Supplementary Information

Application of chiral ligands: carbohydrates, nucleosides-lanthanides and other Lewis acid complexes to control regio- and stereoselectivity of the dipolar cycloaddition reactions of nitrile oxides and esters.

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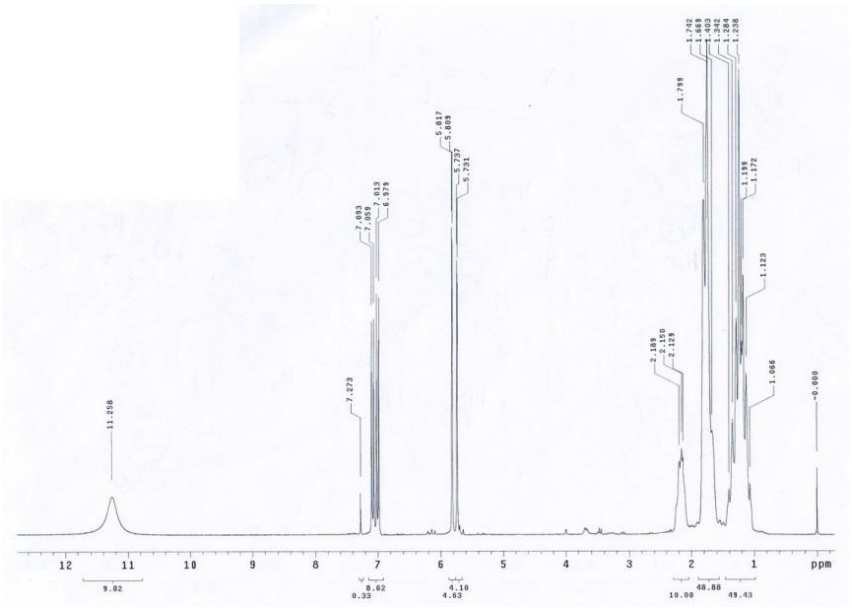

Figure S1. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **2i**

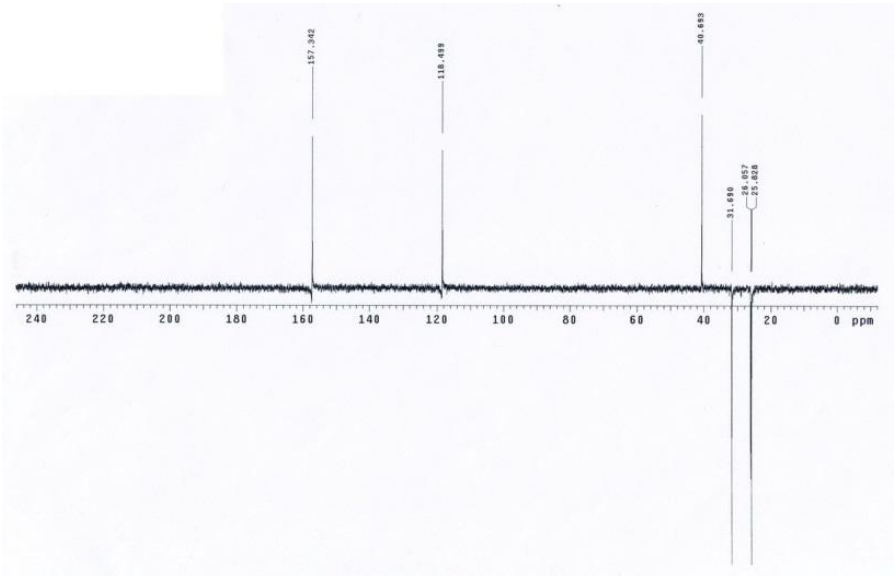

Figure S2. ^{13}C NMR -*dept* -spectrum ($CDCl_3$, 50 MHz) of **2i**

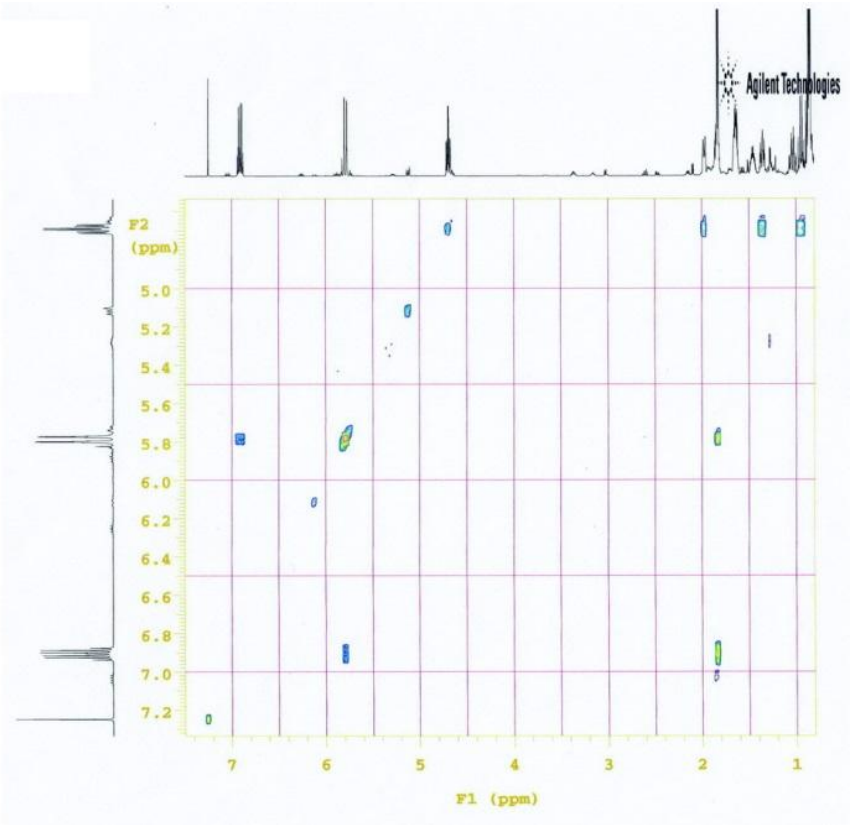

Figure S3. 1H COSY spectrum (expansion) ($CDCl_3$, 600 MHz) of **3f**

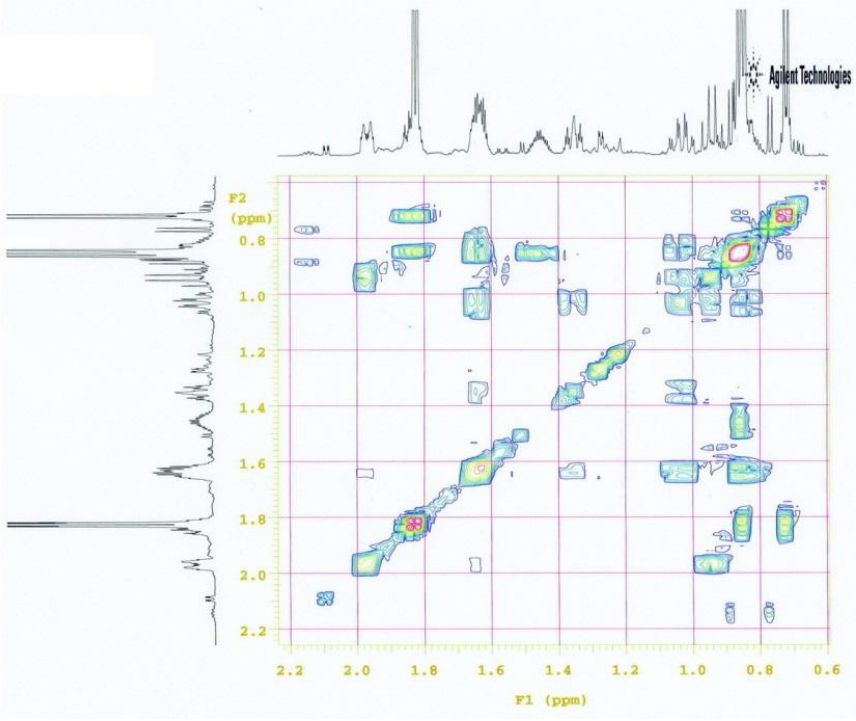

Figure S4. 1H COSY spectrum (expansion) ($CDCl_3$, 600 MHz) of **3f**

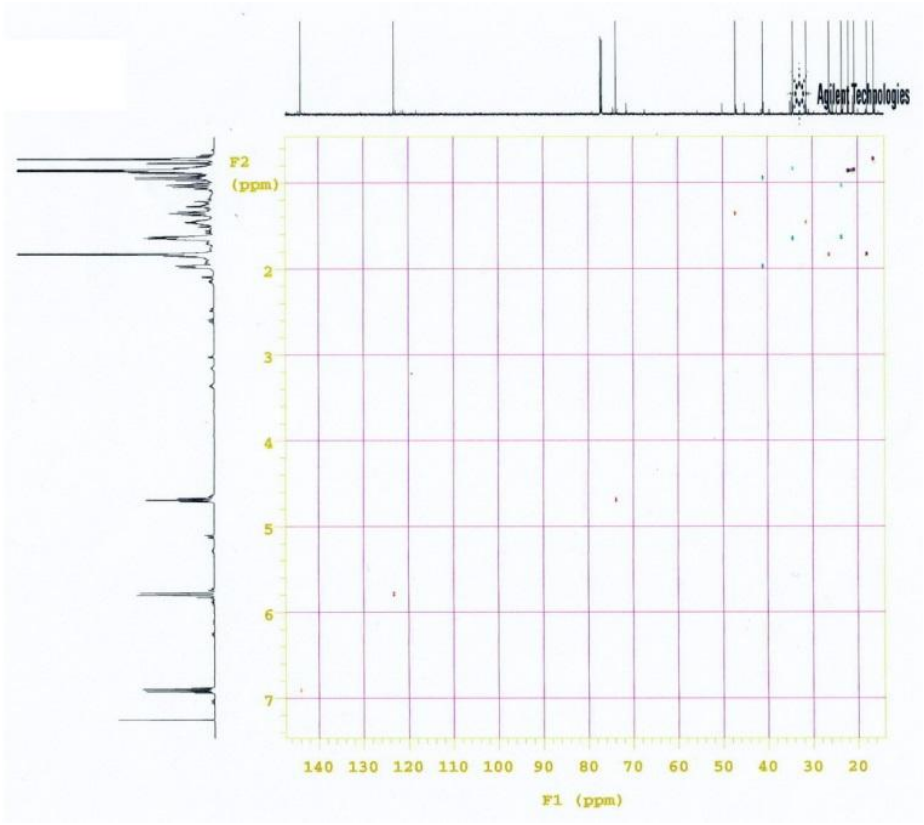

Figure S5. ^{1}H-^{13}C HSQC spectrum ($CDCl_3$, 600 MHz) of **3f**

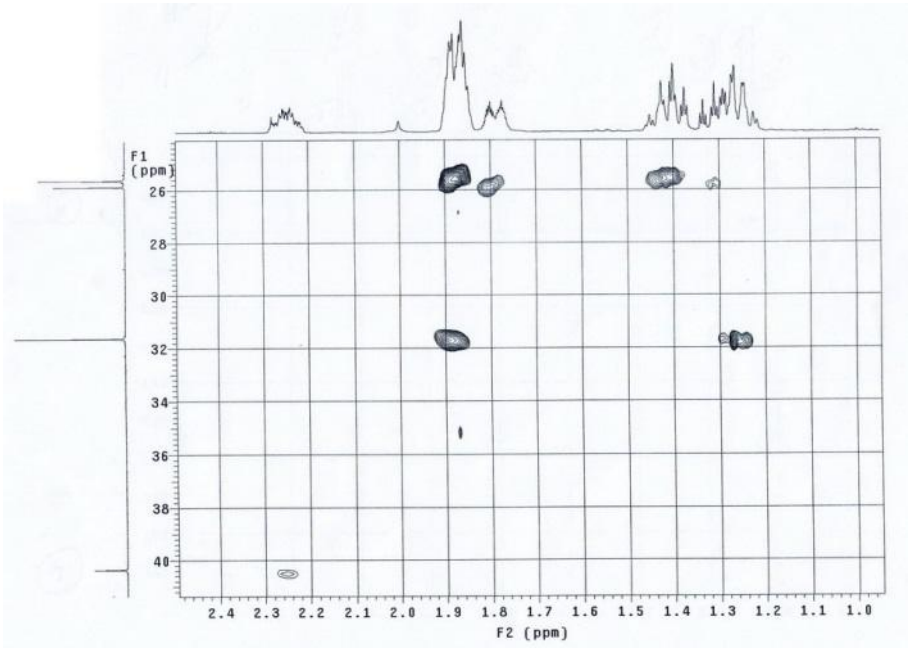

Figure S6. ^{1}H-^{13}C HSQC spectrum (expansion) ($CDCl_3$, 500 MHz) of **3i**

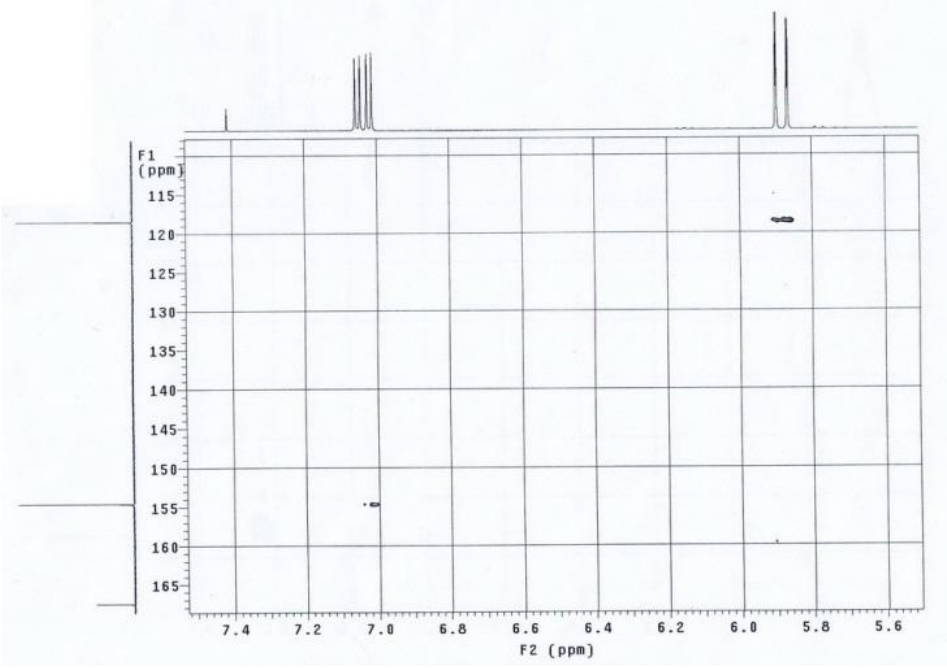

Figure S7. ^{1}H-^{13}C HSQC spectrum (expansion) ($CDCl_3$, 500 MHz) of **3i**.

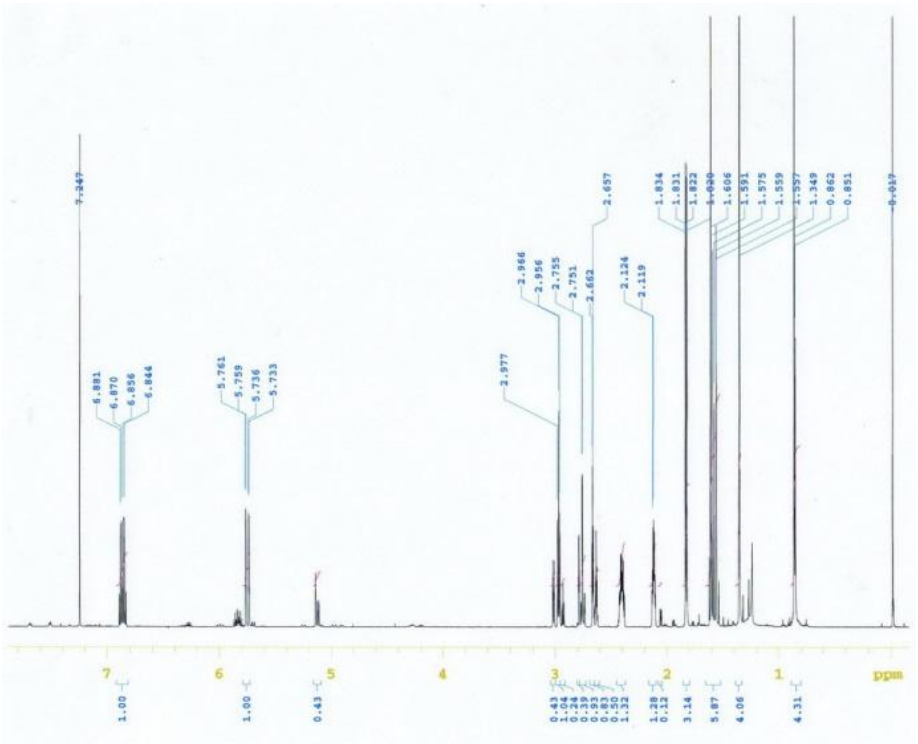

Figure S8. ^{1}H NMR spectrum ($CDCl_3$, 600 MHz) of **3j**

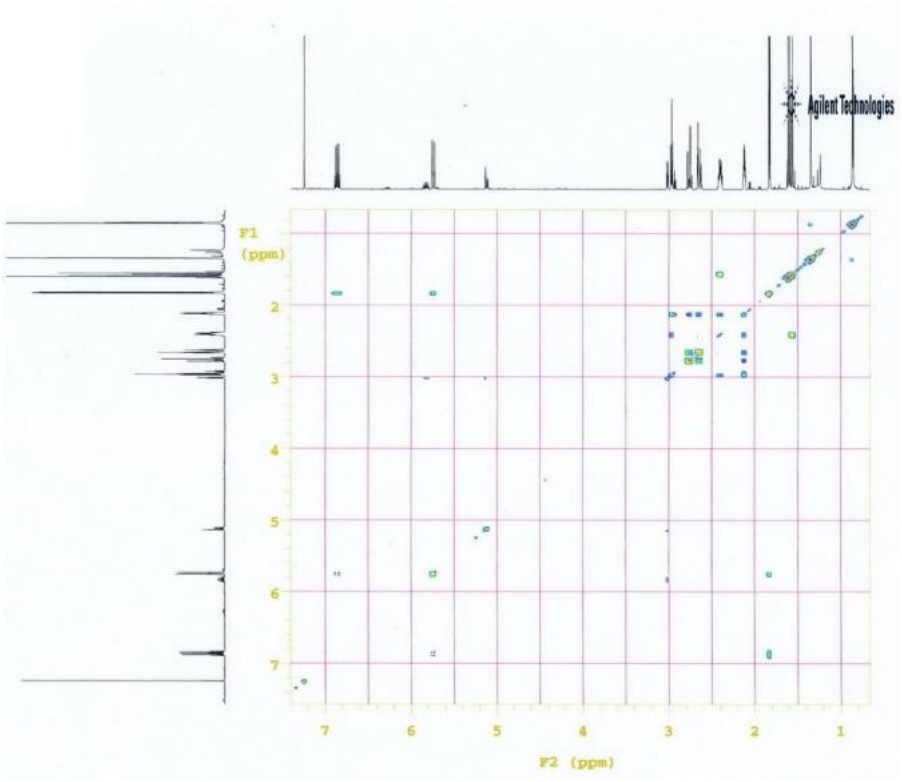

Figure S9. ^{1}H COSY spectrum (an expansion) ($CDCl_3$, 600 MHz) of **3j**.

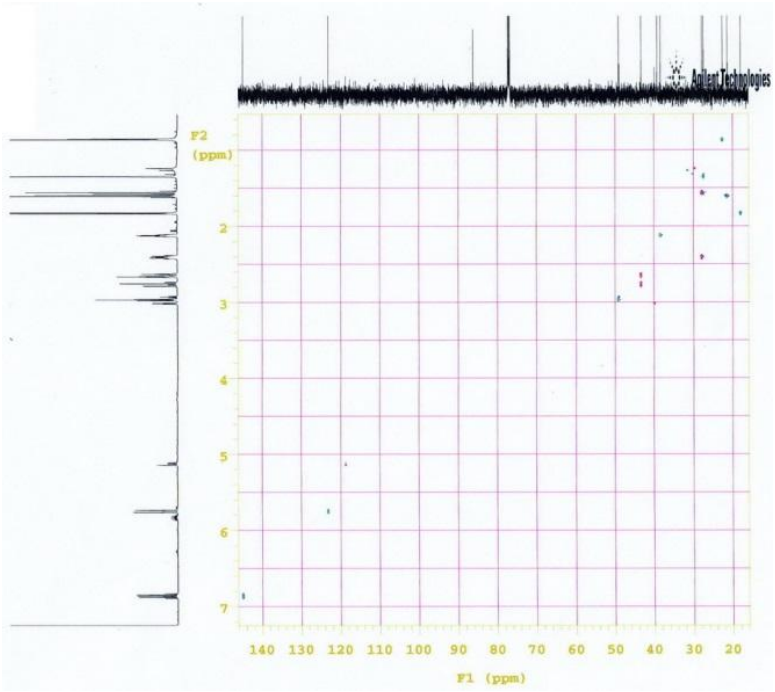

Figure S10. ^{1}H-^{13}C HSQC spectrum ($CDCl_3$, 600 MHz) of **3j**

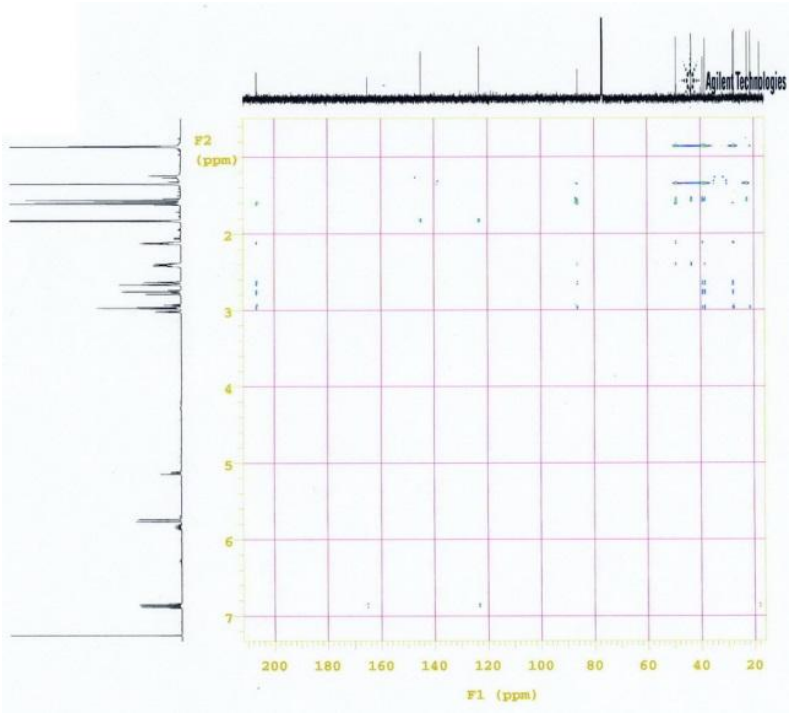

Figure S11. ^{1}H-^{13}C HMBC spectrum ($CDCl_3$, 600 MHz) of **3j**

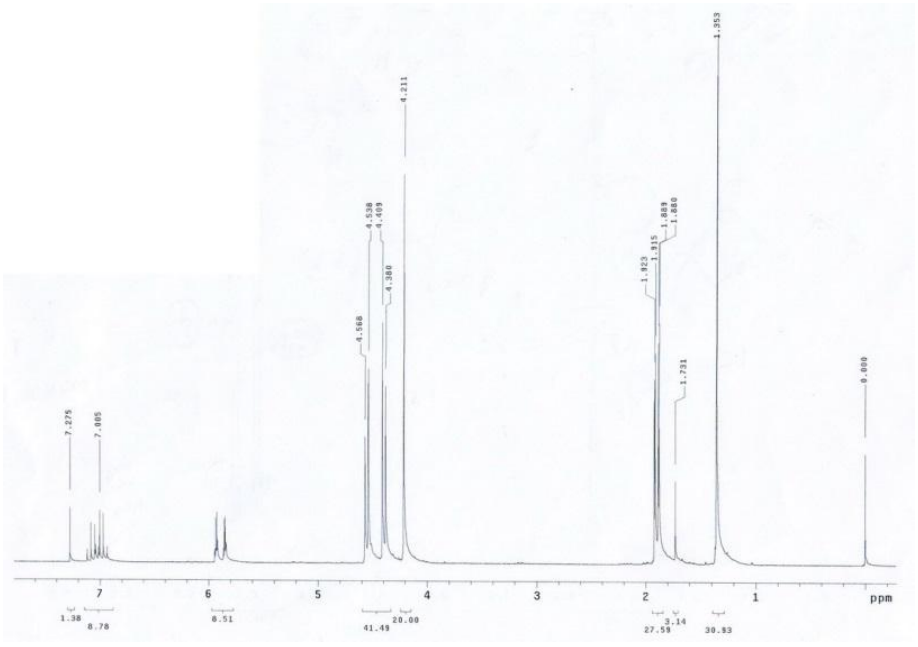

Figure S12. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **3k**

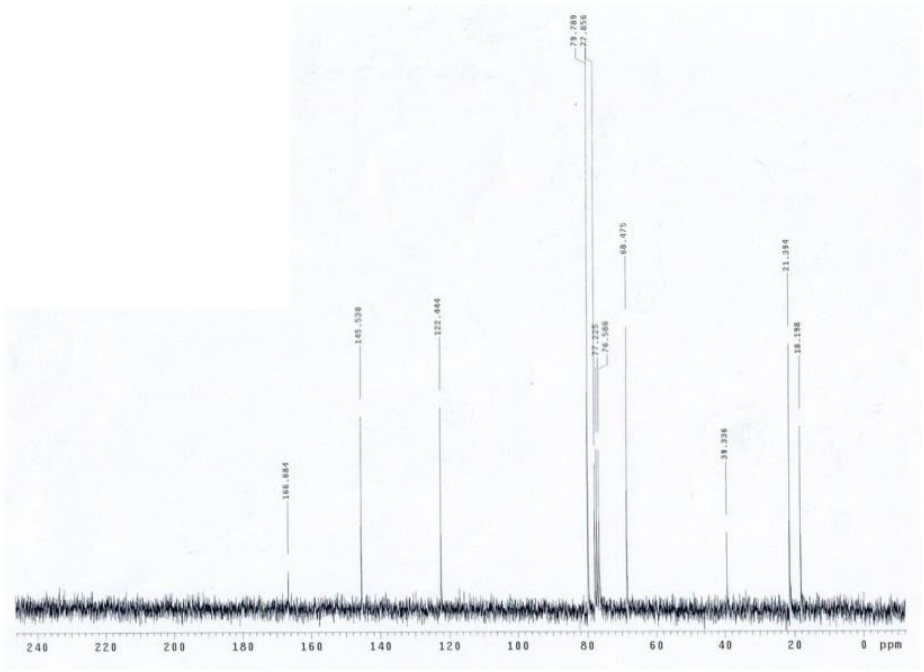

Figure S13. ^{13}C NMR spectrum ($CDCl_3$, 50 MHz) of **3k**

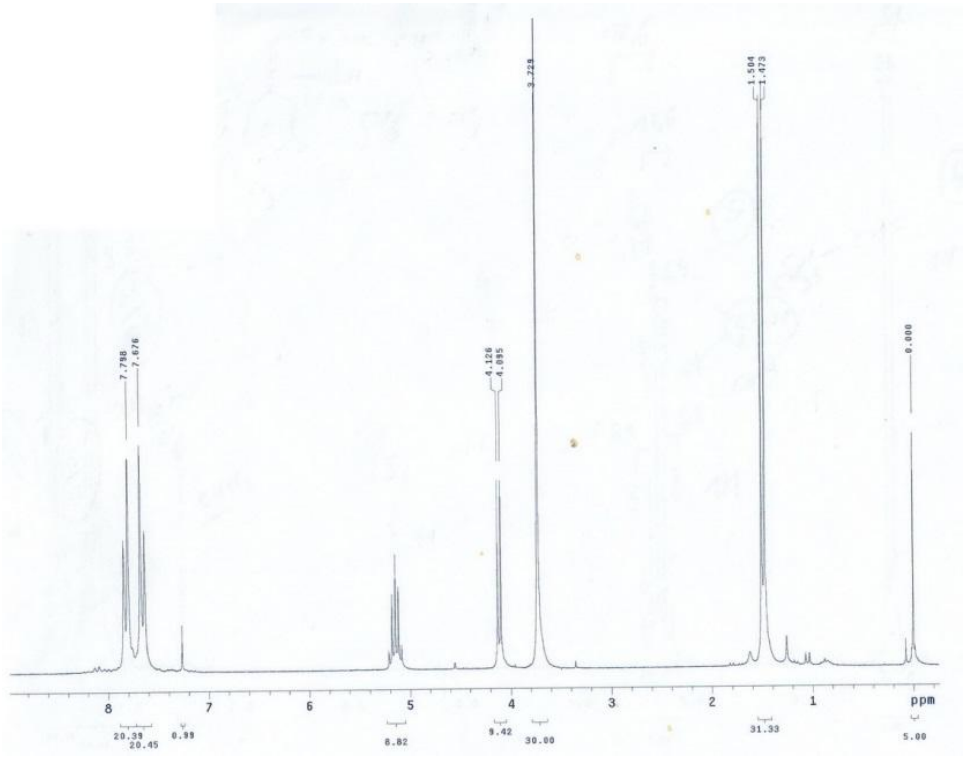

Figure S14. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **5a**

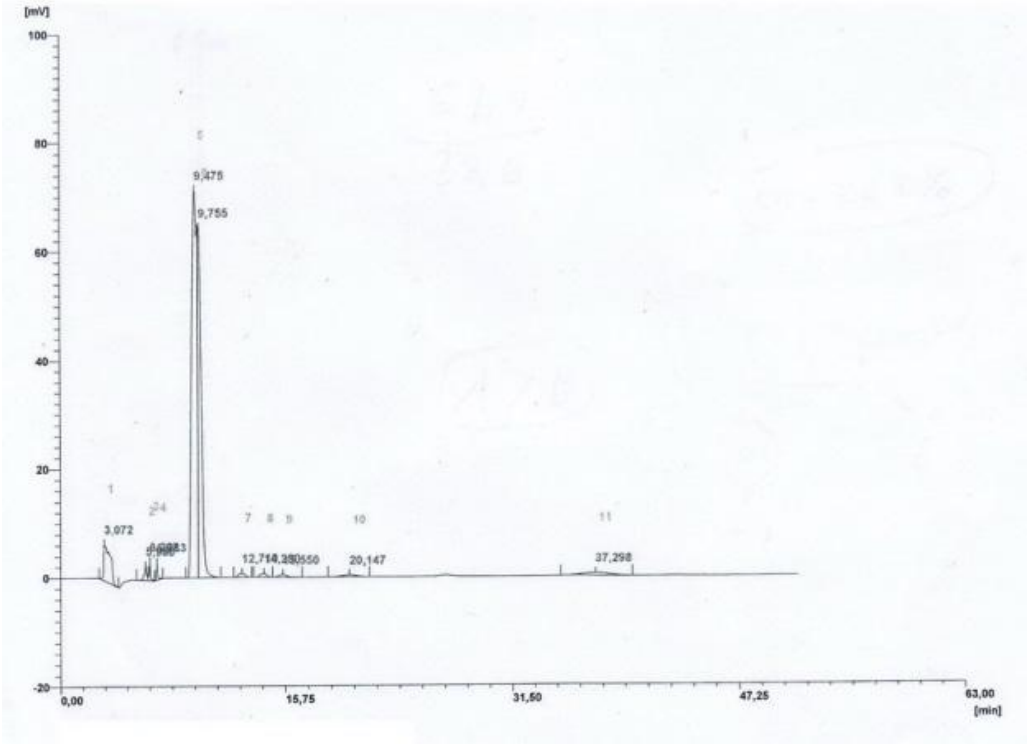

Figure S15. HPLC-chiral column AD-H, (hexane/2-propanole – 95/5, 254 nm, 1ml/min) spectrum of **5a,** *ee* = 22.8%

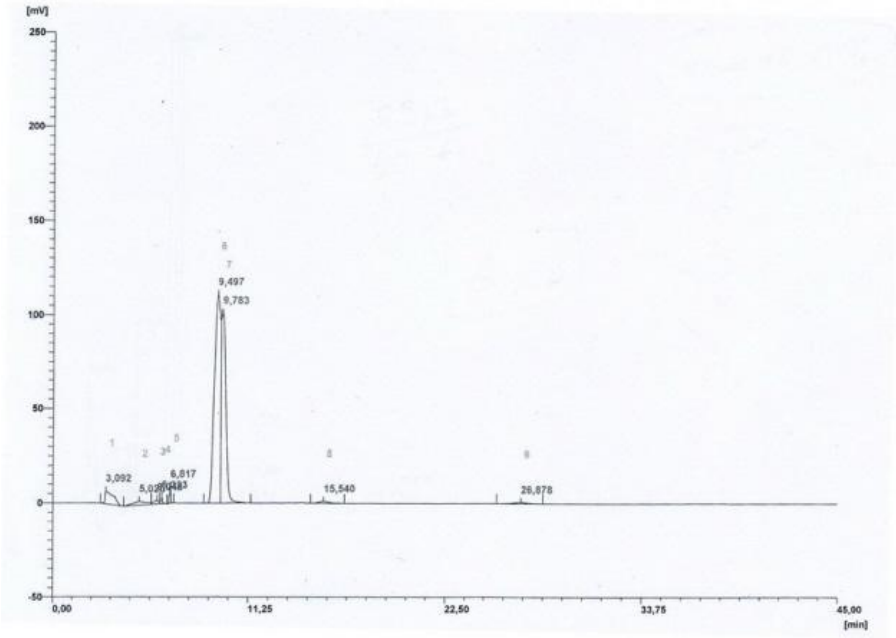

Figure S16. HPLC-chiral column AD-H, (hexane/2-propanole – 95/5, 254 nm, 1ml/min) spectrum of **5a,** *ee* = 18.6%

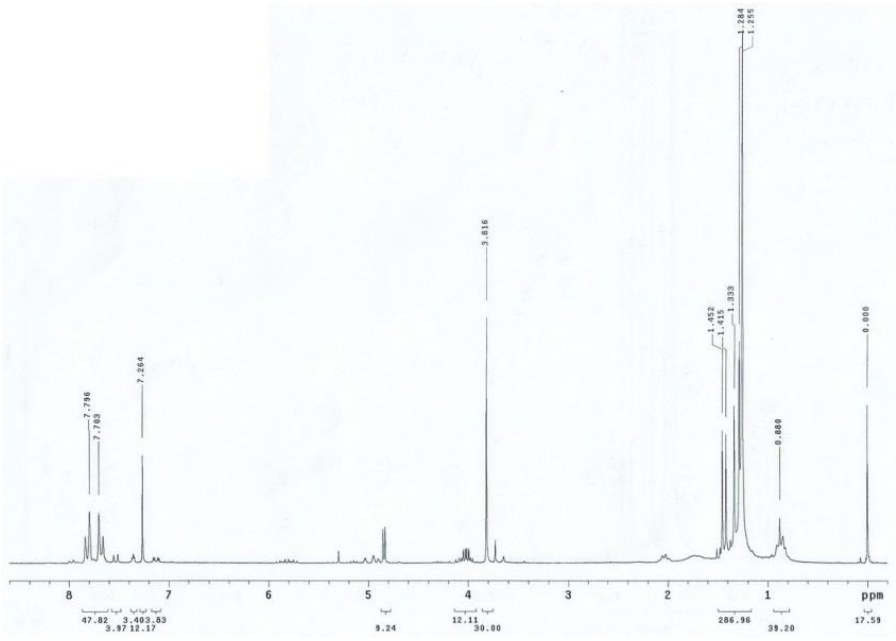

Figure S17. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **6a**

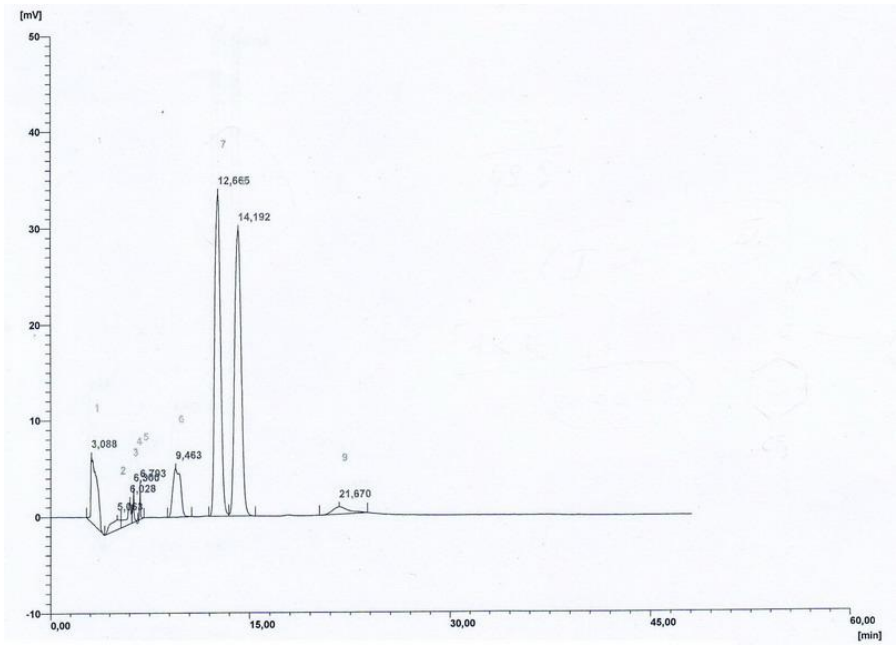

Figure S18. HPLC-chiral column AD-H, (hexane/2-propanole – 95/5, 254 nm, 1ml/min) spectrum of **6a,** *ee* = 12%

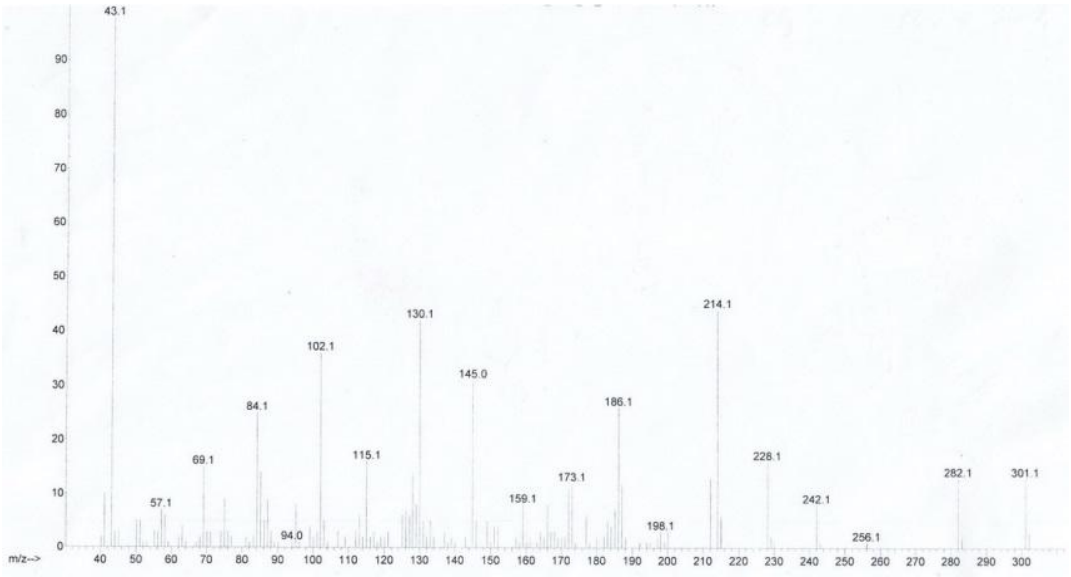

Figure S19. EI-MS-LR spectrum of **5b**.

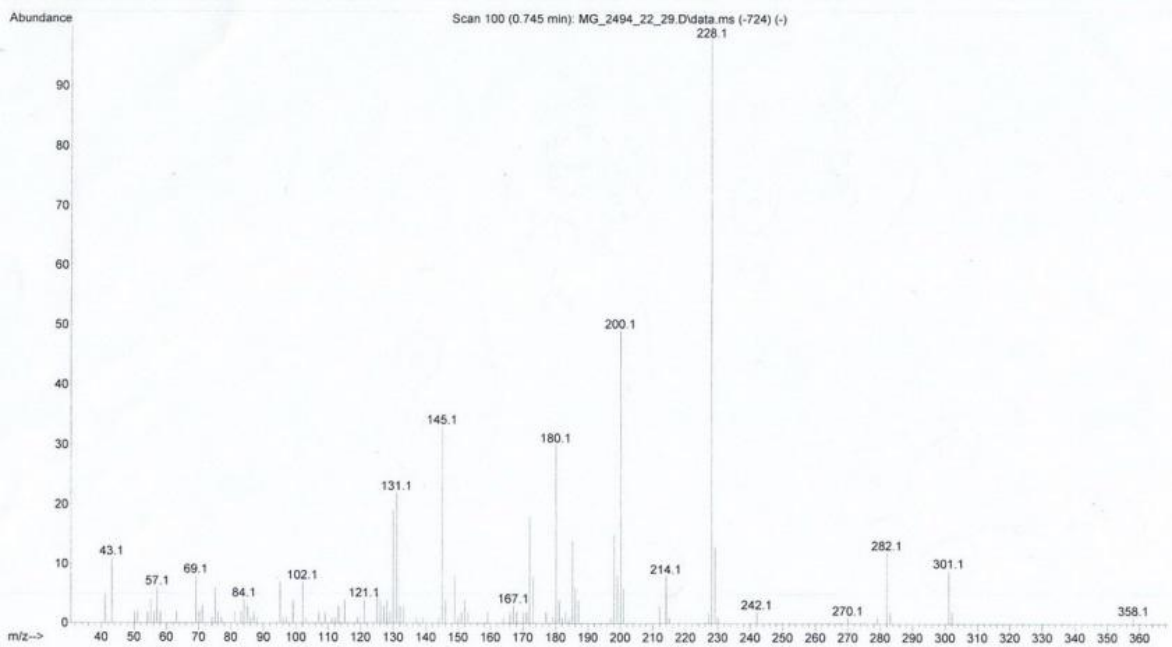

Figure S20. EI-MS-LR spectrum of **6b**.

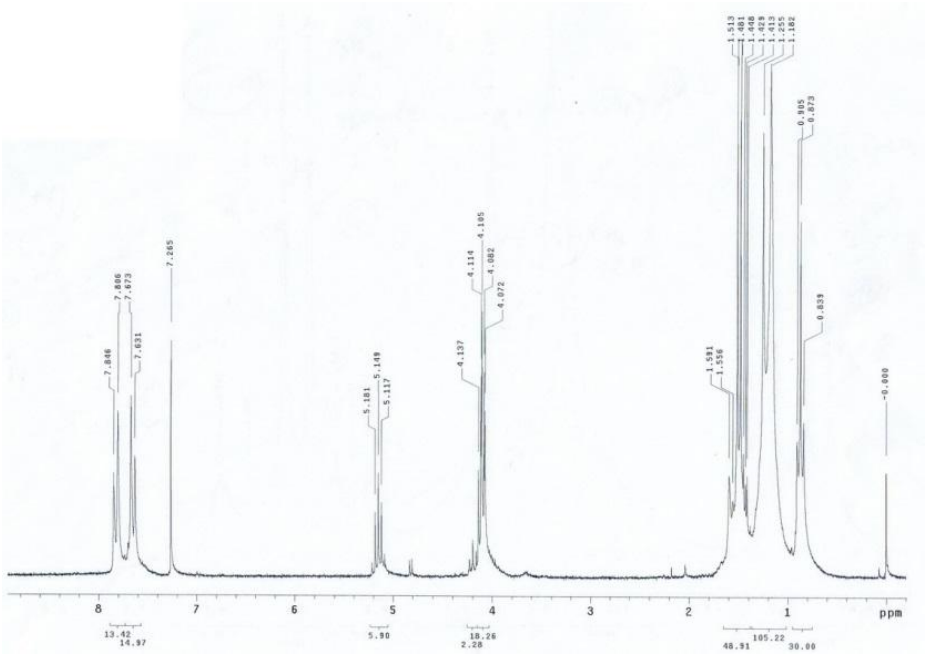

Figure S21. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **5c**.

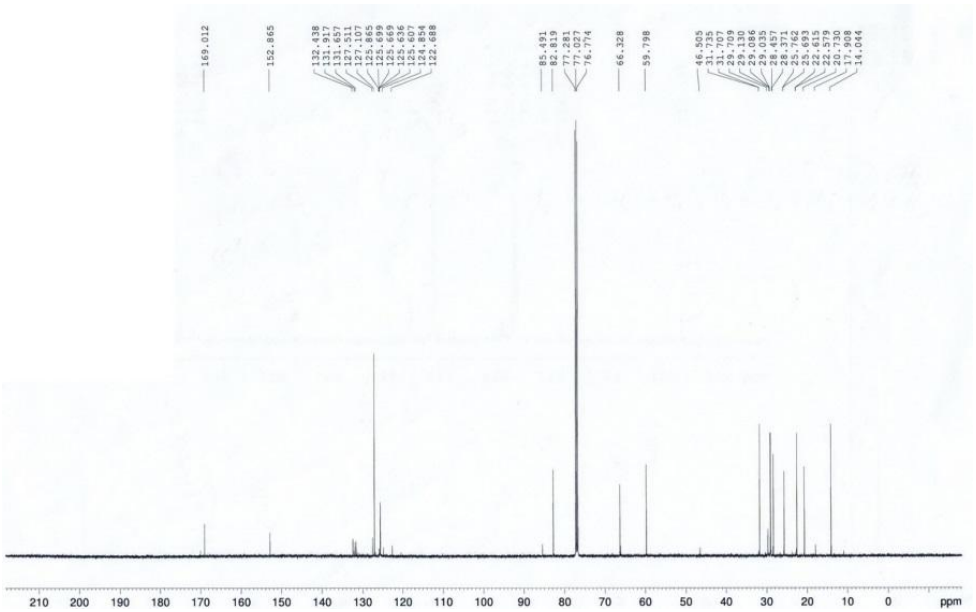

Figure S22. ^{13}C NMR spectrum ($CDCl_3$, 200 MHz) of **5c**.

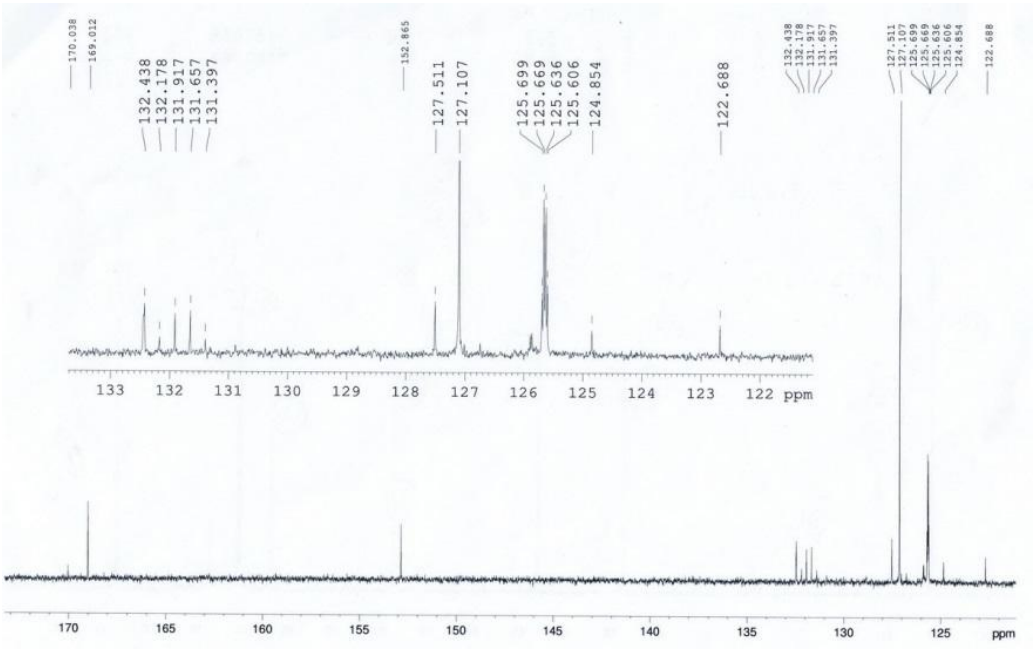

Figure S23. ^{13}C NMR spectrum (expansion) ($CDCl_3$, 200 MHz) of **5c**.

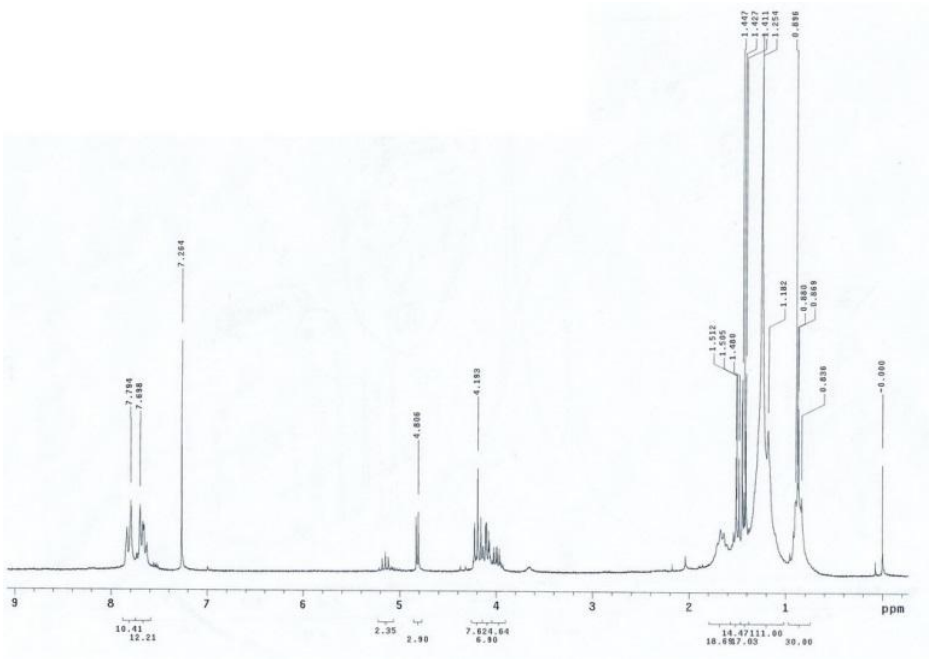

Figure S24. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **6c**.

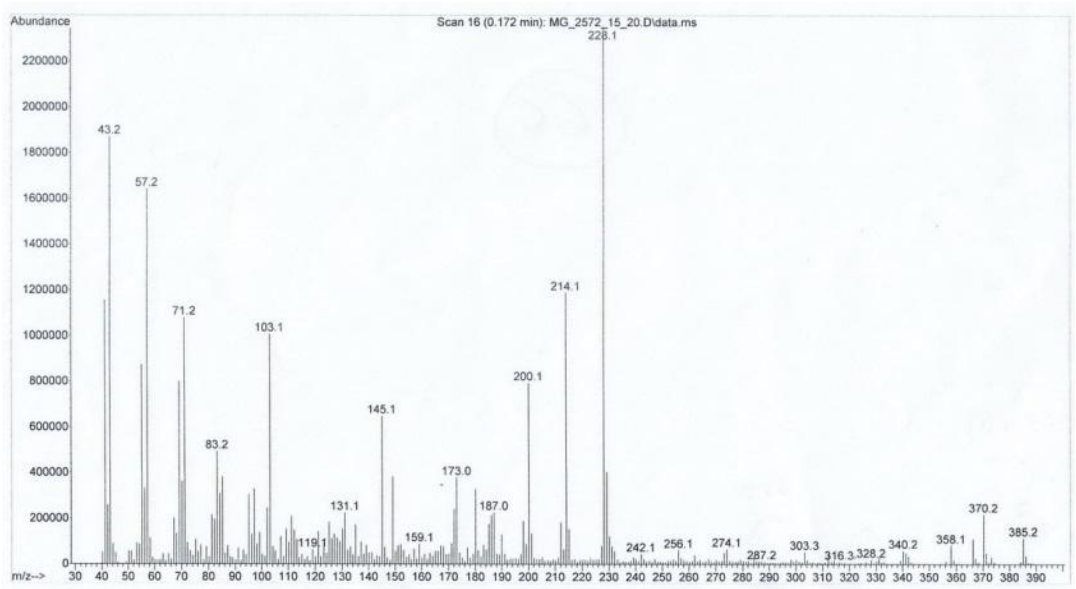

Figure S25. EI-MS-LR spectrum of **6c**.

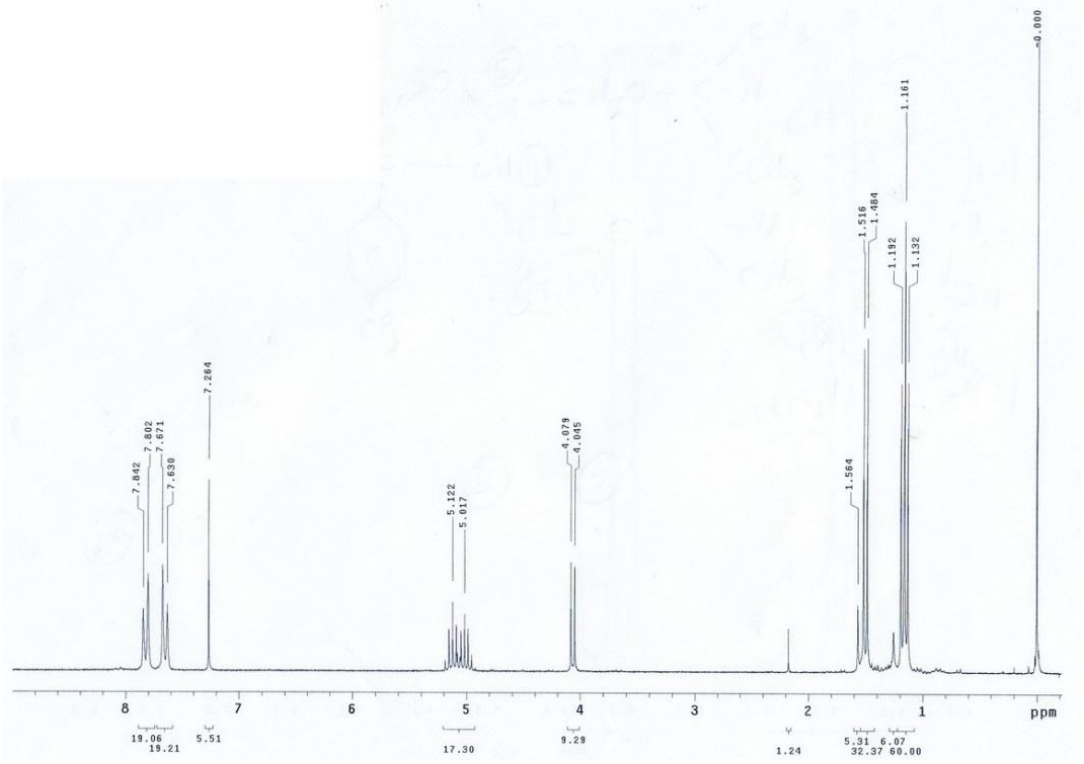

Figure S26. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **5d**

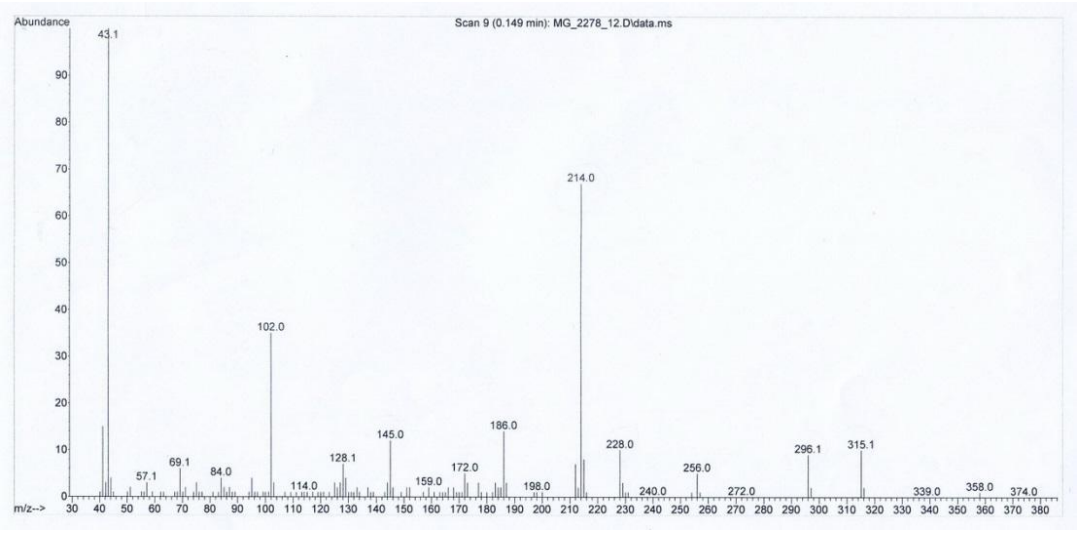

Figure S27. EI-MS-LR spectrum of **5d**

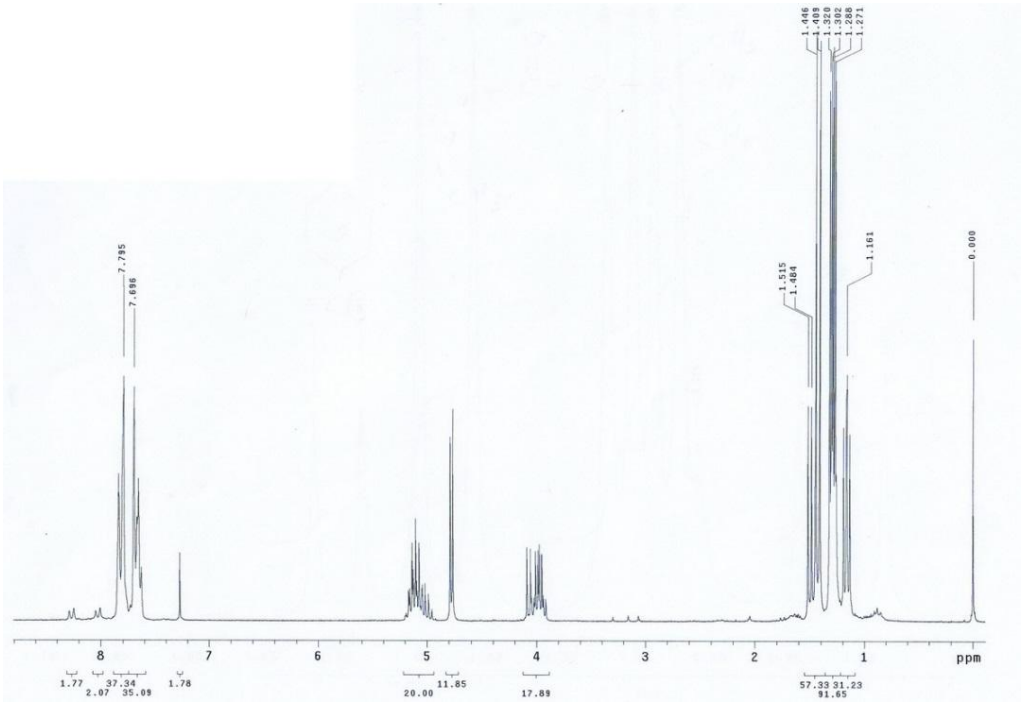

Figure S28. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **6d**

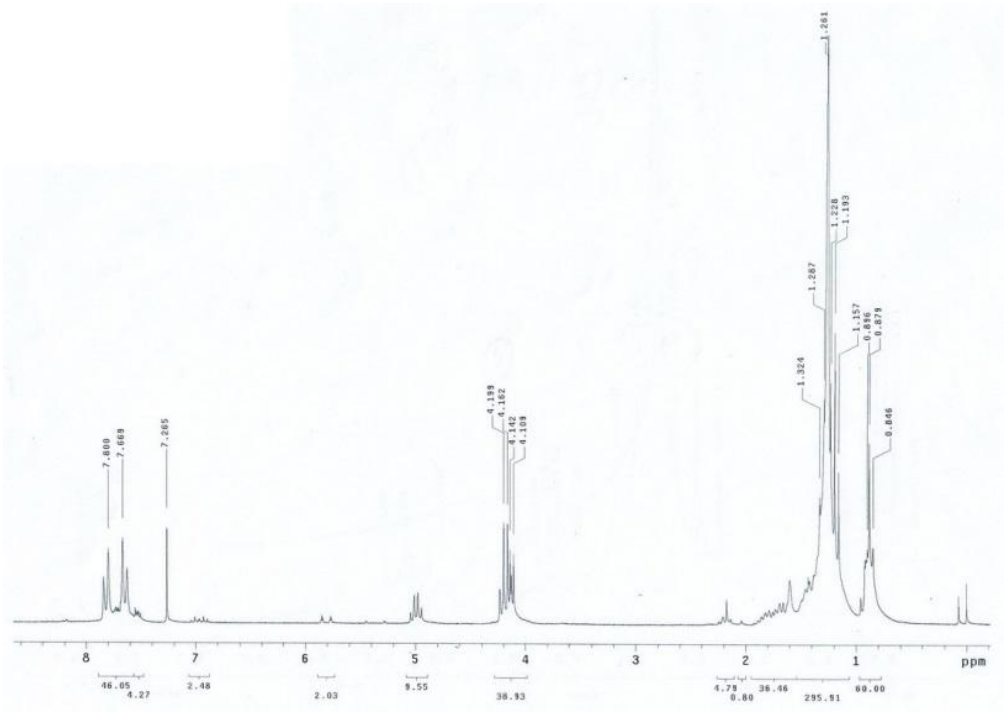

Figure S29. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **5e**

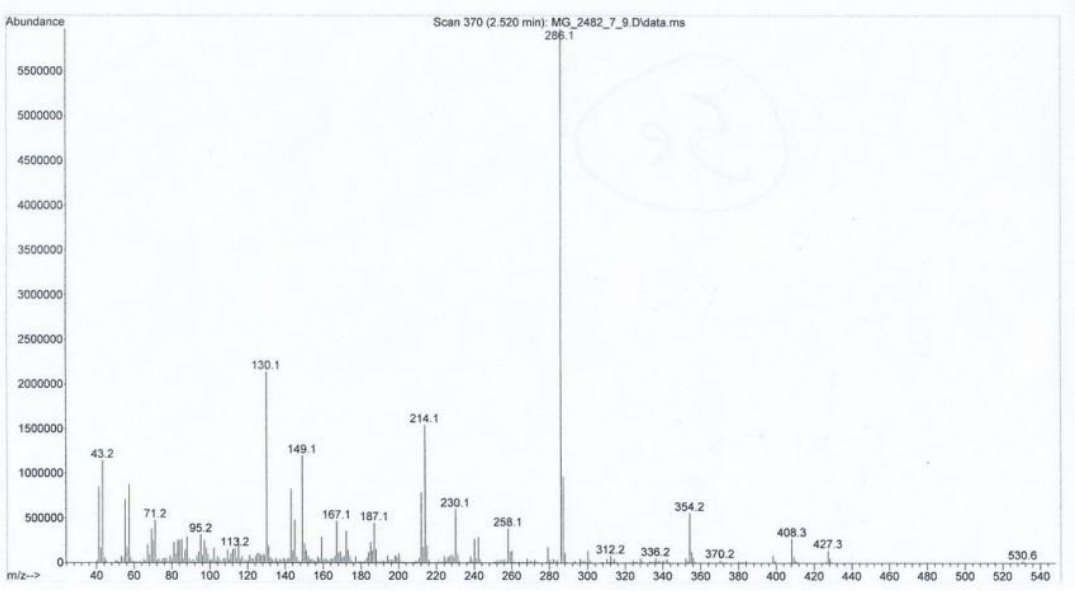

Figure S30. EI-MS-LR spectrum of **5e**

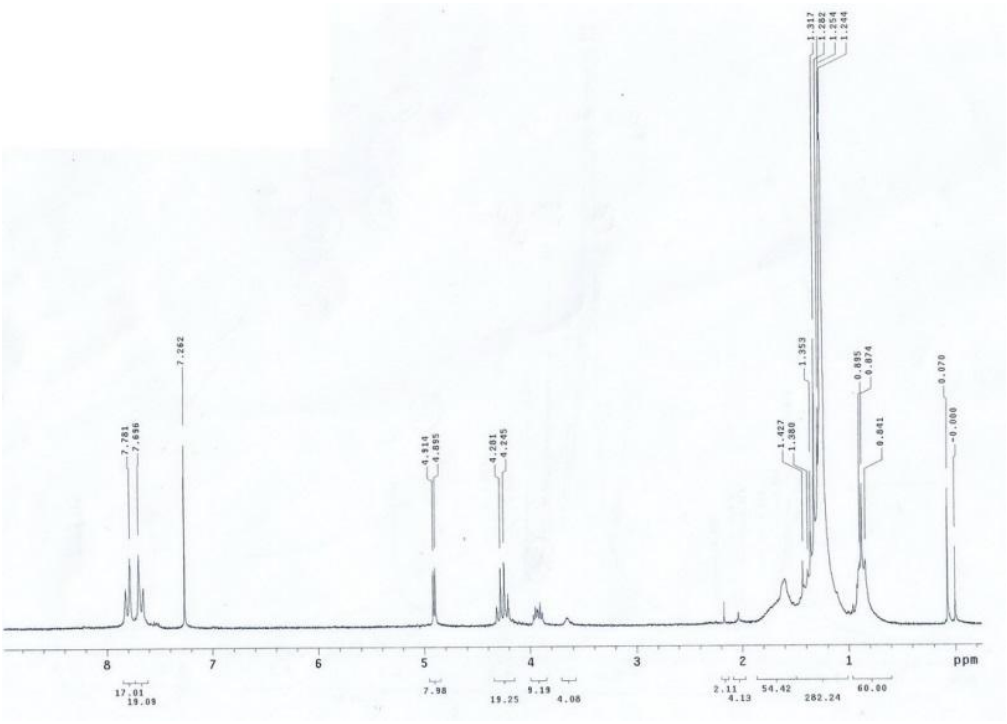

Figure S31. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **6e**.

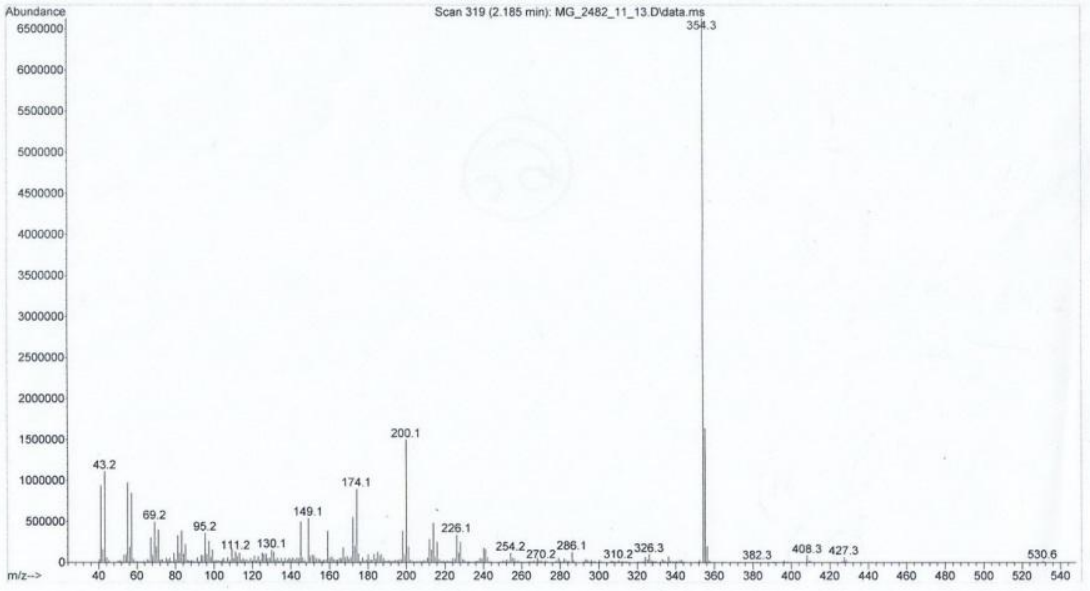

Figure S32. EI-MS-LR spectrum of **6e**

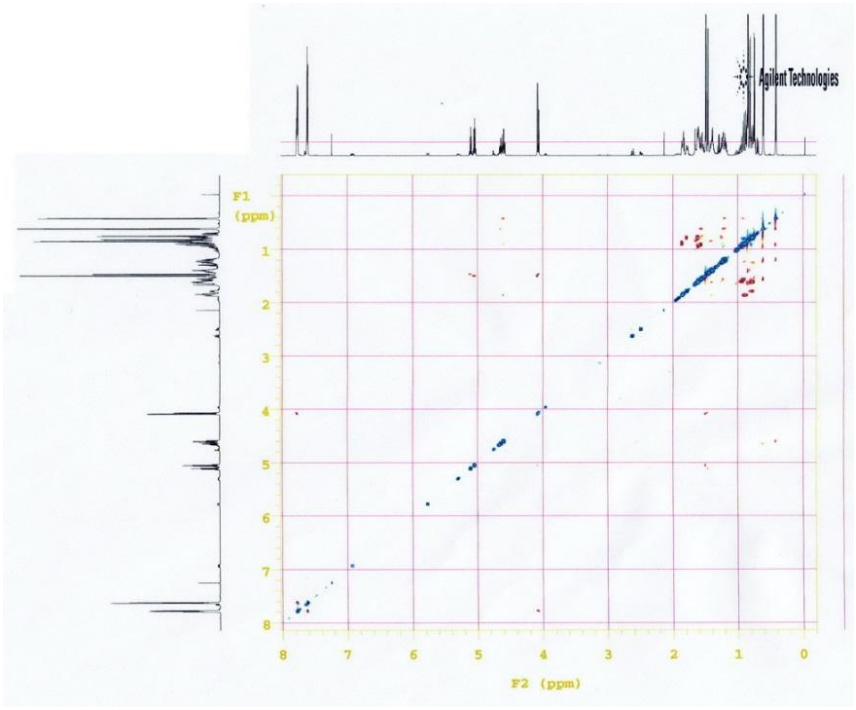

Figure S33. ^{1}H - NOESY spectrum ($CDCl_3$, 600 MHz) of **5f** **(**diastereoisomers **A** and **B)** *de* = 22%

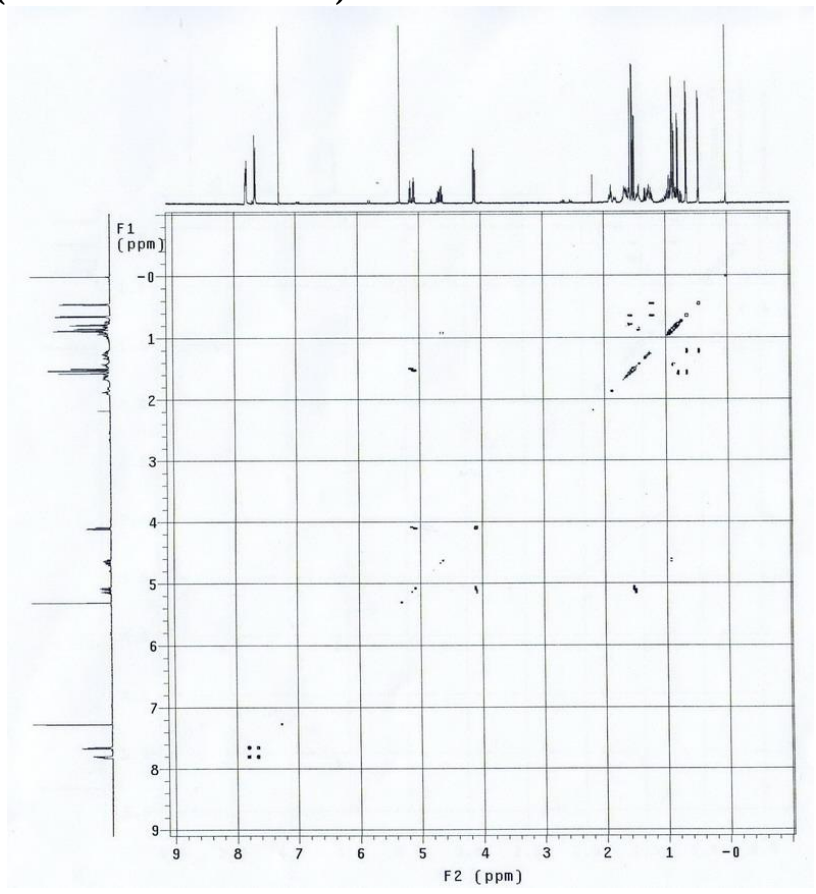

Figure S34. ^{1}H - COSY spectrum ($CDCl_3$, 500 MHz) of **5f** **(**diastereoisomers **A** and **B)**, *de* = 22%

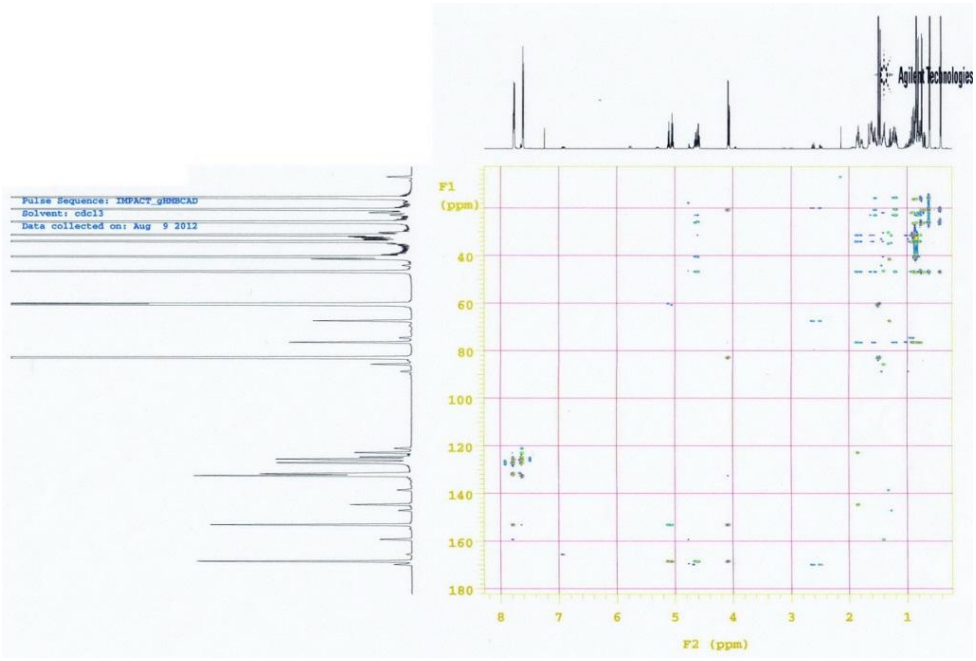

Figure S35. ^{1}H-^{13}C HMBC spectrum (expansion) ($CDCl_3$, 600 MHz) of **5f** **(**diastereoisomers **A** and **B)**, *de* = 22%

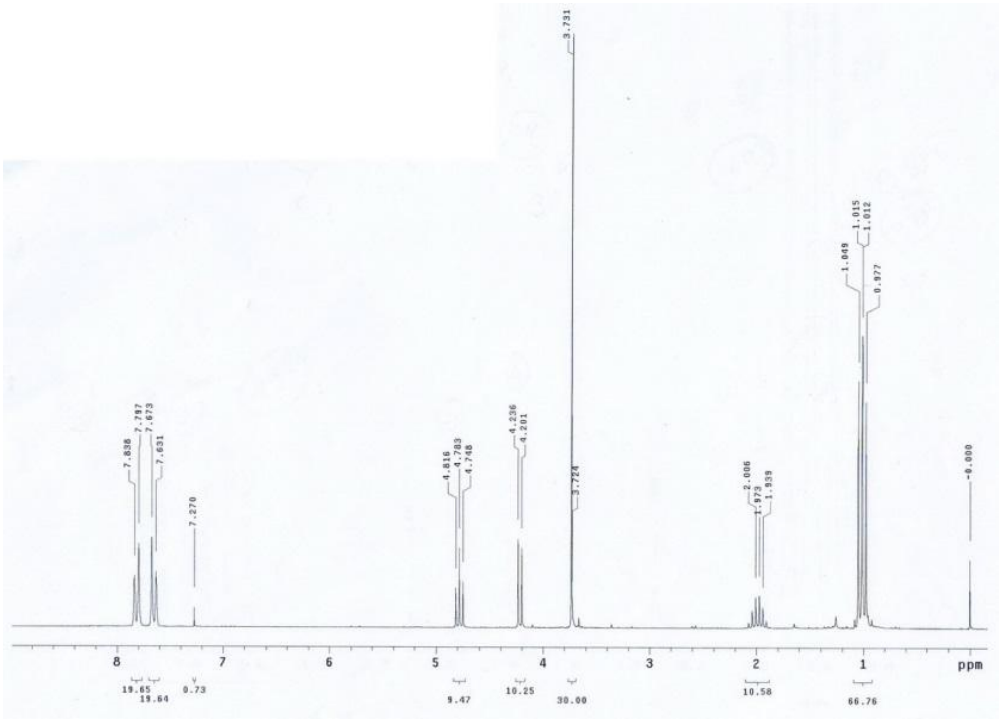

Figure S36. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **5g**

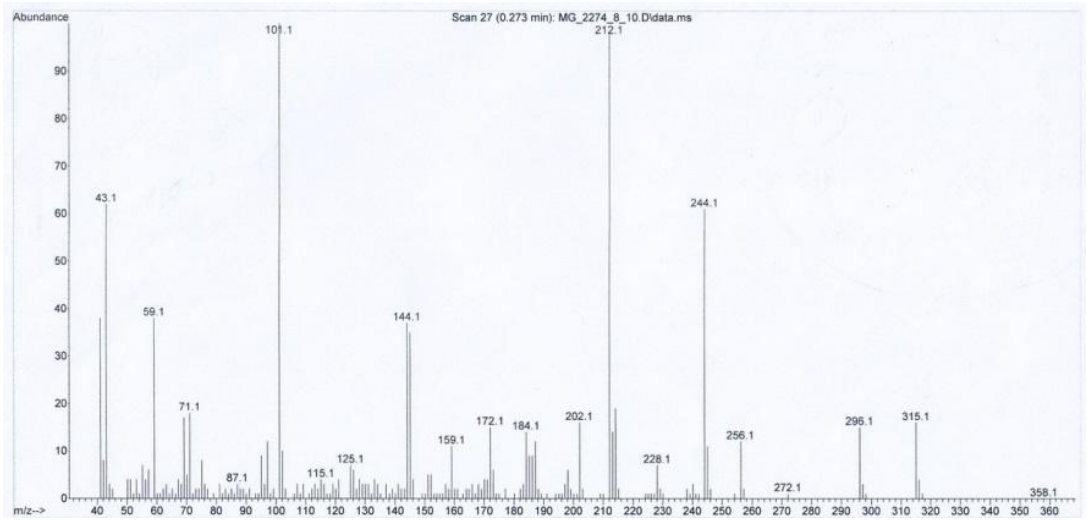

Figure S37. EI-MS-LR spectrum of **5g**

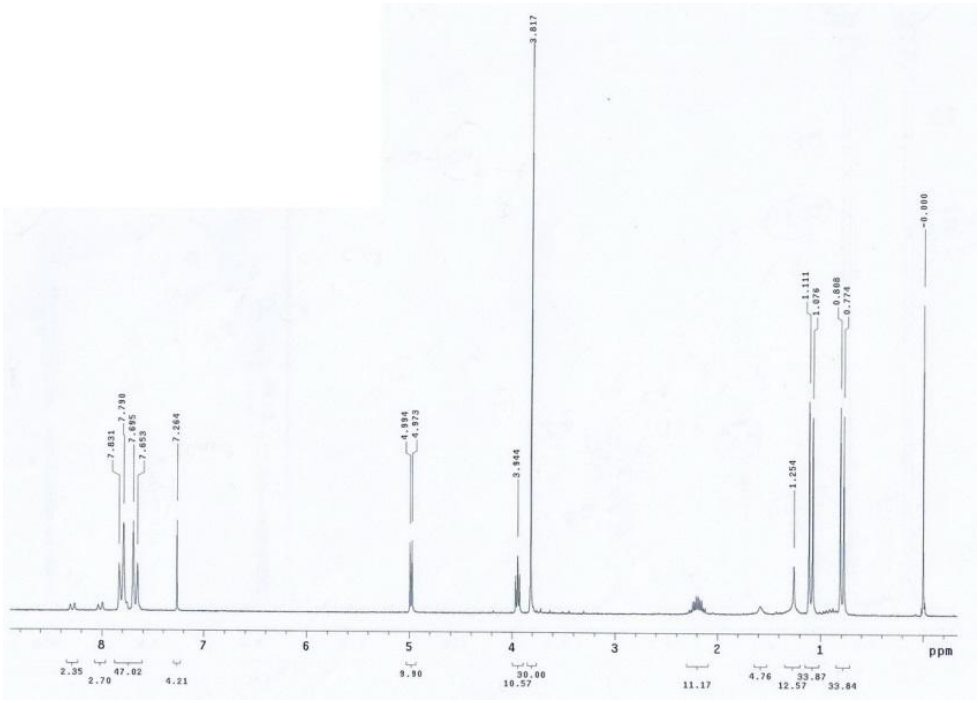

Figure S38. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **6g**

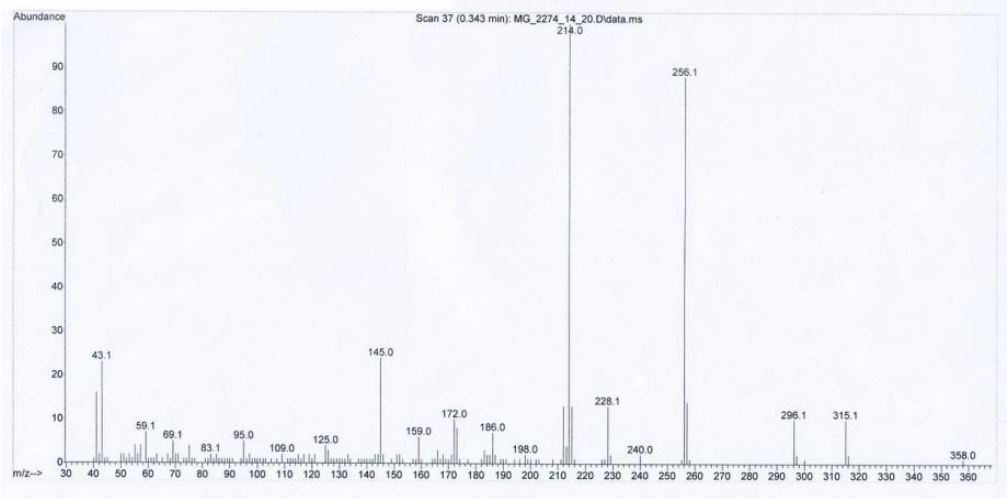

Figure S39. EI-MS-LR spectrum of **6g**

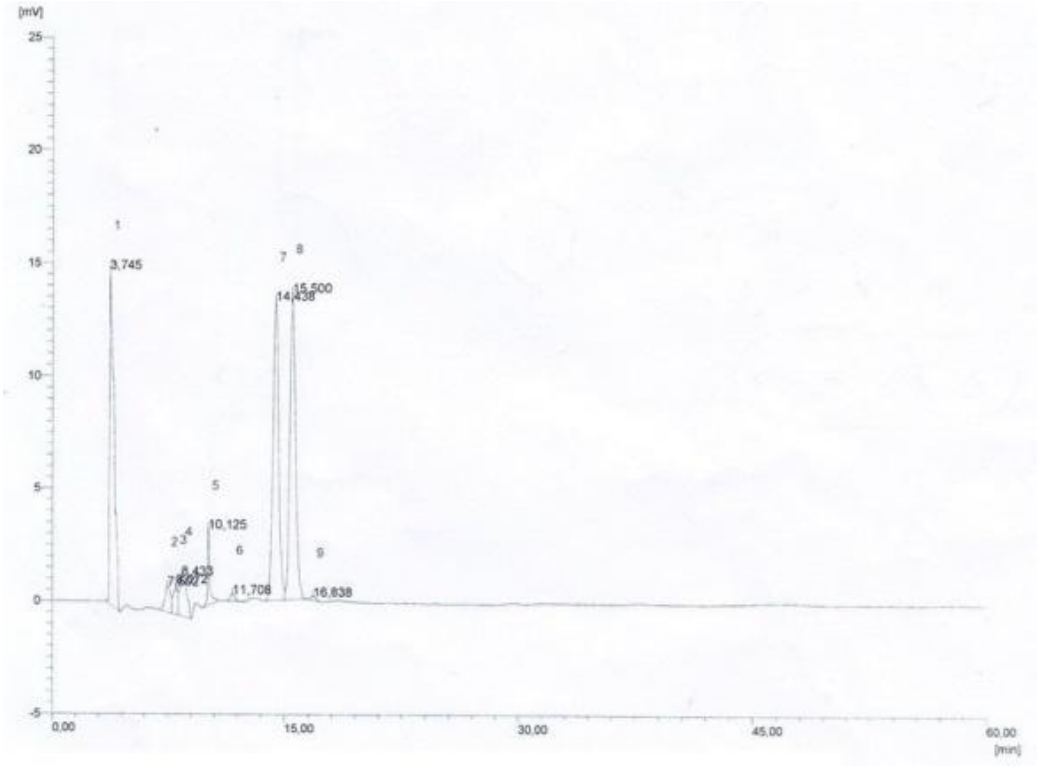

Figure S40. HPLC-chiral column AD-H, (hexane/2-propanole – 96/4, 254 nm, 1ml/min) spectrum of **6g,** *ee* = 1.8%

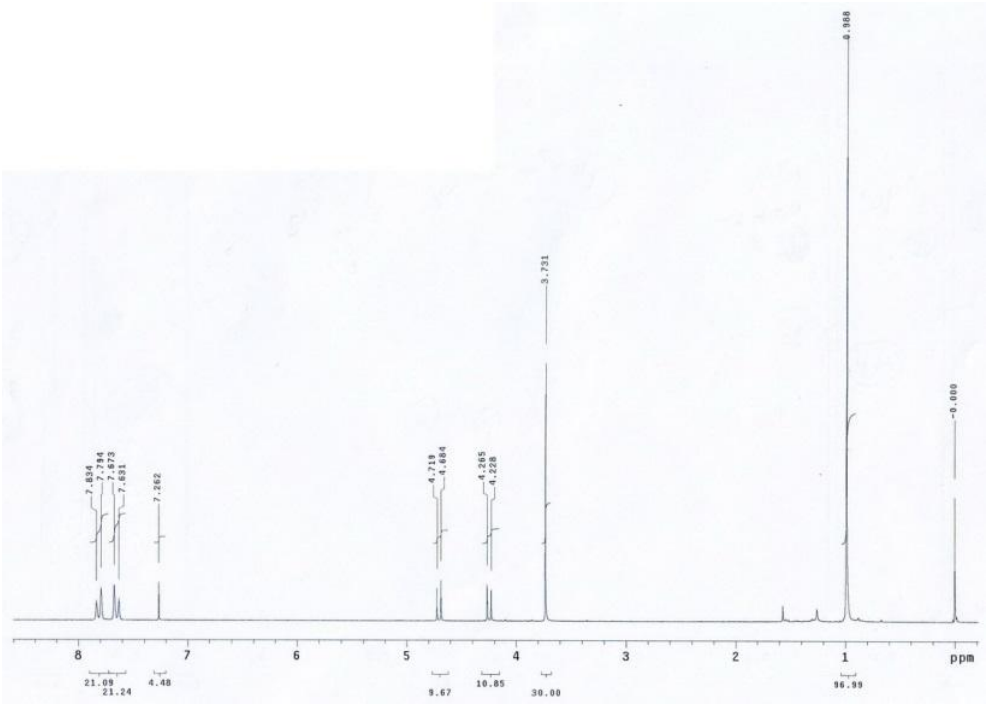

Figure S41. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **5h**

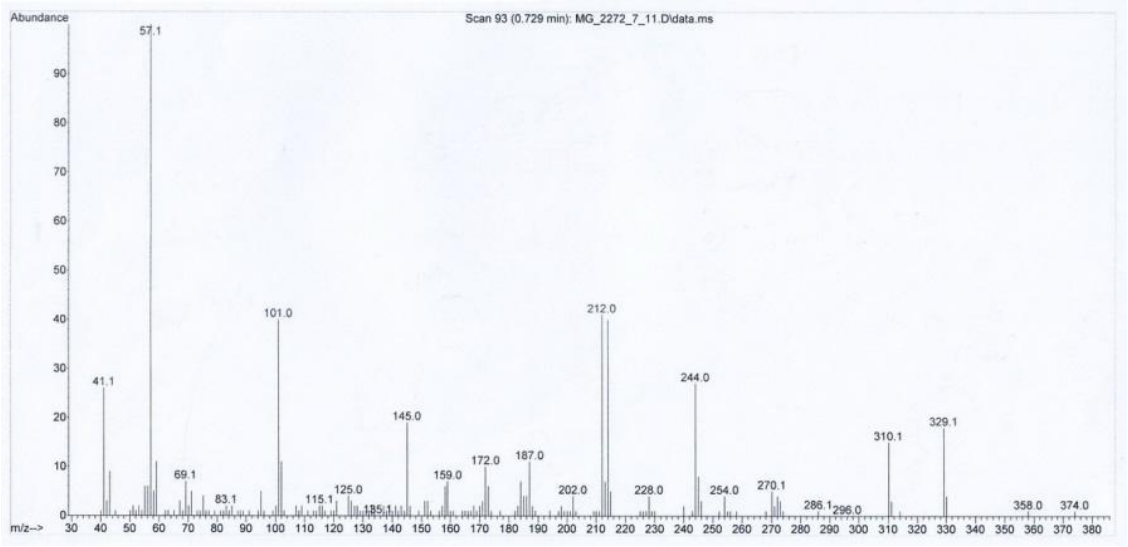

Figure S42. EI-MS-LR spectrum of **5h**

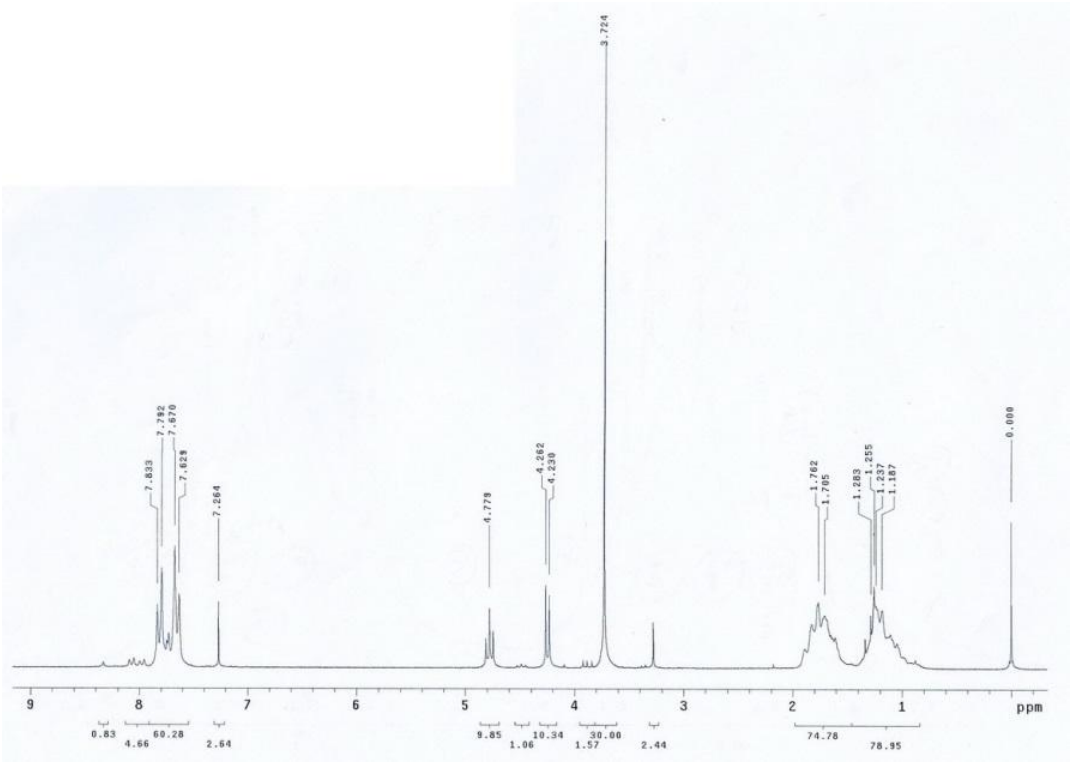

Figure S43. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **5i**

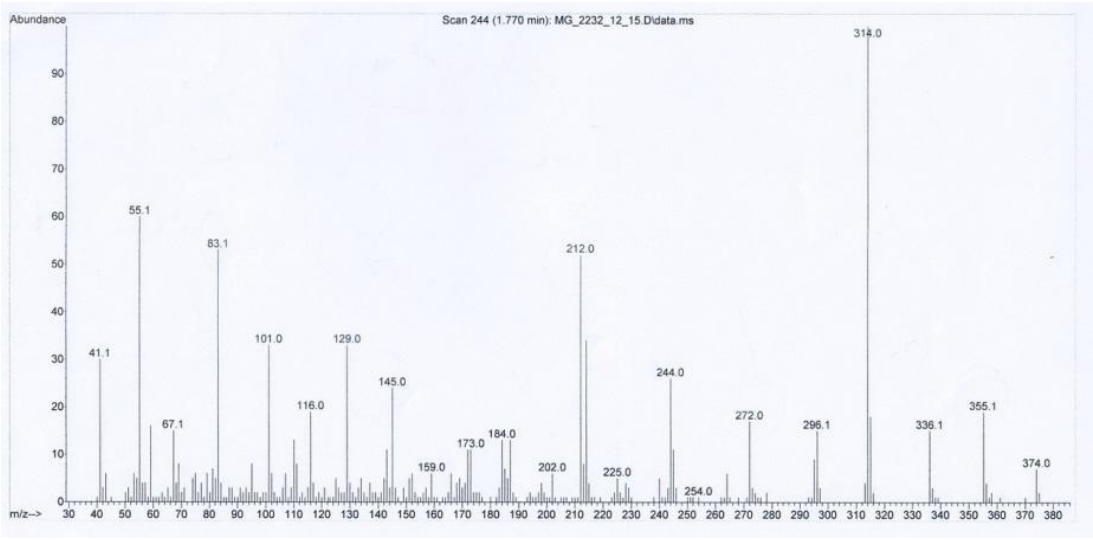

Figure S44. EI-MS-LR spectrum of **5i**

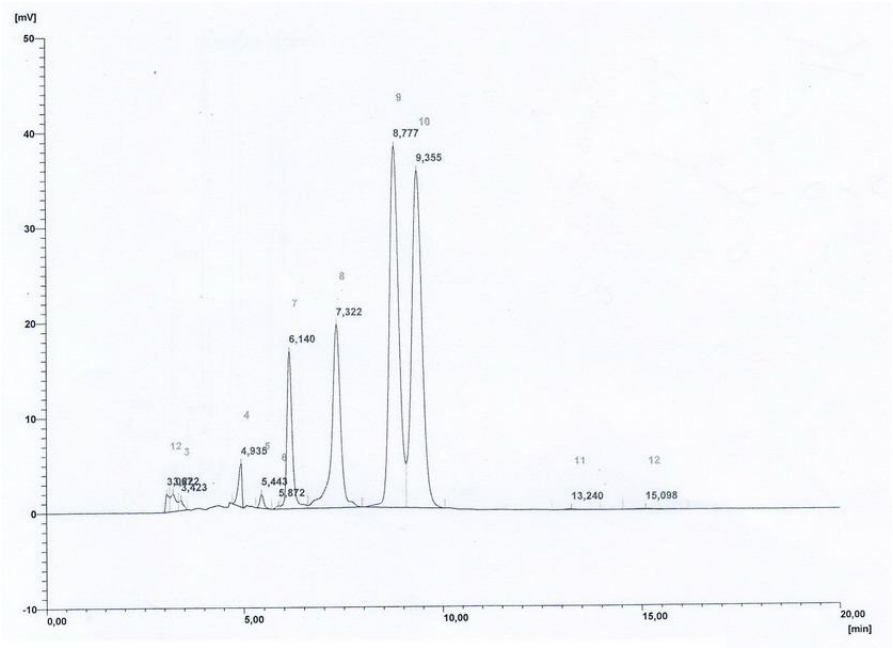

Figure S45. HPLC-chiral column AD-H, (hexane/2-propanole – 90/10, 254 nm, 1ml/min) spectrum of **5i,** *ee* = 22.8%

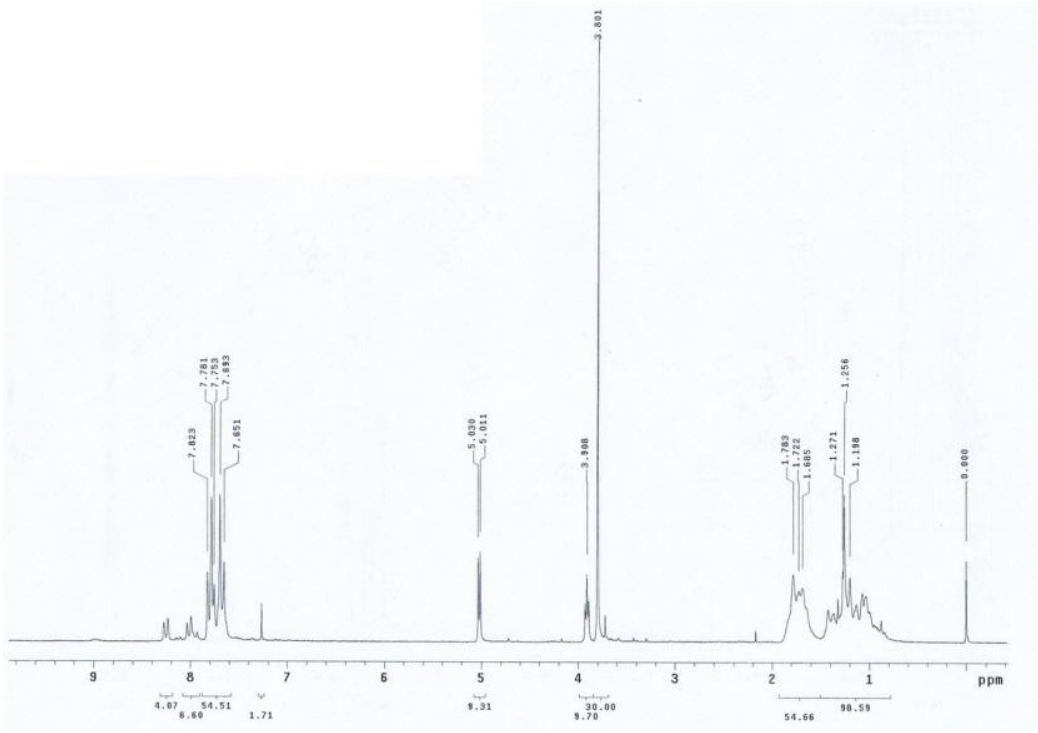

Figure S46. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **6i**

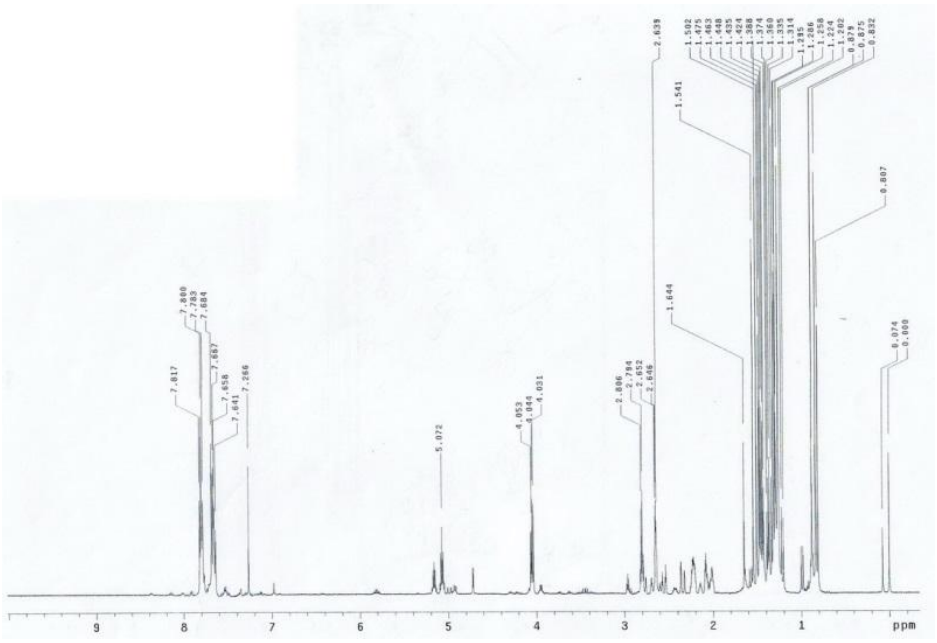

Figure S47. ^{1}H NMR spectrum ($CDCl_3$, 500 MHz) of **5j**

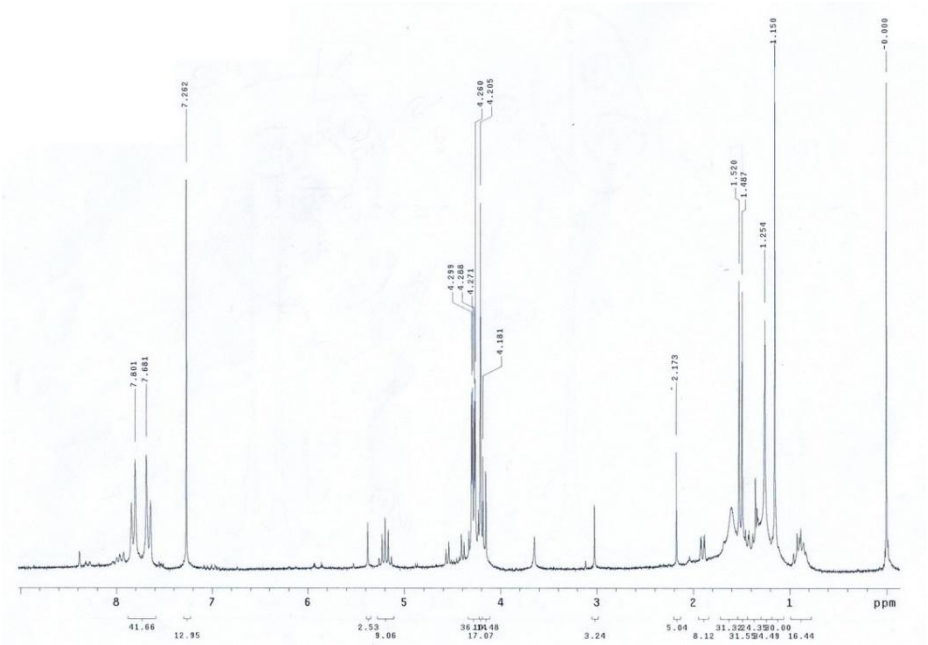

Figure S48. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **5k**

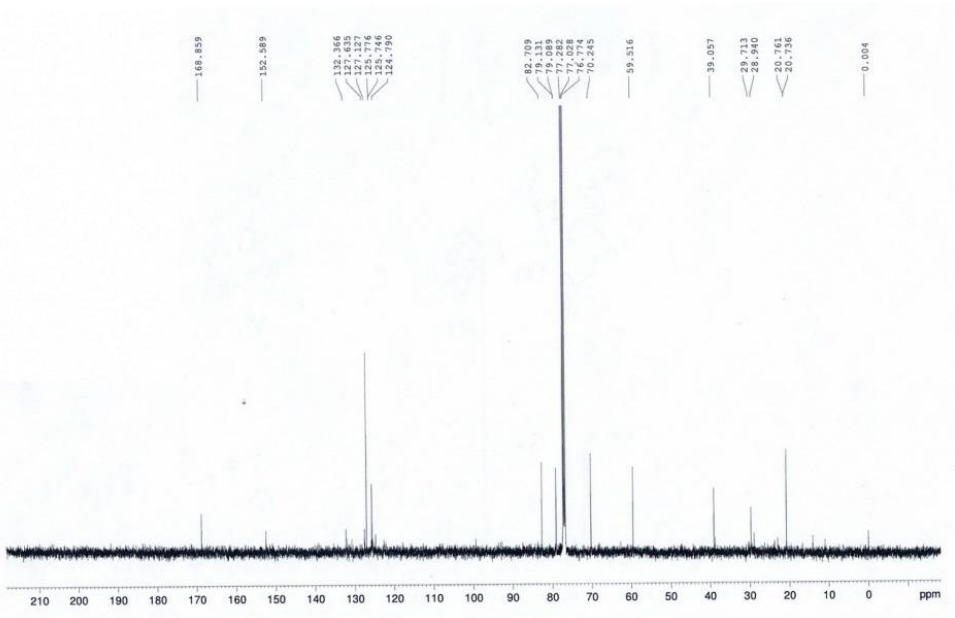

Figure S49. ^{13}C NMR spectrum ($CDCl_3$, 200 MHz) of **5k**

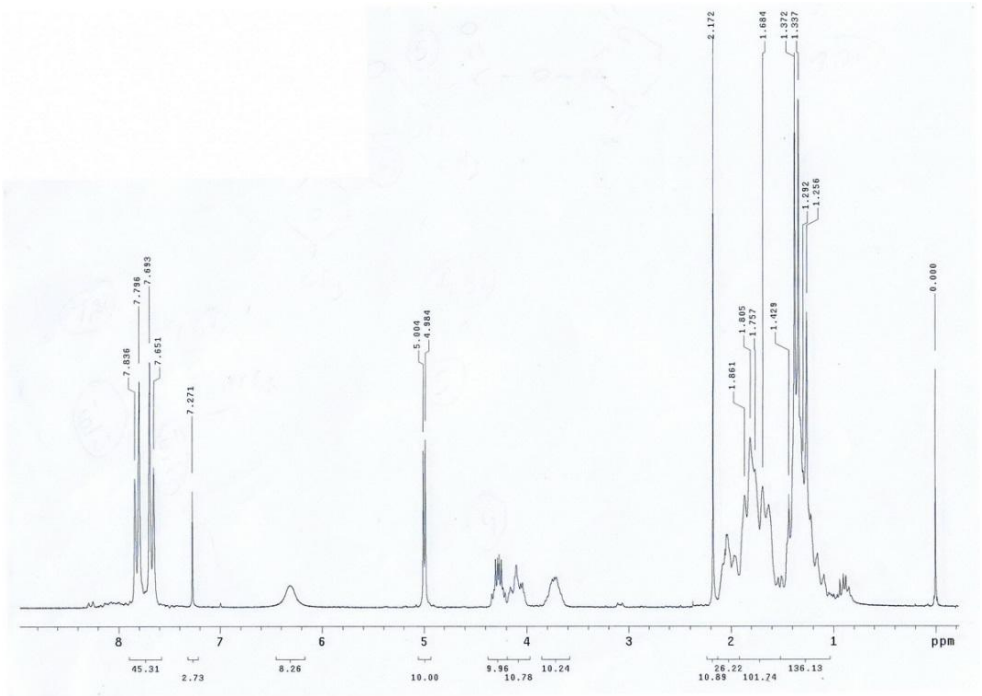

Figure S50. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **6l**

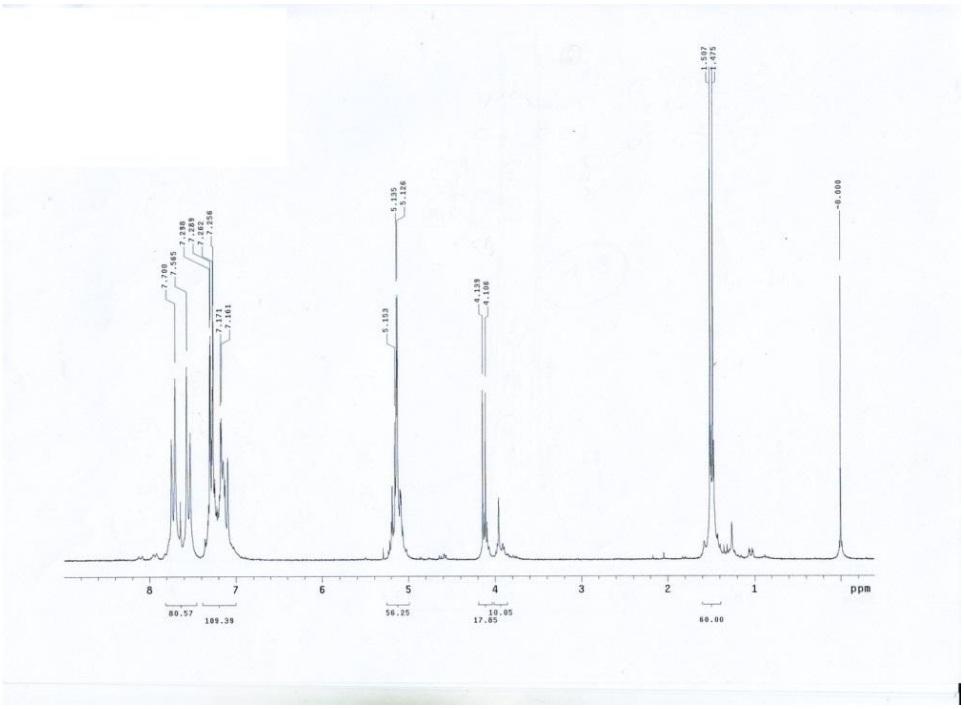

Figure S51. ^{1}H NMR spectrum ($CDCl_3$, 500 MHz) of **5m**

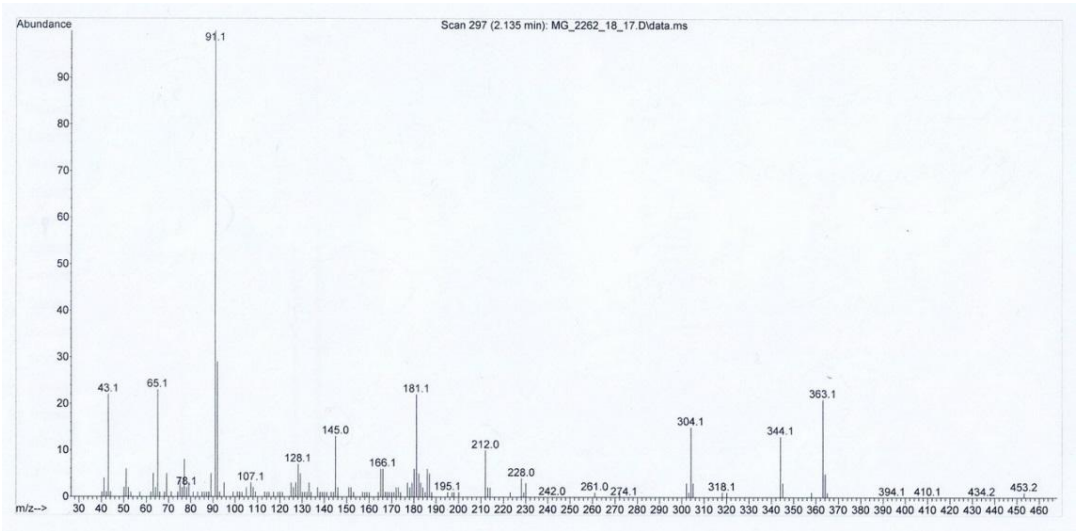

Figure S52. EI-MS-LR spectrum of **5m**

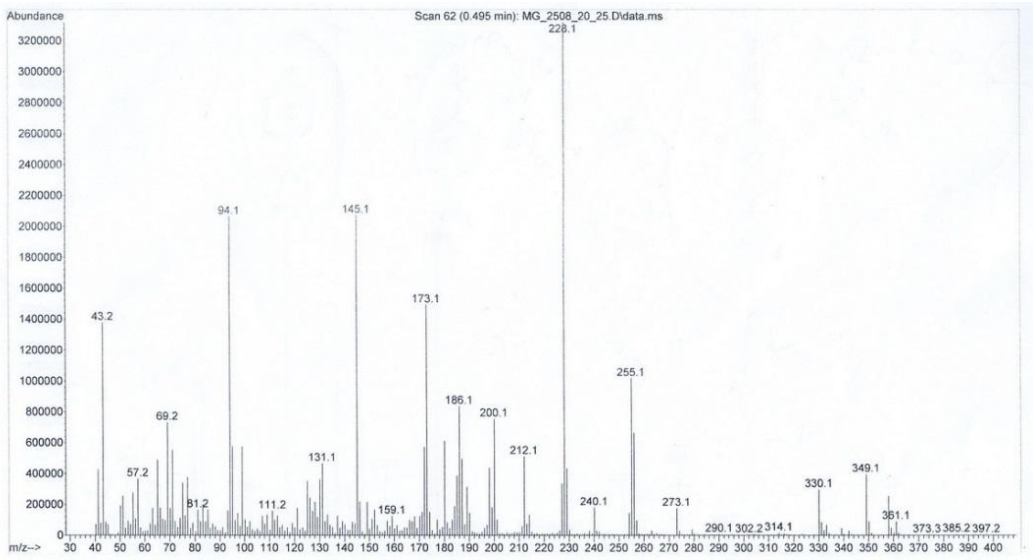

Figure S53. EI-MS-LR spectrum of **6n**

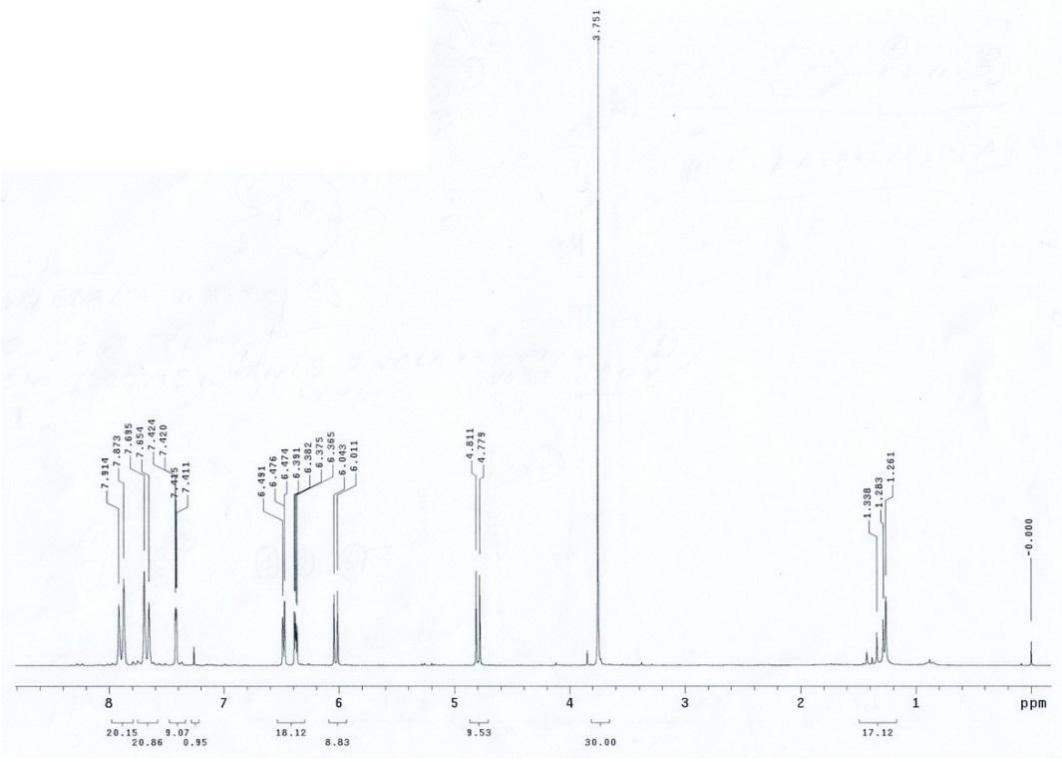

Figure S54. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **5o**

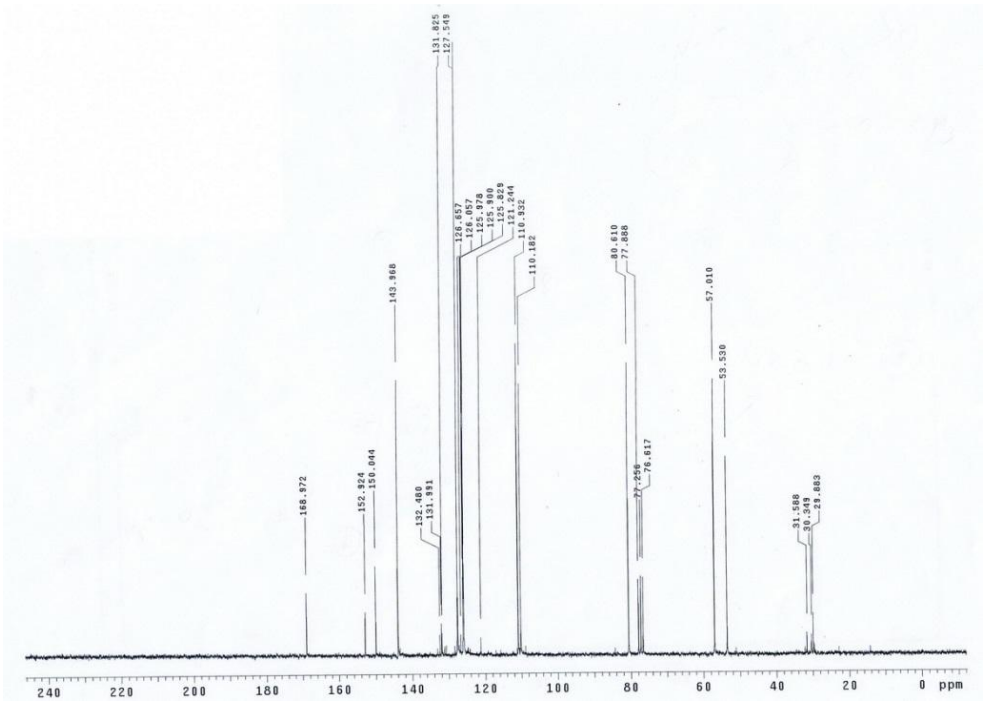

Figure S55. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **5o**

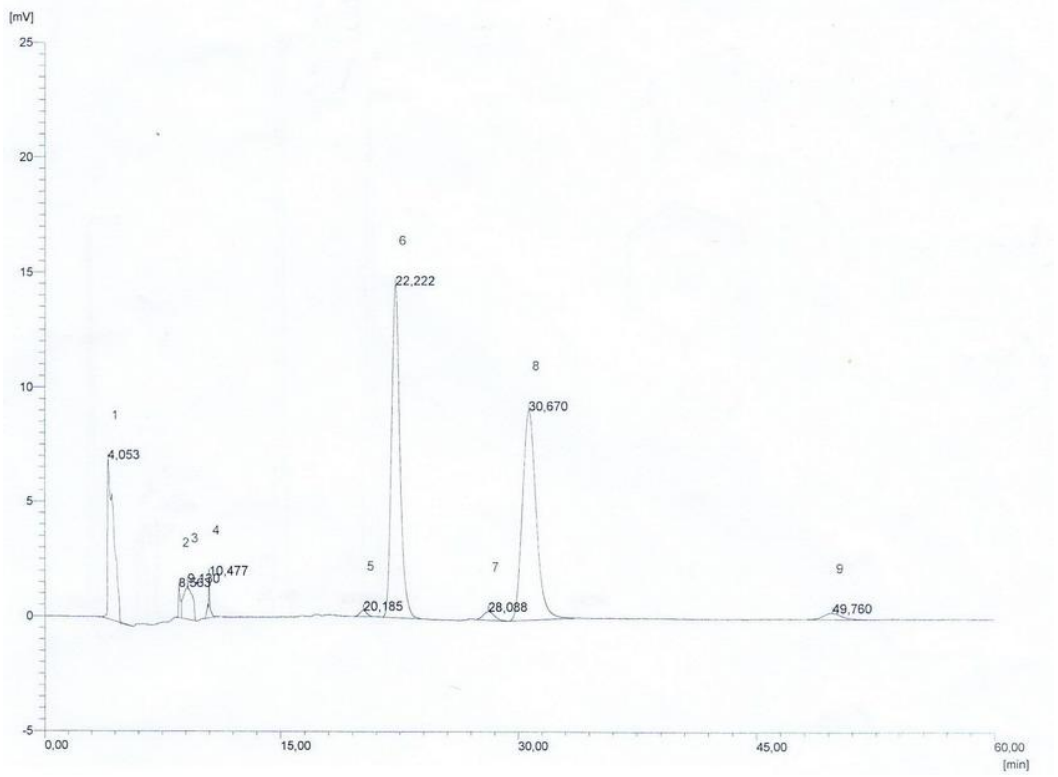

Figure S56. HPLC-chiral column AD-H, (hexane/2-propanole – 96/4, 254 nm, 1ml/min) spectrum of **5o**, *ee* = 2%

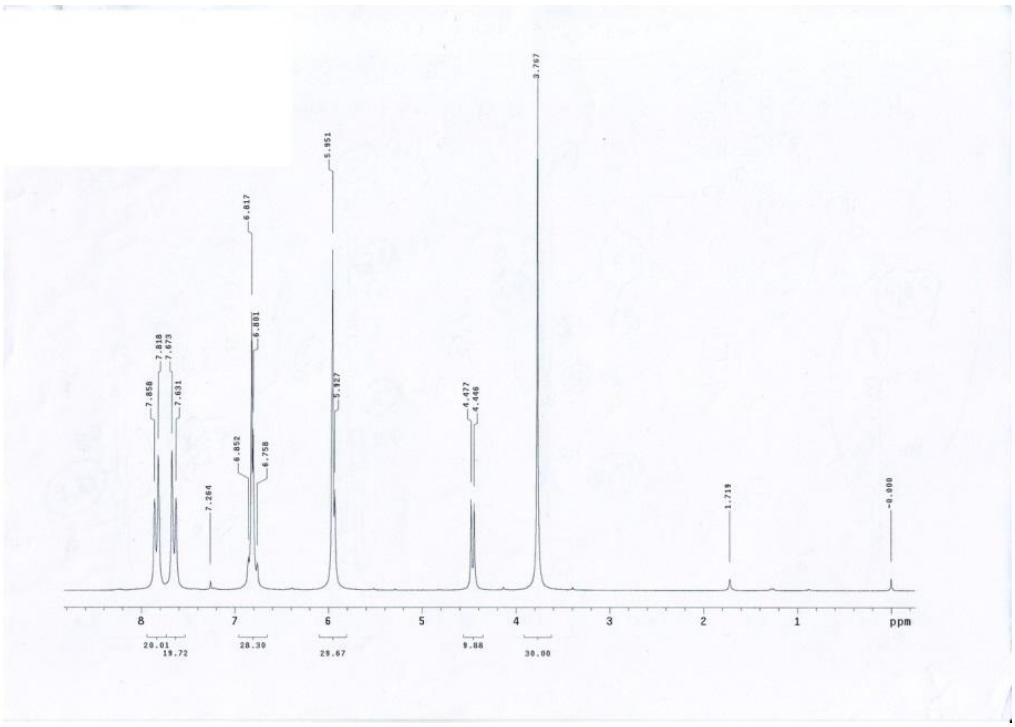

Figure S57. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **6p**

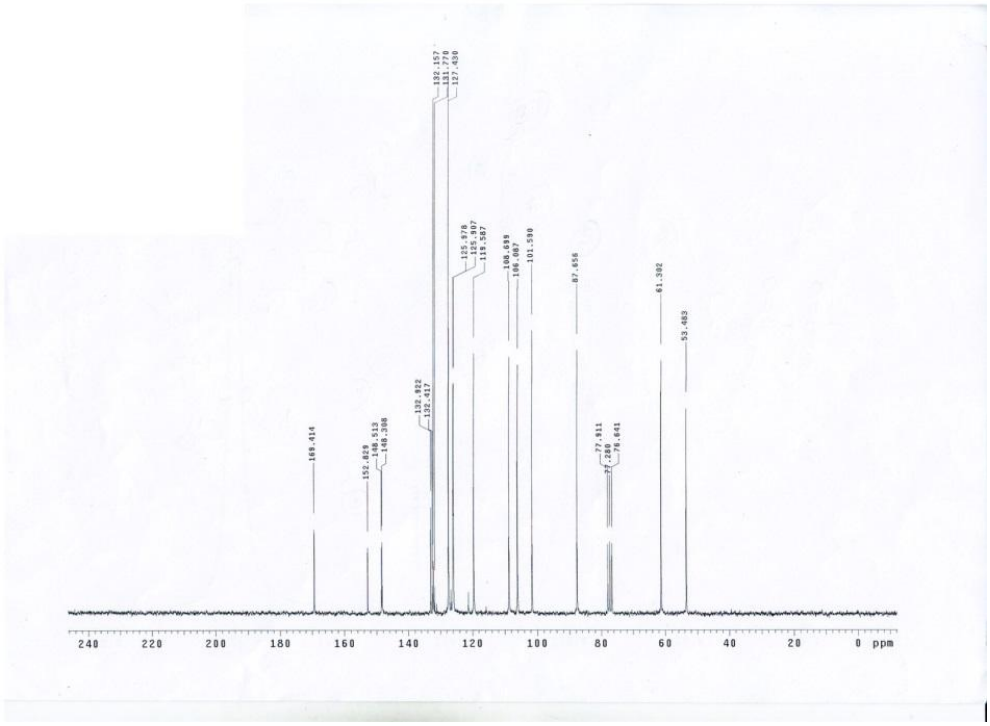

Figure S58. ^{13}C NMR spectrum ($CDCl_3$, 200 MHz) of **6p**

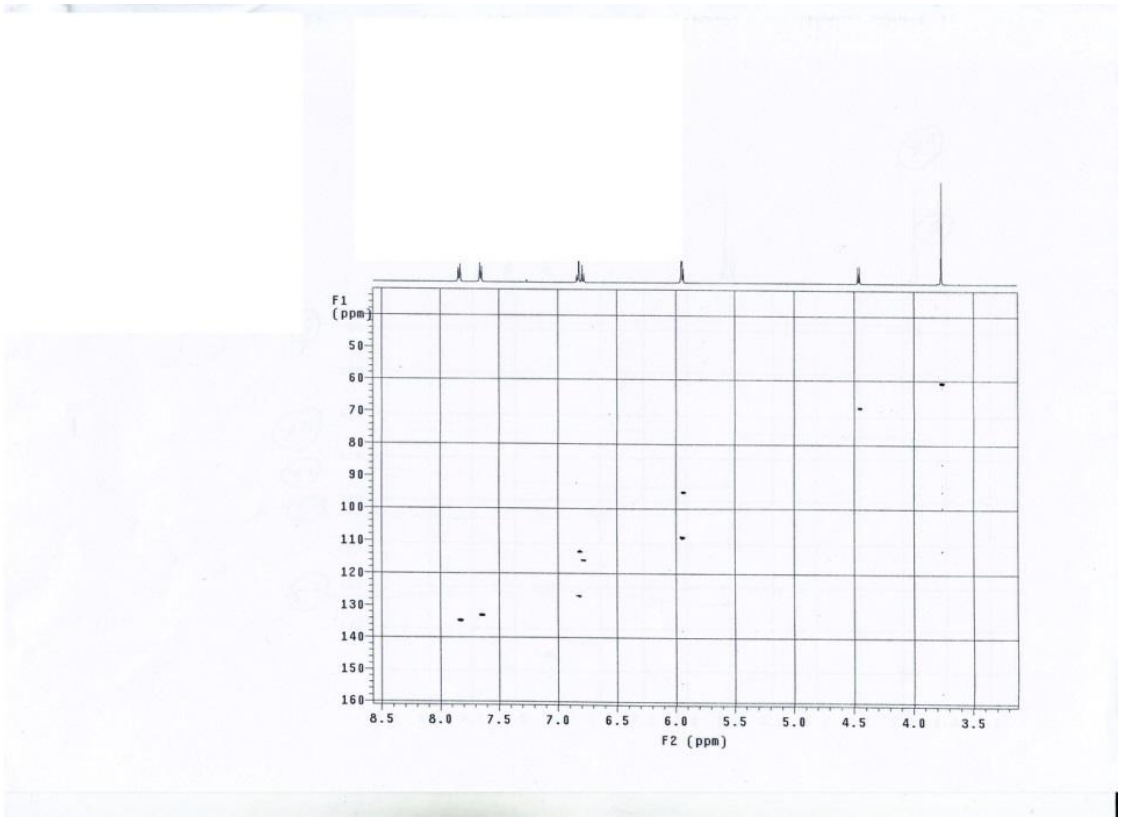

Figure S59. ^{1}H-^{13}C HQCC spectrum ($CDCl_3$, 500 MHz) of **6p**

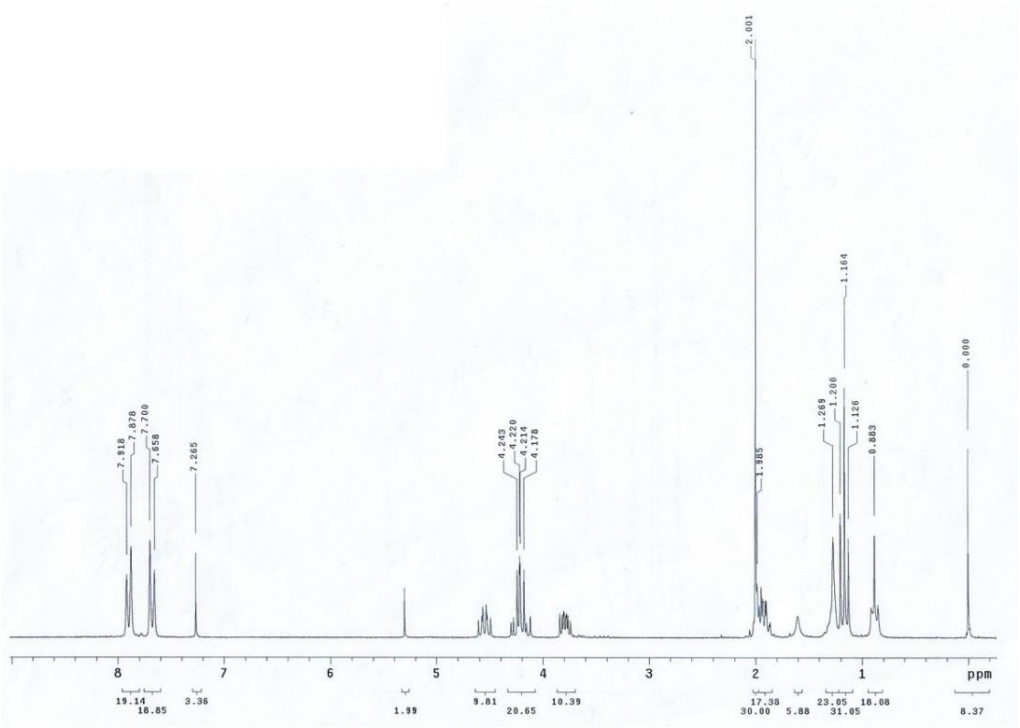

Figure S60. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **8a**

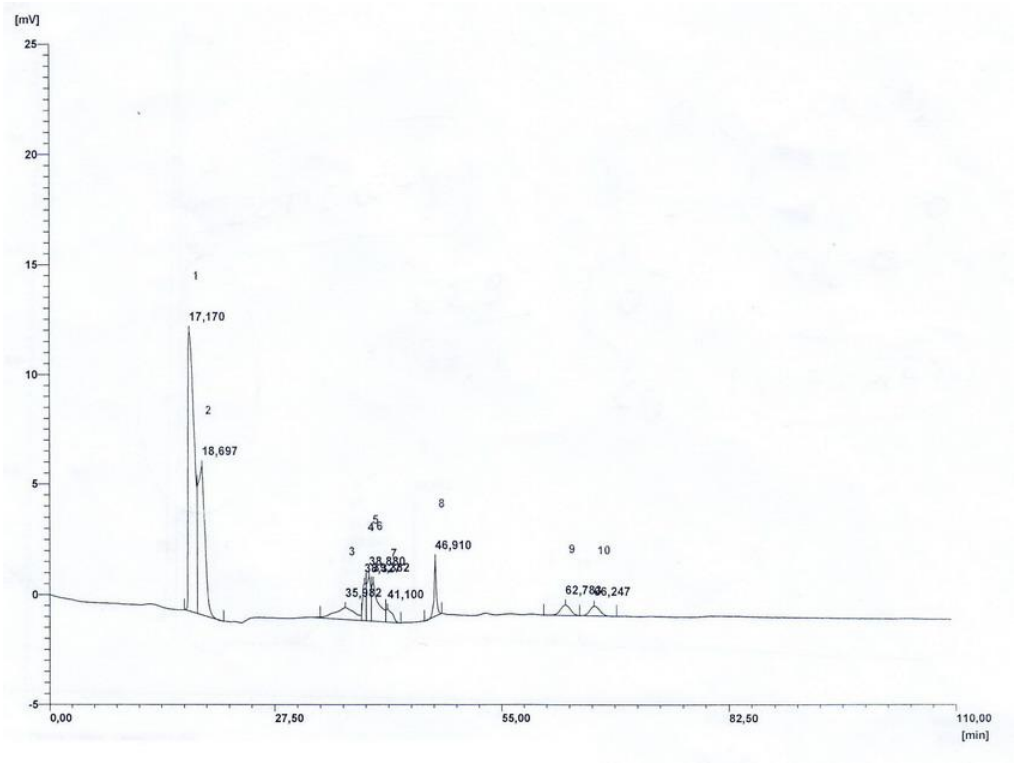

Figure S61. HPLC-chiral column AD-H, (hexane/2-propanole – 96/4, 254 nm, 1ml/min) spectrum of **8a,** *ee* = 25.8%

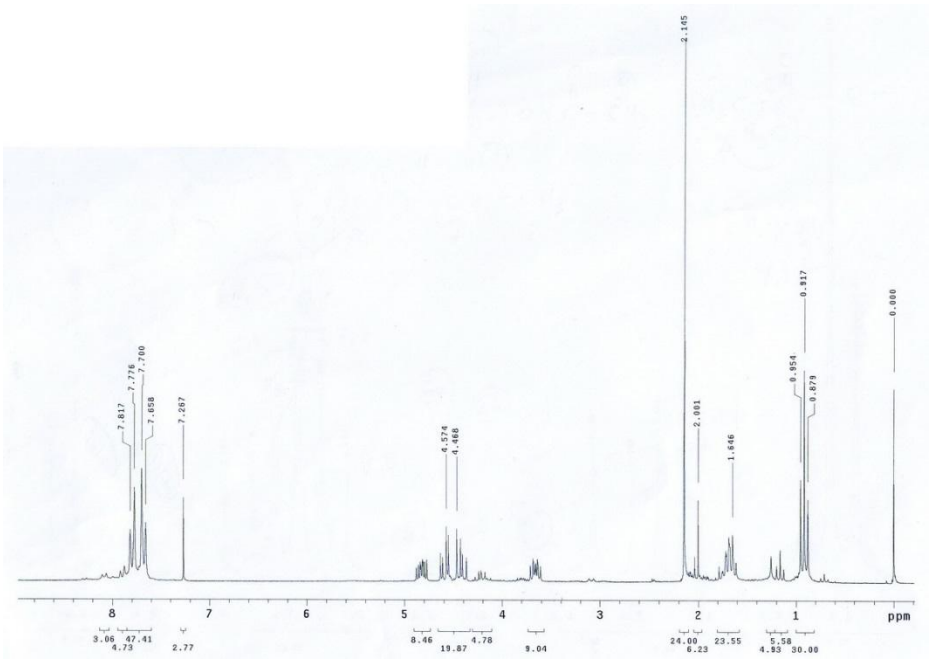

Figure S62. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **8b**

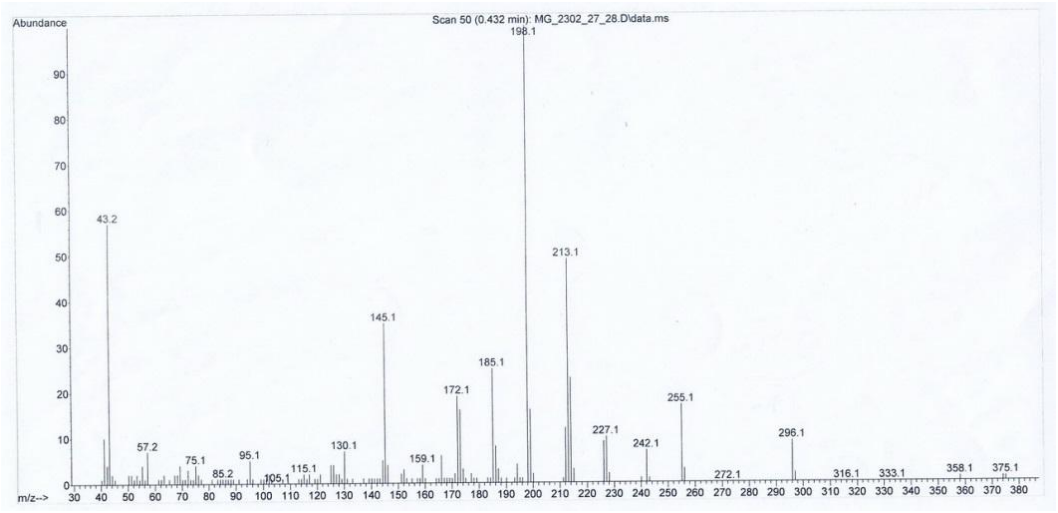

Figure S63. EI-MS-LR spectrum of **8b**

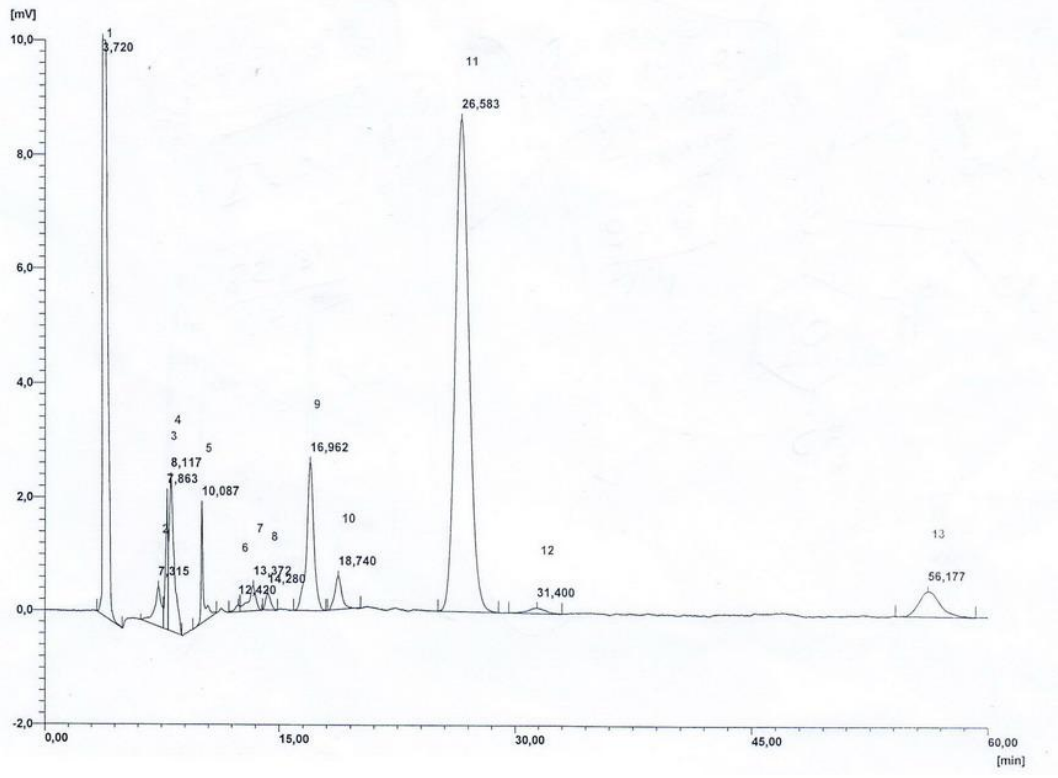

Figure S64. HPLC-chiral column AD-H, (hexane/2-propanole – 95/5, 254 nm, 1ml/min) spectrum of **8a;** *ee* = 64.6%, and **8b;** *ee* = 97.3%

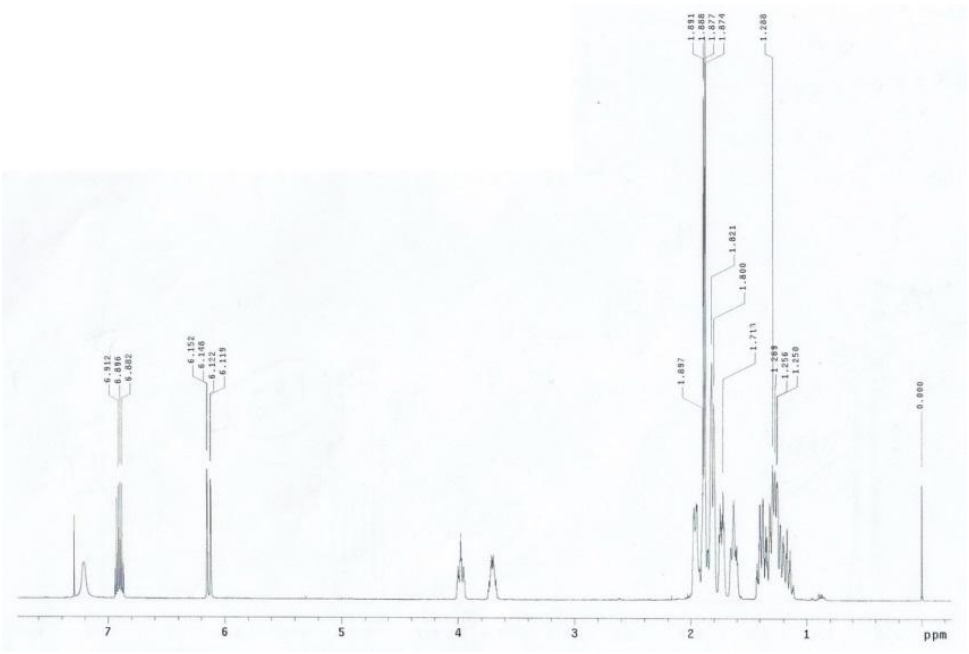

Figure S65. ^{1}H NMR spectrum ($CDCl_3$, 200 MHz) of **10**

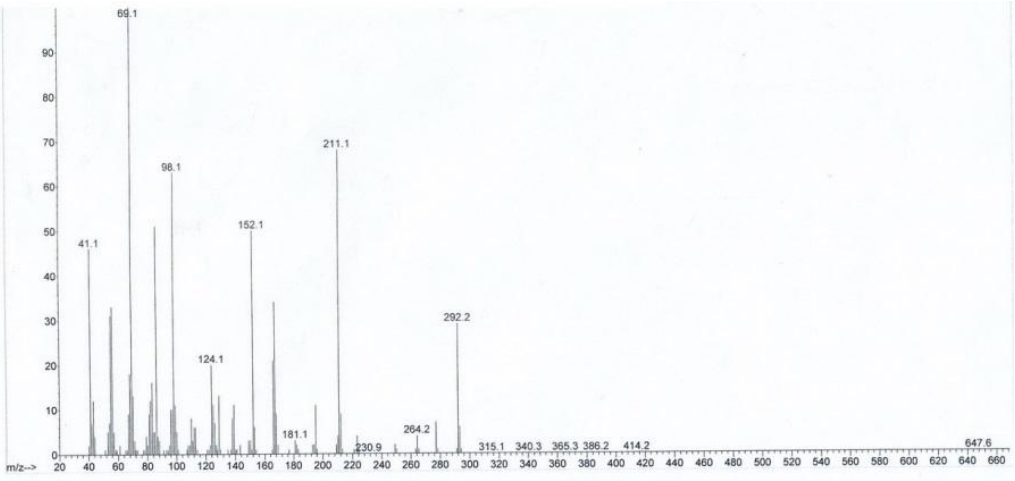

Figure S66. EI-MS-LR spectrum of **10**