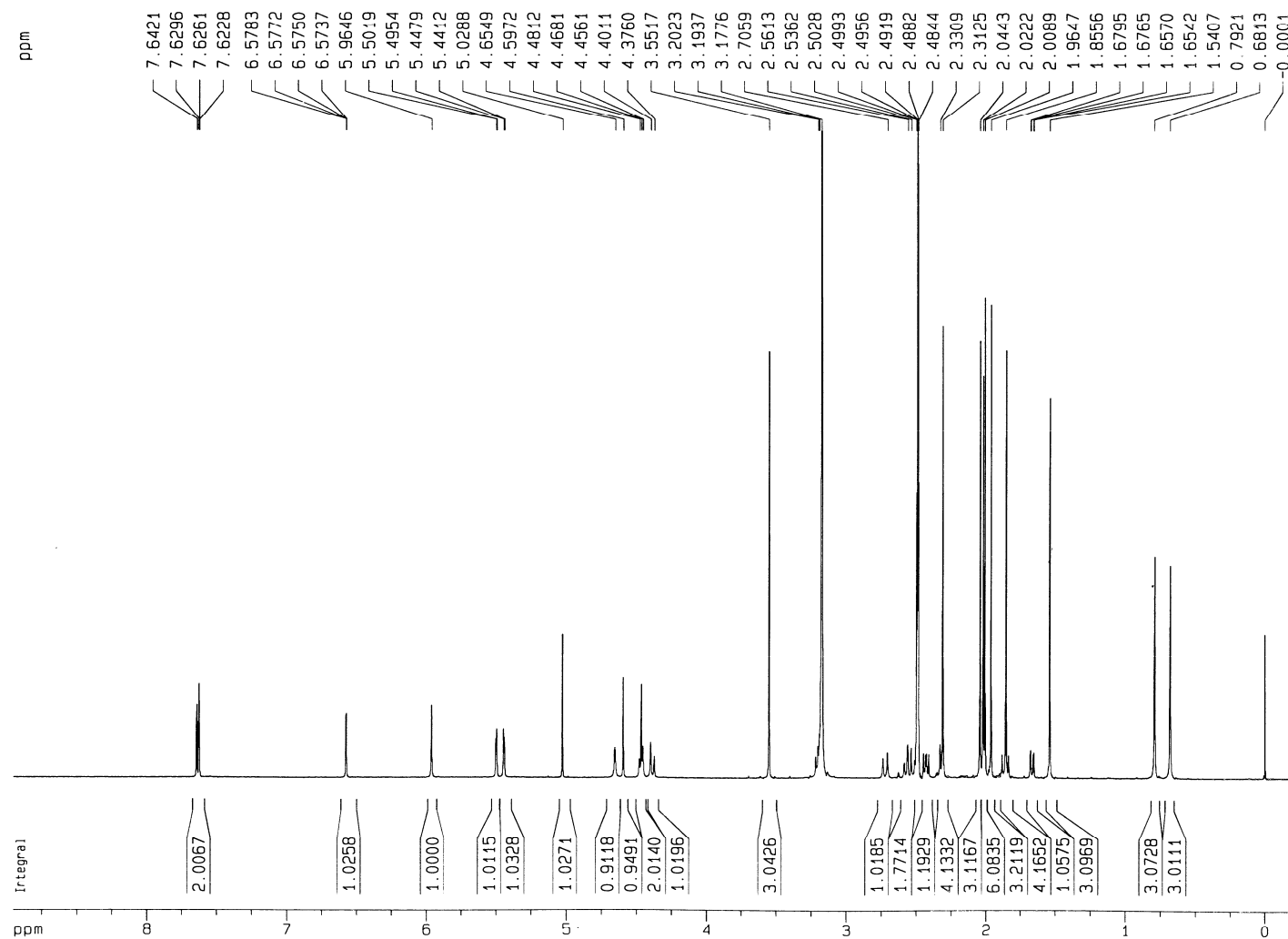
S30. HRESIMS spectrum of Chuktabularin K (7)



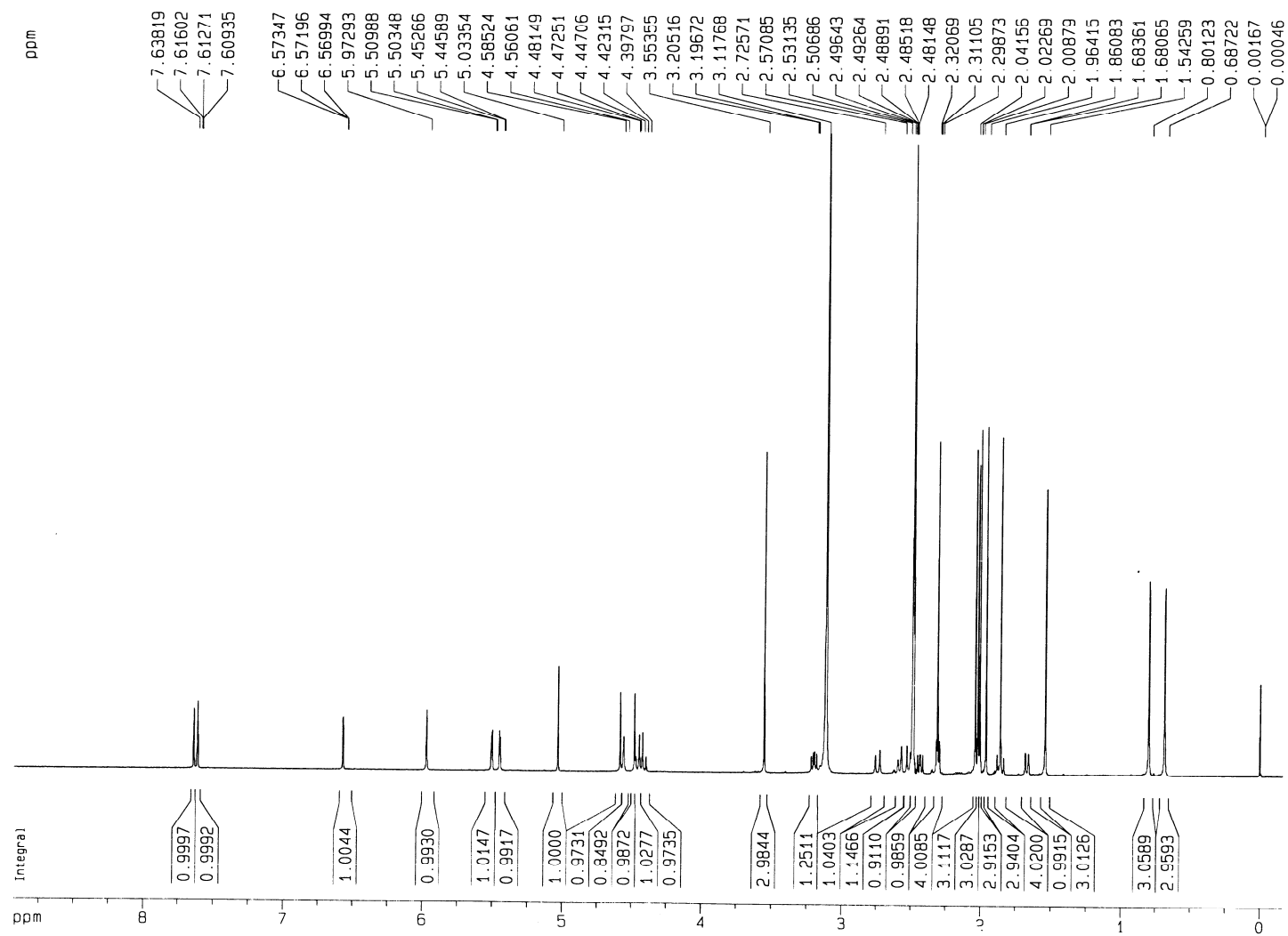
S31. ^1H NMR spectrum of Chuktabularin K (7) in $\text{DMSO}-d_6$ (303K)



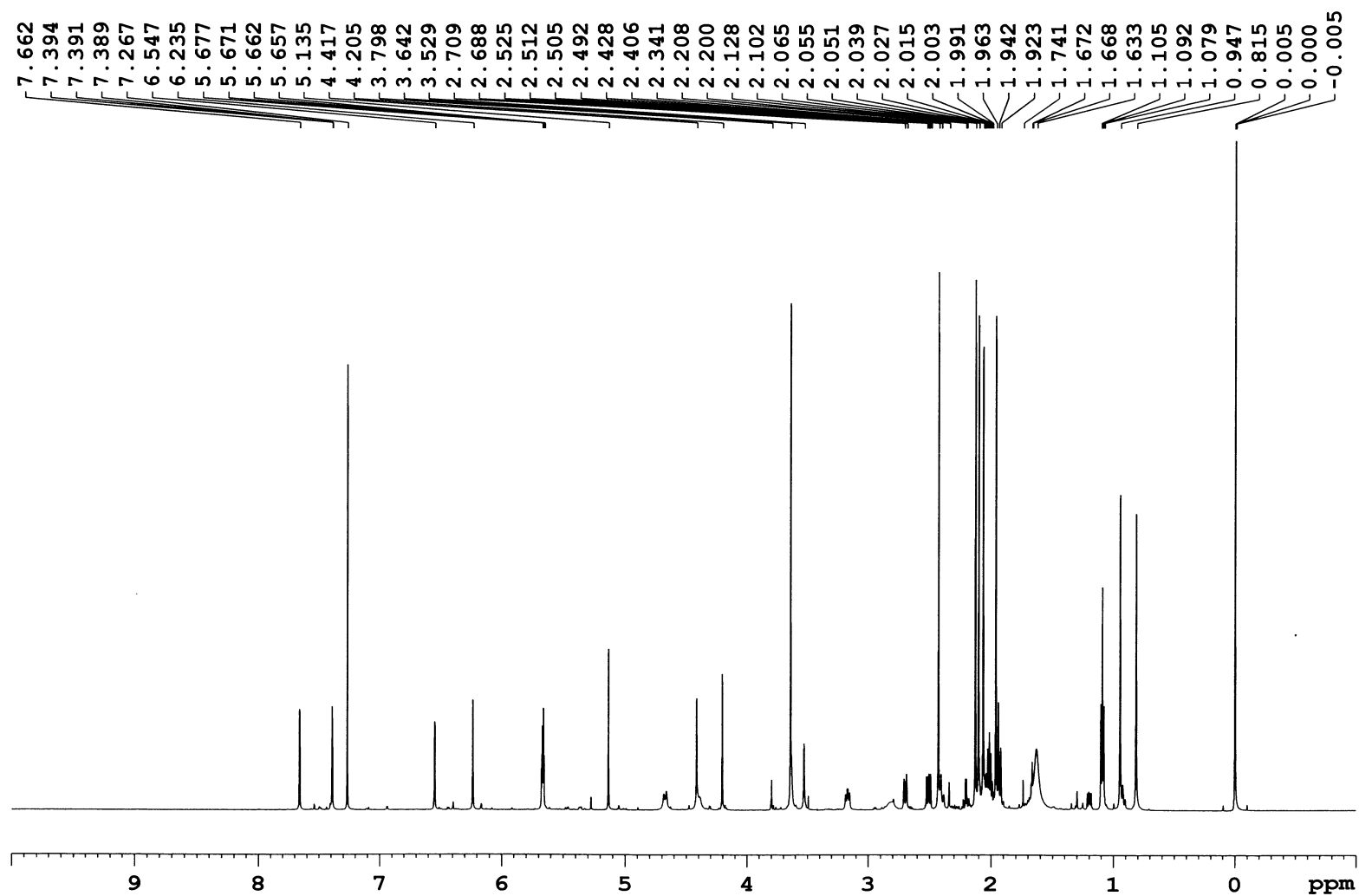
S32. ^1H NMR spectrum of Chuktabularin K (7) in $\text{DMSO-}d_6$ (318K)



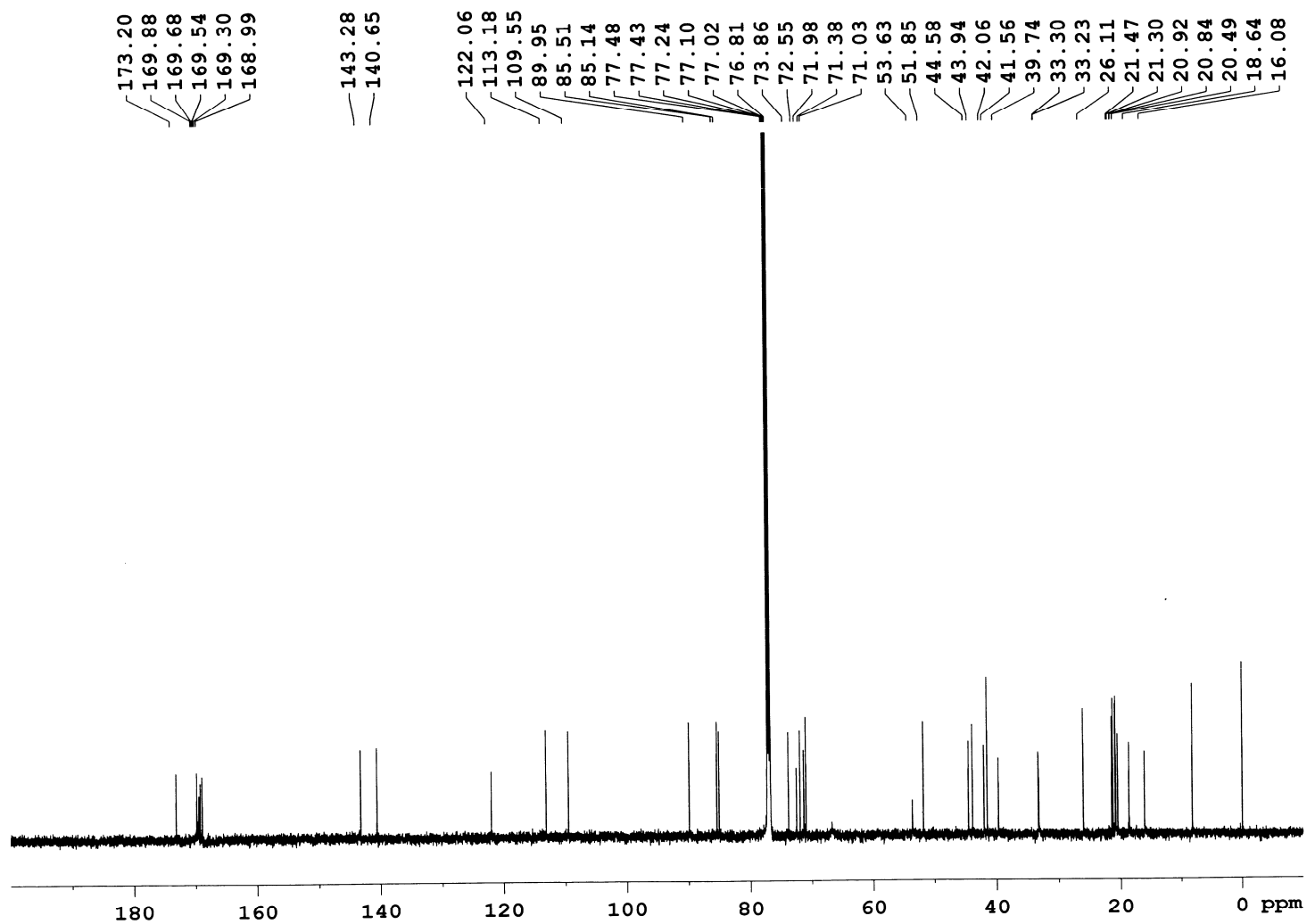
S33. ^1H NMR spectrum of Chuktabularin K (7) in $\text{DMSO}-d_6$ (323K)



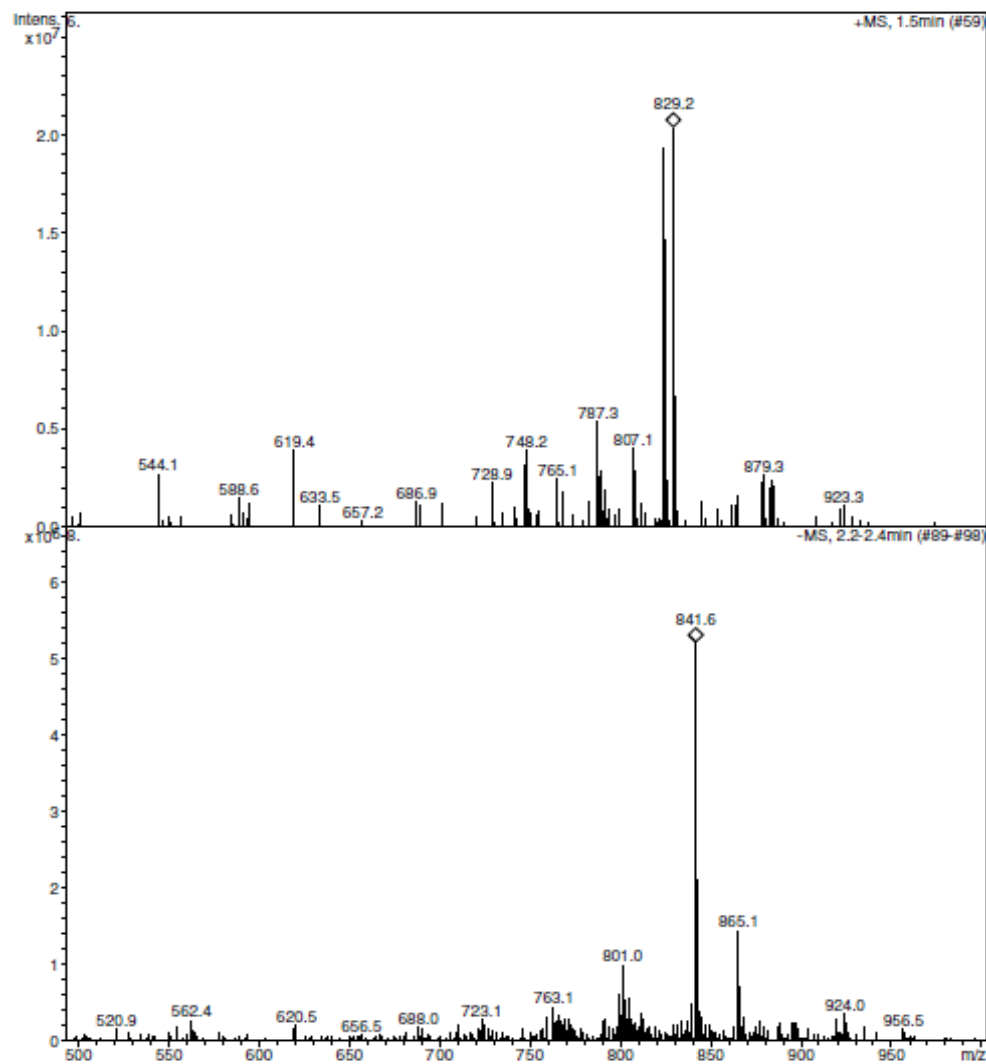
S34. ^1H NMR spectrum of Chuktabularin K (7) in $\text{DMSO}-d_6$ (333K)



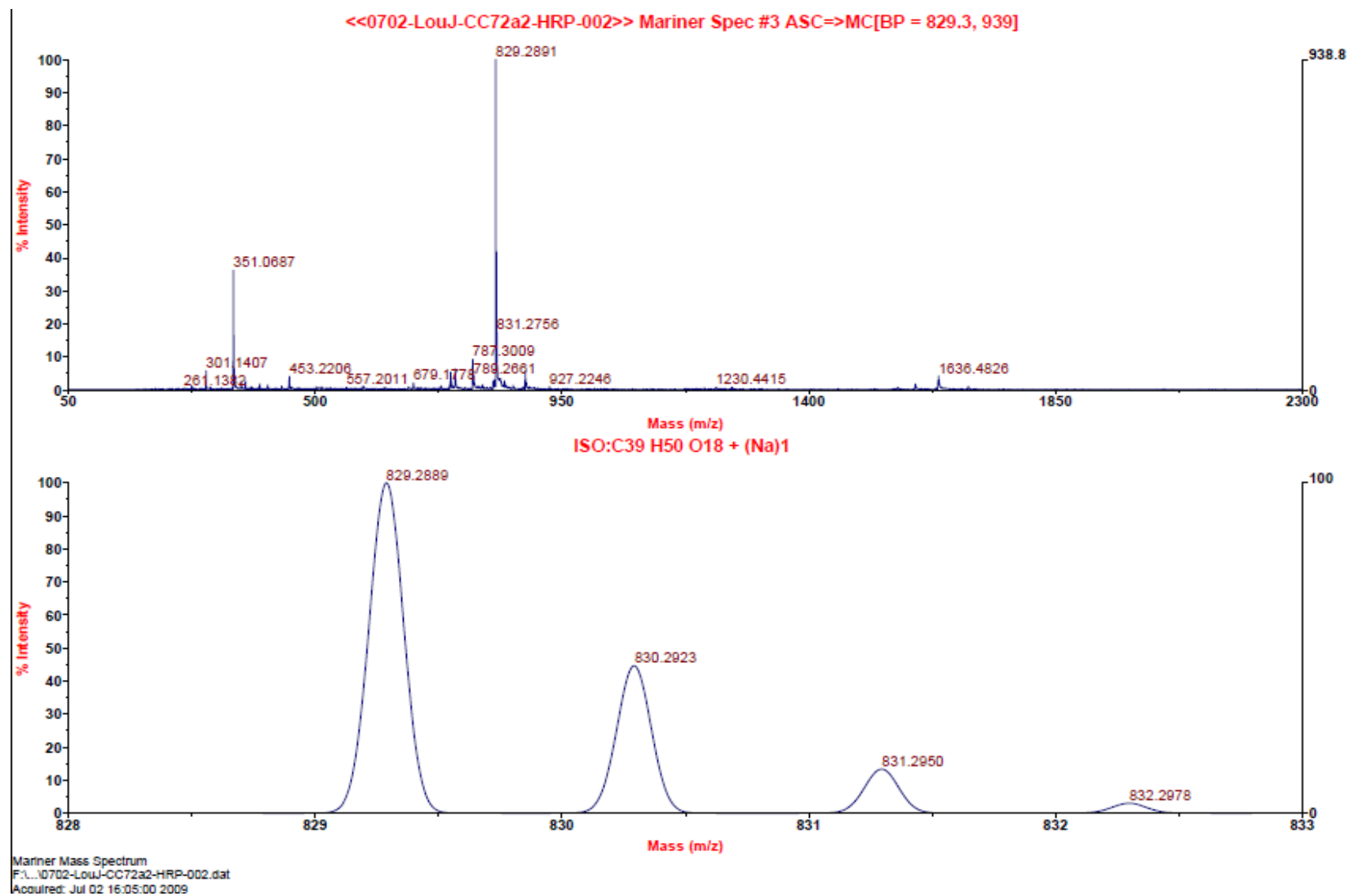
S35. ^1H NMR spectrum of Chuktabularin L (**8**) in CDCl_3



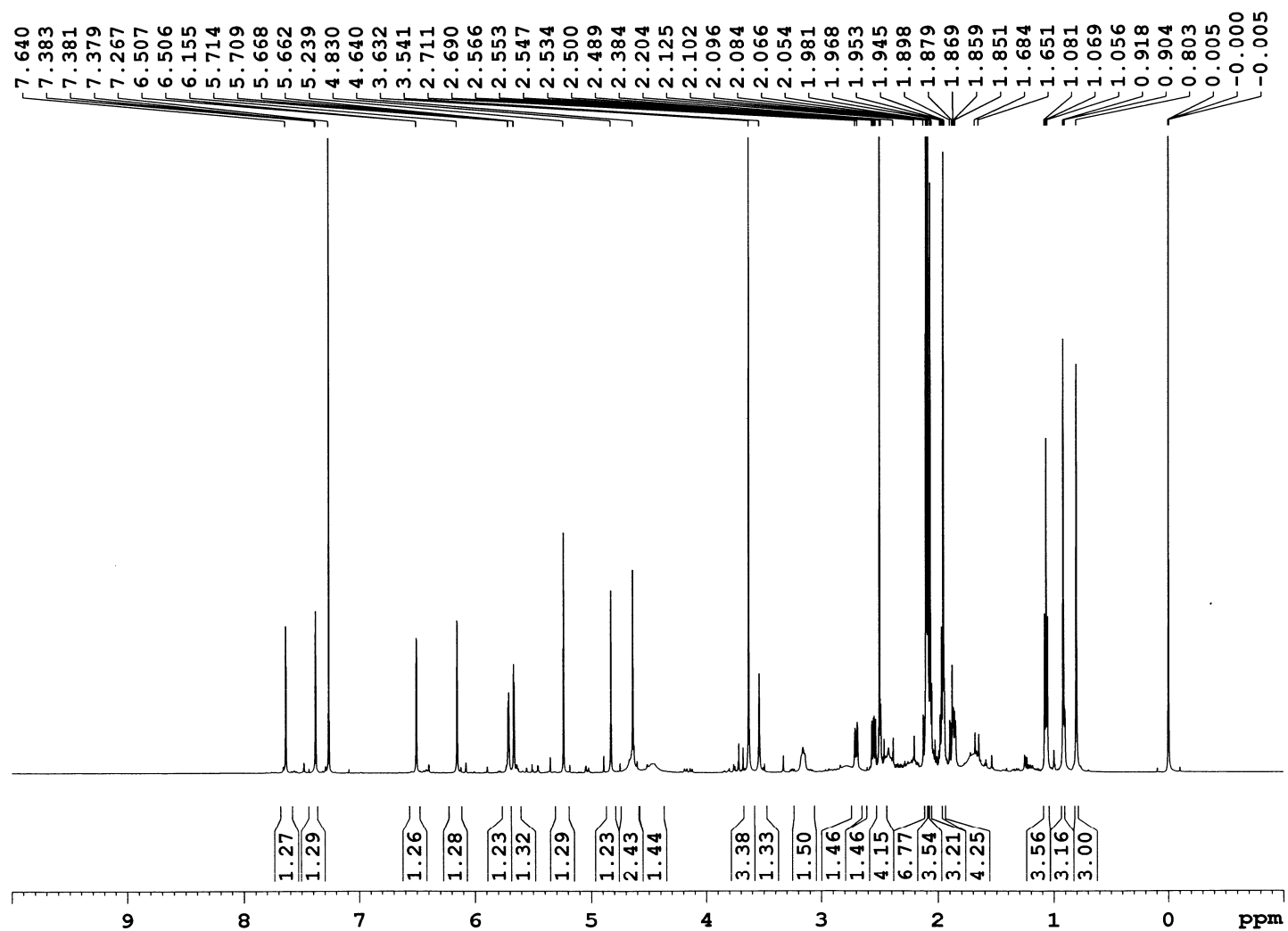
S36. ¹³C NMR spectrum of Chuktabularin L (8) in CDCl₃



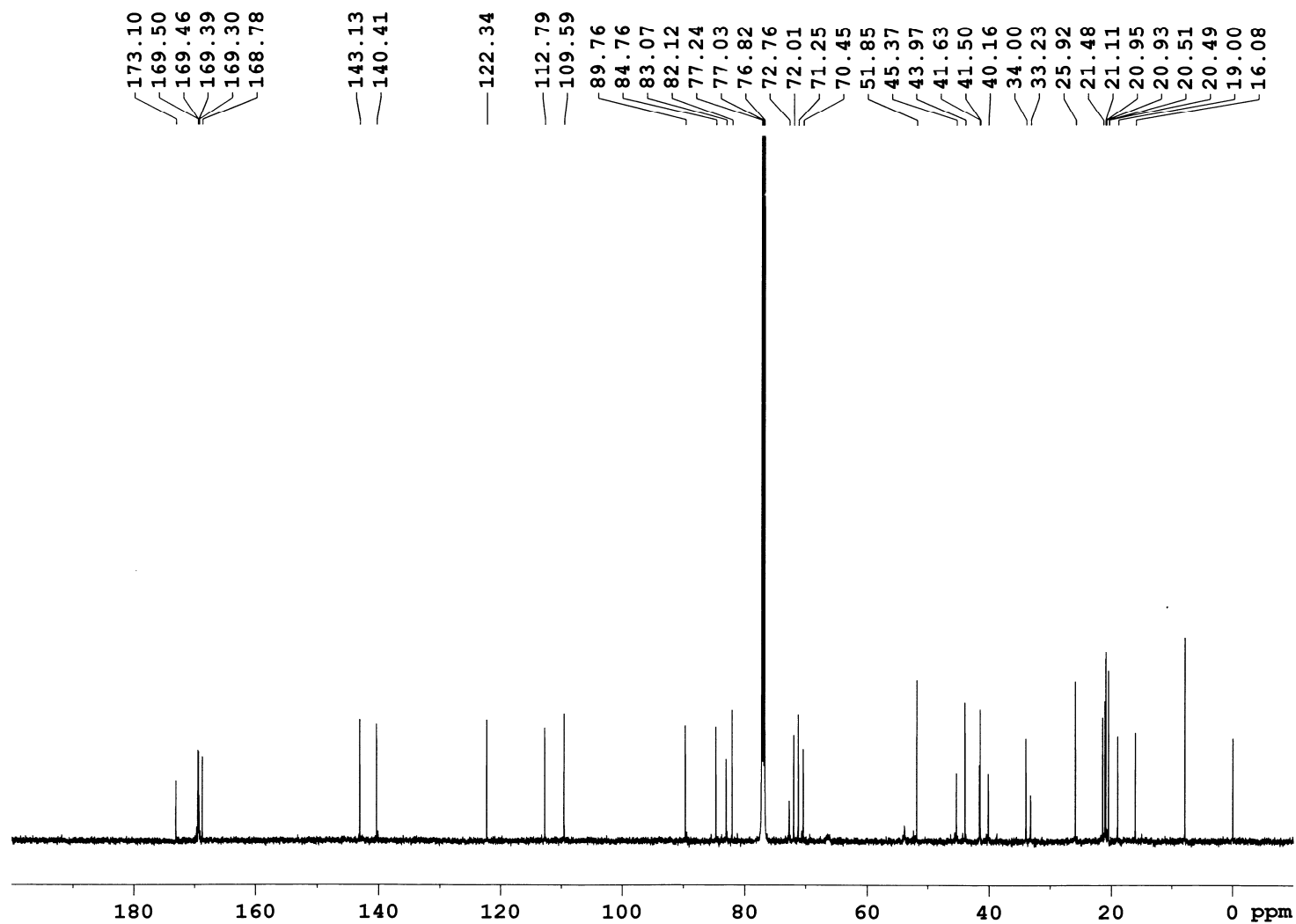
S37. ESIMS spectrum of Chuktabularin L (**8**)



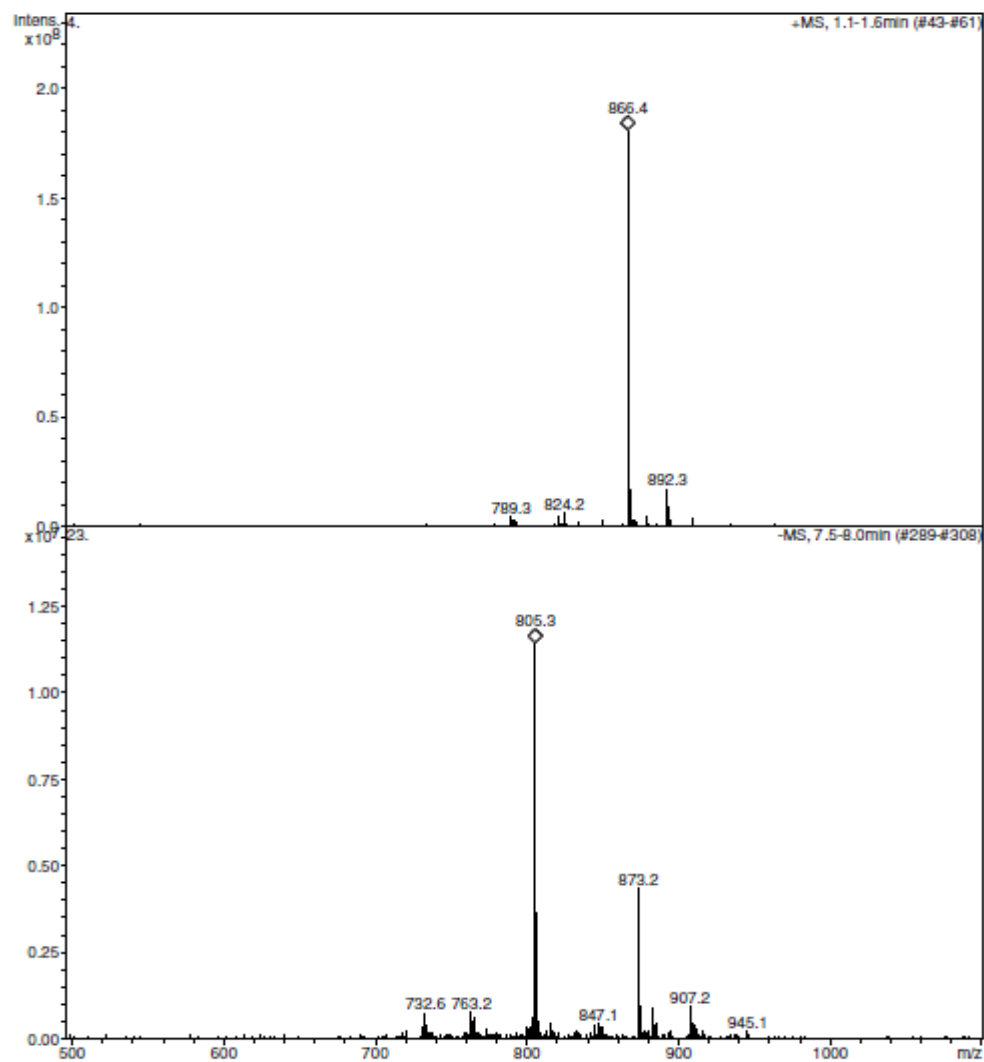
S38. HRESIMS spectrum of Chuktabularin L (**8**)



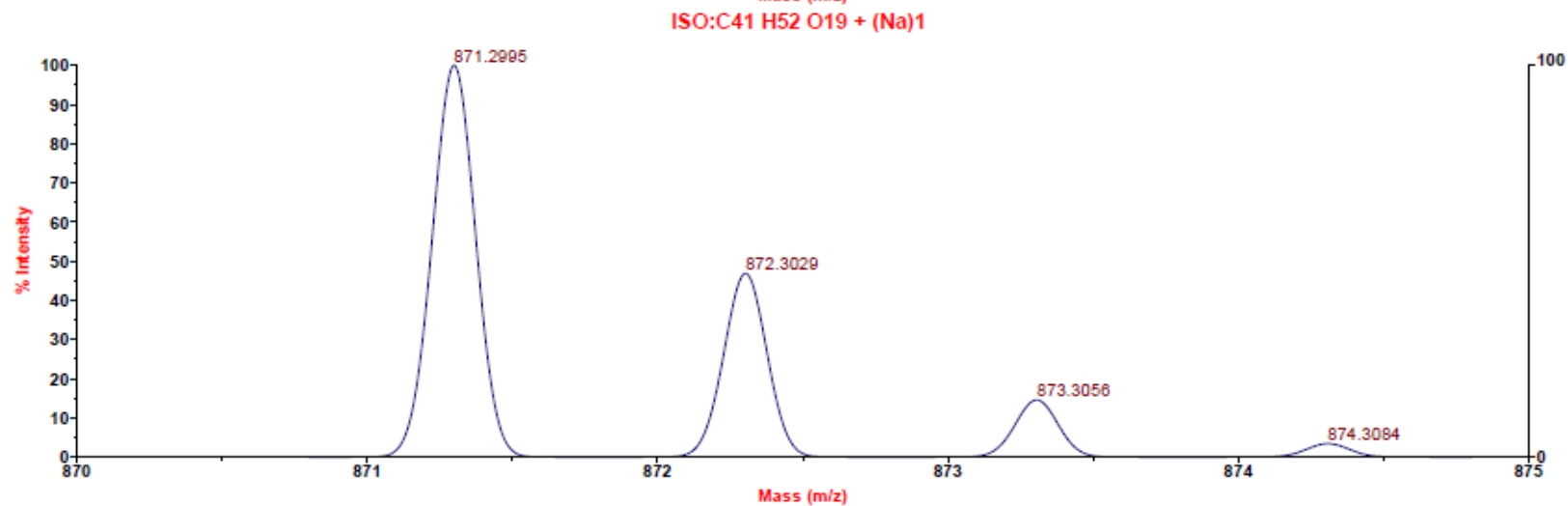
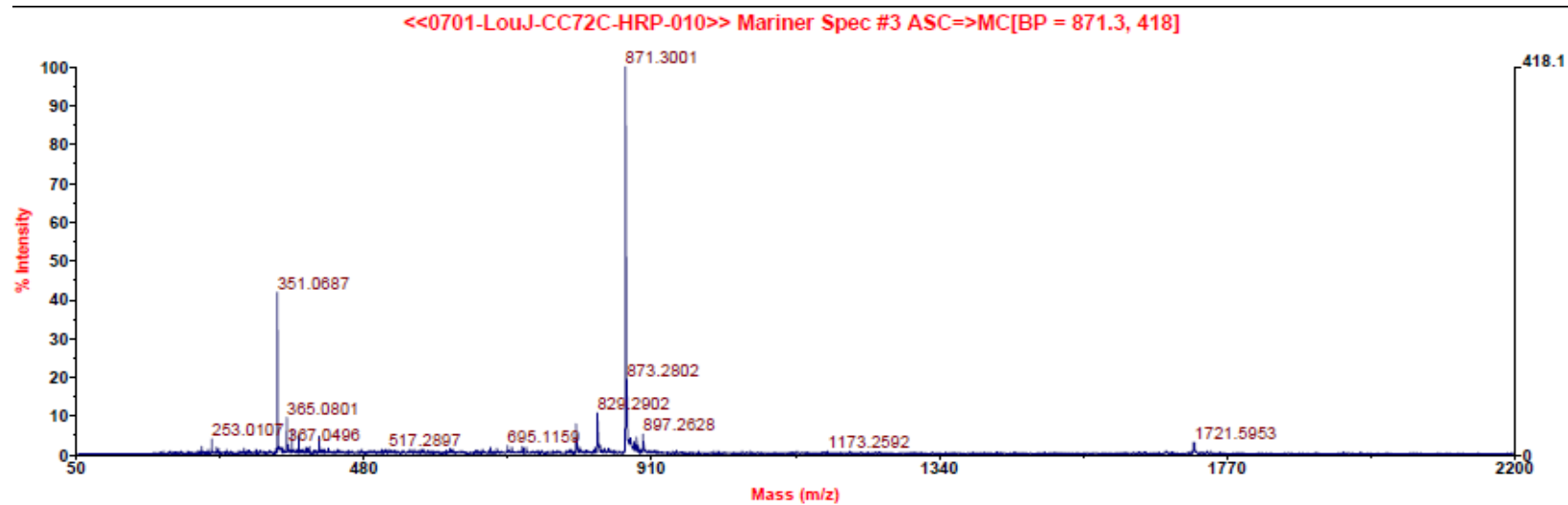
S39. ¹H NMR spectrum of Chuktabularin M (9) in CDCl₃



S40. ^{13}C NMR spectrum of Chuktabularin M (9) in CDCl_3

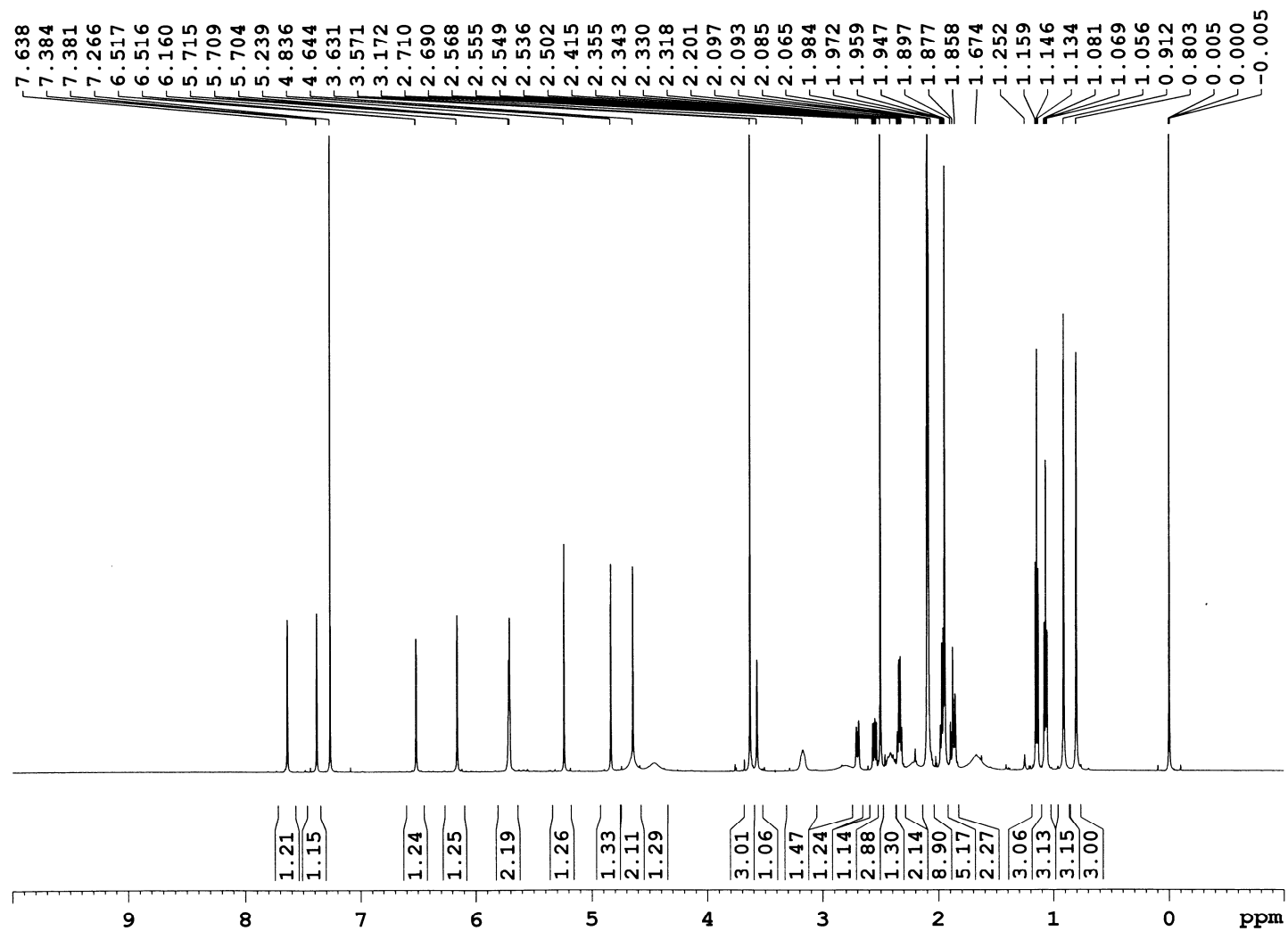


S41. ESIMS spectrum of Chuktabularin M (9)

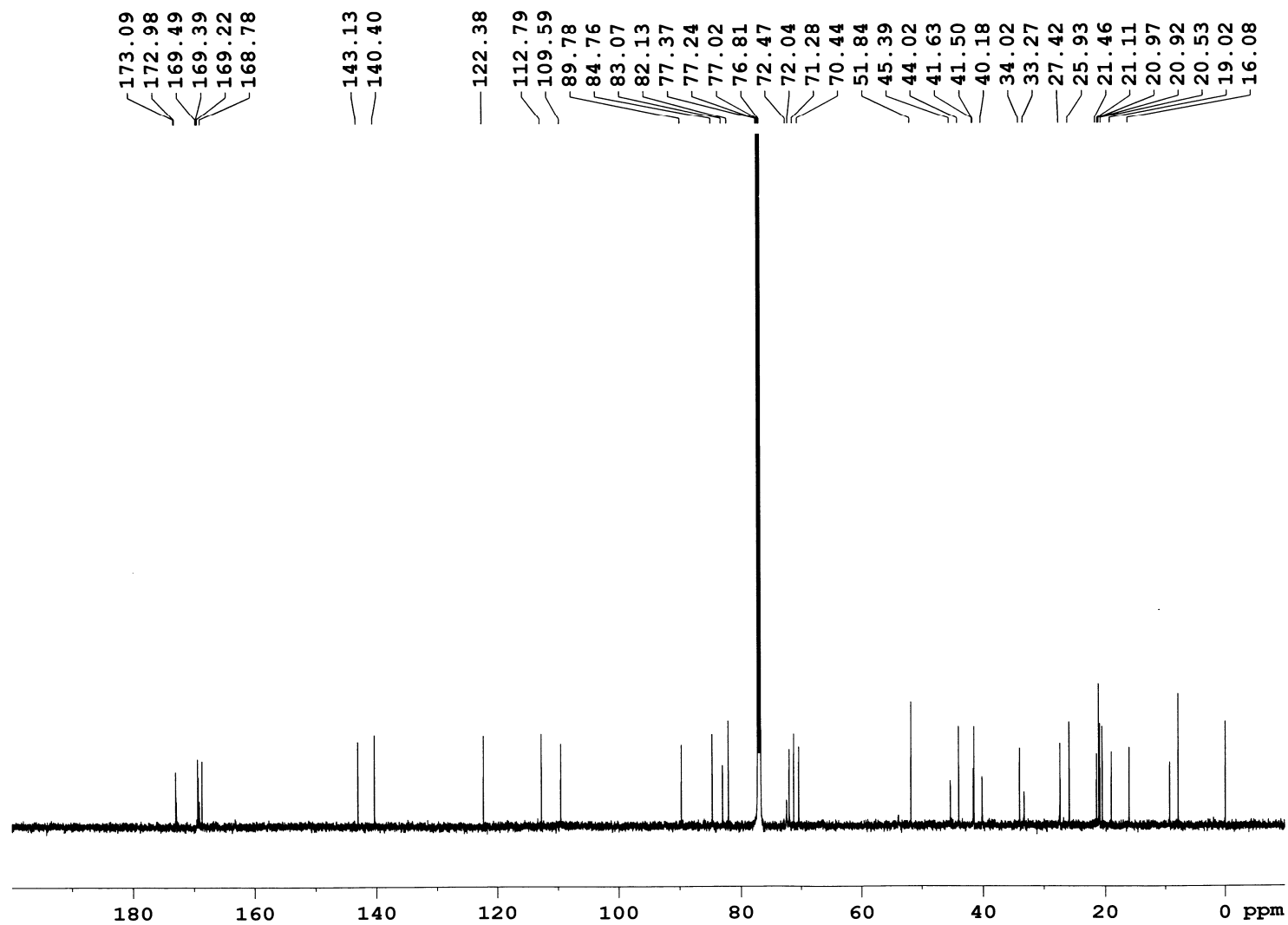


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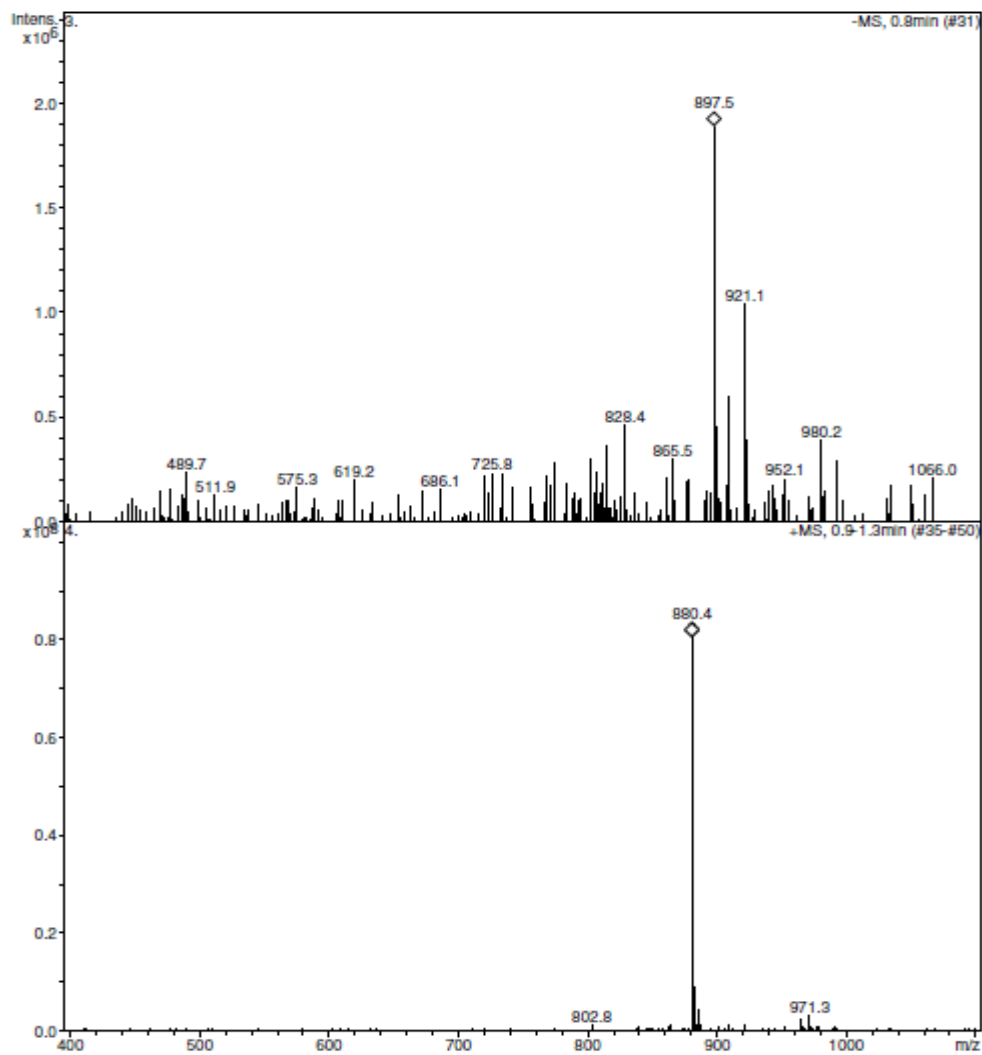
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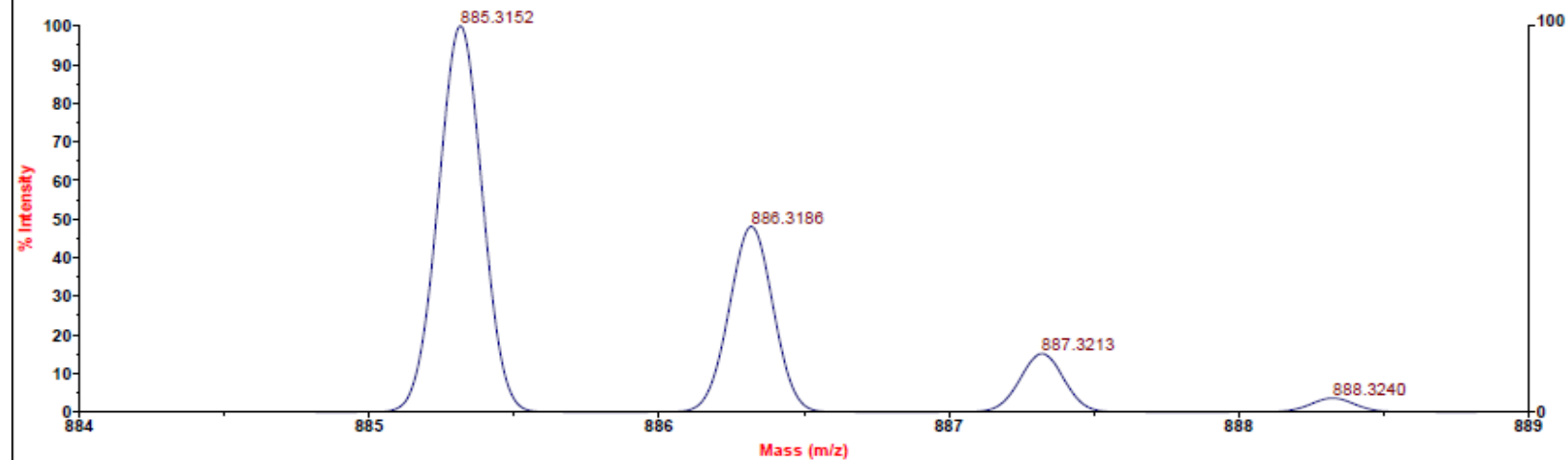
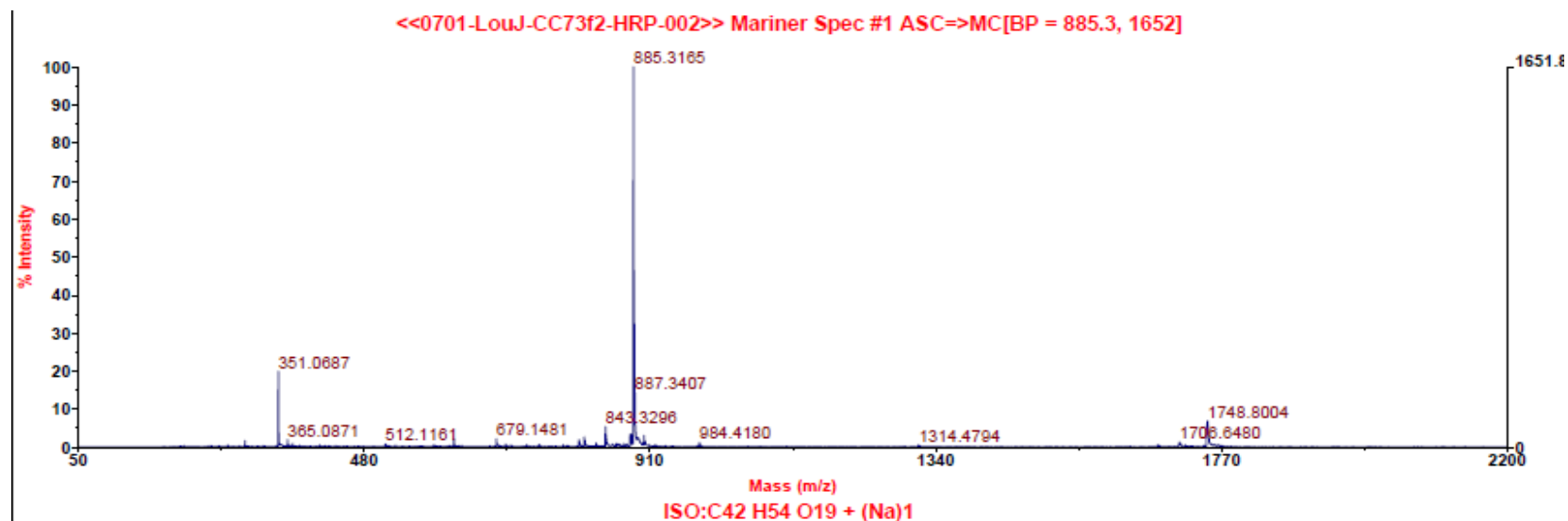
S43. ¹H NMR spectrum of Chuktabularin N (**10**) in CDCl₃



S44. ^{13}C NMR spectrum of Chuktabularin N (**10**) in CDCl_3

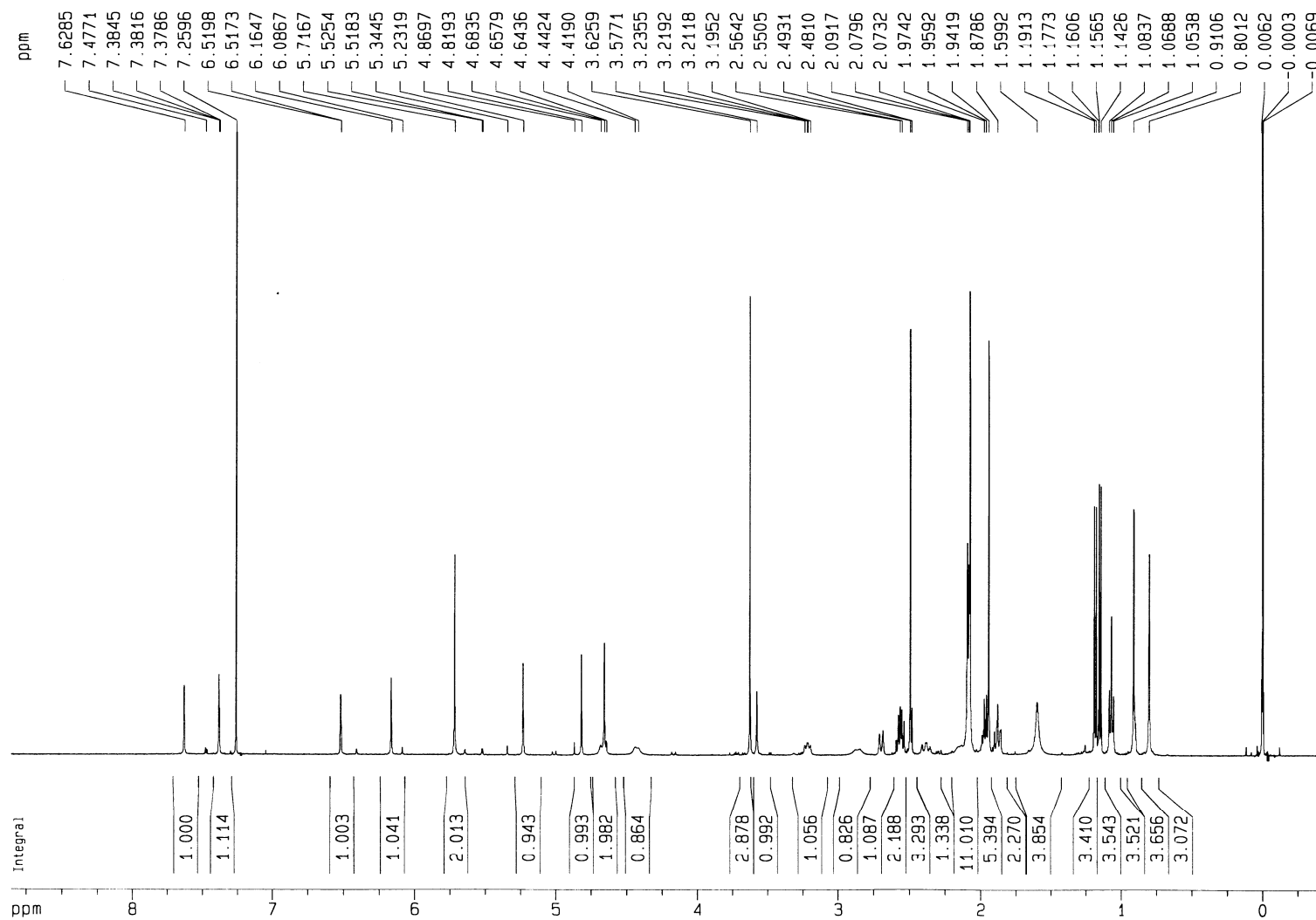


S45. ESI-MS spectrum of Chuktabularin N (**10**)

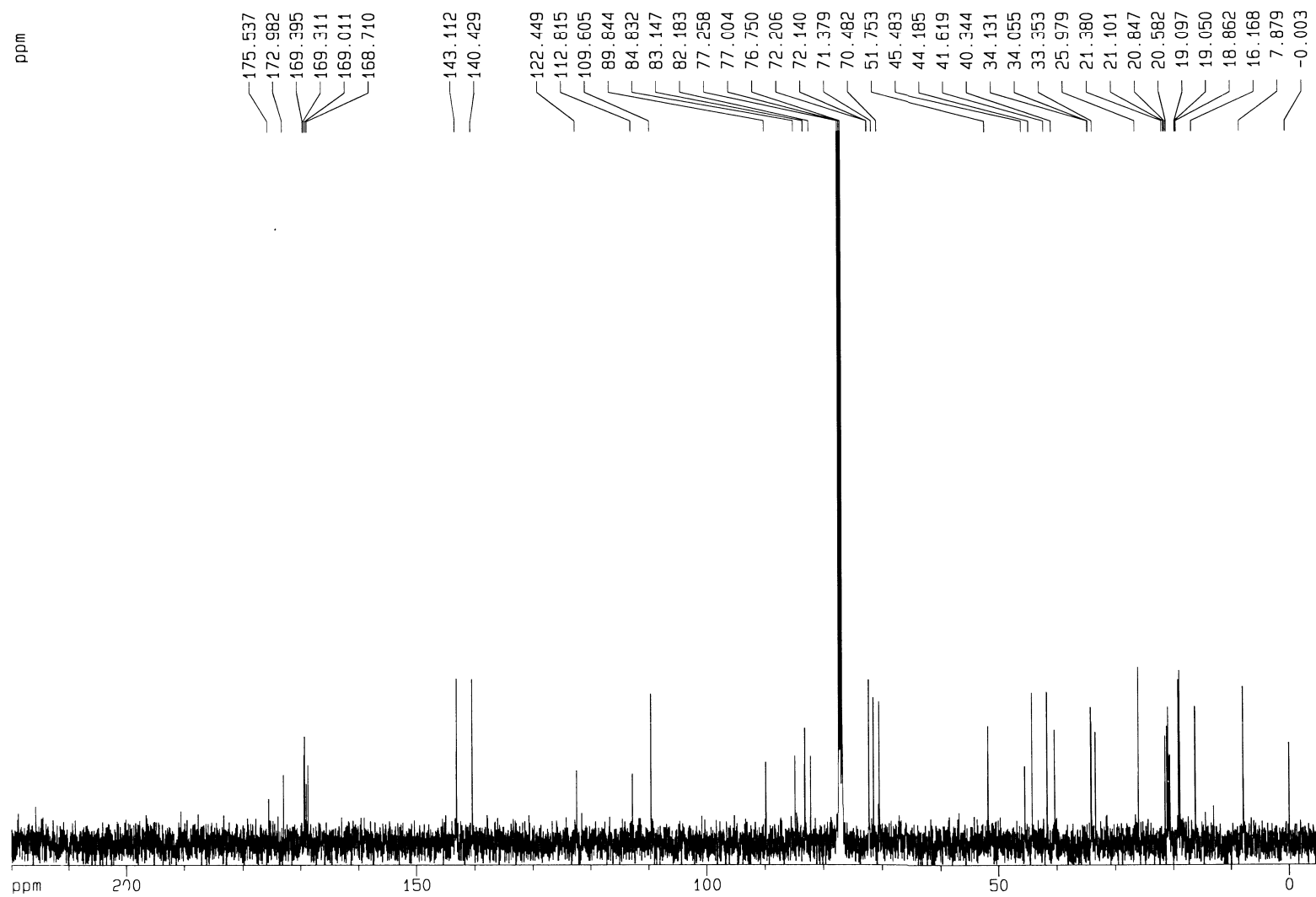


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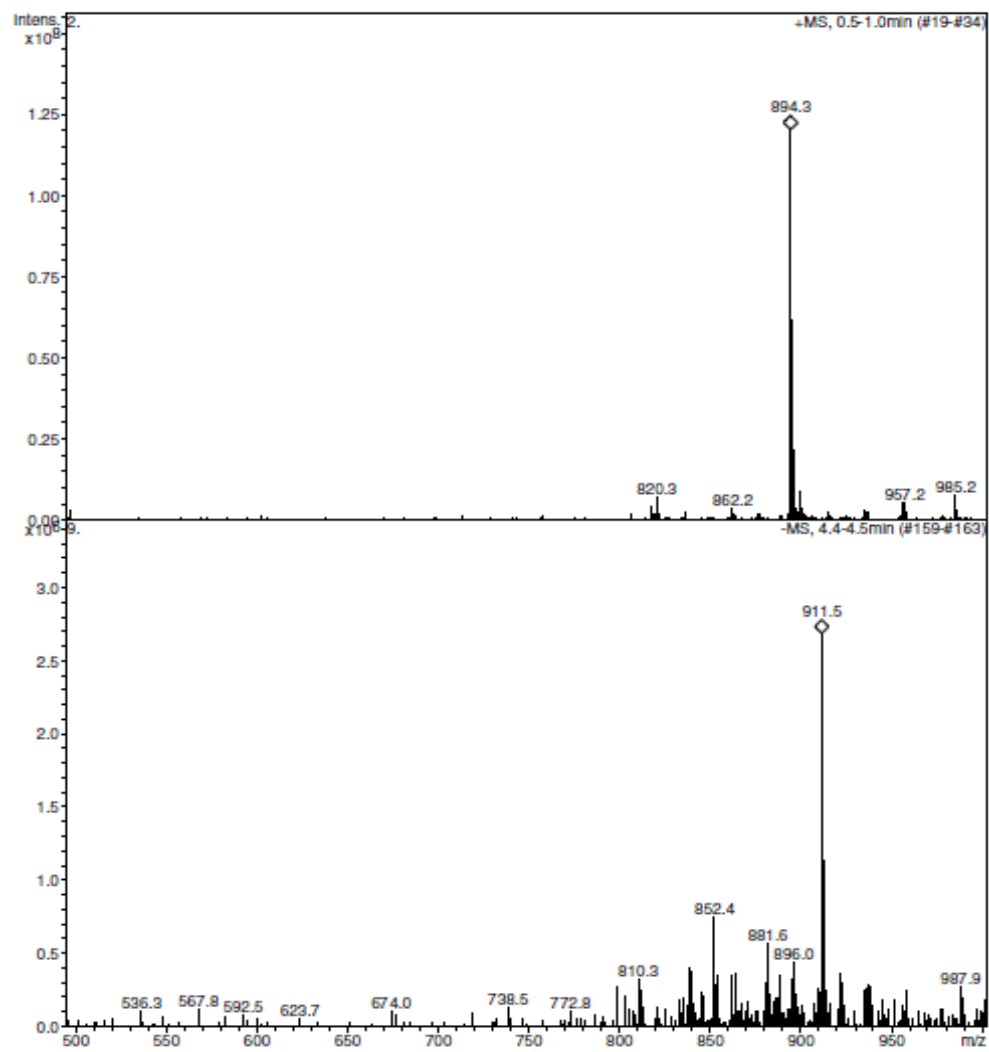
S46. HRESIMS spectrum of Chuktabularin N (10)



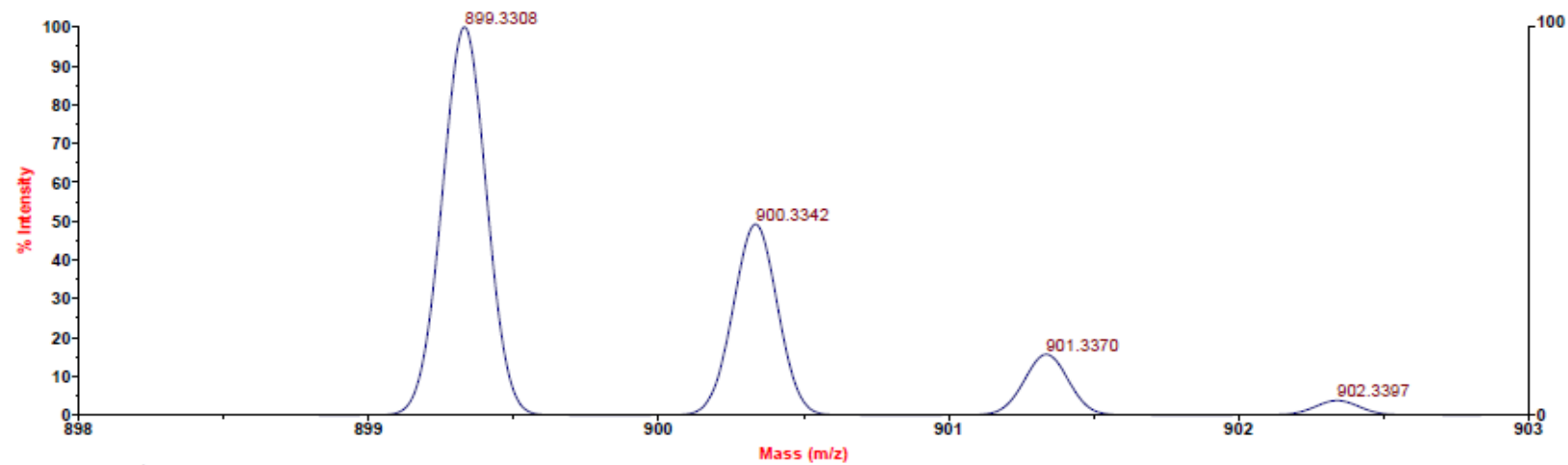
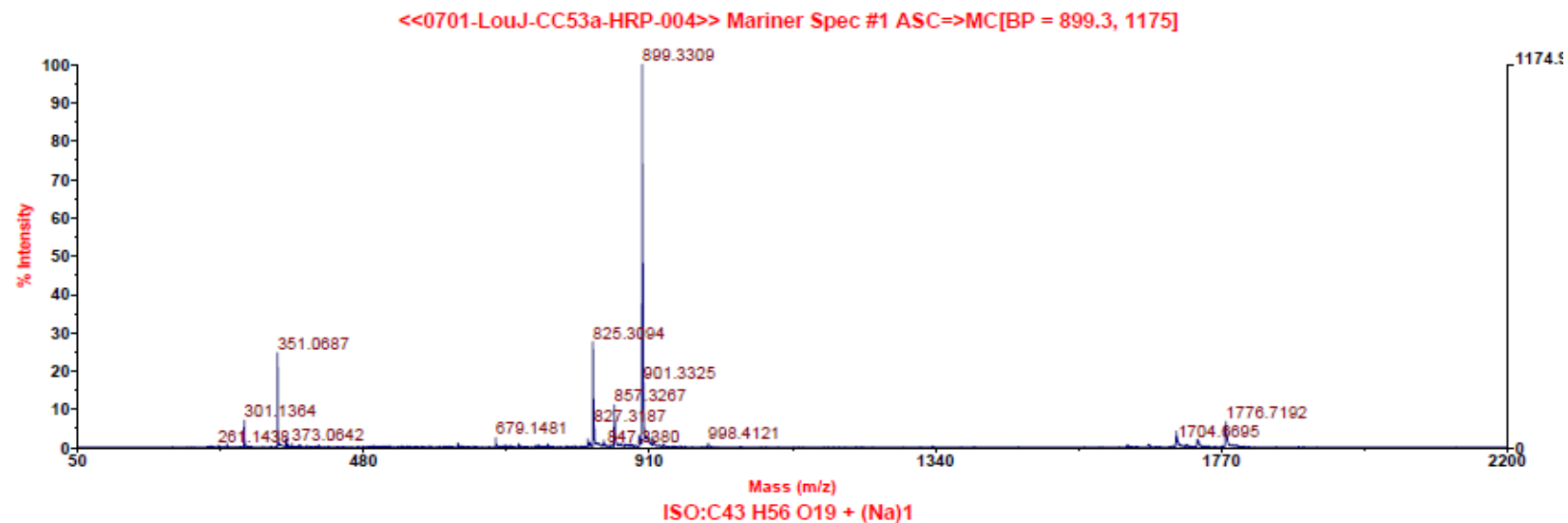
S47. ^1H NMR spectrum of Chuktabularin O (**11**) in CDCl_3



S48. ^{13}C NMR spectrum of Chuktabularin O (**11**) in CDCl_3

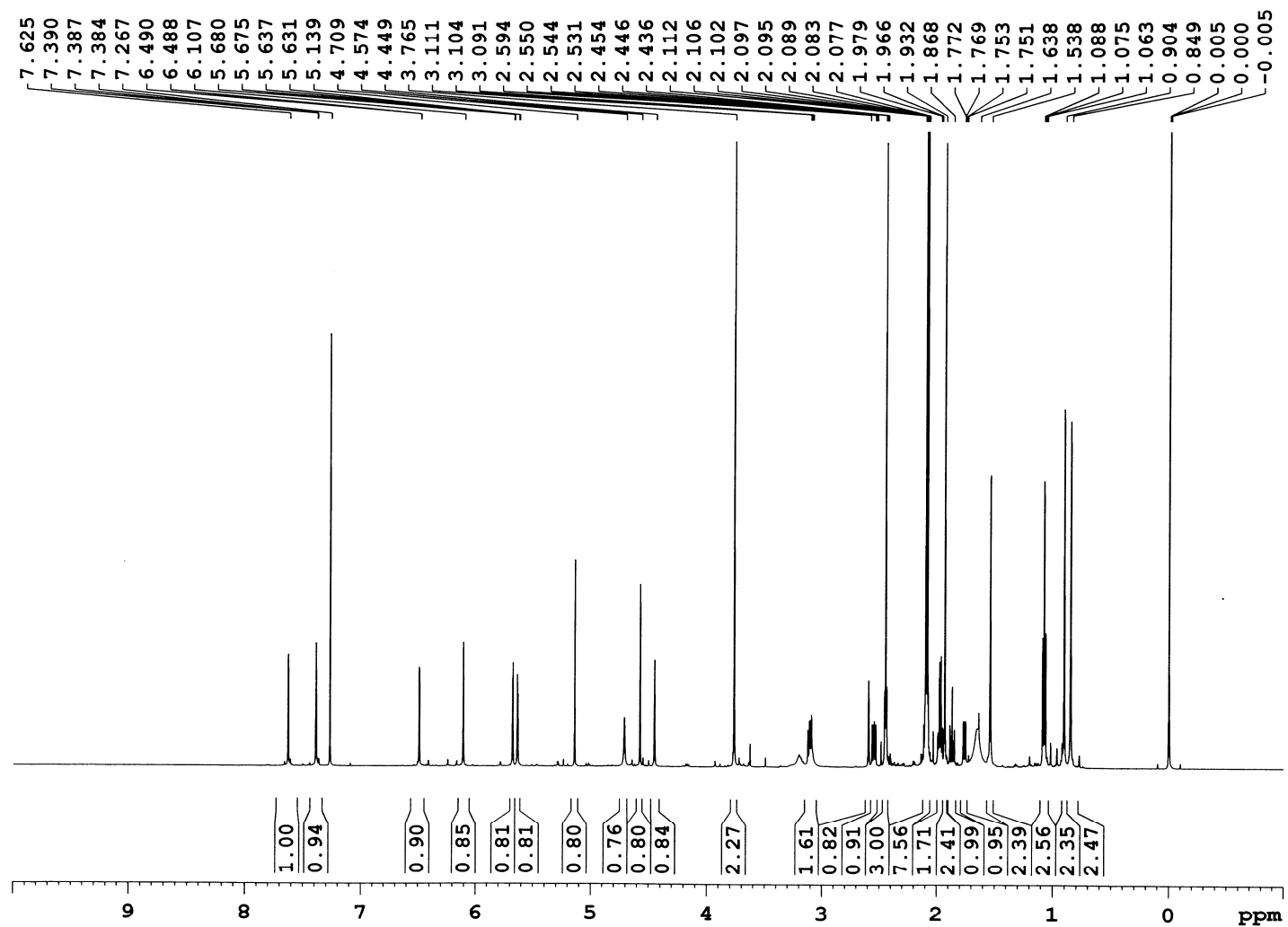


S49. ESIMS spectrum of Chuktabularin O (11)

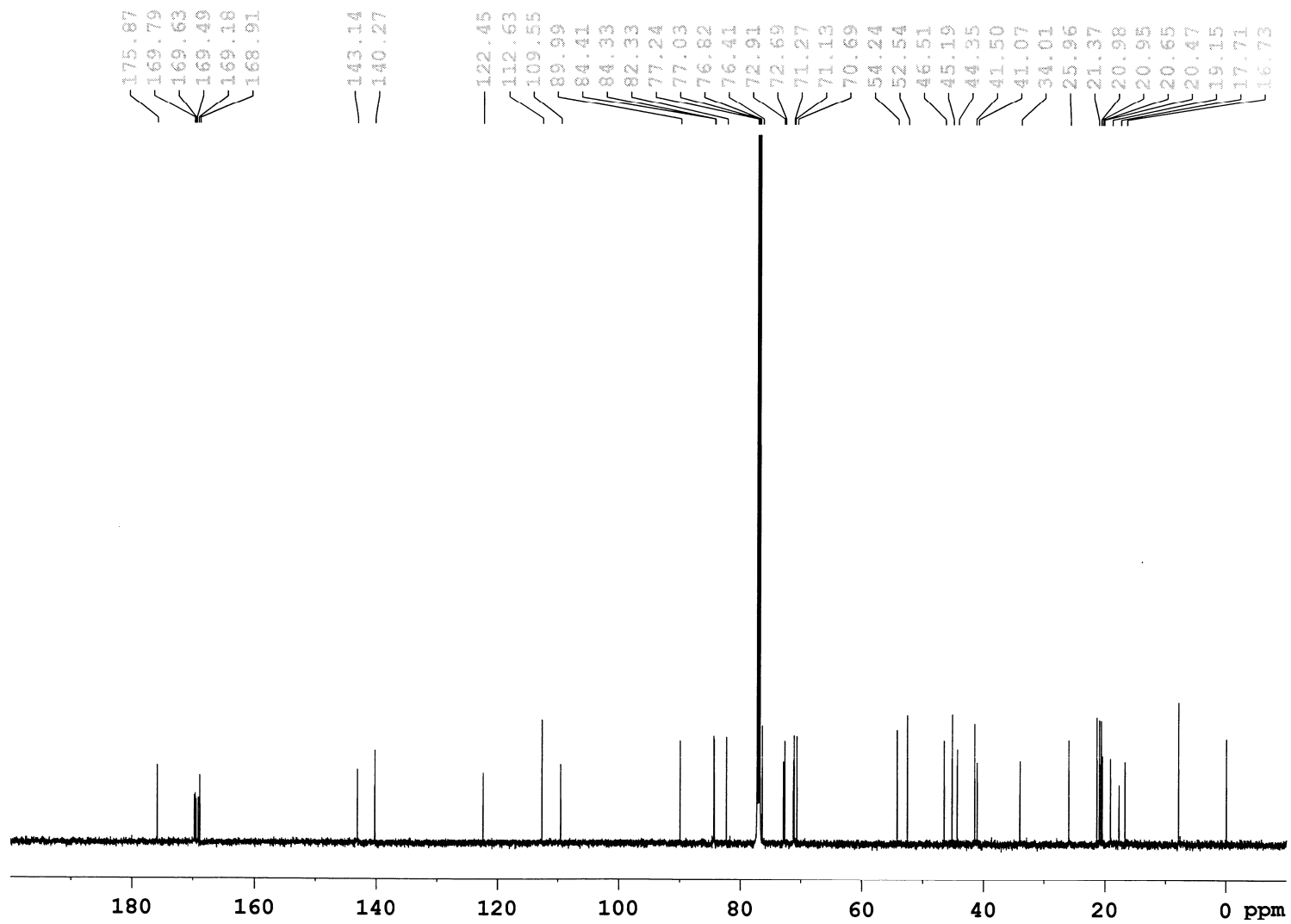


Mariner Mass Spectrum
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Acquired: Jun 30 12:53:00 2009

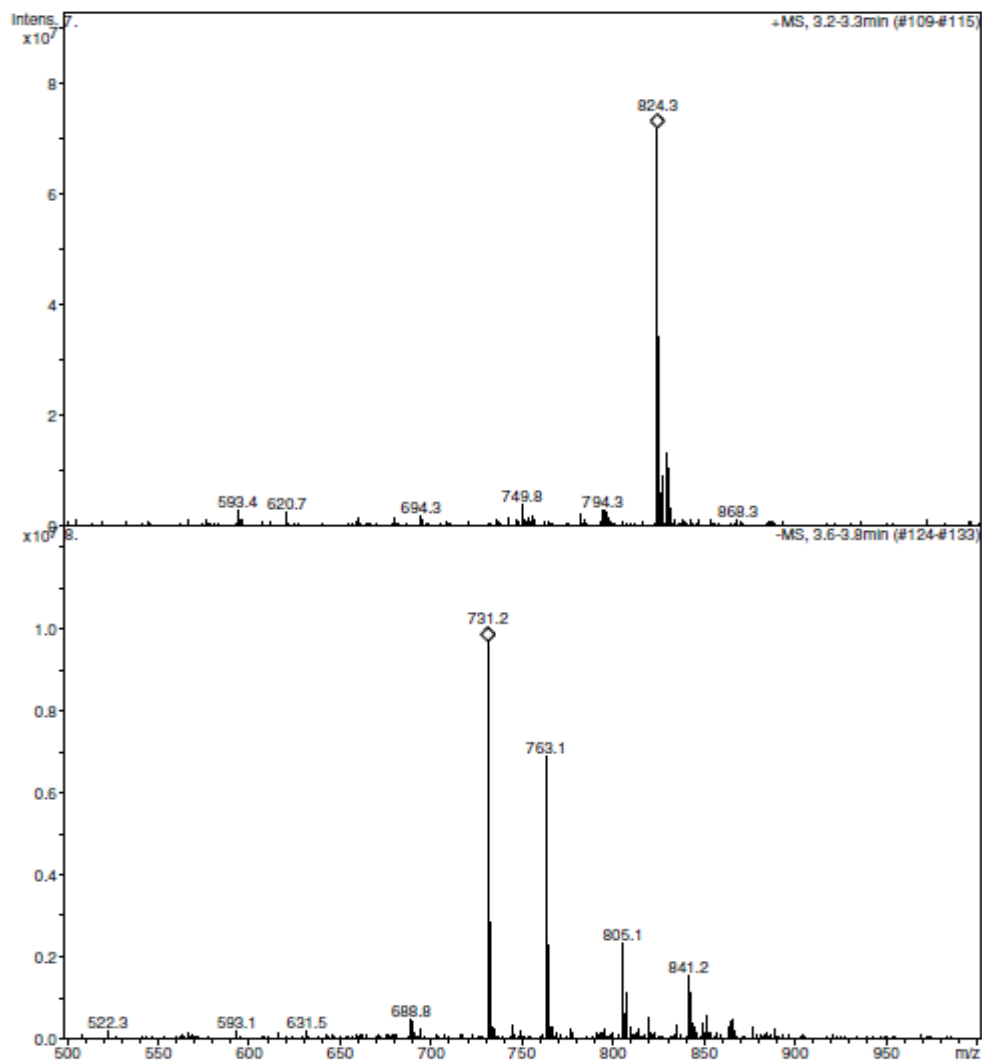
S50. HRESIMS spectrum of Chuktabularin O (**11**)



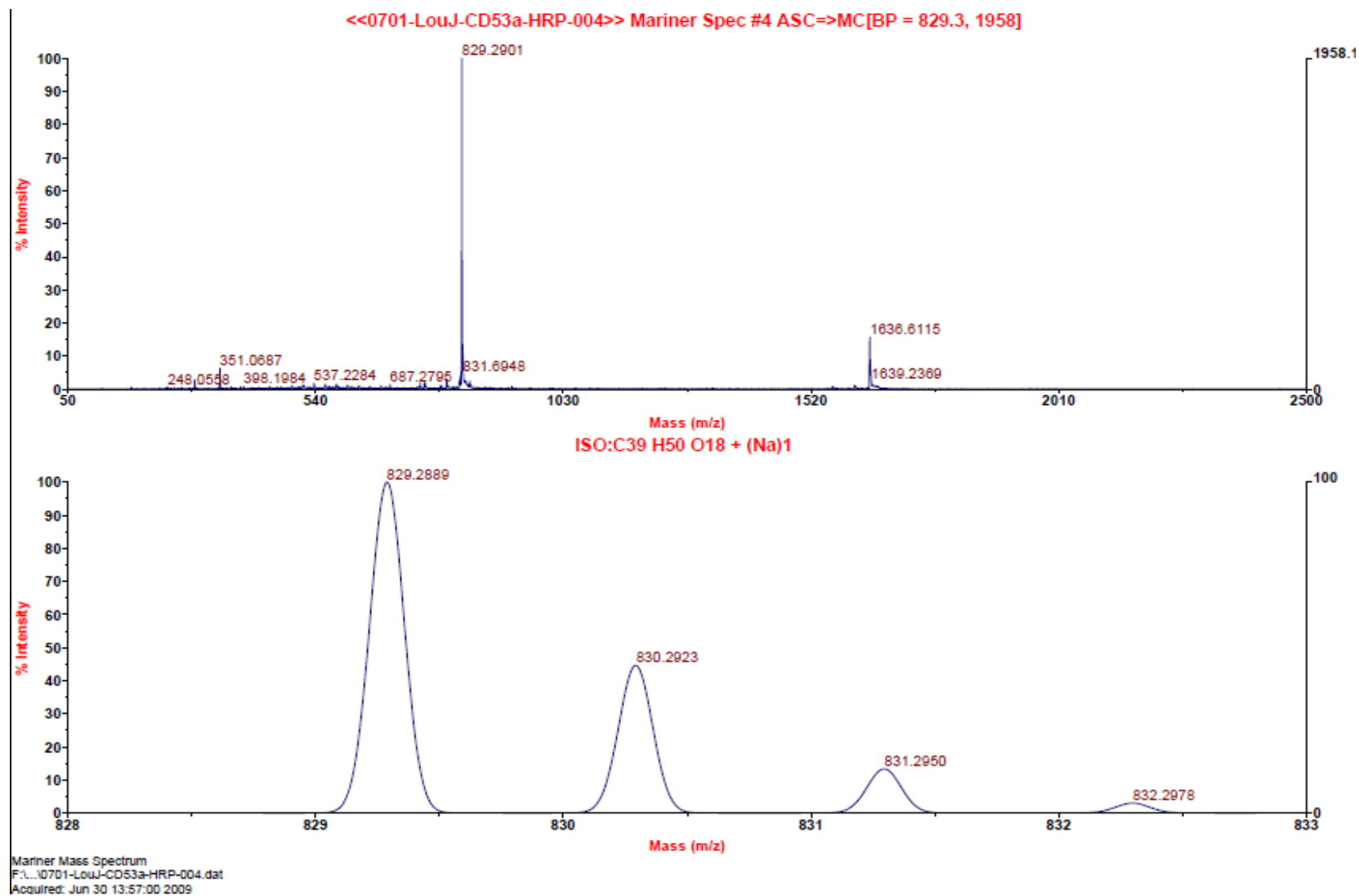
S51. ¹H NMR spectrum of Chuktabularin P (12) in CDCl₃



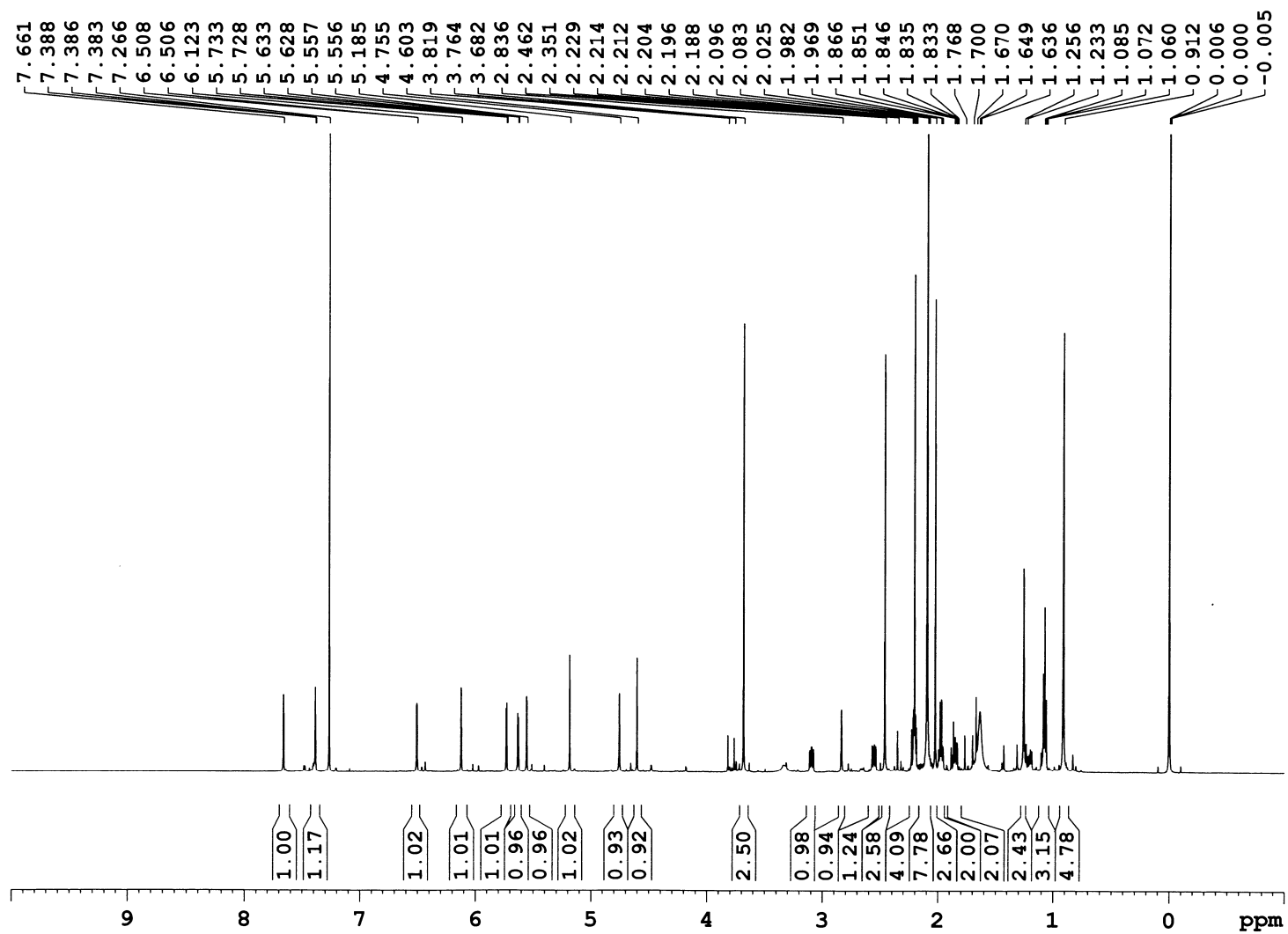
S52. ¹³C NMR spectrum of Chuktabularin P (12) in CDCl₃



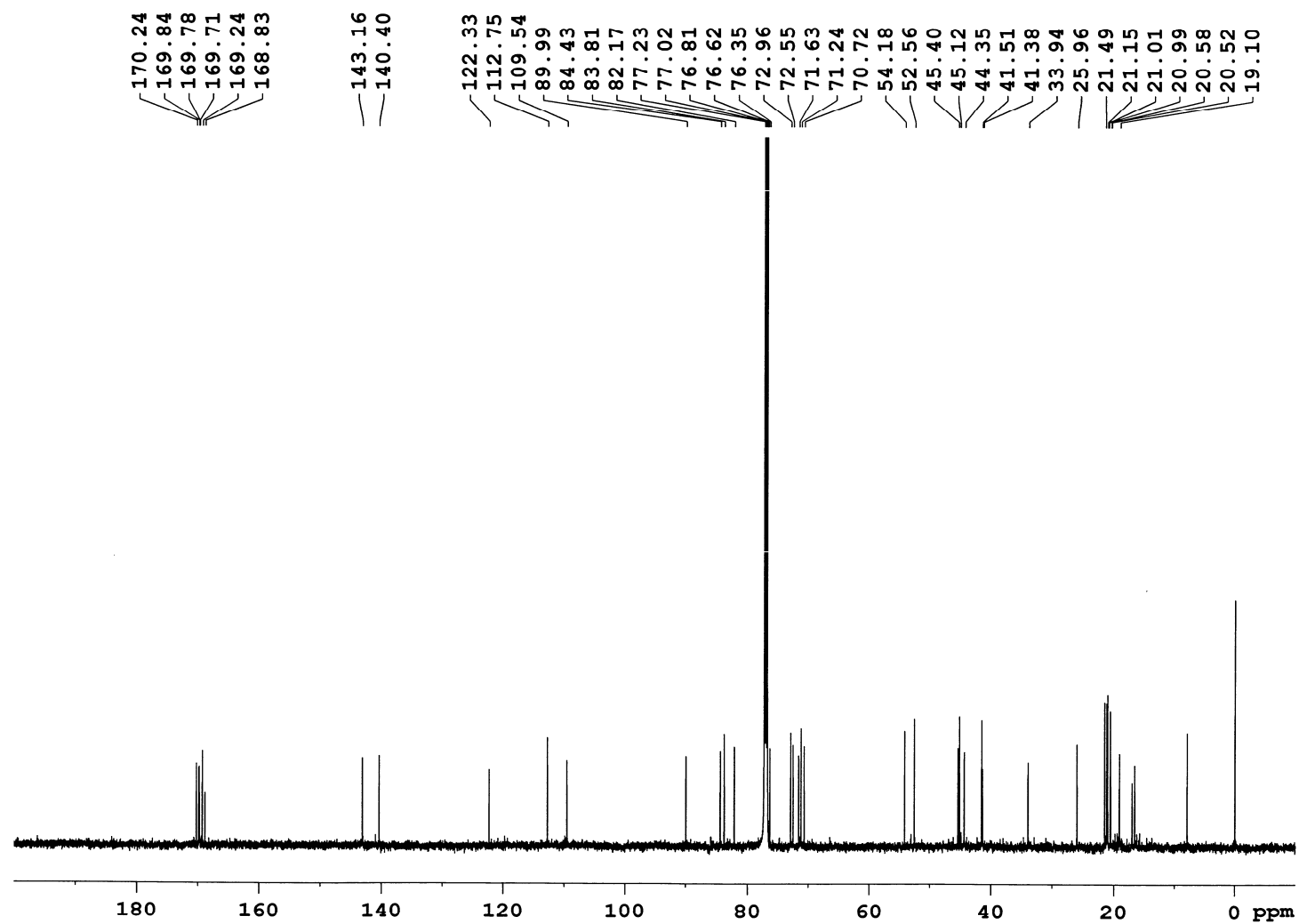
S53. ESI-MS spectrum of Chuktabularin P (12)



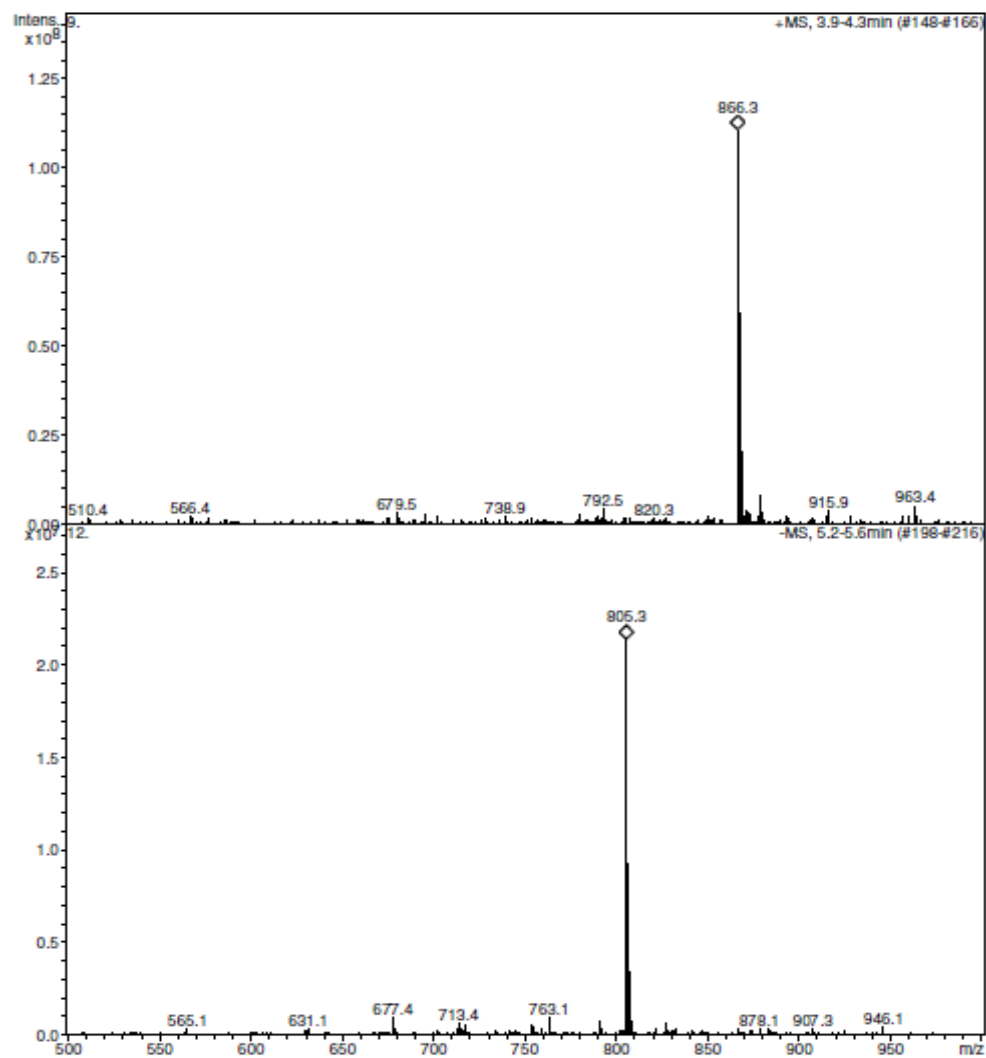
S54. HRESIMS spectrum of Chuktabularin P (12)



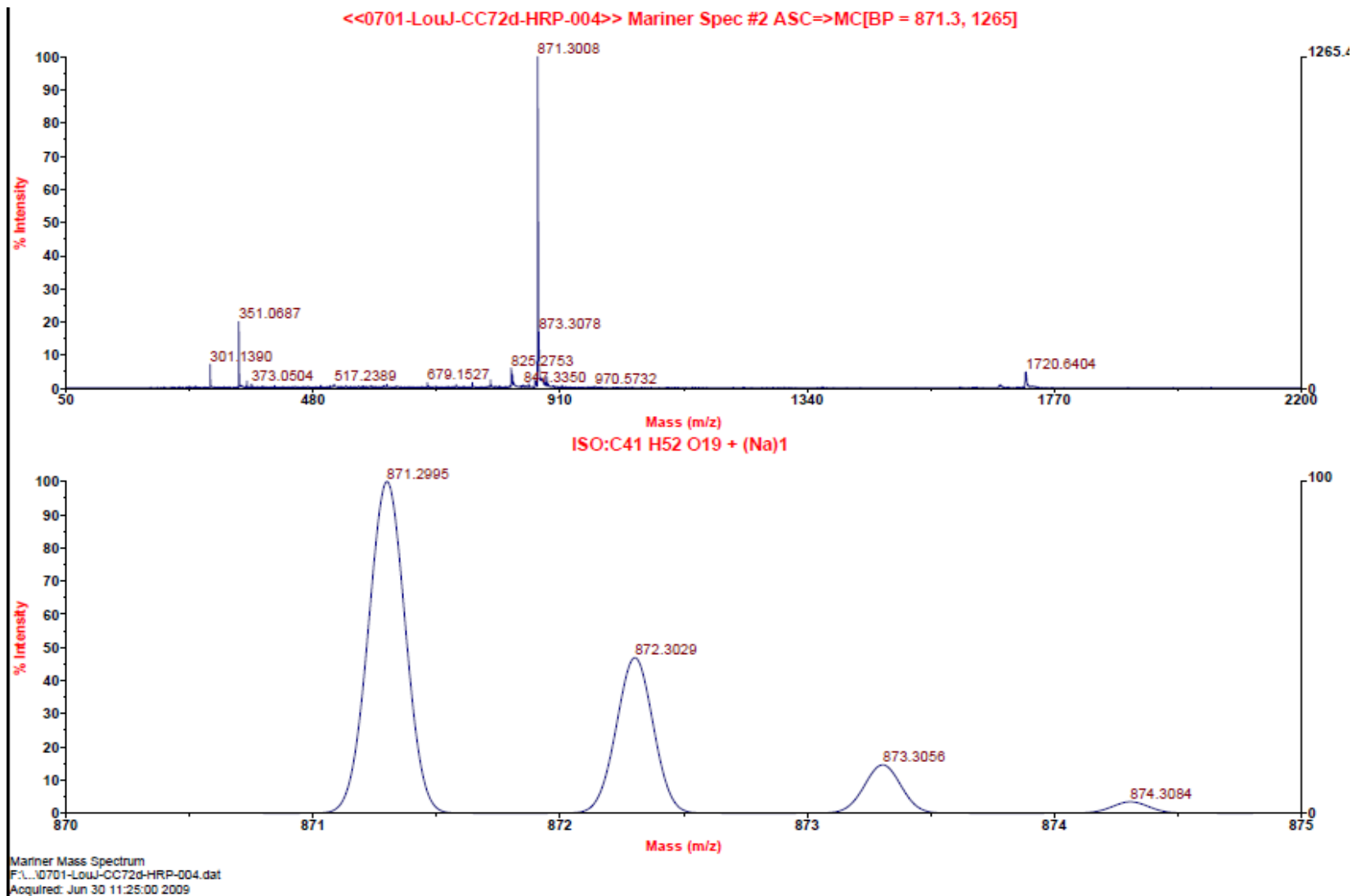
S55. ¹H NMR spectrum of Chuktabularin Q (13) in CDCl₃



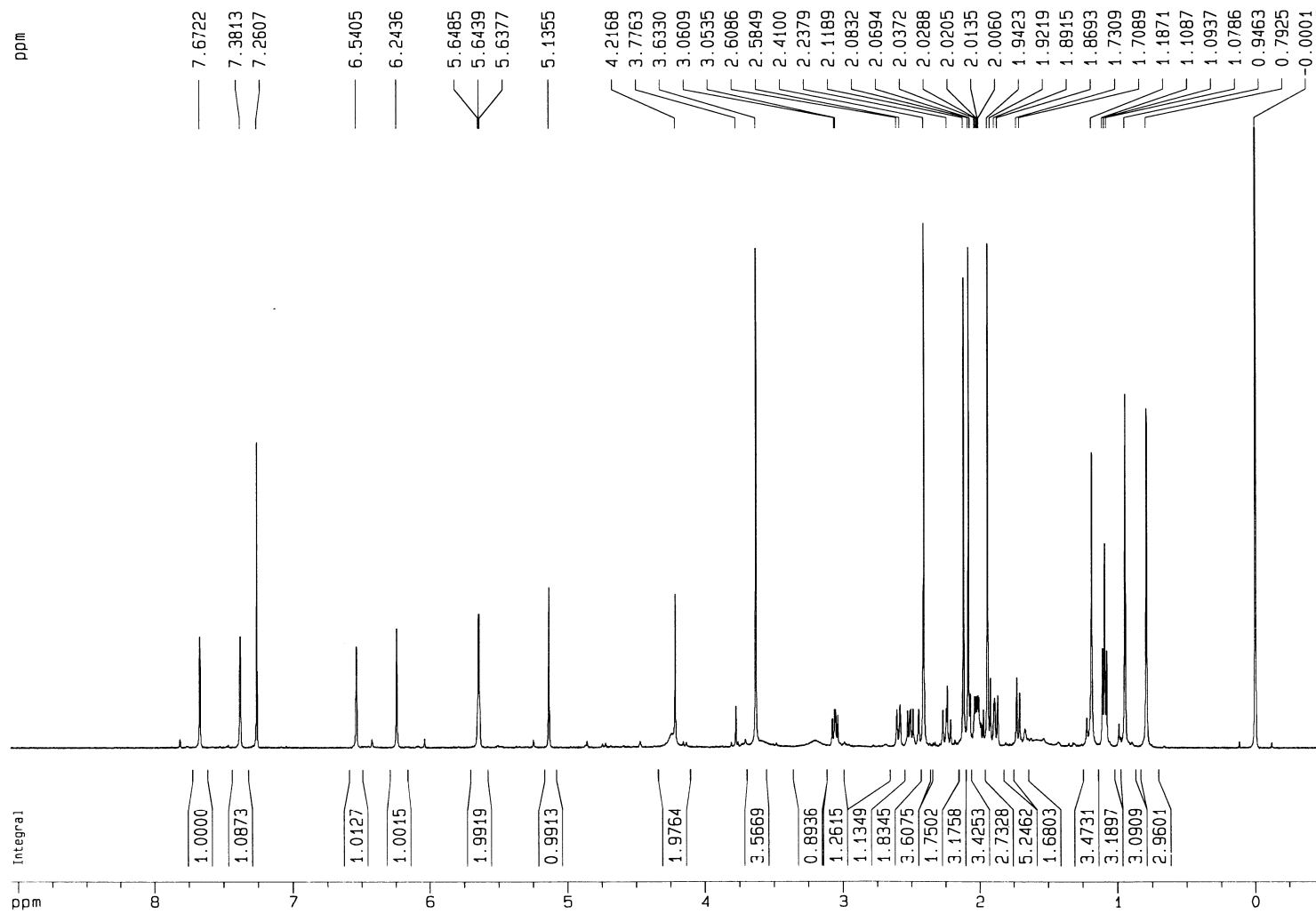
S56. ^{13}C NMR spectrum of Chuktabularin Q (13) in CDCl_3



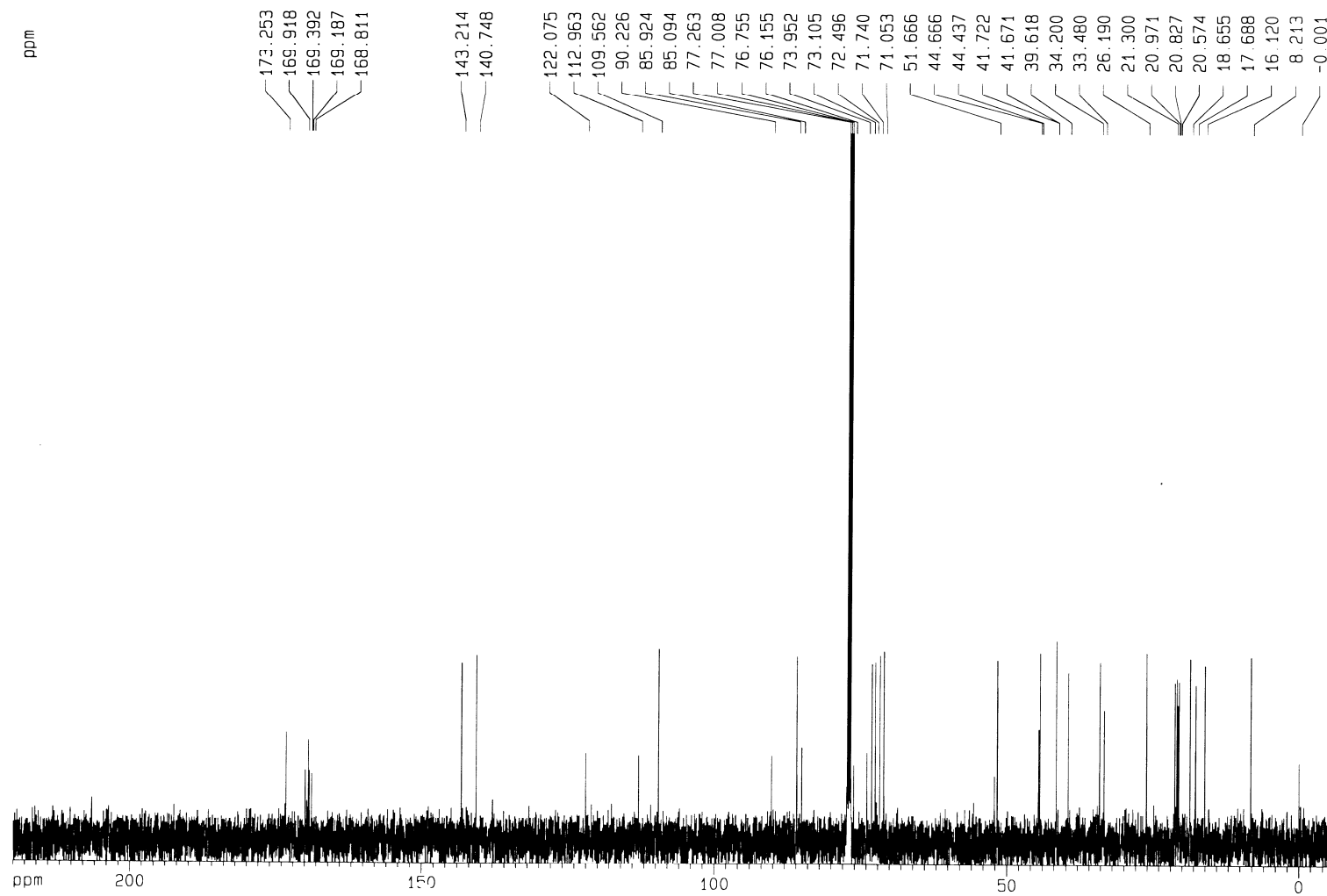
S57. ESIMS spectrum of Chuktabularin Q (13)



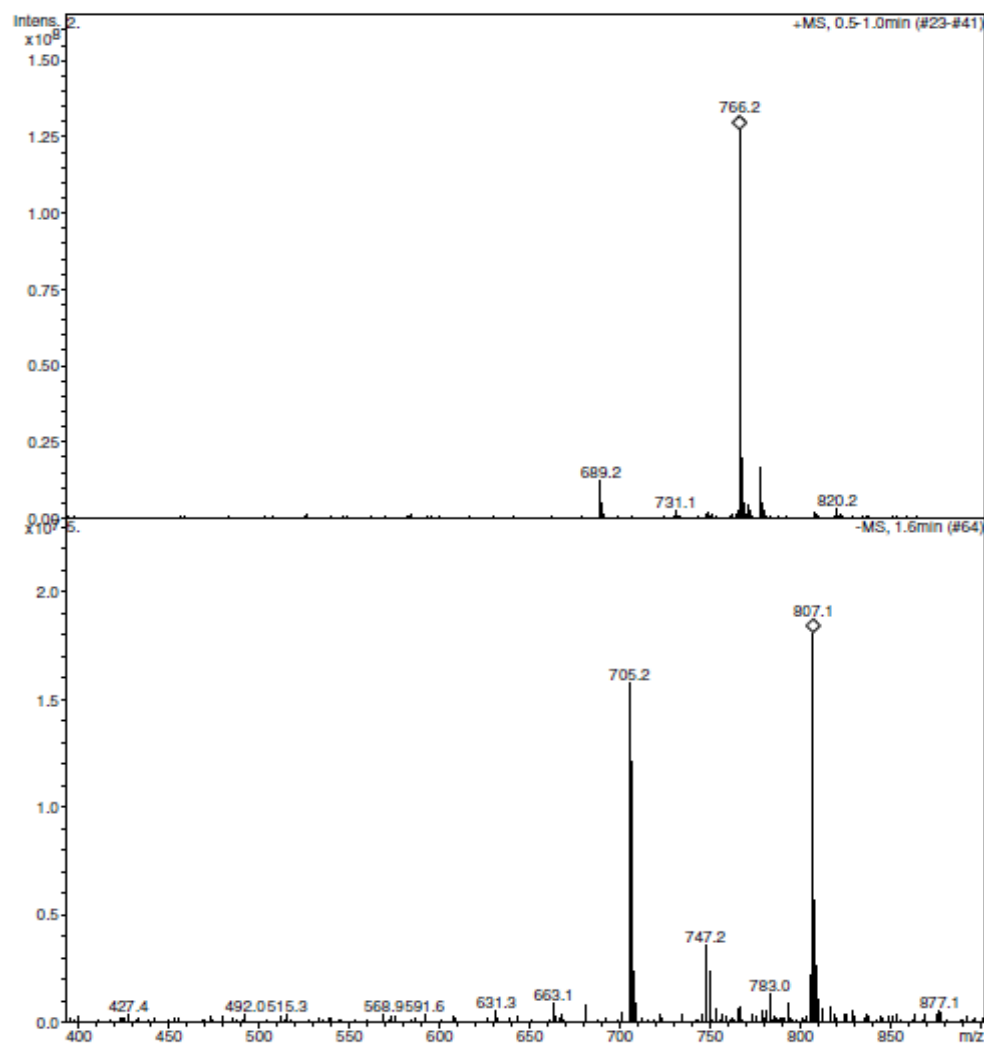
S58. HRESIMS spectrum of ChuktabularinQ (13)



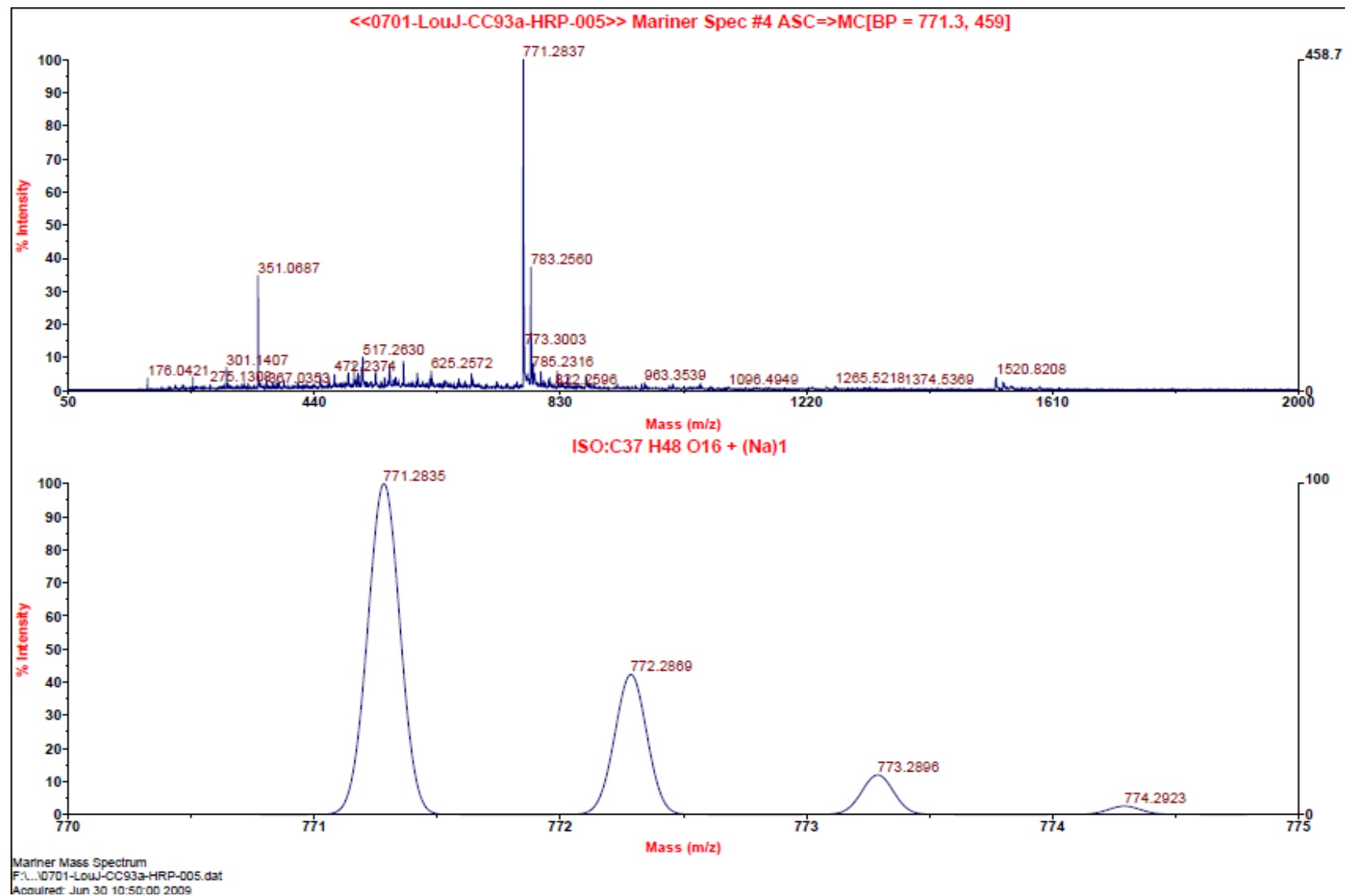
S59. ¹H NMR spectrum of Chuktabularin R (14) in CDCl₃



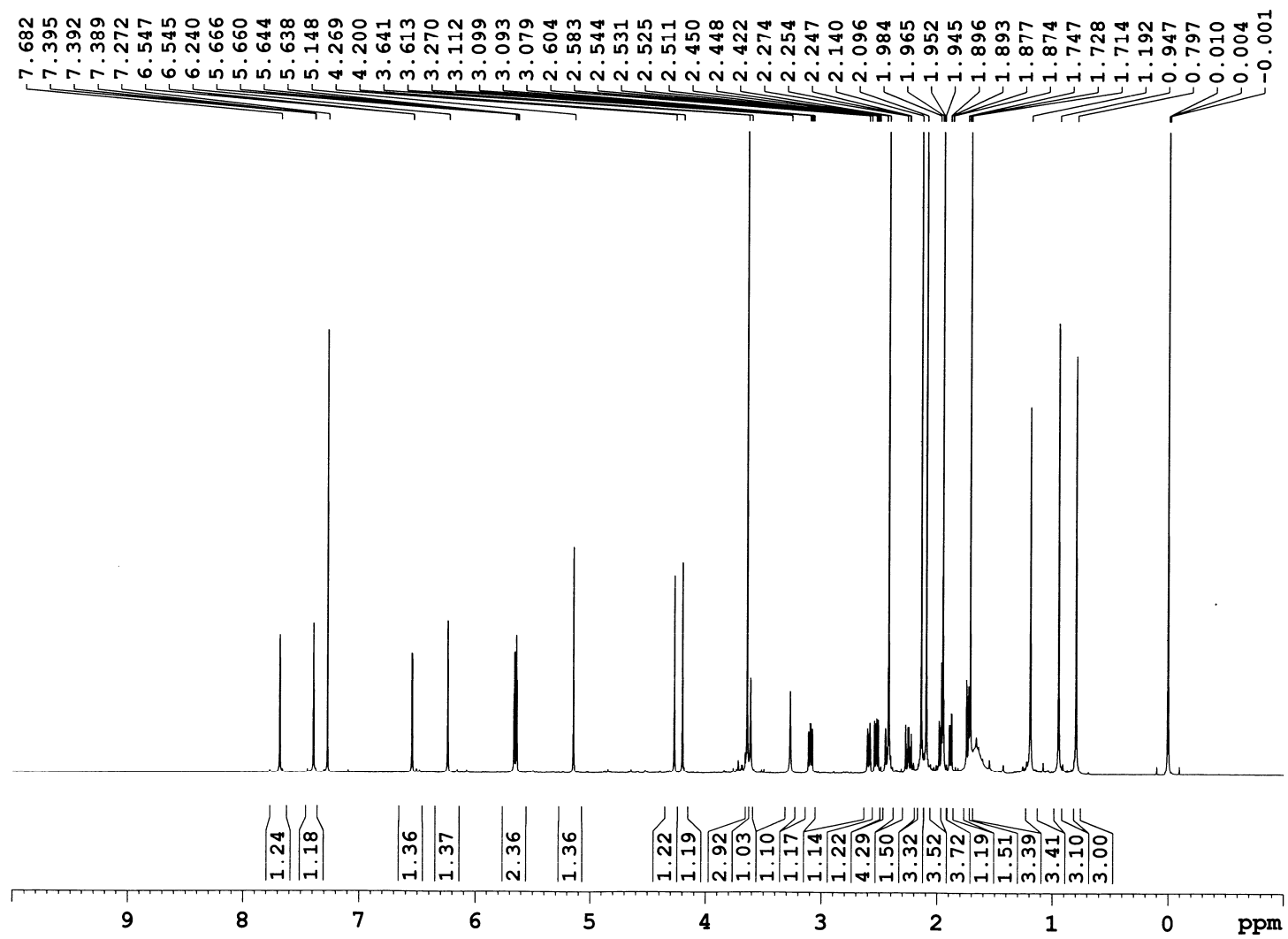
S60. ^{13}C NMR spectrum of Chuktabularin R (**14**) in CDCl_3



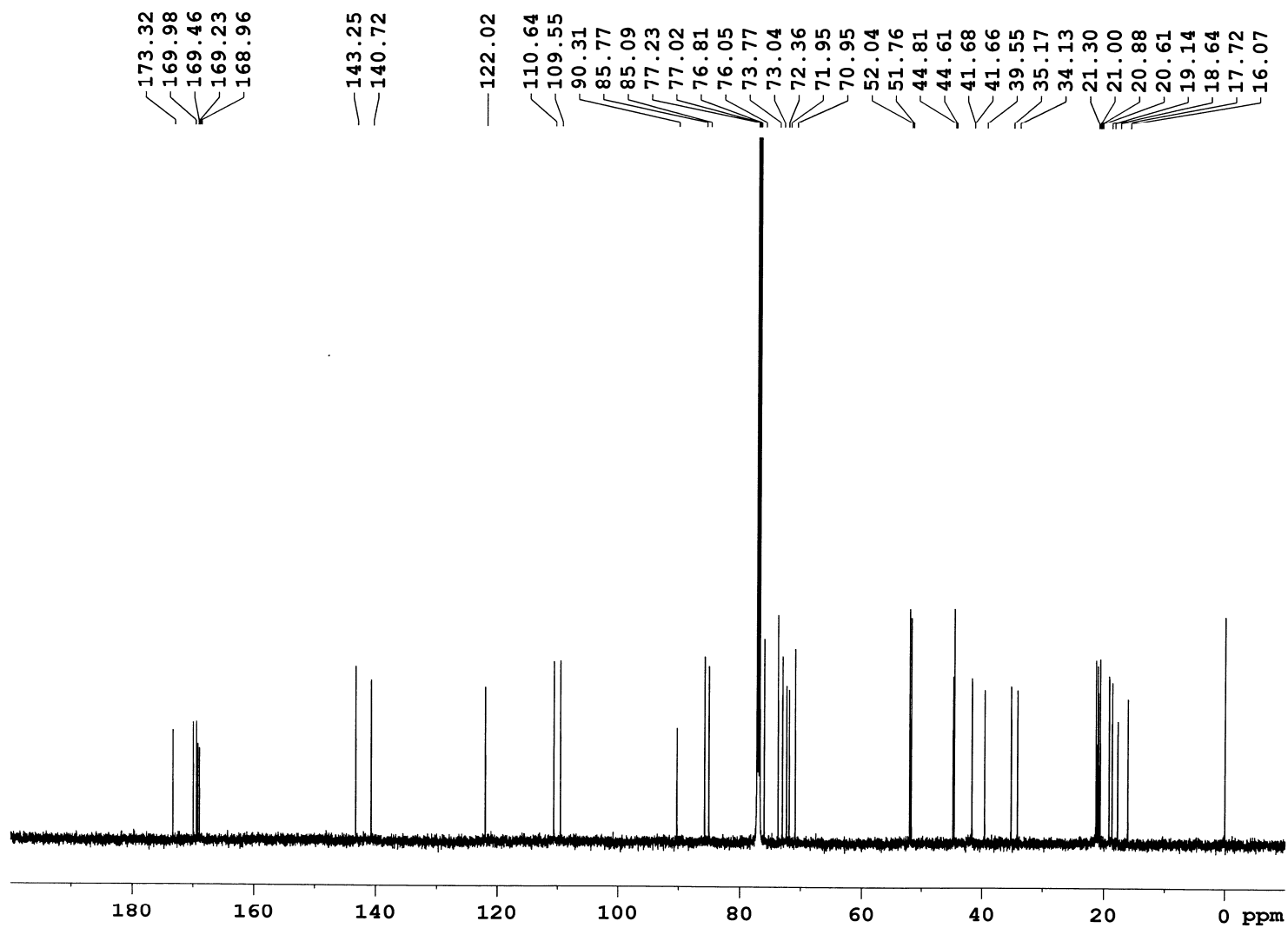
S61. ESI-MS spectrum of Chuktabularin R (**14**)



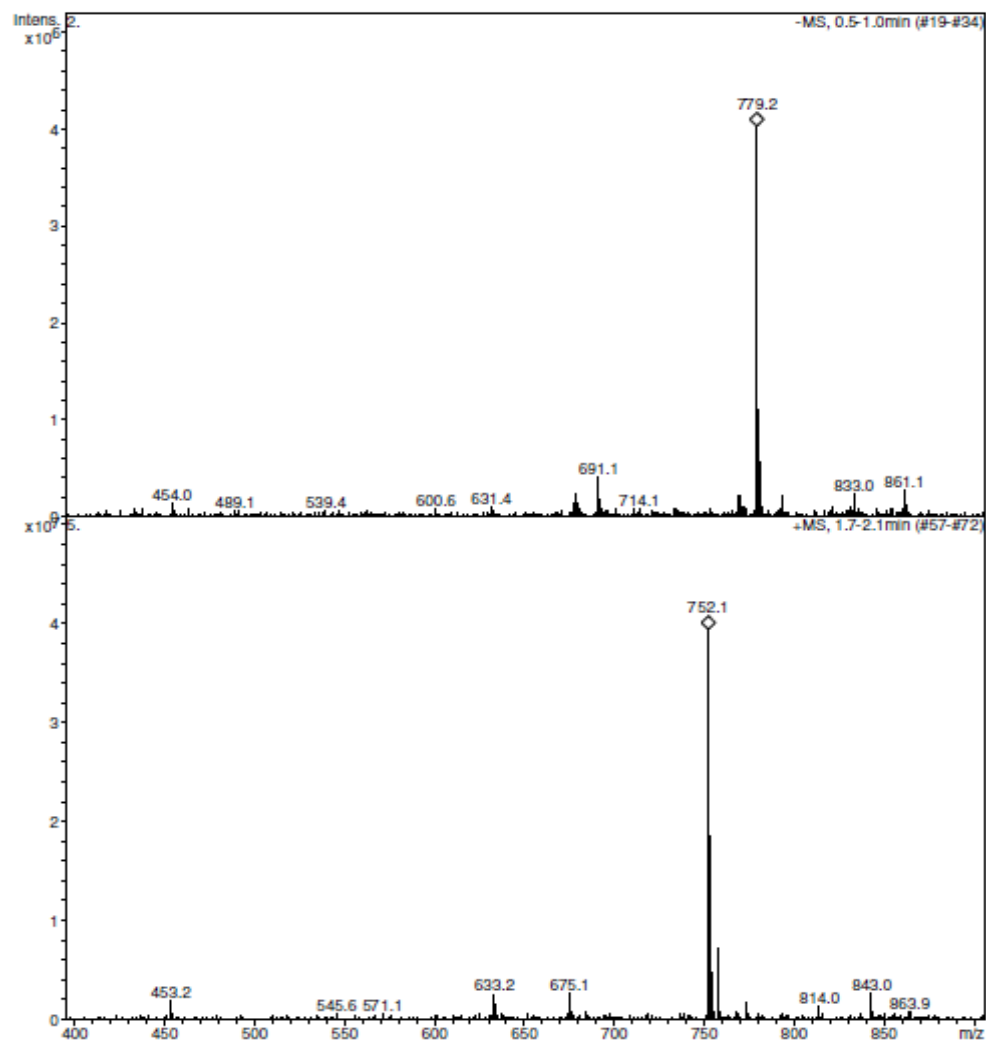
S62. HRESIMS spectrum of Chuktabularin R (14)



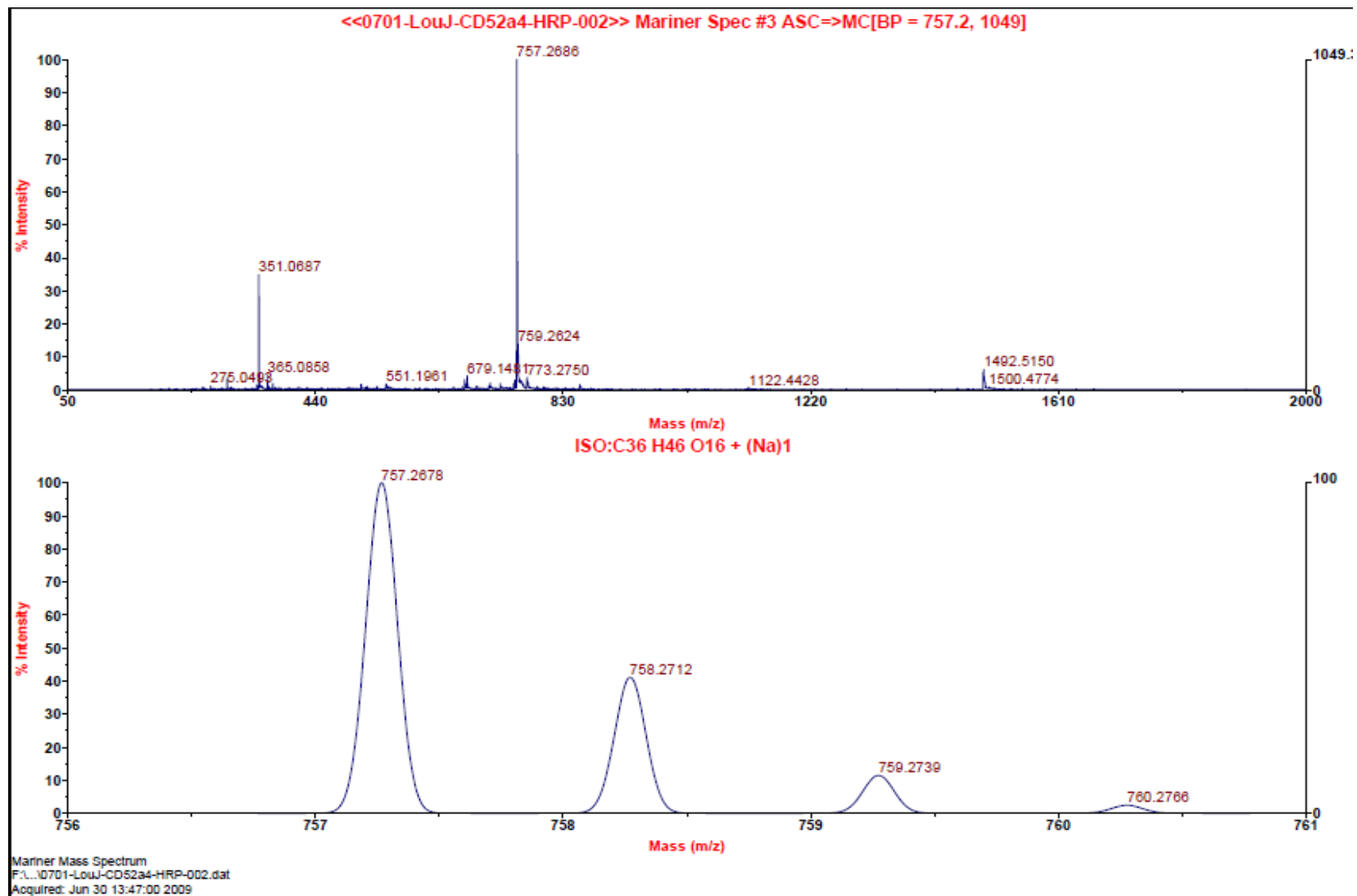
S63. ^1H NMR spectrum of Chuktabularin S (15) in CDCl_3



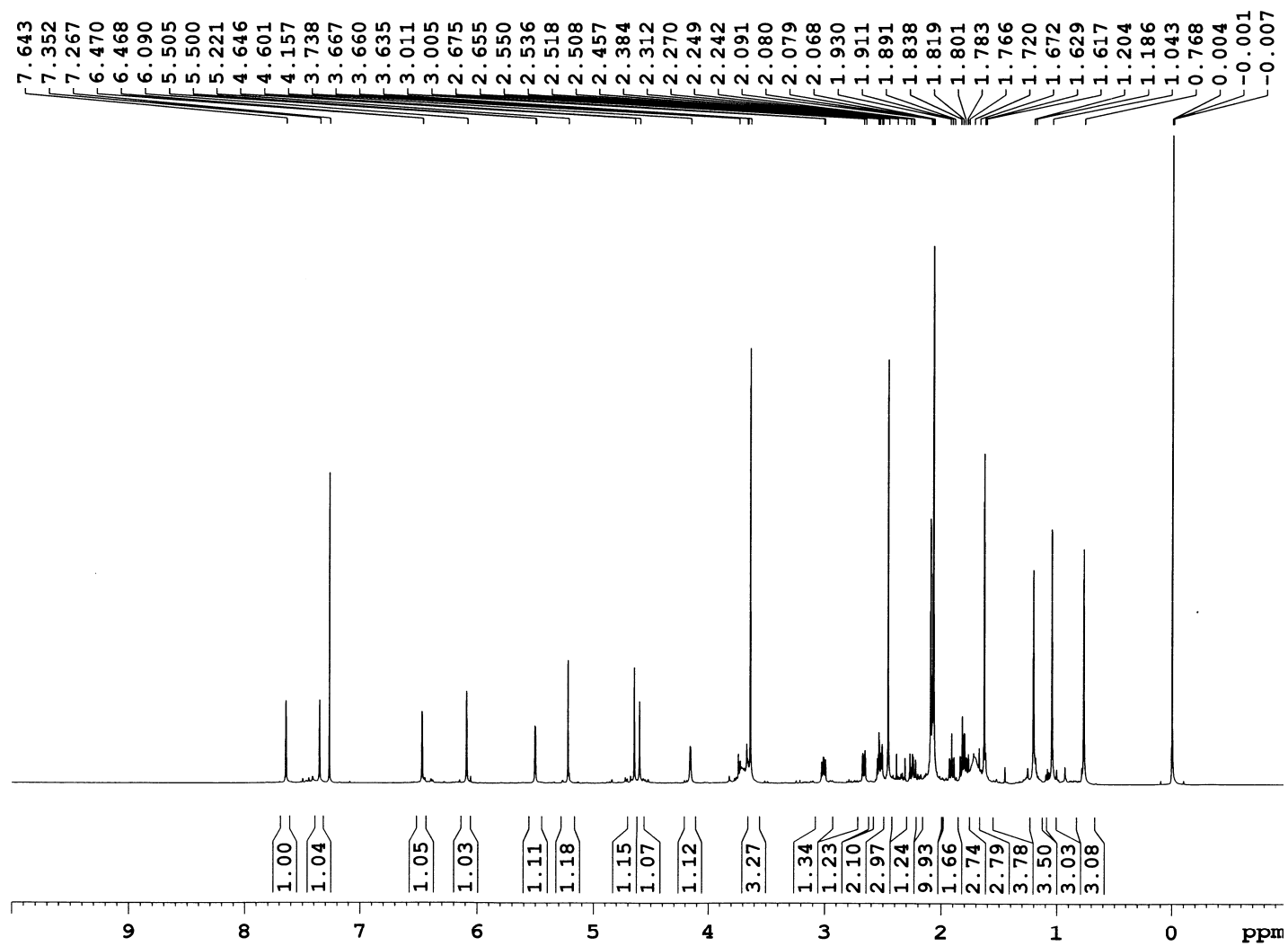
S64. ¹³C NMR spectrum of Chuktabularin S (15) in CDCl₃



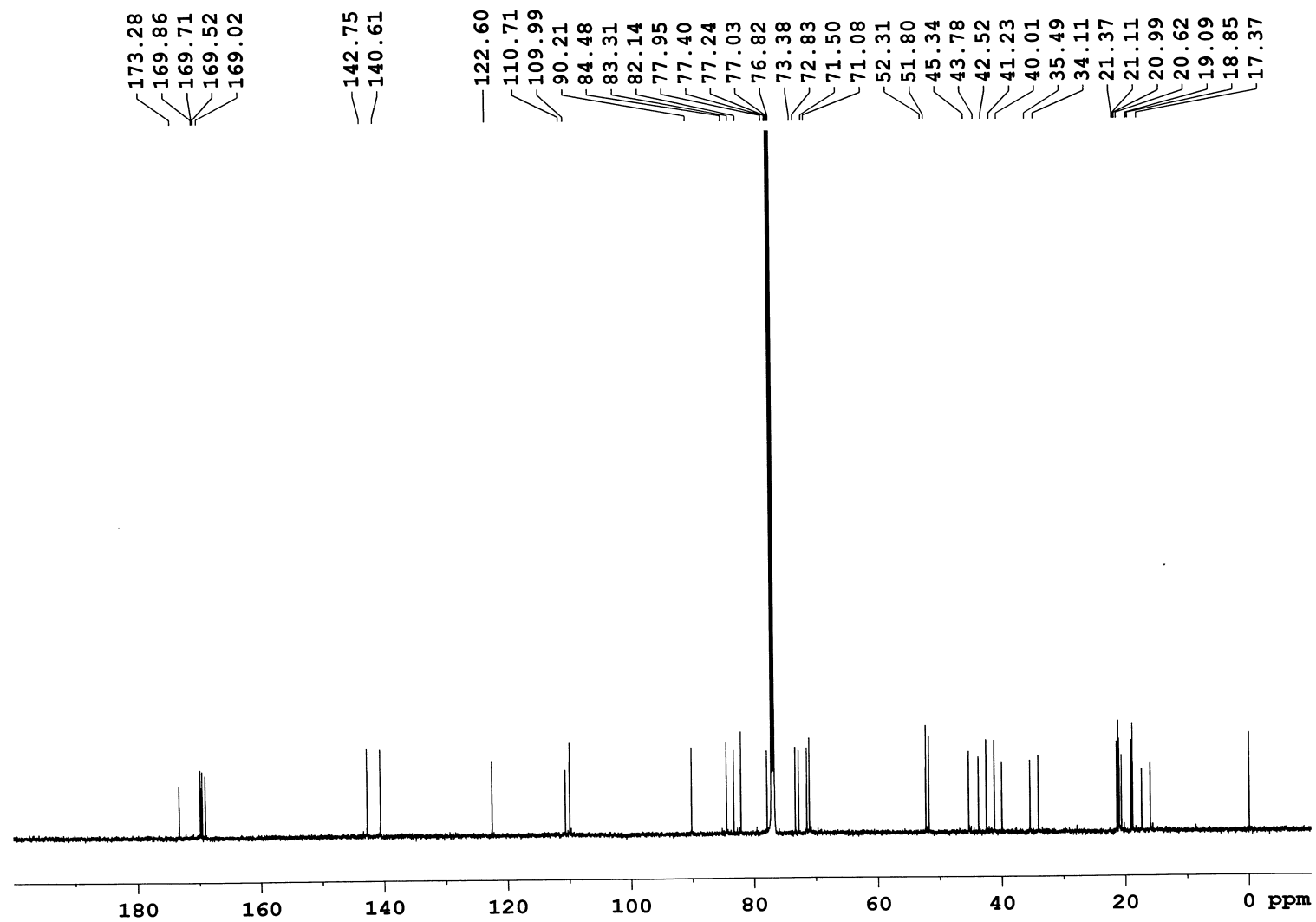
S65. ESI-MS spectrum of Chuktabularin S (15)



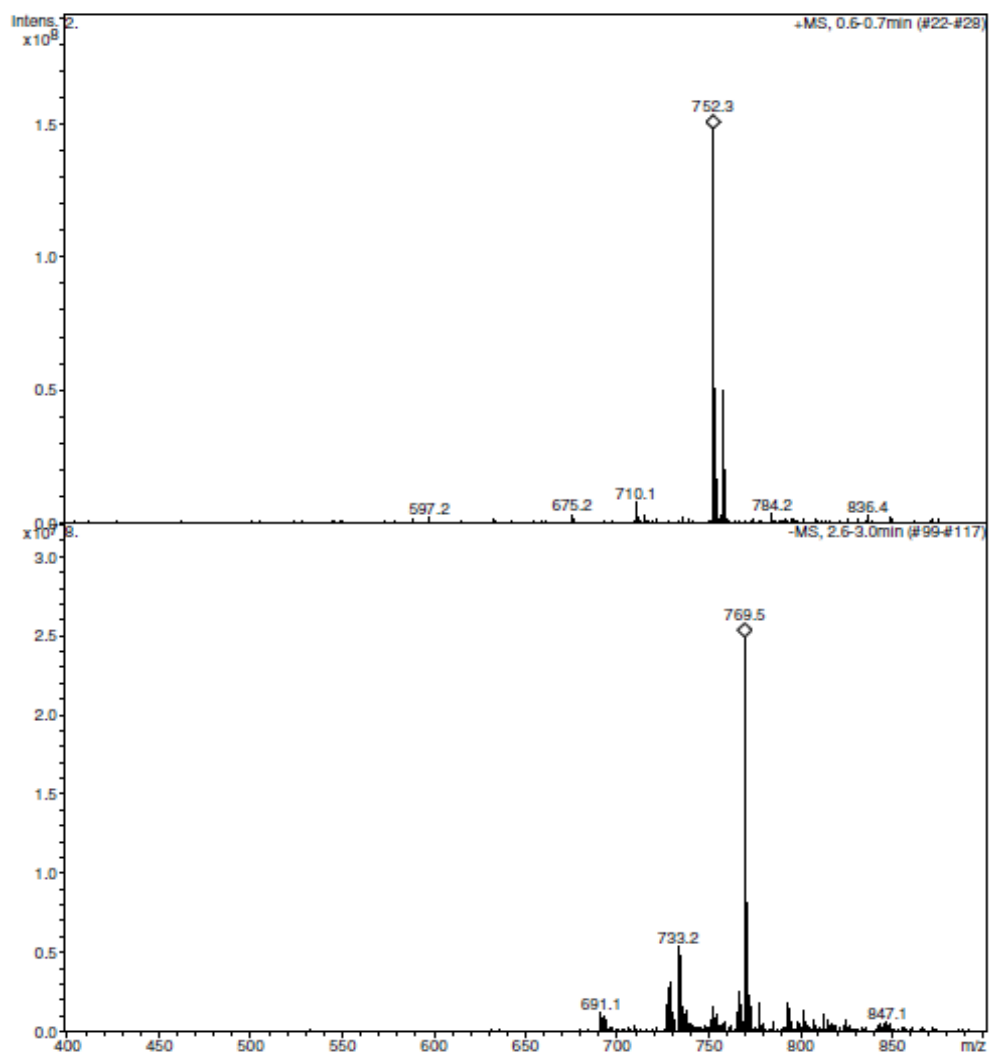
S66. HRESIMS spectrum of Chuktabularin S (15)



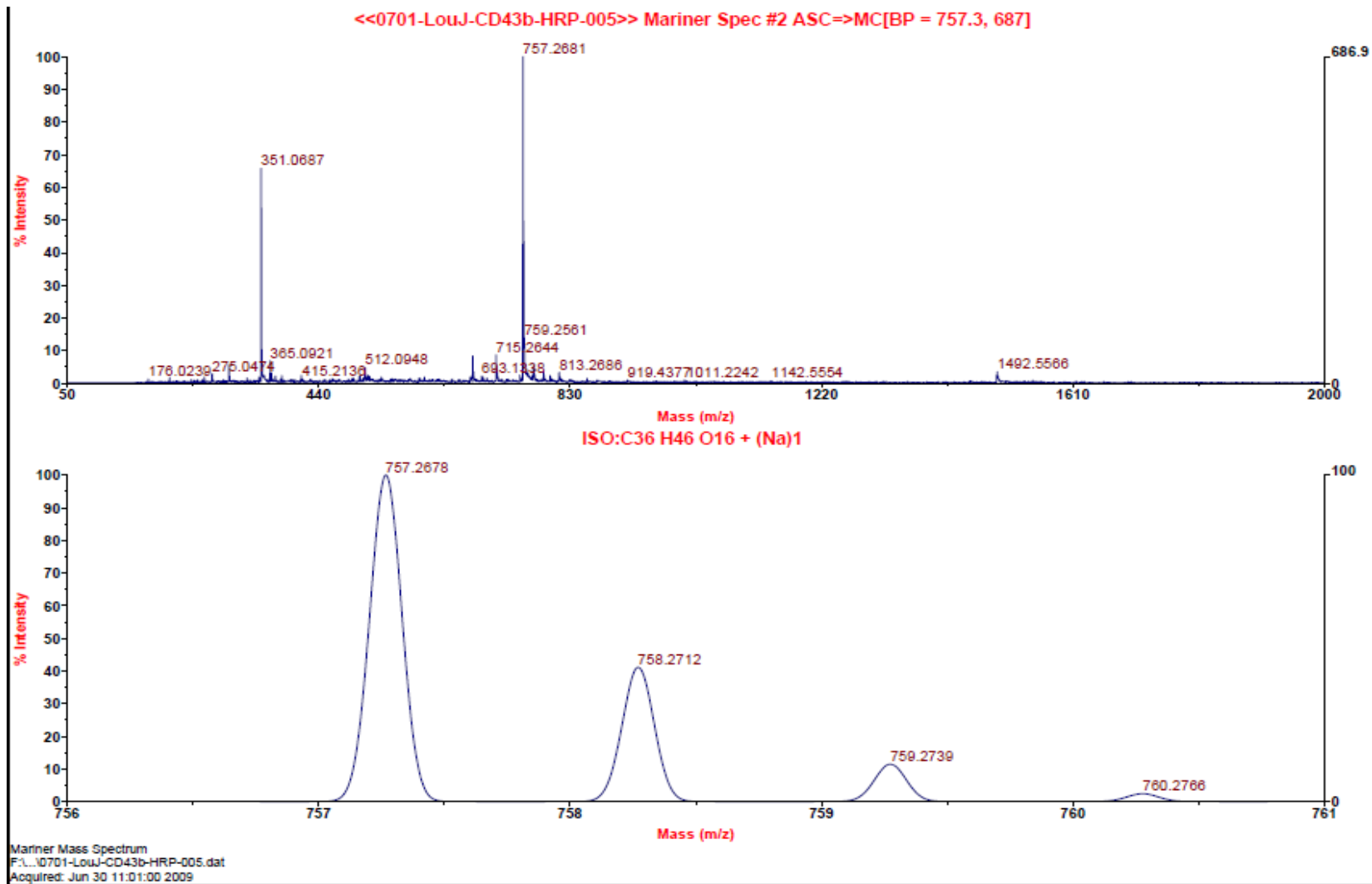
S67. ¹H NMR spectrum of Chuktabularin T (16) in CDCl₃



S68. ¹³C NMR spectrum of Chuktabularin T (16) in CDCl₃



S69. ESIMS spectrum of Chuktabularin T (16)



S70. HRESIMS spectrum of Chuktabularin T (16)