Supporting Information

Enantioselective Synthesis of Functionalized 3,4-Disubstituted Dihydro-2(1*H*)-quinolinones via Michael–Hemiaminalization/Oxidation Reaction

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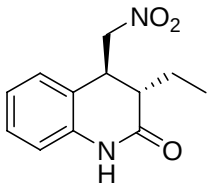
1. General information

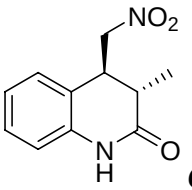
The ^{1}H NMR and ^{13}C NMR spectra were recorded in $CDCl_3$ or DMSO at 500 MHz and 125 MHz, respectively, with TMS as the internal standard. GC-MS experiments were performed on a GC system with a mass selective detector. HRMS data were measured on a LC/TOF-MS with ESI source. Column chromatography and flash chromatography experiments were performed on silica gel (200-300 mesh) eluting with ethyl ether and petroleum ether. TLC experiments were carried out on glass-backed silica plates. In each case, enantiomeric ratio was determined on a chiral column in comparison with authentic racemates by chiral HPLC. Chemicals were used without purification as commercially available.

2. Typical procedure for the organocatalytic asymmetric Michael–hemiaminalization/oxidation Reaction

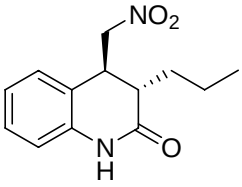
Solvent (0.5 mL) was added to a mixture of nitroolefins **1** (0.1 mmol) with aldehydes **2** (0.3 mmol) in the presence of 20 mol% catalyst **3d** and 20 mol% $PhCO_2H$ **4a** at room temperature under vigorous stirring. After 1 day, the reaction mixture was extracted with DCM, washed with water, dried, and concentrated. The residue was purified by flash chromatography on silica gel (ethyl ether/petroleum ether = 1:4 as eluent) to yield products **5**. Then, **5** and DCM (2 mL) was added to a mixture of PCC (3 equiv.) with CH_3CO_2Na (3 equiv.) or Na_2CO_3 (3 equiv.) at room temperature under vigorous stirring. After reaction completion, the residue was purified by flash chromatography on silica gel (ethyl ether/petroleum ether = 1:2 as eluent) to yield products **6**. Enantiomeric ratio was determined by HPLC analysis on a chiral column.



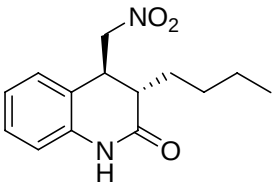
Compound (6a), yield: 20.4 mg, 87 %; 99 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak AD-H with hexane/i-PrOH (98:2) as the eluent, Flow: 1.0 mL/min; UV = 252 nm; t_{major} = 65.672 min, t_{minor} =71.174; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 9.38 (s, 1H), 7.29−7.26 (m, 1H), 7.21−7.19 (m, 1H), 7.06−7.03 (m, 1H), 6.92−6.89 (m, 1H), 4.53−4.43 (m, 2H), 3.73−3.70 (m, 1H), 2.51−2.48 (m, 1H), 1.72−1.64 (m, 1H), 1.55−1.46 (m, 1H), 1.06−1.02 (m, 3H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 172.2, 135.9, 129.4 (×2), 124.1, 119.7, 116.1, 78.1, 45.6, 40.2, 23.7, 11.6 ppm; HRMS: (ESI+) m/z calcd for $C_{12}H_{15}N_2O_3$ $[M+H]^+$ 235.1083, found 235.1094.



Compound (6b), yield: 13.4 mg, 61 %; > 99 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak OB-H with hexane/i-PrOH (95:5) as the eluent, Flow: 1.0 mL/min; UV = 252 nm; t_{major} = 50.489min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 8.99 (s, 1H), 7.30−7.26 (m, 1H), 7.22−7.20 (m, 1H), 7.08−7.05 (m, 1H), 6.90−6.88 (m, 1H), 4.53−4.42 (m, 2H), 3.60−3.57 (m, 1H), 2.76−2.70 (m, 1H), 1.26−1.25 (m, 3H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 172.7, 136.6, 129.6, 129.5, 124.2, 119.5, 116.0, 78.0, 42.5, 38.6, 16.4 ppm; HRMS: (ESI+) m/z calcd for $C_{11}H_{13}N_2O_3$ $[M+H]^+$ 221.0926, found 221.0930.

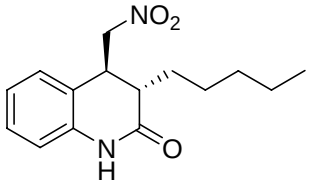


Compound (6c), yield: 15.6 mg, 63 %; 98 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak AD-H with hexane/i-PrOH (98:2) as the eluent, Flow: 1.0 mL/min; UV = 252 nm; t_{minor} = 75.746 min, t_{major} = 66.776 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 8.37 (s, 1H), 7.29−7.26 (m, 1H), 7.20−7.19 (m, 1H), 7.07−7.04 (m, 1H), 6.84−6.83 (m, 1H), 4.51−4.41 (m, 2H), 3.70−3.68 (m, 1H), 2.60−2.58 (m, 1H), 1.60−1.56 (m, 2H), 1.45−1.40 (m, 2H), 0.93−0.83 (m, 3H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 171.9, 135.9, 129.5, 129.4, 124.1, 119.8, 115.9, 78.1, 43.8, 40.5, 32.4, 20.1, 13.7 ppm; HRMS: (ESI+) m/z calcd for $C_{13}H_{17}N_2O_3$ $[M+H]^+$ 249.1239, found 249.1235.

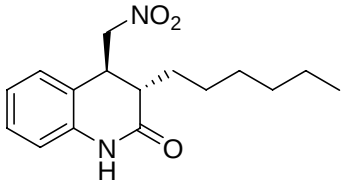


Compound (6d), yield: 20.4 mg, 87 %; > 99 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak OB-H with hexane/i-PrOH (95:5) as the eluent, Flow: 1.0 mL/min; UV = 252 nm; t_{major} = 46.583 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 9.44 (s, 1H), 7.29−7.26 (m, 1H), 7.20−7.19 (m, 1H), 7.06−7.03 (m, 1H), 6.92−6.90 (m, 1H), 4.52−4.42 (m, 2H), 3.71−3.68 (m, 1H), 2.58−2.55 (m, 1H), 1.63−1.58 (m, 1H), 1.49−1.36 (m, 3H),

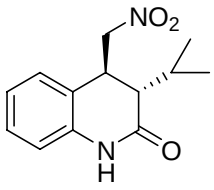
1.33−1.24 (m, 3H), 0.88−0.86 (m, 3H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 172.5, 136.0, 129.4 (×2), 124.1, 119.7, 116.1, 78.1, 43.9, 40.4, 30.1, 29.0, 22.3, 13.8 ppm; HRMS: (ESI+) m/z calcd for $C_{14}H_{19}N_2O_3$ $[M+H]^+$ 263.1396, found 263.1401.



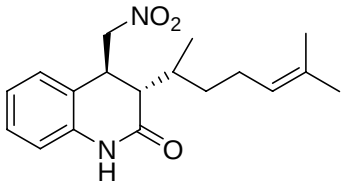
Compound (6e), yield: 20.4 mg, 74 %; > 99 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak OB-H with hexane/i-PrOH (90:10) as the eluent, Flow: 1.0 mL/min; UV = 252 nm; t_{minor} = 21.425 min, t_{major} = 24.892 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 9.57 (s, 1H), 7.29−7.26 (m, 1H), 7.20−7.19 (m, 1H), 7.06−7.03 (m, 1H), 6.92−6.91 (m, 1H), 4.52−4.42 (m, 2H), 3.71−3.68 (m, 1H), 2.59−2.56 (m, 1H), 1.64−1.55 (m, 1H), 1.50−1.37 (m, 3H), 1.30−1.26 (m, 4H), 0.87−0.84 (m, 3H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 172.6, 156.0, 136.0, 129.4, 129.3, 124.1, 119.7, 116.1, 78.1, 43.9, 40.4, 31.3, 30.3, 26.5, 22.3, 13.9 ppm; HRMS: (ESI+) m/z calcd for $C_{15}H_{21}N_2O_3$ $[M+H]^+$ 277.1552, found 277.1549.



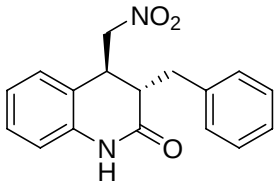
Compound (6f), yield: 22.0 mg, 76 %; 98 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak OB-H with hexane/i-PrOH (90:10) as the eluent, Flow: 1.0 mL/min; UV = 252 nm; t_{minor} = 75.746 min, t_{major} = 66.776 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 9.30 (s, 1H), 7.29−7.26 (m, 1H), 7.20−7.19 (m, 1H), 7.06−7.03 (m, 1H), 6.90−6.89 (m, 1H), 4.51−4.41 (m, 2H), 3.71−3.68 (m, 1H), 2.58−2.55 (m, 1H), 1.64−1.57 (m, 1H), 1.49−1.34 (m, 3H), 1.29−1.22 (m, 6H), 0.86−0.84 (m, 3H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 172.4, 135.9, 129.4 (×2), 124.1, 119.7, 116.0, 78.1, 44.0, 40.4, 31.5, 30.3, 28.8, 26.8, 22.5, 14.0 ppm; HRMS: (ESI+) m/z calcd for $C_{16}H_{23}N_2O_3$ $[M+H]^+$ 291.1709, found 291.1709.



Compound (6g), yield: 19.1 mg, 77 %; 95 % ee; > 30:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak AD-H with hexane/i-PrOH (98:2) as the eluent, Flow: 1.0 mL/min; UV = 252 nm; t_{minor} = 63.017 min, t_{major} = 52.155 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 8.81 (s, 1H), 7.28−7.25 (m, 1H), 7.20−7.19 (m, 1H), 7.06−7.03 (m, 1H), 6.86−6.85 (m, 1H), 4.51−4.42 (m, 2H), 3.87−3.84 (m, 1H), 2.25−2.23 (m, 1H), 1.79−1.71 (m, 1H), 1.03−0.98 (m, 6H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 171.2, 136.1, 129.4, 129.1, 124.1, 120.4, 115.9, 78.2, 50.8, 39.0, 28.3, 20.8, 20.5 ppm; HRMS: (ESI+) m/z calcd for $C_{13}H_{17}N_2O_3$ $[M+H]^+$ 249.1239, found 249.1247.

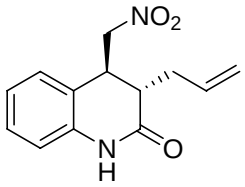


Compound (6h), yield: 23.1 mg, 73 %; > 99 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak OB-H with hexane/i-PrOH (95:5) as the eluent, Flow: 1.0 mL/min; UV = 252 nm; t_{major} = 33.481 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 8.47 (s, 1H), 7.28−7.26 (m, 1H), 7.19−7.17 (m, 1H), 7.05−7.02 (m, 1H), 6.83−6.81 (m, 1H), 5.01−4.98 (m, 1H), 5.50−4.41 (m, 2H), 3.86−3.62 (m, 1H), 2.39−2.36 (m, 1H), 2.08−2.01 (m, 1H), 1.86−1.81 (m, 1H), 1.73−1.67 (m, 1H), 1.62 (s, 3H), 1.54 (s, 3H), 1.52−1.48 (m, 1H), 1.35−1.28 (m, 1H), 0.91−0.88 (m, 3H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 171.2, 136.0, 131.9, 129.4, 128.9, 124.1, 123.8, 120.6, 115.8, 78.5, 49.3, 38.4, 34.3, 33.3, 25.6, 25.2, 17.6, 16.6 ppm; HRMS: (ESI+) m/z calcd for $C_{18}H_{25}N_2O_3$ $[M+H]^+$ 317.1865, found 317.1849.

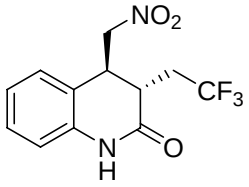


Compound (6i), yield: 22.2 mg, 75 %; 95 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak OB-H with hexane/i-PrOH (95:5) as the eluent, Flow: 1.0 mL/min; UV = 252 nm;

t_{minor} = 133.223 min, t_{major} = 167.151 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 9.02 (s, 1H), 7.34−7.30 (m, 3H), 7.29−7.26 (m, 1H), 7.16−7.15 (m, 1H), 7.11−7.08 (m, 3H), 6.92−7.90 (m, 1H), 4.43−4.36 (m, 2H), 3.53−3.49 (m, 1H), 3.11−3.07 (m, 1H), 2.89−2.85 (m, 1H), 2.58−2.53 (m, 1H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 171.5, 136.8, 136.0, 129.7, 129.6, 129.0 (×2), 128.9 (×2), 127.2, 124.4, 119.4, 116.2, 77.8, 45.7, 38.6, 35.8 ppm; HRMS: (ESI+) m/z calcd for $C_{17}H_{17}N_2O_3$ $[M+H]^+$ 297.1239, found 297.1243.

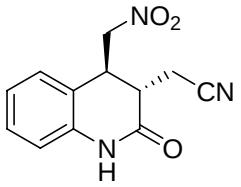


Compound (6j), yield: 18.0 mg, 73 %; 98 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak AD-H with hexane/i-PrOH (95:5) as the eluent, Flow: 1.0 mL/min; UV = 252 nm; t_{minor} = 26.985 min, t_{major} = 24.238 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 9.68 (s, 1H), 7.30−7.27 (m, 1H), 7.19−7.17 (m, 1H), 7.08−7.05 (m, 1H), 6.95−6.93 (m, 1H), 5.81−5.72 (m, 1H), 5.15−5.13 (m, 1H), 5.03−5.00 (m, 1H), 4.52−4.43 (m, 2H), 3.77−3.74 (m, 1H), 2.68−2.65 (m, 1H), 2.48−2.43 (m, 1H), 2.16−2.10 (m, 1H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 172.0, 135.9, 133.6, 129.5, 129.4, 124.3, 119.3, 118.8, 77.9, 43.4, 39.2, 34.3 ppm; HRMS: (ESI+) m/z calcd for $C_{13}H_{15}N_2O_3$ $[M+H]^+$ 247.1083, found 247.1079.

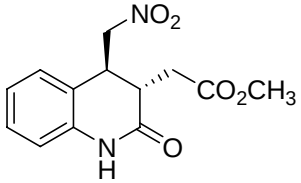


Compound (6k), yield: 20.2 mg, 70 %; 92 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak AS-H with hexane/i-PrOH (90:10) as the eluent, Flow: 1.0 mL/min; UV = 252nm; t_{minor} = 40.799 min, t_{major} = 52.021 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 9.21 (s, 1H), 7.35−7.32 (m, 1H), 7.26−7.25 (m, 1H), 7.14−7.10 (m, 1H), 6.94−6.92 (m, 1H), 4.57−4.53 (m, 1H), 4.49−4.45 (m, 1H), 3.89−3.86 (m, 1H), 3.03−3.00 (m, 1H), 2.46−2.36 (m, 1H), 2.31−2.20 (m, 1H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 169.2, 135.5, 130.0 (1C, m), 126.8, 124.9, 124.6, 118.5, 116.5, 77.1, 39.1 (d, $^3J_{C\text{-}F}$ = 139.6

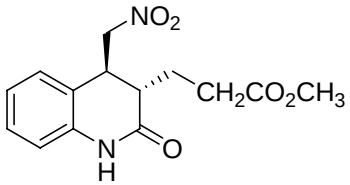
Hz), 33.8 (1C, m), 29.7 ppm; HRMS: (ESI+) m/z calcd for $C_{12}H_{12}F_3N_2O_3$ $[M+H]^+$ 289.0800, found 289.0806.



Compound (6l), yield: 16.4 mg, 67 %; > 99 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak AD-H with hexane/i-PrOH (90:10) as the eluent, Flow: 1.0 mL/min; UV = 252 nm; t_{major} = 38.653 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 9.65 (s, 1H), 7.36−7.27 (m, 2H), 7.15−7.09 (m, 1H), 6.97−6.93 (m, 1H), 4.65−4.61 (m, 1H), 4.56−4.52 (m, 1H), 3.90−3.87 (m, 1H), 3.08−3.04 (m, 1H), 2.78−2.73 (m, 1H), 2.61−2.56 (m, 1H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 168.4, 135.2, 130.2, 129.4, 125.1, 117.8, 116.7, 116.1, 76.8, 40.3, 39.6, 18.7 ppm; HRMS: (ESI+) m/z calcd for $C_{12}H_{12}N_3O_3$ $[M+H]^+$ 246.0879, found 246.0888.

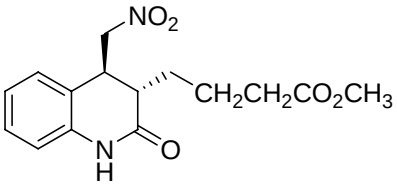


Compound (6m), yield: 18.9 mg, 68 %; > 99 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak AS-H with hexane/i-PrOH (70:30) as the eluent, Flow: 1.0 mL/min; UV = 254 nm; t_{major} = 26.057 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 9.49 (s, 1H), 7.31−7.28 (m, 1H), 7.22−7.20 (m, 1H), 7.09−7.06 (m, 1H), 6.95−6.94 (m, 1H), 4.61−4.57 (m, 1H), 4.51−4.47 (m, 1H), 3.83−3.80 (m, 1H), 3.70 (s, 3H), 3.14−3.11 (m, 1H), 2.67−2.63 (m, 1H), 2.51−2.45 (m, 1H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 170.7, 170.5, 135.7, 129.7, 129.6, 124.4, 118.9, 116.3, 77.8, 52.2, 40.4, 39.9, 34.1 ppm; HRMS: (ESI+) m/z calcd for $C_{13}H_{15}N_2O_5$ $[M+H]^+$ 279.0980, found 279.0988.

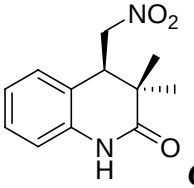


Compound (6n), yield: 19.3 mg, 66 %; > 99 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak OD-H with hexane/i-PrOH (95:5) as the eluent, Flow: 1.0 mL/min; UV =

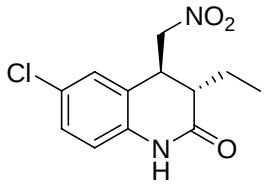
252 nm; t_{major} = 91.434 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 9.22 (s, 1H), 7.30−7.27 (m, 1H), 7.21−7.20 (m, 1H), 7.08−7.05 (m, 1H), 6.90−6.88 (m, 1H), 4.53−4.49 (m, 1H), 4.46−4.42 (m, 1H), 3.70−3.65 (m, 1H), 3.66 (s, 3H), 3.66−3.62 (m, 1H), 2.57−2.45 (m, 2H), 1.93−1.81 (m, 2H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 172.8, 171.2, 135.6, 129.6, 129.5, 124.3, 119.4, 116.2, 77.8, 51.8, 43.2, 41.0, 31.2, 25.7 ppm; HRMS: (ESI+) m/z calcd for $C_{14}H_{17}N_2O_5$ $[M+H]^+$ 293.1137, found 293.1145.



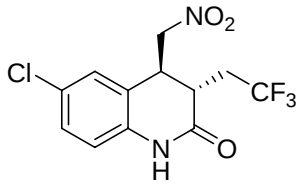
Compound (6o), yield: 21.4 mg, 70 %; 96 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak AS-H with hexane/ethanol (80:20) as the eluent, Flow: 1.0 mL/min; UV = 252 nm; t_{minor} = 15.732 min, t_{major} = 19.345 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 9.70 (s, 1H), 7.29−7.26 (m, 1H), 7.21−7.19 (m, 1H), 7.06−7.03 (m, 1H), 6.93−6.92 (m, 1H), 4.54−4.49 (m, 1H), 4.47−4.43 (m, 1H), 3.72−3.68 (m, 1H), 3.63 (s, 3H), 2.61−2.58 (m, 1H), 2.37−2.27 (m, 2H), 1.88−1.71 (m, 2H), 1.66−1.59 (m, 1H), 1.55−1.48 (m, 1H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 173.4, 172.0, 135.7, 129.5, 129.4, 124.1, 119.5, 116.2, 77.9, 51.6, 43.6, 40.4, 33.4, 29.7, 22.2 ppm; HRMS: (ESI+) m/z calcd for $C_{15}H_{19}N_2O_5$ $[M+H]^+$ 307.1294, found 307.1292.



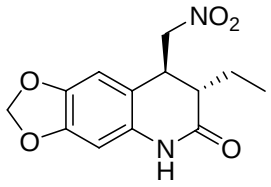
Compound (6p), yield: 11.7 mg, 50 %; > 99 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak OB-H with hexane/i-PrOH (90:10) as the eluent, Flow: 1.0 mL/min; UV = 252 nm; t_{major} = 51.768 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 8.97 (s, 1H), 7.28−7.25 (m, 1H), 7.11−7.09 (m, 1H), 7.03−7.00 (m, 1H), 6.89−6.88 (m, 1H), 4.73−4.69 (m, 1H), 4.37−4.32 (m, 1H), 3.49−3.46 (m, 1H), 1.36 (s, 3H), 1.21 (s, 3H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 174.8, 135.7, 129.2, 129.0, 123.9, 121.8, 115.6, 76.8, 47.2, 39.8, 25.4, 20.8 ppm; HRMS: (ESI+) m/z calcd for $C_{12}H_{15}N_2O_3$ $[M+H]^+$ 235.1083, found 235.1077.



Compound (6q), yield: 20.1 mg, 75 %; > 99 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak AS-H with hexane/EtOH (80:20) as the eluent, Flow: 1.0 mL/min; UV = 216 nm; t_{major} = 19.025 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 9.56 (s, 1H), 7.27−7.21 (m, 2H), 6.89−6.88 (m, 1H), 4.51−4.42 (m, 2H), 3.70−3.67 (m, 1H), 2.49−2.46 (m, 1H), 1.70−1.56 (m, 1H), 1.53−1.44 (m, 1H), 1.04−1.02 (m, 3H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 172.0, 134.6, 129.5, 129.3, 129.0, 121.4, 117.4, 77.6, 45.2, 39.9, 23.7, 11.5 ppm; HRMS: (ESI+) m/z calcd for $C_{12}H_{14}ClN_2O_3$ $[M+H]^+$ 269.0692, found 269.0687.

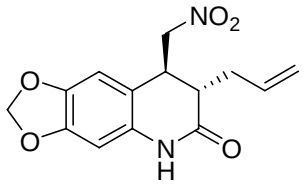


Compound (6r), yield: 24.5 mg, 76 %; > 99 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak AS-H with hexane/EtOH (80:20) as the eluent, Flow: 1.0 mL/min; UV = 216 nm; t_{minor} = 10.106 min, t_{major} = 11.612 min; ^{1}H NMR (500 MHz, DMSO): δ = 10.65 (s, 1H), 7.36−7.2 (m, 2H), 6.96−6.94 (m, 1H), 4.88−4.86 (m, 1H), 4.67−4.63 (m, 1H), 3.78−3.75 (m, 1H), 2.84−2.82 (m, 1H), 2.58−2.47 (m, 1H), 2.42−2.33 (m, 1H) ppm; ^{13}C NMR (125 MHz, DMSO): δ = 167.5, 135.9, 129.1, 129.0, 126.3, 126.3 (d, $^1J_{C\text{-}F}$ = 275.4 Hz), 121.0, 117.4, 77.0, 39.2, 37.1, 33.3 (1C, m) ppm; HRMS: (ESI+) m/z calcd for $C_{12}H_{11}ClF_3N_2O_3$ $[M+H]^+$ 323.0410, found 323.0413.

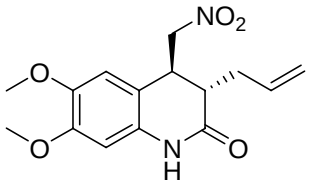


Compound (6s), yield: 18.4 mg, 66 %; 97 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak AS-H with hexane/EtOH (80:20) as the eluent, Flow: 1.0 mL/min; UV = 216 nm; t_{minor} = 17.279 min, t_{major} = 26.131 min; ^{1}H NMR (500 MHz, DMSO): δ = 10.04 (s, 1H), 6.79 (s, 1H), 6.49 (s, 1H), 5.96 (s, 2H), 4.65−4.61 (m, 1H), 4.53−4.49 (m, 1H),

3.51 (t, *J* = 7.5 Hz, 1H), 2.22 (t, *J* = 7.5 Hz, 1H), 1.44−1.30 (m, 2H), 0.89 (t, *J* = 7.5 Hz, 3H) ppm; ^{13}C NMR (125 MHz, DMSO): δ = 169.9, 147.2, 142.4, 131.5, 111.8, 109.1, 101.2, 97.2, 78.2,44.5, 39.4, 23.1, 11.3 ppm; HRMS: (ESI+) m/z calcd for $C_{13}H_{15}N_2O_5$ $[M+H]^+$ 279.0980, found 279.0985.



Compound (6t), yield: 22.6 mg, 78 %; 97 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak AS-H with hexane/EtOH (80:20) as the eluent, Flow: 1.0 mL/min; UV = 216 nm; t_{minor} = 19.225 min, t_{major} = 27.705 min; ^{1}H NMR (500 MHz, DMSO): δ = 10.12 (s, 1H), 6.75 (s, 1H), 6.52 (s, 1H), 5.98 (d, *J* = 3 Hz, 2H),5.78−5.70 (m, 1H), 5.07−4.97 (m, 2H), 4.68−4.64 (m, 1H), 4.55−4.51 (m, 1H), 3.50−3.47 (m, 1H), 2.45−2.42 (m, 1H), 2.23−2.18 (m, 1H), 2.06−2.00 (m, 1H) ppm; ^{13}C NMR (125 MHz, DMSO): δ = 169.4, 117.4, 112.6, 131.7, 131.6, 117.7, 111.4, 109.0, 101.2, 97.3, 78.1, 42.2, 38.9, 34.08 ppm; HRMS: (ESI+) m/z calcd for $C_{14}H_{15}N_2O_5$ $[M+H]^+$ 291.0980, found 291.0985.



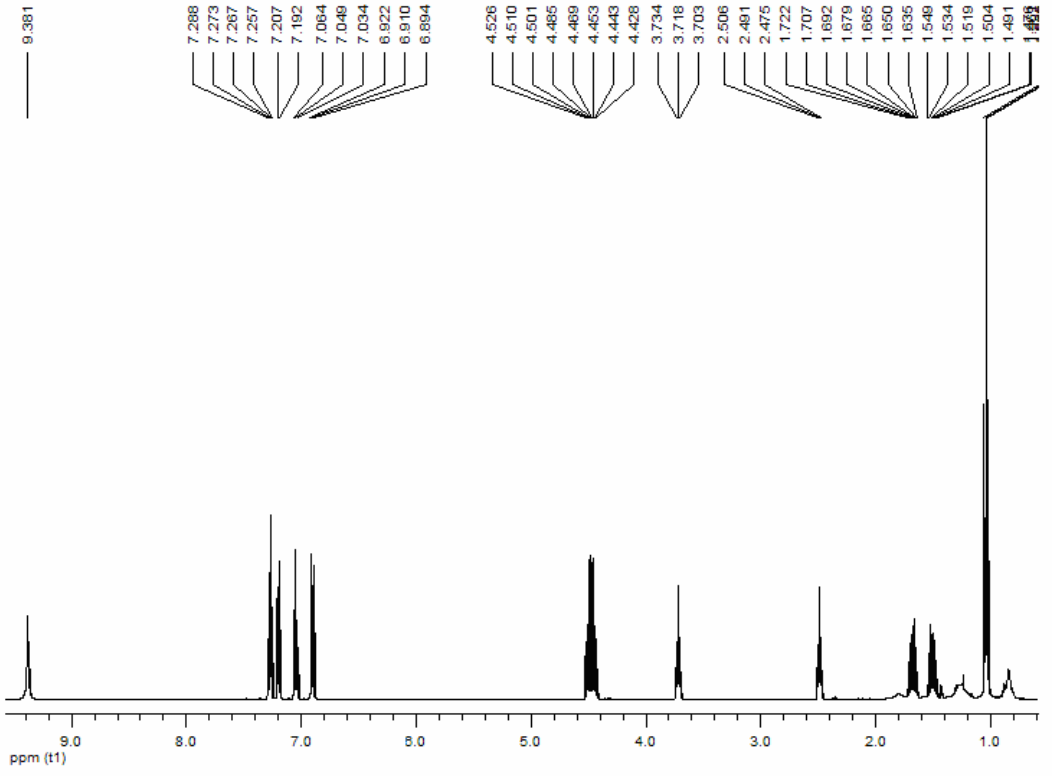
Compound (6u), yield: 22.0 mg, 72 %; > 99 % ee; > 99:1 dr; yellow oil; The enantiomeric excess was determined by HPLC on Daicel Chiralpak AS-H with hexane/EtOH (50:50) as the eluent, Flow: 0.5 mL/min; UV = 216 nm; t_{minor} = 38.491 min, t_{major} = 44.023 min; ^{1}H NMR (500 MHz, $CDCl_3$): δ = 9.31 (s, 1H), 6.66 (s, 1H), 6.45 (s, 1H), 5.80−5.72 (m, 1H), 5.15−5.13 (m, 1H), 5.04−5.01 (m, 1H), 4.49−4.42 (m, 2H), 3.89 (s, 3H), 3.85 (s, 3H), 3.66−3.63 (m, 1H), 2.63−2.60 (m, 1H), 2.47−2.42 (m, 1H), 2.17−2.10 (m, 1H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ = 171.5, 149.9, 145.7, 133.7, 129.6, 118.7, 112.2, 110.3, 100.6, 78.0, 56.4, 56.2, 43.5, 39.1, 34.2 ppm; HRMS: (ESI+) m/z calcd for $C_{15}H_{19}N_2O_5$ $[M+H]^+$ 307.1293, found 307.1289.

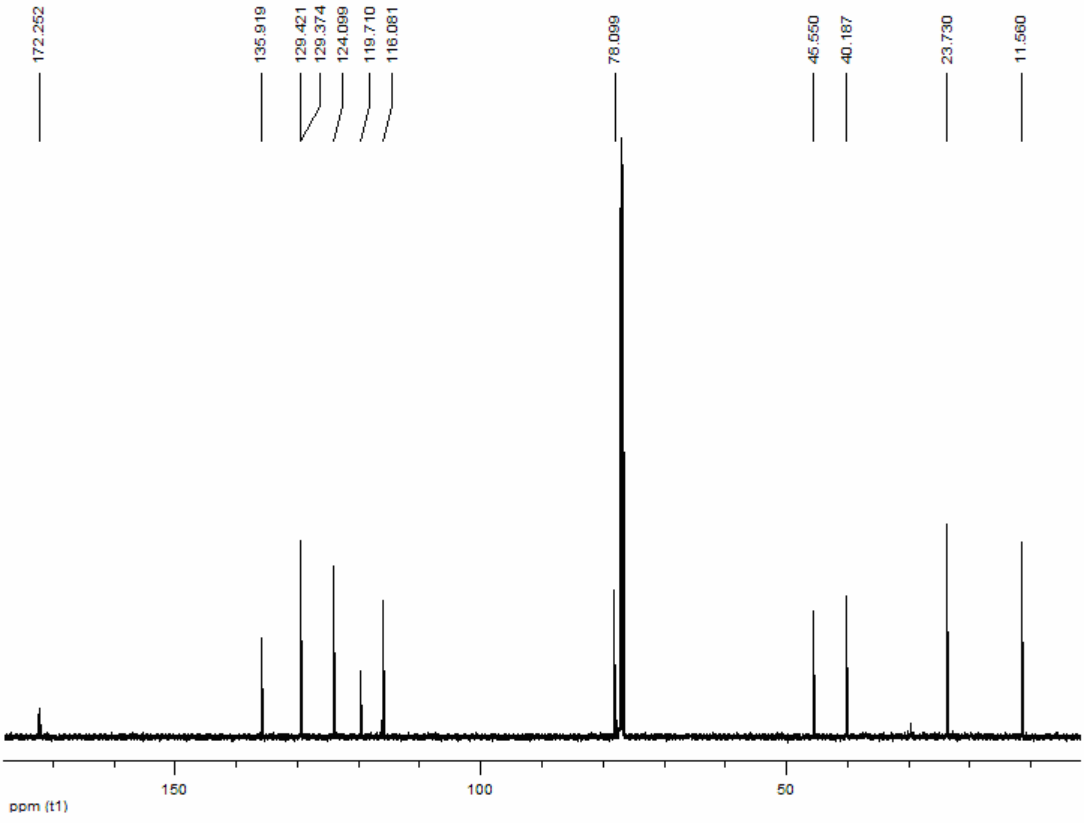
3.Typical procedure for one-pot synthesis of 6a

Solvent (1 mL) was added to a mixture of nitroolefins **1** (0.2 mmol) with aldehydes **2** (0.6 mmol) in the presence of 20 mol% catalyst **3d** and 20 mol% $PhCO_2H$ **4a** at room temperature under vigorous stirring. After 1 day, the reaction was quenched by adding aq. HCl, extracted with DCM (3 × 5 mL), washed with aq. Na_2CO_3, and concentrated. DCM (8 mL) and a mixture of PCC (8 equiv.) with CH_3CO_2Na (8 equiv.) were added to the residue at room temperature under vigorous stirring. After reaction completion, the residue was purified by flash chromatography on silica gel (ethyl ether/petroleum ether = 1:2 as eluent) to yield product **6a**. Enantiomeric ratio was determined by HPLC analysis on a Daicel Chiralpak AD-H.

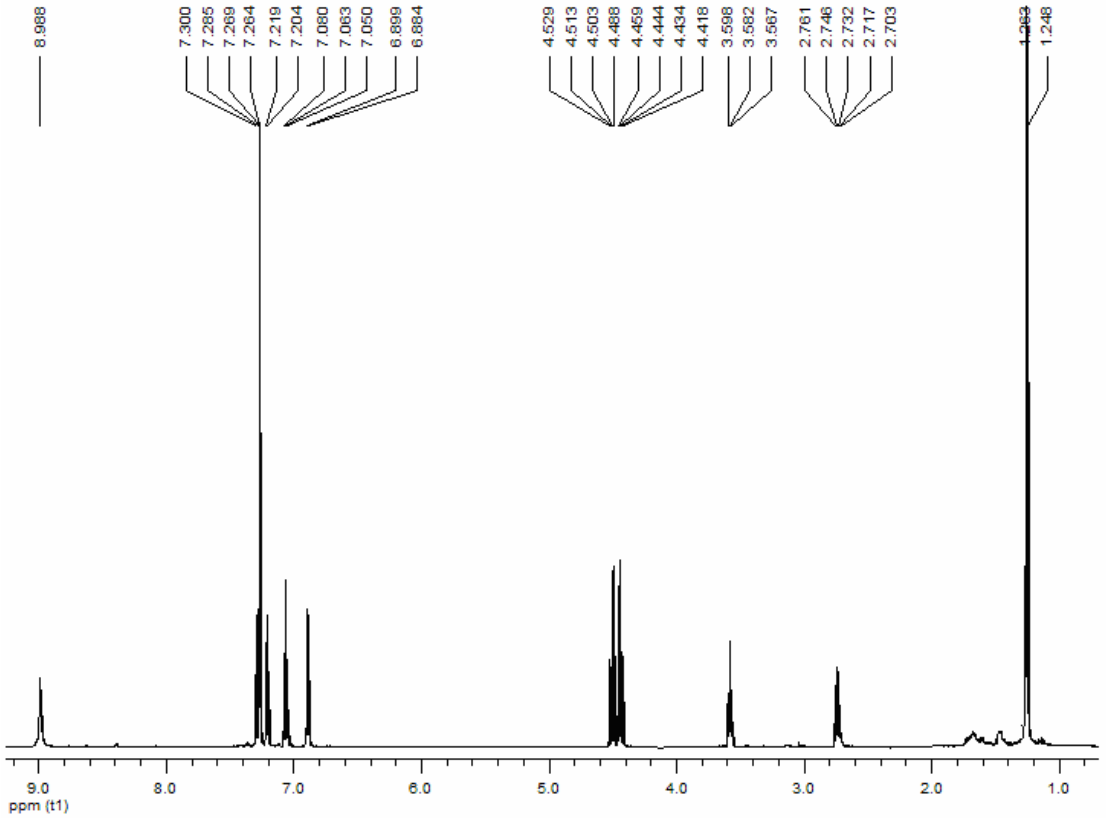
4. NMR spectra

Compound 6a





Compound 6b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7.219
7.204
7.080
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7.050
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4.529
4.513
4.503
4.488
4.459
4.444
4.434
4.418
3.598
3.582
3.567
2.761
2.746
2.732
2.717
2.703
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1.248
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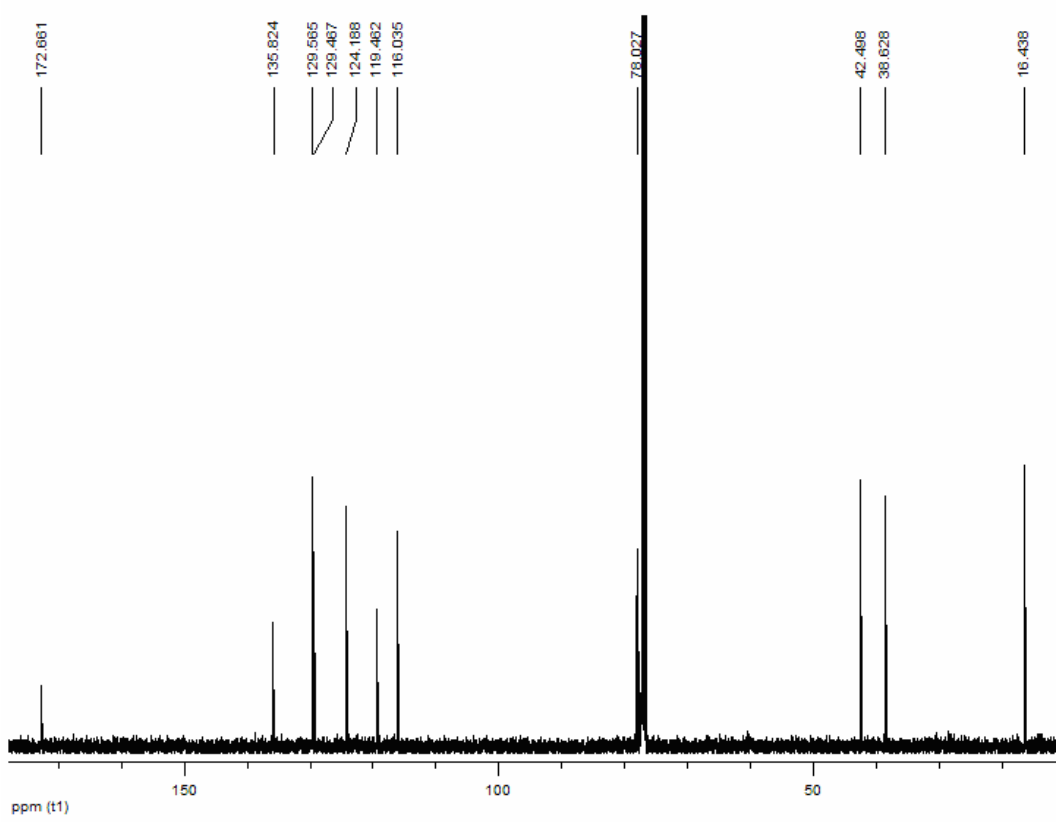
7.0
6.0
5.0
4.0
3.0
2.0
1.0
ppm (t1)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129.565
129.467
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78.027
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16.438
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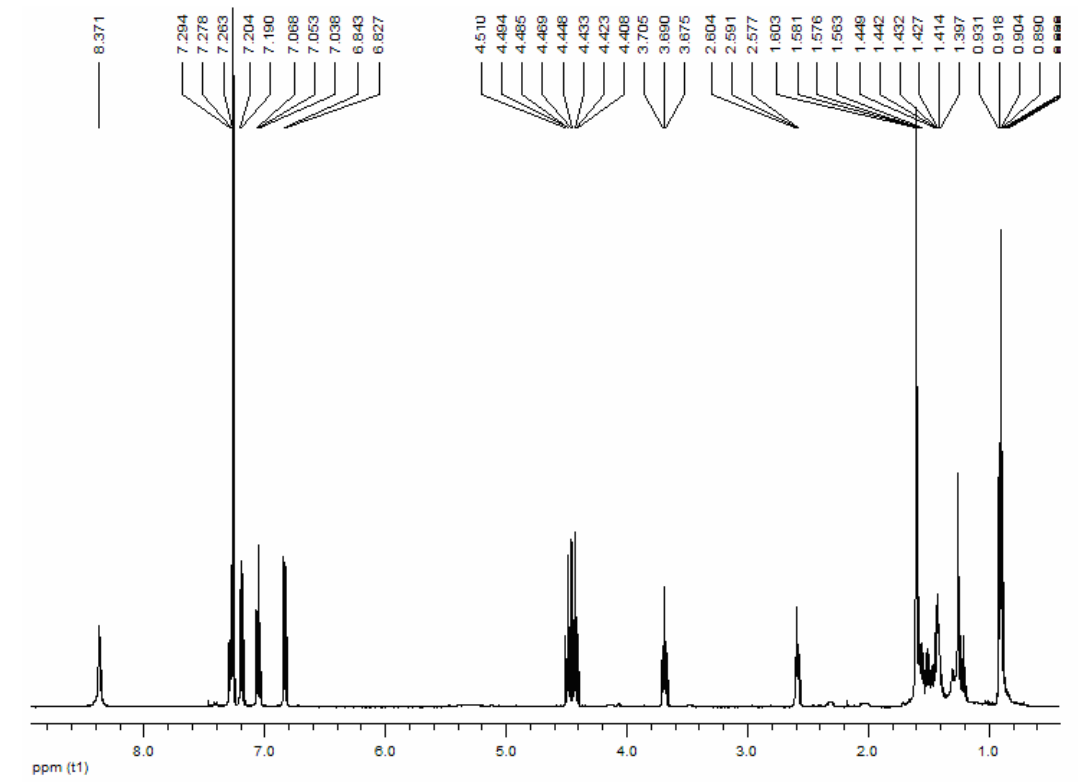
50
ppm (t1)

Compound 6c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7.053
7.038
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6.827
4.510
4.494
4.485
4.469
4.448
4.433
4.423
4.408
3.705
3.690
3.675
2.604
2.591
2.577
1.603
1.581
1.576
1.563
1.449
1.442
1.432
1.427
1.414
1.397
0.931
0.918
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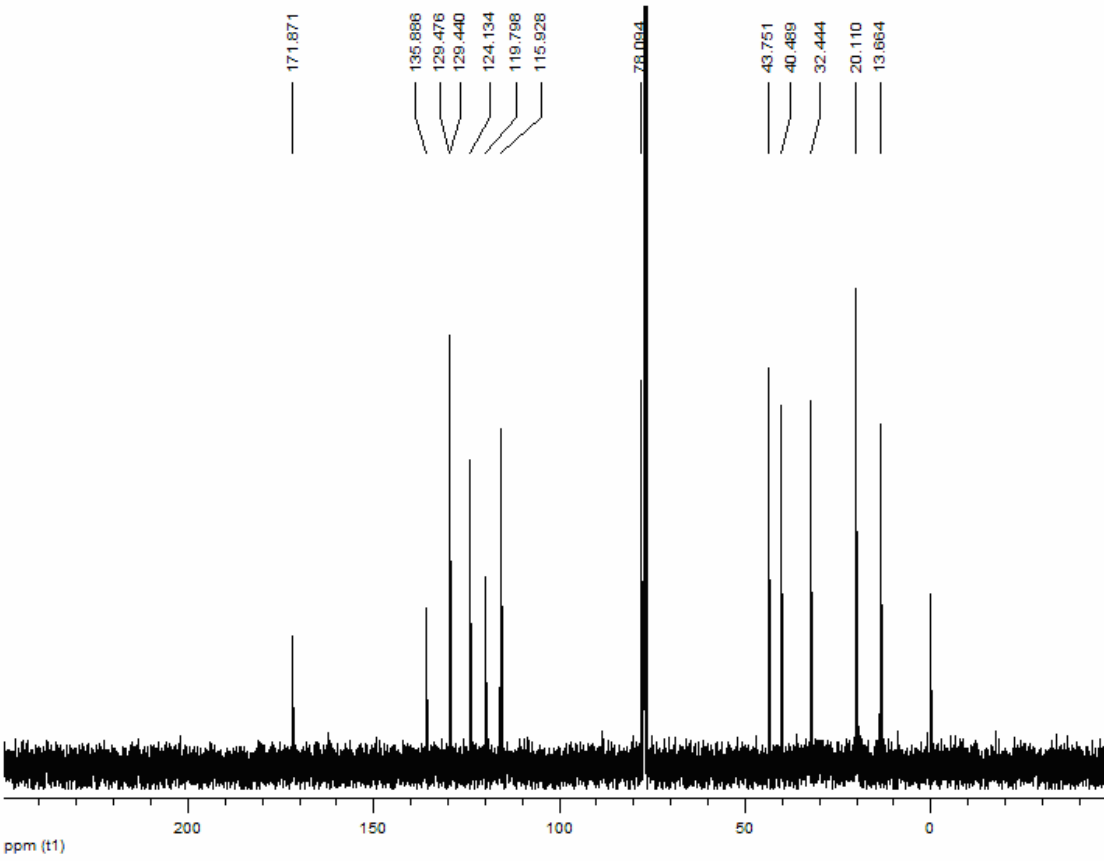
1.0
ppm (t1)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20.110
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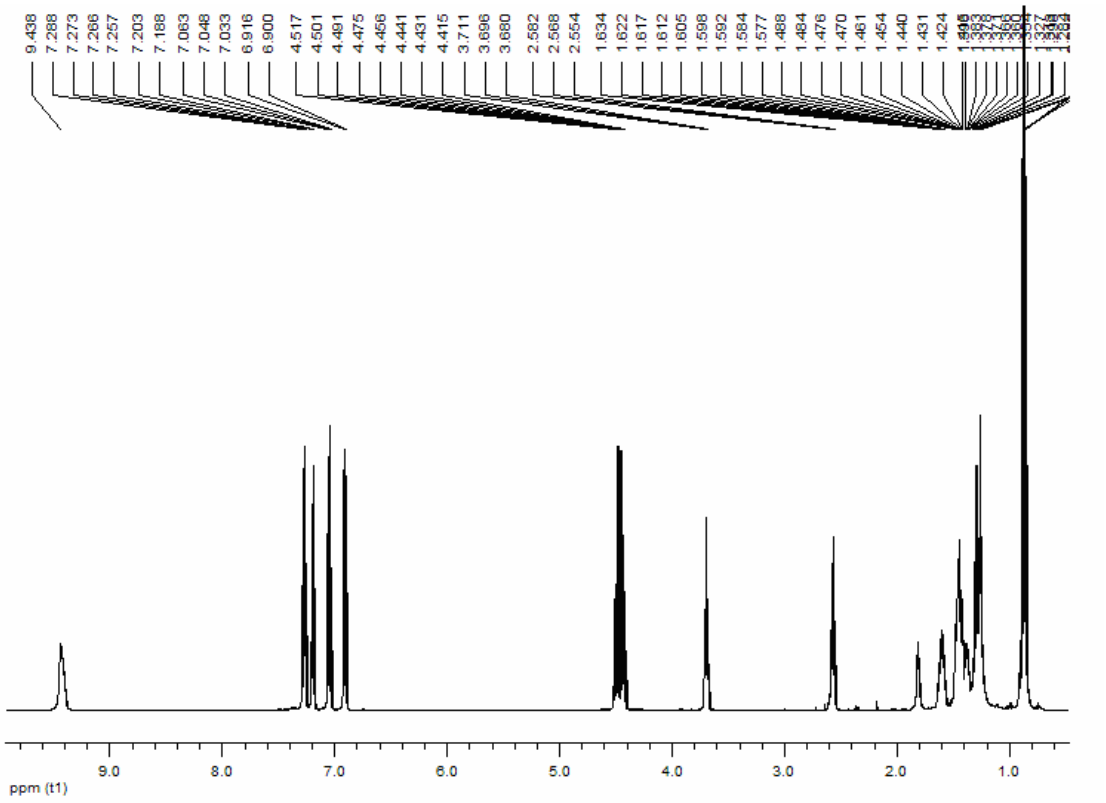
150
100
50
0
ppm (t1)

Compound 6d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4.517
4.501
4.491
4.475
4.456
4.441
4.431
4.415
3.711
3.696
3.680
2.582
2.568
2.554
1.634
1.622
1.617
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1.454
1.440
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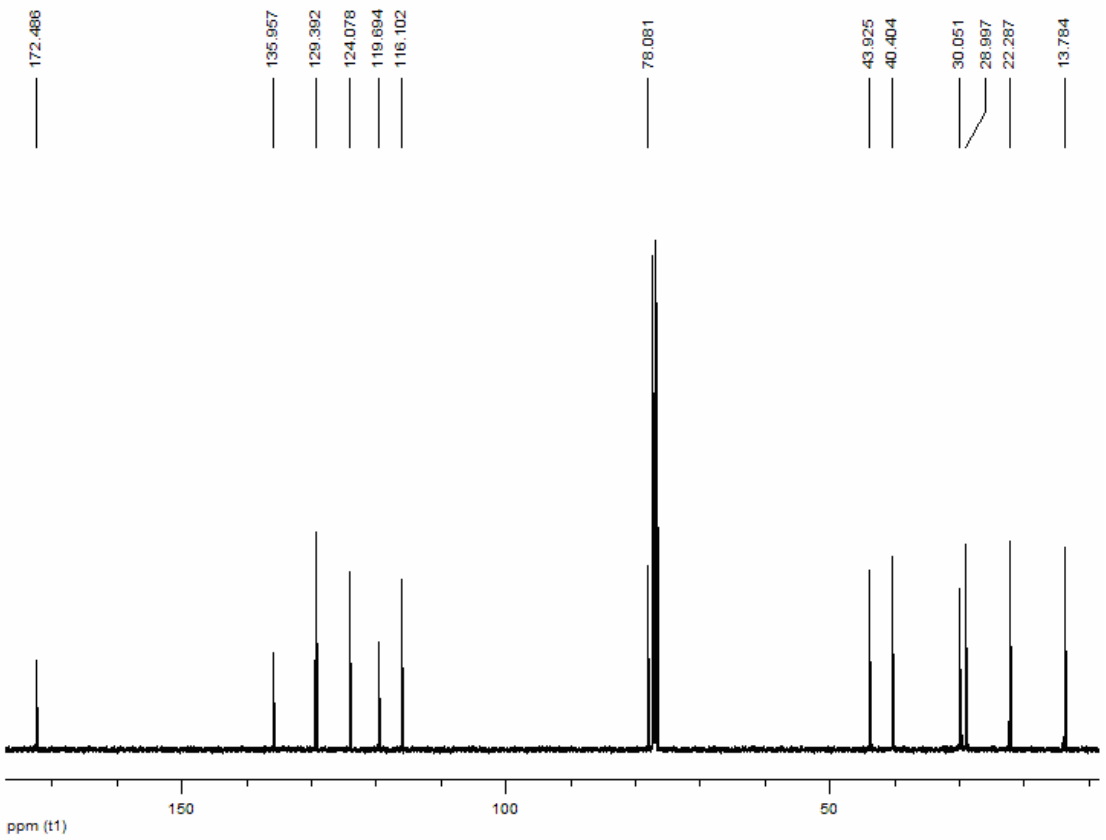
ppm (t1)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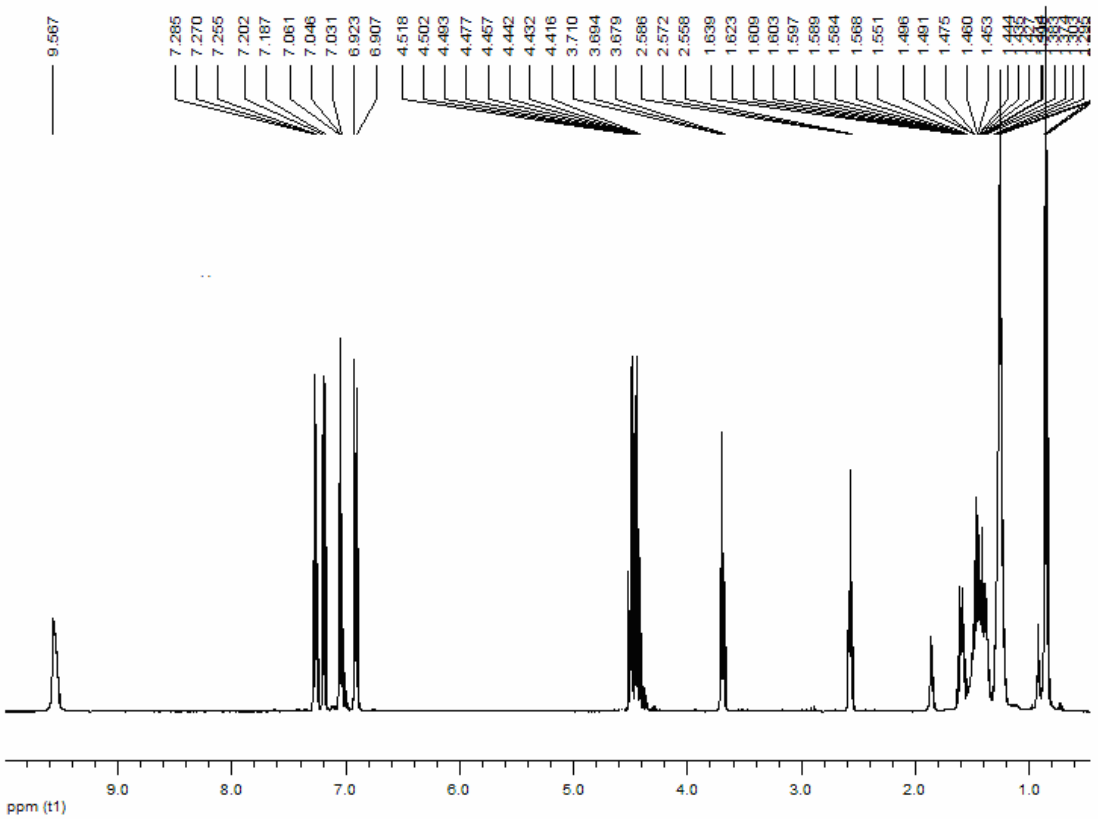
50
ppm (t1)

Compound 6e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4.502
4.493
4.477
4.457
4.442
4.432
4.416
3.710
3.694
3.679
2.586
2.572
2.558
1.639
1.623
1.609
1.603
1.597
1.589
1.584
1.568
1.551
1.496
1.491
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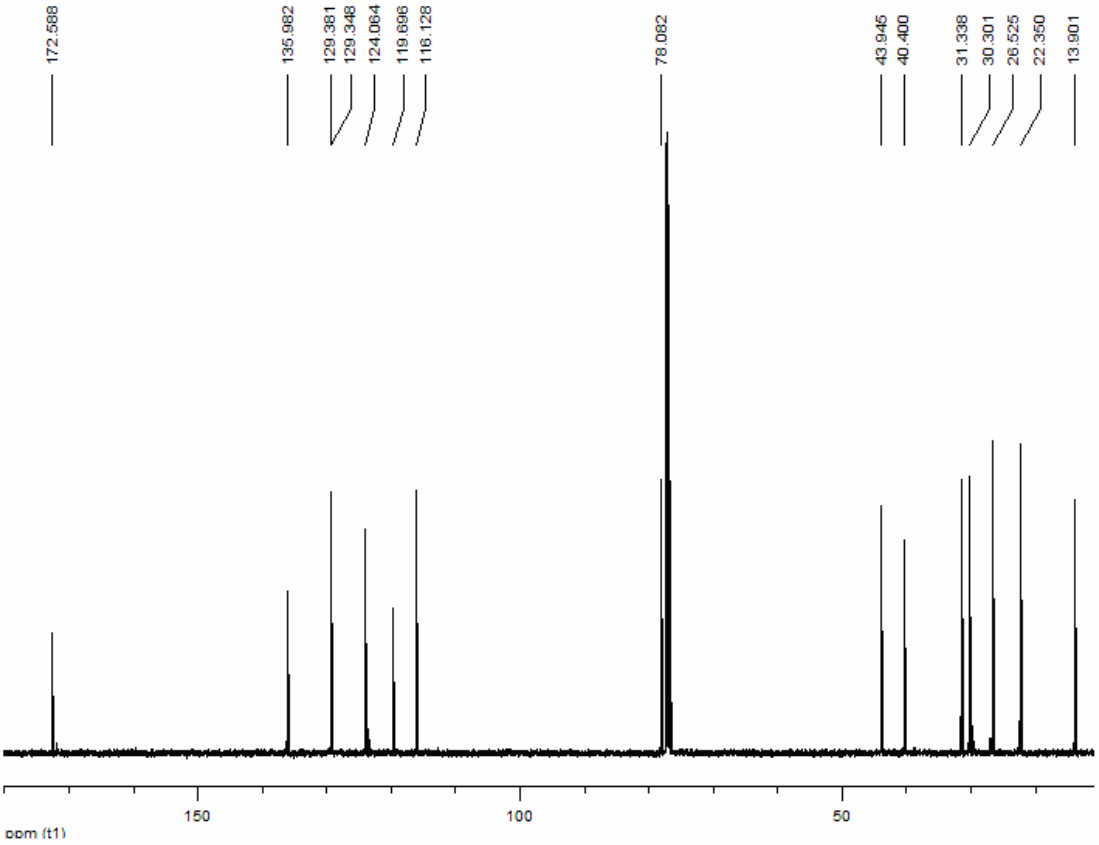
ppm (t1)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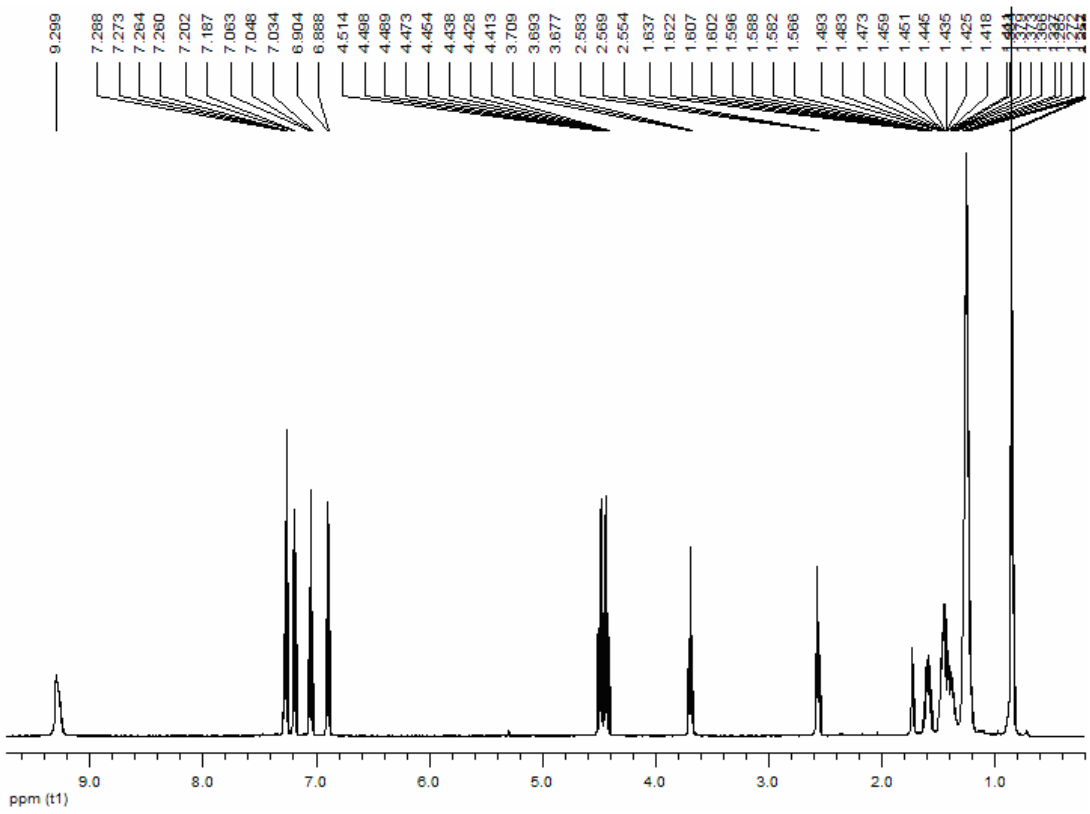
26.525
22.350
13.901
150
100
50
ppm (t1)

Compound 6f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7.034
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1.445
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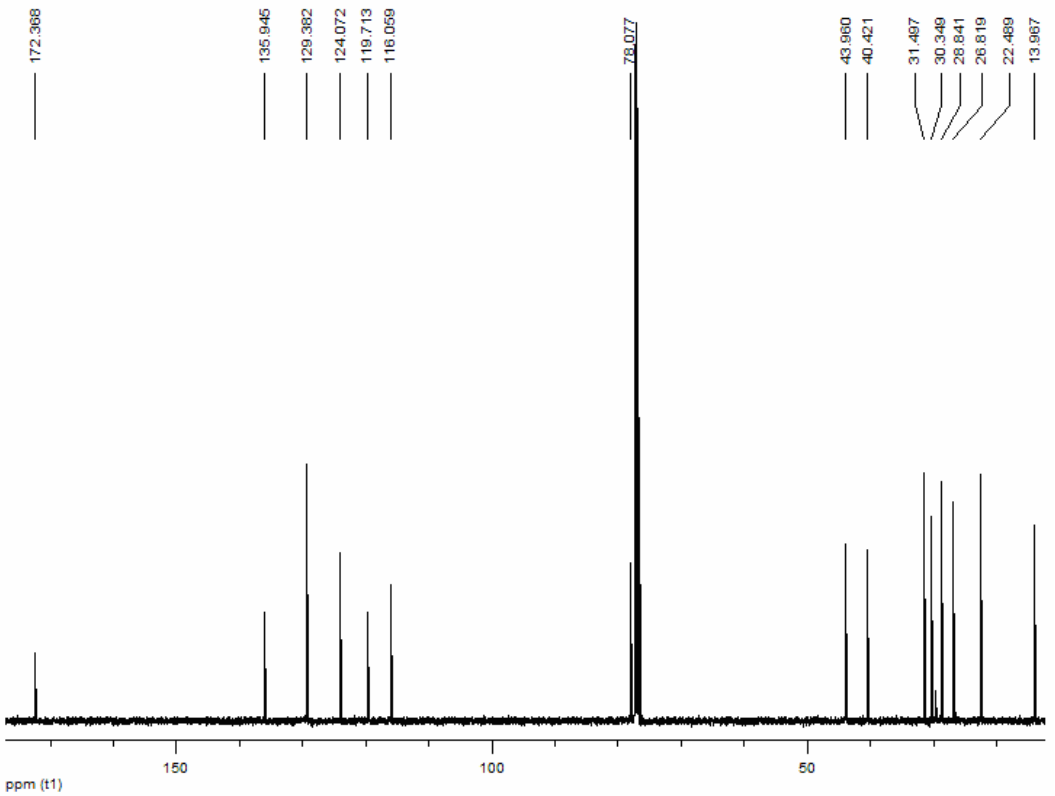
1.0
ppm (t1)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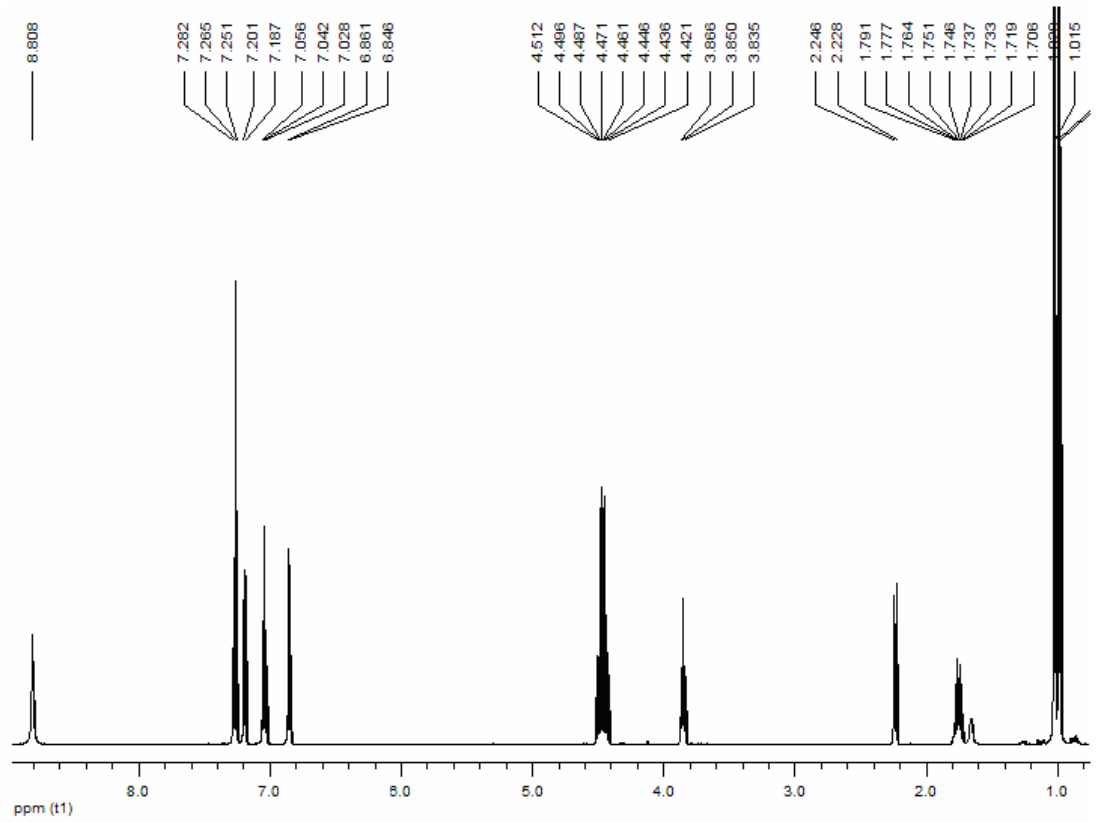
100
50
ppm (t1)

Compound 6g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4.471
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4.436
4.421
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3.850
3.835
2.246
2.228
1.791
1.777
1.764
1.751
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1.733
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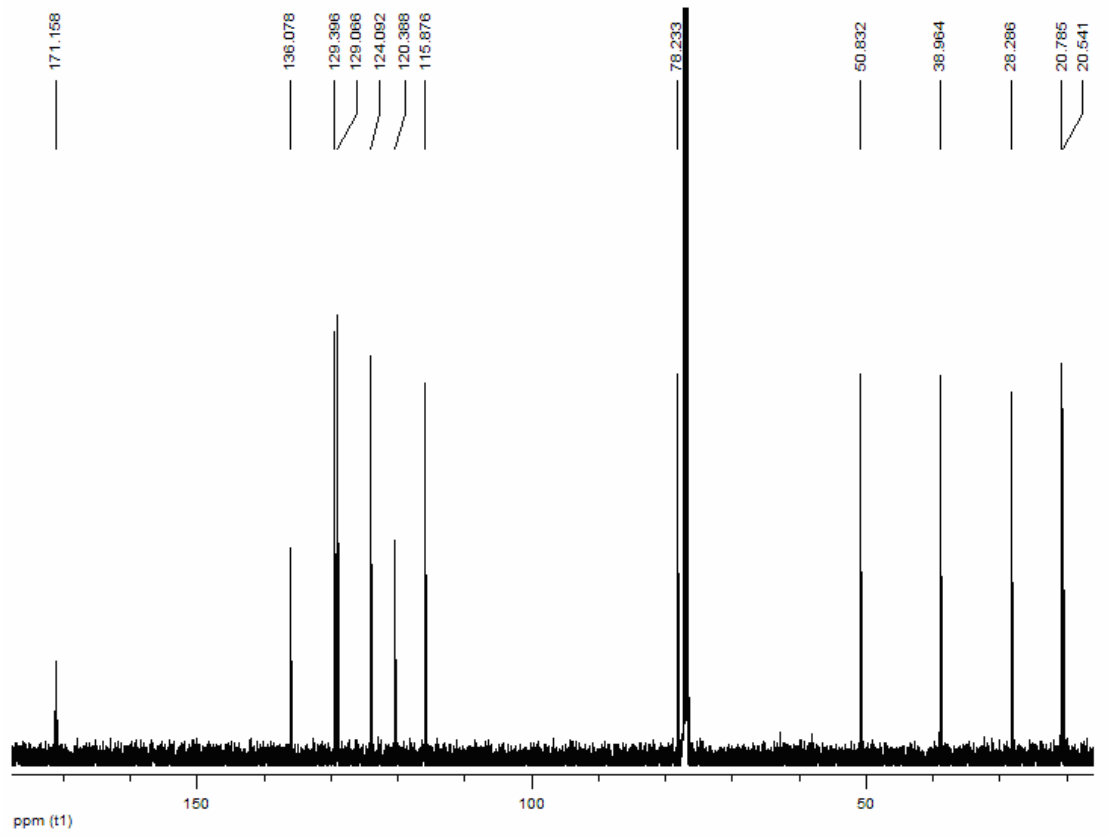
ppm (t1)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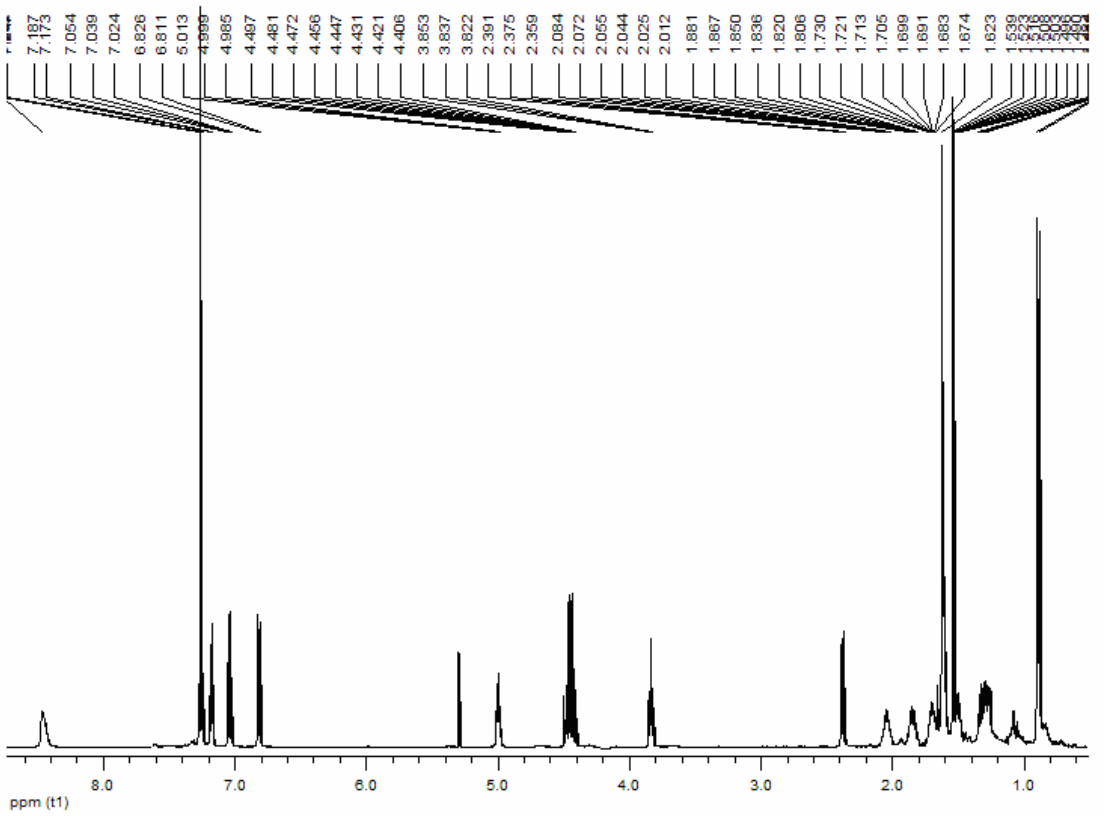
50
ppm (t1)

Compound 6h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3.853
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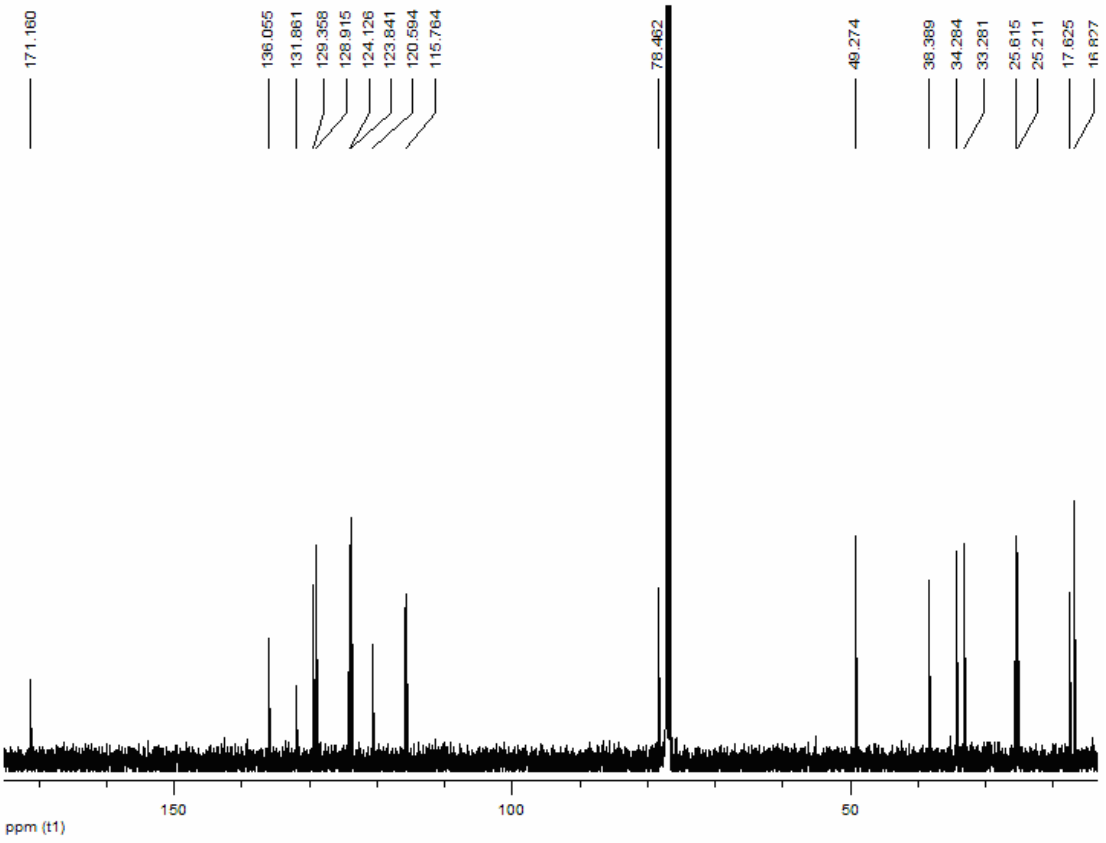
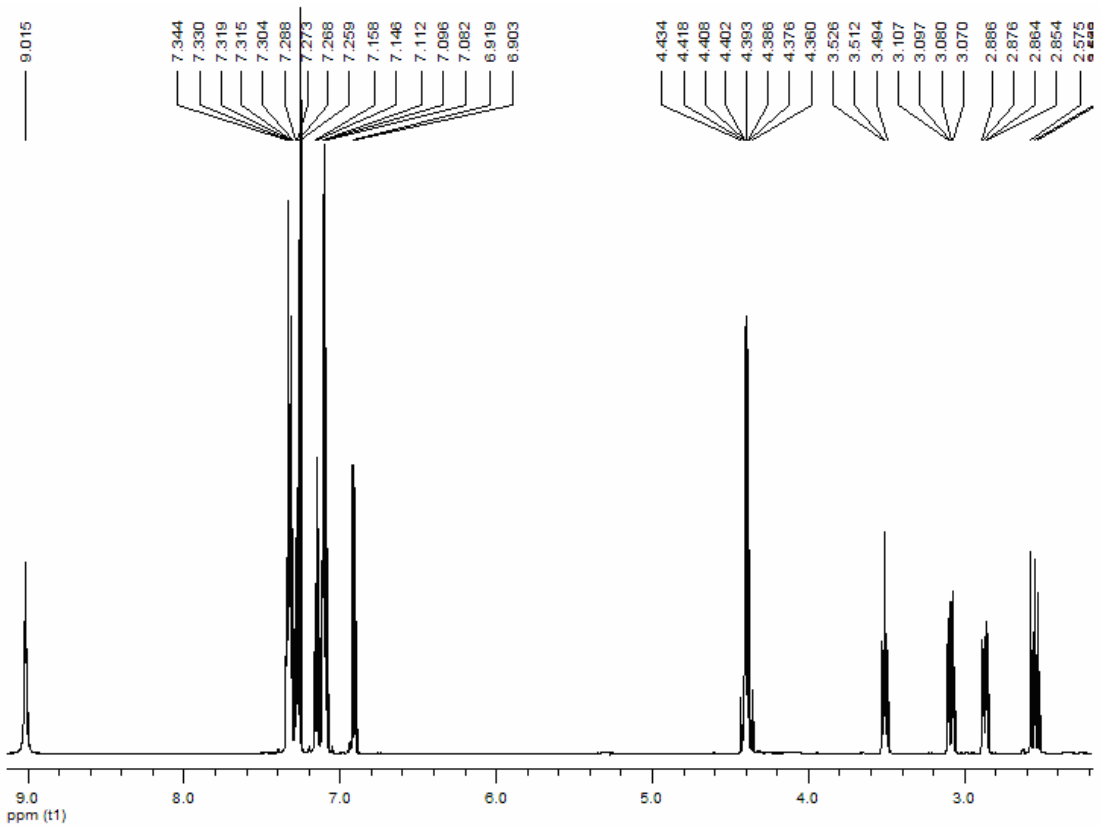
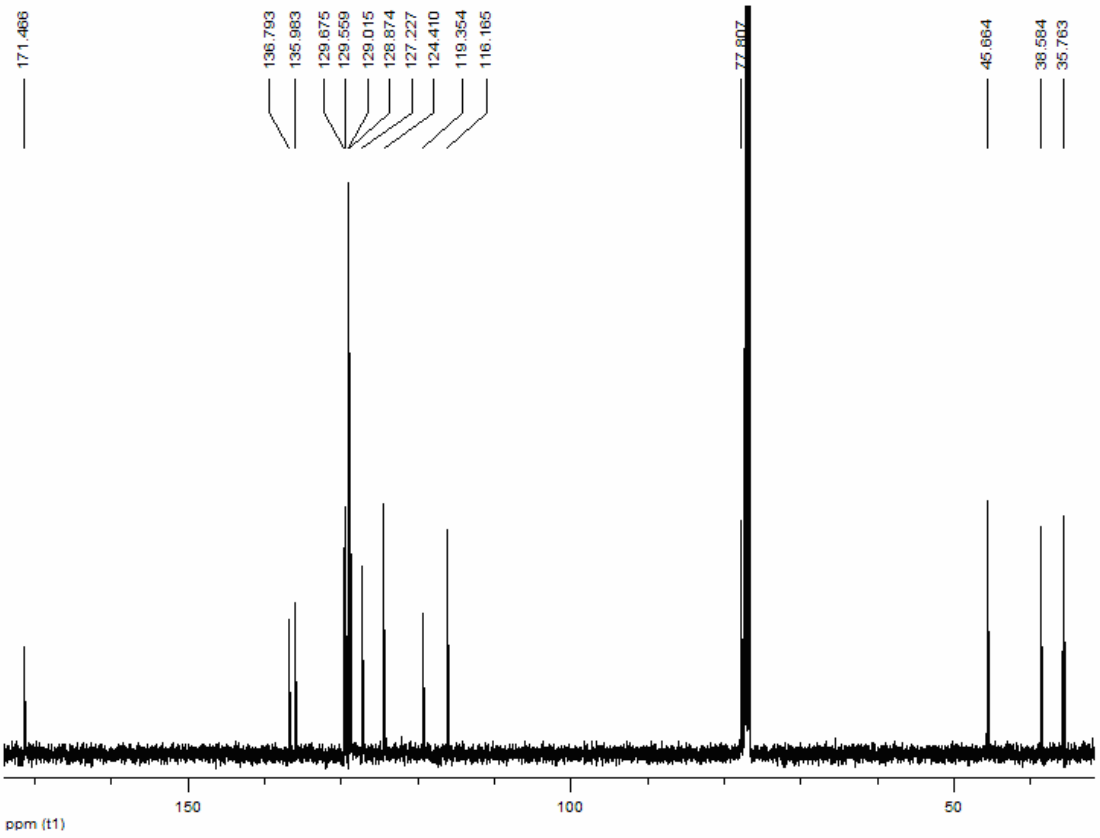
2.072
2.055
2.044
2.025
2.012
1.881
1.867
1.850
1.836
1.820
1.806
1.730
1.721
1.713
1.705
1.699
1.691
1.683
1.674
1.623
1.539
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
ppm (t1)

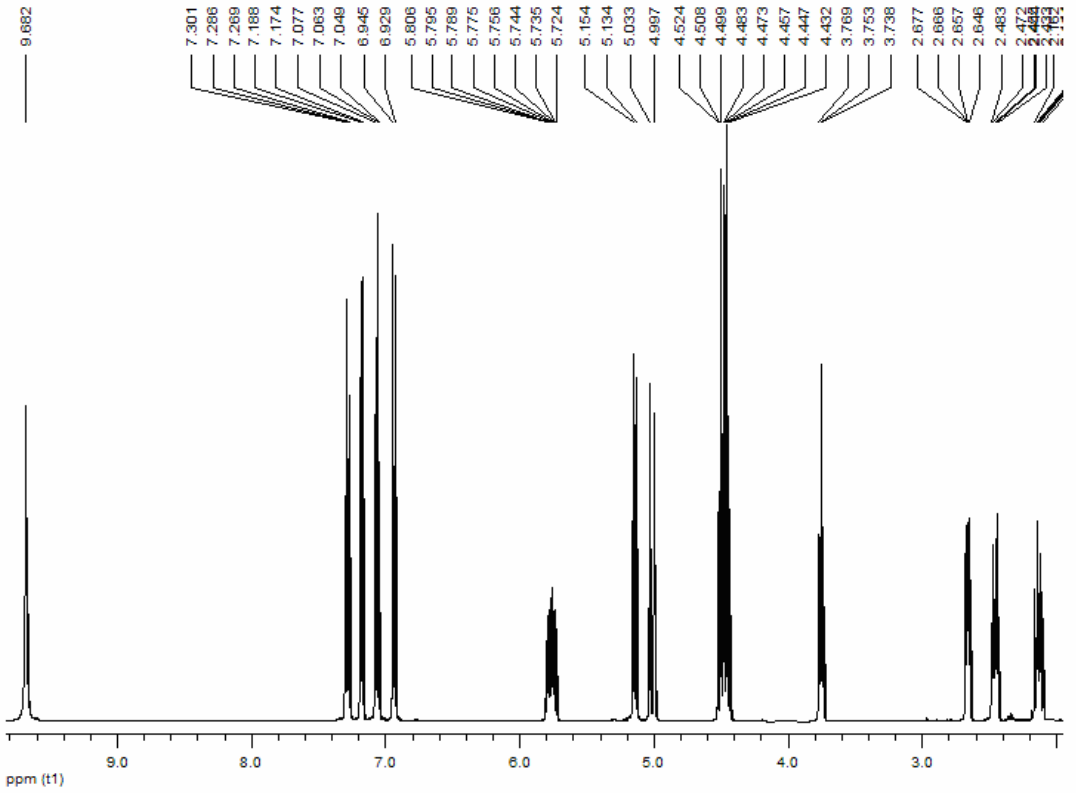

171.160
136.055
131.861
129.358
128.915
124.126
123.841
120.594
115.784
78.462
49.274
38.389
34.284
33.281
25.615
25.211
17.625
150
100
50
ppm (t1)

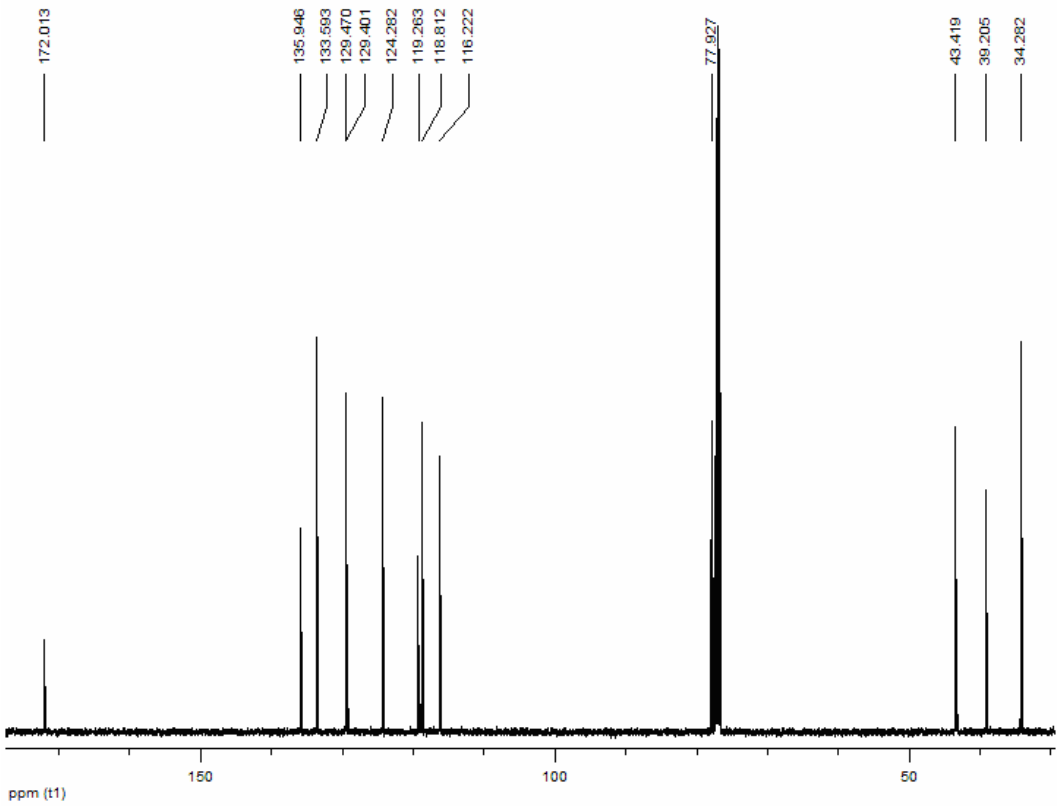
Compound 6i


9.015
7.344
7.330
7.319
7.315
7.304
7.288
7.273
7.268
7.259
7.158
7.146
7.112
7.096
7.082
6.919
6.903
4.434
4.418
4.408
4.402
4.393
4.386
4.376
4.360
3.526
3.512
3.494
3.107
3.097
3.080
3.070
2.886
2.876
2.864
2.854
2.575
9.0
8.0
7.0
6.0
5.0
4.0
3.0
ppm (t1)

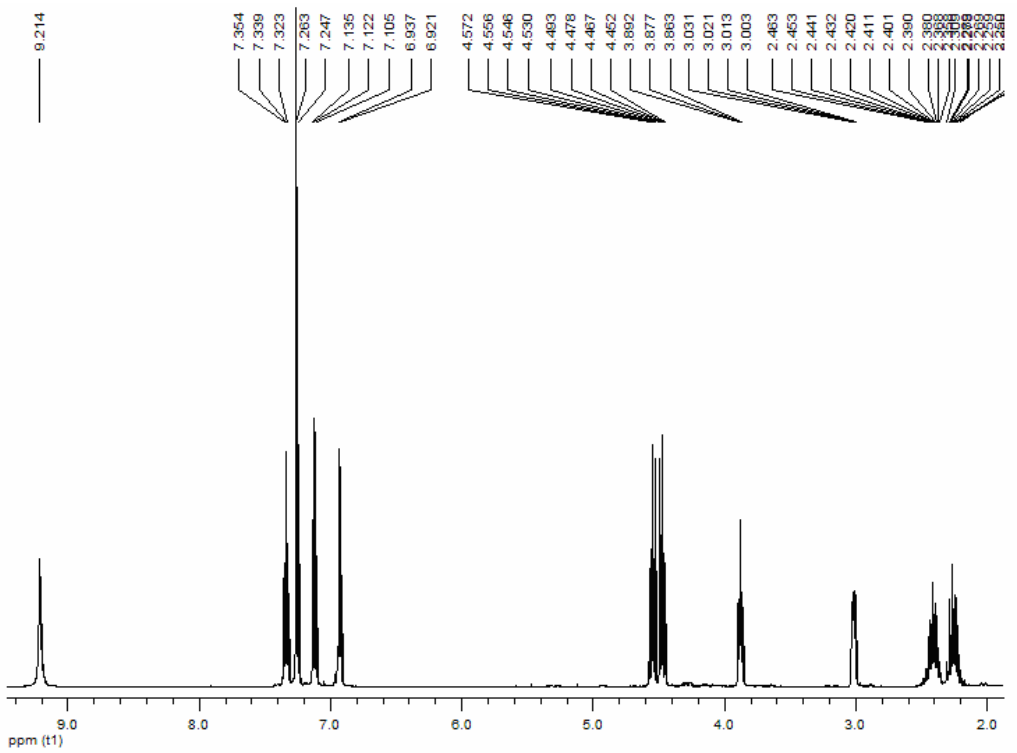

171.466
136.793
135.983
129.675
129.559
129.015
128.874
127.227
124.410
119.354
116.165
77.807
45.664
38.584
35.763
150
100
50
ppm (t1)

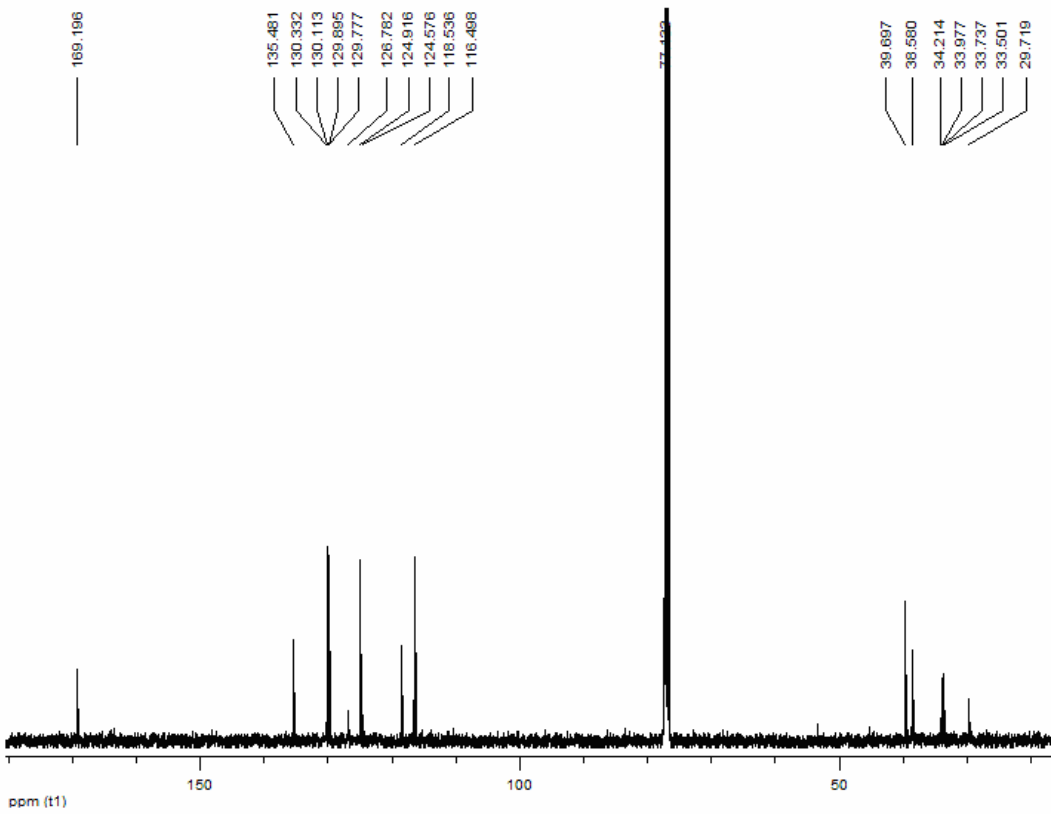
Compound 6j


9.682
7.301
7.286
7.269
7.188
7.174
7.077
7.063
7.049
6.945
6.929
5.806
5.795
5.789
5.775
5.756
5.744
5.735
5.724
5.154
5.134
5.033
4.997
4.524
4.508
4.499
4.483
4.473
4.457
4.447
4.432
3.769
3.753
3.738
2.677
2.666
2.657
2.646
2.483
9.0
8.0
7.0
6.0
5.0
4.0
3.0
ppm (t1)

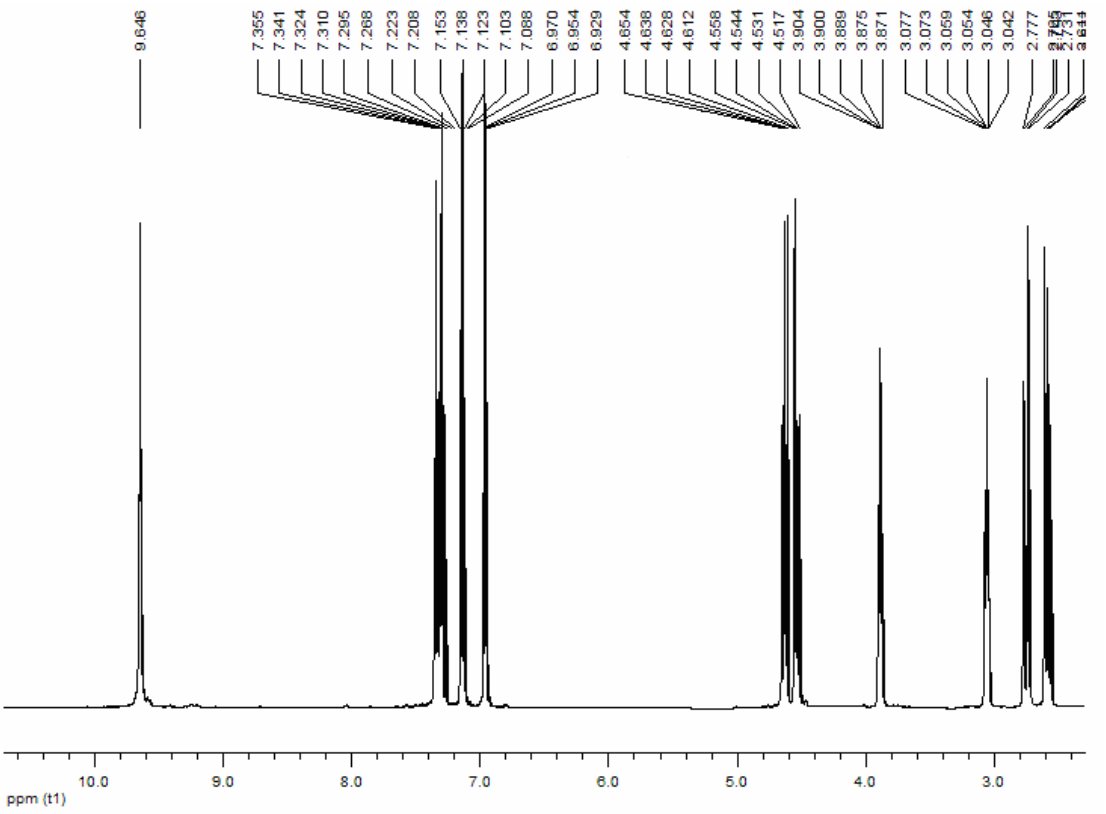

172.013
135.946
133.593
129.470
129.401
124.282
119.263
118.812
116.222
77.927
43.419
39.205
34.282
150
100
50
ppm (t1)

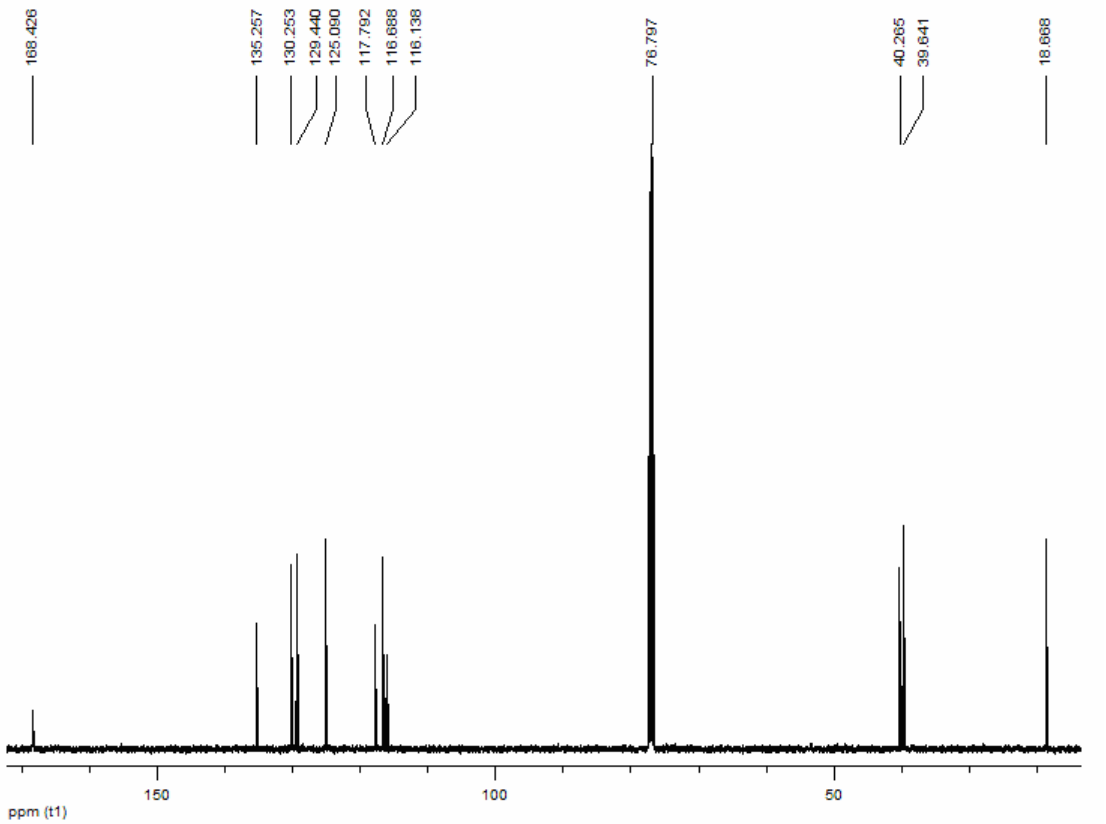
Compound 6k


9.214
7.354
7.339
7.323
7.263
7.247
7.135
7.122
7.105
6.937
6.921
4.572
4.556
4.546
4.530
4.493
4.478
4.467
4.452
3.892
3.877
3.863
3.031
3.021
3.013
3.003
2.463
2.453
2.441
2.432
2.420
2.411
2.401
2.390
2.380
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
ppm (t1)

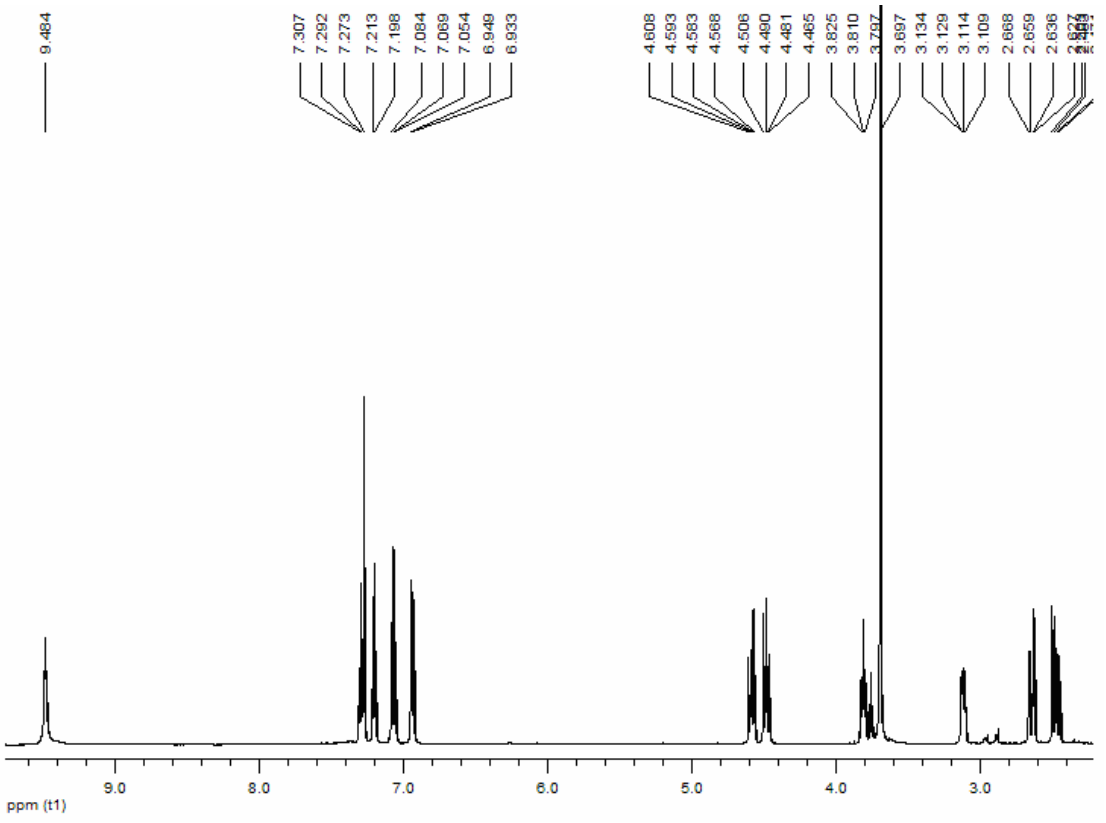

169.196
135.481
130.332
130.113
129.895
129.777
126.782
124.916
124.576
118.536
116.498
77.422
39.697
38.580
34.214
33.977
33.737
33.501
29.719
150
100
50
ppm (t1)

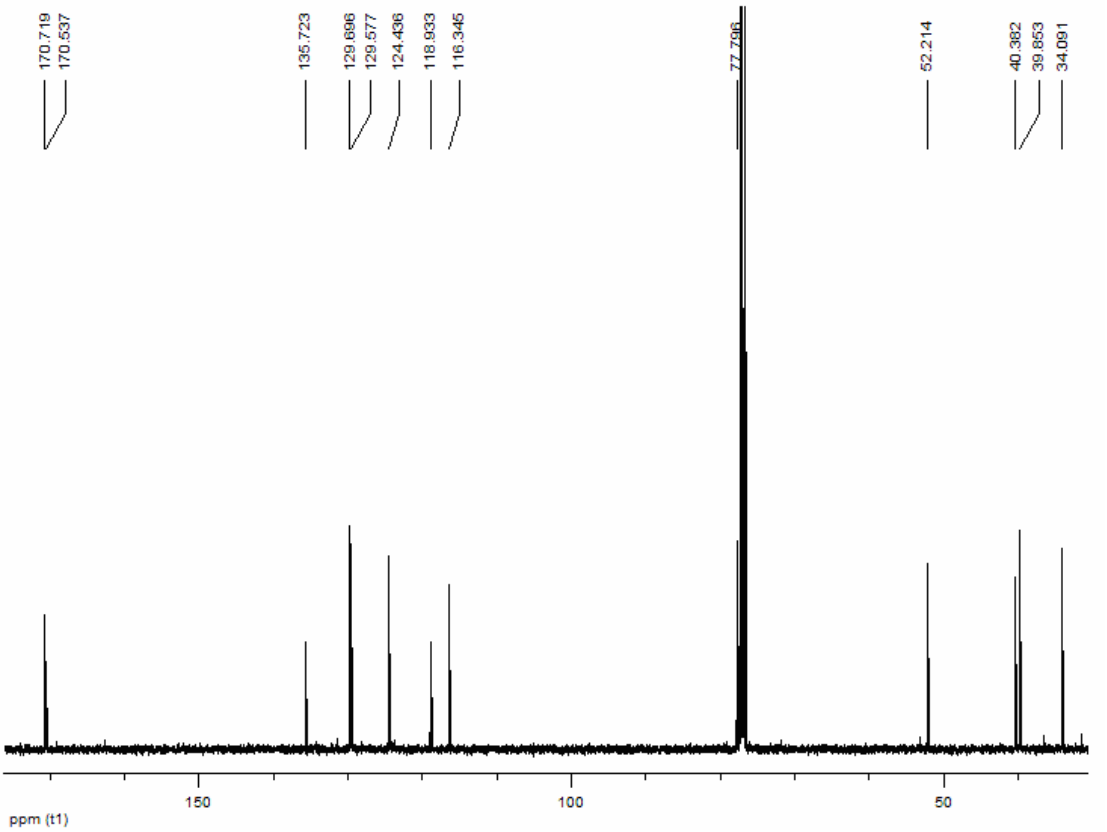
Compound 6l


9.646
7.355
7.341
7.324
7.310
7.295
7.268
7.223
7.208
7.153
7.138
7.123
7.103
7.088
6.970
6.954
6.929
4.654
4.638
4.628
4.612
4.558
4.544
4.531
4.517
3.904
3.900
3.889
3.875
3.871
3.077
3.073
3.059
3.054
3.046
3.042
2.777
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
ppm (t1)

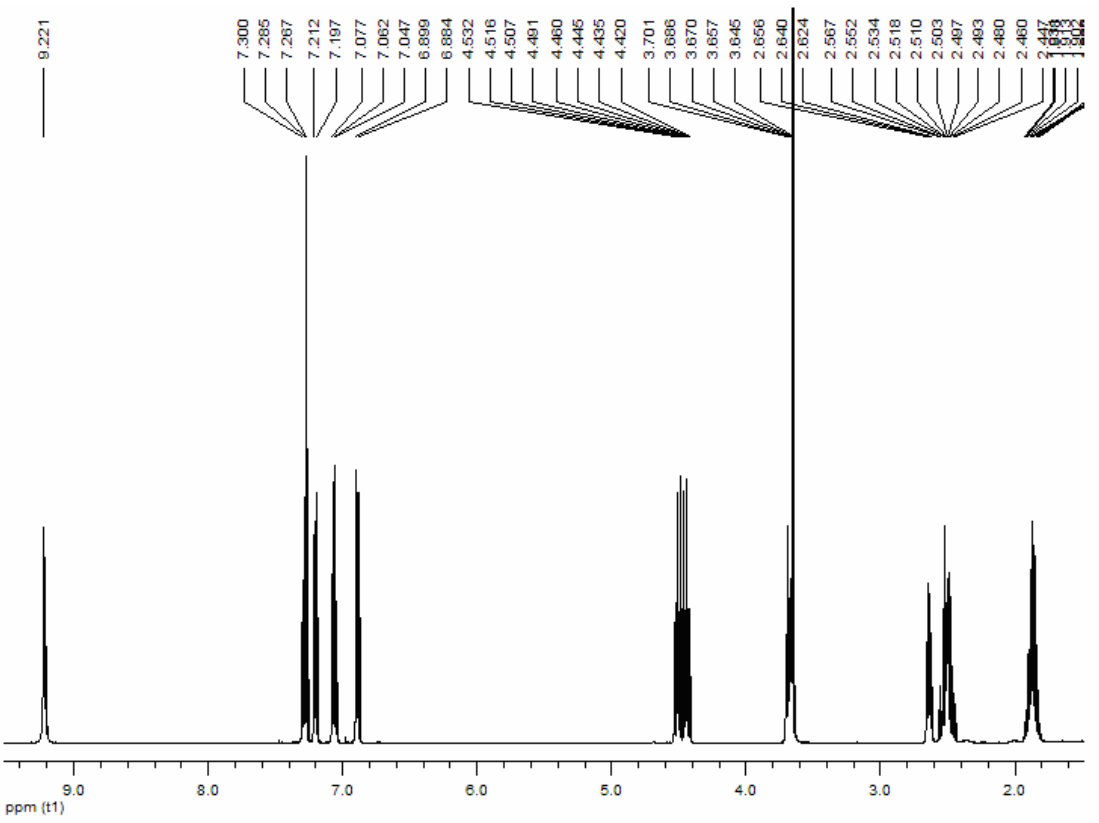

168.426
135.257
130.253
129.440
125.090
117.792
116.688
116.138
76.797
40.265
39.641
18.668
150
100
50
ppm (t1)

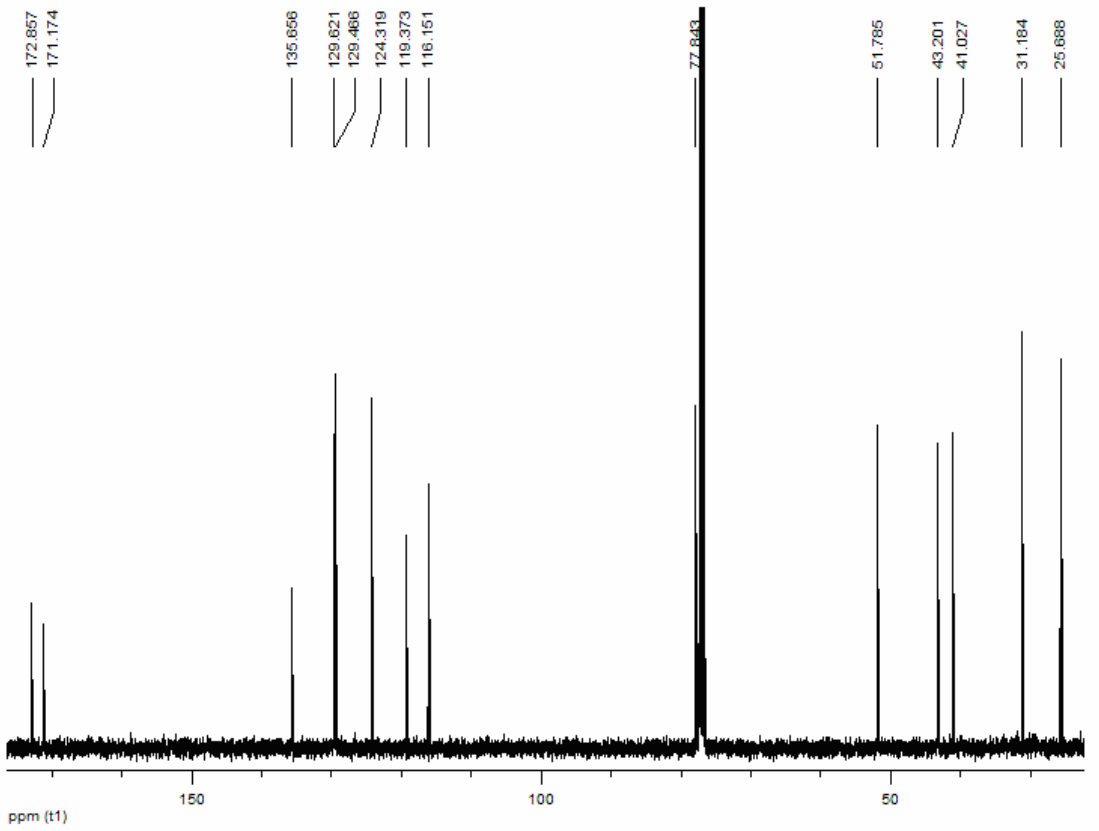
Compound 6m


9.484
7.307
7.292
7.273
7.213
7.198
7.084
7.069
7.054
6.949
6.933
4.608
4.593
4.583
4.568
4.506
4.490
4.481
4.465
3.825
3.810
3.797
3.697
3.134
3.129
3.114
3.109
2.668
2.659
2.636
9.0
8.0
7.0
6.0
5.0
4.0
3.0
ppm (t1)

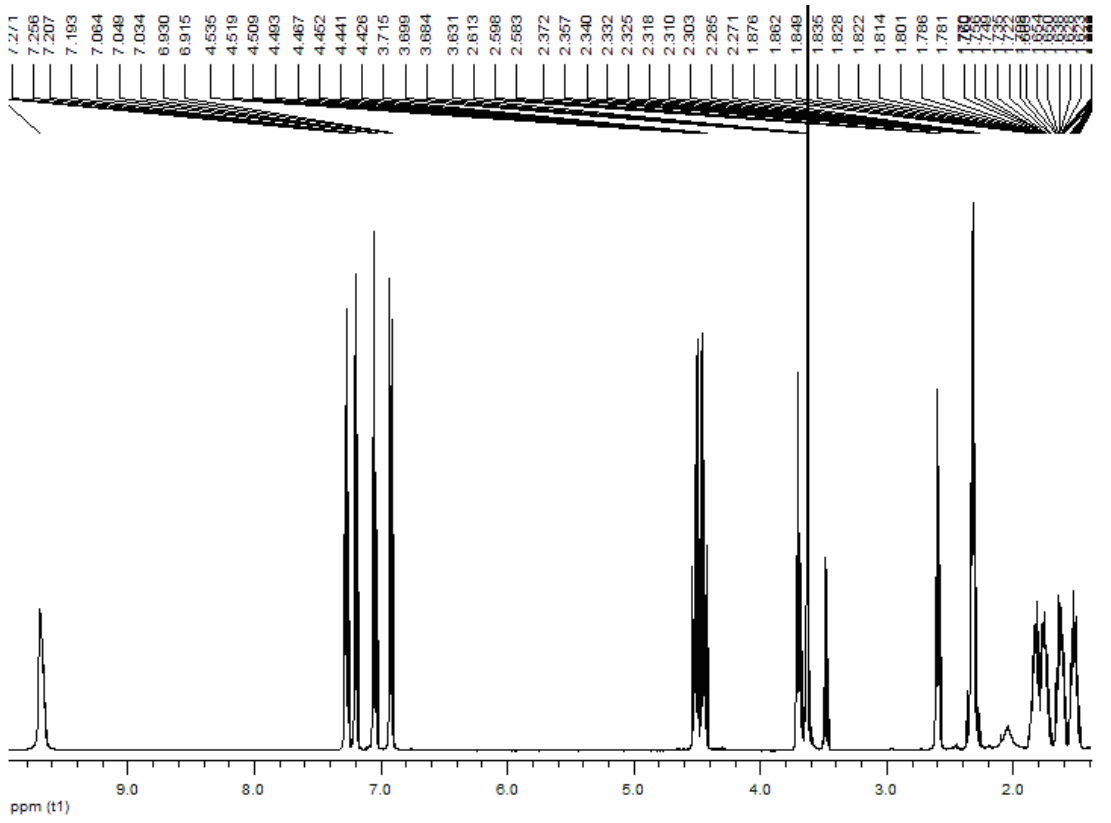

170.719
170.537
135.723
129.696
129.577
124.436
118.933
116.345
77.796
52.214
40.382
39.853
34.091
150
100
50
ppm (t1)

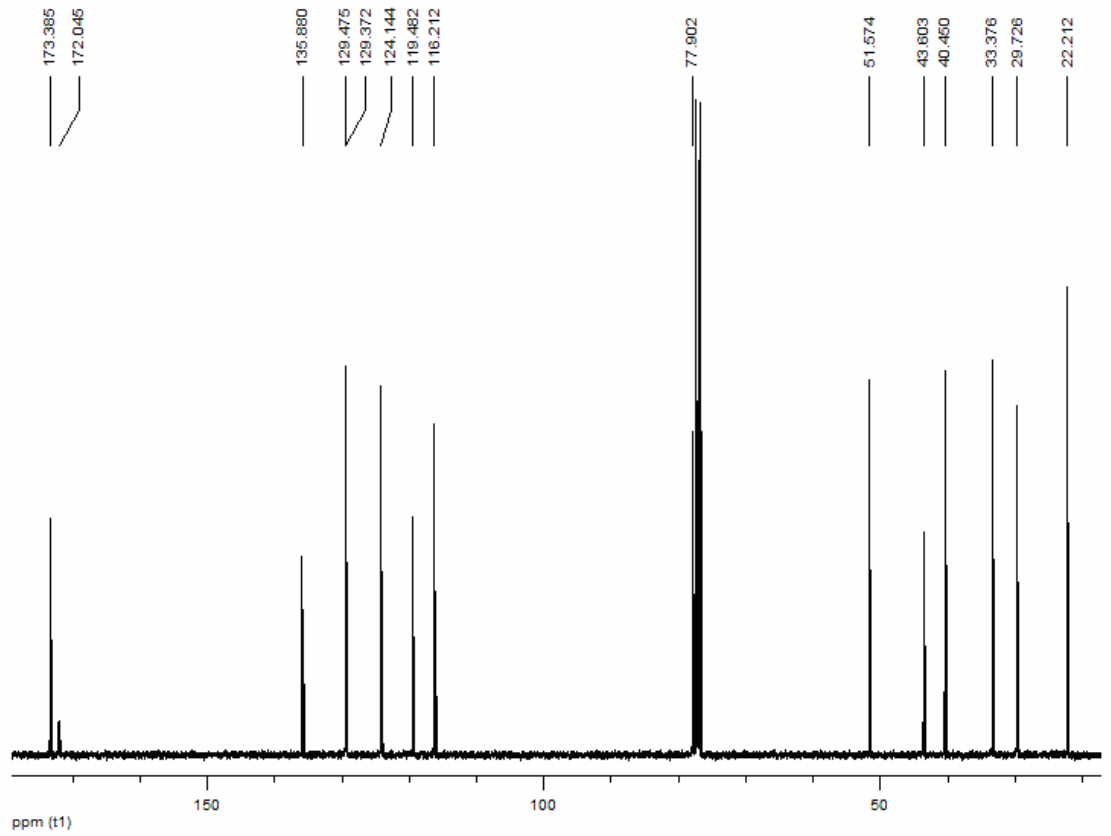
Compound 6n


9.221
7.300
7.285
7.267
7.212
7.197
7.077
7.062
7.047
6.899
6.884
4.532
4.516
4.507
4.491
4.460
4.445
4.435
4.420
3.701
3.686
3.670
3.657
3.645
2.656
2.640
2.624
2.567
2.552
2.534
2.518
2.510
2.503
2.497
2.493
2.480
2.460
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
ppm (t1)

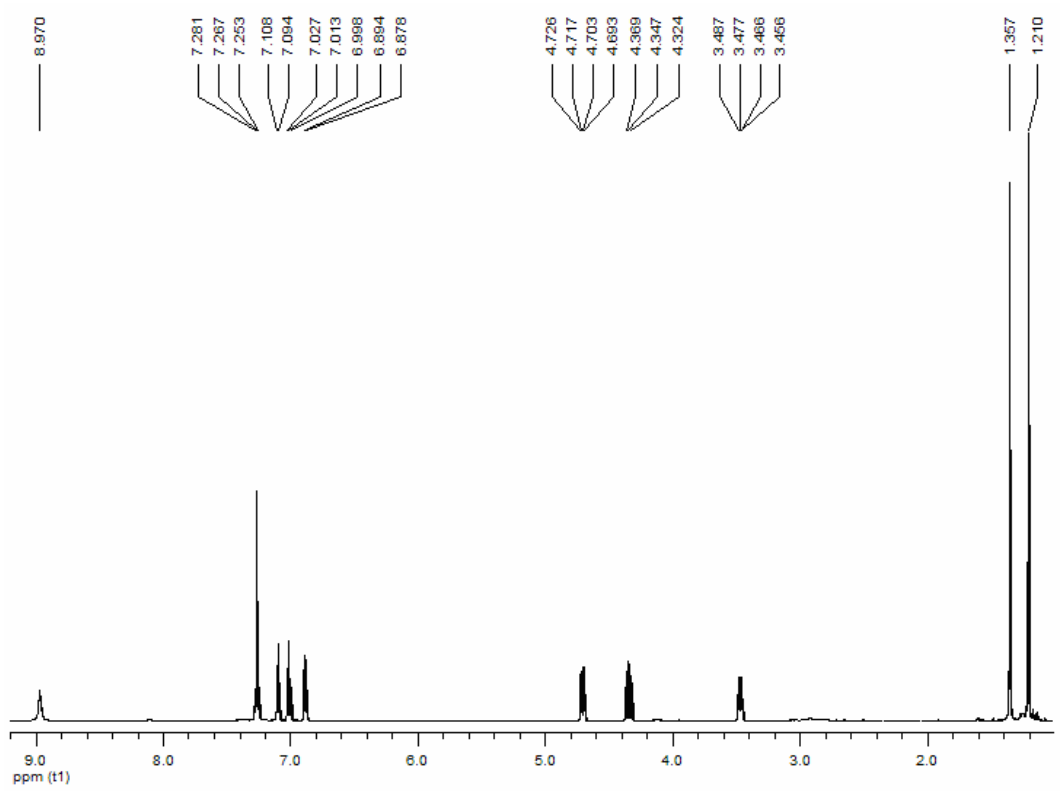

172.857
171.174
135.656
129.621
129.466
124.319
119.373
116.151
77.843
51.785
43.201
41.027
31.184
25.688
150
100
50
ppm (t1)

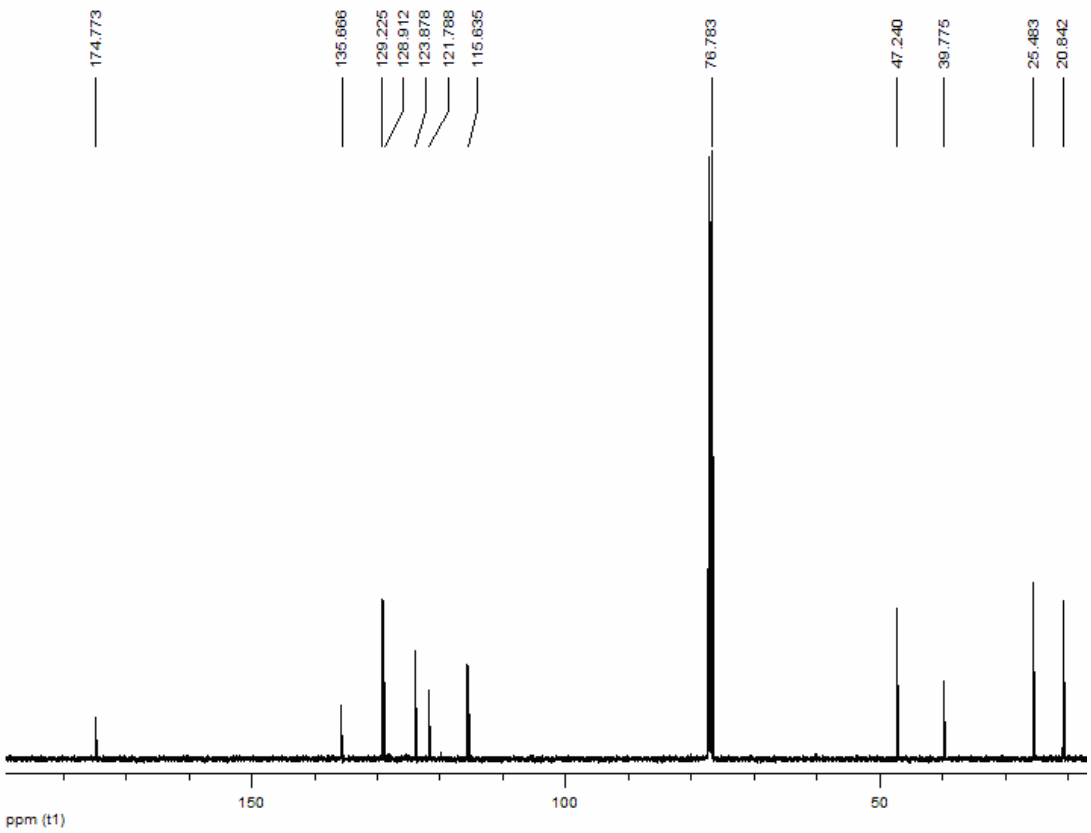
Compound 6o


7.256
7.207
7.193
7.064
7.049
7.034
6.930
6.915
4.535
4.519
4.509
4.493
4.467
4.452
4.441
4.426
3.715
3.699
3.684
3.631
2.613
2.598
2.583
2.372
2.357
2.340
2.332
2.325
2.318
2.310
2.303
2.285
2.271
1.876
1.862
1.849
1.835
1.828
1.822
1.814
1.801
1.786
1.781
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
ppm (t1)

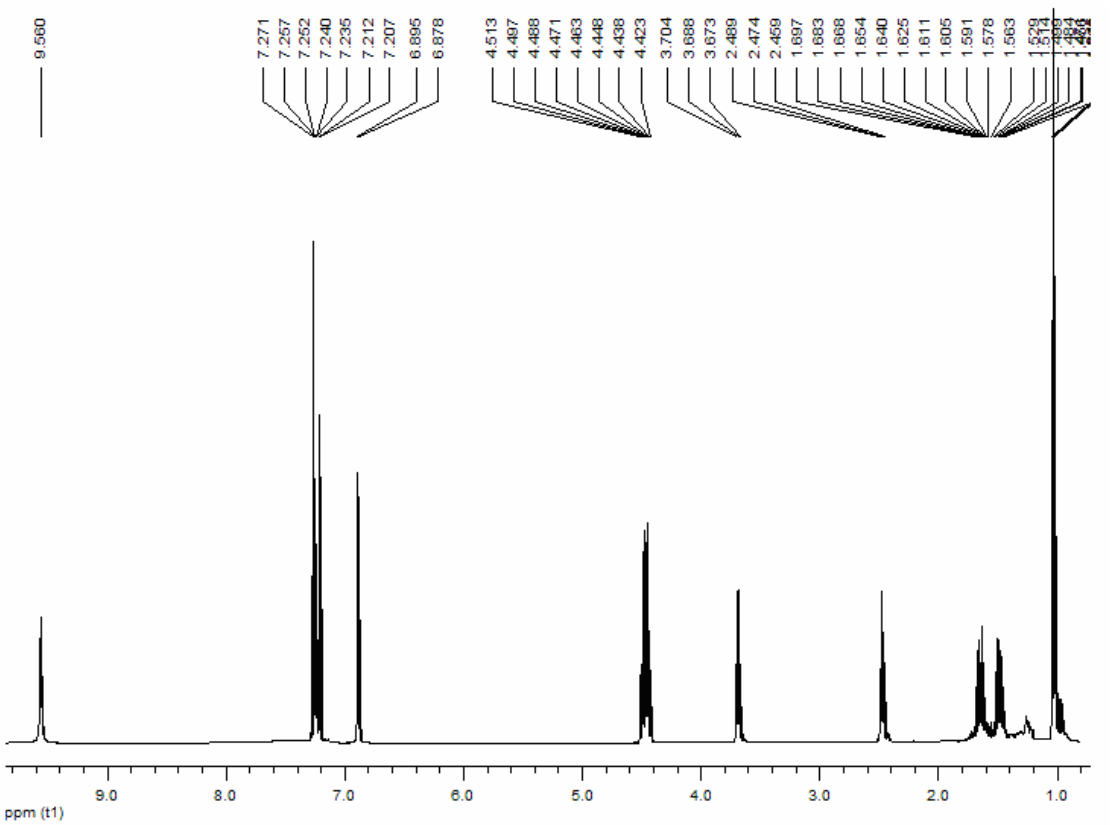

173.385
172.045
135.880
129.475
129.372
124.144
119.482
116.212
77.902
51.574
43.603
40.450
33.376
29.726
22.212
150
100
50
ppm (t1)

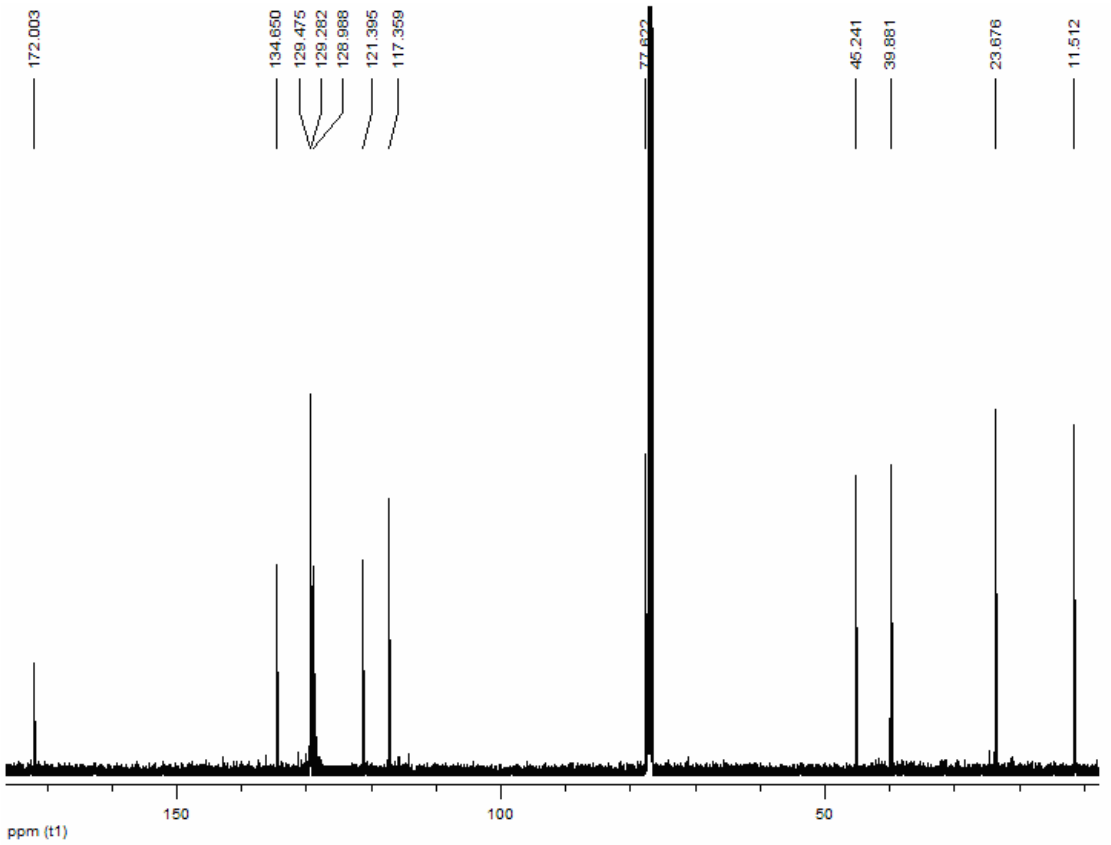
Compound 6p


8.970
7.281
7.267
7.253
7.108
7.094
7.027
7.013
6.998
6.894
6.878
4.726
4.717
4.703
4.693
4.369
4.347
4.324
3.487
3.477
3.466
3.456
1.357
1.210
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
ppm (t1)

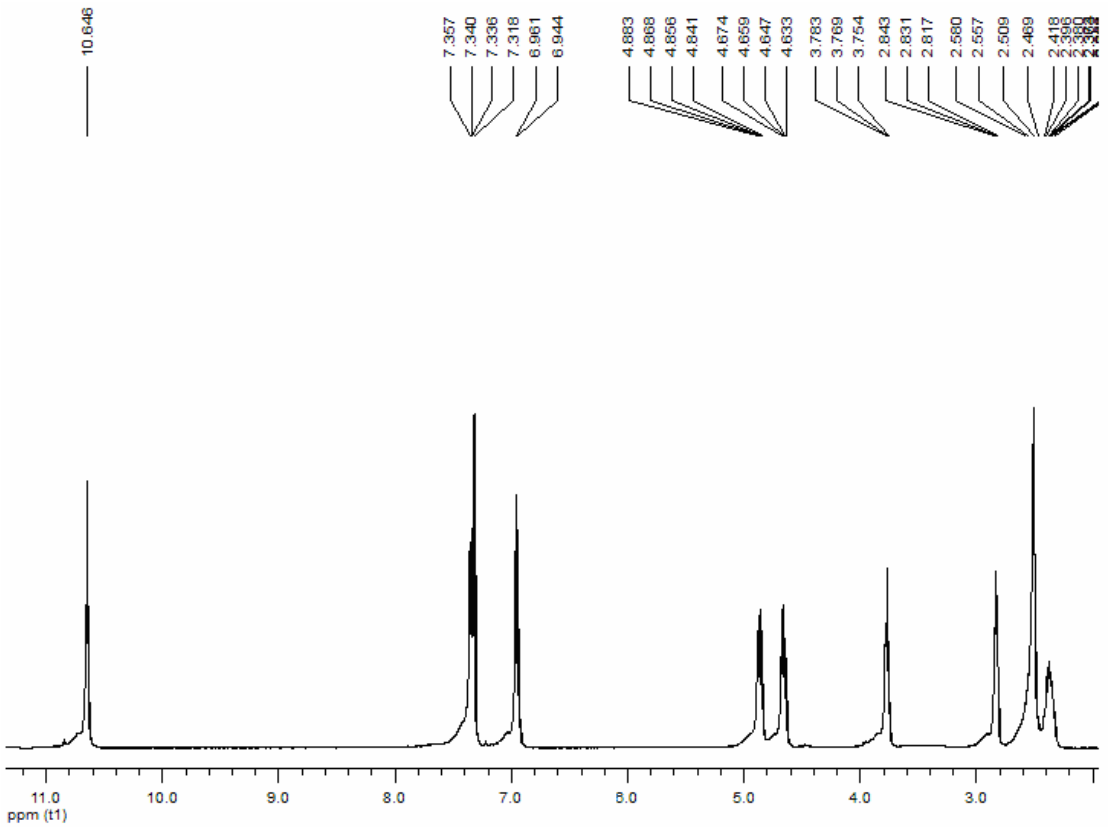

174.773
135.666
129.225
128.912
123.878
121.788
115.635
76.783
47.240
39.775
25.483
20.842
150
100
50
ppm (t1)

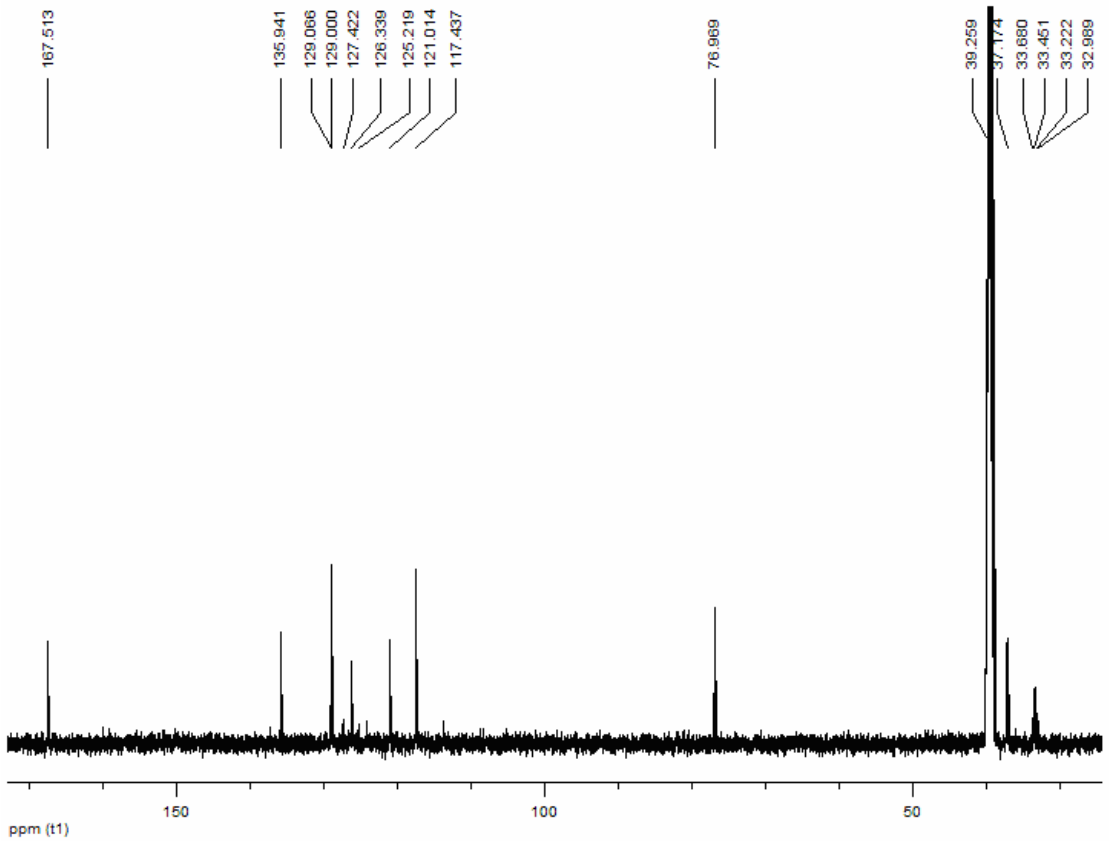
Compound 6q


9.560
7.271
7.257
7.252
7.240
7.235
7.212
7.207
6.895
6.878
4.513
4.497
4.488
4.471
4.463
4.448
4.438
4.423
3.704
3.688
3.673
2.489
2.474
2.459
1.697
1.683
1.668
1.654
1.640
1.625
1.611
1.605
1.591
1.578
1.563
1.529
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
ppm (t1)

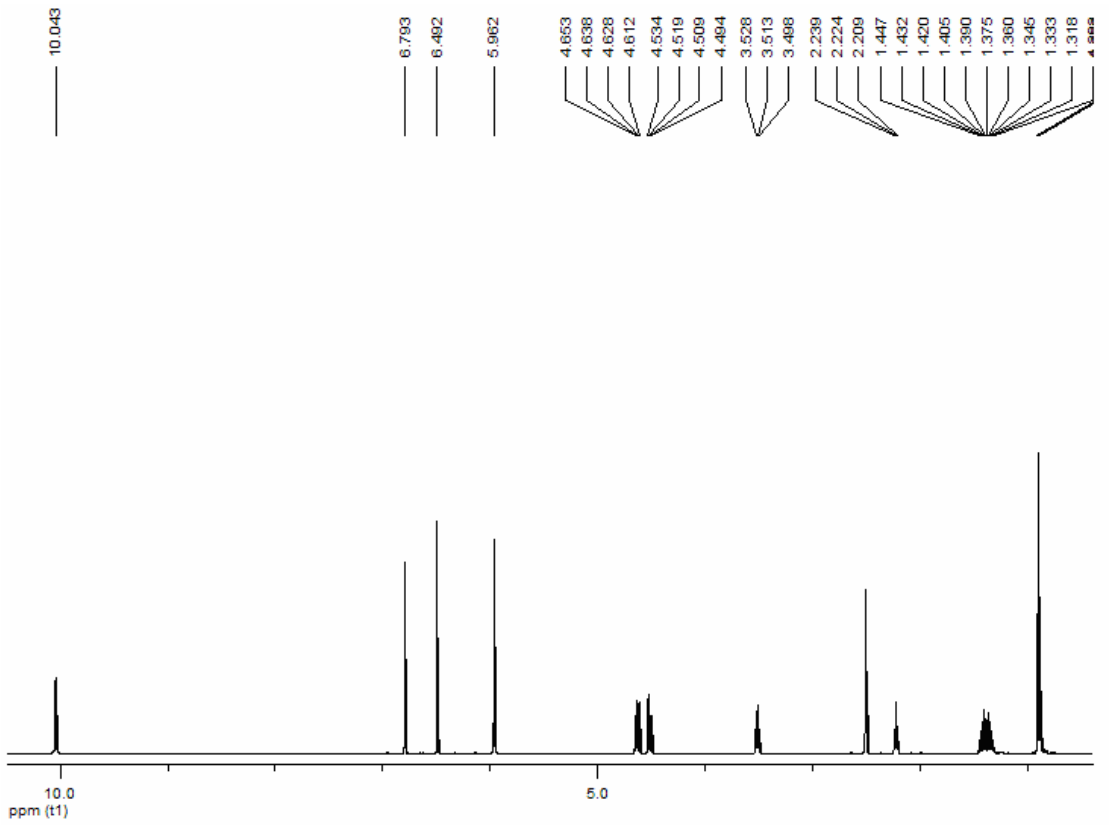

172.003
134.650
129.475
129.282
128.988
121.395
117.359
77.622
45.241
39.881
23.676
11.512
150
100
50
ppm (t1)

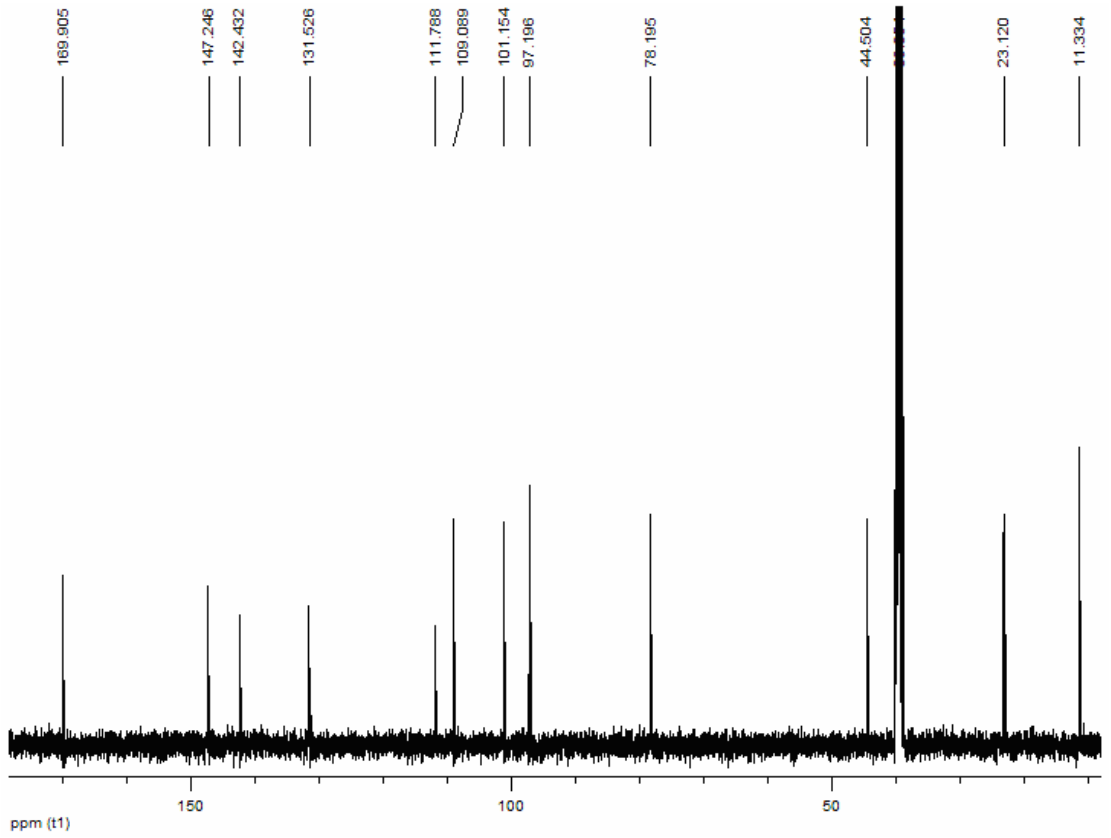
Compound 6r


10.646
7.357
7.340
7.336
7.318
6.961
6.944
4.883
4.868
4.856
4.841
4.674
4.659
4.647
4.633
3.783
3.769
3.754
2.843
2.831
2.817
2.580
2.557
2.509
2.469
2.418
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
ppm (t1)

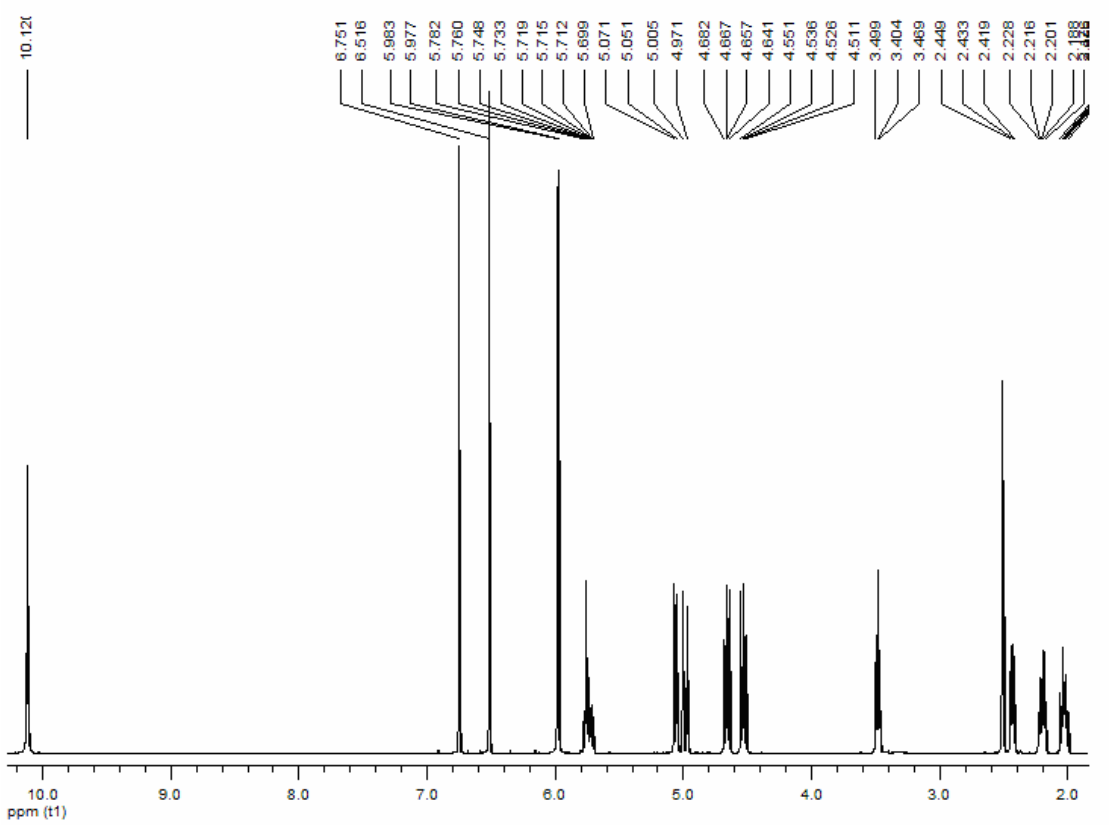

167.513
135.941
129.066
129.000
127.422
126.339
125.219
121.014
117.437
78.969
39.259
37.174
33.680
33.451
33.222
32.989
150
100
50
ppm (t1)

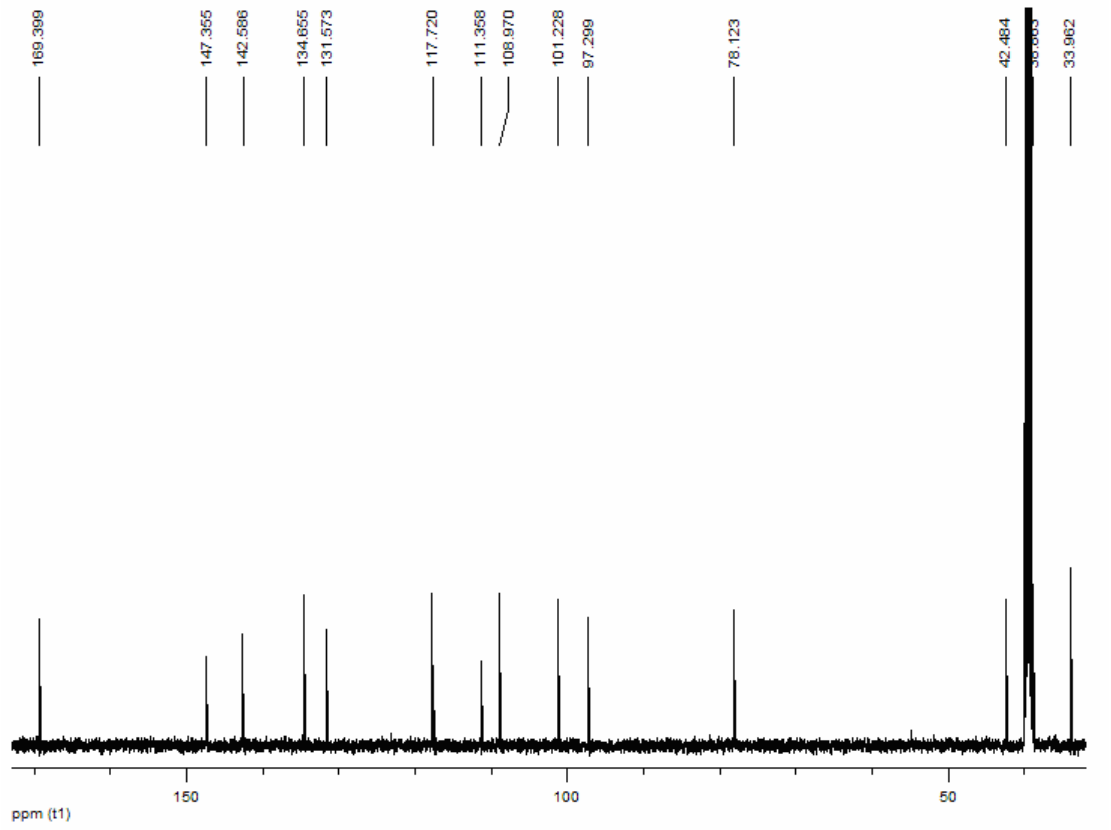
Compound 6s


10.043
6.793
6.492
5.962
4.653
4.638
4.628
4.612
4.534
4.519
4.509
4.494
3.528
3.513
3.498
2.239
2.224
2.209
1.447
1.432
1.420
1.405
1.390
1.375
1.360
1.345
1.333
1.318
10.0
5.0
ppm (t1)

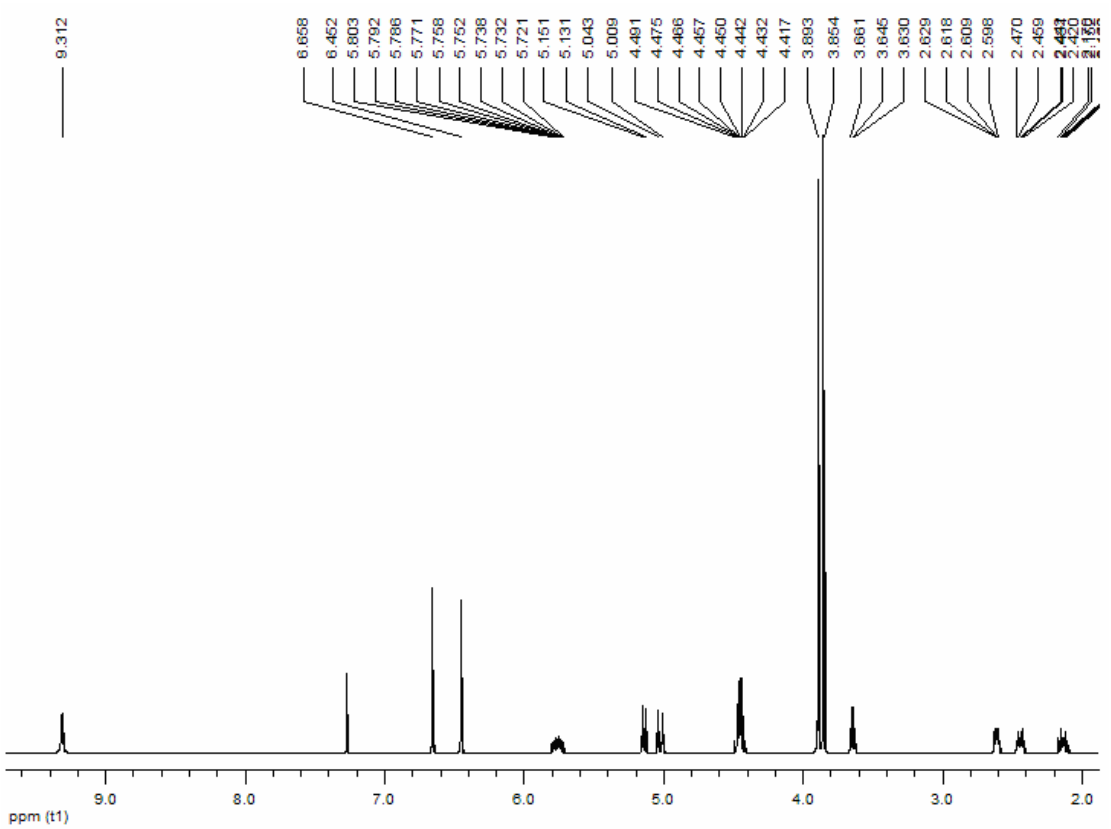

169.905
147.246
142.432
131.526
111.788
109.089
101.154
97.196
78.195
44.504
23.120
11.334
150
100
50
ppm (t1)

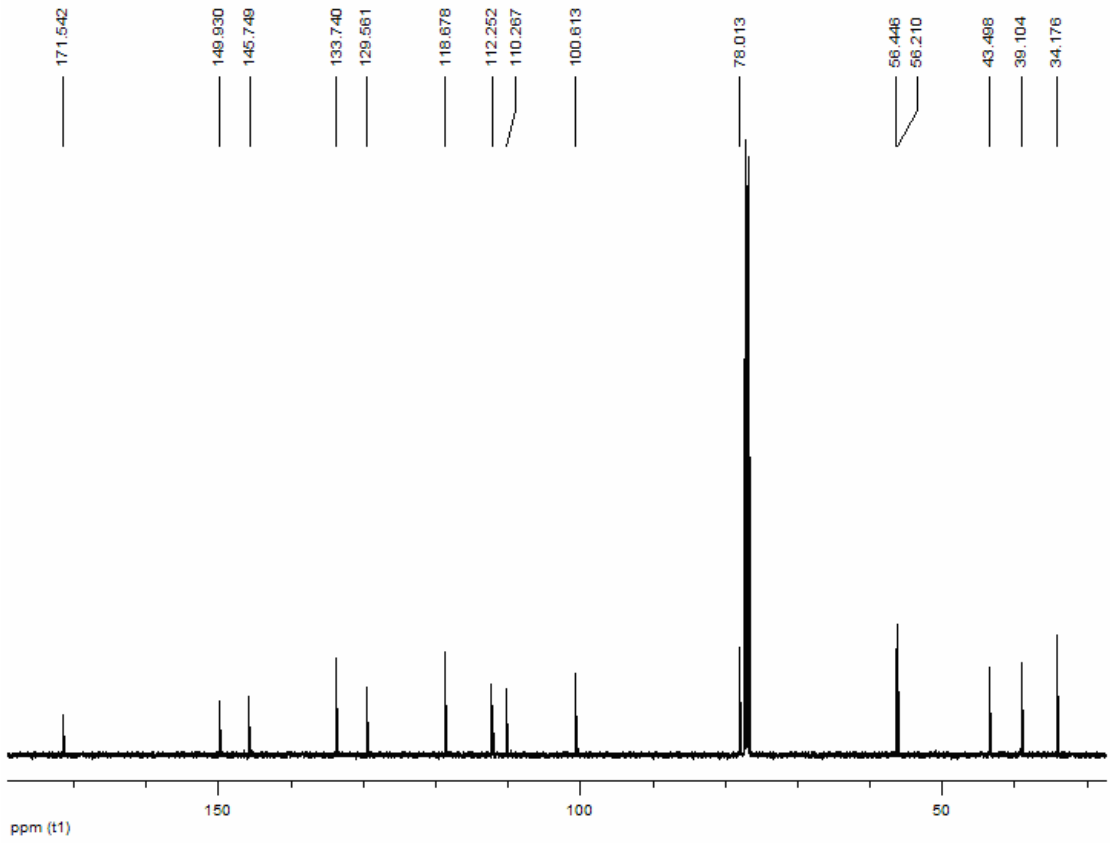
Compound 6t


10.12
6.751
6.516
5.983
5.977
5.782
5.760
5.748
5.733
5.719
5.715
5.712
5.699
5.071
5.051
5.005
4.971
4.682
4.667
4.657
4.641
4.551
4.536
4.526
4.511
3.499
3.404
3.469
2.449
2.433
2.419
2.228
2.216
2.201
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
ppm (t1)

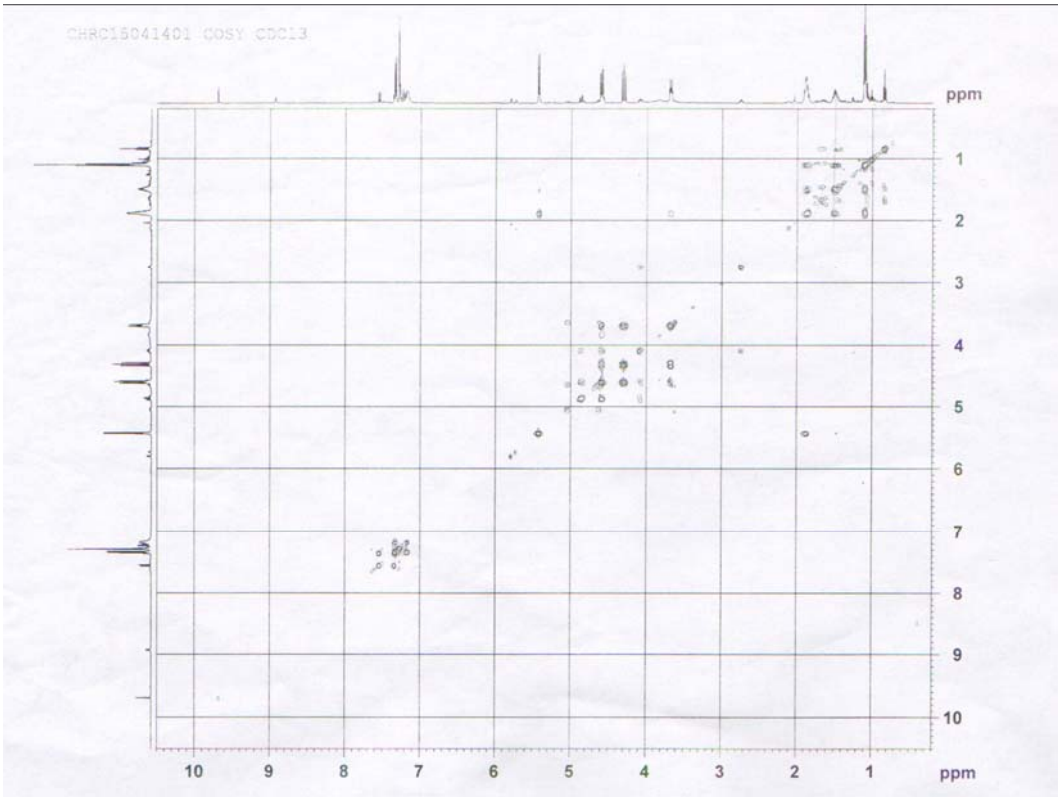

169.399
147.355
142.586
134.855
131.573
117.720
111.358
108.970
101.228
97.299
78.123
42.484
33.962
150
100
50
ppm (t1)

Compound 6u

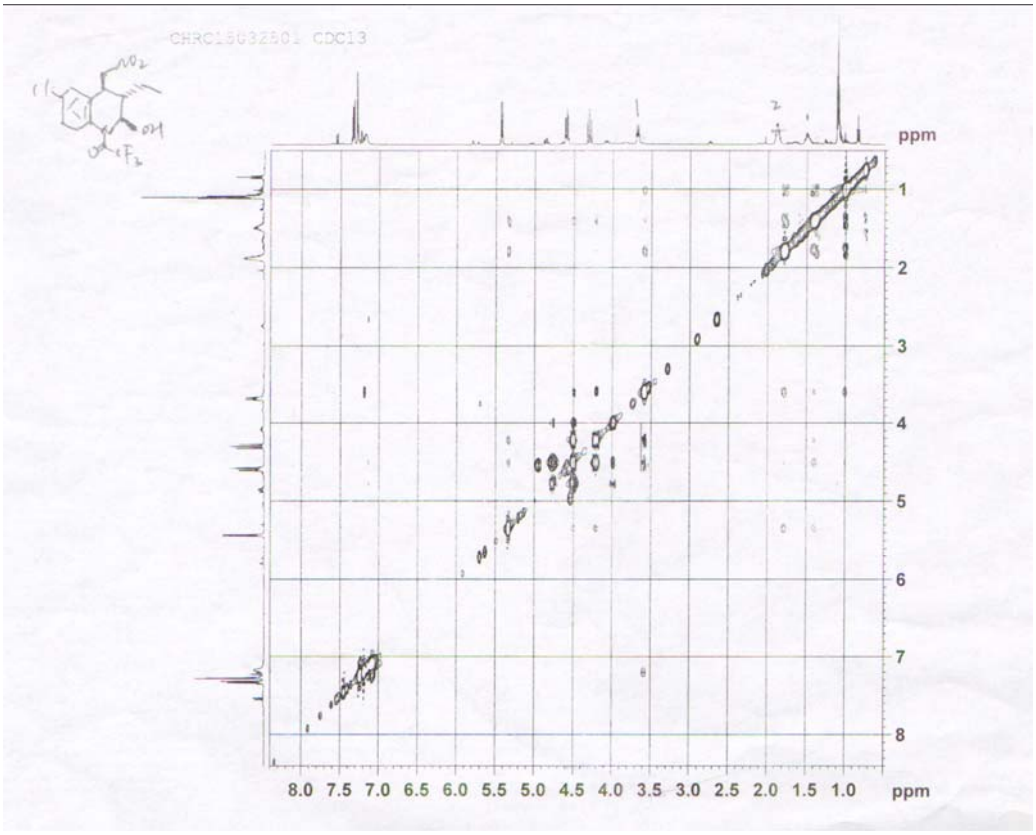

9.312
6.658
6.452
5.803
5.792
5.786
5.771
5.758
5.752
5.738
5.732
5.721
5.151
5.131
5.043
5.009
4.491
4.475
4.466
4.457
4.450
4.442
4.432
4.417
3.893
3.854
3.661
3.645
3.630
2.629
2.618
2.609
2.598
2.470
2.459
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
ppm (t1)


171.542
149.930
145.749
133.740
129.561
118.678
112.252
110.267
100.613
78.013
56.446
56.210
43.498
39.104
34.176
150
100
50
ppm (t1)

H-H COSY spectra of 5q



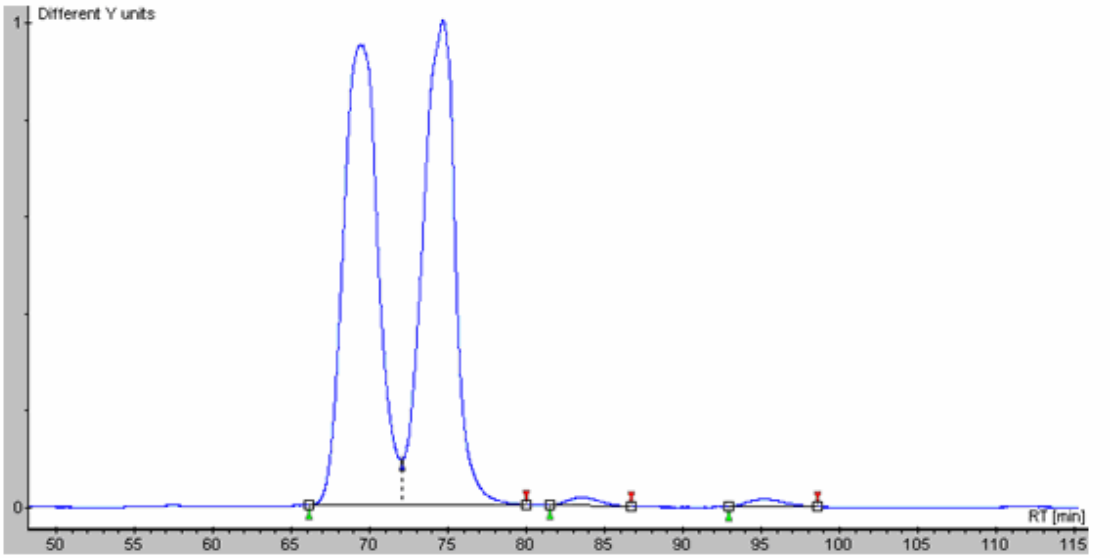
H-H NOESY spectra of 5q



5. HPLC spectra of Michael adducts

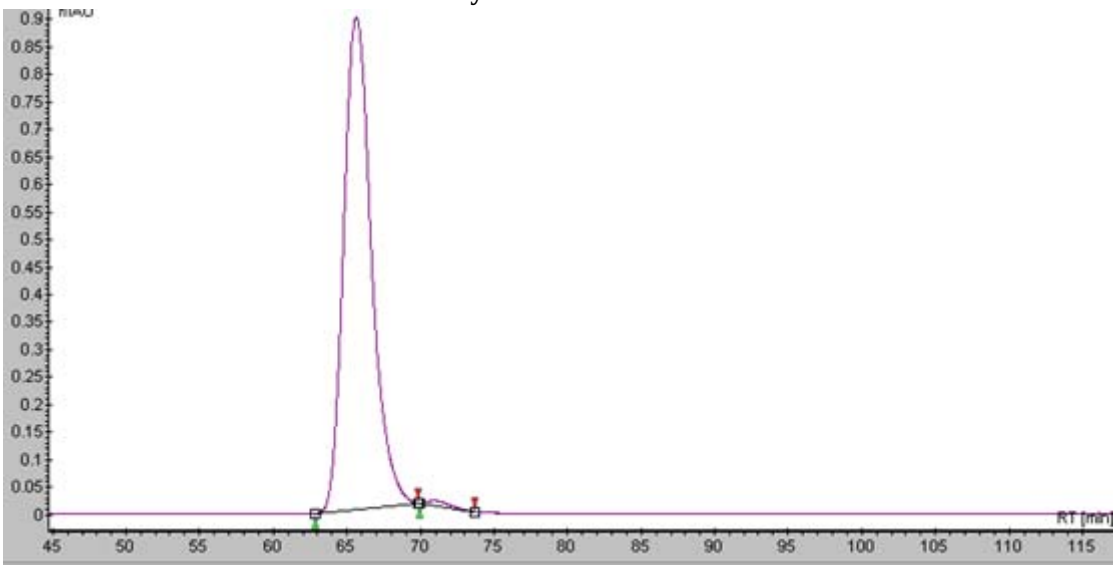
Compound 6a

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	66.057	69.442	72.015	49.754
2	72.015	74.667	79.957	48.564
3	81.480	83.530	86.643	0.813
4	92.865	95.099	98.557	0.869

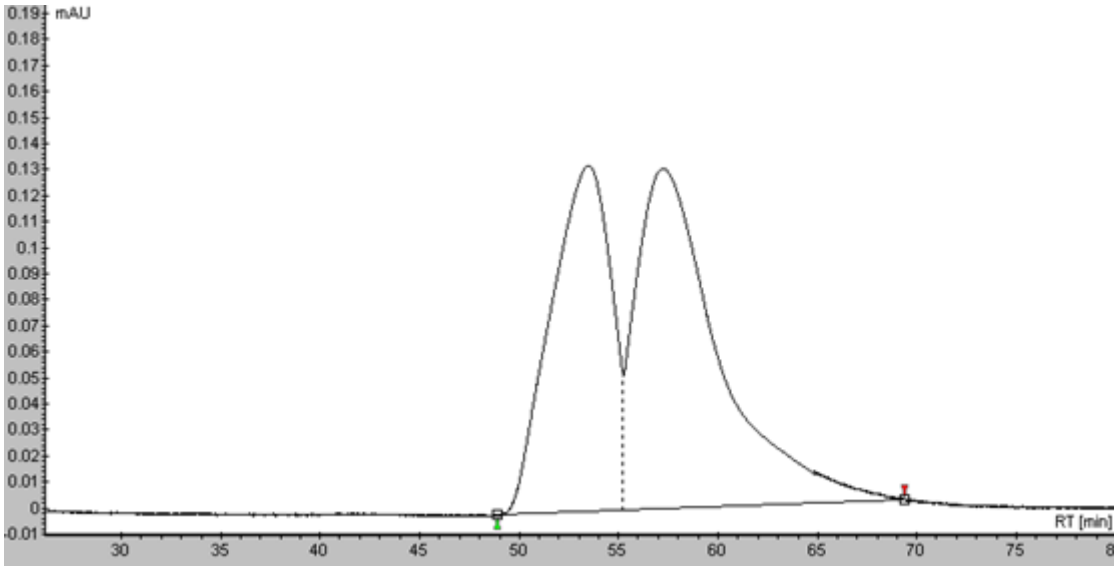
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	62.811	65.672	69.874	99.289
2	69.981	71.174	73.661	0.711

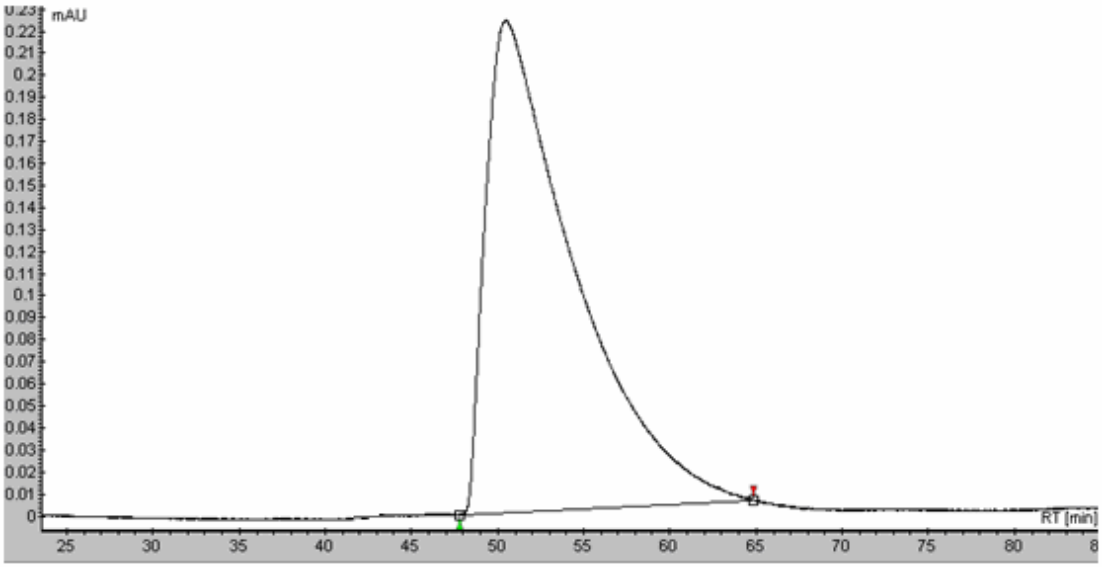
Compound 6b

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	48.905	52.697	55.222	48.025
2	55.222	57.940	69.358	51.975

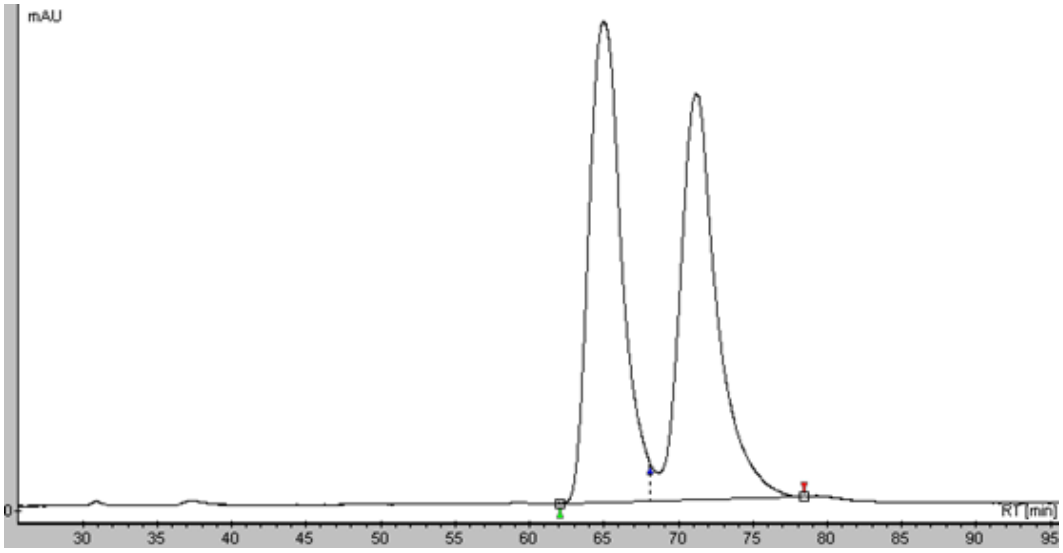
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	47.770	50.489	64.881	100.000

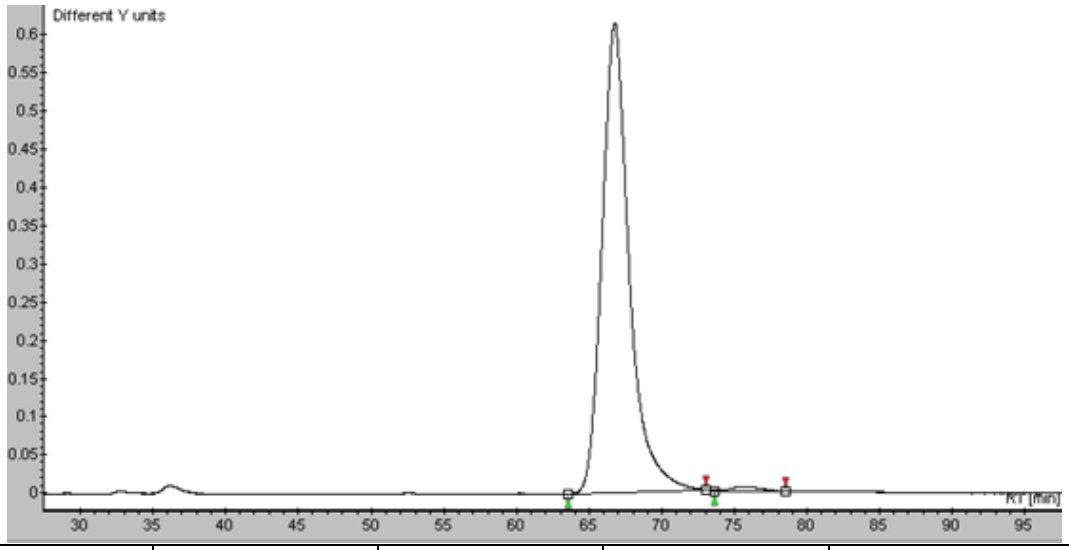
Compound 6c

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	62.037	64.950	68.105	50.975
2	68.105	71.214	78.419	49.025

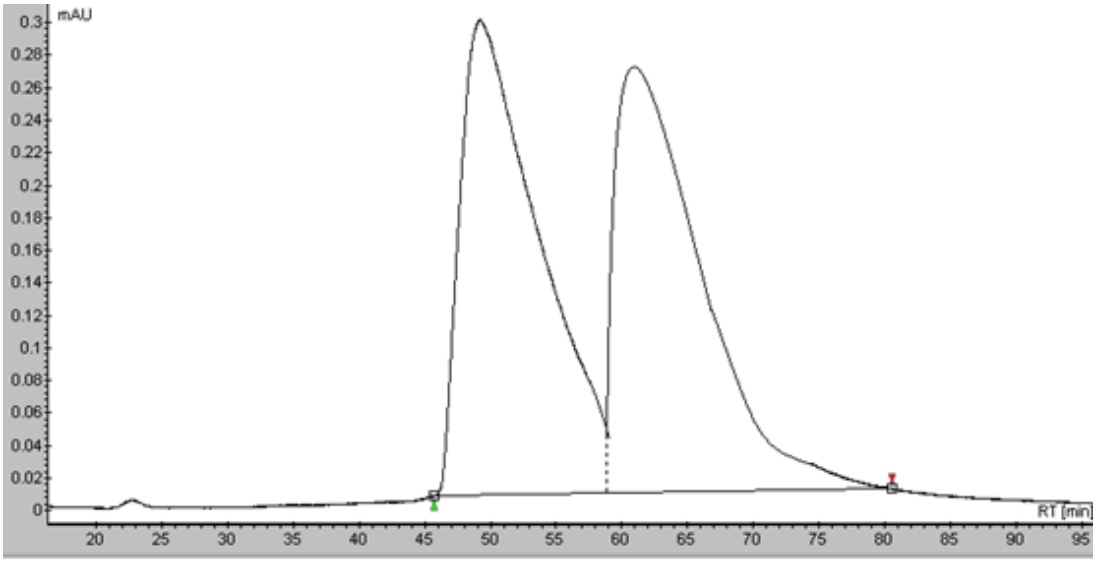
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	63.588	66.776	73.049	98.981
2	73.646	75.746	78.504	1.019

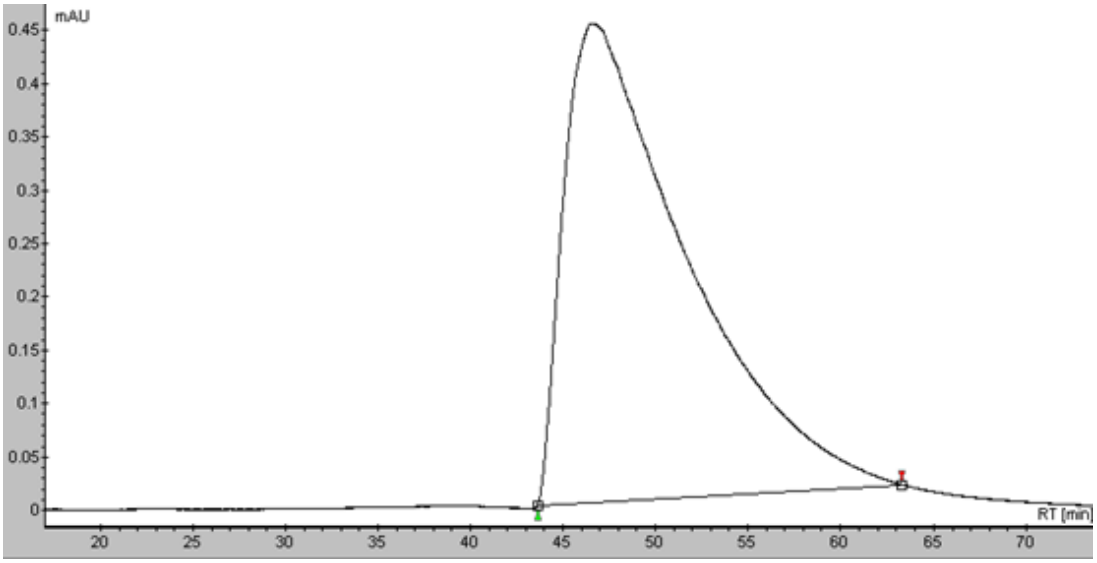
Compound 6d

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	45.671	49.249	58.799	51.399
2	58.799	61.578	80.587	48.601

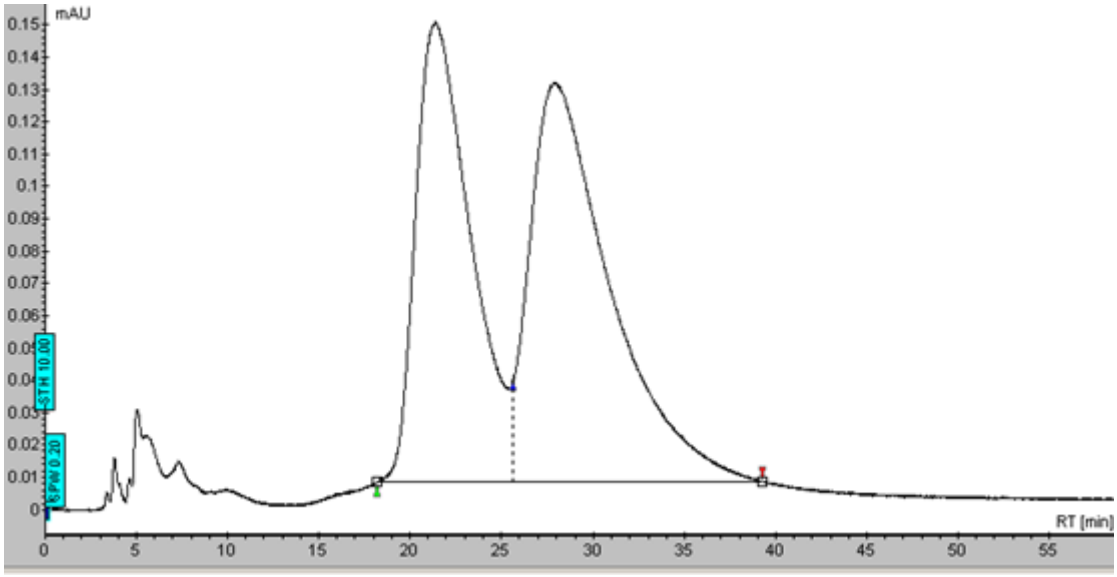
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	43.604	46.583	63.293	100.000

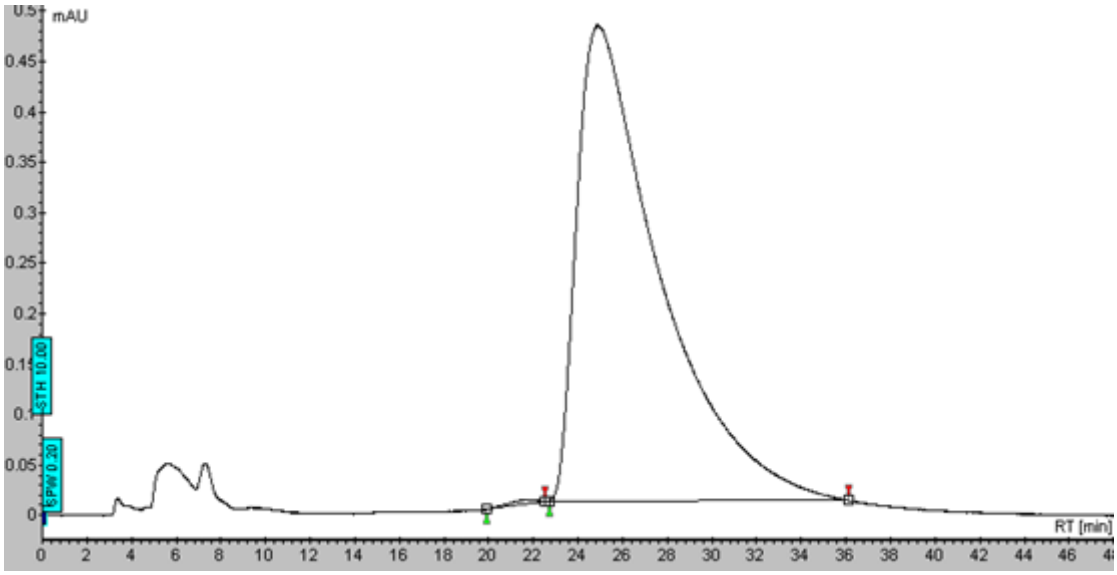
Compound 6e

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	18.168	21.358	25.615	44.285
2	25.615	27.918	39.282	55.715

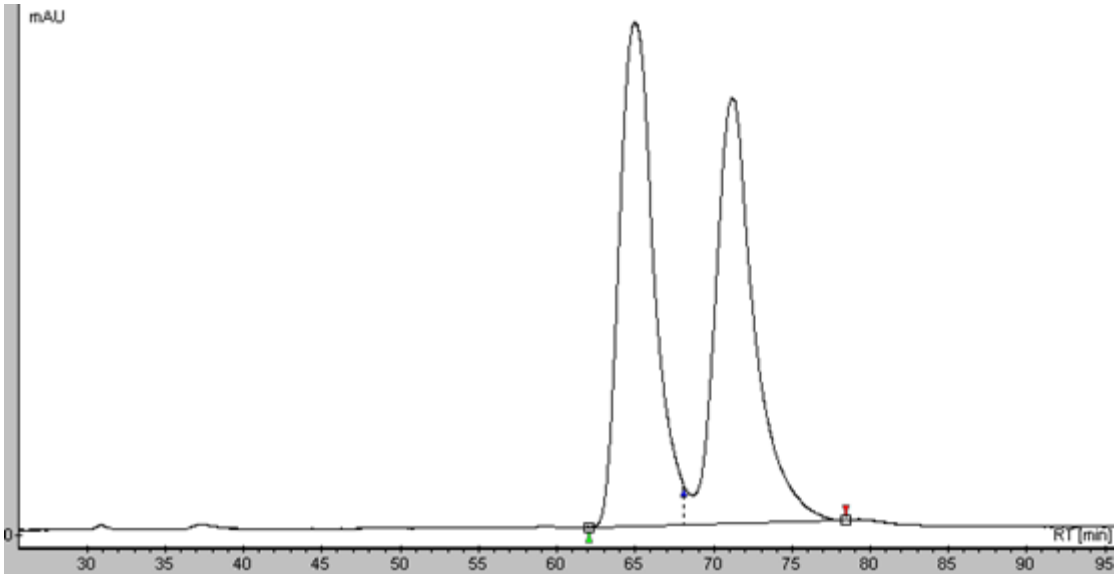
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	19.897	21.425	22.530	0.299
2	22.691	24.892	36.112	99.701

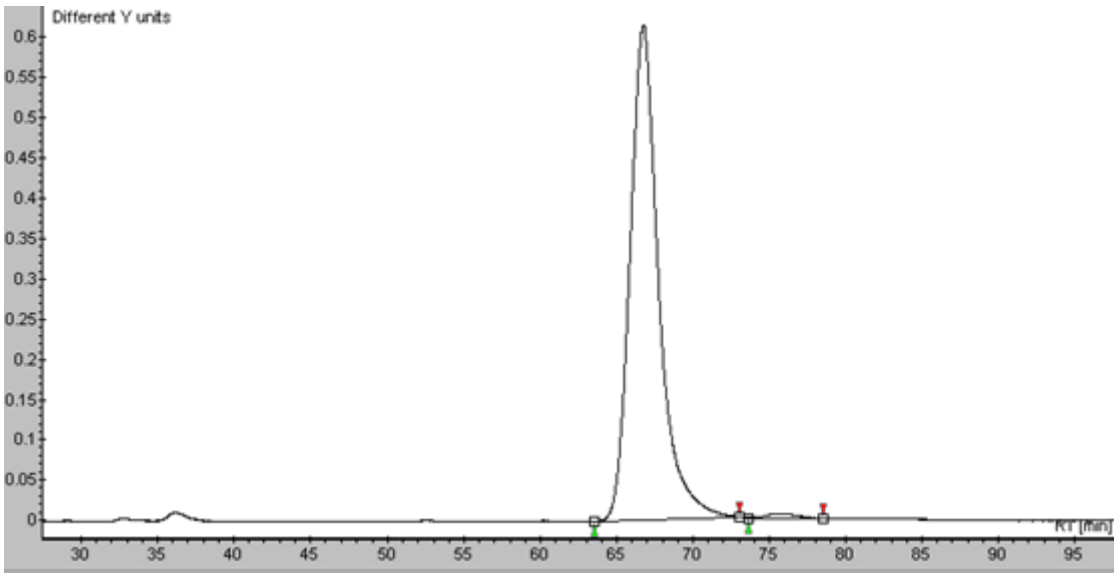
Compound 6f

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	62.037	64.950	68.105	50.975
2	68.105	71.214	78.419	49.025

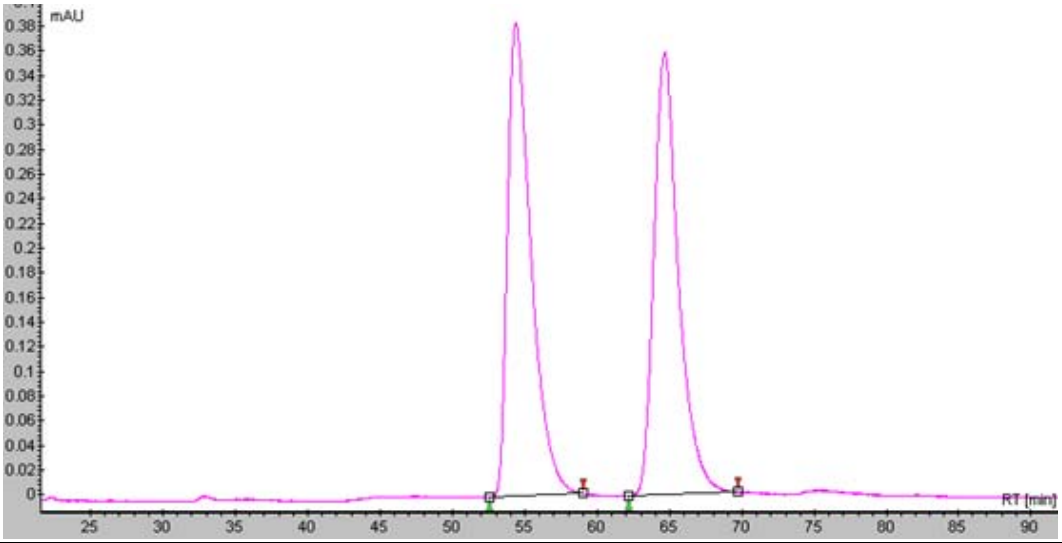
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	63.588	66.776	73.049	98.981
2	73.646	75.746	78.504	1.019

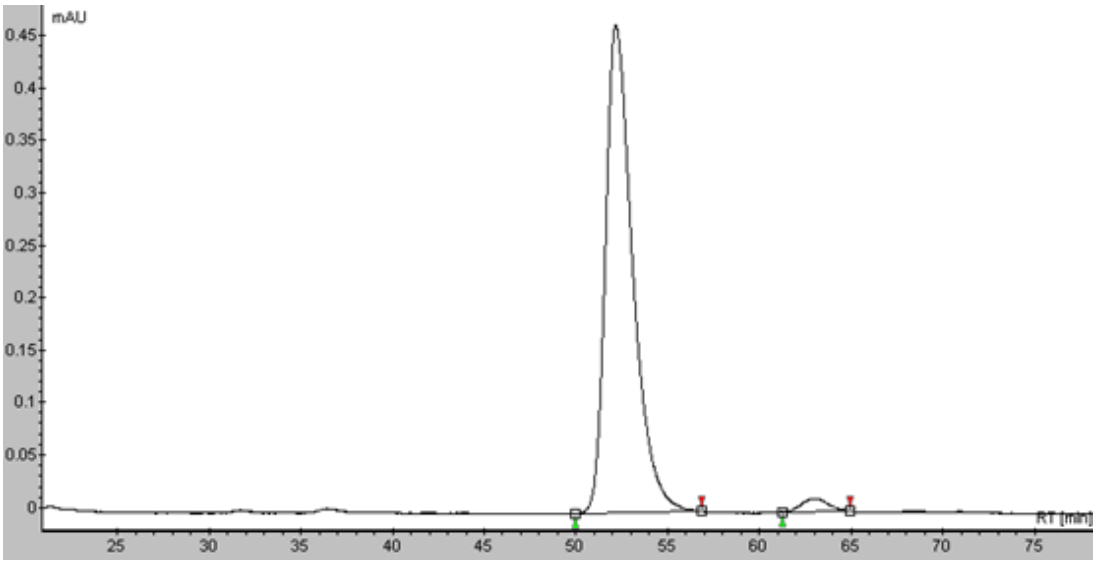
Compound 6g

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	52.545	54.380	59.005	50.518
2	62.164	64.697	69.773	49.482

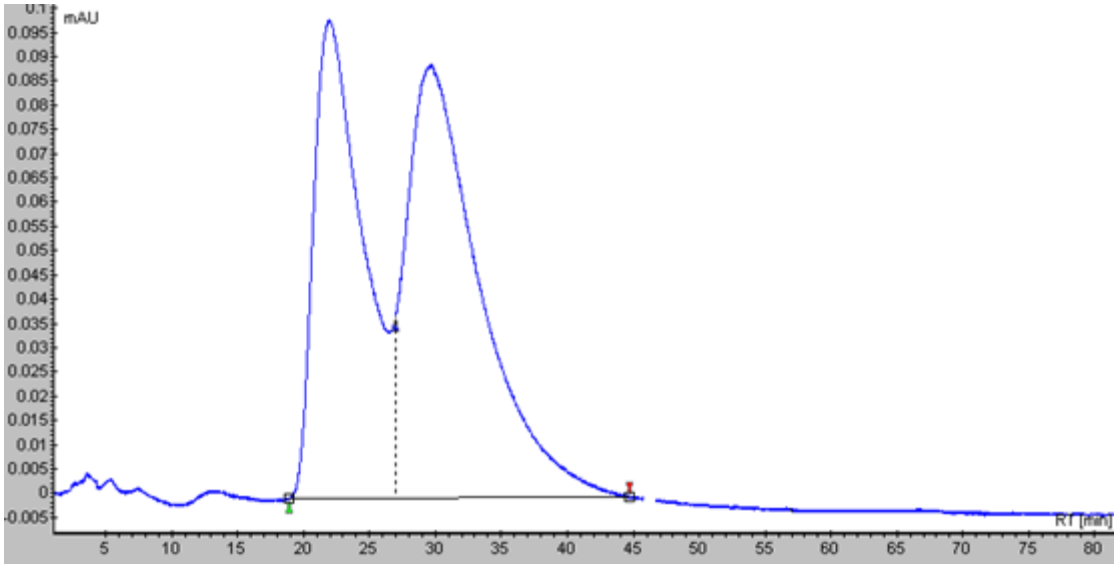
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	49.969	52.155	56.857	97.414
2	61.231	63.017	64.948	2.586

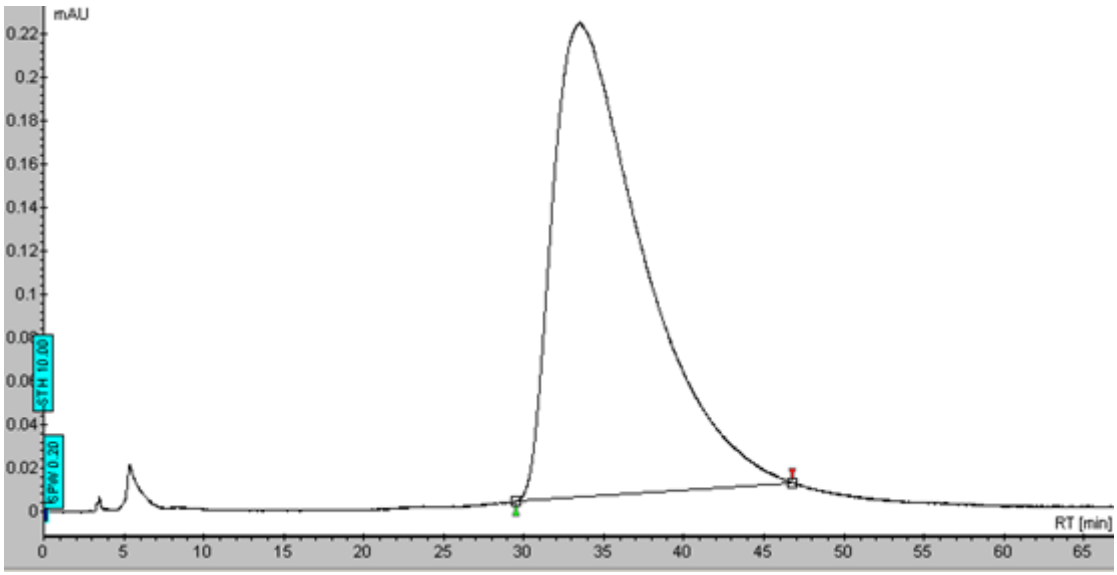
Compound 6h

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	18.901	21.940	26.939	42.872
2	26.939	29.679	44.754	57.128

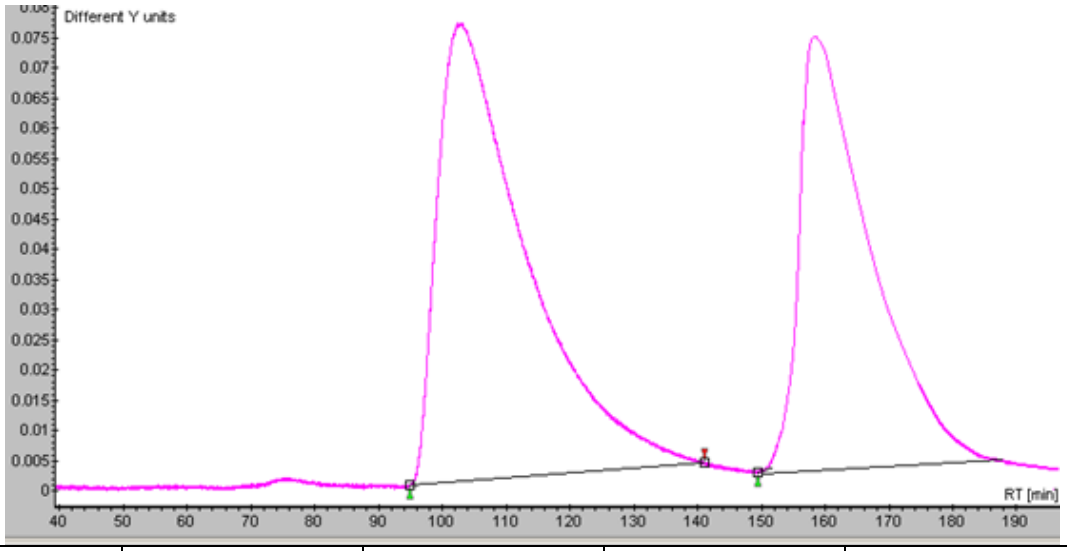
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	29.505	33.481	46.779	100.000

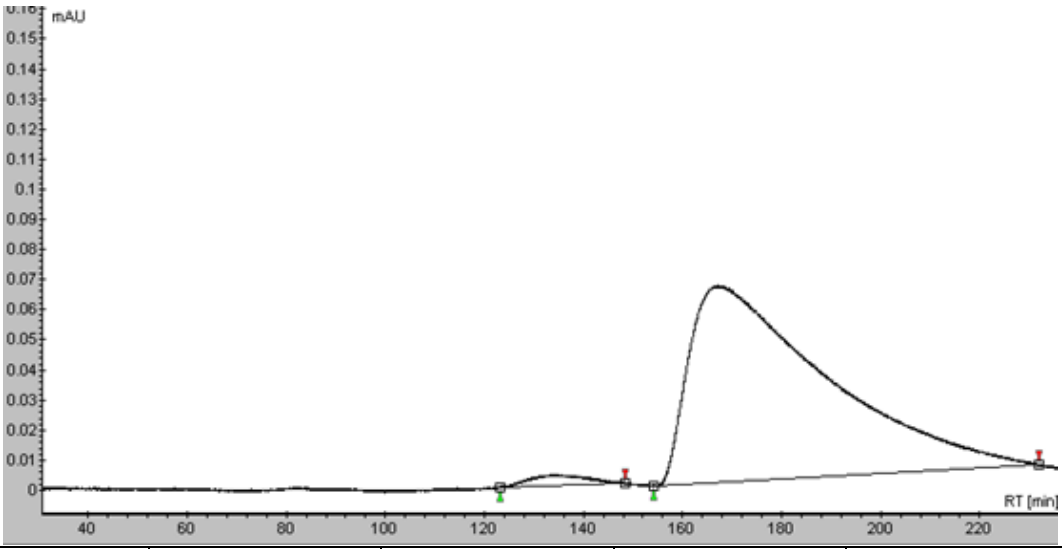
Compound 6i

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
2	94.894	103.091	140.977	56.657
1	149.430	161.769	187.606	43.343

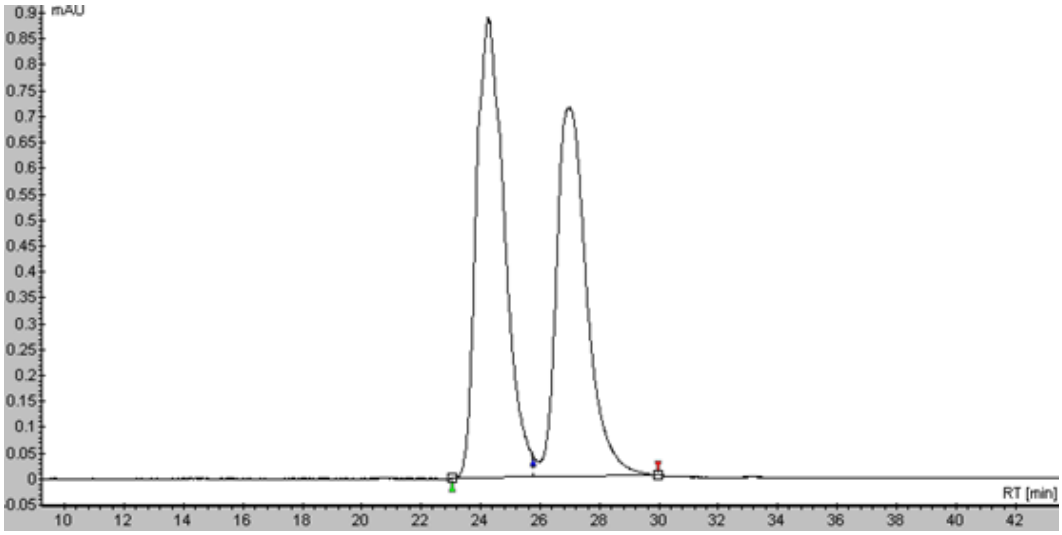
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	123.052	133.223	148.454	2.302
2	154.062	167.151	231.918	97.698

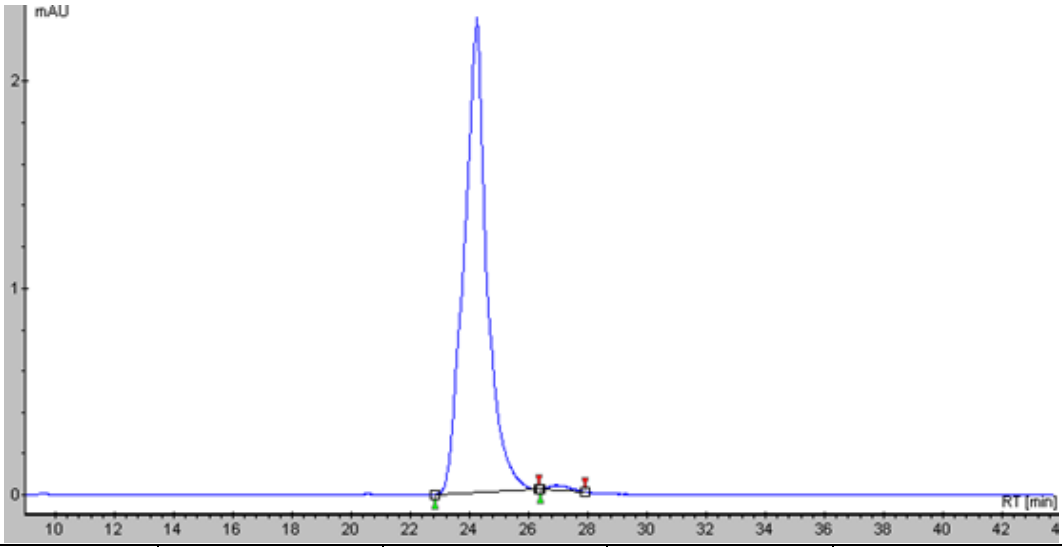
Compound 6j

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	23.047	24.252	25.776	53.417
2	25.776	26.998	29.961	46.583

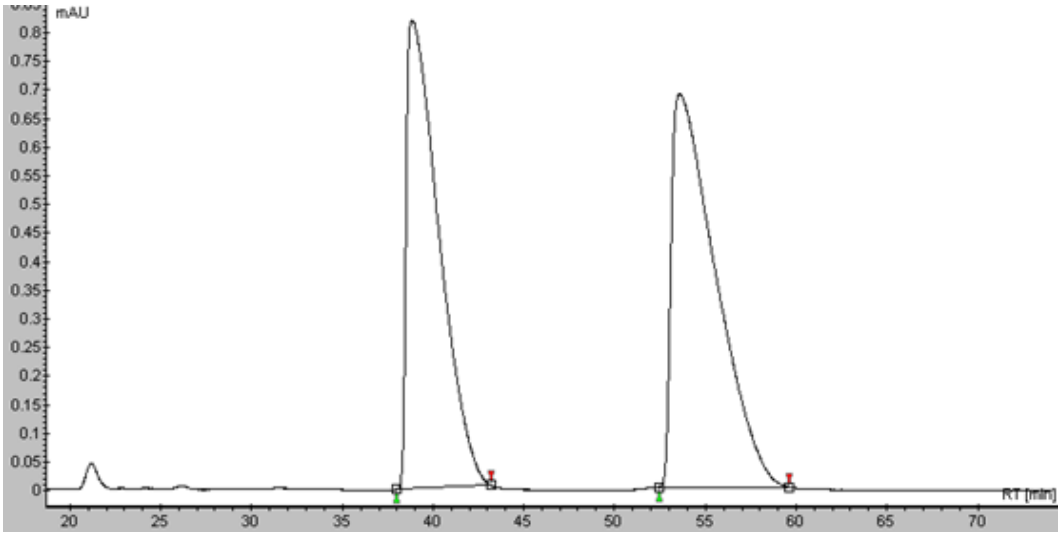
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	22.832	24.238	26.328	99.064
2	26.408	26.985	27.918	0.936

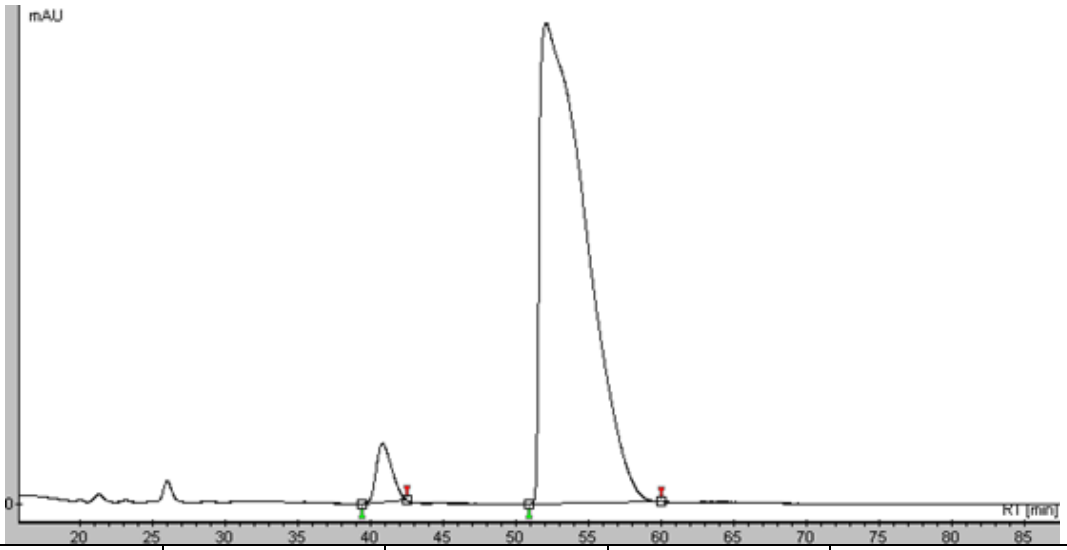
Compound 6k

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	37.996	38.799	43.158	46.765
2	52.451	53.581	59.575	53.235

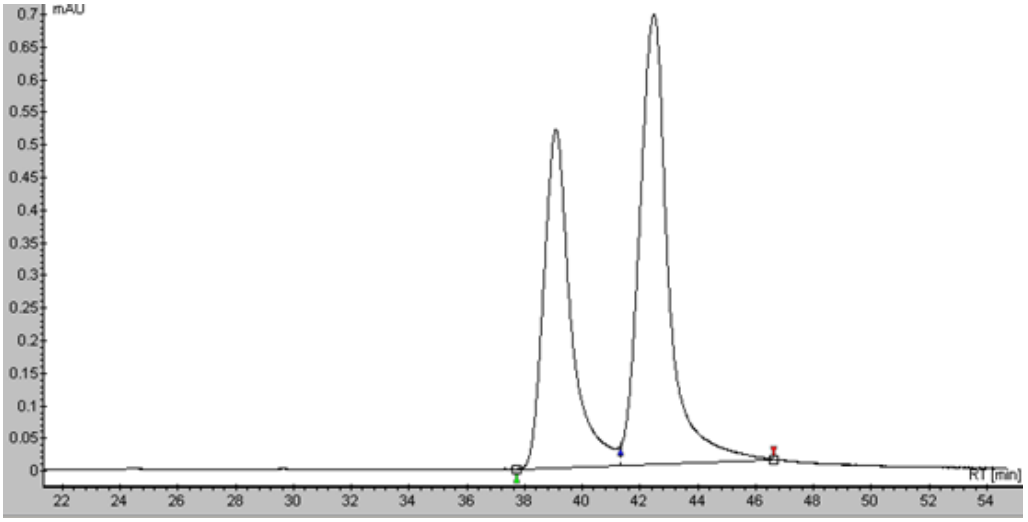
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	39.410	40.799	42.483	3.984
2	50.899	52.021	59.983	96.016

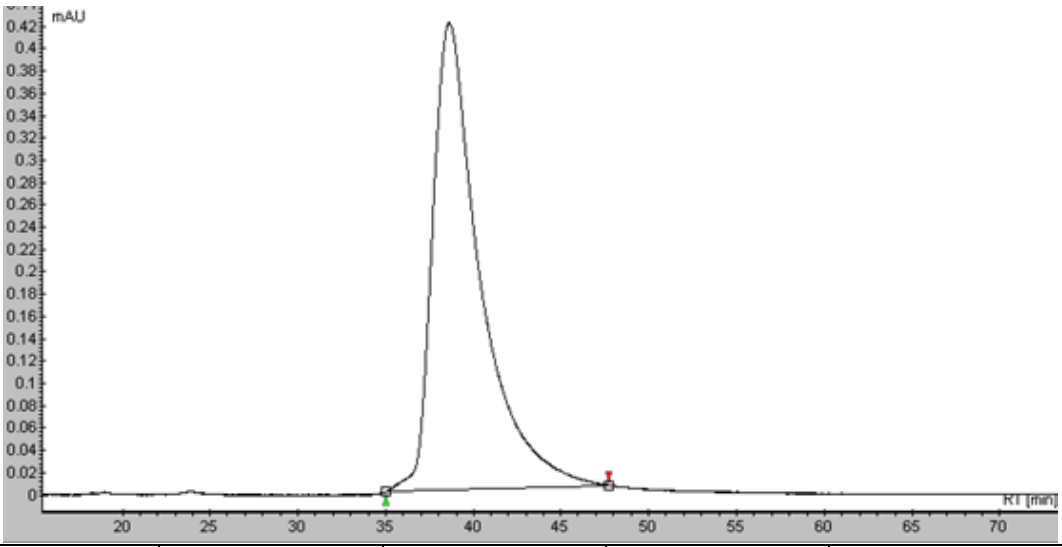
Compound 6l

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	37.725	39.077	41.317	41.494
2	41.317	42.464	46.642	58.506

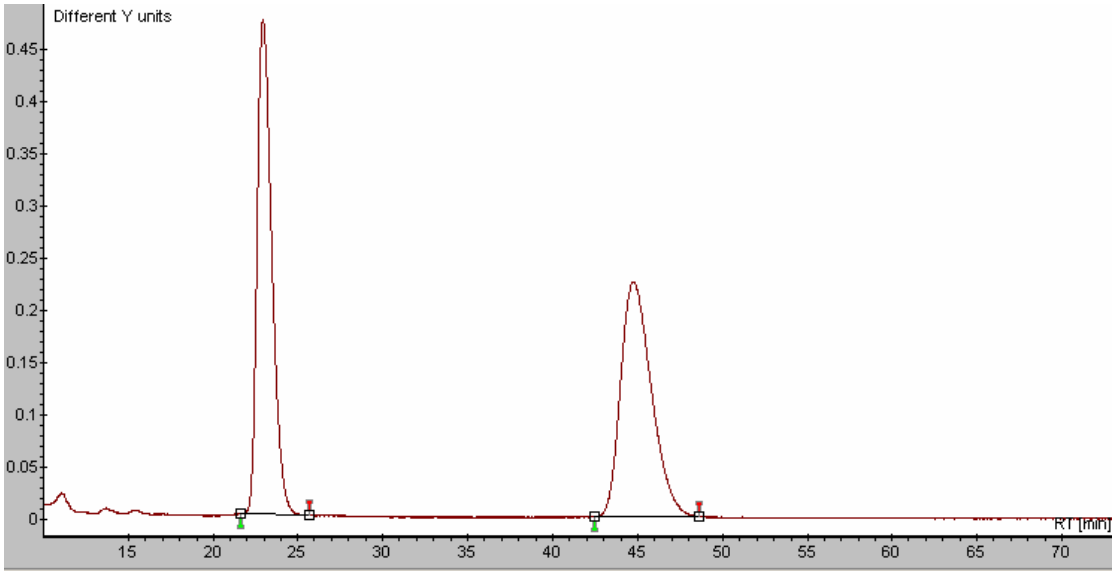
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	34.979	38.653	47.719	100.000

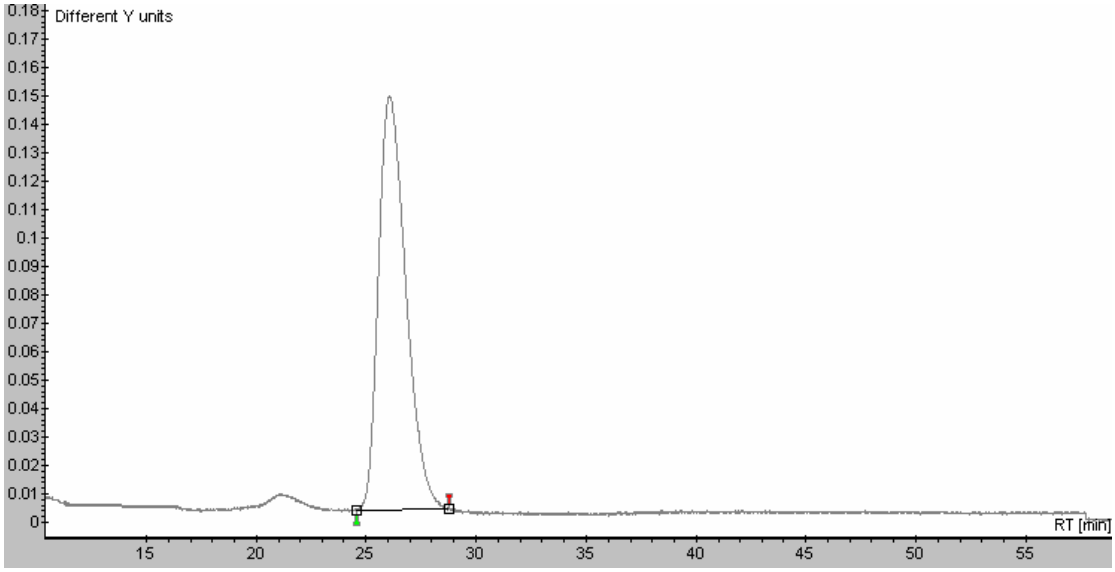
Compound 6m

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	21.626	22.952	25.671	50.101
2	42.464	44.731	48.619	49.899

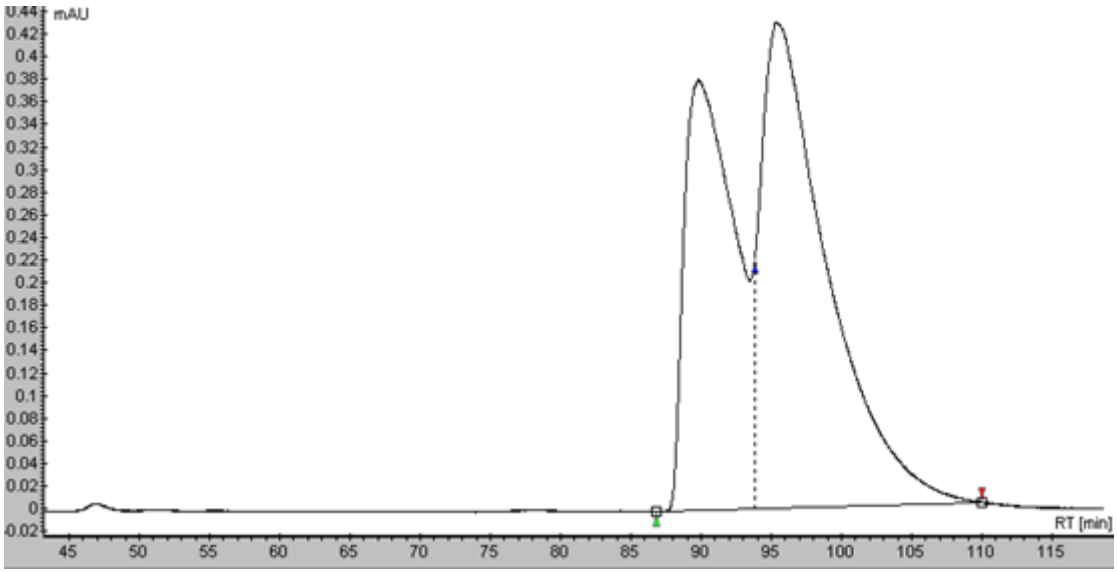
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	24.561	26.057	28.764	100.000

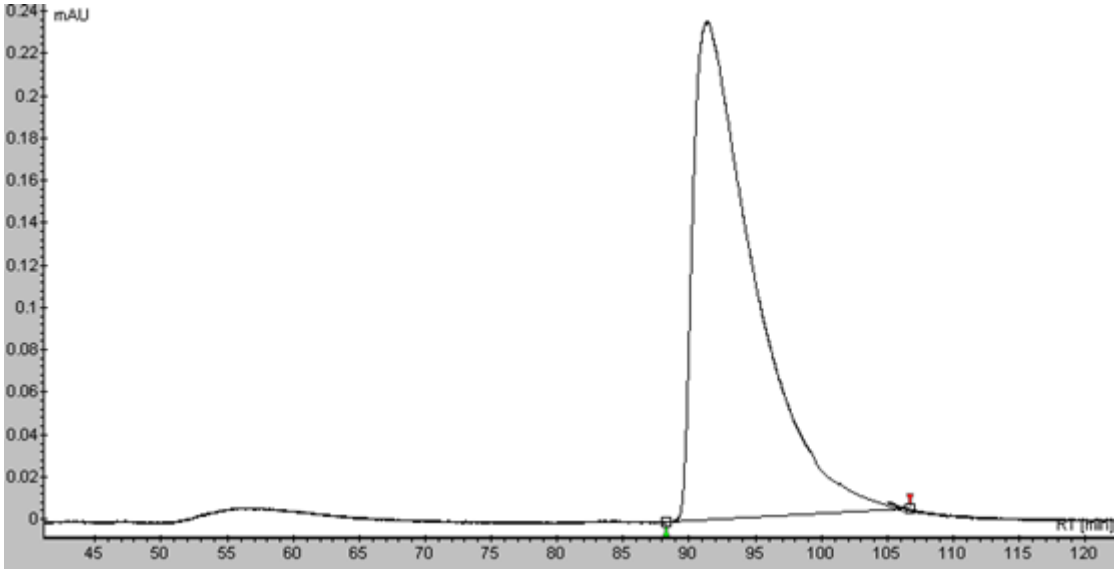
Compound 6n

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	86.798	89.781	93.742	40.233
2	93.742	95.312	109.944	59.767

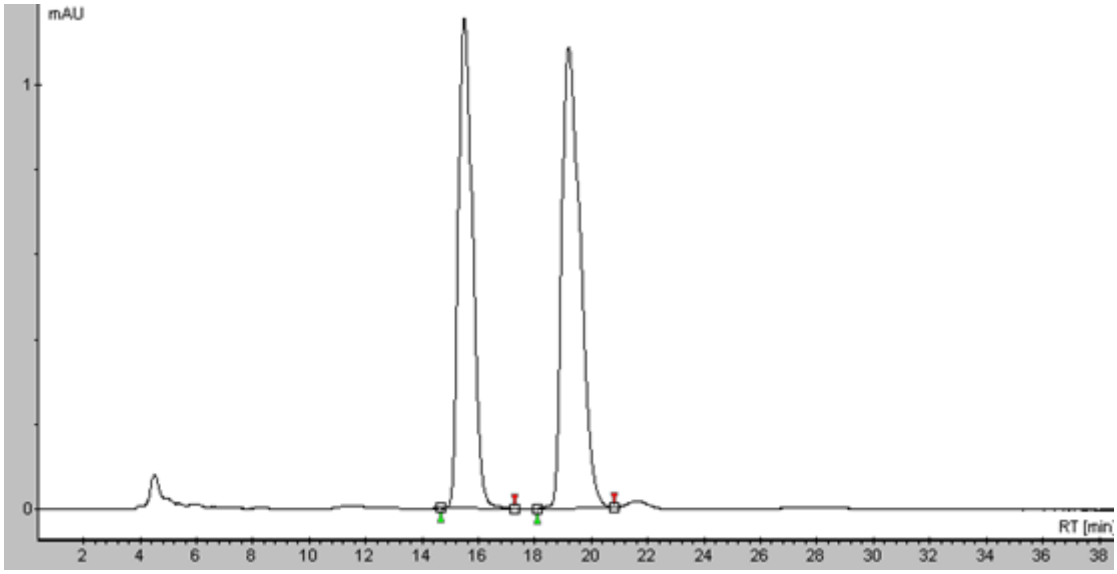
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	88.215	91.434	106.714	100.000

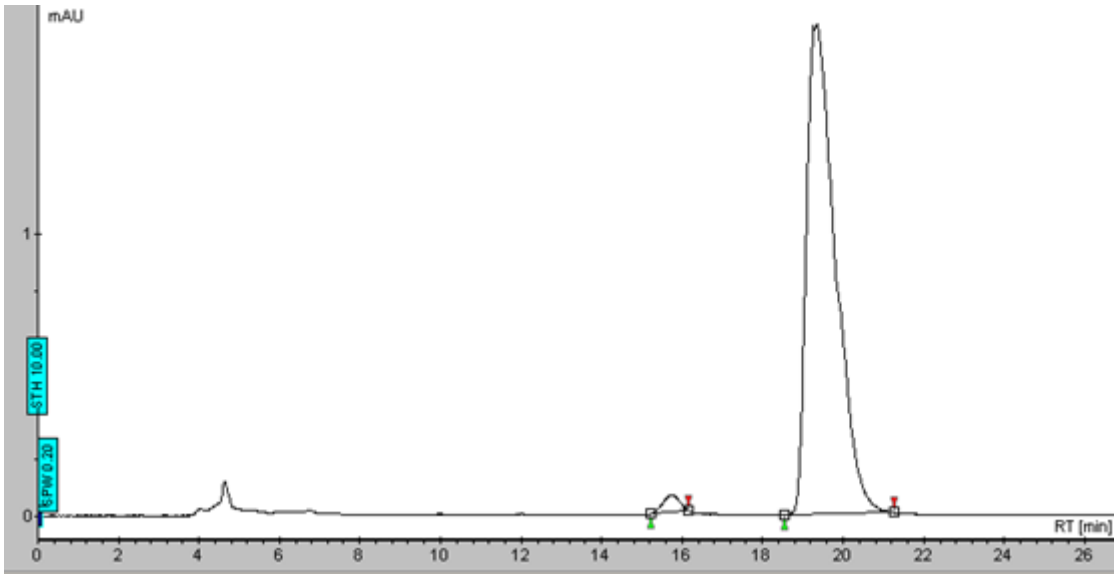
Compound 6o

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	14.686	15.488	17.284	45.173
2	18.076	19.206	20.801	54.827

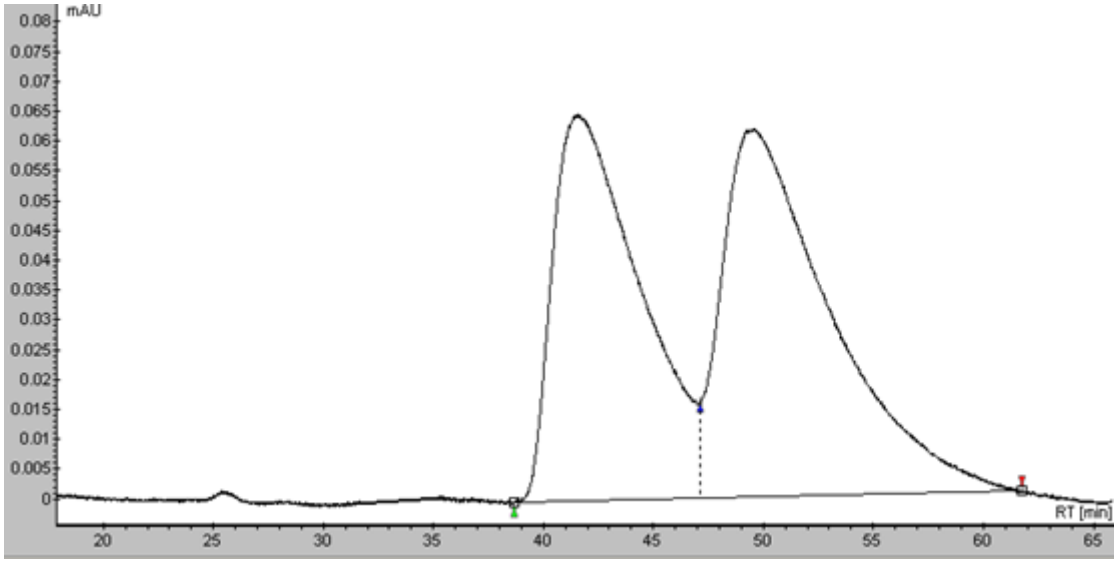
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	15.221	15.732	16.154	1.959
2	18.542	19.345	21.265	98.041

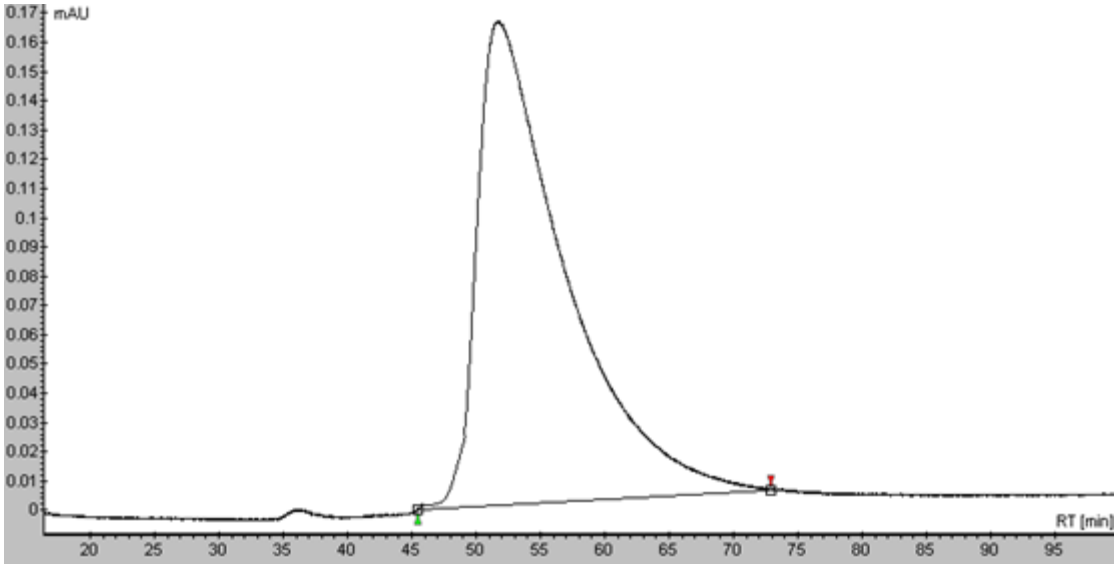
Compound 6p

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	38.705	41.558	47.143	45.773
2	47.143	49.556	61.726	54.227

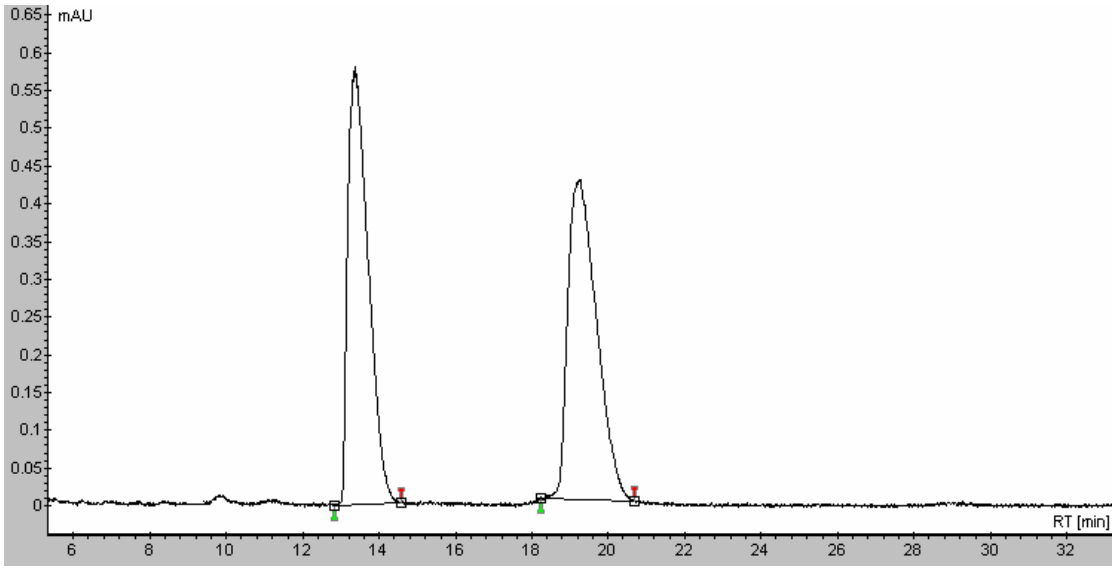
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	45.525	51.768	72.931	100.000

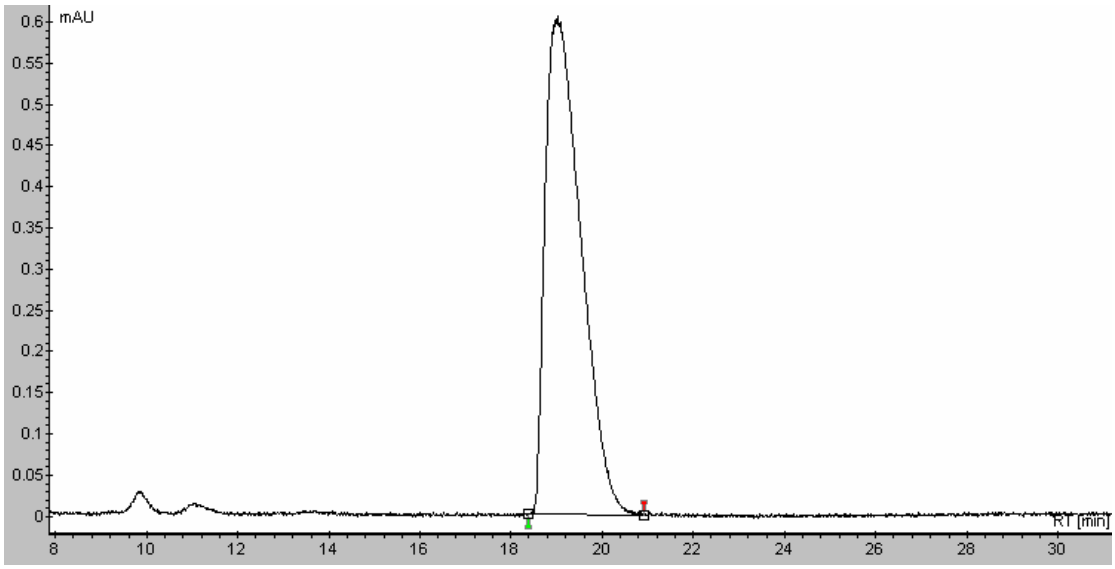
Compound 6q

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	12.833	13.359	14.581	49.080
2	18.233	19.252	20.681	50.920

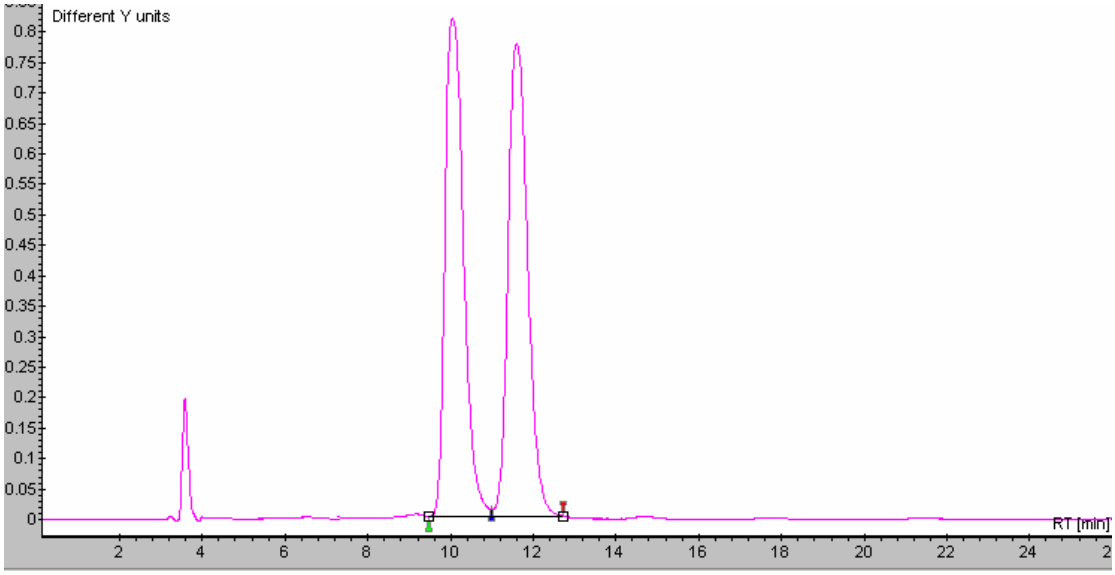
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	18.363	19.025	20.910	100.000

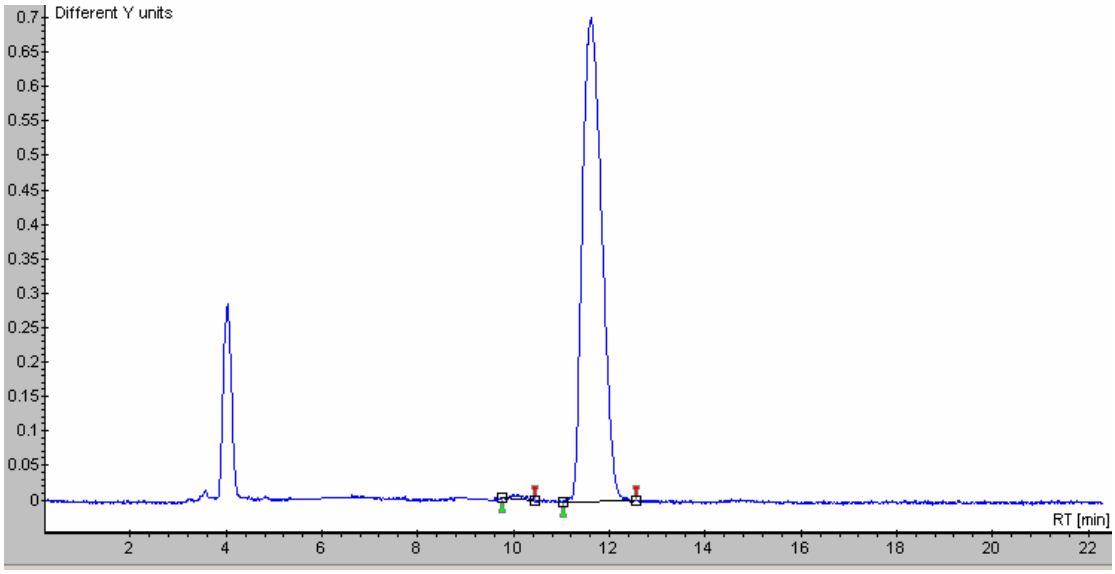
Compound 6r

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	9.477	10.039	10.998	49.941
2	10.998	11.586	12.717	50.059

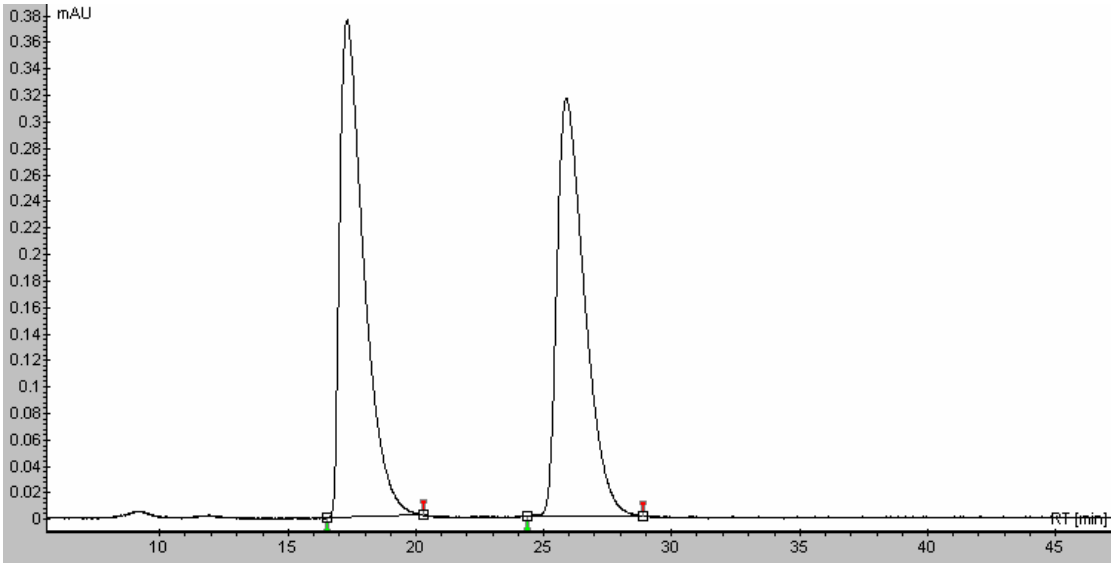
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area [%]
1	9.748	10.106	10.438	0.707
2	11.037	11.612	12.554	99.293

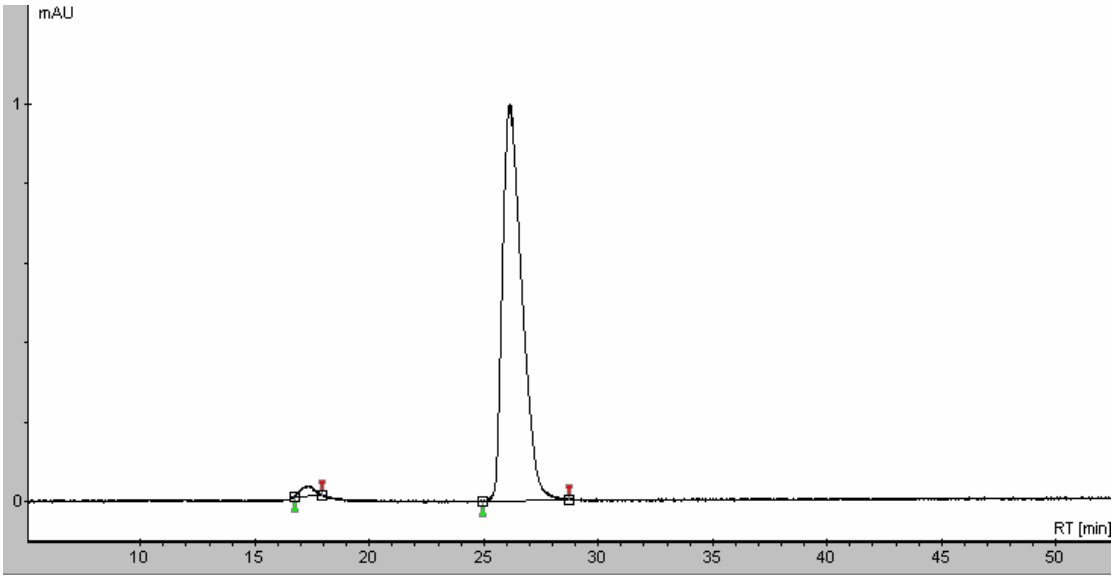
Compound 6s

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area % [%]
1	16.522	17.319	20.286	50.997
2	24.330	25.878	28.861	49.003

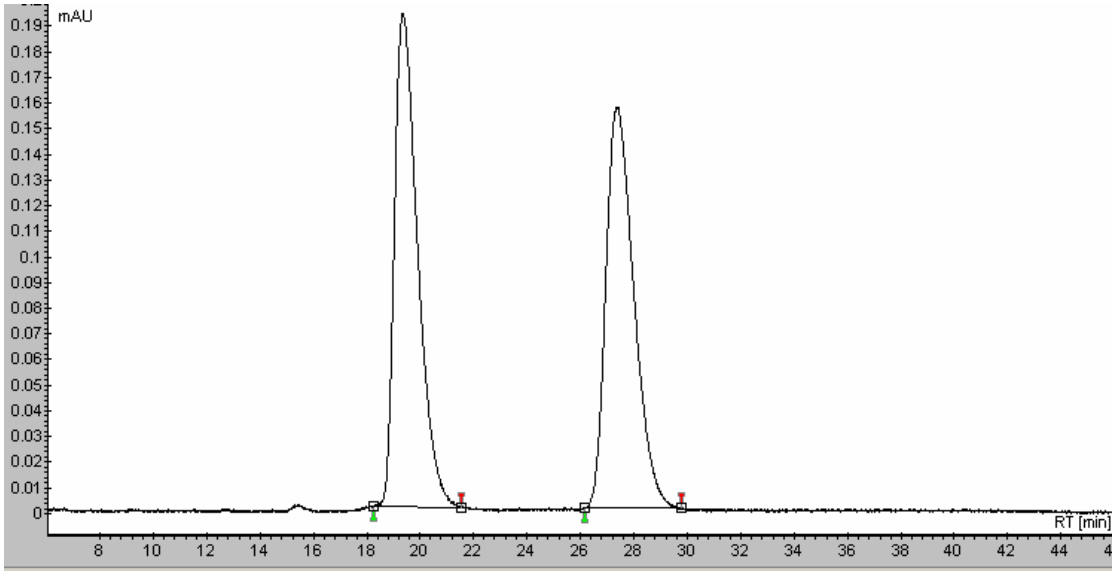
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area % [%]
1	16.719	17.279	17.914	1.608
2	24.976	26.131	28.751	98.392

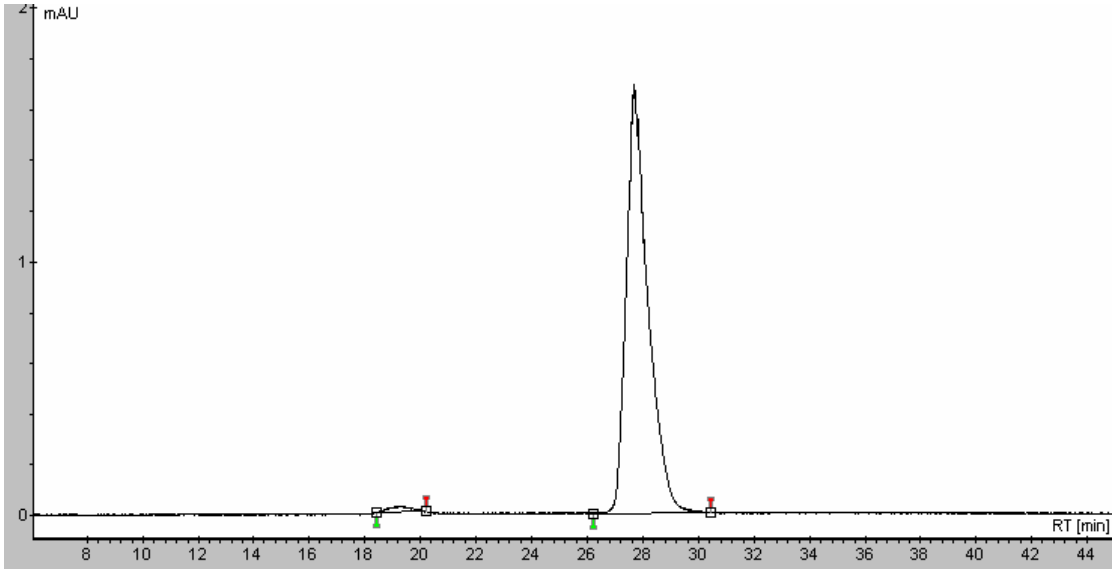
Compound 6t

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area % [%]
1	18.264	19.345	21.543	50.546
2	26.173	27.371	29.775	49.454

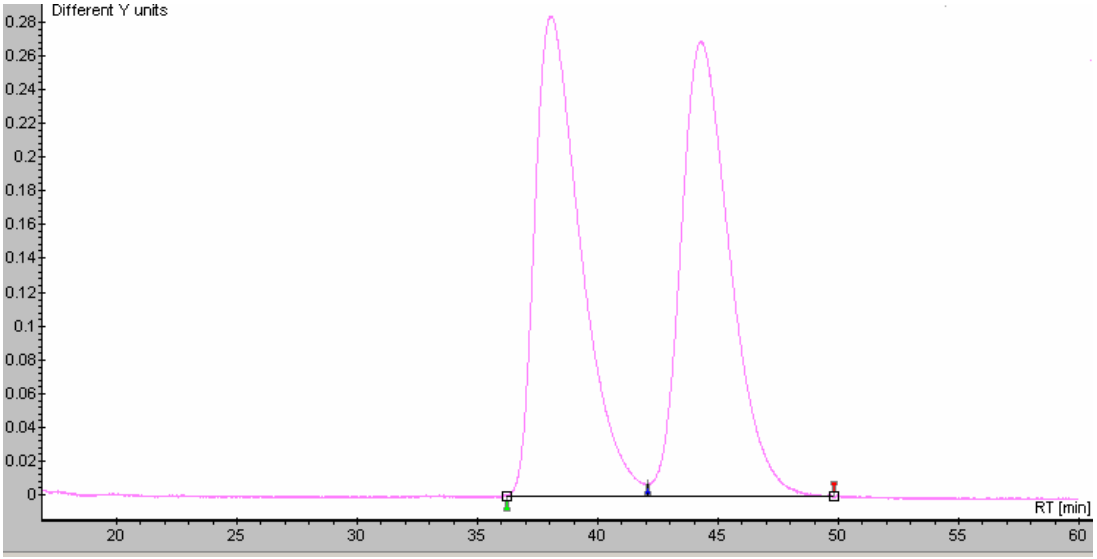
Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area % [%]
1	18.427	19.225	20.181	1.453
2	26.195	27.705	30.430	98.547

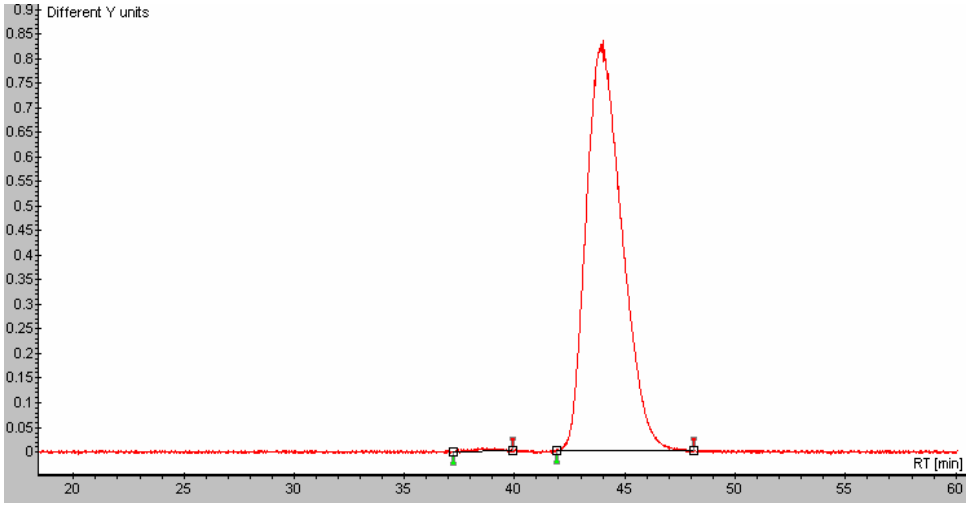
Compound 6u

Racemic adduct



#	Start [Min]	Time [Min]	End [Min]	Area % [%]
1	36.175	38.011	42.061	49.765
2	42.061	44.263	49.804	50.235

Asymmetric adduct



#	Start [Min]	Time [Min]	End [Min]	Area % [%]
2	37.227	38.491	39.918	0.455
1	41.913	44.023	48.104	99.545