Nickel nanoparticles: A highly efficient and retrievable catalyst for the solventless friedlander annulation of quinolines and their *in-silico* molecular docking studies as histone deacetylase inhibitors.

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Supplementary file

Analytical data

***9-phenyl-3,4-dihydroacridin-1(2H)-one*, 3a**

Pale yellow solid, 96 % yield, mp 158-159 °C. IR (KBr pellets, cm^{-1}) υ: 1482.19, 1672.23, 2948.50, 3072.81, 3258.04. ^{1}H NMR ($CDCl_3$, ppm, 400 MHz) δ: 2.34-2.41 (2H, M, CH_2), 2.80-2.83 (2H, t, J = 6.4 Hz, CH_2), 3.80-3.83 (2H, t, J = 6.4 Hz, CH_2), 7.51-7.54 (4H, t, J = 7.2 Hz, CH), 7.62-7.66 (2H, t, J = 7.6 Hz, CH), 7.69-7.71 (2H, d, J = 7.6 Hz, CH) 8.59-8.61 (1H, d, J = 8.8 Hz, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 20.09, 24.26, 41.22, 113.53, 126.83, 127.57, 128.09, 128.58, 129.59, 129.68, 131.09, 132.59, 133.05, 133.61, 139.87, 142.02, 149.28, 157.92, 188.22. Mol. formula: $C_{19}H_{16}NO$ requires 273.1154; GC-MS: m/z 273.3285 (M^+).

***3,3-dimethyl-9-phenyl-3,4-dihydroacridin-1(2H)-one*, 3b**

Off white, 95 % yield, mp 191 °C. IR (KBr pellets, cm^{-1}) υ: 1480.16, 1674.24, 2937.48, 3077.28, 3246.12. ^{1}H NMR ($CDCl_3$, ppm, 400 MHz) δ: 1.24 (6H, s, CH_3), 2.64 (2H, s, CH_2), 3.36 (2H, s, CH_2), 7.25-7.27 (2H, t, CH), 7.33 (1H, s, CH), 7.49-7.51 (4H, d, J = 7.2 Hz, CH), 7.83-7.86 (1H, t, J = 7.2 Hz, CH), 8.16-8.18 (1H, d, J = 8.4 Hz, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 28.36, 32.19, 48.30, 54.24, 122.76, 126.54, 127.54, 127.60, 128.06, 128.16, 128.31, 128.41, 131.78, 137.55, 148.83, 161.14, 197.91. Mol. formula: $C_{21}H_9NO$ requires 301.3817; GC-MS: m/z 301.2814 (M^+).

***Ethyl 2-methyl-4-phenylquinoline-3-carboxylate*, 3c**

Pale brown, 92.0 % yield, mp 96-97 °C. IR (KBr pellets, cm^{-1}) υ: 1082.31, 1483.17, 1545.09, 1732.04, 2942.14. ^{1}H NMR ($CDCl_3$, ppm, 400 MHz) δ: 2.34-2.41 (2H, m, CH_2), 3.04 (3H, s, CH_3), 3.51-3.54 (3H, t, J = 6.4 Hz, CH_3), 7.26-7.27 (2H, t, J = 6.4 Hz, CH), 7.31(1H, s, CH), 7.49-7.51 (4H, d, J = 7.6 Hz, CH), 7.83-7.88 (1H, t, J = 5.2 Hz, CH), 8.14-8.16 (1H, d, J = 7.6 Hz, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 18.75, 24.58, 38.73, 118.56, 119.61, 119.84, 121.90, 122.54, 122.68, 122.75, 123.48, 125.80, 129.92, 130.38, 149.75, 160.58, 187.73. Mol. formula: $C_{19}H_{17}NO_2$ requires 291.3438; GC-MS: m/z 291.3462 (M^+).

***Methyl 2-methyl-4-phenylquinoline-3-carboxylate*, 3d**

Creamish white, 94 % yield, mp 107 °C. IR (KBr pellets, cm^{-1}) υ: 1079.28, 1480.15, 1539.04, 1642.19, 2942.16, 3248.62. ^{1}H NMR ($CDCl_3$, ppm, 400 MHz) δ: 2.13 (3H, s, CH_3), 3.08 (3H, s, CH_3), 7.15-7.17 (2H, t, J = 6 Hz, CH), 7.43 (1H, s, CH), 7.50-7.52 (3H, t, J = 3.2, CH), 7.60-7.70 (2H, t, J = 8 Hz, CH) 8.05-8.07 (1H, d, J = 8.4, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 22.09, 35.08, 121.42, 124.31, 125.60, 128.77, 132.62, 134.83, 136.47, 138.71, 141.22, 143.79, 145.46, 148.19, 159.65, 185.95. Mol. formula: $C_{18}H_{15}NO_2$ requires 277.3172; GC-MS: m/z 277.3145 (M^+).

***1-(2-methyl-4-phenylquinolin-3-yl)ethanone*, 3e**

Light yellow solid, 89 % yield, mp 113 °C. IR (KBr pellets, cm^{-1}) υ: 1081.72, 1482.30, 1572.16, 1624.80, 3047.13, 3254.10. ^1H NMR ($CDCl_3$, ppm, 400 MHz) δ: 2.25 (3H, s, CH_3), 2.68 (3H, s, CH_3), 7.12-7.17 (2H, t, *J* = *4*, CH), 7.43 (1H, s, CH), 7.50-7.54 (3H, t, *J* = 8.8*,* CH), 7.67-7.70 (2H, t, *J* = 5.2 Hz, CH) 8.05-8.07 (1H, d, *J* = 8, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 13.67, 18.86, 118.29, 120.55, 122.52, 125.74, 127.52, 132.39, 134.65, 140.39, 142.20, 143.85, 145.95, 147.82, 151.53, 187.59. Mol. formula: $C_{18}H_{15}NO$ requires 261.3178; GC-MS: m/z (M^+).

***9-phenyl-1,2,3,4-tetrahydroacridine*, 3f**

Light pink, 95 % yield, mp 139-140 °C. IR (KBr pellets, cm^{-1}) υ: 875.63, 1437.26, 2925.74, 3022.17, 3043.12. ^1H NMR ($CDCl_3$, ppm, 400 MHz) δ: 1.64-1.70 (2H, m, CH_2), 1.78-1.84 (2H, m, CH_2), 2.27-2.30 (4H, t, *J* = 6.4 Hz, 2 x CH_2), 7.16-7.18 (1H, d, *J* = 7.6 Hz, CH), 7.48 (1H, s, CH), 7.59-7.63 (2H, t, *J* = 8.4 Hz, CH), 7.78-7.81 (2H, t, *J* = 8 Hz, CH), 7.92-7.94 (2H, d, *J* = 7.6 Hz, CH), 8.02-8.04 (1H, d, *J* = 8 Hz, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 22.48, 35.39, 41.44, 124.81, 125.61, 126.79, 127.71, 129.72, 130.07, 130.42, 131.07, 131.43, 131.60, 132.25, 133.06, 133.77, 134.05, 156.02. Mol. formula: $C_{19}H_{17}NO$ requires 259.3450; GC-MS m/z 259.3443 (M^+).

***7-chloro-9-phenyl-3,4-dihydroacridin-1(2H)-one*, 3g**

Creamish white solid, 92.0 % yield, mp 187 °C. IR (KBr pellets, cm^{-1}) υ: 748.67, 1472.19, 1548.23, 1624.02, 2938.42, 3049.73. ^1H NMR ($CDCl_3$, ppm, 400 MHz) δ: 2.22-2.29 (2H, m, CH_2), 2.75-2.76 (2H, t, *J* = 6.8 Hz, CH_2), 3.31-3.34 (2H, t, *J* = 6.4 Hz, CH_2), 7.06-7.09 (3H, m, CH), 7.44-7.48 (4H, m, CH), 8.46 (1H, s, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 19.27, 28.08, 41.45, 115.87, 116.03, 117.21, 117.46, 126.32, 126.86, 127.58, 128.32, 129.67, 129.89, 133.32, 139.12, 149.64, 183.48. Mol. formula: $C_{19}H_{14}NO$ requires 307.7736; GC-MS m/z 307.7724 (M^+).

***7-chloro-3,3-dimethyl-9-phenyl-3,4-dihydroacridin-1(2H)-one*, 3h**

Light yellow solid, 94 % yield, mp 210 °C. IR (KBr pellets, cm^{-1}) υ: 724.19, 1452.63, 1632.17, 3029.52, 3047.26. ^1H NMR ($CDCl_3$, ppm, 400 MHz) δ: 1.15 (6H, s, 2 x CH_3), 2.56 (2H, s, CH_2), 3.26 (2H, s, CH_2), 7.15-7.17 (2H, t, *J* = 5.2 Hz CH), 7.43 (1H, s, CH), 7.50-7.52 (3H, t, *J* = 4.4, CH), 7.67-7.70 (1H, q, CH), 8.00-8.03 (1H, d, *J* = 8.8, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 28.35, 32.28, 48.22, 54.19, 123.34, 126.81, 127.95, 128.01, 128.38, 130.09, 132.54, 132.61, 136.77, 147.23, 161.43, 197.65. Mol. formula: $C_{21}H_{18}ClNO$ requires 335.8267; GC-MS m/z 335.2930 (M^+).

***Ethyl 6-chloro-2-methyl-4-phenylquinoline-3-carboxylate*, 3i**

Pale yellow solid, 96.0 % yield, mp 135-136 °C. IR (KBr pellets, cm^{-1}) υ: 727.50, 1468.21, 1562.18, 1635.74, 2938.42, 3049.73. ^1H NMR ($CDCl_3$, ppm, 400 MHz) δ: 2.34-2.40 (2H, m, CH_2), 2.96 (3H, s, CH_3), 3.21-3.24 (3H, t, *J* = 10 Hz, CH_3), 7.23-7.26 (2H, t, *J* = 10.4 Hz, CH), 7.38 (1H, s, CH), 7.54-7.56 (3H, d, *J* = 7.6 Hz, CH), 7.82-7.89 [1H, d, *J* = 6.4 Hz, CH], 8.17-8.19 [1H, d, *J* = 7.2 Hz, CH] ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 21.60, 32.28, 39.78, 121.67, 124.96, 126.97, 127.35, 128.13, 130.52, 132.82, 134.54, 137.99, 140.65, 143.76, 146.21, 152.40, 185.90. Mol. formula: $C_{19}H_{16}ClNO_2$ requires 325.7888; GC-MS m/z 325.7859 (M^+).

***Methyl 6-chloro-2-methyl-4-phenylquinoline-3-carboxylate*, 3j**

White solid, 92.0 % yield, mp 152 °C. IR (KBr pellets, cm^{-1}) υ: 716.89, 1456.17, 1574.93, 1642.51, 2942.80, 3056.12. ^1H NMR ($CDCl_3$, ppm, 400 MHz) δ: 2.37 (3H, s, CH_3), 3.38 (3H, s, CH_3), 7.10-7.16 (2H, t, *J* = 9.2 Hz, CH), 7.27 (1H, s, CH), 7.50-7.56 (3H, t, *J* = 9.6 Hz, CH), 7.60-7.77 (1H, q, *J* = 7.6 Hz, CH), 8.06-8.08 [1H, d, *J* = 6.8 Hz, CH] ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 17.83, 22.02, 102.81, 107.12, 121.79, 123.28, 126.31, 127.05, 129.56, 129.55, 134.89, 137.57, 142.21, 144.51, 145.80, 157.16, 187.14. Mol. formula: $C_{18}H_{14}ClNO_2$ requires 311.7623; GC-MS m/z 311.7642 (M^+).

***1-(6-chloro-2-methyl-4-phenylquinolin-3-yl)ethanone*, 3k**

Pale brown, 89.0 % yield, mp 116 °C. IR (KBr pellets, cm^{-1}) υ: 716.29, 1472.50, 1563.72, 1631.26, 2940.16, 3042.74. ^1H NMR ($CDCl_3$, ppm, 400 MHz) δ: 2.07 (3H, s, CH_3), 2.53 (3H, s, CH_3), 7.12-7.17 (1H, t, *J* = 8.8 Hz, CH), 7.43 (1H, s, CH), 7.52-7.54 (3H, t, *J* = 8.4 Hz, CH), 7.66-7.71 (2H, q, CH), 8.05-8.06 [1H, d, *J* = 7.2 Hz, CH] ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 27.78, 32.63, 122.36, 124.84, 125.06, 127.07, 133.40, 134.12, 136.03, 137.66, 140.52, 143.87, 145.36, 147.20, 151.78, 185.78. Mol. formula: $C_{18}H_{14}ClNO$ requires 295.7629; GC-MS m/z 295.7608 (M^+).

***7-chloro-9-phenyl-2,3-dihydro-1H-cyclopenta[b]quinoline*, 3l**

White solid, 95.0 % yield, mp 175 °C. IR (KBr pellets, cm^{-1}) υ: 863.15, 1428.72, 2942.80, 3019.25, 3041.62. ^1H NMR ($CDCl_3$, ppm, 400 MHz) δ: 2.23-2.29 (2H, m, CH_2), 2.72-2.76 (2H, t, CH_2), 3.23-3.27 (2H, t, CH_2), 7.42-7.44 (3H, q, CH), 7.56-7.65 (4H, m, CH), 8.47 (1H, s, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 18.66, 20.08, 31.03, 41.26, 106.77, 111.52, 129.67, 130.36, 130.52, 131.08, 131.22, 131.66, 132.95, 133.18, 133.38, 156.13. Mol. formula: $C_{18}H_{14}ClN$ requires 279.7635; GC-MS m/z 279.7629 (M^+).

***9-methyl-3,4-dihydroacridin-1(2H)-one*, 3m**

Pale yellow solid, 92 % yield, mp 126 °C. IR (KBr pellets, cm^{-1}) υ: 1476.32, 1674.58, 2925.18, 3086.05, 3244.62. ^1H NMR ($CDCl_3$, ppm, 400 MHz) δ: 1.27 (3H, s, CH_3), 2.23-2.29 (2H, m, CH_2), 2.72-2.76 (2H, t, *J* = 6.4 Hz, CH_2), 3.33-3.37 (2H, t, *J* = 6 Hz, CH_2), 7.42-7.44 (1H, q, CH), 7.56-7.62 (2H, m, CH) 8.46 (1H, s, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 20.63, 25.29, 34.45, 40.04, 115.77, 128.43, 128.64, 129.57, 130.81, 144.38, 148.86, 151.97, 151.31, 192.83. Mol. formula: $C_{14}H_{13}NO$ requires 273.2591; GC-MS: m/z 211.3438 (M^+).

***3,3,9-trimethyl-3,4-dihydroacridin-1(2H)-one*, 3n**

Creamish white, 95 % yield, mp 138-139 °C. IR (KBr pellets, cm^{-1}) υ: 1484.29, 1670.15, 2942.10, 3046.58, 3248.52. ^1H NMR ($CDCl_3$, ppm, 400 MHz) δ: 1.35 (6H, s, 2 x CH_3), 2.66 (2H, s, CH_2), 3.06 (3H, s, CH_3), 3.18 (2H, s, CH_2), 7.54-7.58 (1H, t, *J* = 7.2 Hz, CH), 7.74-7.78 (1H, t, *J* = 6.8 Hz, CH), 8.01-8.03 (1H, d, *J* = 8.4 Hz, CH), 8.20-8.22 (1H, d, *J* = 8.8 Hz, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 16.01, 28.30, 32.12, 48.47, 54.85, 124.17, 125.54, 126.44, 127.66, 129.09, 131.54, 148.11, 149.88, 161.05, 200.58. Mol. formula: $C_{16}H_{17}NO$ requires 239.3123; GC-MS: m/z 239.2774 (M^+).

***Ethyl 2,4-dimethylquinoline-3-carboxylate*, 3o**

Pale brown, 90.0 % yield, mp 112 °C. IR (KBr pellets, cm^{-1}) υ: 1076.82, 1476.29, 1567.88, 1724.20, 2934.68. ^1H NMR ($CDCl_3$, ppm, 400 MHz) δ: 1.34 (2H, m, CH_2), 1.82 (3H, s, CH_3), 2.38 (3H, s, CH_3), 2.90-2.96 (3H, t, *J* = 4 Hz, CH_3), 7.50-7.54 (1H, m, CH), 7.61-7.63 (1H, t, *J* = 5.2 Hz, CH), 7.64-7.75 (1H, q, CH), 8.67-8.69 (1H, d, *J* = 8 Hz, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 26.49, 31.46, 44.37, 114.20, 126.23, 127.27, 127.62, 129.40, 129.57, 130.20, 131.73, 132.59, 138.22, 149.51, 159.86, 189.73. Mol. formula: $C_{14}H_{15}NO_2$ requires 229.2744; GC-MS: m/z 229.2764 (M^+).

***Methyl 2,4-dimethylquinoline-3-carboxylate*, 3p**

Pale yellow solid, 94.0 % yield, mp 127-128 °C. IR (KBr pellets, cm^{-1}) υ: 1045.16, 1464.20, 1581.35, 1748.16, 2947.16. ^1H NMR ($CDCl_3$, ppm, 400 MHz) δ: 1.47 (3H, s, CH_3), 2.71 (3H, s, CH_3), 3.44 (3H, s, OCH_3), 7.78-7.81 (1H, q, CH), 8.32 (1H, s, CH), 8.48-8.49 (2H, t, *J* = 7.6 Hz, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 33.70,49.46, 55.29, 124.58, 127.14, 128.34, 128.42, 128.87, 128.90, 129.04, 129.68, 130.19, 131.48, 135.20, 137.77, 144.31, 145.20, 156.94, 191.99. Mol. formula: $C_{14}H_{15}NO_2$ requires 215.2478; GC-MS: m/z (M^+).

***1-(2,4-dimethylquinolin-3-yl)ethanone*, 3q**

Light yellow solid, 92.0 % yield, mp 132°C. IR (KBr pellets, cm^{-1}) υ: 1037.62, 1456.81, 1560.38, 1632.90, 3027.51, 3259.16. ^1H NMR ($CDCl_3$, ppm, 400 MHz) δ: 1.39 (3H, s, CH_3), 2.21 (3H, s, CH_3), 2.94 (3H, s, CH_3) 7.52-7.56

(1H, m, CH), 7.60-7.61 (1H, *J* = 5.6, t, CH), 7.62-7.71 (1H, q, CH), 8.62-8.63 (1H, d, *J* = 5.2 Hz, CH), ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 25.30, 34.08, 124.51, 127.27, 128.16, 128.77, 130.35, 133.35, 133.61, 135.40, 136.67, 144.95, 149.53, 184.07. Mol. formula: $C_{13}H_{13}NO_2$ requires 199.2484; GC-MS: m/z 199.2487 (M^+).

***7-nitro-9-phenyl-3,4-dihydroacridin-1(2H)-one*, 3r**

Light brown solid, 87 % yield, mp 168 °C. IR (KBr pellets, cm^{-1}) υ: 1482.10, 1652.87, 2936.91, 3042.18, 3287.74. ^{1}H NMR ($CDCl_3$, ppm, 400 MHz) δ: 2.27-2.29 (2H, m, CH_2), 2.73-2.26 (2H, t, *J* = 6.4 Hz, CH_2), 3.31-3.34 (2H, t, *J* = 6.4 Hz, CH_2), 7.26-7.27 (1H, d, *J* = 7.2 Hz, CH), 7.33 (1H, s, CH), 7.49-7.51 (4H, d, *J* = 5.6 Hz, CH) 7.84-7.86 (1H, d, *J* = 6 Hz, CH), 8.12-8.13 (1H, d, *J* = 4.8 Hz, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 23.91, 32.72, 42.63, 122.29, 124.69, 125.67, 126.16, 127.62, 127.77, 129.23, 129.37, 132.61, 138.45, 139.82, 141.07, 141.10, 149.33. Mol. formula: $C_{19}H_{14}N_2O_3$ requires 318.3261; GC-MS: m/z 318.3285 (M^+).

***3,3-dimethyl-7-nitro-9-phenyl-3,4-dihydroacridin-1(2H)-one*, 3s**

Light yellow solid, 93 % yield, mp 183-184 °C. IR (KBr pellets, cm^{-1}) υ: 1468.83, 1634.29, 2930.52, 3057.88, 3265.19. ^{1}H NMR ($CDCl_3$, ppm, 400 MHz) δ: 1.89 (6H, s, 2 x CH_3), 2.85 (2H, s, CH_2), 3.35 (2H, s, CH_2), 7.42-7.44 (2H, d, *J* = 5.6 Hz, CH), 7.52-7.54 (3H, d, *J* = 7.6 Hz, CH), 7.66 (1H, s, CH) 7.90-7.92 (1H, d, *J* = 8.8 Hz, CH), 8.92 (1H, s, CH). ^{13}C NMR ($CDCl_3$, ppm, 100 MHz) δ: 24.90, 27.40, 37.55, 47.50, 124.89, 125.95, 126.83, 129.52, 129.79, 130.49, 131.06, 131.42, 131.52, 131.76, 133.70, 133.97, 140.95, 159.73, 185.39. Mol. formula: $C_{21}H_{18}N_2O_3$ requires 346.3792; GC-MS: m/z 346.3772 (M^+).

Fig. 1: ^{1}H NMR spectrum of 9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3a**

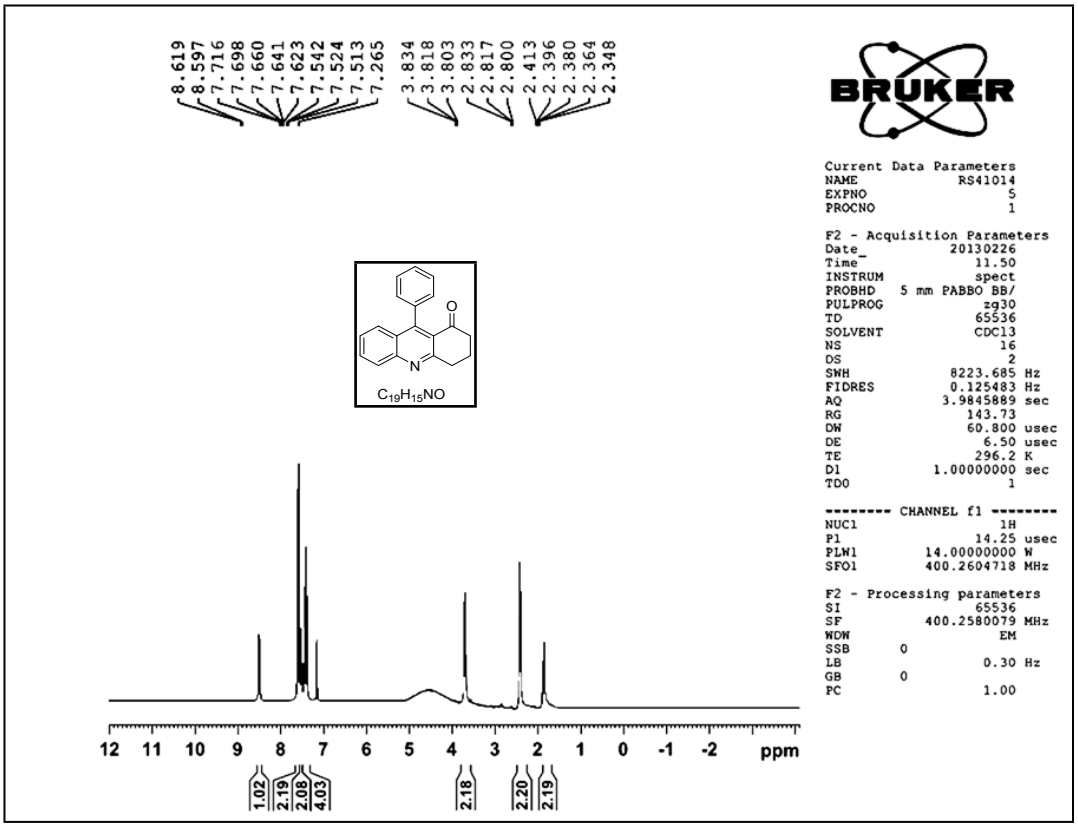


Fig. 2: ^{13}C NMR spectrum of 9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3a**

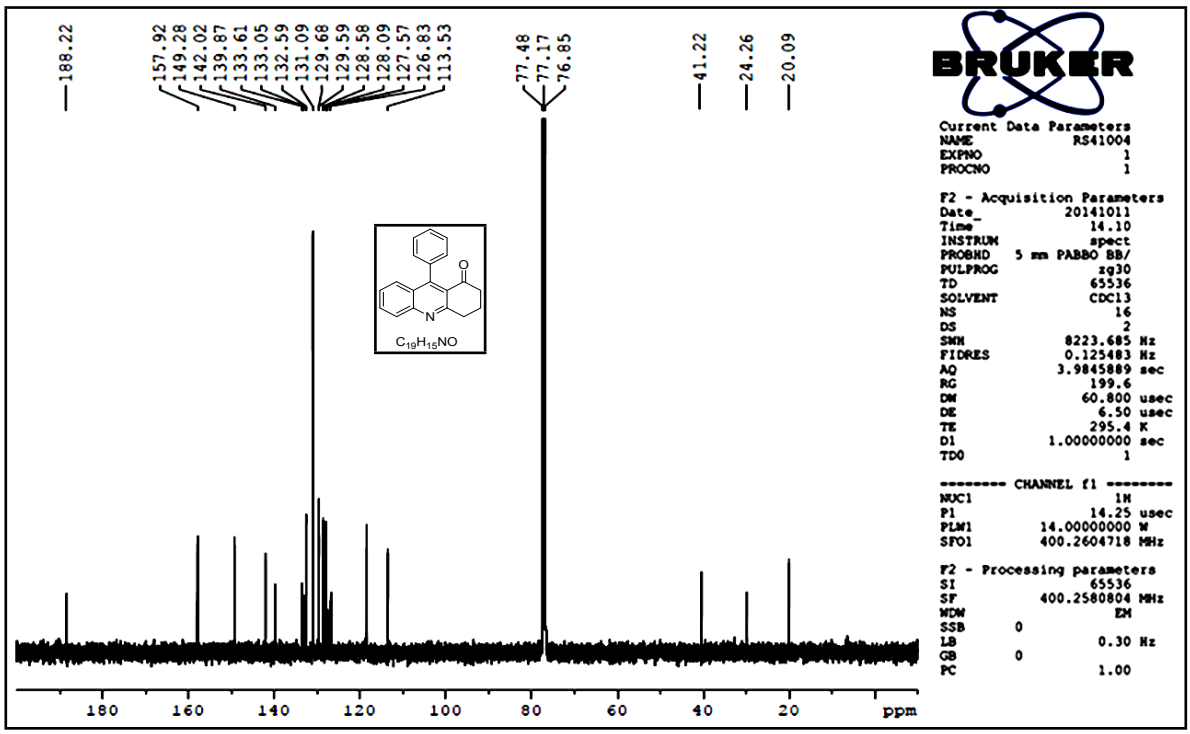


Fig. 3: GC-MS of 9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3a**

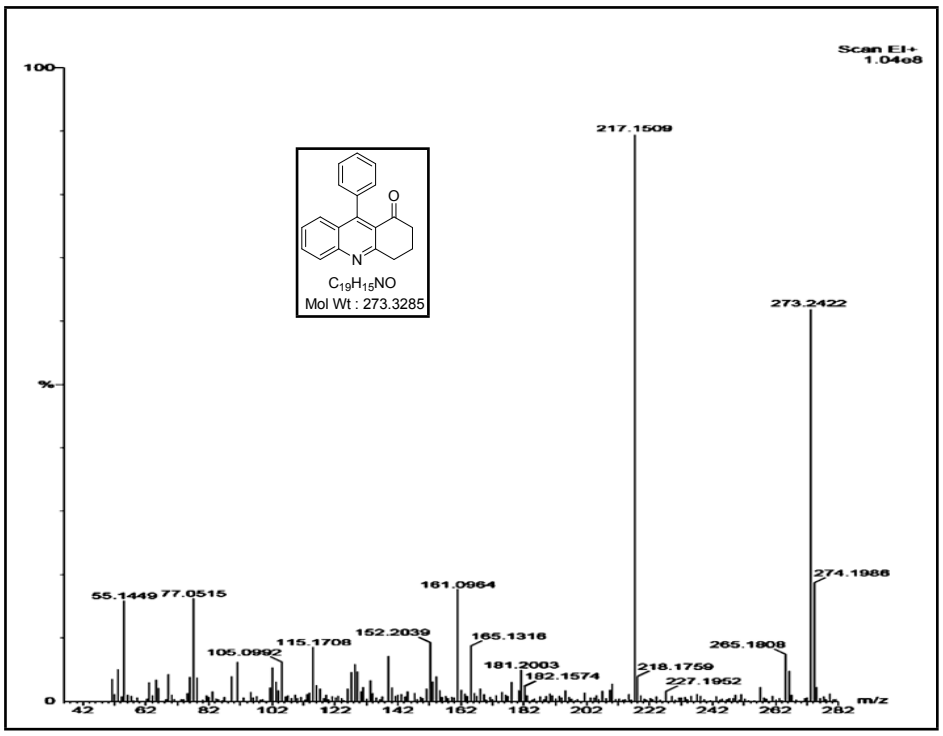


Fig. 4: [1]H NMR spectrum of 3,3-dimethyl-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3b**

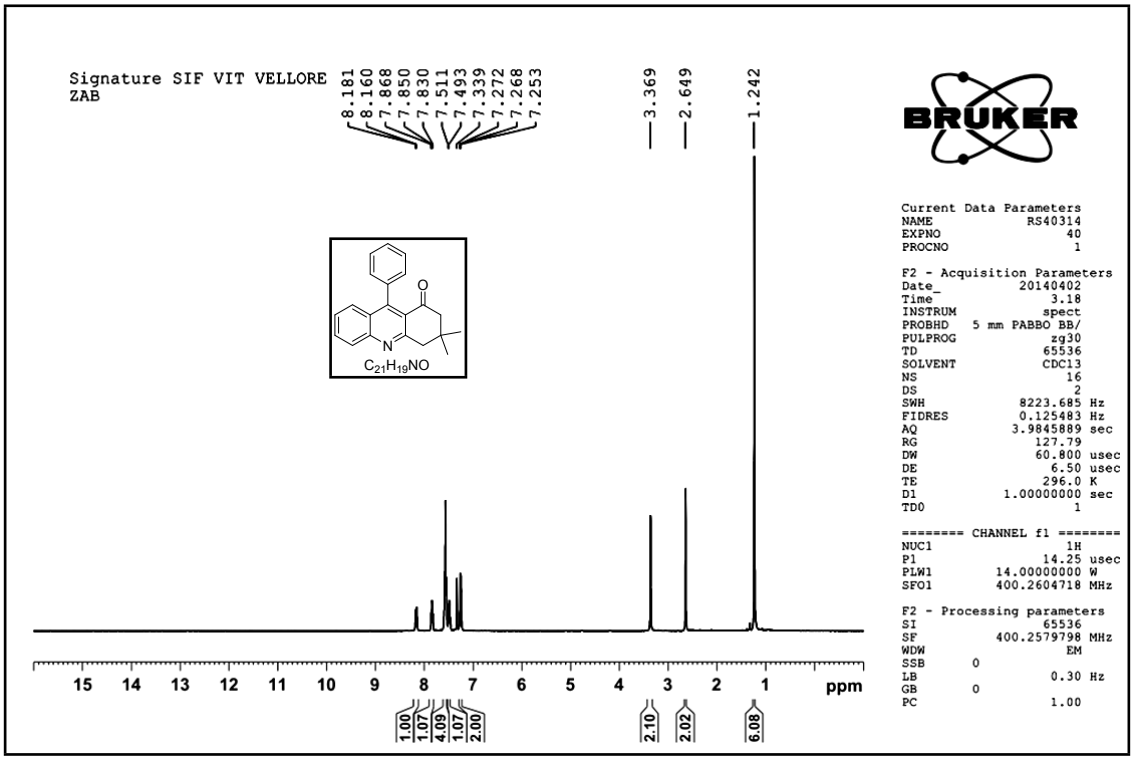


Fig. 5: [13] C NMR spectrum of 3,3-dimethyl-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3b**

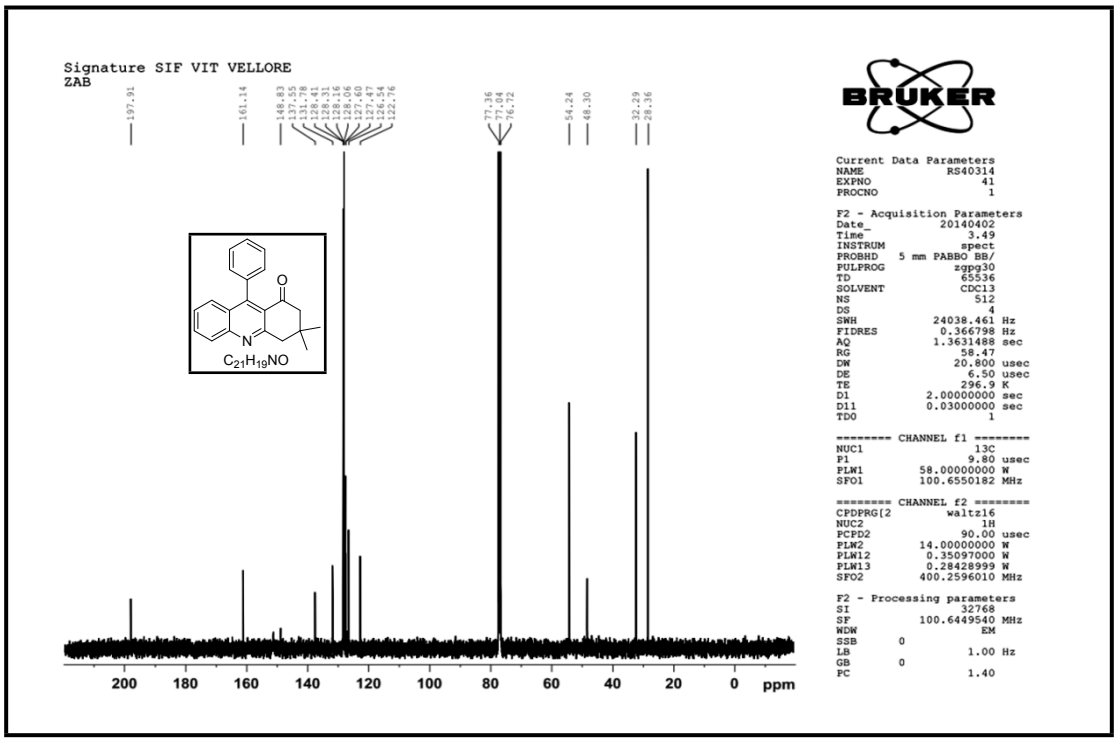


Fig. 6: GC-MS of 3,3-dimethyl-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3b**

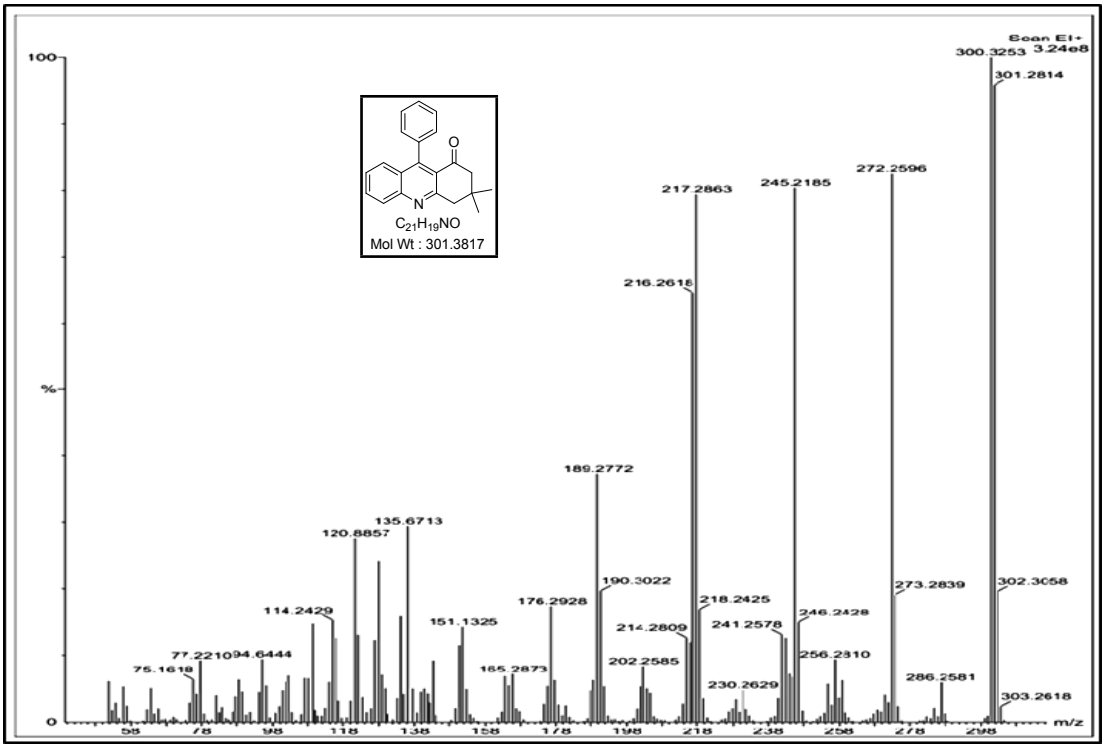


Fig. 7: [1]H NMR spectrum of Ethyl 2-methyl-4-phenylquinoline-3-carboxylate, **3c**

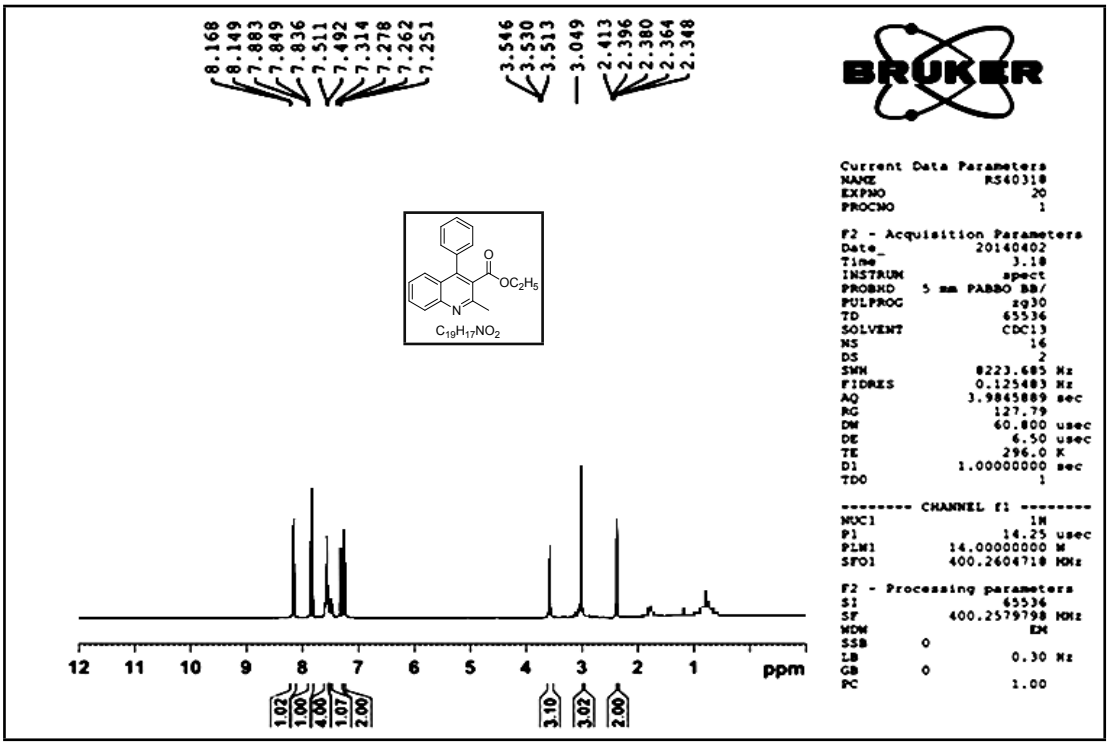


Fig. 8: ^{13}C NMR spectrum of Ethyl 2-methyl-4-phenylquinoline-3-carboxylate, **3c**

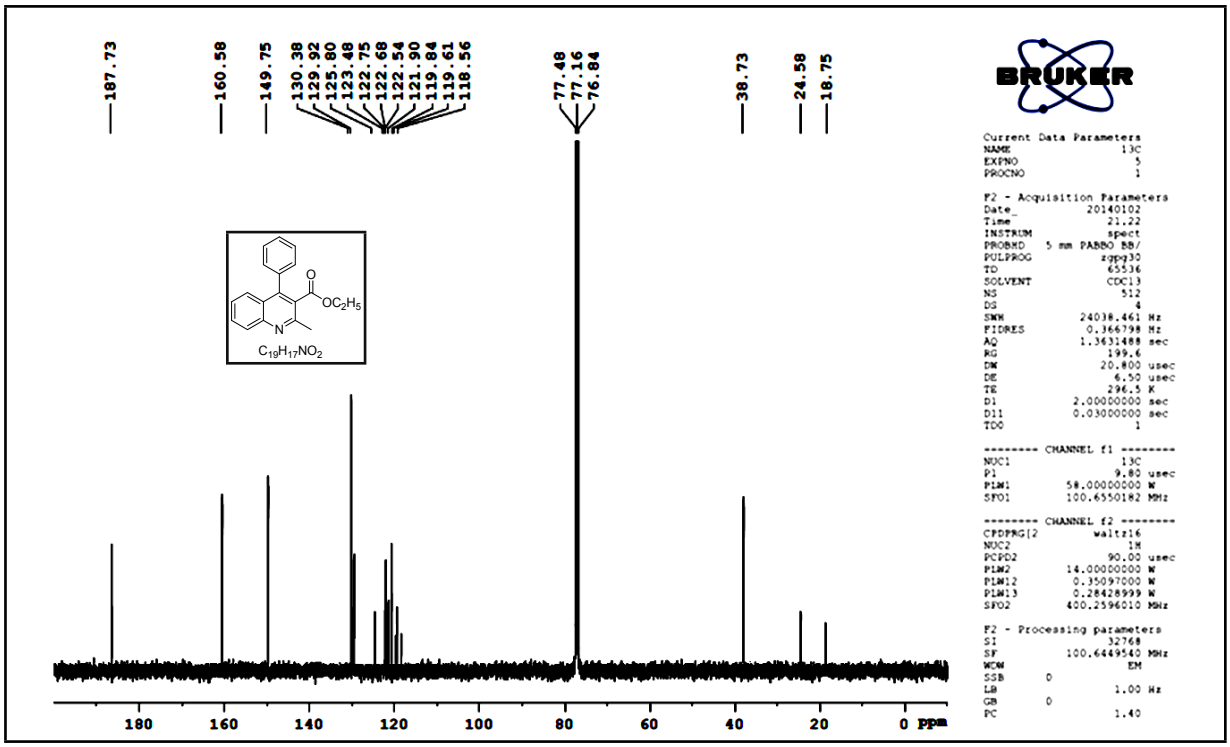


Fig. 9: GC-MS NMR spectrum of Ethyl 2-methyl-4-phenylquinoline-3-carboxylate, **3c**

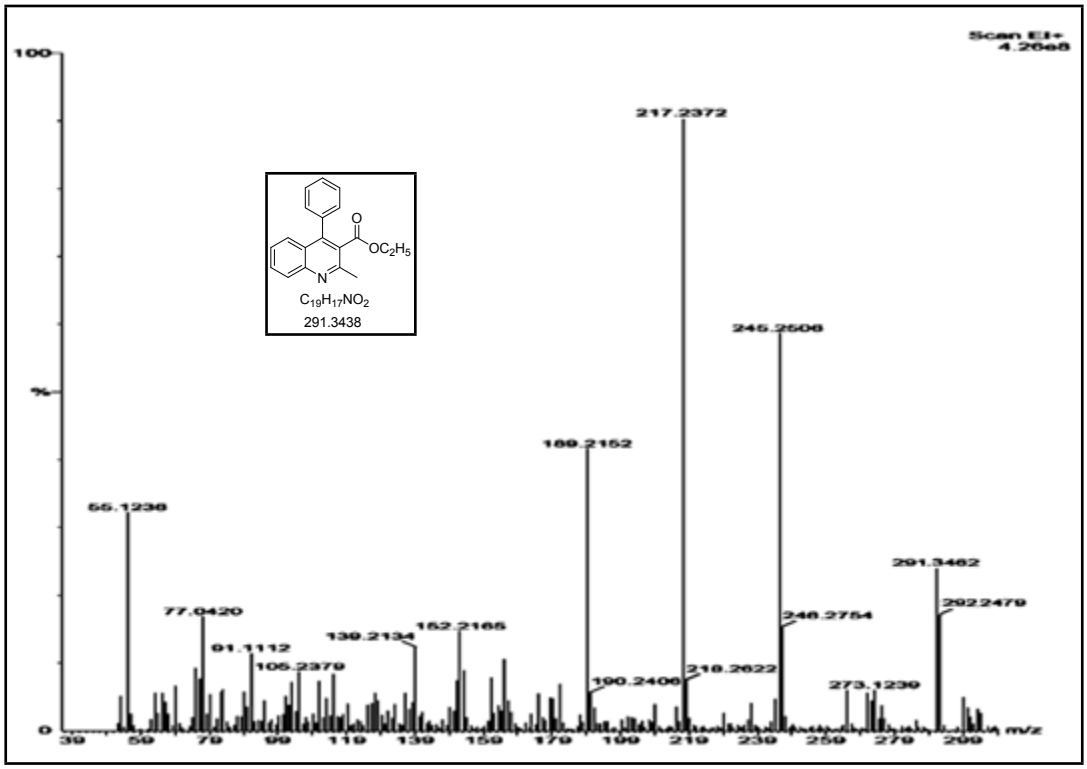


Fig. 10: [1]H NMR spectrum of Methyl 2-methyl-4-phenylquinoline-3-carboxylate, **3d**

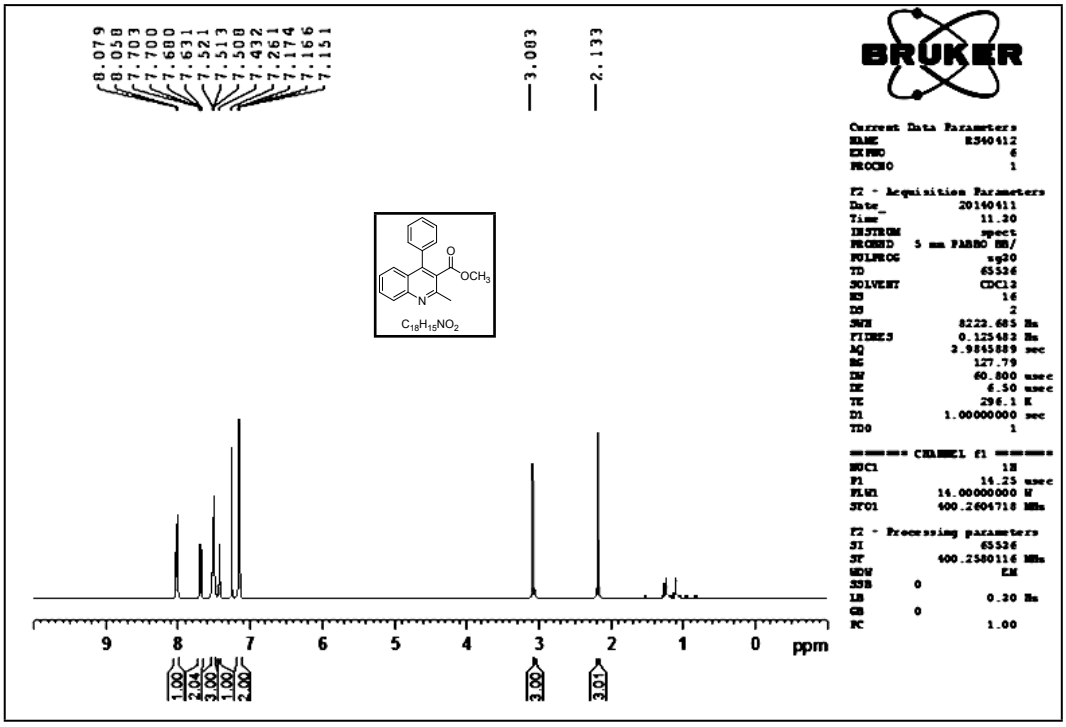


Fig. 11: [13] C NMR spectrum of Methyl 2-methyl-4-phenylquinoline-3-carboxylate, **3d**

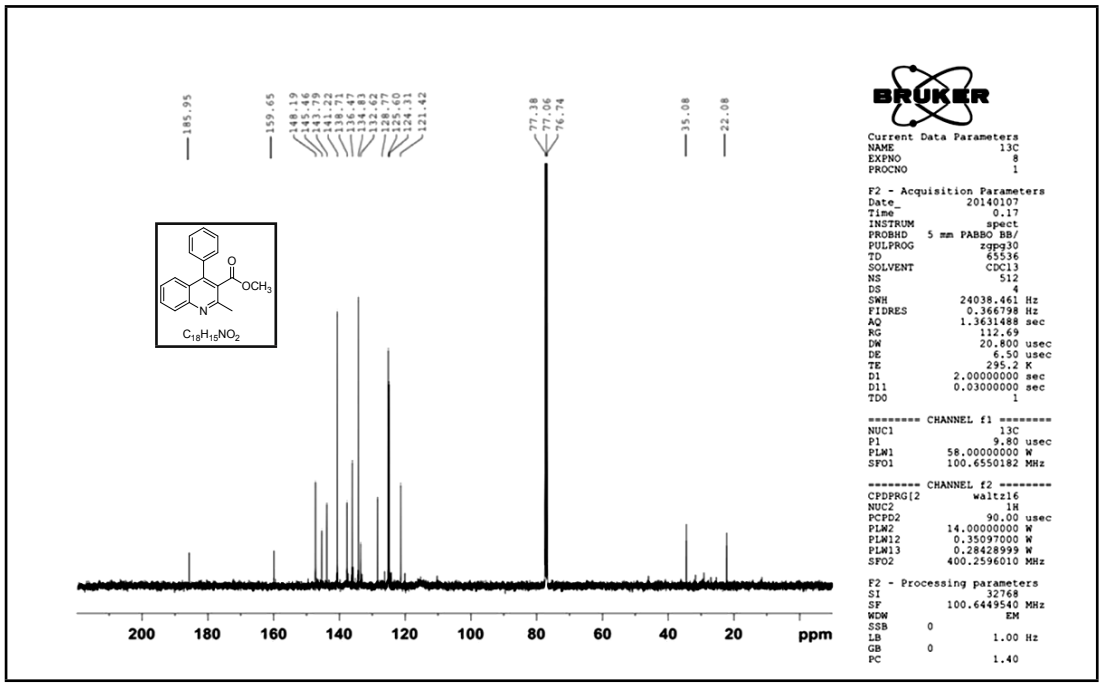


Fig. 12: GC-MS of Methyl 2-methyl-4-phenylquinoline-3-carboxylate, **3d**

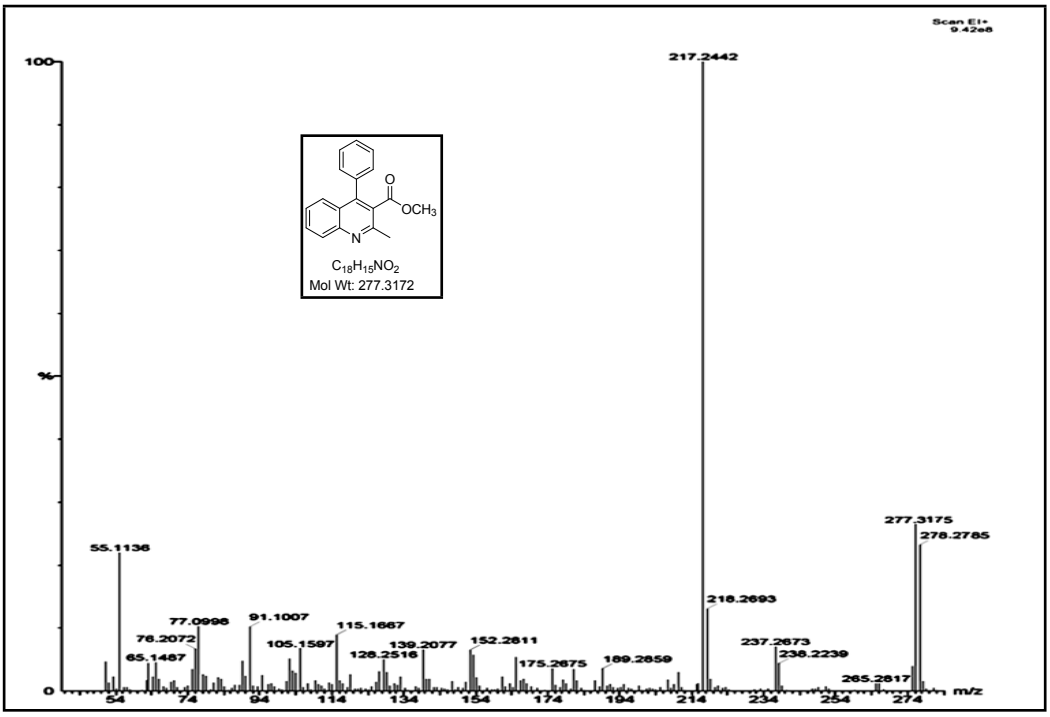


Fig. 13: [1]H NMR spectrum of 1-(2-methyl-4-phenylquinolin-3-yl)ethanone, **3e**

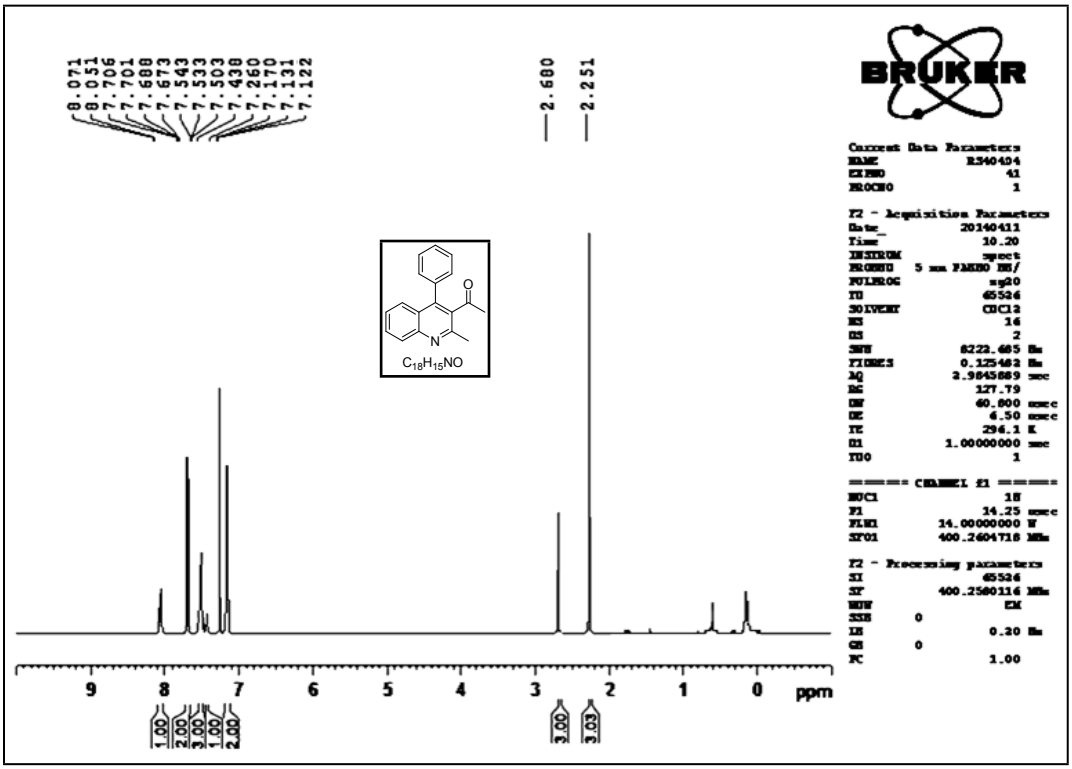


Fig. 14: ^{13}C NMR spectrum of 1-(2-methyl-4-phenylquinolin-3-yl)ethanone, **3e**

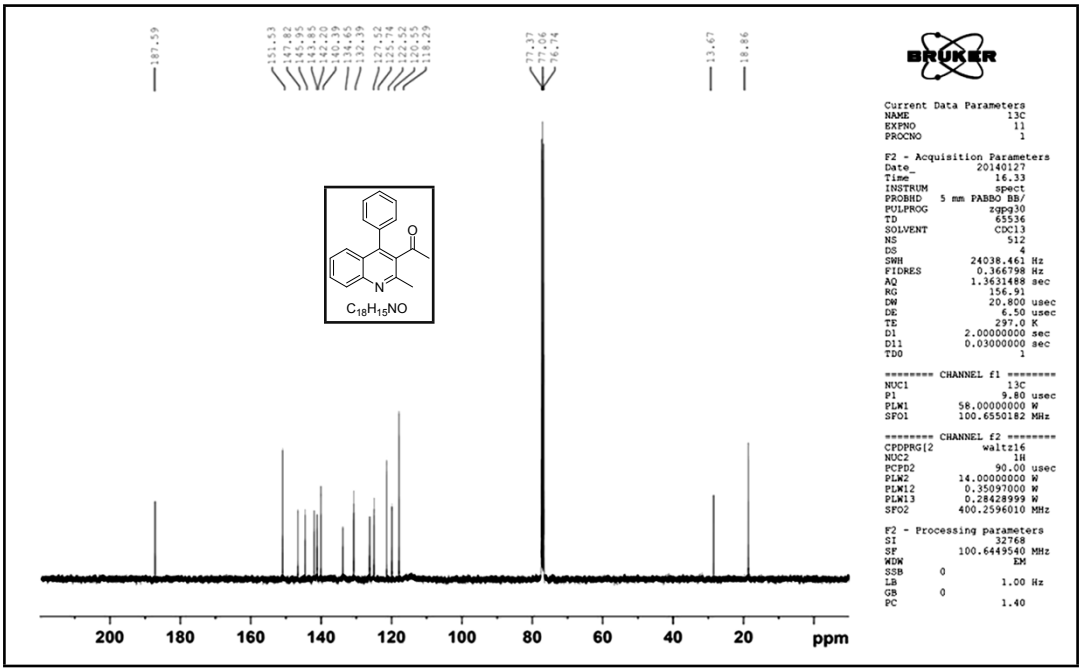


Fig. 15: GC-MS of 1-(2-methyl-4-phenylquinolin-3-yl)ethanone, **3e**

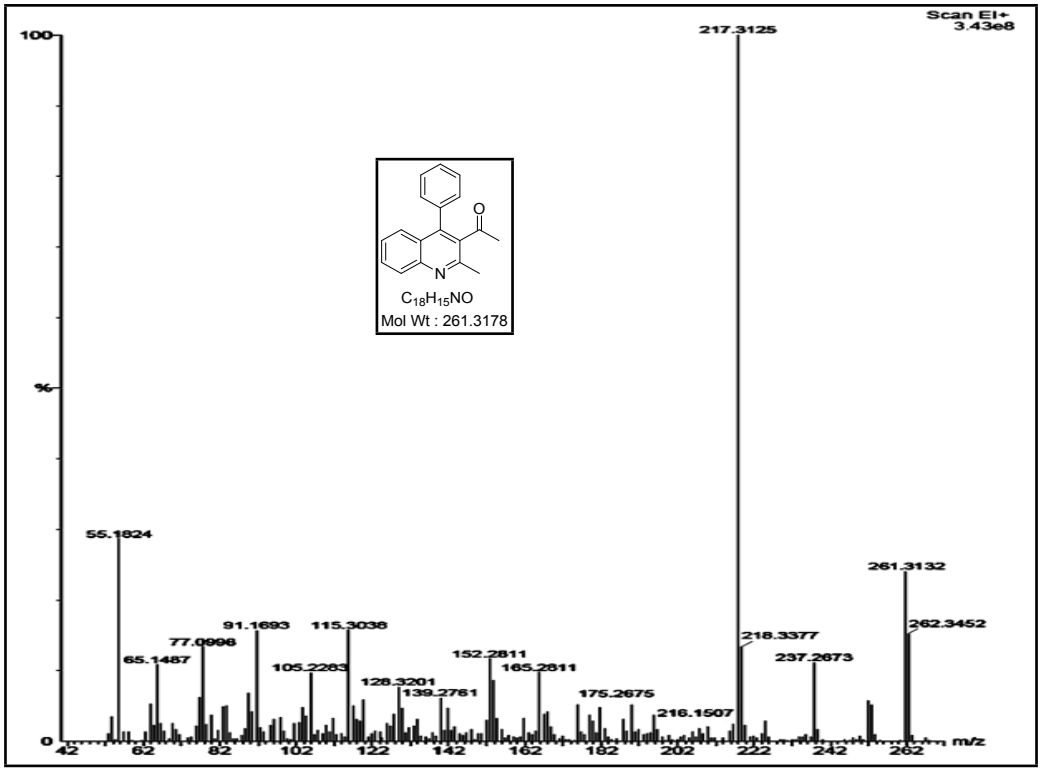


Fig. 16: [1]H NMR spectrum of 9-phenyl-1,2,3,4-tetrahydroacridine, **3f**

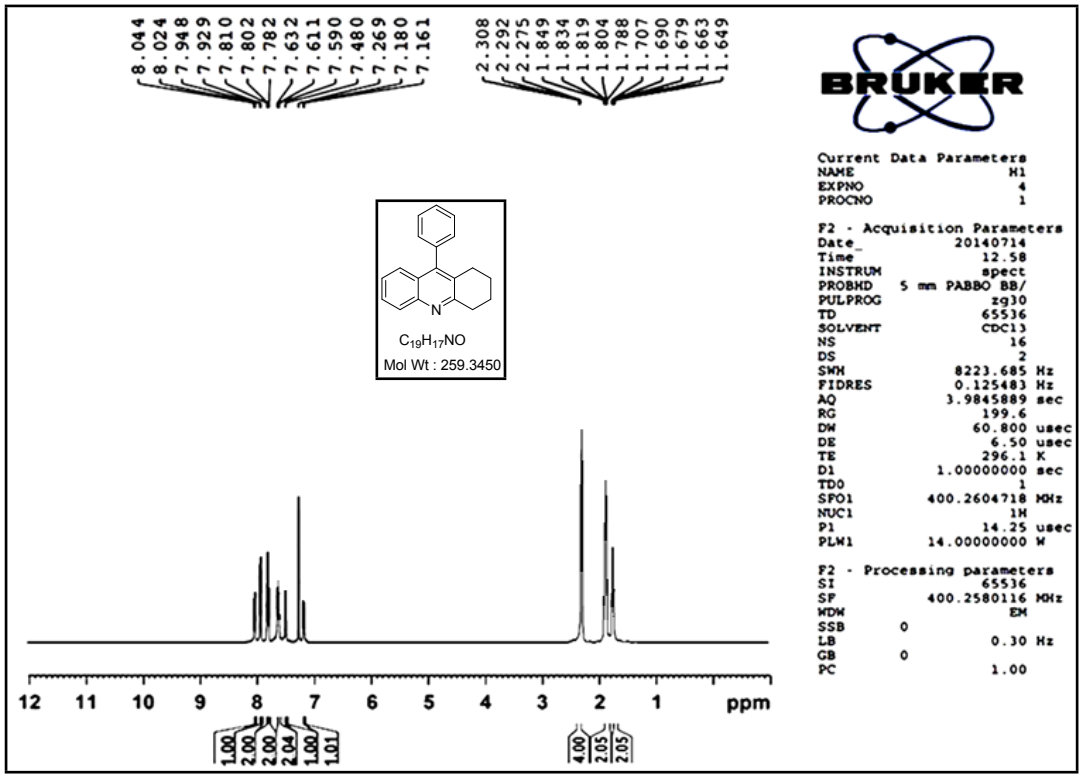


Fig. 17: [13] C NMR spectrum of 9-phenyl-1,2,3,4-tetrahydroacridine, **3f**

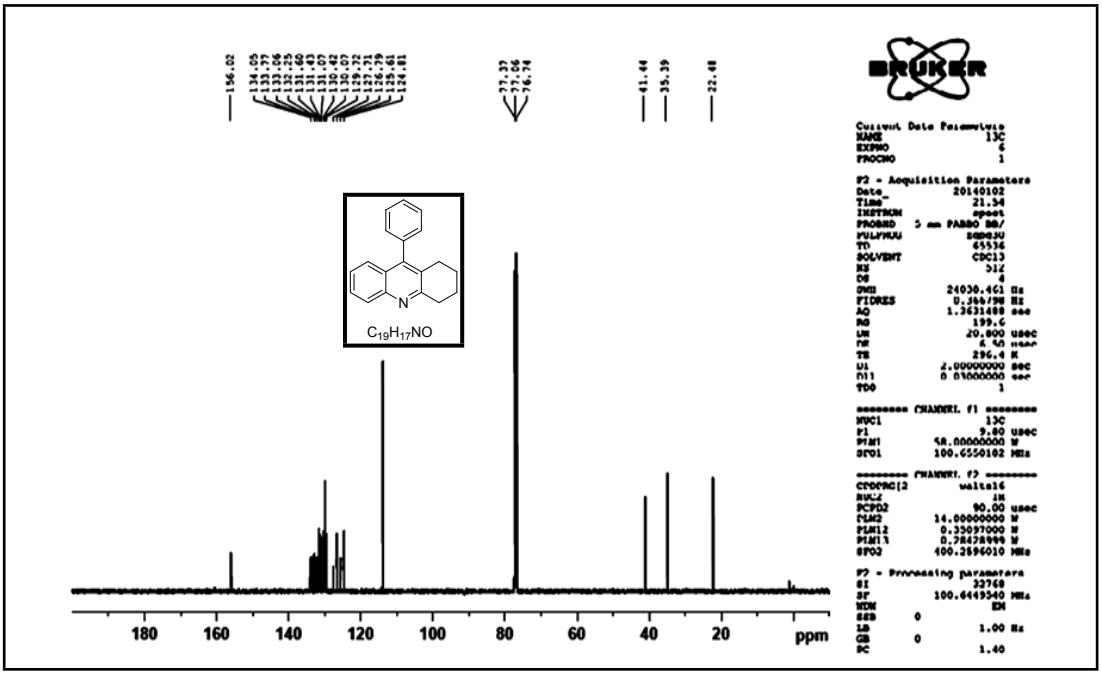


Fig. 18: GC-MS of 9-phenyl-1,2,3,4-tetrahydroacridine, **3f**

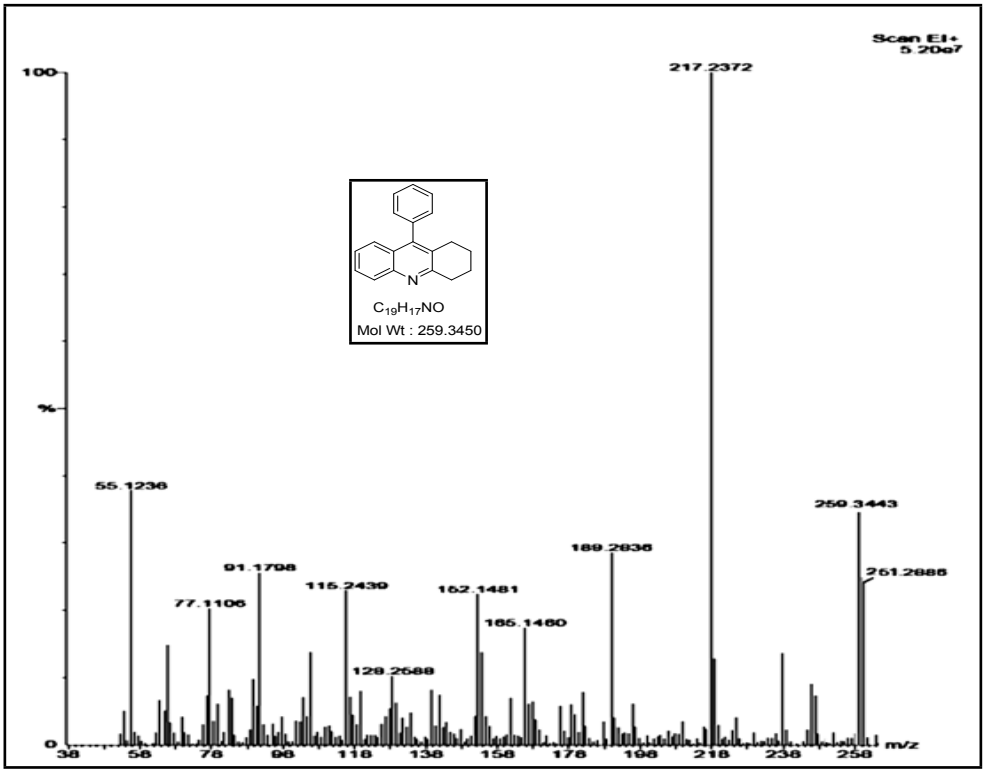


Fig. 19: [1]H NMR spectrum of 7-chloro-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3g**

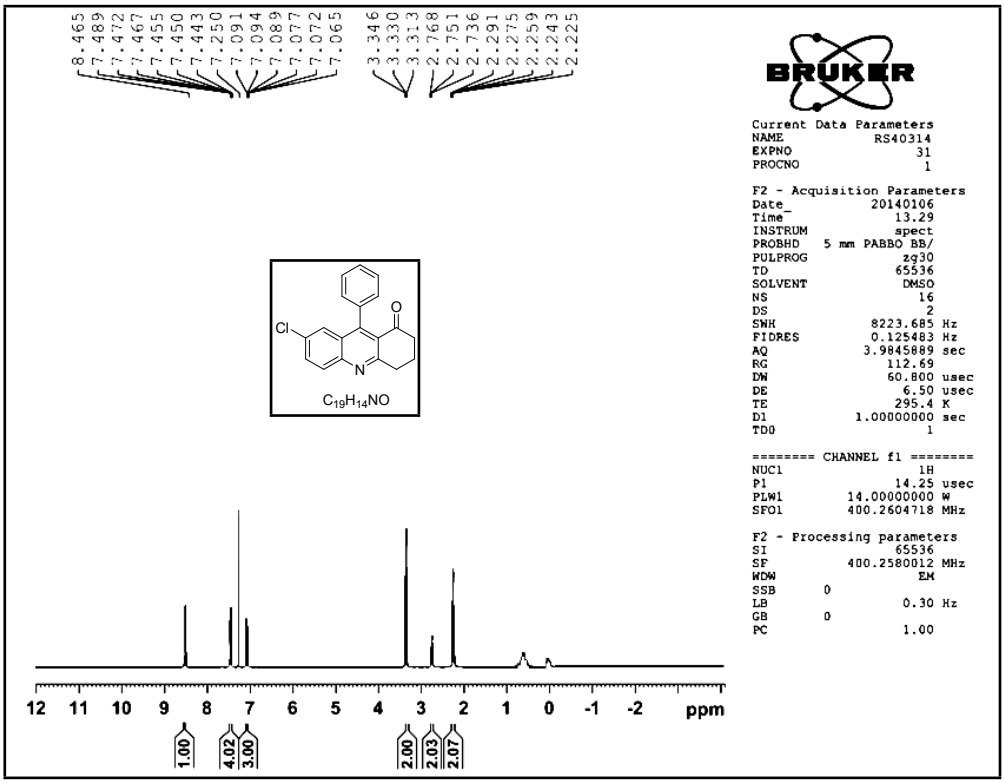


Fig. 20: ^{13}C NMR spectrum of 7-chloro-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3g**

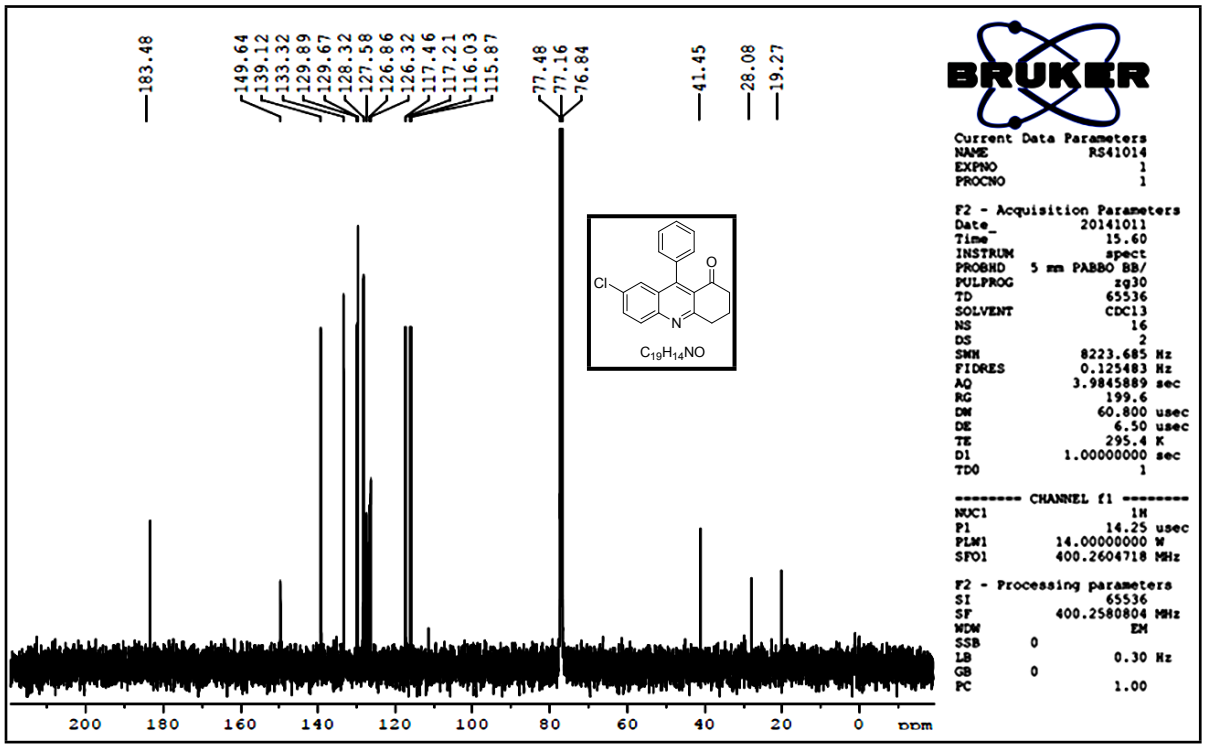


Fig. 21: GC-MS of 7-chloro-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3g**

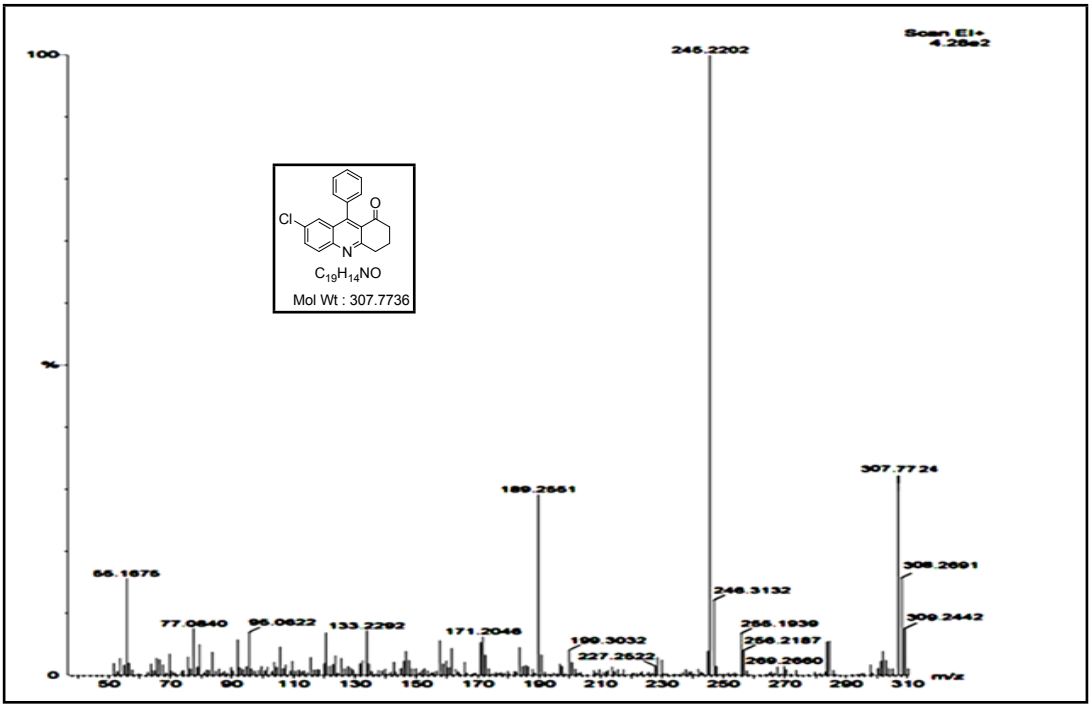


Fig. 22: [1]H NMR spectrum of 7-chloro-3,3-dimethyl-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3h**

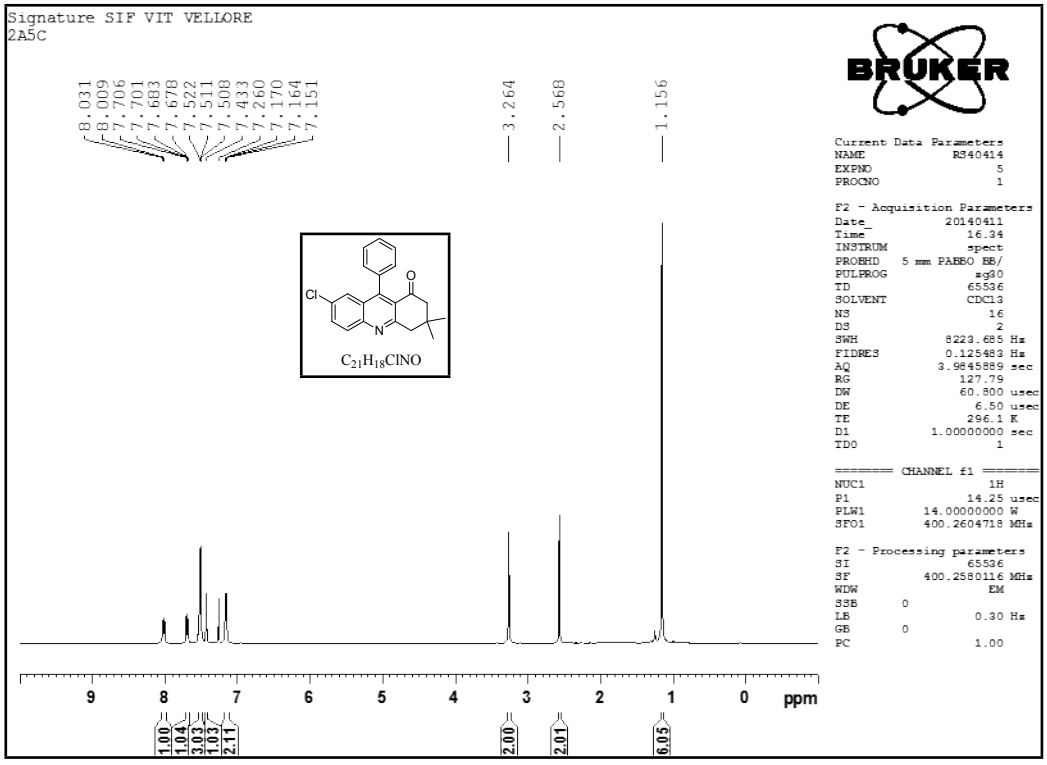


Fig. 23: [13] C NMR spectrum of 7-chloro-3,3-dimethyl-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3h**

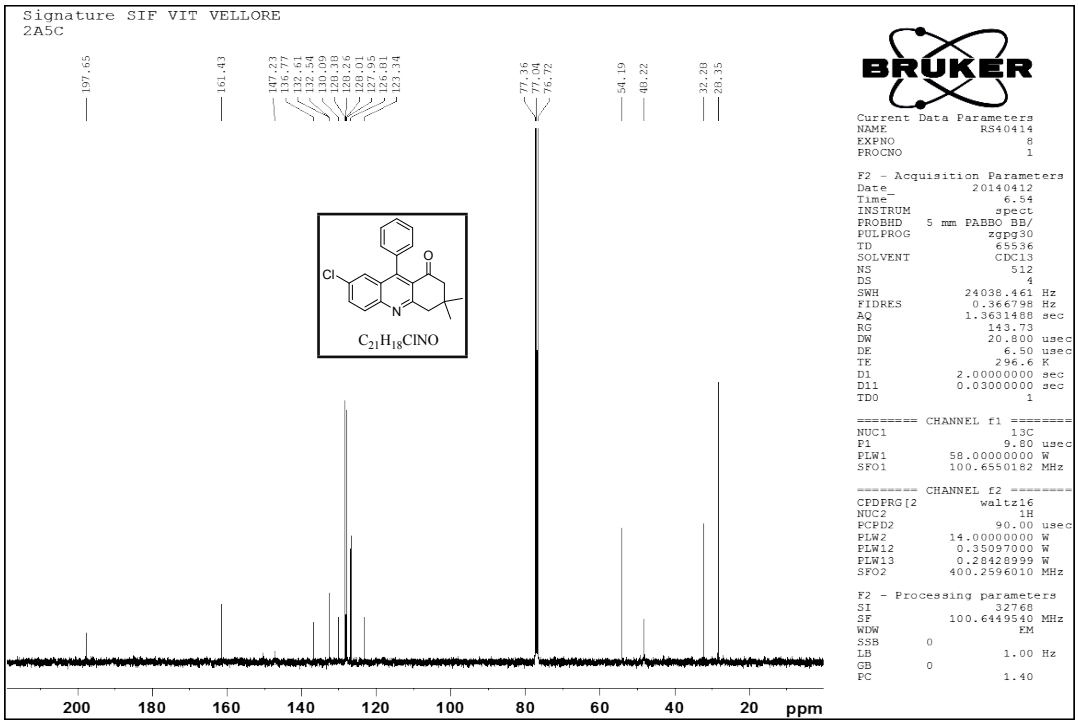


Fig. 24: GC-MS of 7-chloro-3,3-dimethyl-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3h**

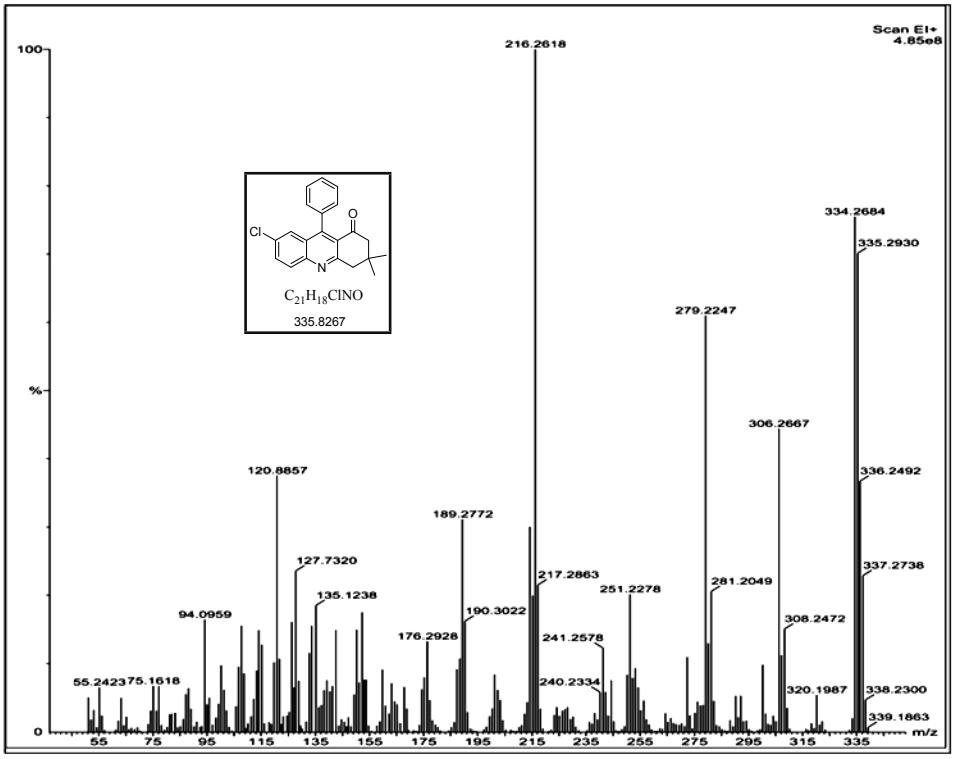


Fig. 25: [1]H NMR spectrum of Ethyl 6-chloro-2-methyl-4-phenylquinoline-3-carboxylate, **3i**

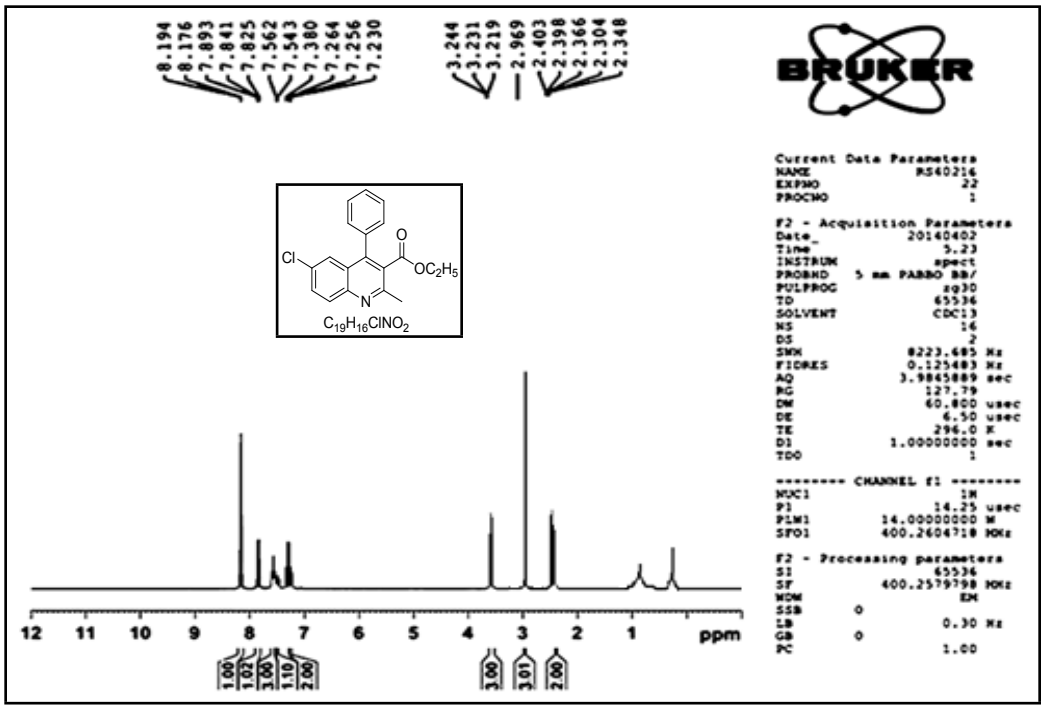


Fig. 26: ^{13}C NMR spectrum of Ethyl 6-chloro-2-methyl-4-phenylquinoline-3-carboxylate, **3i**

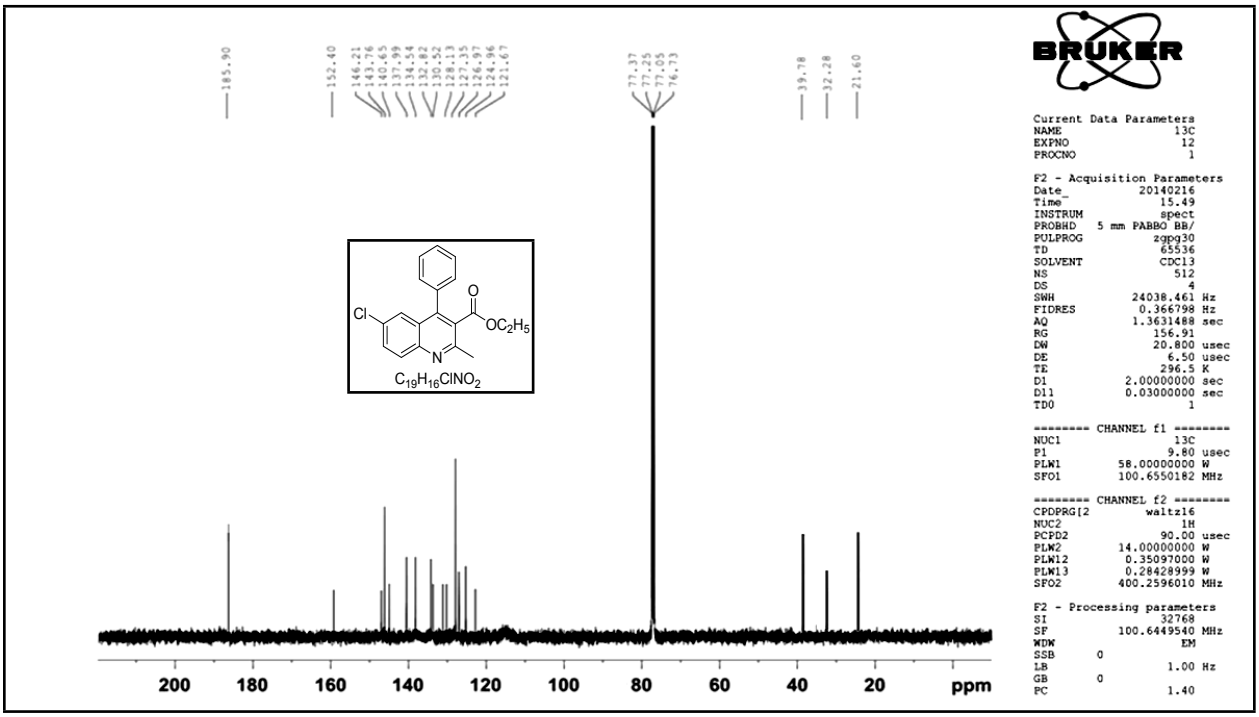


Fig. 27: GC-MS of Ethyl 6-chloro-2-methyl-4-phenylquinoline-3-carboxylate, **3i**

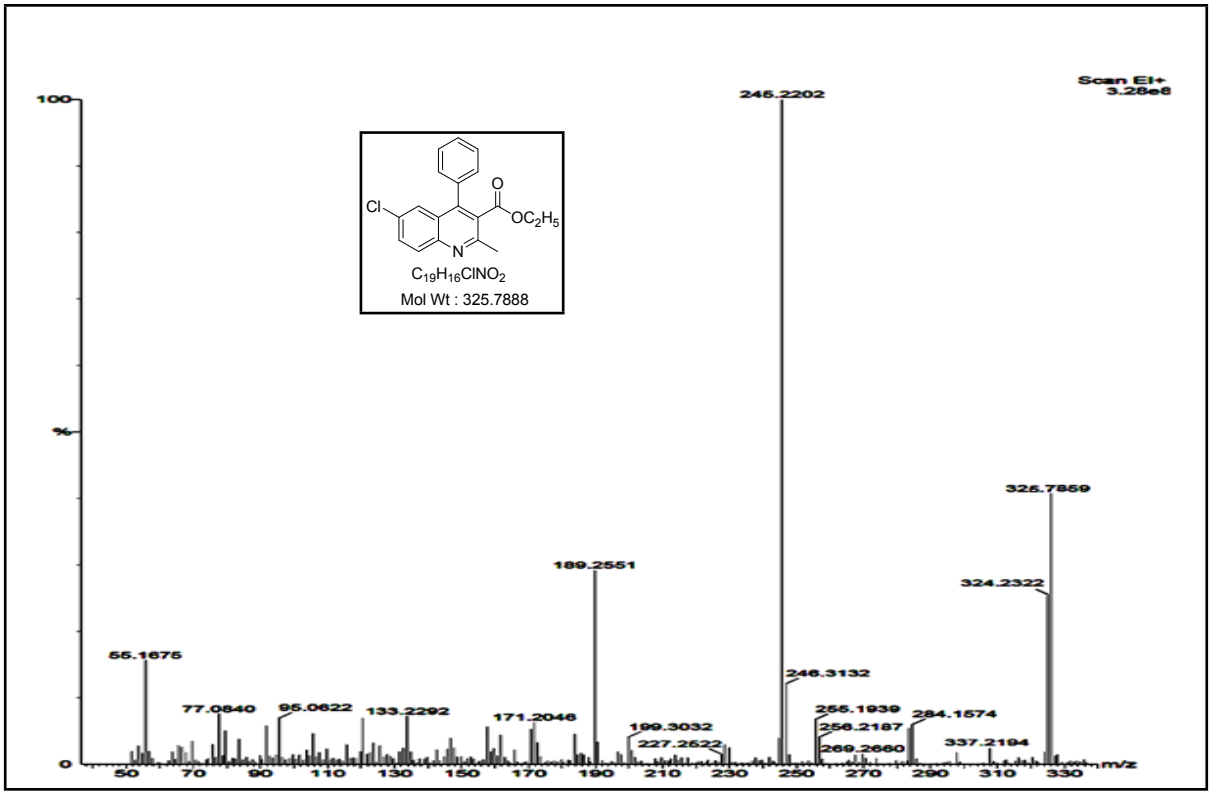


Fig. 28: [1]H NMR spectrum of Methyl 6-chloro-2-methyl-4-phenylquinoline-3-carboxylate, **3j**

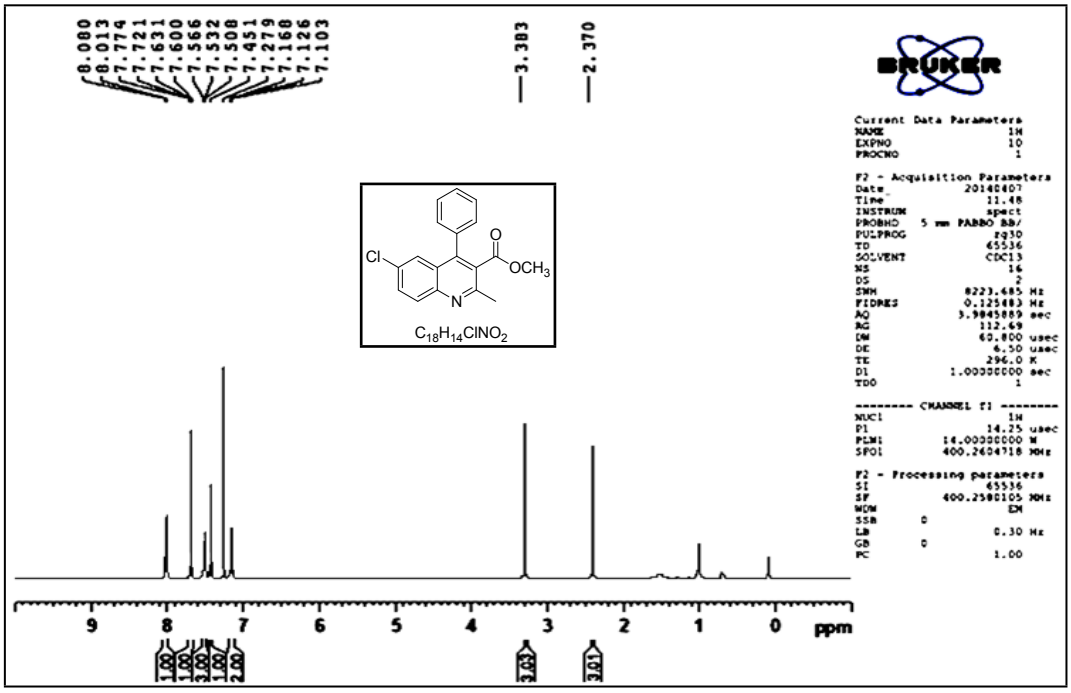


Fig. 29: [13] C NMR spectrum of Methyl 6-chloro-2-methyl-4-phenylquinoline-3-carboxylate, **3j**

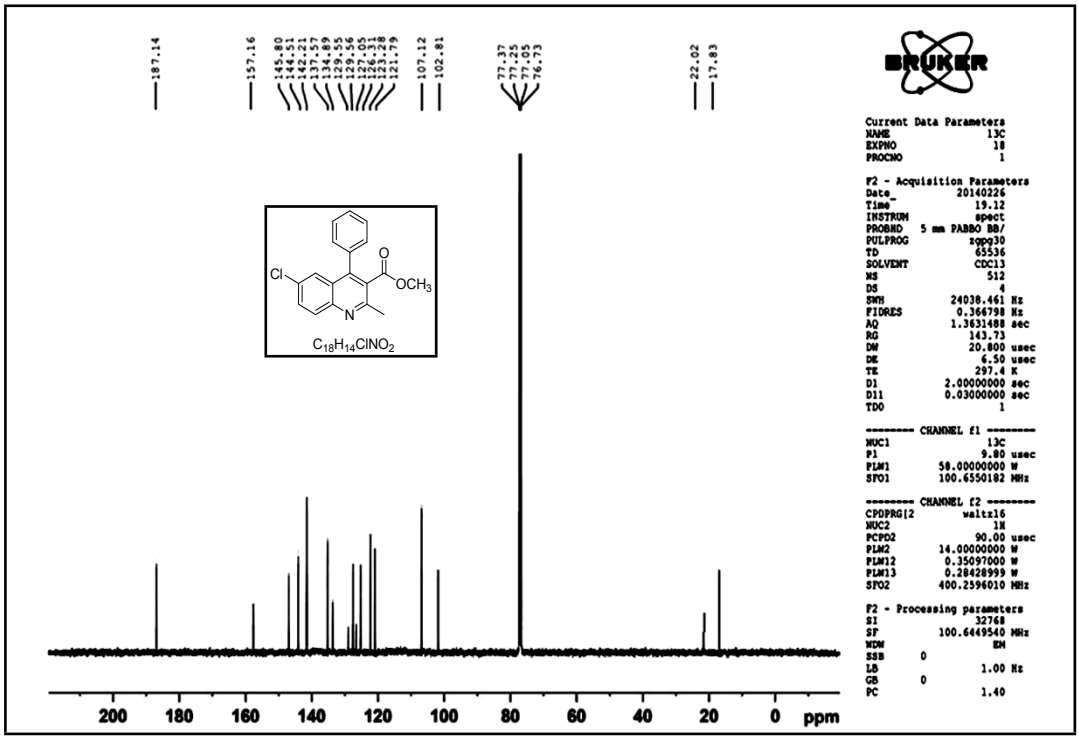


Fig. 30: GC-MS of Methyl 6-chloro-2-methyl-4-phenylquinoline-3-carboxylate, **3j**

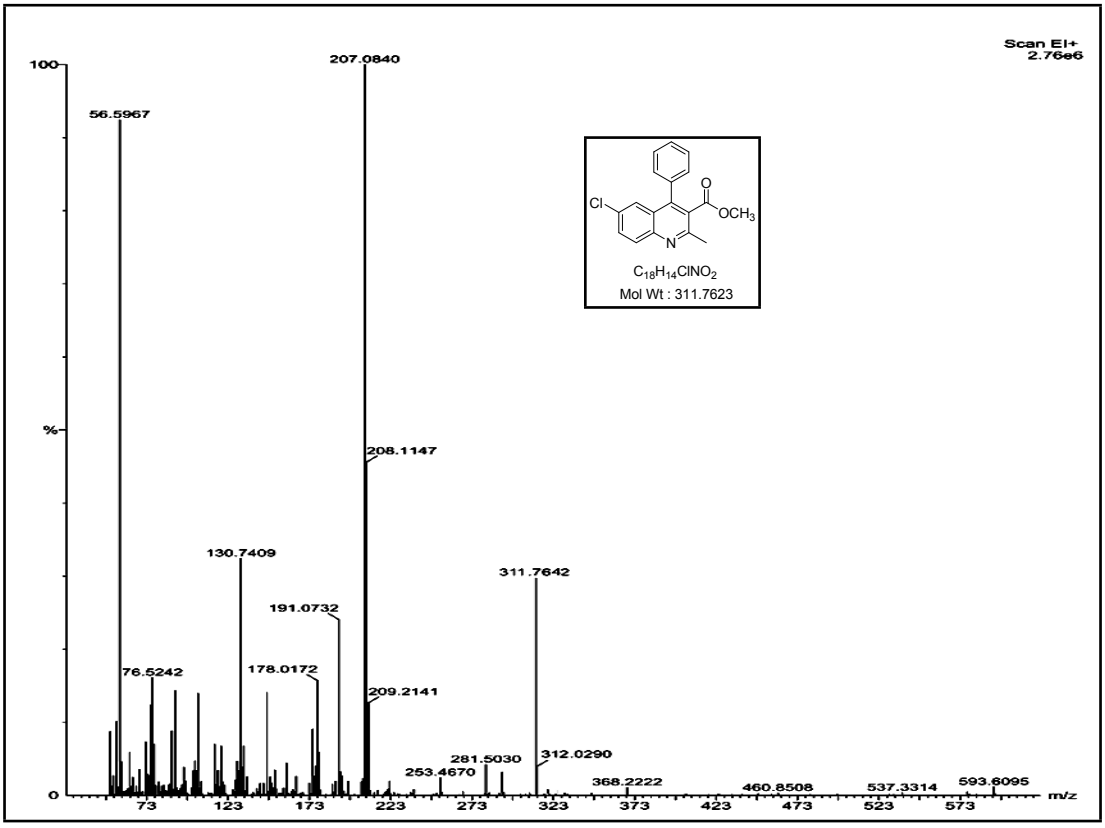


Fig. 31: [1]H NMR spectrum of 1-(6-chloro-2-methyl-4-phenylquinolin-3-yl) ethanone, **3k**

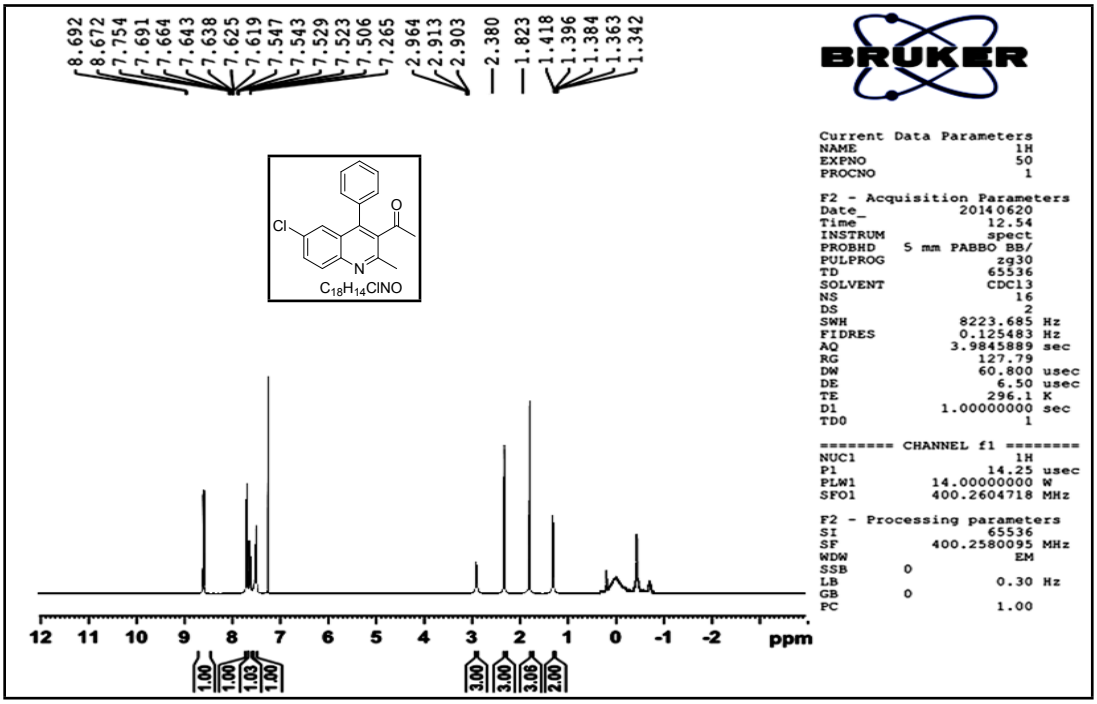


Fig. 32: ^{13}C NMR spectrum of 1-(6-chloro-2-methyl-4-phenylquinolin-3-yl) ethanone, **3k**

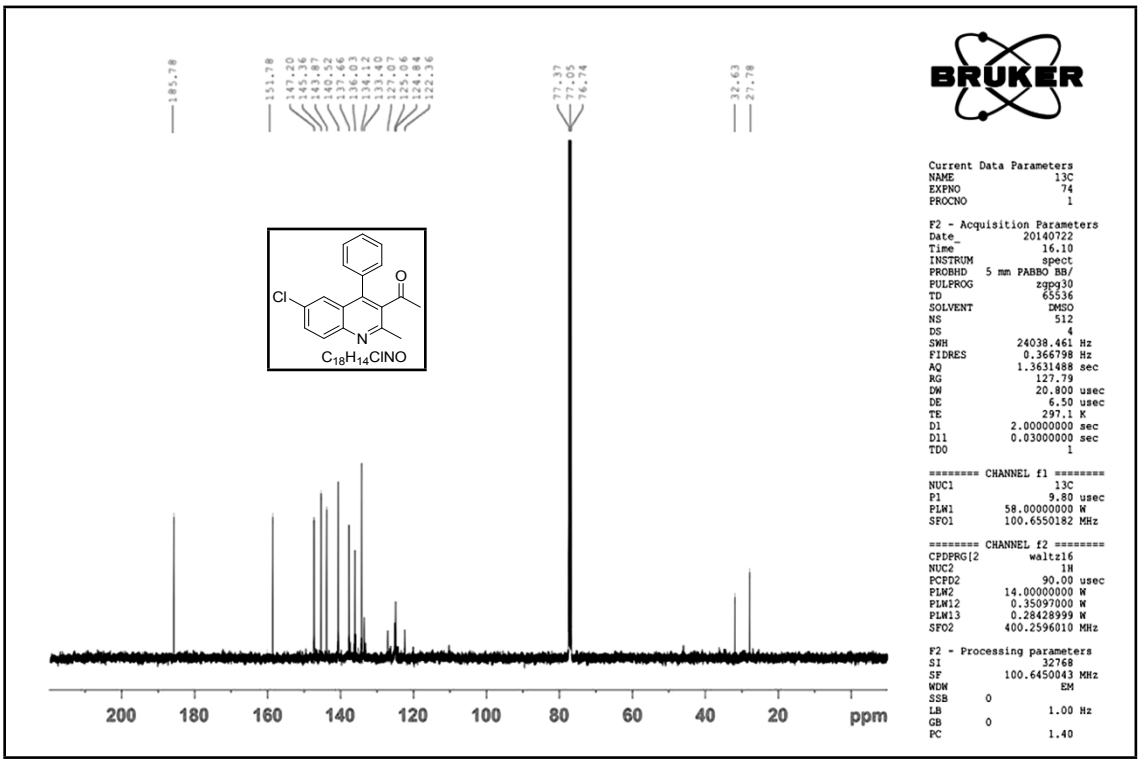


Fig. 33: GC-MS of 1-(6-chloro-2-methyl-4-phenylquinolin-3-yl) ethanone, **3k**

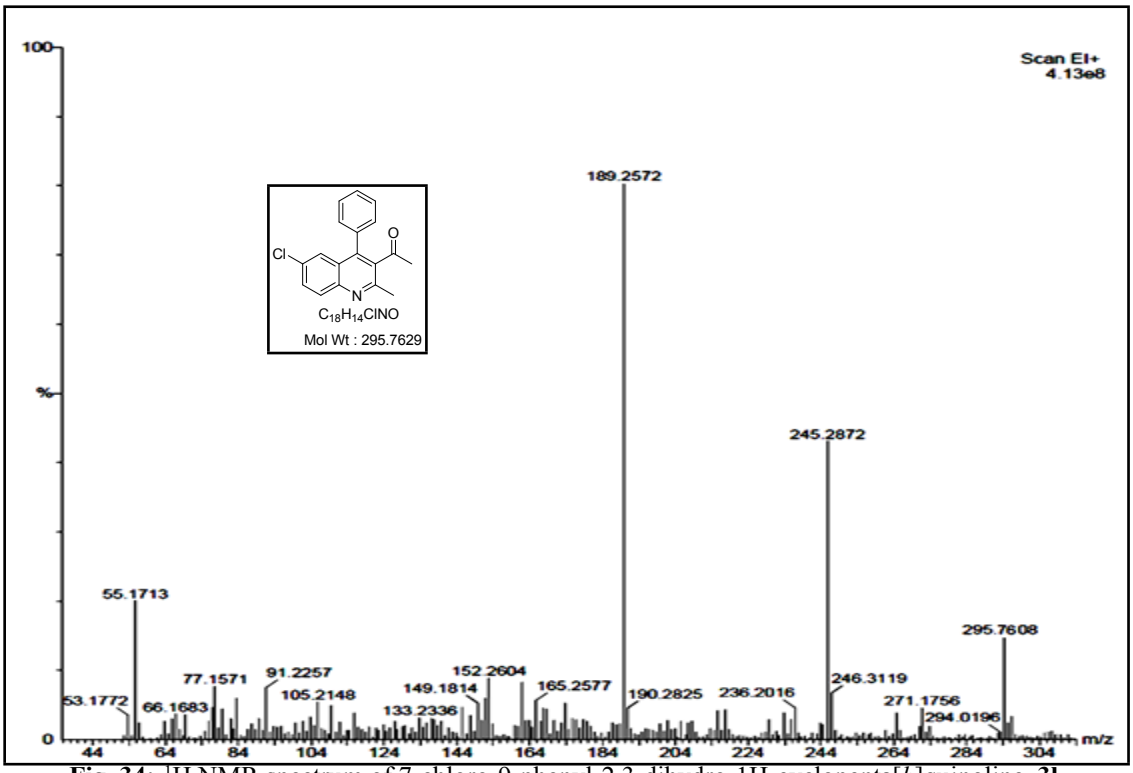


Fig. 34: ^{1}H NMR spectrum of 7-chloro-9-phenyl-2,3-dihydro-1H-cyclopenta[*b*]quinoline, **3l**

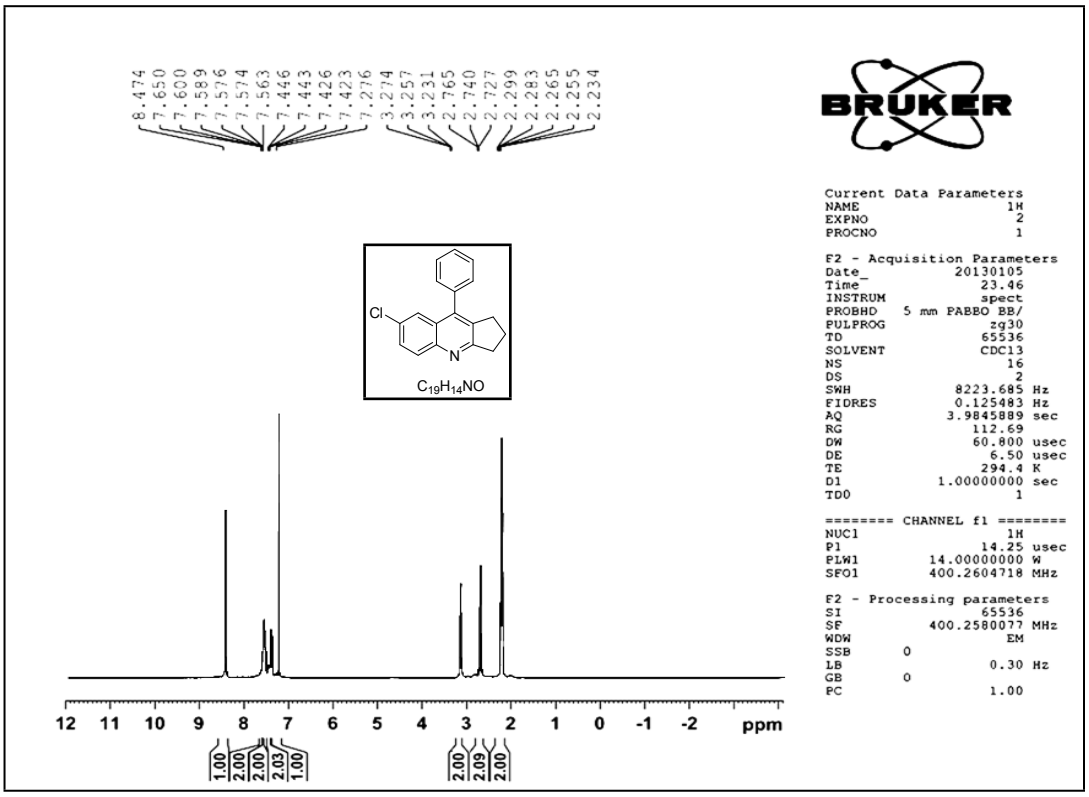


Fig. 35: [13] C NMR spectrum of 7-chloro-9-phenyl-2,3-dihydro-1H-cyclopenta[*b*]quinoline, **3l**

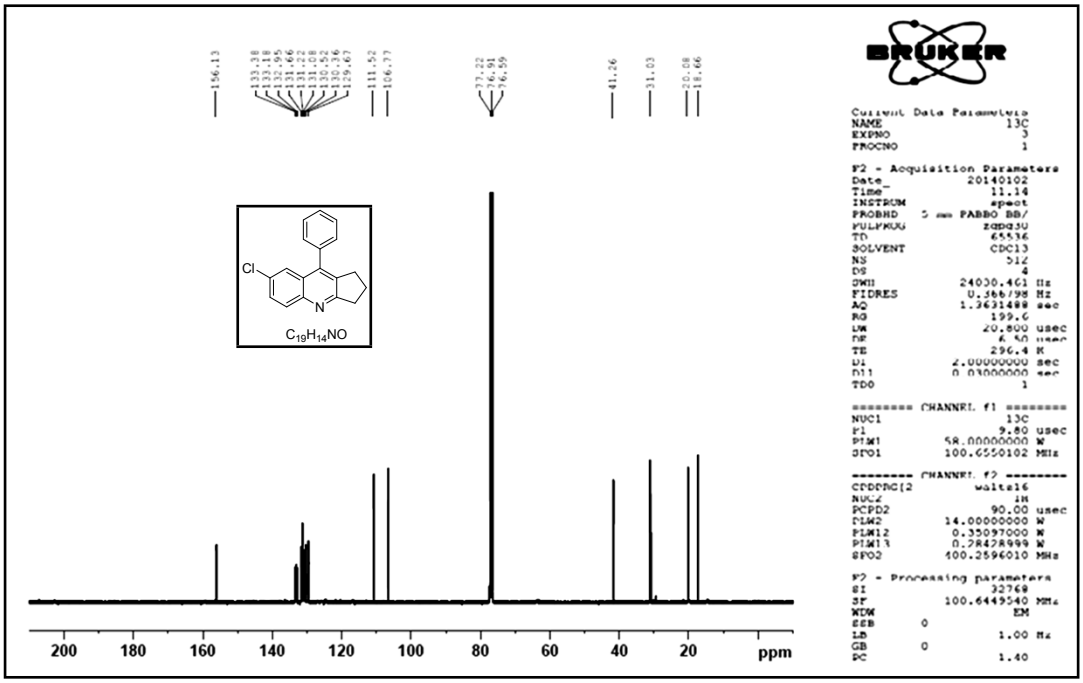


Fig. 36: GC-MS of 7-chloro-9-phenyl-2,3-dihydro-1H-cyclopenta[*b*]quinoline, **3l**

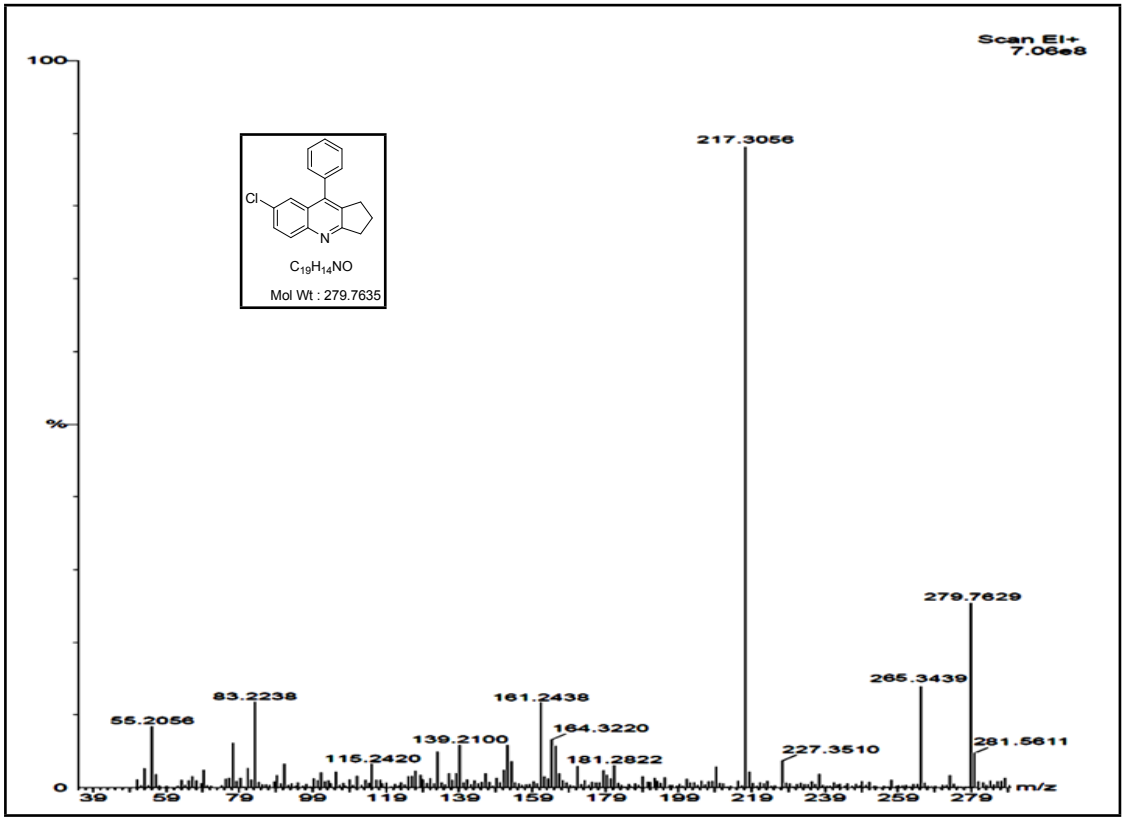


Fig. 37: [1]H NMR spectrum of 9-methyl-3,4-dihydroacridin-1(2*H*)-one, **3m**

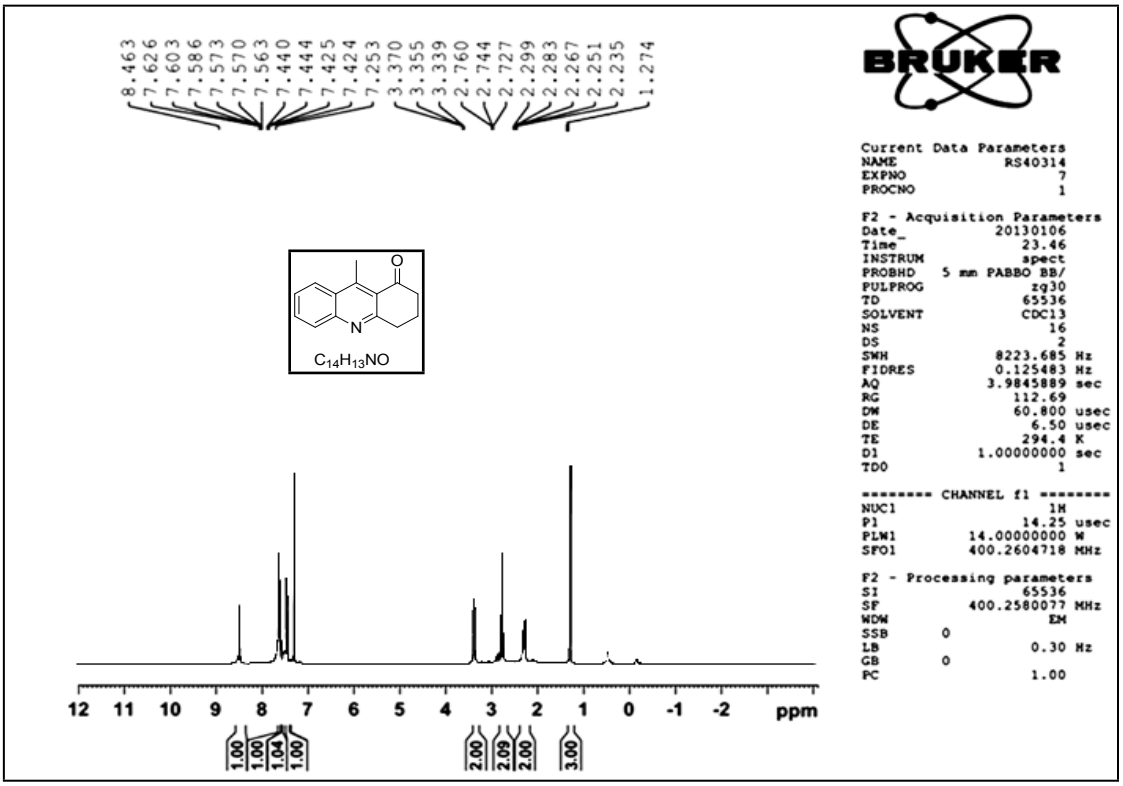


Fig. 38: ^{13}C NMR spectrum of 9-methyl-3,4-dihydroacridin-1(2*H*)-one, **3m**

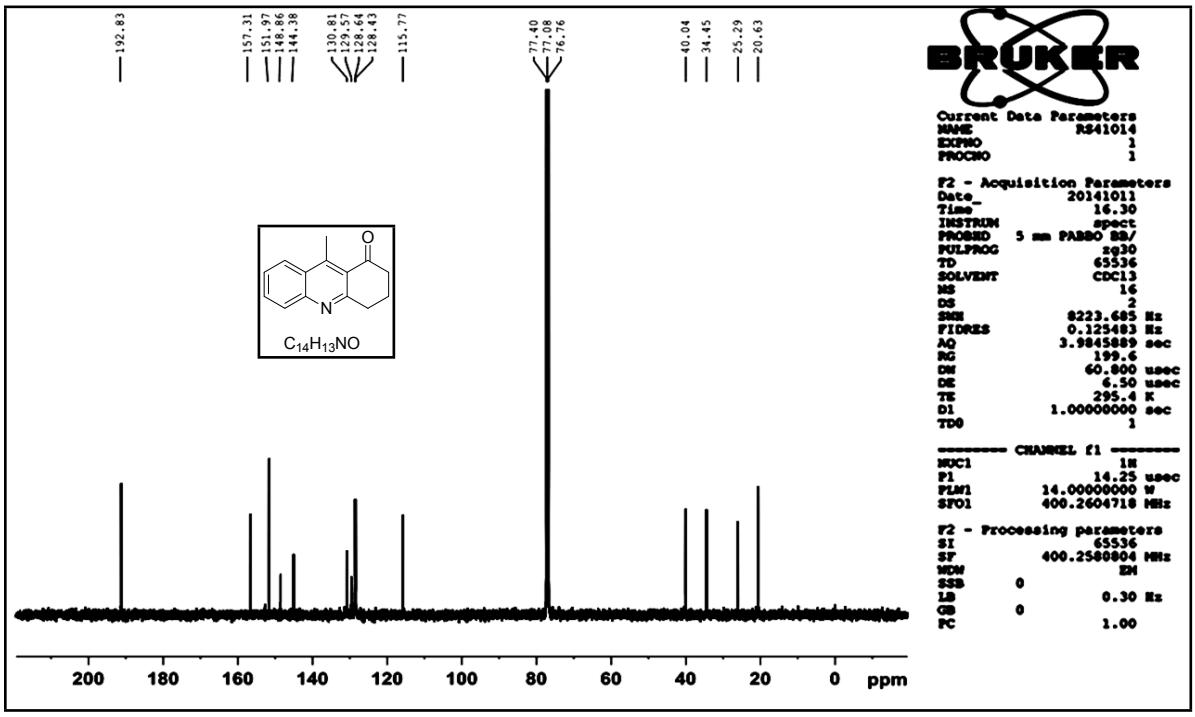
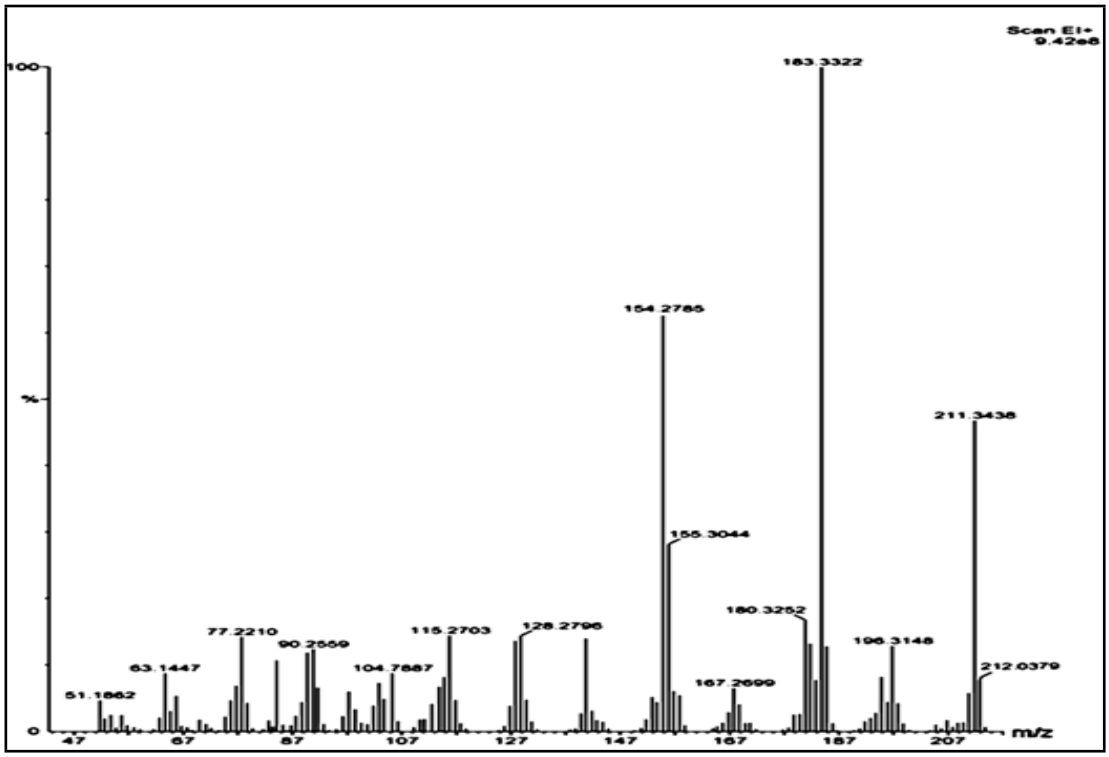


Fig. 39: GC-MS of 9-methyl-3,4-dihydroacridin-1(2*H*)-one, **3m**



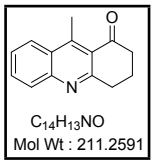


Fig. 40: [1]H NMR spectrum of 3,3,9-trimethyl-3,4-dihydroacridin-1(2*H*)-one, **3n**

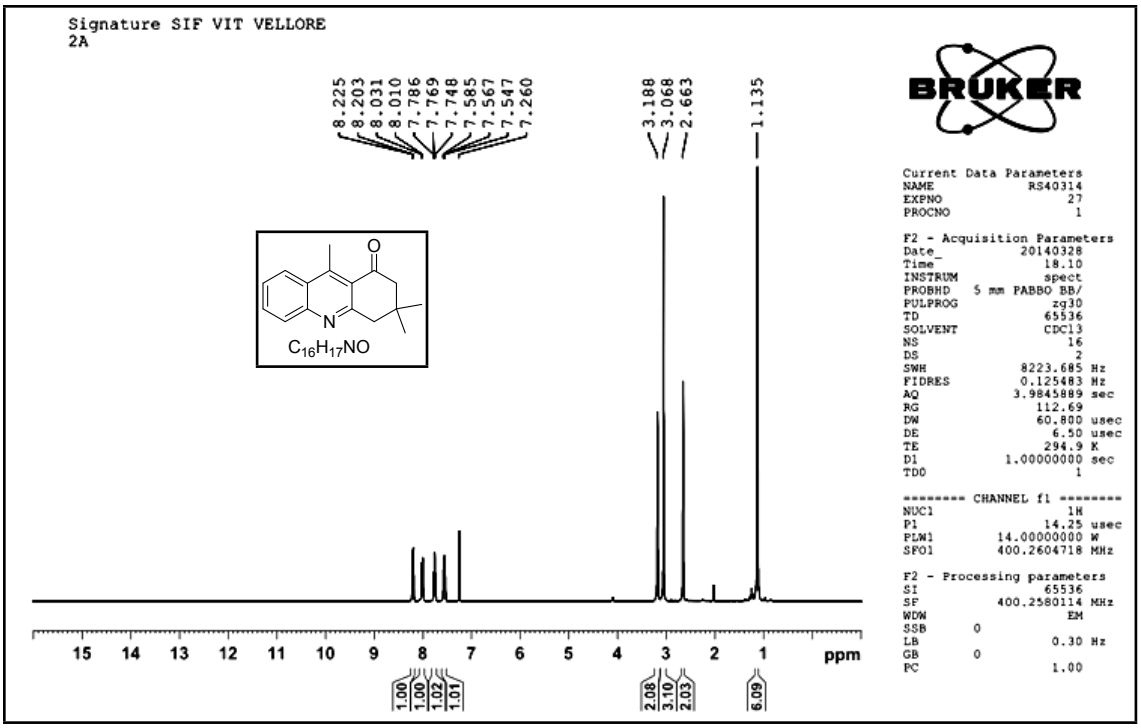
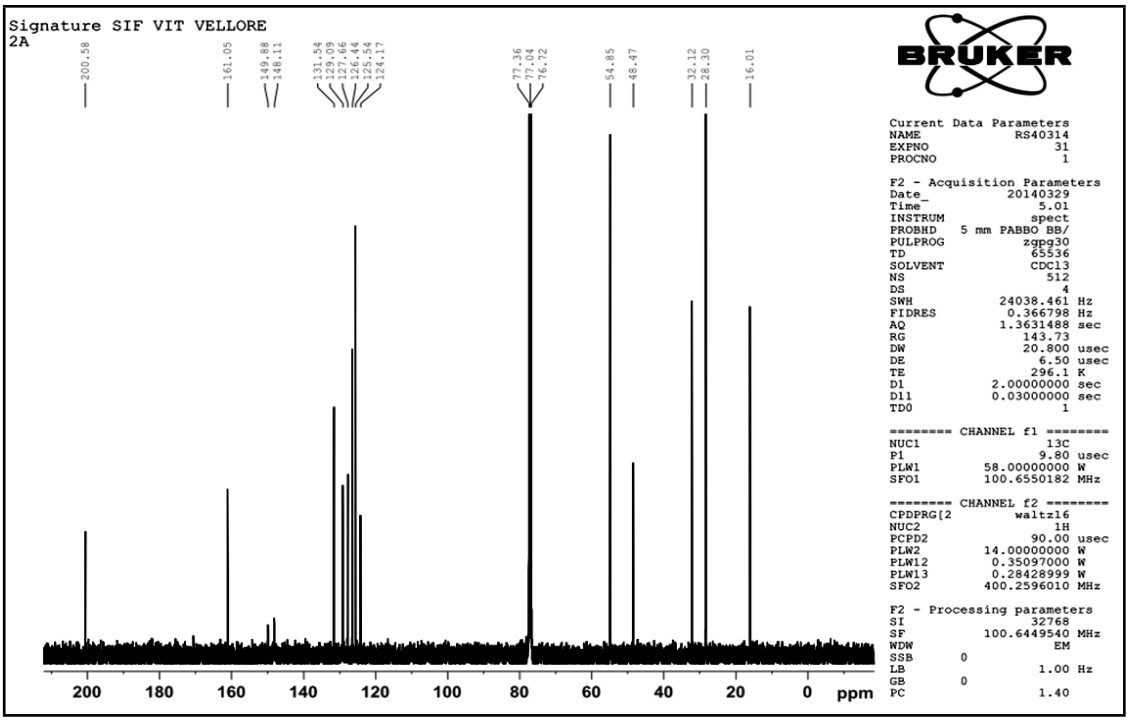


Fig. 41: [13] C NMR spectrum of3,3,9-trimethyl-3,4-dihydroacridin-1(2*H*)-one, **3n**



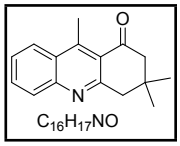


Fig. 42: GC-MS of 3,3,9-trimethyl-3,4-dihydroacridin-1(2*H*)-one, **3n**

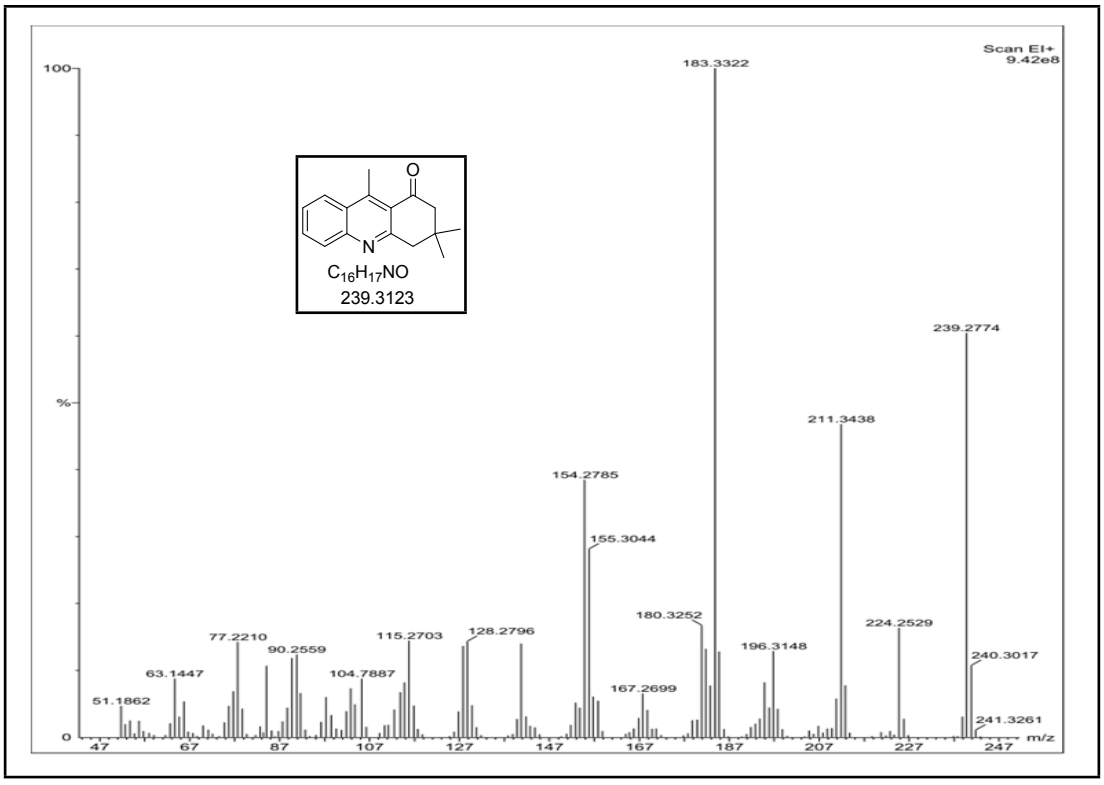


Fig. 43: [1]H NMR spectrum of Ethyl 2,4-dimethylquinoline-3-carboxylate, **3o**

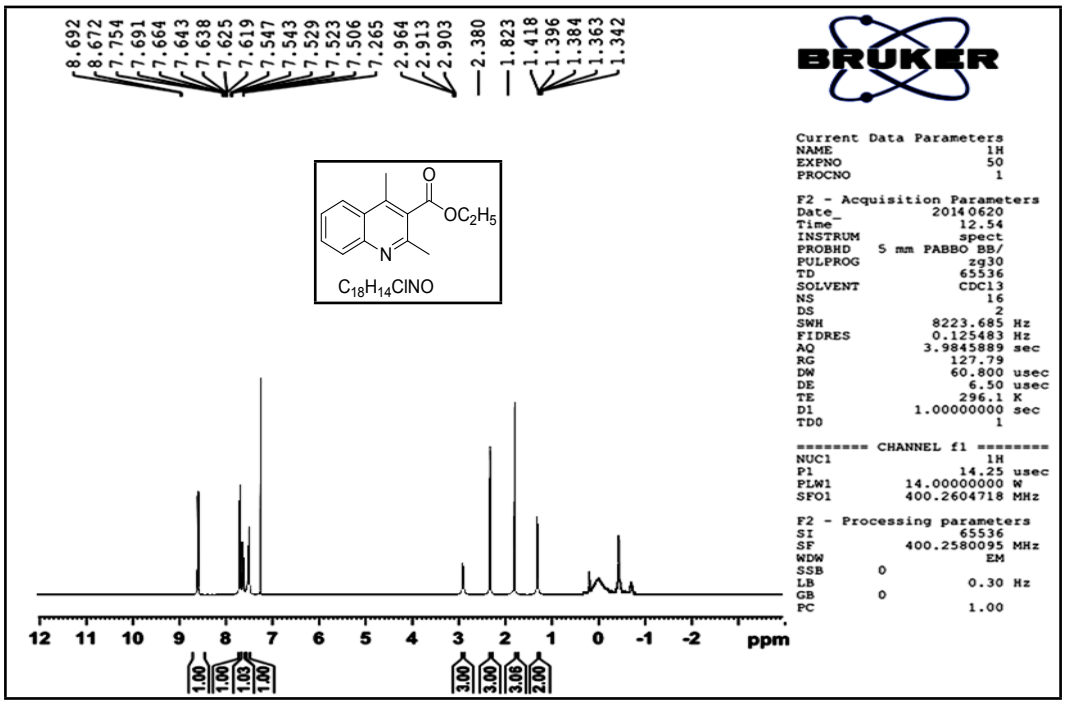


Fig. 44: [13] C NMR spectrum of Ethyl 2,4-dimethylquinoline-3-carboxylate, **3o**

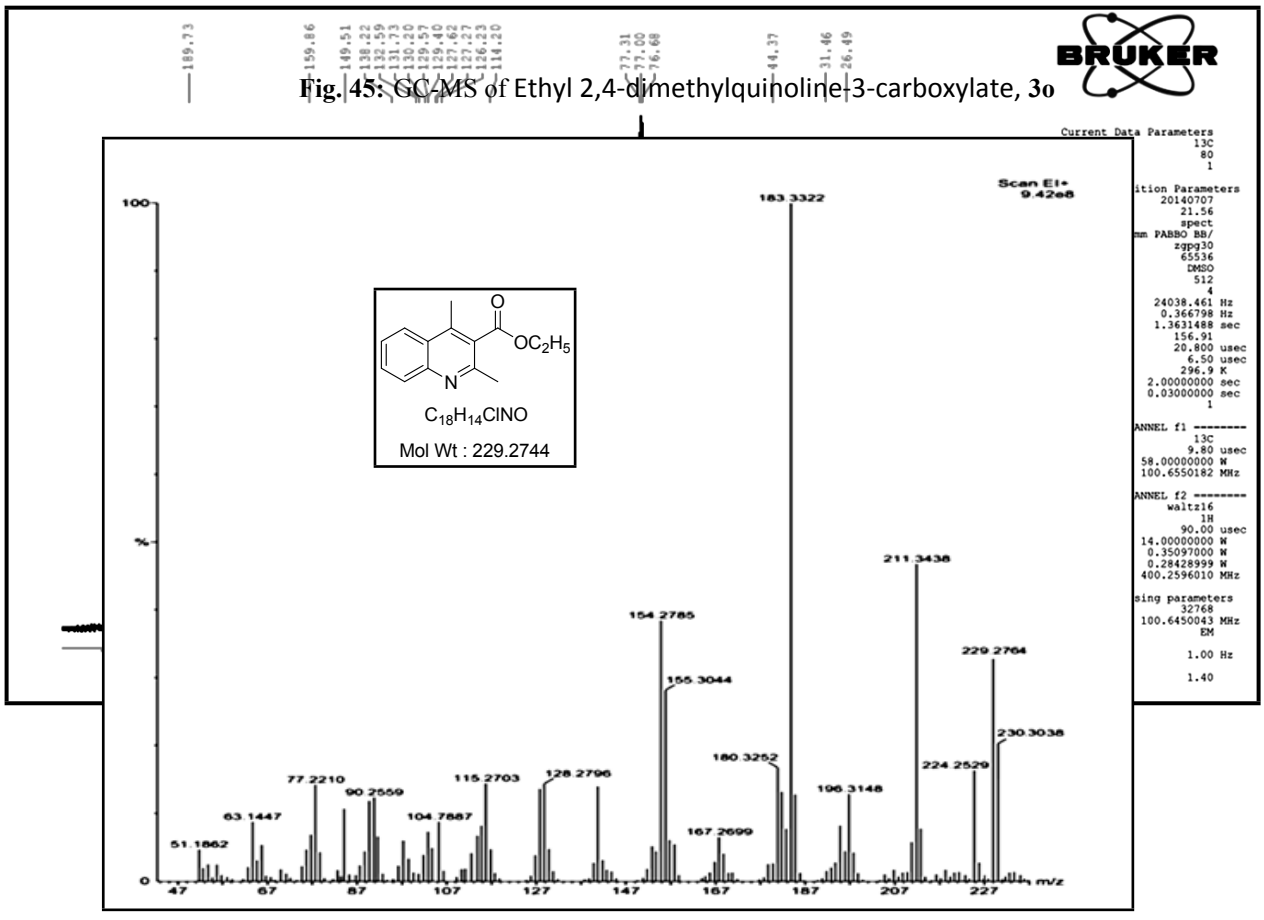


Fig. 45: GC-MS of Ethyl 2,4-dimethylquinoline-3-carboxylate, **3o**

Fig. 46: [1]H NMR spectrum of Methyl 2,4-dimethylquinoline-3-carboxylate, **3p**

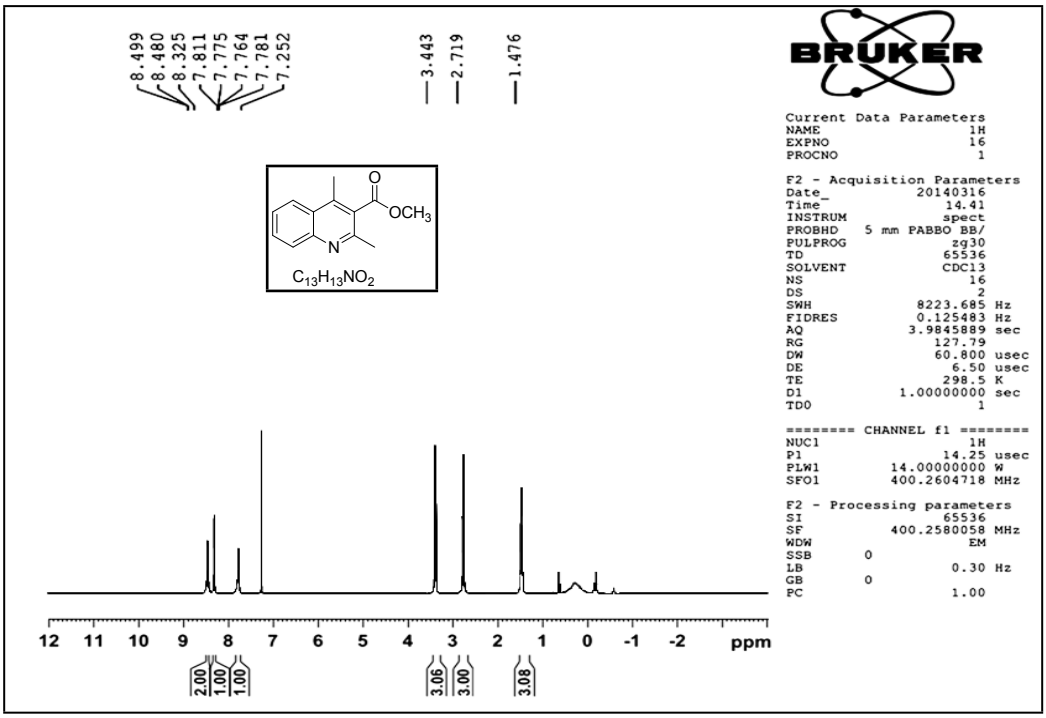


Fig. 47: [13] C NMR spectrum of Methyl 2,4-dimethylquinoline-3-carboxylate, **3p**

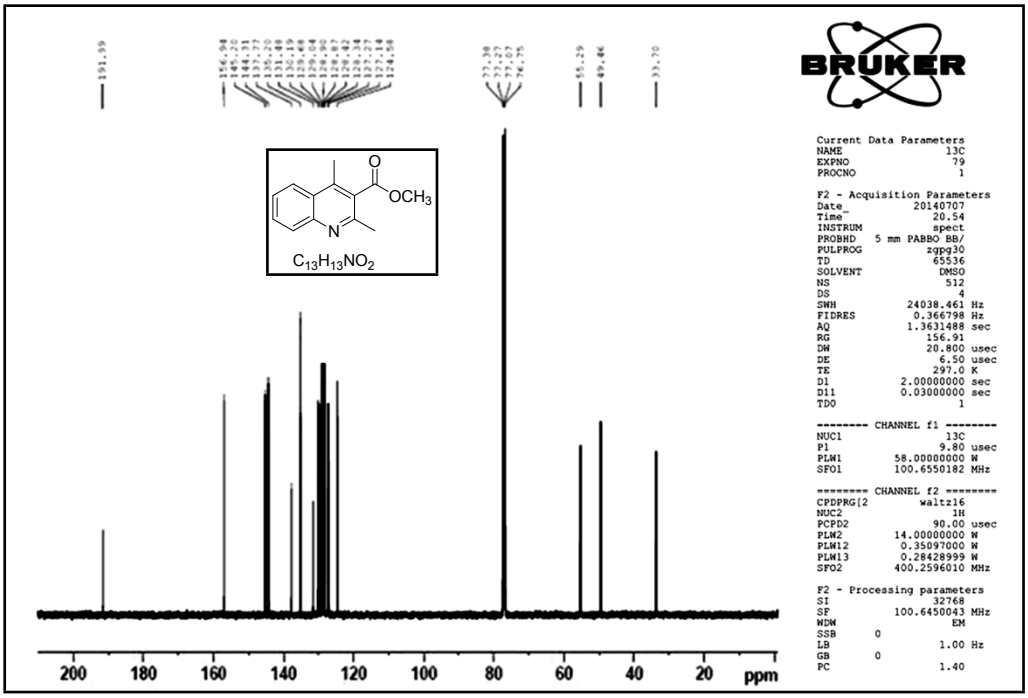


Fig. 48: GC-MS of Methyl 2,4-dimethylquinoline-3-carboxylate, **3p**

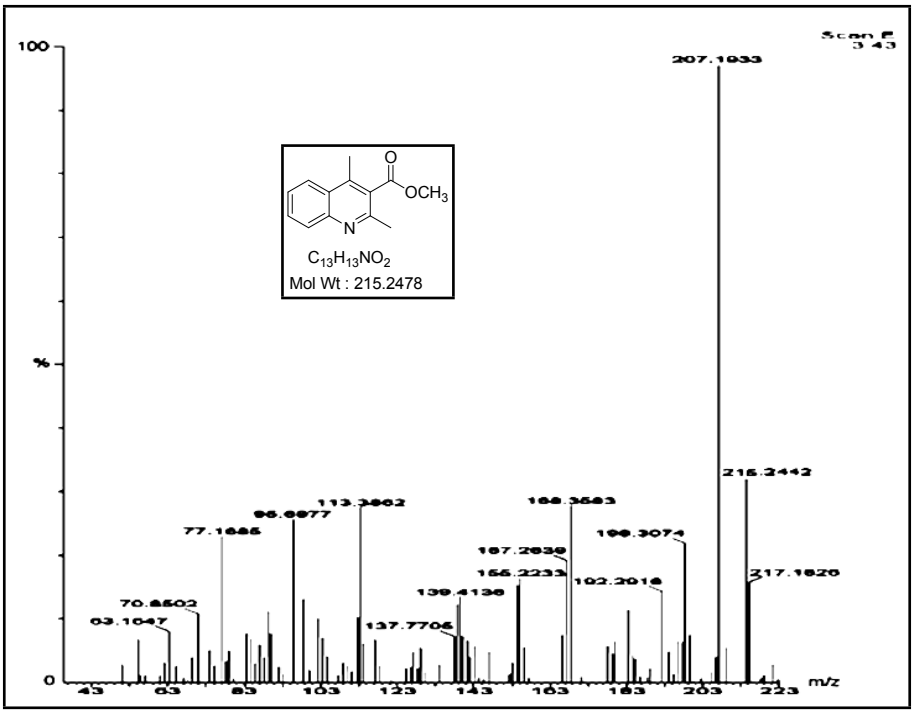


Fig. 49: ^{1}H NMR spectrum of 1-(2,4-dimethylquinolin-3-yl)ethanone, **3q**

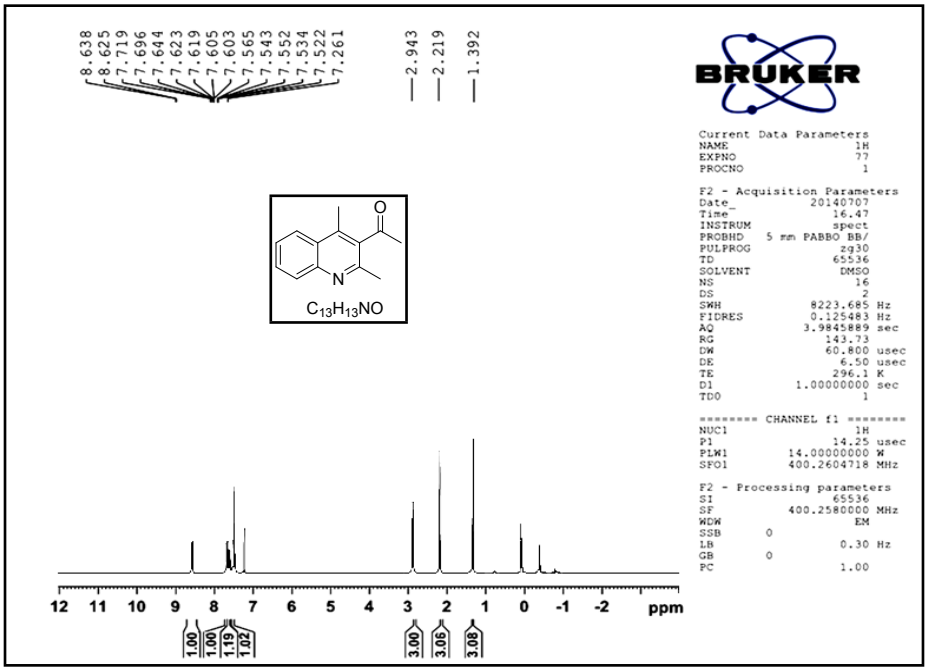


Fig. 50: ^{13}C NMR spectrum of 1-(2,4-dimethylquinolin-3-yl)ethanone, **3q**

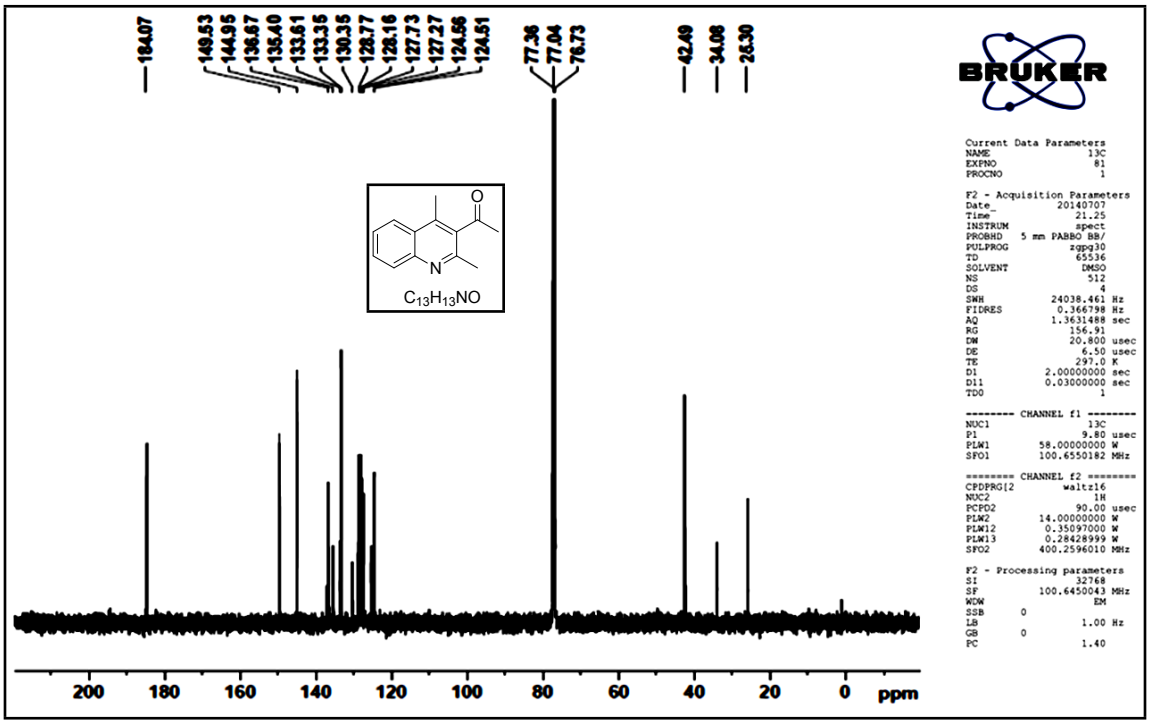


Fig. 51: GC-MS of 1-(2,4-dimethylquinolin-3-yl)ethanone, **3q**

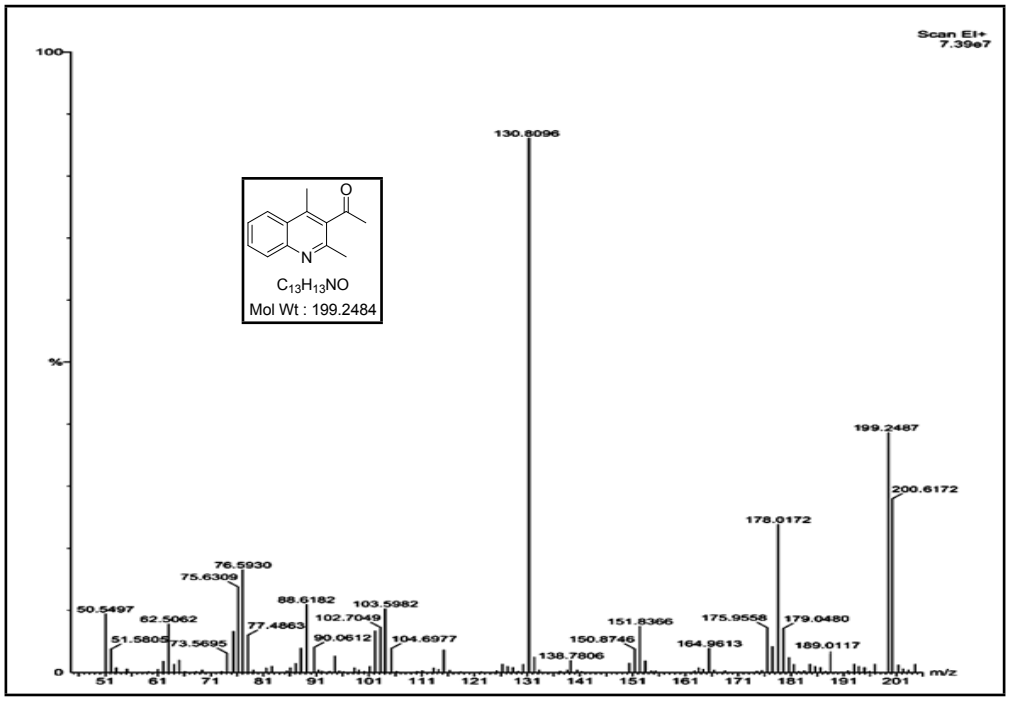


Fig. 52: [1]H NMR spectrum of 7-nitro-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3r**

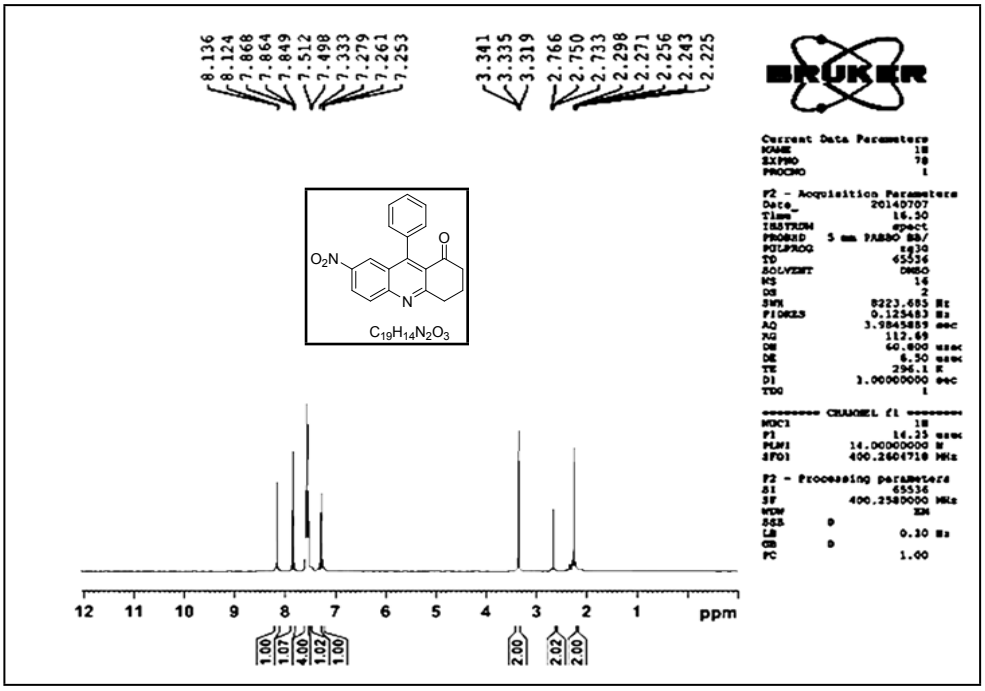


Fig. 53: [13] C NMR spectrum of 7-nitro-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3r**

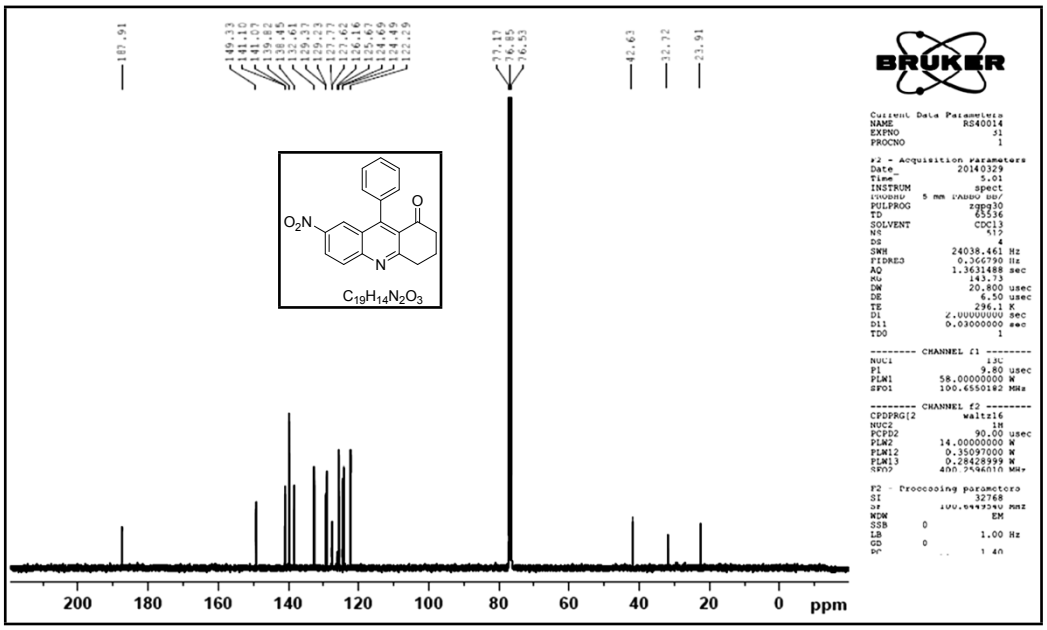


Fig. 54: GC-MS of 7-nitro-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3r**

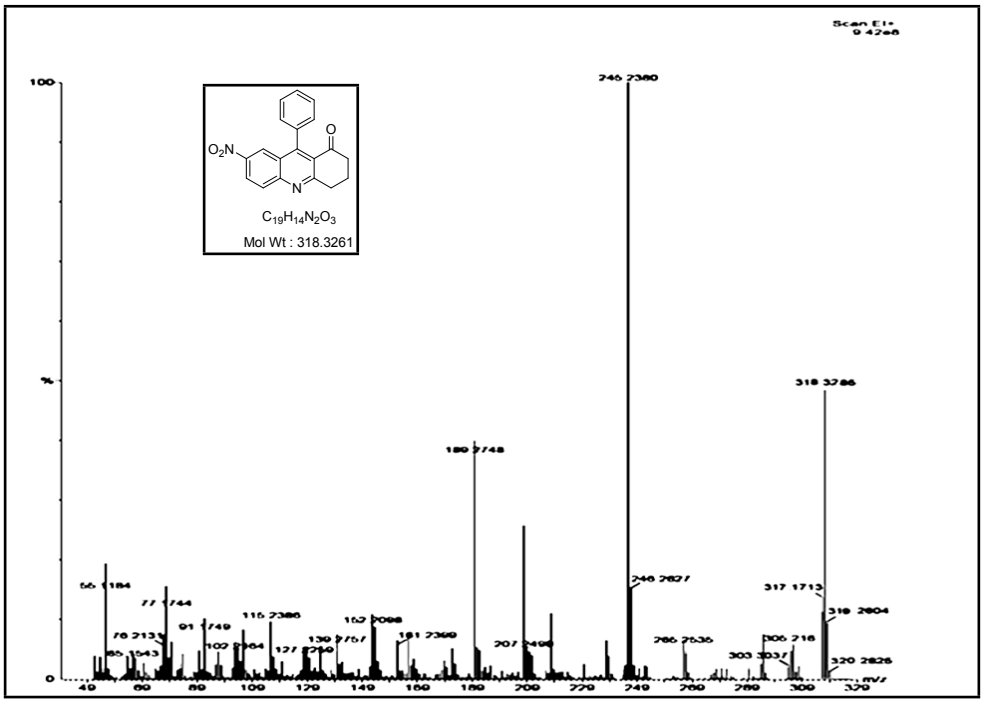


Fig. 55: ^{1}H NMR spectrum of 3,3-dimethyl-7-nitro-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3s**

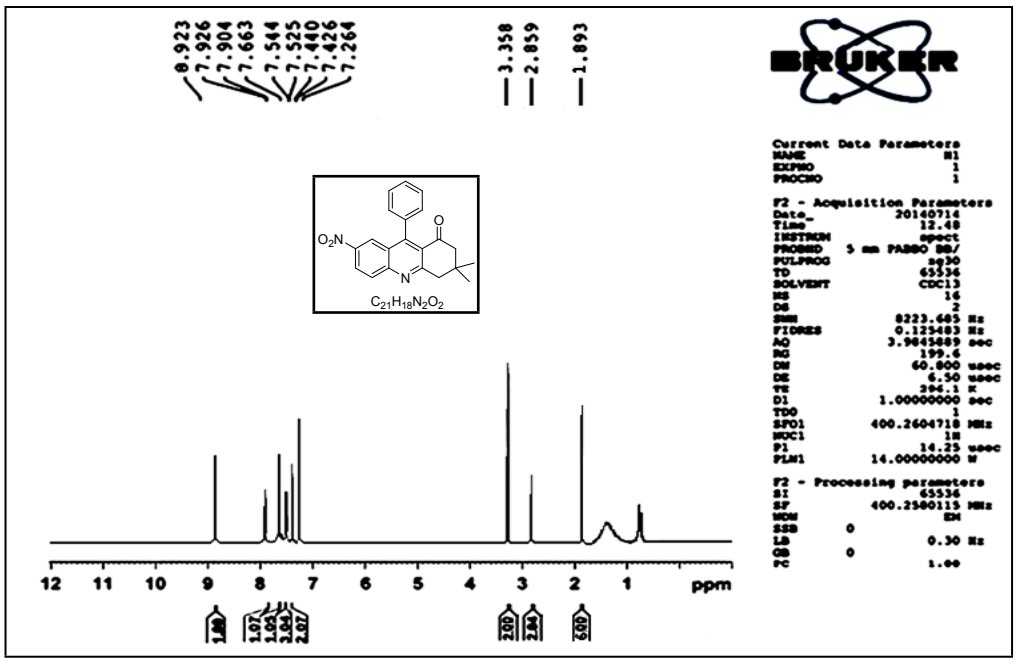


Fig. 56: ^{13}C NMR spectrum of ^{1}H NMR spectrum of 3,3-dimethyl-7-nitro-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3s**

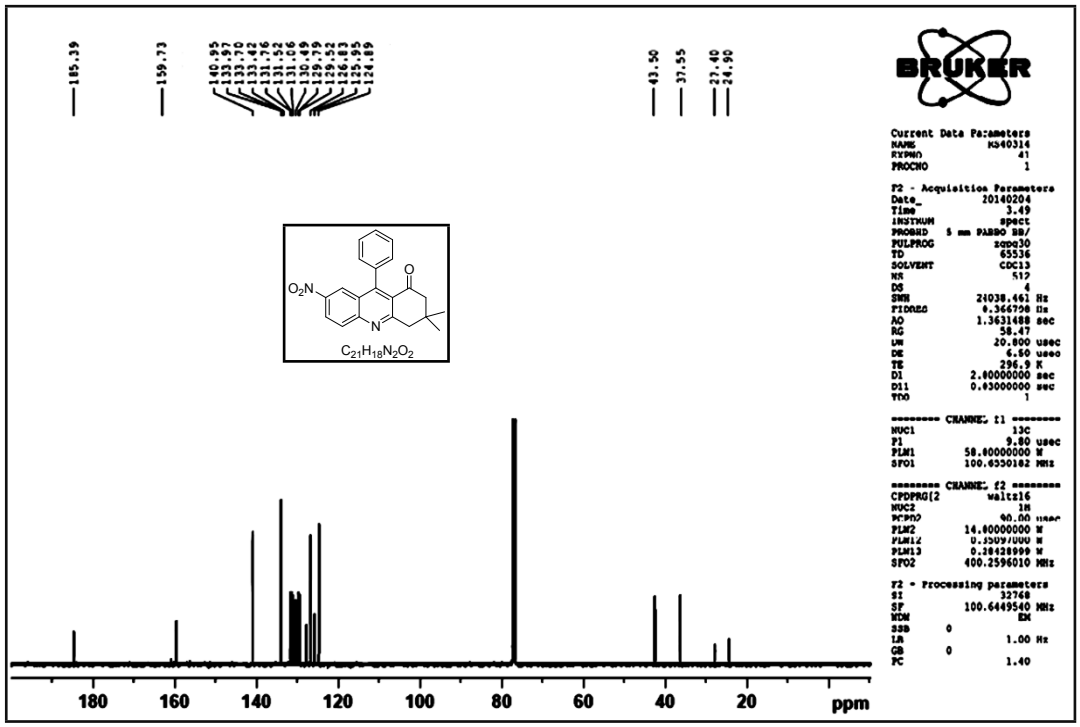


Fig. 57: GC-MS of ^{1}H NMR spectrum of 3,3-dimethyl-7-nitro-9-phenyl-3,4-dihydroacridin-1(2*H*)-one, **3s**