

Supporting information for:

**Design, Synthesis and Antifungal Activities of a Novel Carboxylic
Acid Amides Fungicide: Substituted N-Benzhydryl Valinamide
Carbamates**

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(3,4-dimethoxy phenyl)(phenyl)methanone 4a. white solid, mp 85 - 87 °C. [ref: 88 - 90 °C].¹

(3,4-dimethoxy phenyl)(4-fluorophenyl)methanone 4b. white solid, mp 115 - 117 °C. [ref: 117.5 - 119.5 °C].²

(3,4-dimethoxy phenyl)(4-chlorophenyl)methanone 4c. white solid, mp 105 - 107 °C. [ref: 111 - 112 °C].³

(3,4-dimethoxy phenyl)(4-bromophenyl)methanone 4d. white solid, mp 115 - 117 °C. [ref: 121 - 122 °C].⁴

(3,4-dimethoxy phenyl)(4-methylphenyl)methanone 4e. white solid, mp 108 - 110 °C. [ref: 105 - 107 °C].⁵

(3,4-dimethoxy phenyl)(4-tert-Butylphenyl)methanone 4f was commercial reagents (J&K).

(3,4-dimethoxy phenyl)(4-methoxy phenyl)methanone 4g. white solid, mp 98 - 100 °C. [ref: 98.3 - 99.2 °C].⁶

(3-methoxy-4-ethoxy phenyl)(phenyl)methanol 3h. white solid, mp 108 - 110 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.34 - 7.15 (m, 5H, Ph-H), 6.85 (d, *J* = 1.8 Hz, 1H, Ph-H), 6.76 (dt, *J* = 15.2, 5.0 Hz, 2H, Ph-H), 5.71 (s, 1H, Ph-CH-Ph), 4.00 (q, *J* = 7.0 Hz, 2H, CH₃CH₂O), 3.76 (s, 3H, CH₃O), 1.37 (t, *J* = 7.0 Hz, 3H, CH₃CH₂O).

(3-methoxy-4-ethoxy phenyl)(4-fluorophenyl)methanol 3i. white solid, mp 95 - 96 °C. ¹H NMR (300 MHz, CDCl₃) δ 7.34 (dd, *J* = 8.4, 5.6 Hz, 2H, Ph-H), 7.02 (t, *J* = 8.7 Hz, 2H, Ph-H), 6.89 (s, 1H, Ph-H), 6.83 (s, 2H, Ph-H), 5.78 (s, 1H, Ph-H-Ph), 4.08 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.84 (s, 3H, OCH₃), 1.45 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₇FO₃ ([M + H]): 276.1054; Found: 276.1162.

(3-methoxy-4-ethoxy phenyl)(4-chlorophenyl)methanol 3j. white solid, mp 88 - 90 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.29 (s, 4H, Ph-H), 6.85 (s, 1H, Ph-H), 6.80 (d, *J* = 0.4 Hz, 2H, Ph-H), 5.72 (s, 1H, Ph-H-Ph), 4.07 (dd, *J* = 14.0, 7.0 Hz, 2H, OCH₂CH₃), 3.81 (s, 3H, OCH₃), 1.44 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₇ClO₃ ([M + H]): 292.1582; Found: 292.0866.

(3-methoxy-4-ethoxy phenyl)(4-methylphenyl)methanol 3k. white solid, mp 92 - 94 °C. ¹H NMR (300 MHz, CDCl₃) δ 7.35 - 7.24 (m, 2H, Ph-H), 7.17 (d, *J* = 7.9 Hz, 2H, Ph-H), 6.95 (s, 1H, Ph-H), 6.90 - 6.80 (m, 2H, Ph-H), 5.79 (s, 1H, Ph-H-Ph), 4.10 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.86 (s, 3H, OCH₃), 2.36 (s, 3H, Ph-CH₃), 1.47 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₇H₂₀O₃ ([M + H]): 272.1304; Found: 272.1412.

(3-methoxy-4-propargyl phenyl)(4-methylphenyl)methanol 3l. yellow oil. ¹H NMR (400 MHz, CDCl₃) δ 7.40 - 7.23 (m, 2H, Ph-H), 7.17 (t, *J* = 7.5 Hz, 2H, Ph-H), 7.07 - 6.83 (m, 3H, Ph-H), 5.58 (d, *J* = 177.9 Hz, 1H, Ph-H-Ph), 4.77 (d, *J* = 2.1 Hz, 2H, CHCH₂O), 3.97 - 3.73 (m, 3H, OCH₃), 2.53 (d, *J* = 2.4 Hz, 1H, CHCH₂O), 2.37 (s, 3H, Ph-CH₃).

(3-methoxy-4-benzyloxy phenyl)(4-fluorophenyl)methanol 3m.⁷ white solid, mp 92 - 94 °C.

(3-methoxy-4-benzyloxy phenyl)(4-chlorophenyl)methanol 3n. white solid, mp 81 - 83 °C. [ref: 82 - 85 °C].⁸

(3-methoxy-4-benzyloxy phenyl)(4-bromophenyl)methanol 3o. white solid, mp 91 - 93 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.42 (d, *J* = 7.1 Hz, 2H, Ph-H), 7.36 (t, *J* = 7.3 Hz, 2H, Ph-H), 7.30 (s, 5H, Ph-H), 6.90 (d, *J* = 1.6 Hz, 1H, Ph-H), 6.83 (d, *J* = 8.2 Hz, 1H, Ph-H), 6.77 (dd, *J* = 8.3, 1.6 Hz, 1H, Ph-H), 5.75 (d, *J* = 3.1 Hz, 1H, Ph-H-Ph), 5.14 (s, 2H, Ph-CH₂O), 3.85 (s, 3H, OCH₃).

(3-methoxy-4-benzyloxy phenyl)(4-methylphenyl)methanol 3p. white solid, mp 100 - 102 °C. [ref: 101 - 103 °C].⁹

(3-ethoxy-4-methoxy phenyl)(phenyl)methanol 3q. white solid, mp 101 - 104 °C. ¹H NMR (400

MHz, CDCl₃) δ 7.41 – 7.22 (m, 5H, Ph-H), 6.96 – 6.76 (m, 3H, Ph-H), 5.78 (s, 1H, Ph-H-Ph), 4.06 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.85 (s, 3H, OCH₃), 1.43 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃).

(3-ethoxyl-4-methoxyl phenyl)(4-fluorophenyl)methanol 3r. white solid, mp 96 - 98 °C. ¹H NMR (300 MHz, CDCl₃) δ 7.34 (dd, *J* = 8.4, 5.6 Hz, 2H, Ph-H), 7.02 (t, *J* = 8.7 Hz, 2H, Ph-H), 6.89 (s, 1H, Ph-H), 6.83 (s, 2H, Ph-H), 5.78 (s, 1H, Ph-H-Ph), 4.08 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.84 (s, 3H, OCH₃), 1.45 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃).

(3-ethoxyl-4-methoxyl phenyl)(4-chlorophenyl)methanol 3s. white solid, mp 97 - 99 °C. ¹H NMR (300 MHz, CDCl₃) δ 7.35 – 7.13 (m, 4H, Ph-H), 6.78 (d, *J* = 7.8 Hz, 3H, Ph-H), 5.23 (s, 1H, Ph-H-Ph), 3.95 (q, *J* = 6.9 Hz, 2H, OCH₂CH₃), 3.82 (d, *J* = 3.9 Hz, 3H, OCH₃), 1.42 – 1.30 (m, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₇ClO₃ ([M + Na]): 292.0758; Found: 292.0866.

(3-ethoxyl-4-methoxyl phenyl)(4-bromophenyl)methanol 3t. white solid, mp 102 - 104 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.43 (dd, *J* = 10.4, 8.5 Hz, 2H, Ph-H), 7.22 (dd, *J* = 17.8, 10.0 Hz, 2H, Ph-H), 6.82 (d, *J* = 10.8 Hz, 3H, Ph-H), 5.26 (s, 1H, Ph-H-Ph), 4.11 – 3.91 (m, 2H, OCH₂CH₃), 3.86 (d, *J* = 5.1 Hz, 3H, OCH₃), 1.41 (t, *J* = 6.9 Hz, 3H, OCH₂CH₃).

(3-ethoxyl-4-methoxyl phenyl)(4-methylphenyl)methanol 3u. white solid, mp 82 - 84 °C. ¹H NMR (300 MHz, CDCl₃) δ 7.35 – 7.24 (m, 2H, Ph-H), 7.17 (d, *J* = 7.9 Hz, 2H, Ph-H), 6.95 (s, 1H, Ph-H), 6.90 – 6.80 (m, 2H, Ph-H), 5.79 (s, 1H, Ph-H-Ph), 4.10 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.86 (s, 3H, OCH₃), 2.36 (s, 3H, Ph-CH₃), 1.47 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₂₀O₃ ([M + H]): 272.1331; Found: 272.1412.

(3-benzyloxy-4-methoxyl phenyl)(4-methylphenyl)methanol 3v. white solid, mp 112 - 114 °C. ¹H NMR (300 MHz, CDCl₃) δ 7.42 – 7.20 (m, 5H, Ph-H), 7.17 (d, *J* = 6.1 Hz, 2H, Ph-H), 7.07 (d, *J* = 8.0 Hz, 2H, Ph-H), 6.88 (s, 1H, Ph-H), 6.79 – 6.67 (m, 2H, Ph-H), 5.68 (s, 1H, Ph-H-Ph), 5.06 (s, 2H, Ph-CH₂), 3.78 (s, 3H, OCH₃), 2.26 (s, 3H, Ph-CH₃). HRMS calcd for C₂₂H₂₂O₃ ([M + Na]): 334.1587; Found: 334.1569.

(3-methoxyl-4-ethoxyl phenyl)(phenyl)methanone 4h. white solid, mp 100 - 102 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.76 (dd, *J* = 8.2, 1.3 Hz, 2H, Ph-H), 7.63 – 7.53 (m, 1H, Ph-H), 7.48 (dd, *J* = 13.5, 4.7 Hz, 3H, Ph-H), 7.36 (dd, *J* = 8.3, 2.0 Hz, 1H, Ph-H), 6.88 (d, *J* = 8.4 Hz, 1H, Ph-H), 4.19 (q, *J* = 7.0 Hz, 2H, CH₃CH₂O), 3.94 (s, 3H, CH₃O), 1.52 (t, *J* = 7.0 Hz, 3H, CH₃CH₂O).

(3-methoxyl-4-ethoxyl phenyl)(4-fluorophenyl)methanone 4i. white solid, mp 92 - 94 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.80 (dd, *J* = 8.4, 5.6 Hz, 2H, Ph-H), 7.46 (d, *J* = 1.5 Hz, 1H, Ph-H), 7.32 (dd, *J* = 8.3, 1.6 Hz, 1H, Ph-H), 7.15 (t, *J* = 8.5 Hz, 2H, Ph-H), 6.88 (d, *J* = 8.4 Hz, 1H, Ph-H), 4.19 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.93 (s, 3H, OCH₃), 1.52 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₅FO₃ ([M + H]): 274.1084; Found: 274.1005.

(3-methoxyl-4-ethoxyl phenyl)(4-chlorophenyl)methanone 4j. white solid, mp 117 - 119 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.71 (d, *J* = 8.4 Hz, 2H, Ph-H), 7.48 – 7.43 (m, 3H, Ph-H), 7.32 (dd, *J* = 8.3, 2.0 Hz, 1H, Ph-H), 6.88 (d, *J* = 8.4 Hz, 1H, Ph-H), 4.19 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.94 (s, 3H, OCH₃), 1.52 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₅ClO₃ ([M + H]): 290.0784; Found: 290.0710.

(3-methoxyl-4-ethoxyl phenyl)(4-methylphenyl)methanone 4k. white solid, mp 78 - 80 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.68 (d, *J* = 8.1 Hz, 2H, Ph-H), 7.47 (d, *J* = 1.9 Hz, 1H, Ph-H), 7.35 (dd, *J* = 8.3, 2.0 Hz, 1H, Ph-H), 7.28 (d, *J* = 8.1 Hz, 2H, Ph-H), 6.88 (d, *J* = 8.4 Hz, 1H, Ph-H), 4.19 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.93 (s, 3H, OCH₃), 2.44 (s, 3H, Ph-CH₃), 1.52 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₇H₁₈O₃ ([M + H]): 270.1334; Found: 270.1256.

(3-methoxyl-4-benzyloxy phenyl)(4-fluorophenyl)methanone 4m. white solid, mp 98 - 100 °C.

[ref: 99 - 101 °C].⁷

(3-methoxy-4-benzyloxy phenyl)(4-chlorophenyl)methanone 4n. white solid, mp 103 - 104 °C.
[ref: 106 - 108 °C].⁷

(3-methoxy-4-benzyloxy phenyl)(4-methylphenyl)methanone 4p. white solid, mp 72 - 74 °C.
[ref: 70 - 72 °C].⁹

(3-ethoxy-4-methoxy phenyl)(phenyl)methanone 4q. white solid, mp 118 - 120 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.80 – 7.70 (m, 2H, Ph-H), 7.57 (t, *J* = 7.4 Hz, 1H, Ph-H), 7.48 (dt, *J* = 10.3, 5.0 Hz, 3H, Ph-H), 7.37 (dd, *J* = 8.3, 2.0 Hz, 1H, Ph-H), 6.89 (d, *J* = 8.4 Hz, 1H, Ph-H), 4.17 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.95 (s, 3H, OCH₃), 1.49 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₆O₃ ([M + H]): 256.1177; Found: 256.1099.

(3-ethoxy-4-methoxy phenyl)(4-fluorophenyl)methanone 4r. white solid, mp 123 - 125 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.80 (dd, *J* = 8.7, 5.5 Hz, 2H, Ph-H), 7.44 (d, *J* = 1.8 Hz, 1H, Ph-H), 7.34 (dd, *J* = 8.3, 1.9 Hz, 1H, Ph-H), 7.15 (t, *J* = 8.6 Hz, 2H, Ph-H), 6.90 (d, *J* = 8.4 Hz, 1H, Ph-H), 4.16 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.96 (s, 3H, OCH₃), 1.50 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₅FO₃ ([M + H]): 274.1083; Found: 274.1005.

(3-ethoxy-4-methoxy phenyl)(4-chlorophenyl)methanone 4s. white solid, mp 110 - 111 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.75 – 7.64 (m, 2H, Ph-H), 7.51 – 7.41 (m, 3H, Ph-H), 7.32 (dd, *J* = 8.3, 2.0 Hz, 1H, Ph-H), 6.88 (d, *J* = 8.4 Hz, 1H, Ph-H), 4.19 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.93 (s, 3H, OCH₃), 1.52 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₅ClO₃ ([M + H]): 290.0787; Found: 290.0710.

(3-ethoxy-4-methoxy phenyl)(4-bromophenyl)methanone 4t. white solid, mp 123 - 124 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.63 (d, *J* = 1.7 Hz, 4H, Ph-H), 7.44 (d, *J* = 2.0 Hz, 1H, Ph-H), 7.33 (dd, *J* = 8.3, 2.0 Hz, 1H, Ph-H), 6.89 (d, *J* = 8.4 Hz, 1H, Ph-H), 4.16 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.96 (s, 3H, OCH₃), 1.50 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₅BrO₃ ([M + H]): 334.0277; Found: 334.0205.

(3-ethoxy-4-methoxy phenyl)(4-methylphenyl)methanone 4u. white solid, mp 113 - 115 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.68 (d, *J* = 7.5 Hz, 2H, Ph-H), 7.40 – 7.34 (m, 2H, Ph-H), 7.28 (m, 1H, Ph-H), 7.15 (d, *J* = 7.1 Hz, 1H, Ph-H), 6.89 (d, *J* = 8.3 Hz, 1H, Ph-H), 4.24 – 4.10 (m, 2H, OCH₂CH₃), 3.95 (s, 3H, OCH₃), 2.44 (s, 3H, Ph-CH₃), 1.49 (t, *J* = 6.6 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₇H₁₈O₃ ([M + H]): 270.1334; Found: 270.1256.

(3-benzyloxy-4-methoxy phenyl)(4-methylphenyl)methanone 4v. white solid, mp 114 - 115 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.51 (d, *J* = 8.1 Hz, 2H, Ph-H), 7.39 – 7.21 (m, 7H, Ph-H), 7.14 (d, *J* = 7.9 Hz, 2H, Ph-H), 6.83 (d, *J* = 8.4 Hz, 1H, Ph-H), 5.09 (s, 2H, Ph-CH₂O), 3.87 (s, 3H, OCH₃), 2.34 (s, 3H, Ph-CH₃). HRMS calcd for C₂₂H₂₀O₃ ([M + H]): 332.1489; Found: 332.1412.
Compounds **5a-5g** were prepared according to published procedures.^{10, 11}

(3-methoxy-4-ethoxy phenyl)(phenyl)methanone oxime 5h. yellow oil. ¹H NMR (400 MHz, CDCl₃) δ 7.55 – 7.29 (m, 5H, Ph-H), 7.22 – 6.89 (m, 2H, Ph-H), 6.78 (dd, *J* = 14.1, 5.1 Hz, 1H, Ph-H), 4.14 (dd, *J* = 15.2, 8.5 Hz, 2H, CH₃CH₂O), 3.84 (s, 3H, CH₃O), 1.51 – 1.45 (m, 3H, CH₃CH₂O).

(3-methoxy-4-ethoxy phenyl)(4-fluorophenyl)methanone oxime 5i. yellow oil. ¹H NMR (400 MHz, CDCl₃) δ 7.44 (ddd, *J* = 19.4, 8.7, 5.5 Hz, 2H, Ph-H), 7.20 – 7.09 (m, 2H, Ph-H), 6.99 (ddd, *J* = 20.8, 11.1, 5.9 Hz, 2H, Ph-H), 6.78 (s, 1H, Ph-H), 4.13 (dd, *J* = 20.6, 7.0 Hz, 2H, OCH₂CH₃), 3.84 (d, *J* = 2.6 Hz, 3H, OCH₃), 1.48 (dd, *J* = 18.5, 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₆FNO₃ ([M + K]): 289.1114; Found: 289.1667.

(3-methoxy-4-ethoxy phenyl)(4-chlorophenyl)methanone oxime 5j. white solid, mp 107 - 109 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.43 (t, *J* = 6.6 Hz, 2H, Ph-H), 7.33 (dd, *J* = 13.2, 8.1 Hz, 2H, Ph-H), 7.21 (s, 1H, Ph-H), 6.96 (d, *J* = 19.0 Hz, 1H, Ph-H), 6.78 (s, 1H, Ph-H), 4.13 (dd, *J* = 19.8, 6.8 Hz, 2H, OCH₂CH₃), 3.85 (d, *J* = 9.5 Hz, 3H, OCH₃), 1.75 – 1.22 (m, 3H, OCH₂CH₃). HRMS calcd for C₂₂H₂₀O₃ ([M + K]): 289.1114; Found: 289.1667. HRMS calcd for C₁₆H₁₆ClNO₃ ([M + H]): 305.0785; Found: 305.0819.

(3-methoxy-4-ethoxy phenyl)(4-methylphenyl)methanone oxime 5k. white solid, mp 87 - 89 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.29 (ddd, *J* = 25.4, 22.1, 4.9 Hz, 4H, Ph-H), 7.14 (d, *J* = 8.0 Hz, 1H, Ph-H), 6.96 (dd, *J* = 12.0, 10.3 Hz, 1H, Ph-H), 6.80 (dt, *J* = 21.7, 5.2 Hz, 1H, Ph-H), 4.13 (dd, *J* = 22.3, 7.0 Hz, 2H, OCH₂CH₃), 3.84 (d, *J* = 5.6 Hz, 3H, OCH₃), 2.41 (s, 1H), 1.51 – 1.45 (m, 3H, OCH₂CH₃). HRMS calcd for C₁₇H₁₉NO₃ ([M + H]): 285.1442; Found: 285.1365.

(3-methoxy-4-benzyloxy phenyl)(4-methylphenyl)methanone oxime 5p. white solid, mp 92 - 94 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.45 – 7.25 (m, 5H, Ph-H), 7.14 (d, *J* = 5.2 Hz, 1H, Ph-H), 7.04 (d, *J* = 3.6 Hz, 1H, Ph-H), 7.01 – 6.94 (m, 1H, Ph-H), 5.13 (s, 2H, Ph-CH₂O), 3.93 (dd, *J* = 17.8, 3.4 Hz, 3H, OCH₃), 2.42 (dd, *J* = 23.3, 3.2 Hz, 3H, Ph-CH₃).

(3-ethoxy-4-methoxy phenyl)(phenyl)methanone oxime 5q. white solid, mp 128 - 130 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.51 – 7.29 (m, 5H, Ph-H), 7.21 (s, 1H, Ph-H), 7.04 – 6.91 (m, 1H, Ph-H), 6.81 (dt, *J* = 21.9, 5.1 Hz, 1H, Ph-H), 4.07 (dd, *J* = 7.0, 3.6 Hz, 2H, OCH₂CH₃), 3.90 (d, *J* = 20.0 Hz, 3H, OCH₃), 1.44 (td, *J* = 6.9, 1.4 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₇NO₃ ([M + H]): 271.1177; Found: 271.1208.

(3-ethoxy-4-methoxy phenyl)(4-fluorophenyl)methanone 5r. white solid, mp 86 - 88 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.87 – 7.70 (m, 2H, Ph-H), 7.48 – 7.41 (m, 2H, Ph-H), 7.34 (dd, *J* = 8.3, 2.0 Hz, 1H, Ph-H), 7.16 (s, 1H, Ph-H), 6.89 (s, 1H, Ph-H), 4.17 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.96 (s, 3H, OCH₃), 1.43 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₆FNO₃ ([M + H]): 289.1177; Found: 289.1114.

(3-ethoxy-4-methoxy phenyl)(4-chlorophenyl)methanone oxime 5s. yellow oil. ¹H NMR (400 MHz, CDCl₃) δ 7.87 – 7.70 (m, 2H, Ph-H), 7.48 – 7.41 (m, 2H, Ph-H), 7.34 (dd, *J* = 8.3, 2.0 Hz, 1H, Ph-H), 7.16 (s, 1H, Ph-H), 6.89 (s, 1H, Ph-H), 4.17 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.96 (s, 3H, OCH₃), 1.43 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₆ClNO₃ ([M + H]): 305.0789; Found: 305.0819.

(3-ethoxy-4-methoxy phenyl)(4-bromophenyl)methanone oxime 5t. white solid, mp 85 - 87 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.53 (dd, *J* = 50.5, 8.4 Hz, 2H, Ph-H), 7.32 (dd, *J* = 26.5, 8.2 Hz, 2H, Ph-H), 7.17 (s, 1H, Ph-H), 7.00 – 6.92 (m, 1H, Ph-H), 6.79 (d, *J* = 2.9 Hz, 1H, Ph-H), 4.12 – 4.01 (m, 2H, OCH₂CH₃), 3.90 (d, *J* = 17.3 Hz, 3H, OCH₃), 1.45 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₆BrNO₃ ([M + K]): 349.0102; Found: 349.0314.

(3-ethoxy-4-methoxy phenyl)(4-methylphenyl)methanone oxime 5u. yellow oil. ¹H NMR (400 MHz, CDCl₃) δ 7.72 (d, *J* = 8.0 Hz, 1H, Ph-H), 7.49 (s, 1H, Ph-H), 7.40 (d, *J* = 8.1 Hz, 1H, Ph-H), 7.30 (d, *J* = 7.6 Hz, 2H, Ph-H), 7.04 – 6.88 (m, 2H, Ph-H), 4.19 (dt, *J* = 9.2, 4.7 Hz, 2H, OCH₂CH₃), 3.97 (d, *J* = 13.1 Hz, 3H, OCH₃), 2.47 (s, 3H, Ph-CH₃), 1.52 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₇H₁₉NO₃ ([M + H]): 285.1441; Found: 285.1365.

(3-benzyloxy-4-methoxy phenyl)(4-methylphenyl)methanone oxime 5v. white solid, mp 120 - 122 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.36 (d, *J* = 10.7 Hz, 2H, Ph-H), 7.33 (d, *J* = 7.2 Hz, 3H, Ph-H), 7.25 (d, *J* = 7.3 Hz, 4H, Ph-H), 7.12 (d, *J* = 7.1 Hz, 1H, Ph-H), 7.04 (s, 1H, Ph-H), 6.95 (d, *J* = 8.6 Hz, 1H, Ph-H), 5.10 (s, 2H, OCH₂-Ph), 3.91 (d, *J* = 17.1 Hz, 3H, OCH₃), 2.41 (t, *J* = 13.8

Hz, 3H, Ph-CH₃). HRMS calcd for C₂₂H₂₁NO₂ ([M + H]): 347.1599; Found: 347.1521.

Compounds **6a-6g** were prepared according to published procedures.^{10, 11}

(3-methoxy-4-ethoxy phenyl)(phenyl)methanamine 6h. yellow oil. ¹H NMR (400 MHz, CDCl₃) δ 7.37 (d, *J* = 7.2 Hz, 2H, Ph-H), 7.31 (t, *J* = 7.5 Hz, 2H, Ph-H), 7.23 (d, *J* = 7.1 Hz, 1H, Ph-H), 6.93 (d, *J* = 1.8 Hz, 1H, Ph-H), 6.87 (dd, *J* = 8.2, 1.9 Hz, 1H, Ph-H), 6.80 (d, *J* = 8.2 Hz, 1H, Ph-H), 5.16 (s, 1H, Ph-CH-Ph), 4.07 (q, *J* = 7.0 Hz, 2H, CH₂CH₃O), 3.83 (s, 3H, CH₃O), 1.52 – 1.36 (m, 3H, CH₃CH₂O).

(3-methoxy-4-ethoxy phenyl)(4-fluorophenyl)methanamine 6i. yellow oil. ¹H NMR (400 MHz, CDCl₃) δ 7.40 – 7.28 (m, 2H, Ph-H), 6.98 (t, *J* = 8.4 Hz, 2H, Ph-H), 6.93 – 6.74 (m, 3H, Ph-H), 5.14 (s, 1H, CHNH), 4.06 (dd, *J* = 13.6, 6.7 Hz, 2H, OCH₂CH₃), 3.83 (s, 3H, OCH₃), 1.44 (t, *J* = 6.8 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₈FNO₃ ([M + H]): 275.1137; Found: 275.1322.

(3-methoxy-4-ethoxy phenyl)(4-chlorophenyl)methanamine 6j. white solid, mp 36 - 38 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.32 (dt, *J* = 13.5, 6.6 Hz, 4H, Ph-H), 6.93 – 6.80 (m, 3H, Ph-H), 5.19 (s, 1H, CHNH), 4.14 – 4.04 (m, 2H, OCH₂CH₃), 3.86 (s, 3H, OCH₃), 1.47 (t, *J* = 6.8 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₈ClNO₂ ([M + H]): 291.1010; Found: 291.1026.

(3-methoxy-4-ethoxy phenyl)(4-methylphenyl)methanamine 6k. yellow oil. ¹H NMR (400 MHz, CDCl₃) δ 7.25 (d, *J* = 8.8 Hz, 2H, Ph-H), 7.12 (d, *J* = 7.9 Hz, 2H, Ph-H), 6.93 (d, *J* = 1.9 Hz, 1H, Ph-H), 6.86 (dd, *J* = 8.2, 1.9 Hz, 1H, Ph-H), 6.80 (d, *J* = 8.2 Hz, 1H, Ph-H), 5.13 (s, 1H, CHNH), 4.06 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.84 (s, 3H, OCH₃), 2.32 (s, 3H, Ph-CH₃), 1.44 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₇H₂₁NO₂ ([M + H]): 271.1385; Found: 271.1572.

(3-methoxy-4-benzyloxy phenyl)(4-methylphenyl)methanamine 6p. yellow solid. Mp 69 - 72 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.48 – 7.27 (m, 5H, Ph-H), 7.17 (d, *J* = 7.9 Hz, 2H, Ph-H), 7.09 (d, *J* = 7.8 Hz, 2H, Ph-H), 6.96 – 6.89 (m, 2H, Ph-H), 6.82 (d, *J* = 8.2 Hz, 1H, Ph-H), 5.11 (s, 2H, Ph-CH₂O), 5.08 (s, 1H, CHNH), 3.85 (s, 3H, OCH₃), 2.32 (s, 3H, Ph-CH₃).

(3-ethoxy-4-methoxy phenyl)(phenyl)methanamine 6q. yellow oil. ¹H NMR (400 MHz, CDCl₃) δ 7.40 – 7.19 (m, 5H, Ph-H), 6.96 – 6.86 (m, 2H, Ph-H), 6.81 (d, *J* = 8.1 Hz, 1H, Ph-H), 5.16 (s, 1H, CHNH), 4.06 (dd, *J* = 13.5, 6.6 Hz, 2H, OCH₂CH₃), 3.84 (s, 3H, OCH₃), 1.42 (t, *J* = 6.5 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₉FNO₂ ([M + H]): 257.1208; Found: 257.1416.

(3-ethoxy-4-methoxy phenyl)(4-fluorophenyl)methanamine 6r. yellow oil, ¹H NMR (400 MHz, CDCl₃) δ 7.33 (dd, *J* = 8.5, 5.6 Hz, 2H, Ph-H), 6.98 (t, *J* = 8.7 Hz, 2H, Ph-H), 6.89 – 6.84 (m, 2H, Ph-H), 6.81 (d, *J* = 8.1 Hz, 1H, Ph-H), 5.14 (s, 1H, CHNH), 4.05 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.84 (s, 3H, OCH₃), 1.42 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₈FNO₂ ([M + H]): 275.1133; Found: 275.1322.

(3-ethoxy-4-methoxy phenyl)(4-chlorophenyl)methanamine 6s. yellow oil. ¹H NMR (400 MHz, CDCl₃) δ 7.32 (d, *J* = 8.6 Hz, 2H, Ph-H), 7.29 – 7.25 (m, 2H, Ph-H), 6.88 (d, *J* = 1.8 Hz, 1H, Ph-H), 6.87 – 6.83 (m, 1H, Ph-H), 6.81 (dd, *J* = 8.0, 3.1 Hz, 1H, Ph-H), 5.14 (s, 1H, CHNH), 4.07 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.83 (s, 3H, OCH₃), 1.44 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₈ClNO₂ ([M + H]): 291.0838; Found: 291.1026.

(3-ethoxy-4-methoxy phenyl)(4-bromophenyl)methanamine 6t. yellow oil. ¹H NMR (400 MHz, CDCl₃) δ 7.44 (d, *J* = 7.7 Hz, 2H, Ph-H), 7.28 (d, *J* = 7.8 Hz, 2H, Ph-H), 6.91 (t, *J* = 14.9 Hz, 2H, Ph-H), 6.83 (d, *J* = 7.9 Hz, 1H, Ph-H), 5.14 (s, 1H, CHNH), 4.08 (dd, *J* = 13.2, 6.4 Hz, 2H, OCH₂CH₃), 3.86 (s, 3H, OCH₃), 1.45 (t, *J* = 6.2 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₈BrNO₂ ([M + H]): 319.0329; Found: 319.0521.

(3-ethoxy-4-methoxy phenyl)(4-methylphenyl)methanamine 6u. yellow oil. ¹H NMR (400

MHz, CDCl₃) δ 7.28 – 7.21 (m, 2H, Ph-H), 7.11 (d, *J* = 7.8 Hz, 2H, Ph-H), 6.93 (s, 1H, Ph-H), 6.88 (d, *J* = 8.3 Hz, 1H, Ph-H), 6.80 (d, *J* = 8.2 Hz, 1H, Ph-H), 5.13 (s, 1H, CHNH), 4.06 (q, *J* = 7.0 Hz, 2H, OCH₂CH₃), 3.84 (s, 3H, OCH₃), 2.32 (s, 3H, Ph-CH₃), 1.42 (t, *J* = 7.0 Hz, 3H, OCH₂CH₃). HRMS calcd for C₁₆H₁₈ClNO₂ ([M + Na]): 271.1531; Found: 271.1572.

(3-benzyloxy-4-methoxy phenyl)(4-methylphenyl)methanamine 6v. yellow oil, ¹H NMR (400 MHz, CDCl₃) δ 7.40 (d, *J* = 7.1 Hz, 2H, Ph-H), 7.36 – 7.27 (m, 3H, Ph-H), 7.18 (d, *J* = 8.0 Hz, 2H, Ph-H), 7.09 (d, *J* = 7.9 Hz, 2H, Ph-H), 6.95 (d, *J* = 1.7 Hz, 1H, Ph-H), 6.91 (dd, *J* = 8.3, 1.7 Hz, 1H, Ph-H), 6.82 (d, *J* = 8.2 Hz, 1H, Ph-H), 5.11 (s, 2H, Ph-CH₂O), 5.08 (s, 1H, CHNH), 3.85 (s, 3H, OCH₃), 2.32 (s, 3H, Ph-CH₃). HRMS calcd for C₁₆H₁₈FNO₃ ([M + H]): 275.1137; Found: 275.1322. HRMS calcd for C₂₂H₂₃NO₂ ([M + H]): 333.1497; Found: 333.1729.

Isopropyl((2S)-1-(((3,4-dimethoxyphenyl)(phenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9a. white solid, mp 171 - 172 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.48 – 7.05 (m, 5H, Ph-H), 6.92 – 6.56 (m, 3H, Ph-H), 6.18 (d, *J* = 8.0 Hz, 1H, Ph-CHNH), 5.19 (d, *J* = 8.1 Hz, 1H, Ph-CH-Ph), 4.77 (d, *J* = 5.5 Hz, 1H, COCHNH), 4.02 (t, *J* = 7.5 Hz, 1H, (CH₃)₂CHO), 3.81 (dd, *J* = 22.0, 5.7 Hz, 6H, OCH₃), 2.14 (d, *J* = 6.2 Hz, 1H, (CH₃)₂CHCH), 1.25 – 1.08 (m, 6H, (CH₃)₂CHO), 1.01 – 0.80 (m, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 170.67, 149.08, 148.35, 128.61, 127.49, 127.42, 127.27, 119.46, 111.10, 110.87, 68.69, 56.59, 55.89, 55.82, 30.85, 22.01, 19.40. HRMS calcd for C₂₄H₃₂N₂O₅ ([M + H]): 428.2382; Found: 428.2311.

Isopropyl((2S)-1-(((3,4-dimethoxyphenyl)(4-fluorophenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9b. white solid, mp 169 - 171 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.32 – 7.22 (m, 1H, Ph-H), 7.19 (t, *J* = 6.8 Hz, 1H, Ph-H), 7.16 – 7.07 (m, 2H, Ph-H), 6.93 (t, *J* = 8.6 Hz, 1H, Ph-H), 6.67 (m, 1H, Ph-H), 6.11 (d, *J* = 8.4 Hz, 1H, Ph-H), 5.13 (s, 1H, Ph-CH-Ph), 4.74 (s, 1H, COCHNH), 3.94 (d, *J* = 6.0 Hz, 1H, (CH₃)₂CHO), 3.75 (s, 6H, OCH₃), 2.08 (s, 1H, (CH₃)₂CHCH), 1.30 – 1.03 (m, 6H, (CH₃)₂CHO), 1.01 – 0.72 (m, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 171.03, 156.56, 149.07, 129.08, 128.88, 128.56, 127.45, 127.27, 119.41, 115.49, 115.28, 111.02, 110.83, 68.72, 63.77, 60.45, 55.88, 55.80, 53.52, 30.90, 21.99, 19.37. HRMS calcd for C₂₄H₃₁FN₂O₅ ([M + Na]): 446.2105; Found: 446.2217.

Isopropyl((2S)-1-(((3,4-dimethoxyphenyl)(4-chlorophenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9c. white solid, mp 182 - 184 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.45 – 7.22 (m, 2H, Ar-H), 7.16 (d, *J* = 7.8 Hz, 2H, Ar-H), 6.79 (dd, *J* = 8.0, 3.5 Hz, 1H, Ar-H), 6.74 – 6.65 (m, 2H, Ar-H), 6.61 (d, *J* = 7.4 Hz, 1H, CHNHCO), 6.14 (d, *J* = 7.8 Hz, 1H, Ar-CHNH), 5.08 (s, 1H, Ar-CH-Ar), 4.91 – 4.76 (m, 1H, COCHNH), 3.97 (dd, *J* = 13.9, 7.0 Hz, 1H, (CH₃)₂CHO), 3.83 (d, *J* = 18.9 Hz, 6H, OCH₃), 3.10 (d, *J* = 6.0 Hz, 1H, (CH₃)₂CHCH), 1.20 (dd, *J* = 12.6, 6.1 Hz, 6H, (CH₃)₂CHO), 0.94 (dd, *J* = 16.5, 6.2 Hz, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 170.84, 155.57, 149.13, 148.51, 139.81, 133.23, 128.79, 128.70, 119.73, 119.50, 111.06, 110.81, 68.73, 60.45, 55.99, 55.89, 55.85, 45.94, 30.83, 22.00, 19.41. HRMS calcd for C₂₄H₃₁ClN₂O₅ ([M + H]): 462.1995; Found: 462.1922.

Isopropyl((2S)-1-(((3,4-dimethoxyphenyl)(4-bromophenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9d. white solid, mp 180 - 182 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.45 – 7.22 (m, 2H, Ph-H), 7.16 (d, *J* = 7.8 Hz, 2H, Ph-H), 6.79 (dd, *J* = 8.0, 3.5 Hz, 1H, Ph-H), 6.74 – 6.65 (m, 2H, Ph-H), 6.61 (d, *J* = 7.4 Hz, 1H, CHNHCO), 6.14 (d, *J* = 7.8 Hz, 1H, Ph-CHNH), 5.08 (s, 1H, Ph-CH-Ph), 4.91 – 4.76 (m, 1H, COCHNH), 3.97 (dd, *J* = 13.9, 7.0 Hz, 1H, (CH₃)₂CHO), 3.83 (d, *J* = 18.9 Hz, 6H, OCH₃), 3.10 (d, *J* = 6.0 Hz, 1H, (CH₃)₂CHCH), 1.20 (dd, *J* = 12.6, 6.1 Hz, 6H, (CH₃)₂CHO), 0.94 (dd, *J* = 16.5, 6.2 Hz, 6H, (CH₃)₂CHCH). ¹³C NMR (101

MHz, CDCl₃) δ 171.04, 156.32, 148.58, 148.29, 140.84, 133.38, 131.45, 129.18, 121.02, 119.69, 112.41, 111.29, 68.45, 64.31, 63.69, 55.92, 53.37, 43.76, 31.08, 22.00, 19.39, 17.93, 14.71. HRMS calcd for C₂₄H₃₁BrN₂O₅ ([M + H]): 506.1483; Found: 506.1416.

Isopropyl((2S)-1-(((3,4-dimethoxyphenyl)(4-methylphenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9e. white solid, mp 184 - 185 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.10 (t, *J* = 7.3 Hz, 4H, Ph-H), 6.76 (dt, *J* = 13.6, 6.4 Hz, 3H, Ph-H), 6.56 (d, *J* = 7.2 Hz, 1H, CHNHCO), 6.14 (d, *J* = 7.4 Hz, 1H, Ph-CHNH), 5.12 (s, 1H, Ph-CH-Ph), 4.85 (d, *J* = 5.5 Hz, 1H, COCHNH), 4.09 – 3.93 (m, 1H, (CH₃)₂CHO), 3.83 (d, *J* = 17.6 Hz, 6H, OCH₃), 2.33 (s, 3H, Ph-CH₃), 2.16 (s, 1H, (CH₃)₂CHCH), 1.22 (t, *J* = 12.3 Hz, 6H, (CH₃)₂CHO), 0.94 (dd, *J* = 18.8, 6.5 Hz, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 170.86, 156.50, 148.97, 148.22, 138.28, 137.14, 134.13, 129.28, 128.53, 127.77, 127.23, 119.39, 110.99, 110.75, 68.69, 63.76, 60.42, 58.74, 56.39, 55.82, 53.48, 43.83, 30.94, 22.02, 21.07, 19.41, 19.08, 18.00, 17.40. HRMS calcd for C₂₅H₃₄N₂O₅ ([M + Na]): 442.2362; Found: 442.2468.

Isopropyl((2S)-1-(((3,4-dimethoxyphenyl)((4-(tert-butyl)phenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9f. white solid, mp 145 - 146 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.40 – 7.21 (m, 2H, Ph-H), 7.12 (d, *J* = 7.9 Hz, 2H, Ph-H), 6.76 (dd, *J* = 17.5, 8.8 Hz, 3H, Ph-H), 6.64 (s, 1H, CHNHCO), 6.15 (d, *J* = 6.7 Hz, 1H, Ph-CHNH), 5.14 (s, 1H, Ph-CH-Ph), 4.84 (s, 1H, COCHNH), 4.00 (s, 1H, (CH₃)₂CHO), 3.83 (s, 6H, OCH₃), 2.17 (s, 1H, (CH₃)₂CHCH), 1.30 (s, 9H, Ph-C(CH₃)₃), 1.19 (d, *J* = 9.0 Hz, 6H, (CH₃)₂CHO), 1.07 – 0.80 (m, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 169.68, 155.38, 149.28, 147.96, 147.17, 137.51, 133.13, 126.12, 124.44, 118.35, 110.00, 67.54, 59.34, 55.18, 54.75, 33.44, 30.28, 20.97, 18.40. HRMS calcd for C₂₈H₄₀N₂O₅ ([M + H]): 484.3006; Found: 484.2937.

Isopropyl((2S)-1-(((3,4-dimethoxy)(4-methoxyphenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9g. white solid, mp 184 - 186 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.10 (d, *J* = 8.4 Hz, 2H, Ph-H), 6.87 (s, 1H, Ph-H), 6.82 (d, *J* = 8.6 Hz, 1H, Ph-H), 6.74 (m, 3H, Ph-H), 6.12 (d, *J* = 7.8 Hz, 1H, Ph-CHNH), 5.24 (d, *J* = 8.5 Hz, 1H, Ph-CH-Ph), 4.72 (s, 1H, COCHNH), 4.04 (d, *J* = 6.5 Hz, 1H, (CH₃)₂CHO), 3.83 (d, *J* = 7.4 Hz, 3H, OCH₃), 3.77 (s, 6H, OCH₃), 2.17 – 2.03 (m, 1H, (CH₃)₂CHCH), 1.16 (dd, *J* = 11.5, 5.6 Hz, 6H, (CH₃)₂CHO), 0.99 – 0.83 (m, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 170.65, 156.41, 149.00, 148.22, 128.66, 128.49, 119.27, 113.94, 111.02, 110.76, 110.64, 68.62, 60.45, 55.87, 55.79, 55.27, 30.96, 22.02, 19.39. HRMS calcd for C₂₅H₃₄N₂O₆ ([M + H]): 458.2482; Found: 458.2417.

isopropyl((2S)-1-(((4-ethoxy-3-methoxyphenyl)(phenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9h. white solid, mp 142 - 144 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.36 – 7.24 (m, 3H, Ph-H), 7.21 (d, *J* = 7.1 Hz, 2H, Ph-H), 6.77 (dd, *J* = 11.6, 8.6 Hz, 2H, Ph-H), 6.69 (d, *J* = 5.8 Hz, 1H, Ph-H), 6.17 (d, *J* = 7.6 Hz, 1H, CHNHCO), 5.17 (d, *J* = 7.7 Hz, 1H, Ph-CHNH), 4.85 (d, *J* = 6.3 Hz, 1H, Ph-CH-Ph), 4.14 – 4.03 (m, 2H, CH₃CH₂O), 4.02 – 3.92 (m, 1H, COCHNH), 3.79 (s, 3H, OCH₃), 3.21 – 2.92 (m, 1H, (CH₃)₂CHO), 2.15 (m, 1H, (CH₃)₂CHCH), 1.44 (t, *J* = 7.0 Hz, 3H, CH₃CH₂O), 1.20 (dd, *J* = 12.7, 6.6 Hz, 6H, (CH₃)₂CHO), 0.93 (dd, *J* = 17.8, 6.3 Hz, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 169.85, 155.42, 147.54, 147.28, 133.05, 127.48, 126.28, 118.75, 118.48, 111.36, 110.29, 67.49, 63.18, 59.28, 54.89, 44.67, 29.88, 20.98, 18.36, 13.71. HRMS calcd for C₂₅H₃₄N₂O₅ ([M + H]): 442.2540; Found: 442.2468.

Isopropyl((2S)-1-(((4-ethoxy-3-methoxyphenyl)(4-fluorophenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9i. white solid, mp 176 - 177 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.17 (dd, *J* = 8.2, 5.2 Hz, 2H, Ph-H), 6.99 (dd, *J* = 18.0, 9.0 Hz, 2H, Ph-H), 6.78 (dd, *J* = 8.2, 5.5 Hz,

1H, Ph-H), 6.71 (s, 1H, Ph-H), 6.68 – 6.61 (m, 1H, Ph-H), 6.15 (d, $J = 7.8$ Hz, 1H, Ph-CHNH), 5.18 (d, $J = 8.6$ Hz, 1H, Ph-CH-Ph), 4.80 (s, 1H, COCHNH), 4.12 – 4.02 (m, 2H, CH₃CH₂O), 3.99 (dd, $J = 12.7, 7.3$ Hz, 1H, (CH₃)₂CHO), 3.78 (d, $J = 3.2$ Hz, 3H, OCH₃), 2.14 (s, 1H, (CH₃)₂CHCH), 1.44 (td, $J = 6.9, 2.4$ Hz, 3H, CH₃CH₂O), 1.19 (dd, $J = 11.7, 5.7$ Hz, 6H, (CH₃)₂CHO), 0.98 – 0.86 (m, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 170.96, 163.22, 160.78, 156.51, 149.33, 147.75, 129.11, 128.95, 119.37, 115.46, 115.25, 112.40, 111.12, 68.68, 64.28, 60.42, 55.84, 30.98, 21.98, 19.36, 18.16, 14.79. HRMS calcd for C₂₅H₃₃FN₂O₅ ([M + H]): 460.2446; Found: 460.2374.

Isopropyl((2S)-1-(((4-ethoxyl-3-methoxyphenyl)(4-chlorophenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9j. white solid, mp 186 - 187 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.17 (dd, $J = 8.2, 5.2$ Hz, 2H, Ph-H), 6.99 (dd, $J = 18.0, 9.0$ Hz, 2H, Ph-H), 6.78 (dd, $J = 8.2, 5.5$ Hz, 1H, Ph-H), 6.71 (s, 1H, Ph-H), 6.68 – 6.61 (m, 1H, Ph-H), 6.15 (d, $J = 7.8$ Hz, 1H, Ph-CHNH), 5.18 (d, $J = 8.6$ Hz, 1H, Ph-CH-Ph), 4.80 (s, 1H, COCHNH), 4.12 – 4.02 (m, 2H, CH₃CH₂O), 3.99 (dd, $J = 12.7, 7.3$ Hz, 1H, (CH₃)₂CHO), 3.78 (d, $J = 3.2$ Hz, 3H, OCH₃), 2.14 (s, 1H, (CH₃)₂CHCH), 1.44 (td, $J = 6.9, 2.4$ Hz, 3H, CH₃CH₂O), 1.19 (dd, $J = 11.7, 5.7$ Hz, 6H, (CH₃)₂CHO), 0.98 – 0.86 (m, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 170.95, 148.36, 140.33, 133.49, 132.96, 128.72, 128.56, 119.72, 112.30, 111.30, 68.55, 64.29, 63.69, 55.92, 53.39, 43.74, 31.03, 21.99, 19.39, 18.01, 17.83, 14.72. HRMS calcd for C₂₅H₃₃ClN₂O₅ ([M + H]): 476.2150; Found: 476.2078.

Isopropyl((2S)-1-(((4-ethoxyl-3-methoxyphenyl)(4-methylphenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9k. white solid, mp 174 - 176 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.19 – 7.01 (m, 4H, Ph-H), 6.76 (dd, $J = 13.3, 6.0$ Hz, 2H, Ph-H), 6.69 (d, $J = 7.8$ Hz, 1H, Ph-H), 6.13 (d, $J = 7.6$ Hz, 1H, CHNHCO), 5.19 (d, $J = 5.6$ Hz, 1H, Ph-CHNH), 4.78 (s, 1H, Ph-CH-Ph), 4.06 (dd, $J = 12.6, 6.8$ Hz, 2H, COCHNH), 4.02 – 3.97 (m, 1H, (CH₃)₂CHO), 3.78 (d, $J = 4.7$ Hz, 3H, OCH₃), 2.31 (d, $J = 4.9$ Hz, 3H, Ph-CH₃), 2.13 (s, 1H, (CH₃)₂CHCH), 1.43 (td, $J = 6.9, 3.1$ Hz, 3H, CH₃CH₂O), 1.18 (dd, $J = 9.8, 6.0$ Hz, 6H, (CH₃)₂CHO), 0.92 (dd, $J = 17.3, 6.5$ Hz, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 170.76, 156.43, 149.23, 147.54, 137.03, 129.23, 127.44, 127.22, 119.69, 119.33, 112.40, 111.12, 68.55, 64.24, 60.37, 56.24, 55.83, 22.01, 21.08, 19.38, 14.82. HRMS calcd for C₂₆H₃₆N₂O₅ ([M + H]): 456.2695; Found: 456.2624.

Isopropyl((2S)-1-(((3-methoxy-4-(prop-2-yn-1-yloxy)phenyl)(p-tolyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9l. white solid, mp 181 - 182 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.15 – 7.04 (m, 4H, Ph-H), 6.95 (dd, $J = 8.3, 3.2$ Hz, 1H, Ph-H), 6.78 (s, 1H, Ph-H), 6.72 (dd, $J = 8.0, 2.7$ Hz, 1H, Ph-H), 6.13 (d, $J = 7.8$ Hz, 1H, Ph-CH-Ph), 5.15 (d, $J = 8.3$ Hz, 1H, COCHNH), 4.90 – 4.79 (m, 1H, (CH₃)₂CHO), 4.72 (t, $J = 2.2$ Hz, 2H, CH₂CCH), 3.79 (s, 3H, OCH₃), 2.49 (t, $J = 2.1$ Hz, 1H, CH₂CCH), 2.31 (s, 3H, Ar-CH₃), 2.15 (m, 1H, (CH₃)₂CHCH), 1.19 (dd, $J = 11.8, 5.6$ Hz, 6H, (CH₃)₂CHO), 0.97 – 0.86 (m, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 170.85, 156.41, 149.59, 145.95, 137.10, 135.68, 129.25, 127.32, 119.36, 114.04, 111.28, 78.57, 75.87, 68.58, 63.74, 60.31, 55.84, 53.39, 22.01, 21.04, 19.39. HRMS calcd for C₂₇H₃₄N₂O₅ ([M + H]): 466.2535; Found: 466.2468.

Isopropyl((2S)-1-(((4-(benzyloxy)-3-methoxyphenyl)(4-fluorophenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9m. white solid, mp 177 - 179 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.44 (d, $J = 7.1$ Hz, 2H, Ph-H), 7.38 (t, $J = 7.3$ Hz, 2H, Ph-H), 7.35 – 7.24 (m, 2H, Ph-H), 7.19 (dd, $J = 12.1, 5.2$ Hz, 2H, Ph-H), 7.00 (dd, $J = 18.8, 8.7$ Hz, 2H, Ph-H), 6.80 (dd, $J = 17.9, 10.8$ Hz, 2H, Ph-H), 6.63 (s, 1H, CHNHCO), 6.16 (d, $J = 7.7$ Hz, 1H, Ph-CHNH), 5.20 (d, $J = 7.9$

Hz, 1H, Ph-CH-Ph), 5.14 (d, $J = 5.1$ Hz, 2H, OCH₂-Ph), 4.80 (s, 1H, COCHNH), 4.02 (t, $J = 7.4$ Hz, 1H, (CH₃)₂CHO), 3.83 (s, 3H, OCH₃), 2.16 (s, 1H, (CH₃)₂CHCH), 1.20 (dd, $J = 14.9, 5.7$ Hz, 6H, (CH₃)₂CHO), 1.03 – 0.84 (m, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 170.92, 170.87, 160.70, 156.42, 149.66, 147.51, 137.00, 134.36, 134.24, 129.07, 128.55, 127.88, 127.26, 119.59, 115.42, 115.21, 113.72, 111.42, 70.98, 63.73, 55.99, 53.45, 43.83, 30.97, 22.01, 19.40. HRMS calcd for C₃₀H₃₅FN₂O₅ ([M + Na]): 522.2415; Found: 522.2530.

Isopropyl((2S)-1-(((4-(benzyloxy)-3-methoxyphenyl)(4-chlorophenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9n. white solid, mp 193 - 195 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.41 (d, $J = 7.5$ Hz, 2H, Ph-H), 7.35 (t, $J = 7.3$ Hz, 2H, Ph-H), 7.32 – 7.22 (m, 3H, Ph-H), 7.13 (dd, $J = 8.1, 4.4$ Hz, 2H, Ph-H), 6.85 – 6.75 (m, 2H, Ph-H), 6.73 (s, 1H, Ph-H), 6.59 (d, $J = 8.2$ Hz, 1H, CHNHCO), 6.12 (d, $J = 7.3$ Hz, 1H, Ph-CHNH), 5.20 (d, $J = 8.4$ Hz, 1H, Ph-CH-Ph), 5.12 (d, $J = 4.8$ Hz, 2H, OCH₂-Ph), 4.79 (s, 1H, COCHNH), 3.99 (dd, $J = 13.3, 6.6$ Hz, 1H, (CH₃)₂CHO), 3.80 (d, $J = 3.3$ Hz, 3H, OCH₃), 2.13 (s, 1H, (CH₃)₂CHCH), 1.26 – 1.07 (m, 6H, (CH₃)₂CHO), 0.99 – 0.80 (m, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 169.98, 155.48, 148.67, 146.62, 138.65, 135.92, 133.00, 132.17, 127.81, 127.60, 127.53, 126.87, 126.19, 118.36, 112.64, 110.35, 69.90, 67.70, 59.40, 54.90, 20.95, 18.34, 17.12. HRMS calcd for C₃₀H₃₅ClN₂O₅ ([M + H]): 538.2304; Found: 538.2234.

Isopropyl((2S)-1-(((4-(benzyloxy)-3-methoxyphenyl)(4-bromophenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9o. white solid, mp 164 - 165 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.41 (d, $J = 7.5$ Hz, 2H, Ph-H), 7.35 (t, $J = 7.3$ Hz, 2H, Ph-H), 7.32 – 7.22 (m, 3H, Ph-H), 7.13 (dd, $J = 8.1, 4.4$ Hz, 2H, Ph-H), 6.85 – 6.75 (m, 2H, Ph-H), 6.73 (s, 1H, Ph-H), 6.59 (d, $J = 8.2$ Hz, 1H, CHNHCO), 6.12 (d, $J = 7.3$ Hz, 1H, Ph-CHNH), 5.20 (d, $J = 8.4$ Hz, 1H, Ph-CH-Ph), 5.12 (d, $J = 4.8$ Hz, 2H, OCH₂-Ph), 4.79 (s, 1H, COCHNH), 3.99 (dd, $J = 13.3, 6.6$ Hz, 1H, (CH₃)₂CHO), 3.80 (d, $J = 3.3$ Hz, 3H, OCH₃), 2.13 (s, 1H, (CH₃)₂CHCH), 1.26 – 1.07 (m, 6H, (CH₃)₂CHO), 0.99 – 0.80 (m, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 171.06, 156.46, 149.61, 147.44, 136.98, 134.61, 134.03, 131.56, 129.21, 129.10, 128.56, 127.89, 127.27, 113.68, 111.41, 70.97, 63.71, 55.98, 53.37, 43.68, 31.05, 22.02, 19.41. HRMS calcd for C₃₀H₃₅BrN₂O₅ ([M + H]): 582.1796; Found: 582.1729.

Isopropyl((2S)-1-(((4-(benzyloxy)-3-methoxyphenyl)(p-tolyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9p. white solid, mp 168 - 170 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.45 (d, $J = 7.3$ Hz, 1H, Ph-H), 7.38 (t, $J = 7.3$ Hz, 2H, Ph-H), 7.35 – 7.27 (m, 1H, Ph-H), 7.12 (t, $J = 7.3$ Hz, 4H, Ph-H), 6.87 – 6.78 (m, 2H, Ph-H), 6.67 (d, $J = 8.2$ Hz, 2H, Ph-H), 6.16 (d, $J = 7.7$ Hz, 1H, Ph-CH-Ph), 5.15 (d, $J = 2.4$ Hz, 2H, OCH₂-Ph), 4.86 (d, $J = 6.0$ Hz, 1H, COCHNH), 4.01 (d, $J = 7.0$ Hz, 1H, (CH₃)₂CHO), 3.84 (s, 3H, OCH₃), 2.35 (d, $J = 2.7$ Hz, 3H, Ph-CH₃), 2.20 (s, 1H, (CH₃)₂CHCH), 1.22 (d, $J = 6.5$ Hz, 6H, (CH₃)₂CHO), 0.96 (dd, $J = 18.4, 6.5$ Hz, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 169.98, 155.48, 148.67, 146.62, 135.92, 127.81, 127.64, 127.60, 127.53, 126.87, 126.19, 118.36, 112.64, 110.35, 69.92, 69.88, 67.70, 59.40, 54.90, 29.85, 20.95, 18.34. HRMS calcd for C₃₁H₃₈N₂O₅ ([M + Na]): 518.2670; Found: 518.2781.

Isopropyl((2S)-1-(((3-ethoxy-4-methoxyphenyl)(phenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9q. white solid, mp 178 - 180 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.38 – 7.09 (m, 5H, Ph-H), 6.84 – 6.64 (m, 3H, Ph-H), 6.16 (d, $J = 8.0$ Hz, 1H, Ph-CH-Ph), 5.20 (d, $J = 43.2$ Hz, 1H, COCHNH), 4.89 – 4.73 (m, 1H, (CH₃)₂CHO), 3.99 (dd, $J = 14.1, 7.0$ Hz, 2H, CH₃CH₂O), 3.83 (dd, $J = 7.5, 4.2$ Hz, 3H, OCH₃), 2.28 – 1.99 (s, 1H, (CH₃)₂CHCH), 1.51 – 1.32 (m, 3H, CH₃CH₂O), 1.20 (dd, $J = 11.7, 5.3$ Hz, 6H, (CH₃)₂CHO), 0.93 (dd, $J = 16.6, 9.3$ Hz, 6H,

(CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 169.85, 155.42, 147.54, 147.28, 133.05, 127.48, 126.28, 118.75, 118.48, 111.36, 110.29, 67.49, 63.18, 59.28, 54.89, 44.67, 29.88, 20.98, 18.36, 13.71. HRMS calcd for C₂₅H₃₄N₂O₅ ([M + H]): 442.2541; Found: 442.2468.

Isopropyl((2S)-1-(((3-ethoxy-4-methoxyphenyl)(4-fluorophenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9r. white solid, mp 194 - 195 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.32 – 7.22 (d, *J* = 7.5 Hz, 2H, Ph-H), 7.16 (d, *J* = 8.2 Hz, 2H, Ph-H), 6.81 – 6.74 (m, 1H, Ph-H), 6.73 (s, 1H, Ph-H), 6.67 (s, 1H, Ph-H), 6.12 (d, *J* = 7.9 Hz, 1H, CHNHCO), 5.20 (s, 1H, Ph-CHNH), 4.79 (s, 1H, Ph-CH-Ph), 4.18 (s, 1H, COCHNH), 4.04 (dd, *J* = 6.9, 3.9 Hz, 2H, CH₃CH₂O), 3.98 (s, 1H, (CH₃)₂CHO), 3.78 (s, 3H, OCH₃), 2.12 (m, 1H, (CH₃)₂CHCH), 1.42 (t, *J* = 6.8, 3H, CH₃CH₂O), 1.18 (dd, *J* = 9.3, 6.1 Hz, 6H, (CH₃)₂CHO), 0.91 (dd, *J* = 13.0, 5.1 Hz, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 170.91, 163.12, 160.65, 156.39, 148.32, 137.57, 133.78, 129.00, 119.65, 115.15, 112.27, 111.27, 64.26, 63.70, 55.86, 53.39, 43.73, 31.05, 21.98, 19.36, 14.71. HRMS calcd for C₂₅H₃₃FN₂O₅ ([M + H]): 460.2446; Found: 460.2374.

Isopropyl((2S)-1-(((3-ethoxy-4-methoxyphenyl)(4-chlorophenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9s. white solid, mp 176 - 178 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.32 – 7.22 (d, *J* = 7.5 Hz, 2H, Ph-H), 7.16 (d, *J* = 8.2 Hz, 2H, Ph-H), 6.81 – 6.74 (m, 1H, Ph-H), 6.73 (s, 1H, Ph-H), 6.67 (s, 1H, Ph-H), 6.12 (d, *J* = 7.9 Hz, 1H, CHNHCO), 5.20 (s, 1H, Ph-CHNH), 4.79 (s, 1H, Ph-CH-Ph), 4.18 (s, 1H, COCHNH), 4.04 (dd, *J* = 6.9, 3.9 Hz, 2H, CH₃CH₂O), 3.98 (s, 1H, (CH₃)₂CHO), 3.78 (s, 3H, OCH₃), 2.12 (m, 1H, (CH₃)₂CHCH), 1.42 (t, *J* = 6.8, 3H, CH₃CH₂O), 1.18 (dd, *J* = 9.3, 6.1 Hz, 6H, (CH₃)₂CHO), 0.91 (dd, *J* = 13.0, 5.1 Hz, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 171.03, 156.46, 149.31, 147.72, 140.31, 133.45, 133.07, 128.81, 128.58, 119.75, 119.58, 112.37, 64.27, 63.71, 55.92, 53.41, 43.74, 31.04, 21.99, 19.39, 14.77. HRMS calcd for C₂₅H₃₃ClN₂O₅ ([M + H]): 476.2150; Found: 476.2078.

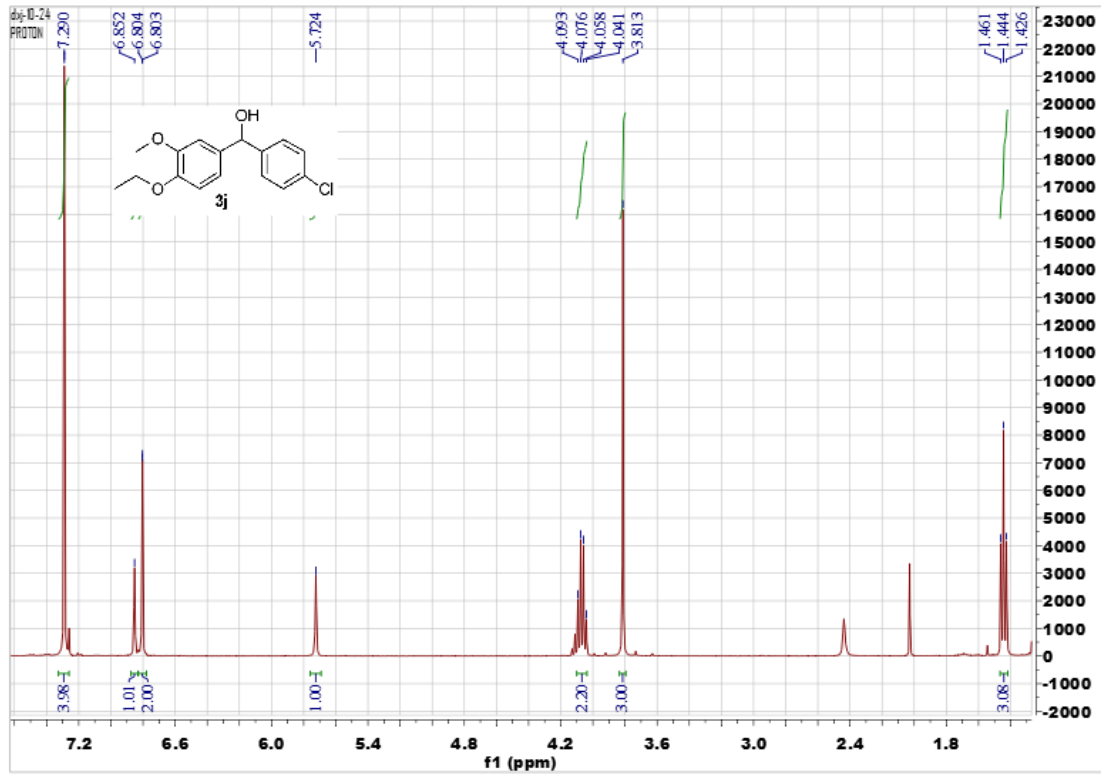
Isopropyl((2S)-1-(((3-ethoxy-4-methoxyphenyl)(4-bromophenyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9t. white solid, mp 190 - 192 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.32 – 7.22 (d, *J* = 7.5 Hz, 2H, Ph-H), 7.16 (d, *J* = 8.2 Hz, 2H, Ph-H), 6.81 – 6.74 (m, 1H, Ph-H), 6.73 (s, 1H, Ph-H), 6.67 (s, 1H, Ph-H), 6.12 (d, *J* = 7.9 Hz, 1H, CHNHCO), 5.20 (s, 1H, Ph-CHNH), 4.79 (s, 1H, Ph-CH-Ph), 4.18 (s, 1H, COCHNH), 4.04 (dd, *J* = 6.9, 3.9 Hz, 2H, CH₃CH₂O), 3.98 (s, 1H, (CH₃)₂CHO), 3.78 (s, 3H, OCH₃), 2.12 (m, 1H, (CH₃)₂CHCH), 1.42 (t, *J* = 6.8, 3H, CH₃CH₂O), 1.18 (dd, *J* = 9.3, 6.1 Hz, 6H, (CH₃)₂CHO), 0.91 (dd, *J* = 13.0, 5.1 Hz, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 171.02, 156.42, 149.04, 140.84, 133.50 (s), 131.52, 129.08, 128.52, 127.31, 121.17, 119.77, 111.00, 68.57, 63.71, 55.90, 53.41, 43.74, 31.06, 21.99, 19.38, 17.91. HRMS calcd for C₂₅H₃₃BrN₂O₅ ([M + H]): 520.1636; Found: 520.1573.

Isopropyl((2S)-1-(((3-ethoxy-4-methoxyphenyl)(p-tolyl)methyl)amino)-3-methyl-1-oxobutan-2-yl)carbamate 9u. white solid, mp 174 - 175 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.11 (d, *J* = 8.6 Hz, 2H, Ph-H), 6.81 (d, *J* = 5.2 Hz, 2H, Ph-H), 6.75 – 6.60 (m, 3H, Ph-H), 6.09 (d, *J* = 6.3 Hz, 1H, Ph-CHNH), 5.17 (s, 1H, Ph-CH-Ph), 4.81 (s, 1H, COCHNH), 3.98 (s, 3H, OCH₃), 3.80 (t, *J* = 7.8 Hz, 2H, CH₃CH₂O), 3.41 (d, *J* = 10.9 Hz, 1H, (CH₃)₂CHO), 2.80 (s, 3H, Ph-CH₃), 2.09 (d, *J* = 32.9 Hz, 1H, (CH₃)₂CHCH), 1.50 – 1.30 (m, 3H, (CH₃)₂CHO), 1.18 (d, *J* = 2.9 Hz, 3H, (CH₃)₂CHO), 1.00 – 0.71 (m, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 170.80, 158.69, 156.32, 148.19, 134.27, 133.84, 128.54, 119.51, 119.39, 113.80, 112.27, 111.22, 63.67, 55.91, 55.22, 53.31, 43.68, 22.00, 19.37, 17.89, 14.73. HRMS calcd for C₂₆H₃₆N₂O₅ ([M + K]): 456.2463; Found: 456.2624.

Isopropyl((2S)-1-(((3-(benzyloxy)-4-methoxyphenyl)(p-tolyl)methyl)amino)-3-methyl-1-

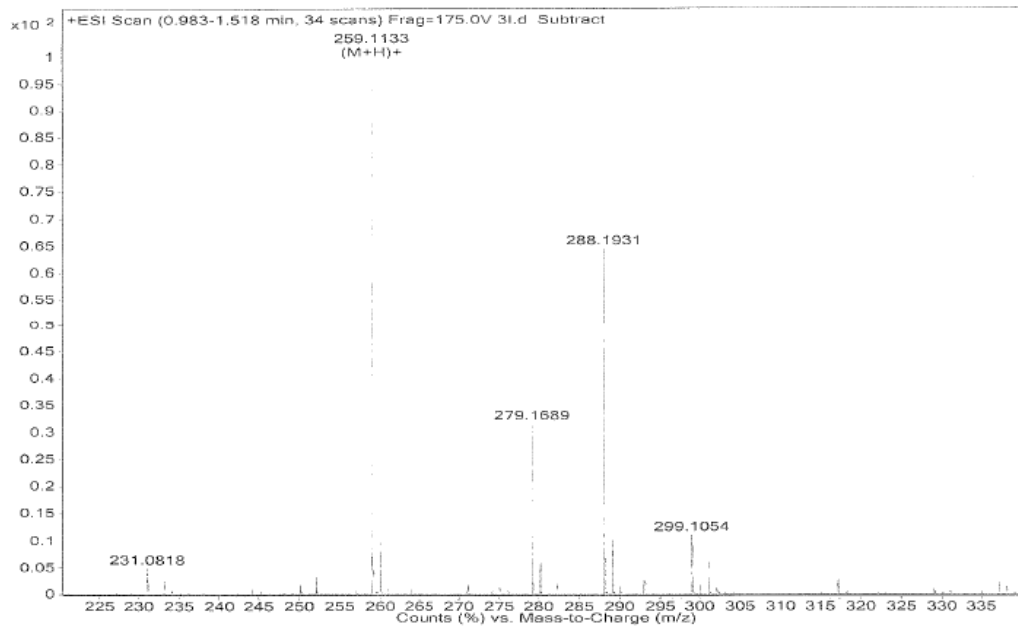
oxobutan-2-yl)carbamate 9v. white solid, mp 151 - 153 °C. ¹H NMR (400 MHz, CDCl₃) δ 7.47 – 7.28 (m, 5H, Ph-H), 7.08 (d, *J* = 5.9 Hz, 2H, Ph-H), 7.05 – 6.99 (d, *J* = 8.2 Hz, 2H, Ph-H), 6.85 – 6.68 (m, 3H, Ph-H), 6.06 (d, *J* = 6.9 Hz, 1H, CHNHCO), 5.15 (s, 1H, Ph-CHNH), 4.85 (s, 1H, Ph-CH-Ph), 4.16 (s, 1H, COCHNH), 4.02 – 3.93 (s, 2H, Ph-CH₂O), 3.84 (s, 3H, OCH₃), 3.39 (s, 1H, (CH₃)₂CHO), 2.26 (s, 3H, Ph-CH₃), 2.12 (m, 1H, (CH₃)₂CHCH), 1.31 – 1.03 (m, 6H, (CH₃)₂CHO), 0.96 – 0.83 (m, 6H, (CH₃)₂CHCH). ¹³C NMR (101 MHz, CDCl₃) δ 170.94, 156.40, 148.82, 147.94, 138.60, 136.92, 134.23, 129.18, 128.45, 127.80, 127.58, 127.16, 120.27, 120.04, 113.66, 111.63, 70.88, 63.71, 55.96, 53.26, 43.59, 31.11, 22.01, 19.38. HRMS calcd for C₃₁H₃₈N₂O₅ ([M + H]): 518.2850; Found: 518.2780.

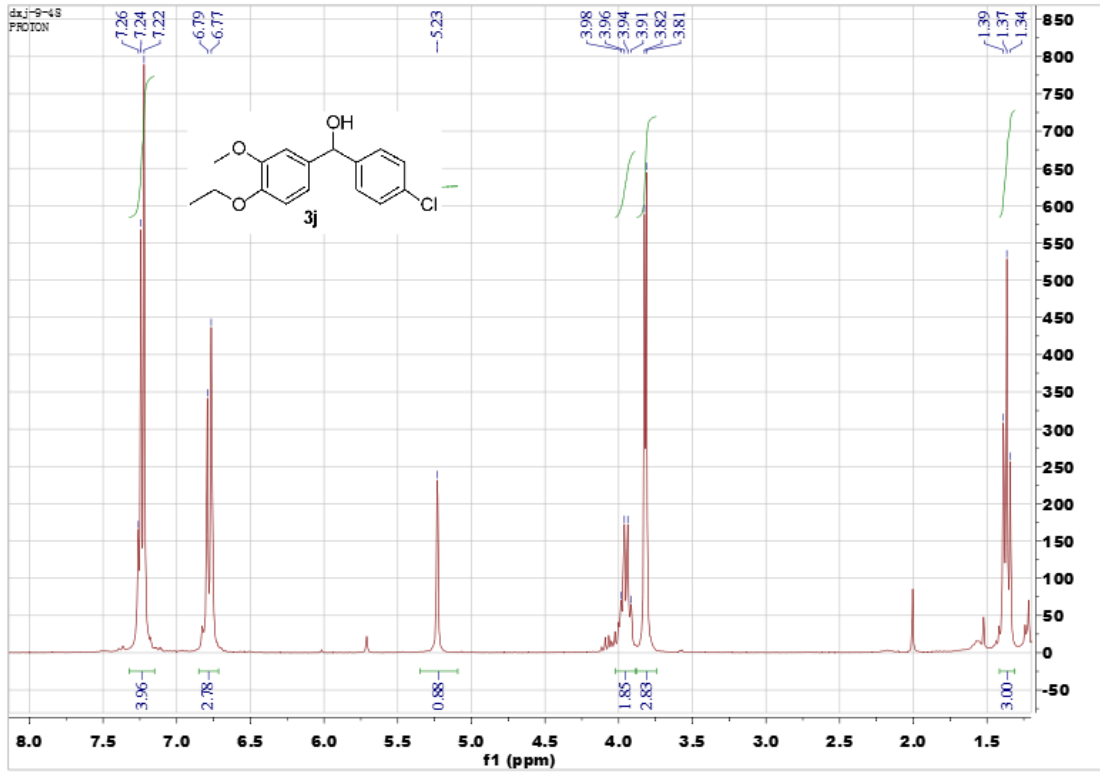
1. C. C. Silveira, E. L. Larghi, S. R. Mendes, A. B. Bracca, F. Rinaldi and T. S. Kaufman, *Eur J Org Chem*, 2009, **2009**, 4637-4645.
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6. M. Jereb and D. Vražič, *Organic & biomolecular chemistry*, 2013, **11**, 1978-1999.
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10. N. O. Isoo Ito, Katsuhiko takeda, Takahiro Wakayama, *Chemical & pharmaceutical bulletin*, 1969, **17**, 1524-1526.
11. B. Bhatkhande, *Journal of the University of Bombay, Science: Physical Sciences, Mathematics, Biological Sciences and Medicine*, 1956, **24**, 11-14.



3i

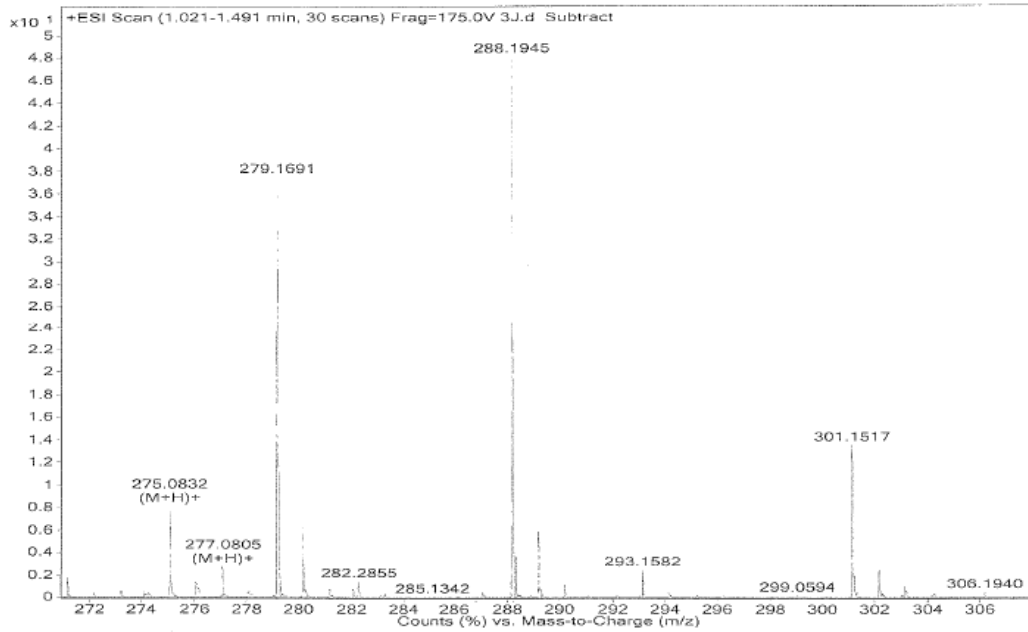
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Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status		2/28/2014 9:17:37 AM
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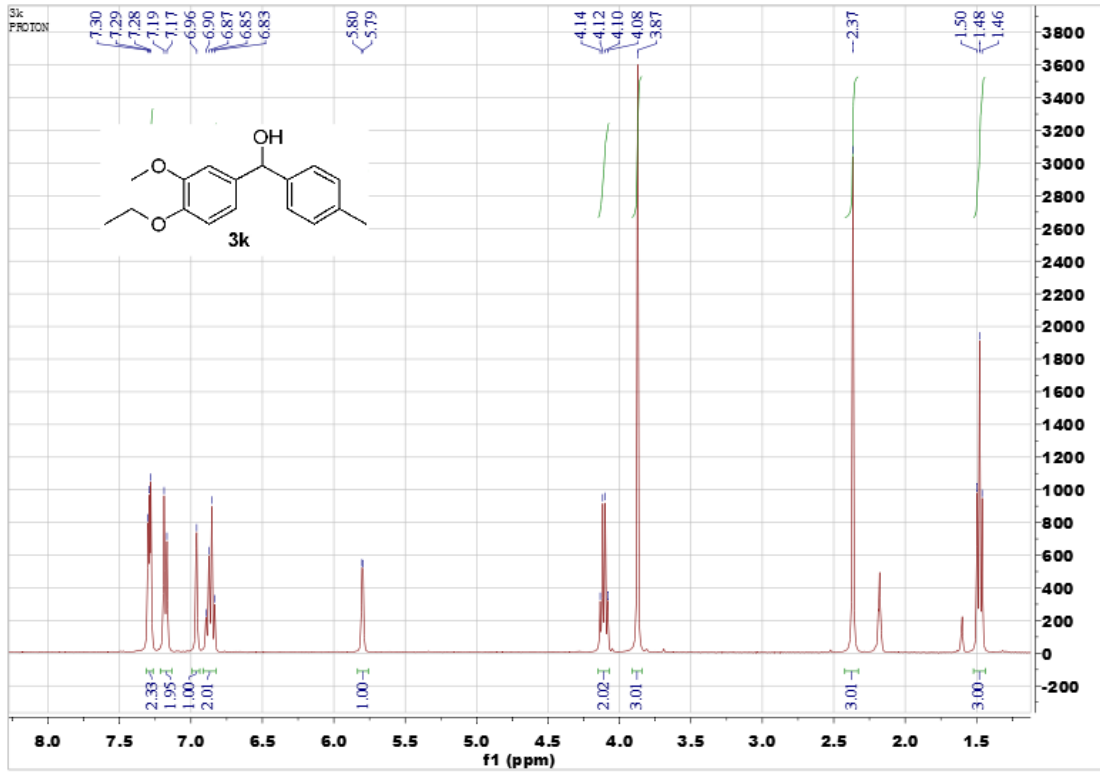




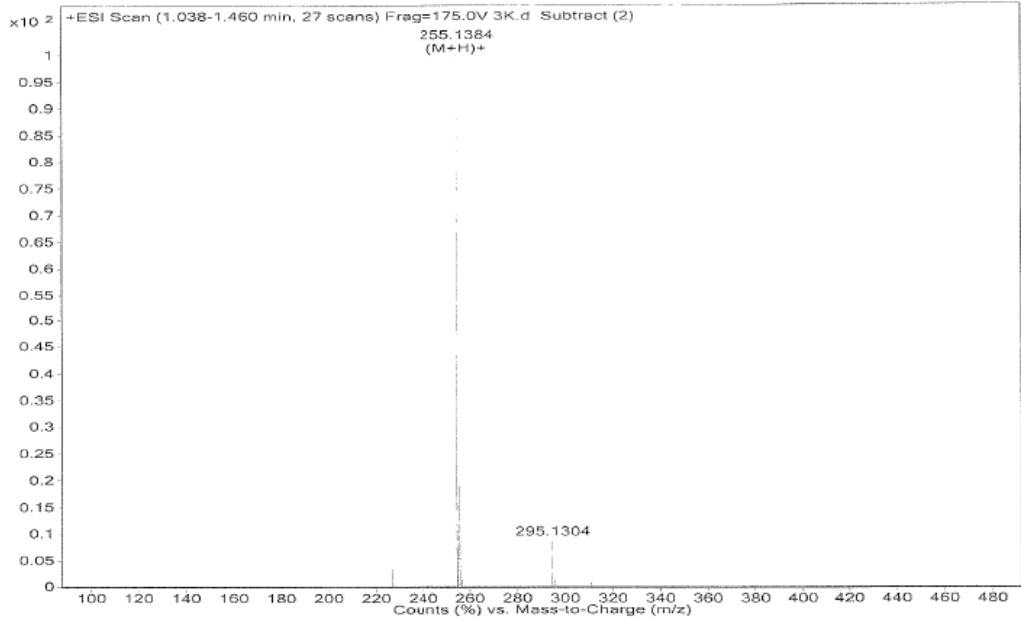
3j

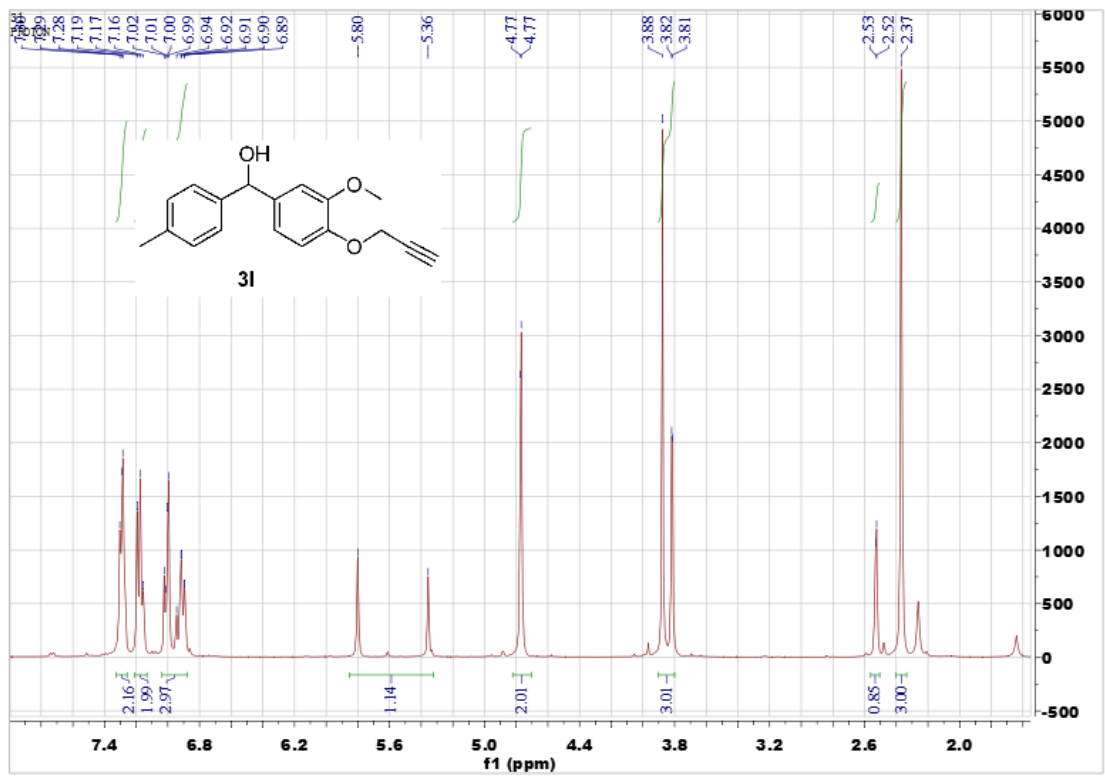
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Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
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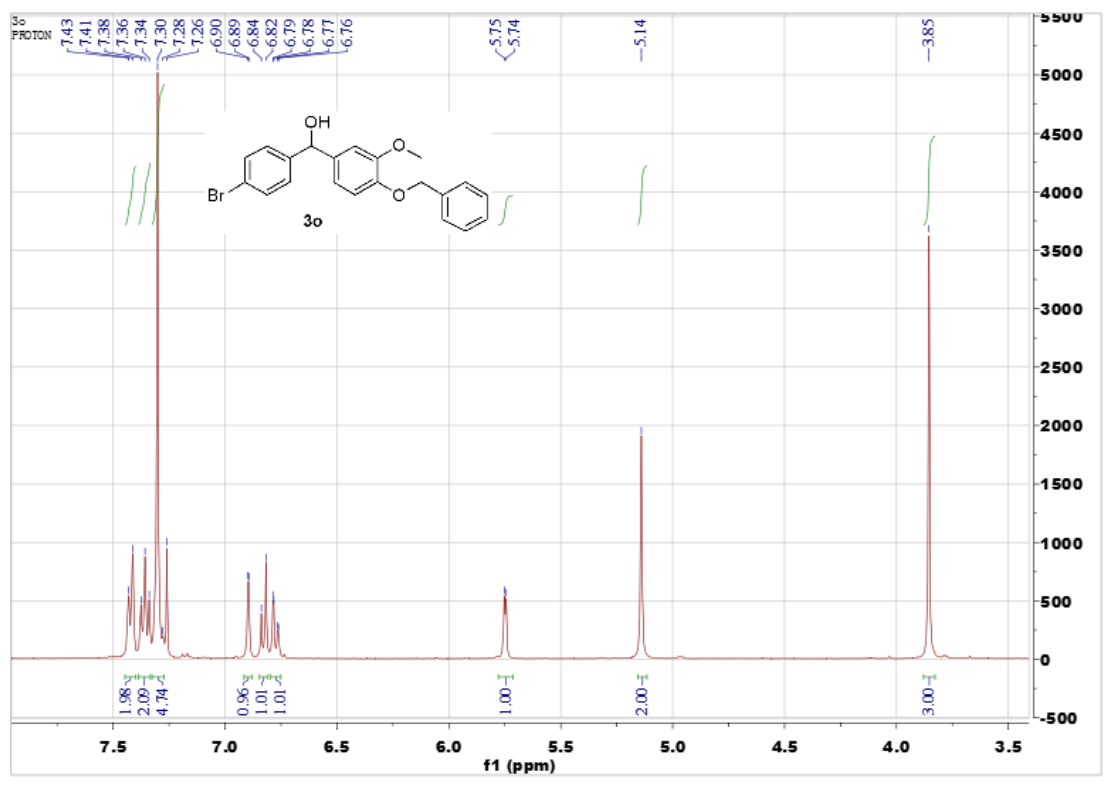


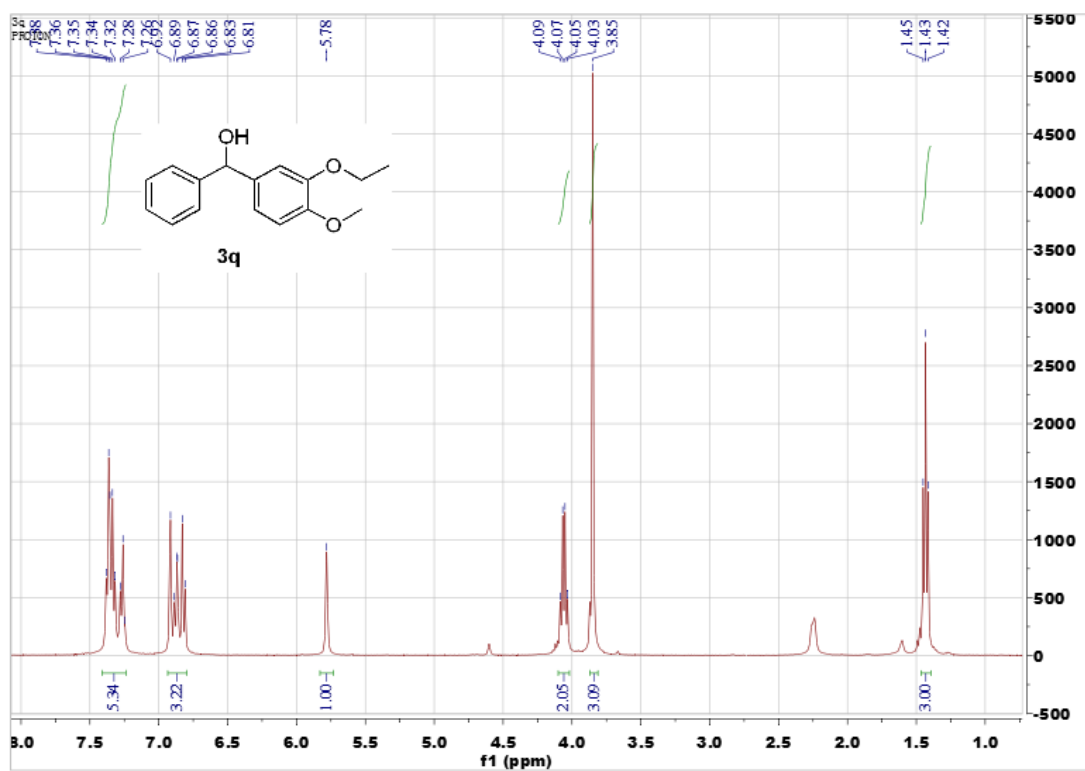
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Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status
Data Filename	3K.d	ACQ Method	chen-ms.m	Comment		Acquired Time



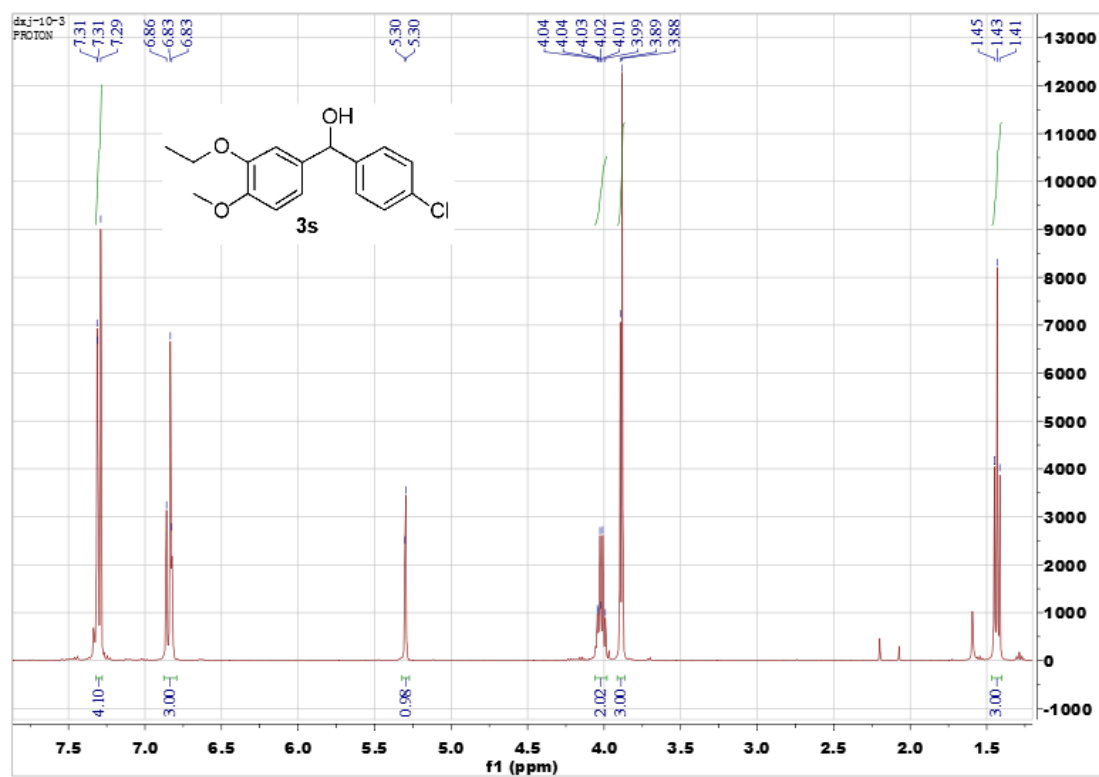


31



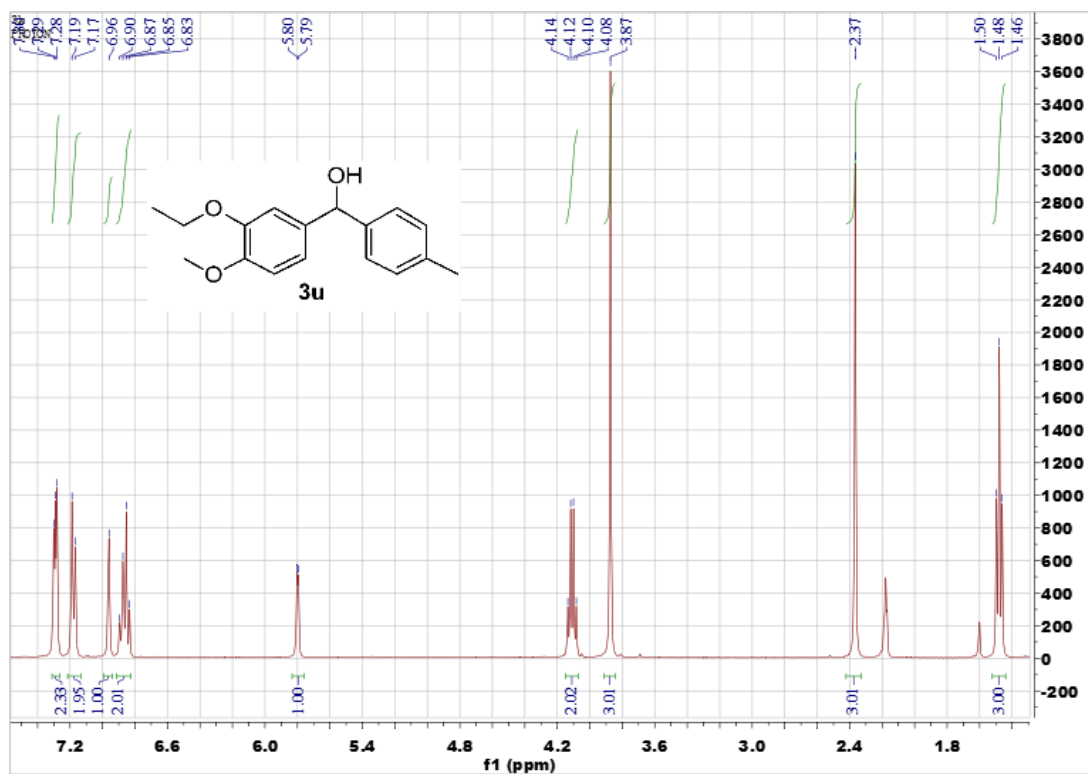
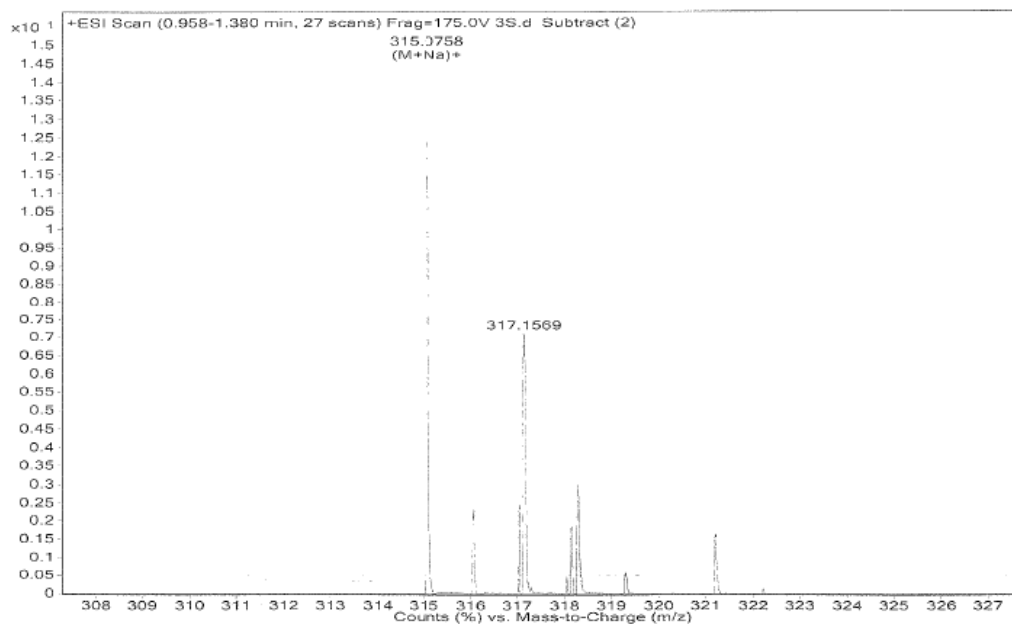


3q



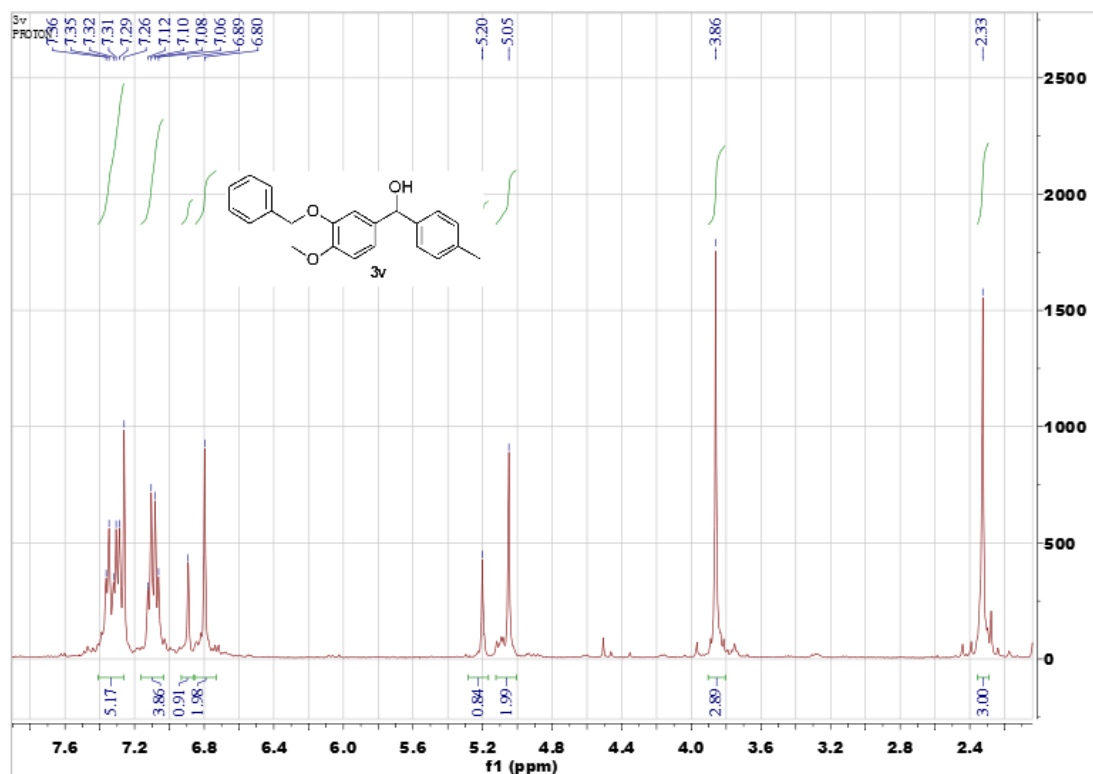
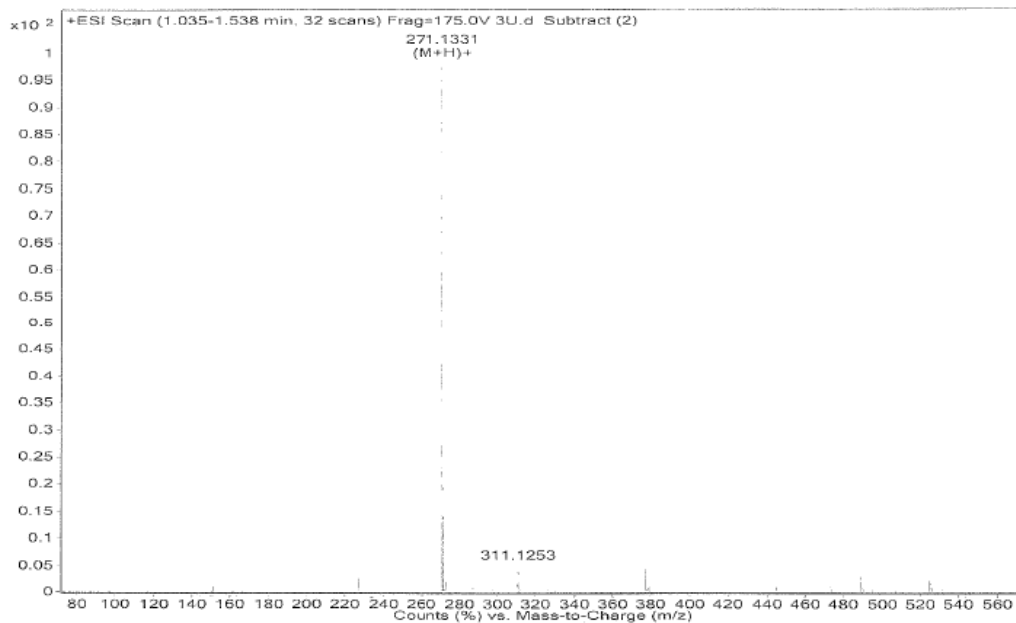
3s

Sample Name	lc/ms	Position	P1-A1	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
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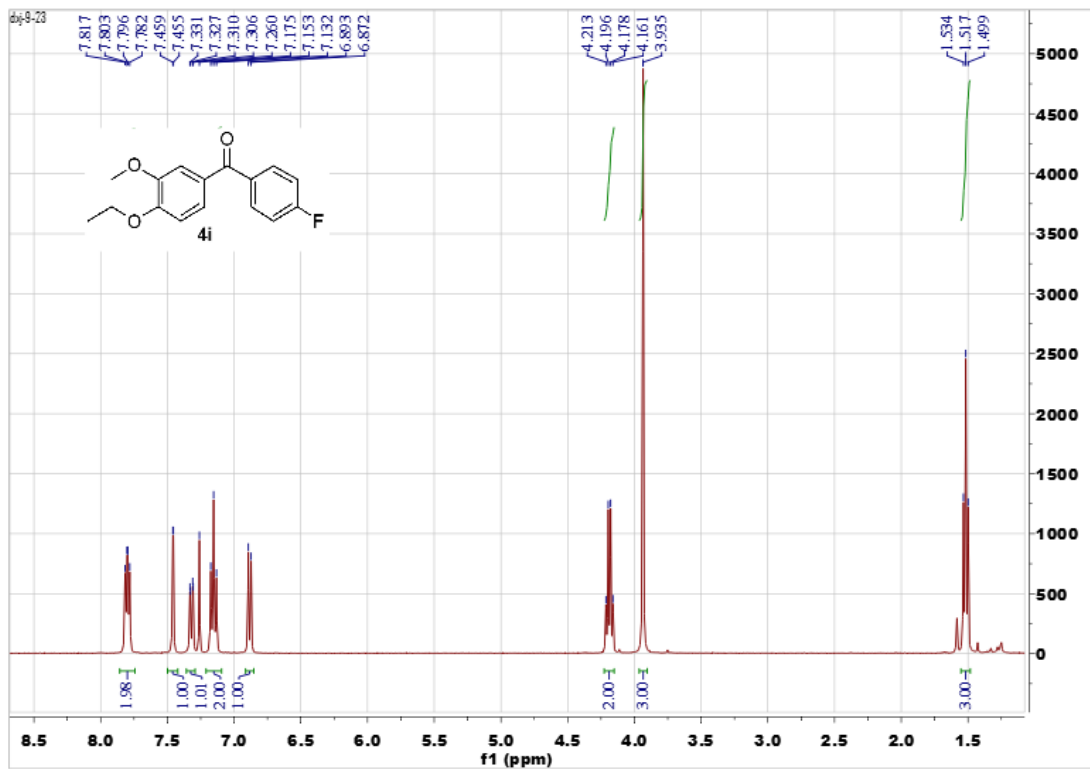
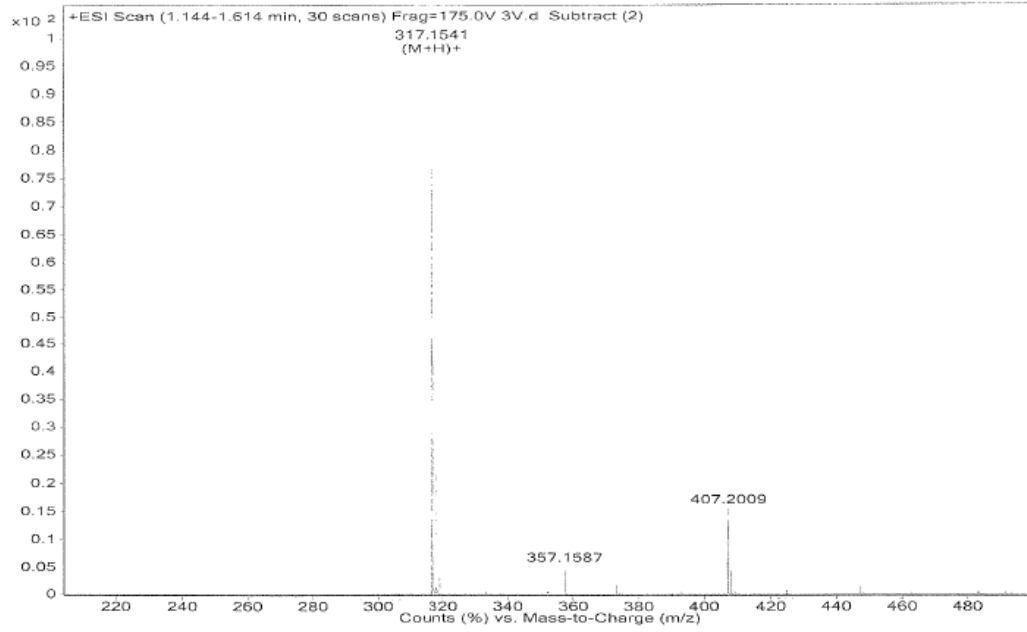
3u

Sample Name	lc/ms	Position	PI-A6	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	3U.d	ACQ Method	chem-ms.m	Comment		Acquired Time	2/26/2014 9:28:47 AM



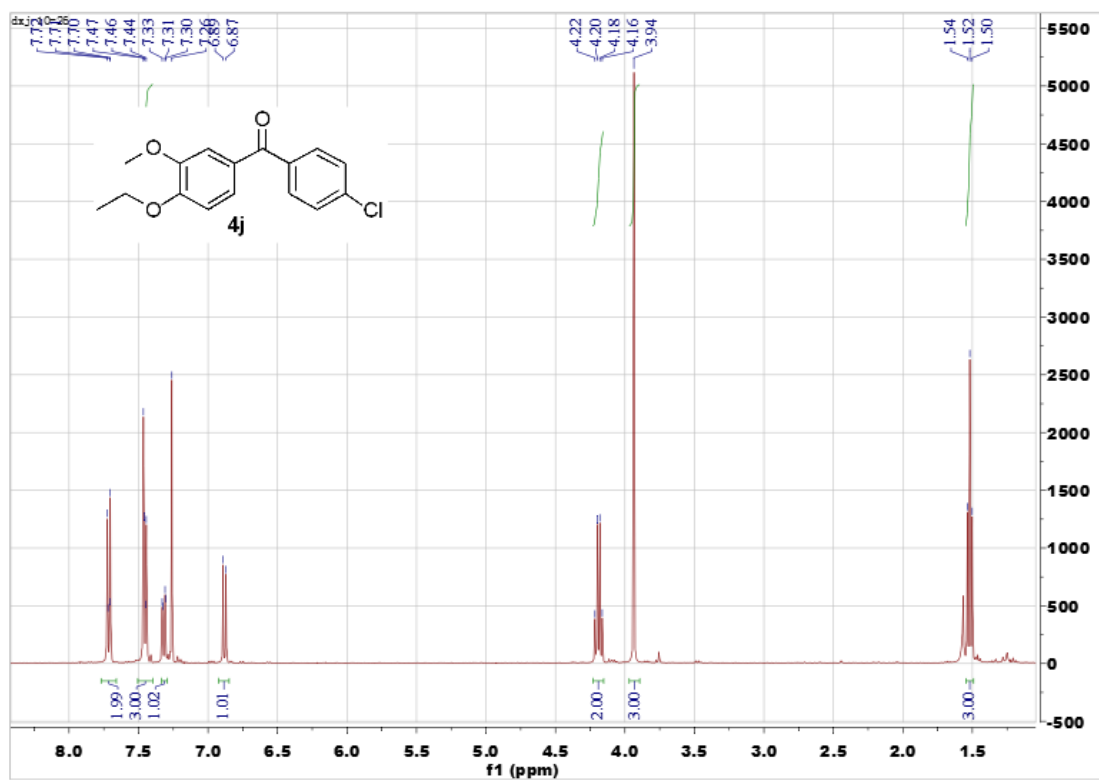
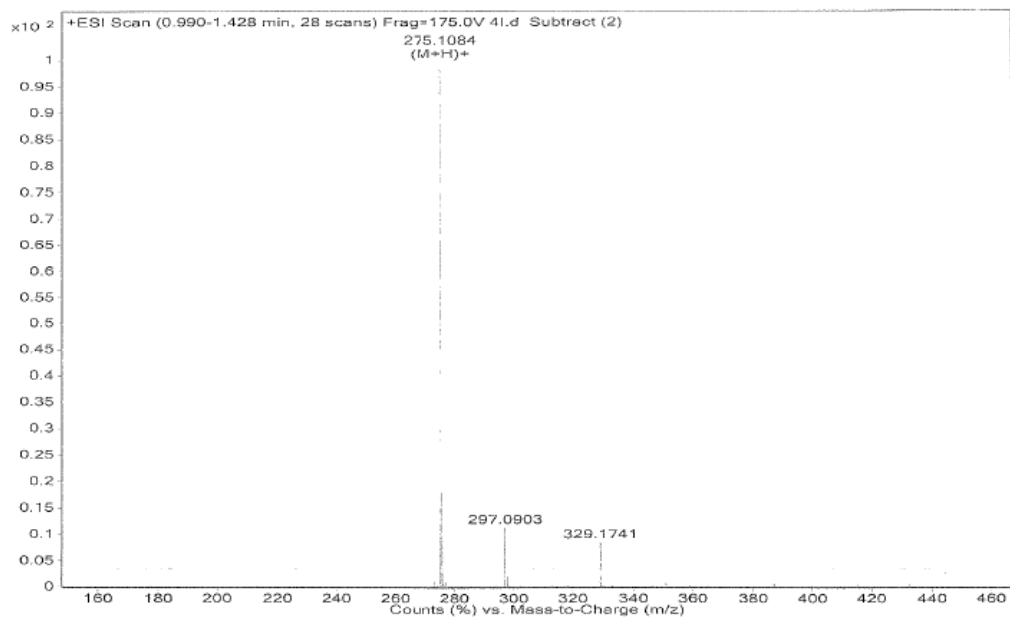
3v

Sample Name	lc/ms	Position	P1-A7	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	3V.d	ACQ Method	chem-ms.m	Comment		Acquired Time	2/28/2014 9:32:28 AM



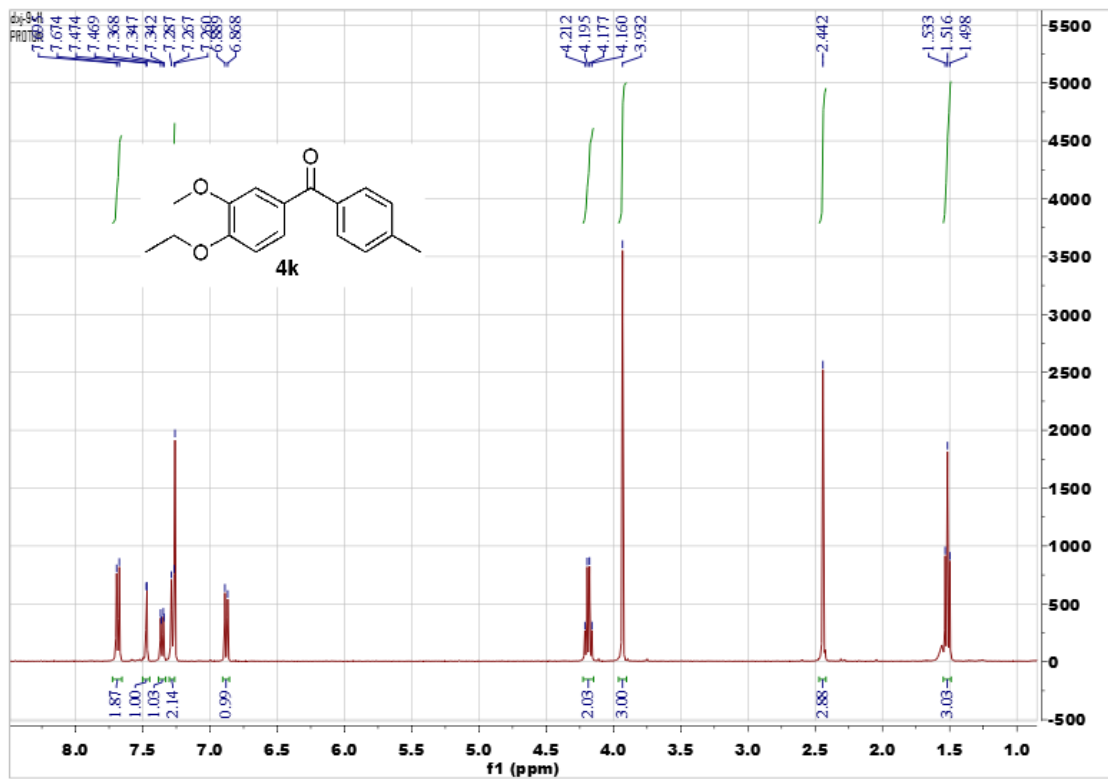
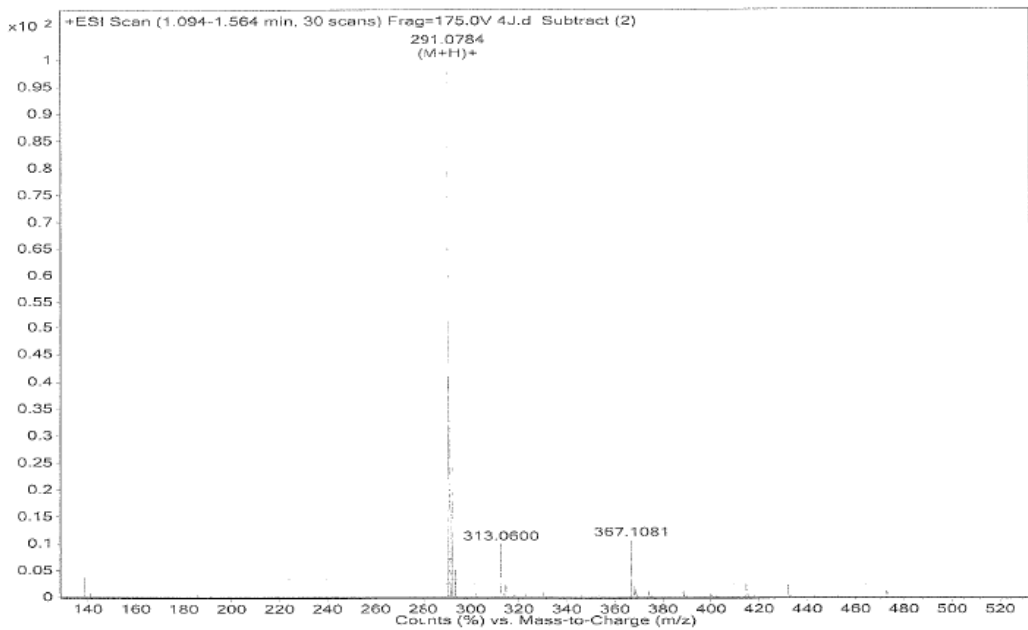
4i

Sample Name	4j.ms	Position	P1-A2	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	41.d	ACQ Method	chem-ms.m	Comment		Acquired Time	2/28/2014 10:15:01 AM



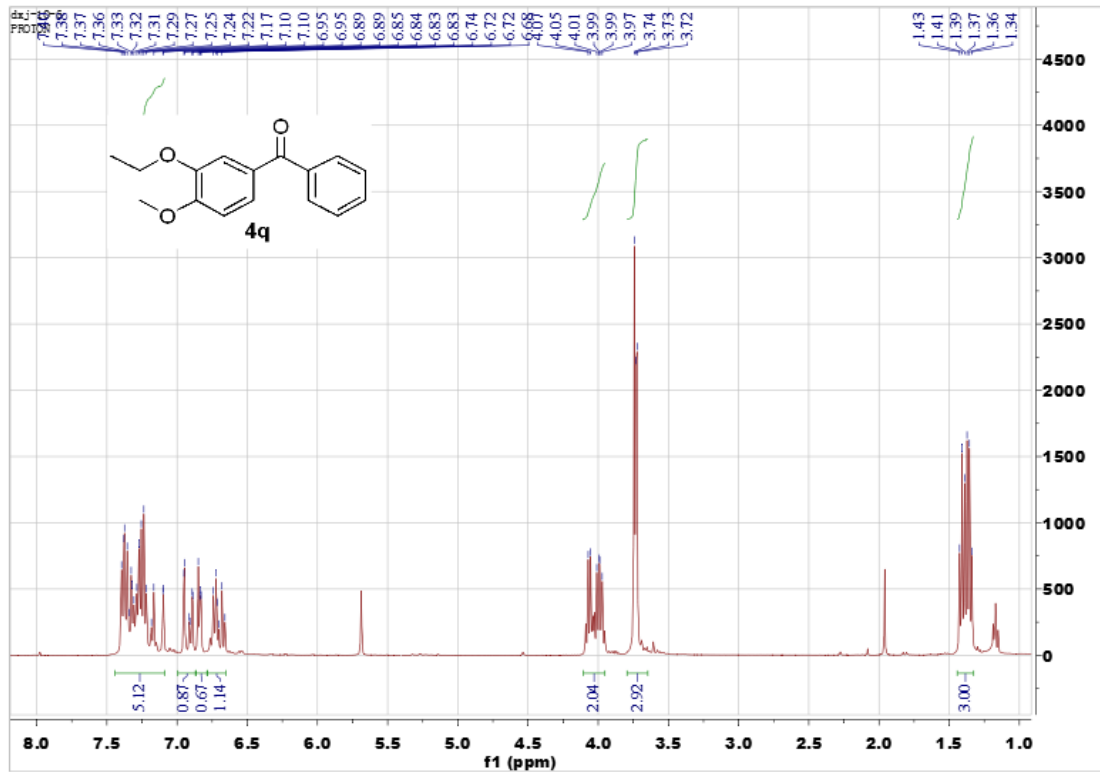
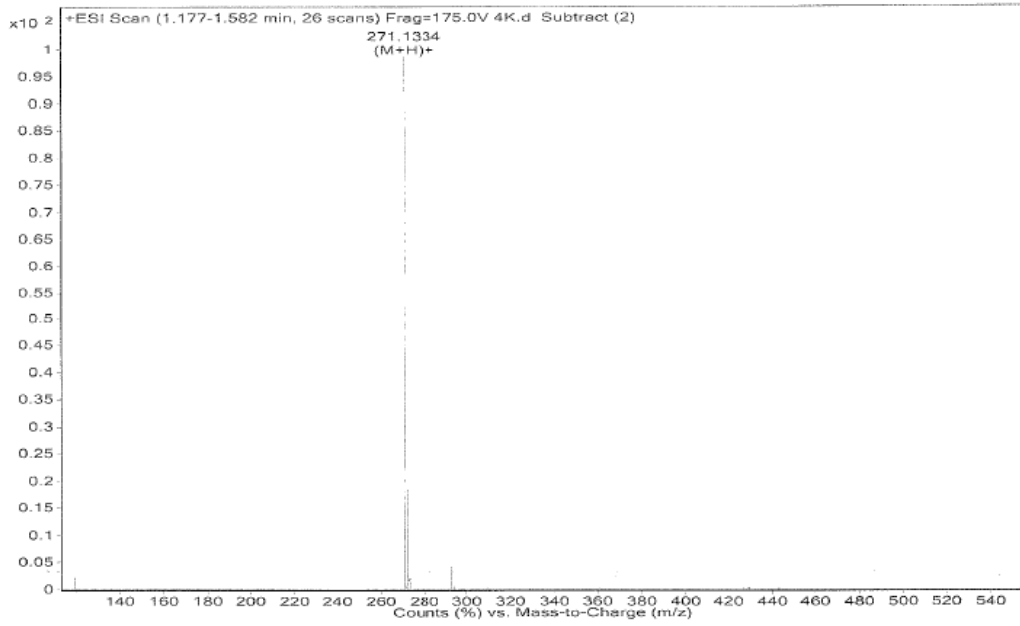
4j

Sample Name	Ic/ms	Position	PL-A3	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	4J.d	ACQ Method	chem-ms.m	Comment		Acquired Time	2/28/2014 10:18:44 AM



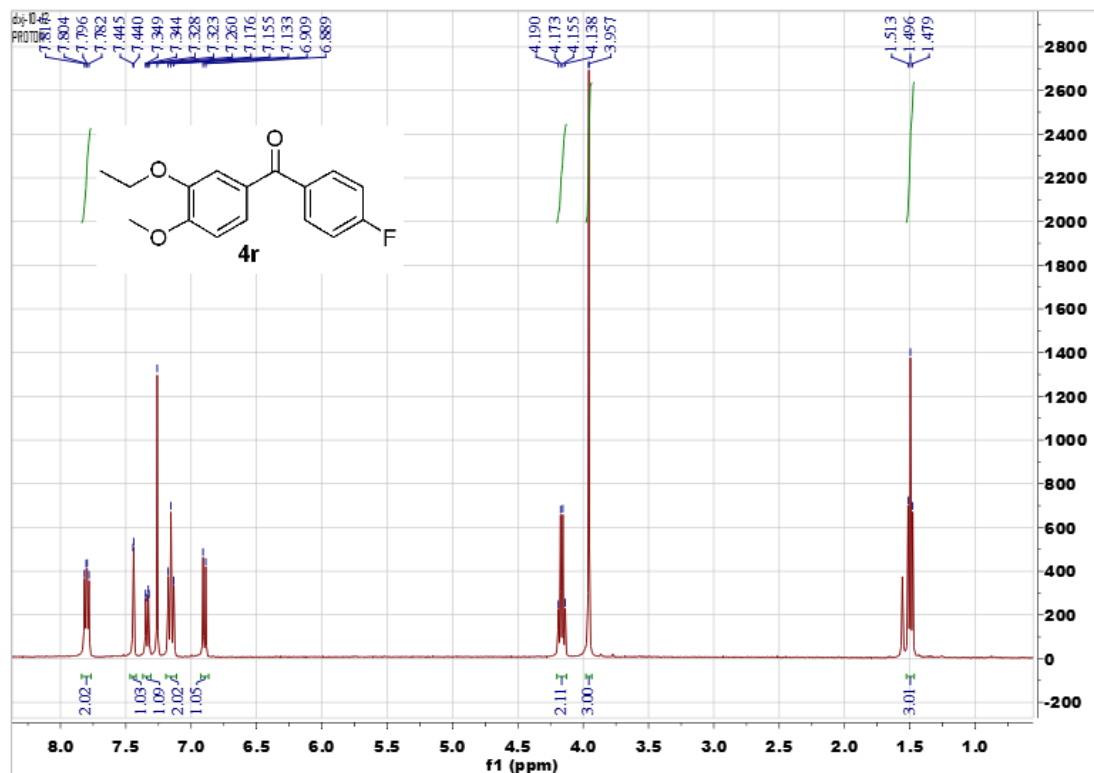
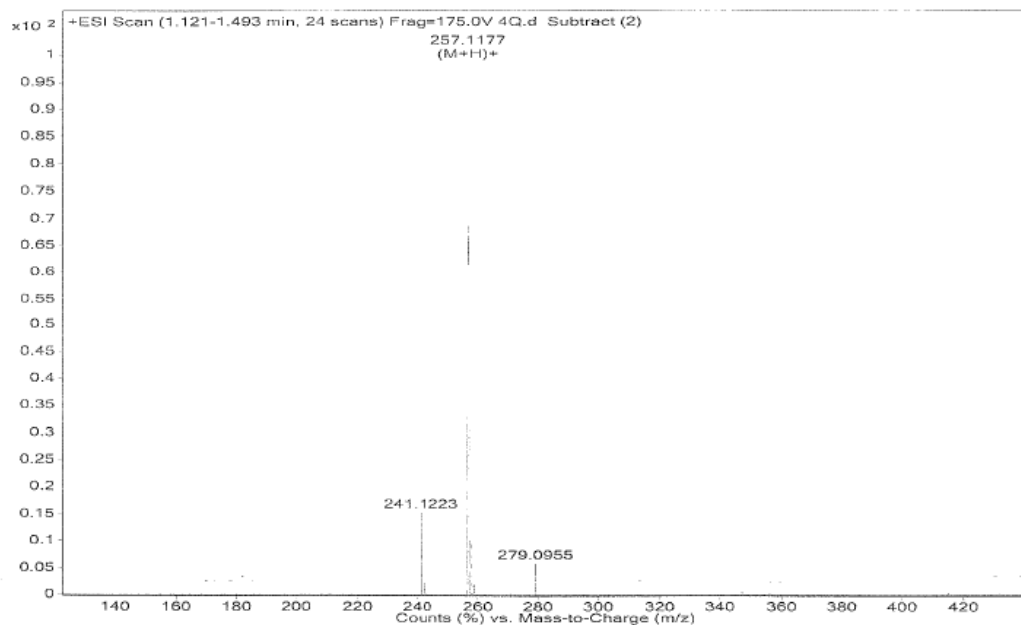
4k

Sample Name	lc/ms	Position	P1-A4	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	4K.d	ACQ Method	chem.ms.m	Comment		Acquired Time	2/28/2014 10:22:27 AM



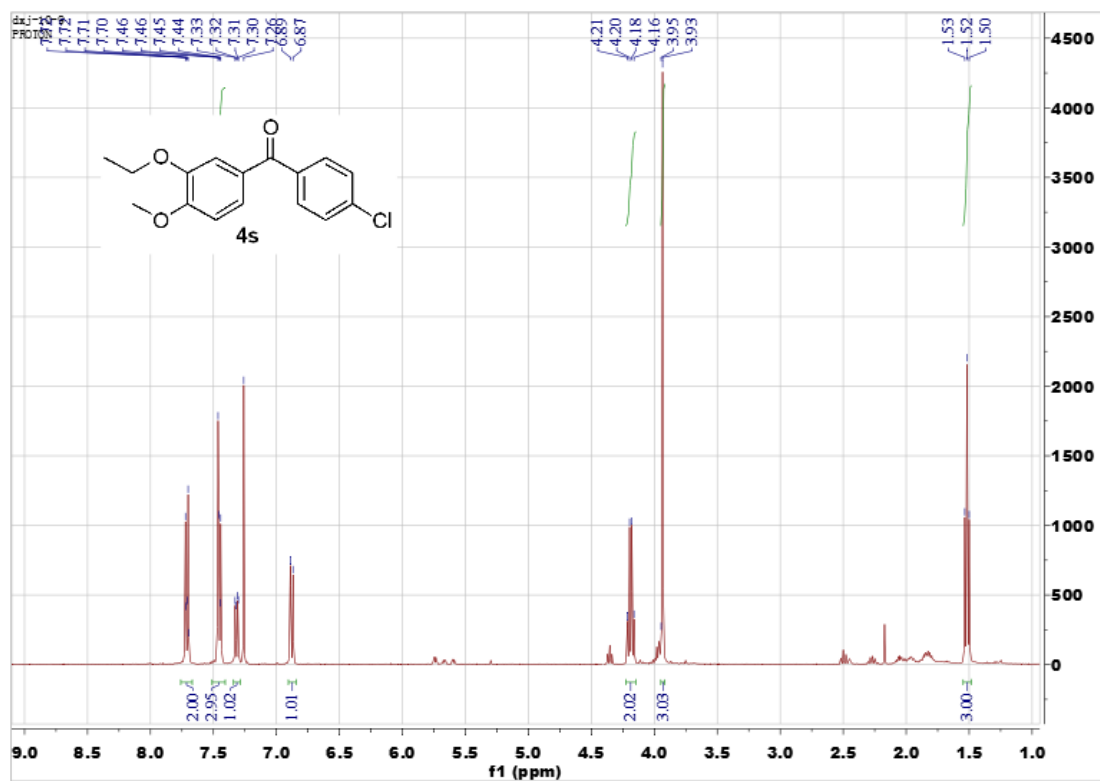
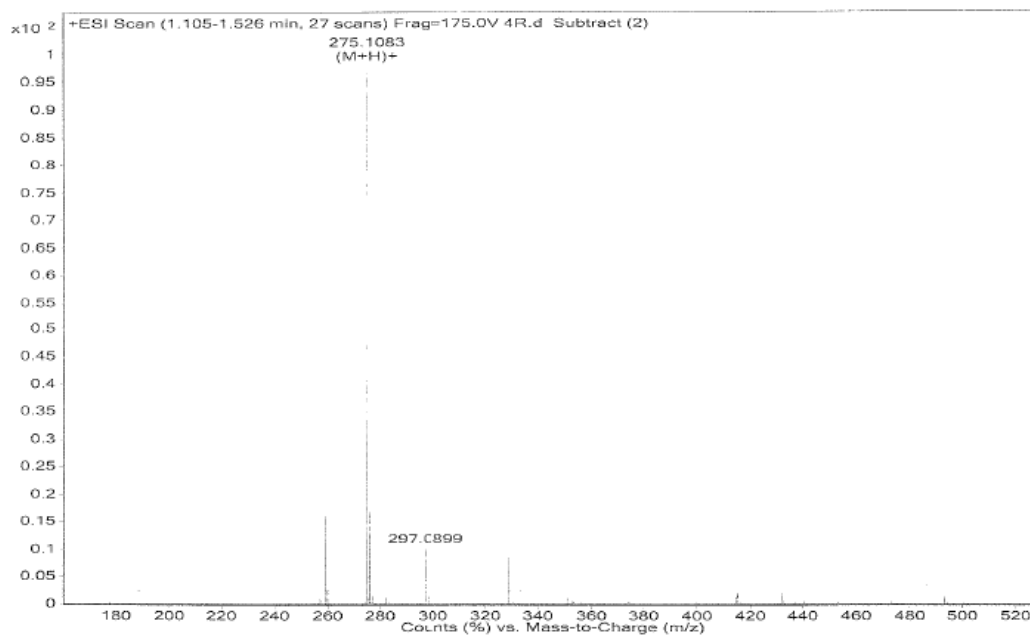
4q

Sample Name	ic/ms	Position	P1-A5	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	4Q.d	ACQ Method	chem-ms.m	Comment		Acquired Time	2/28/2014 10:26:10 AM



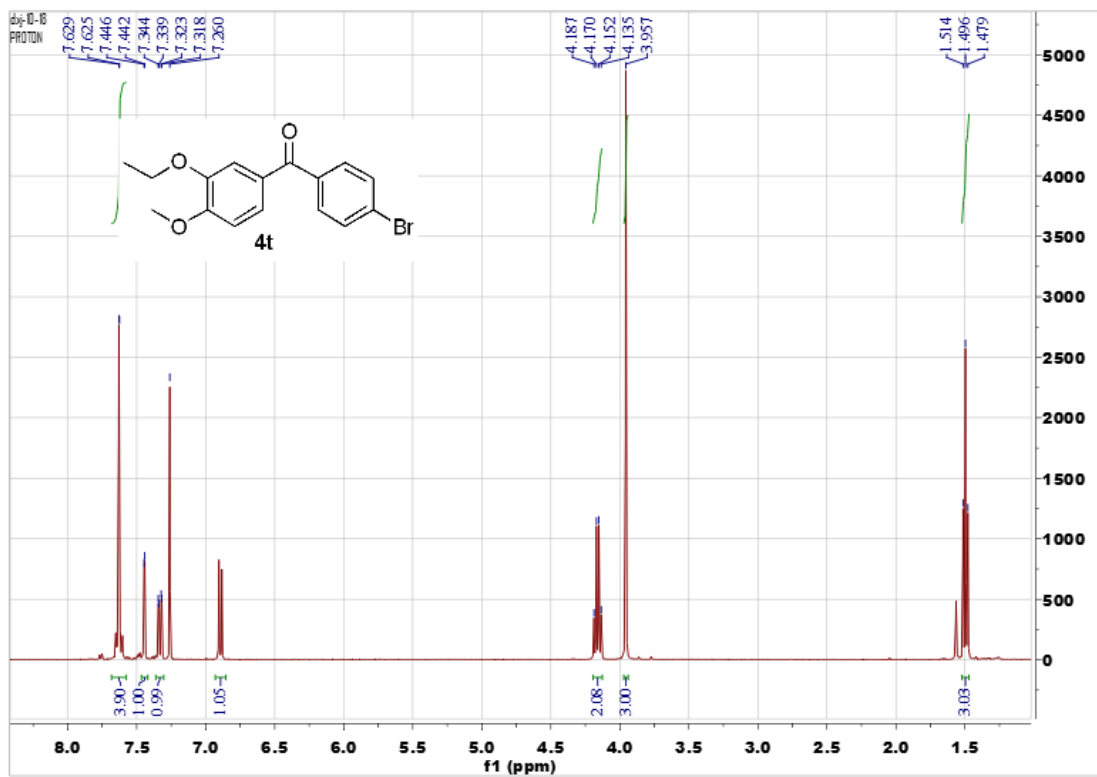
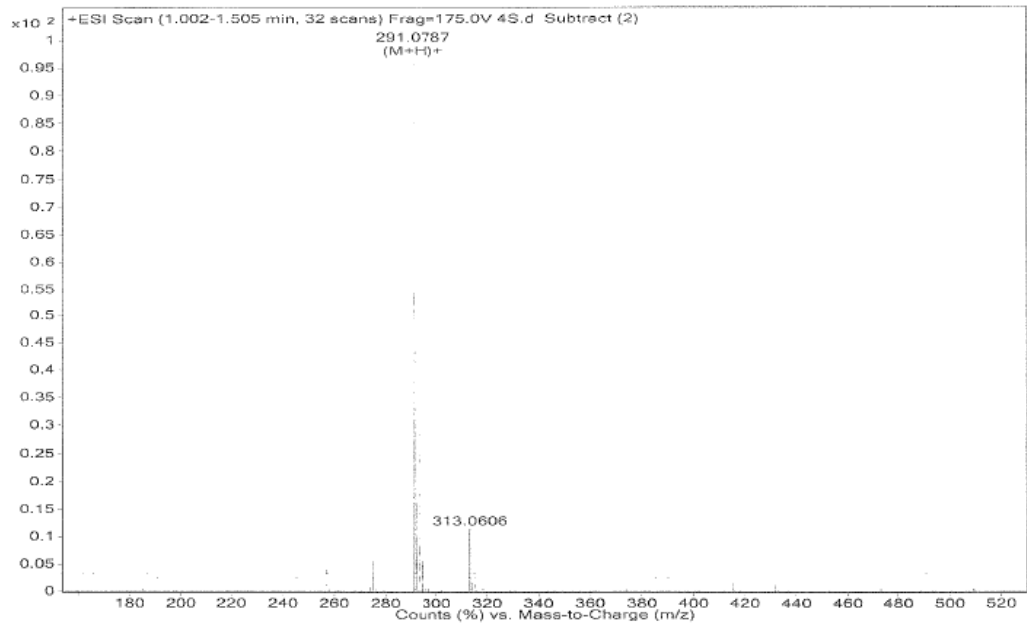
4r

Sample Name	k/ms	Position	P1-A6	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	4R.d	ACQ Method	chen-ms.m	Comment		Acquired Time	2/28/2014 10:23:54 AM



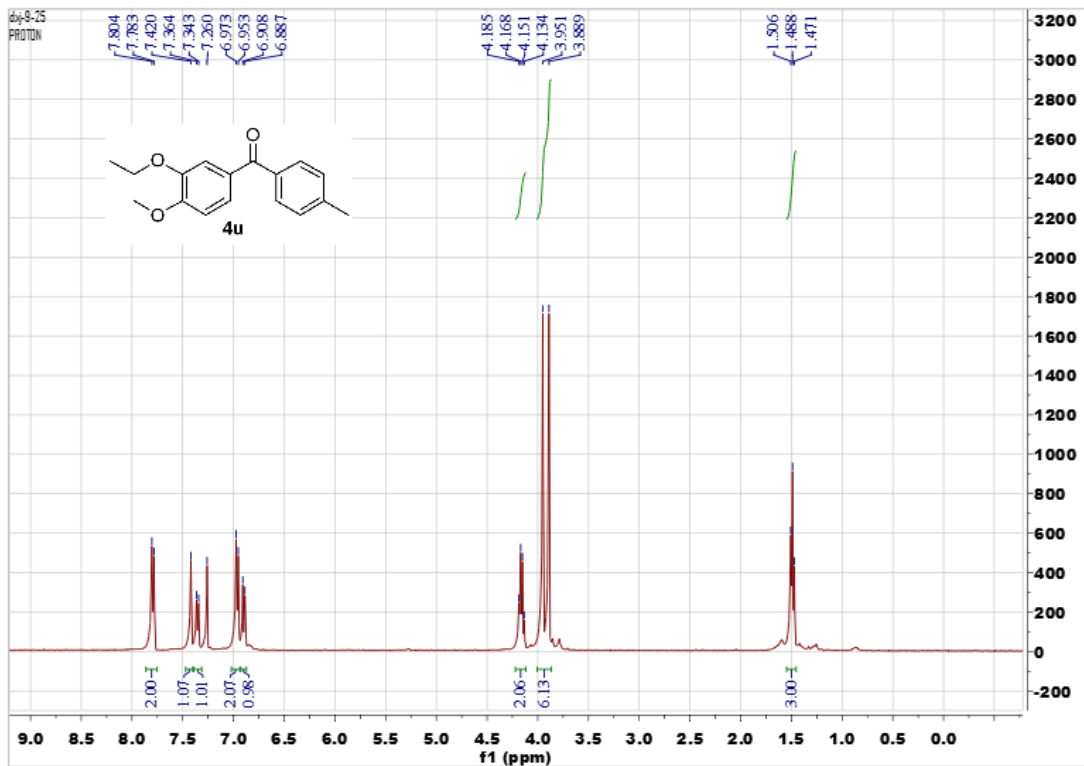
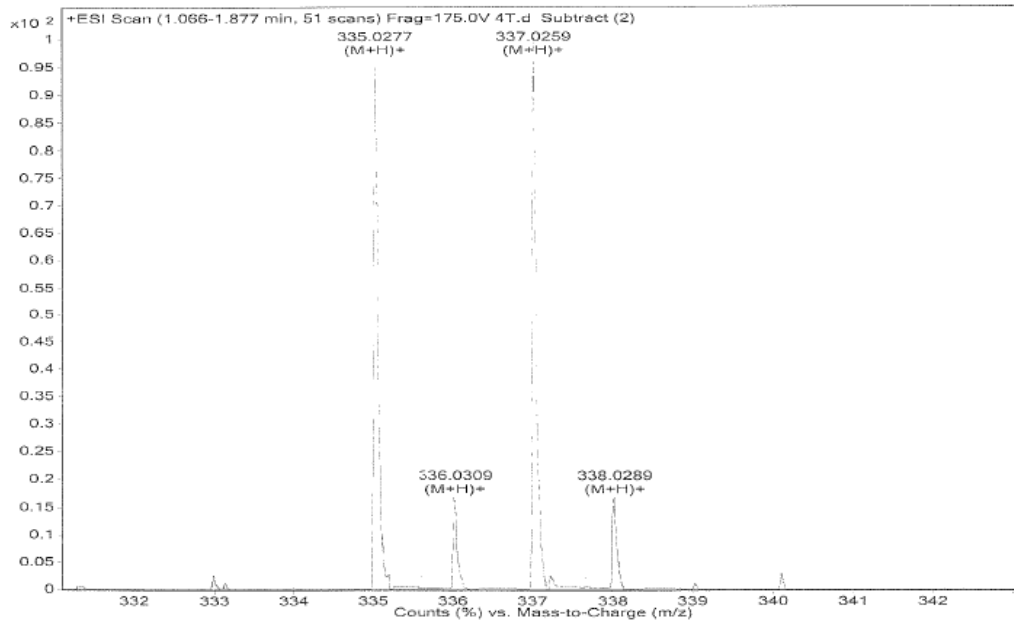
4s

Sample Name	lc/ms	Position	PI-A7	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	4S.d	ACQ Method	chen-ms.m	Comment		Acquired Time	2/26/2014 10:33:36 AM



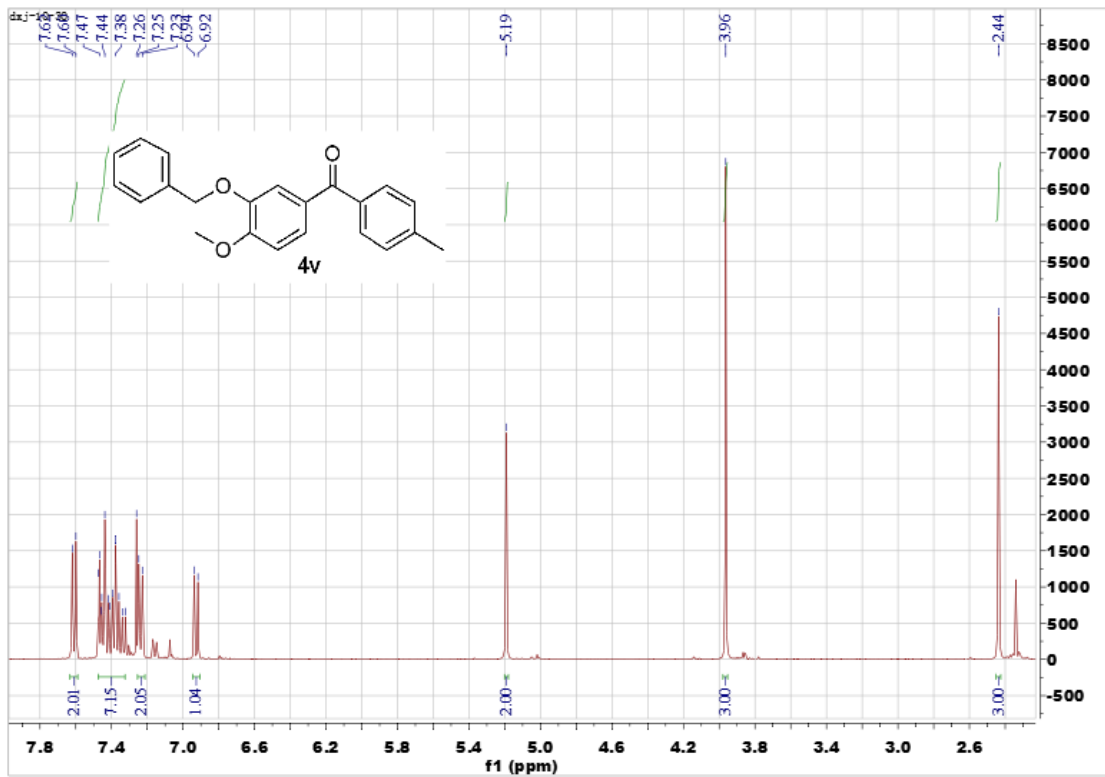
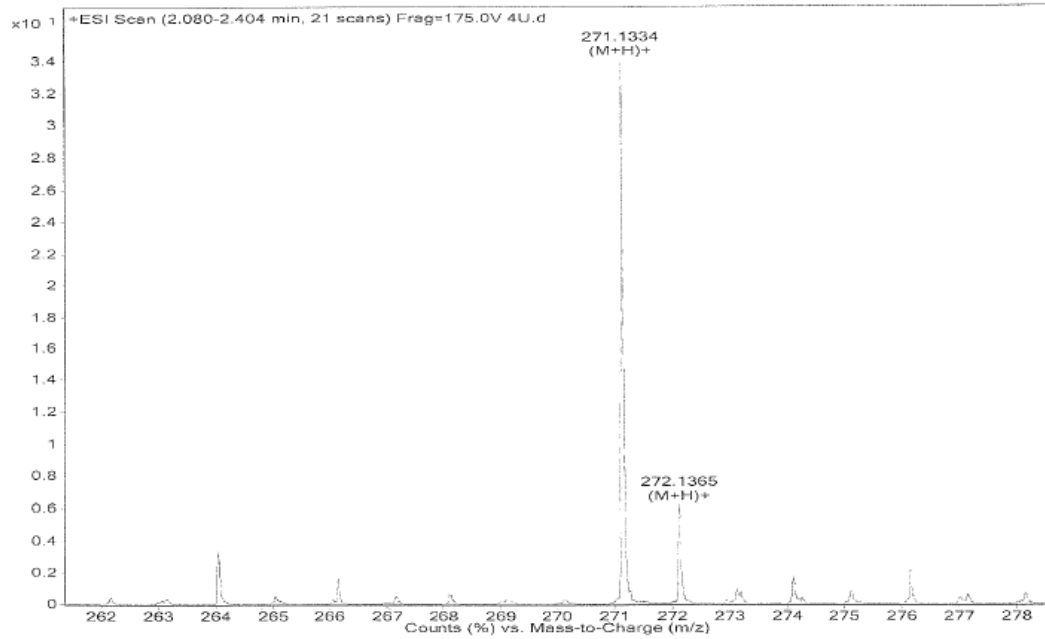
4t

Sample Name	ic/ms	Position	PI-A1	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	4T.d	ACQ Method	chen-ms.m	Comment		Acquired Time	2/28/2014 11:07:06 AM



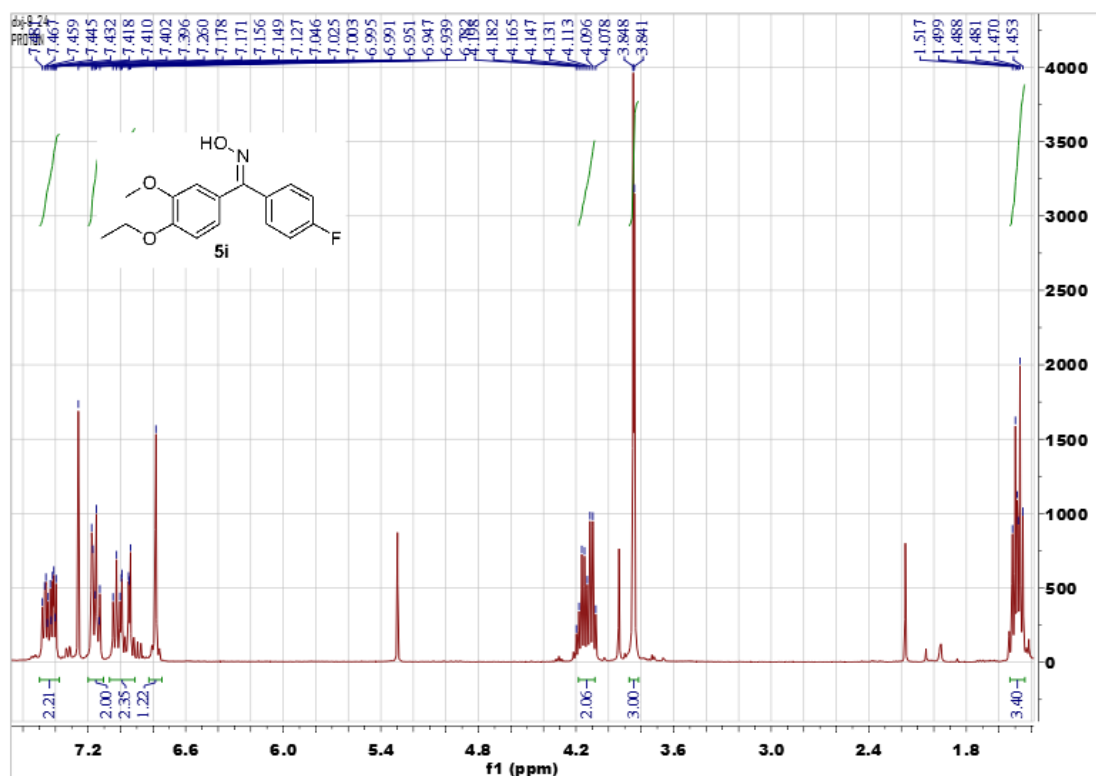
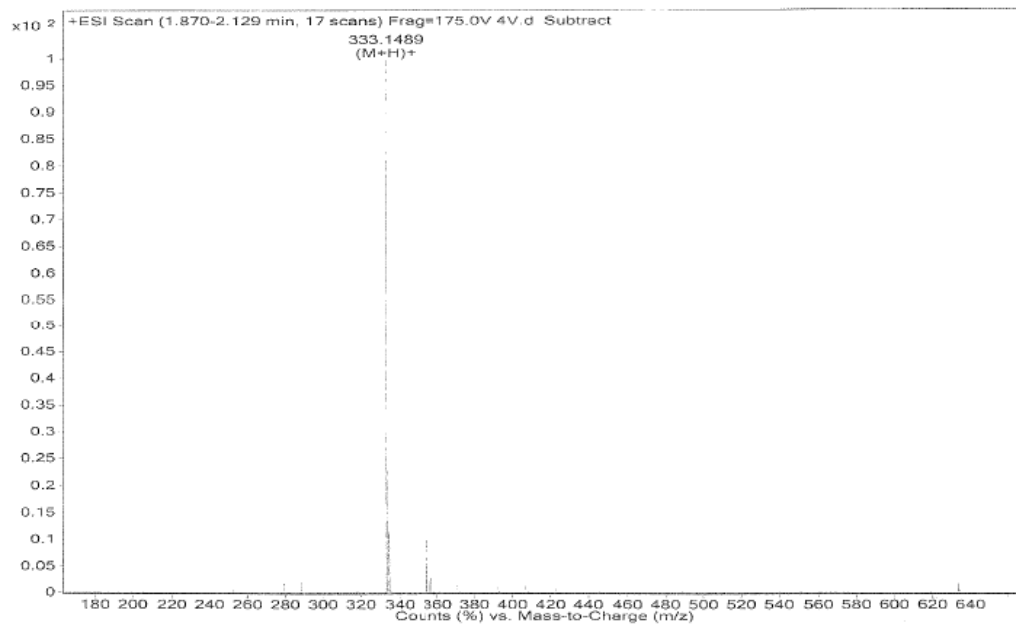
4u

Sample Name	lc/ms	Position	P1-A2	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	4U.d	ACQ Method	chem-ms.m	Comment		Acquired Time	2/28/2014 3:25:18 PM



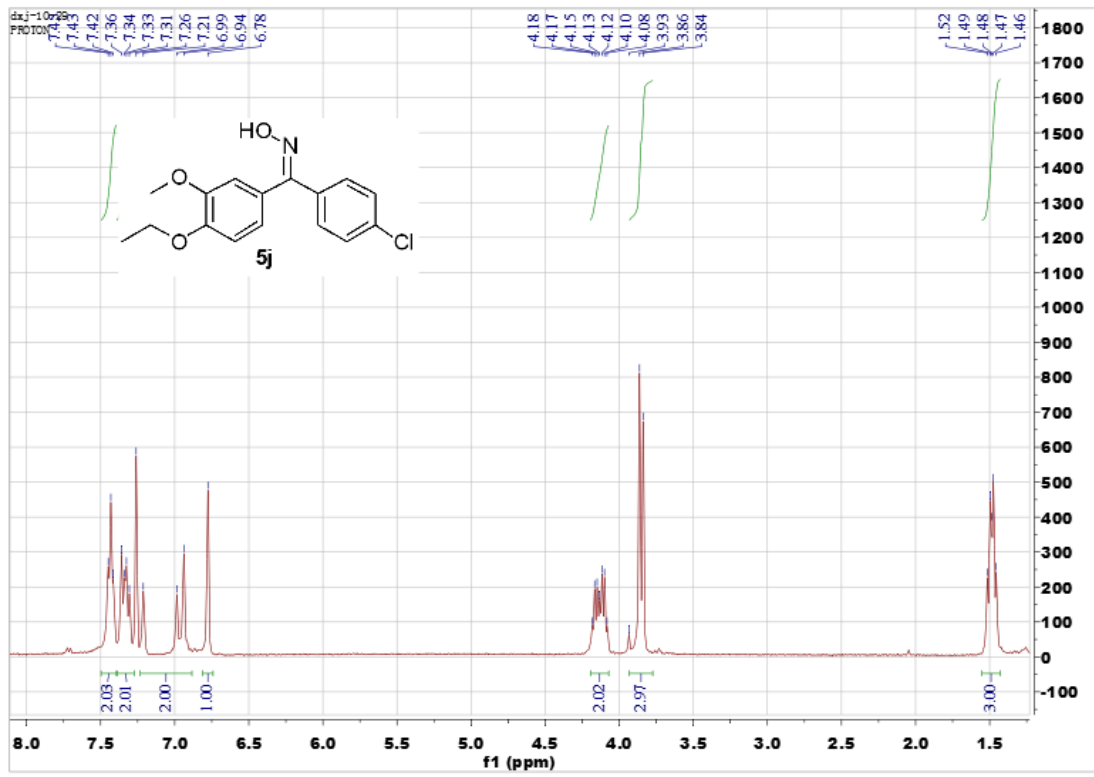
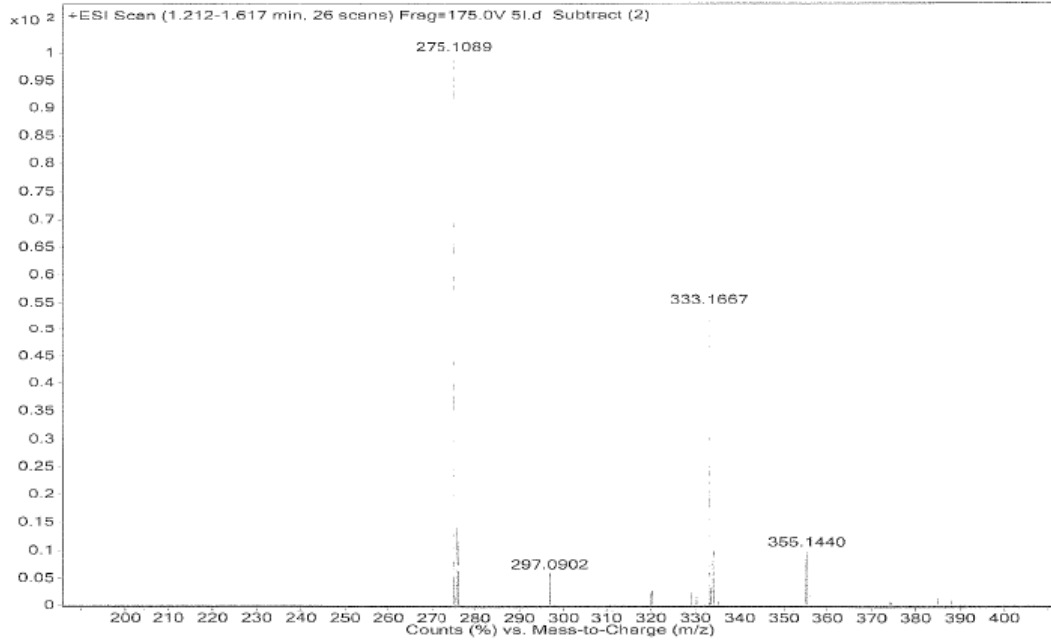
4v

Sample Name	ic/ms	Position	PI-A3	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	4v.d	ACQ Method	chen-ms.m	Comment		Acquired Time	2/28/2014 3:29:00 PM



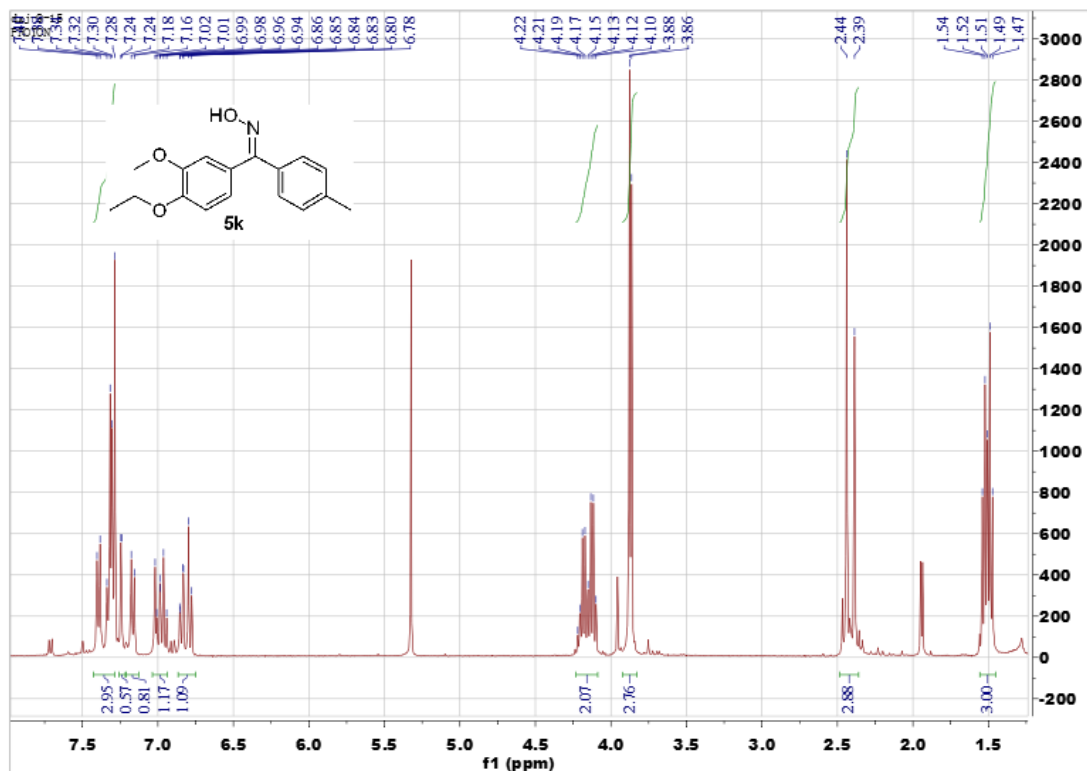
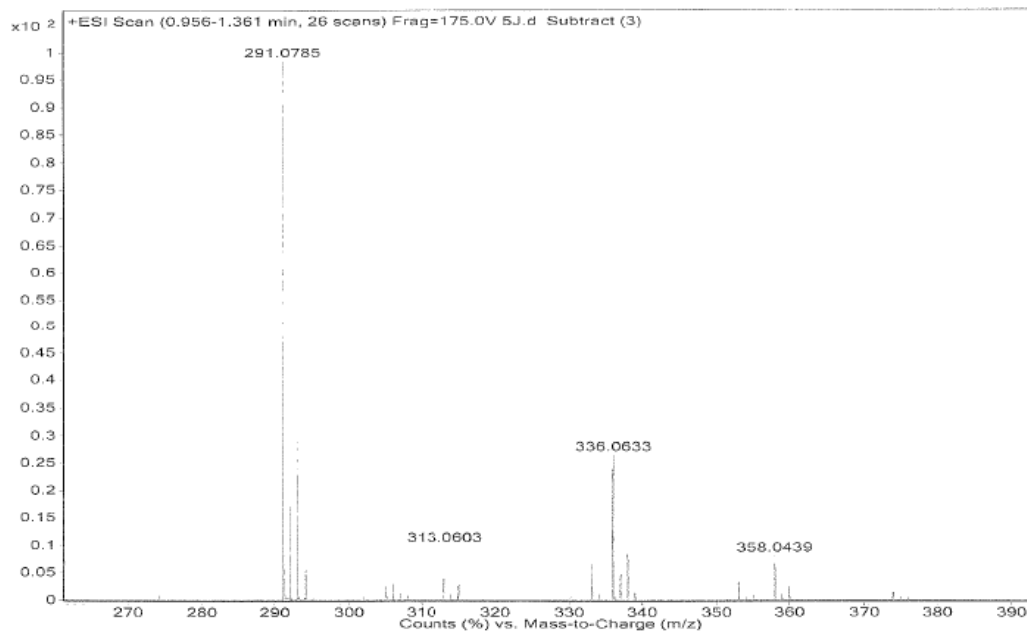
5i

Sample Name	lc/ms	Position	P1-A4	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	5L.d	ACQ Method	chen-ms.m	Comment		Acquired Time	2/28/2014 3:32:43 PM



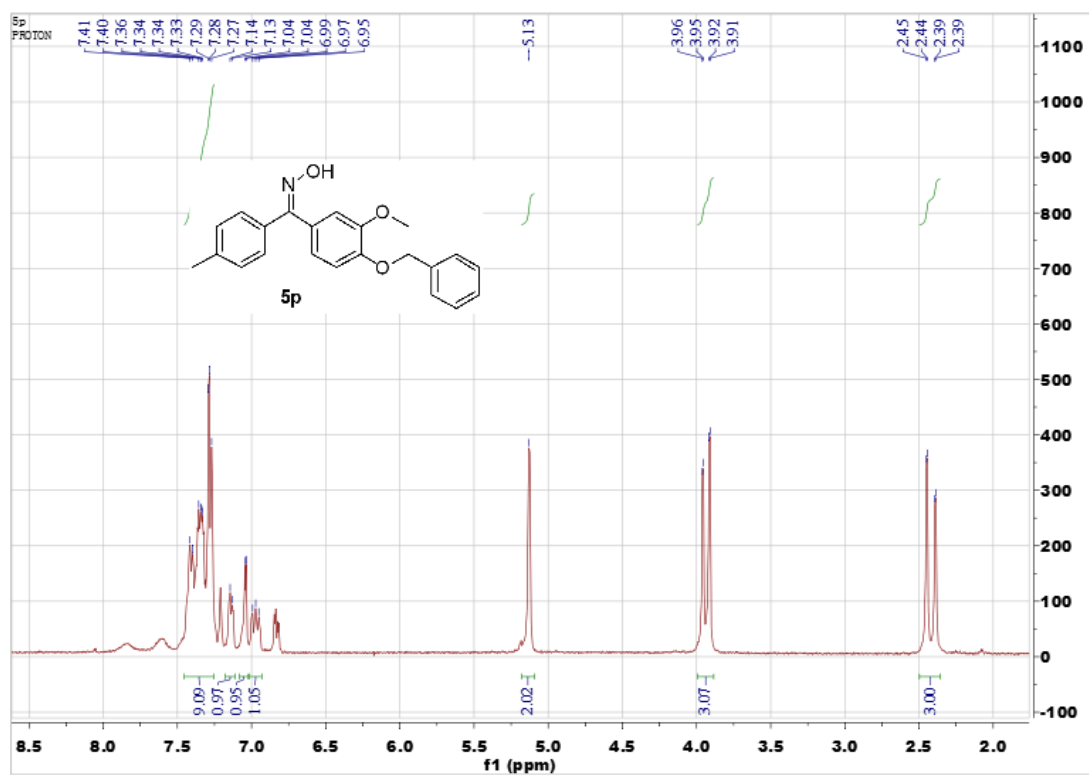
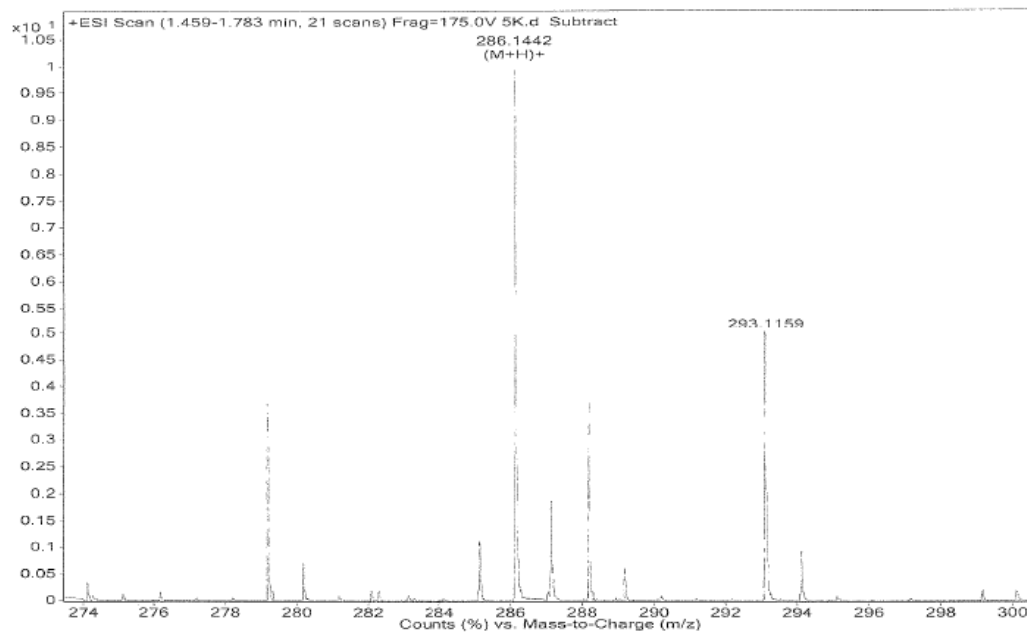
5j

Sample Name	k/ms	Position	P1-A5	Instrument Name	Instrument 1	User Name	
Inj Vel	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	5J.d	ACQ Method	chem-ms.m	Comment		Acquired Time	2/28/2014 3:36:27 PM

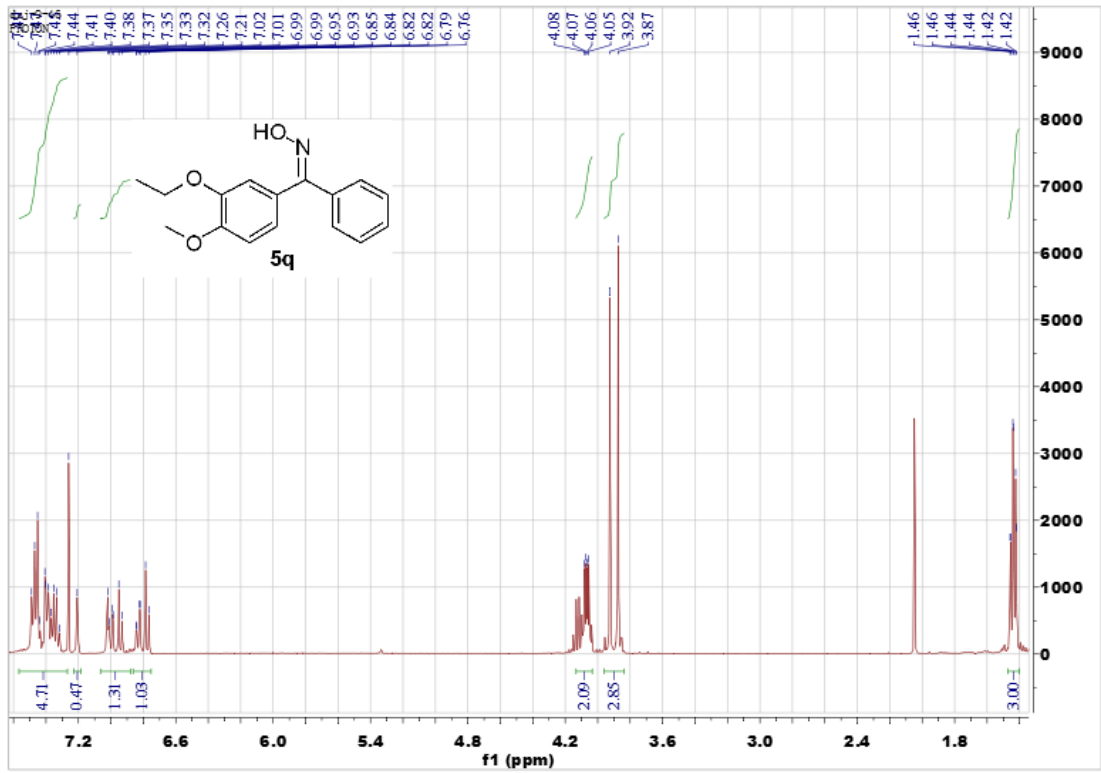


5k

Sample Name	Ic/ms	Position	P1-A6	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	5K.d	ACQ Method	chen-ms.m	Comment		Acquired Time	2/28/2014 3:40:09 PM

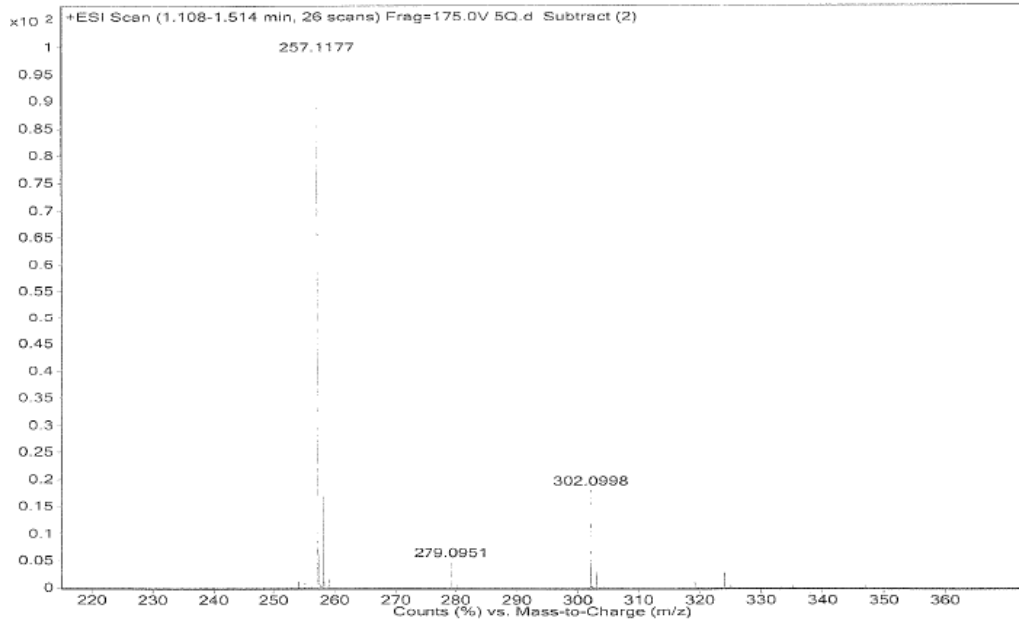


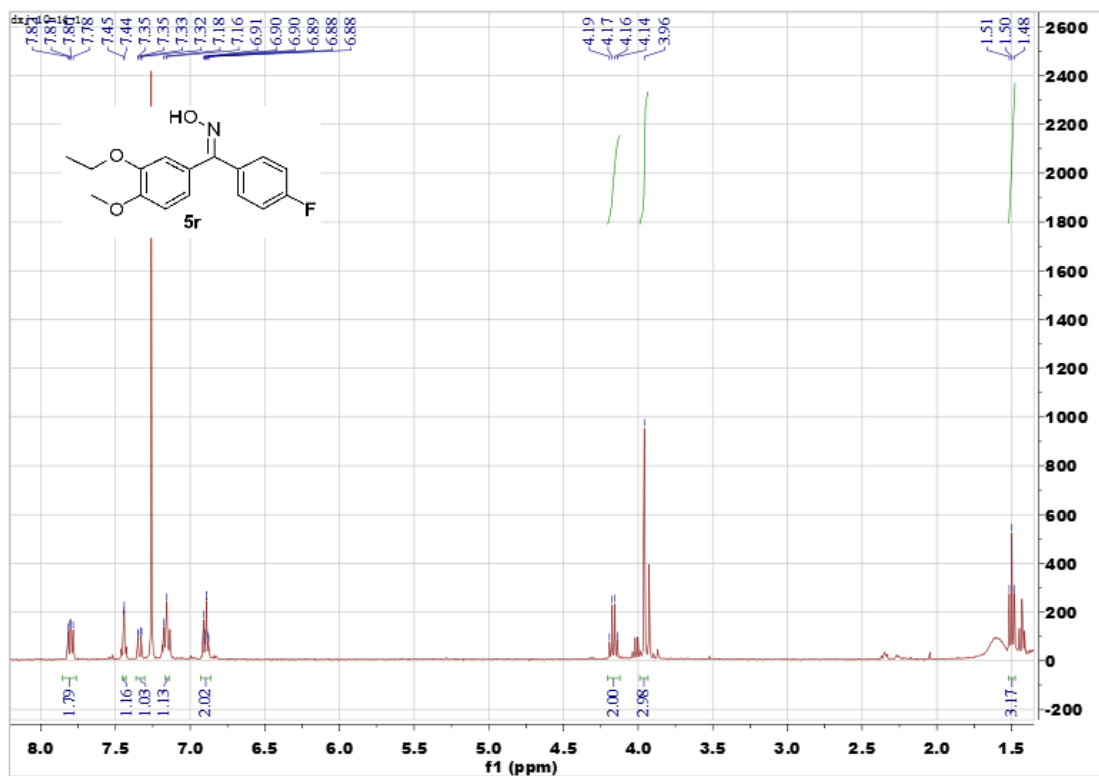
5p



5q

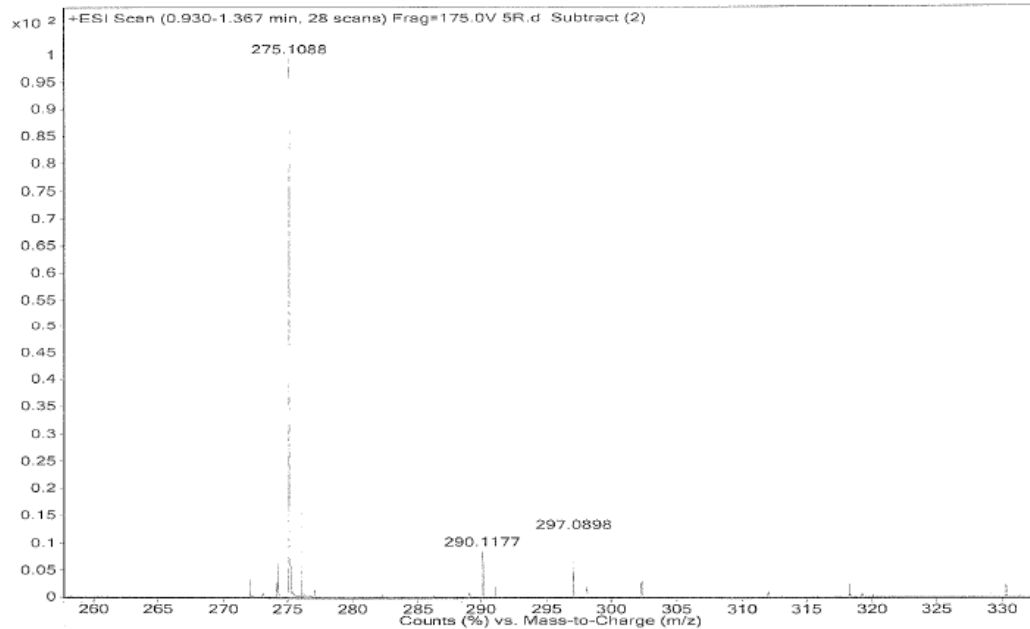
Sample Name	lc/ms	Position	P1-A7	Instrument Name	Instrument 1	User Name	IRM Calibration Status	Some Ions Missed
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status		Some Ions Missed
Data Filename	SQ.d	ACQ Method	chen-ms.m	Comment		Acquired Time		2/28/2014 3:43:52 PM

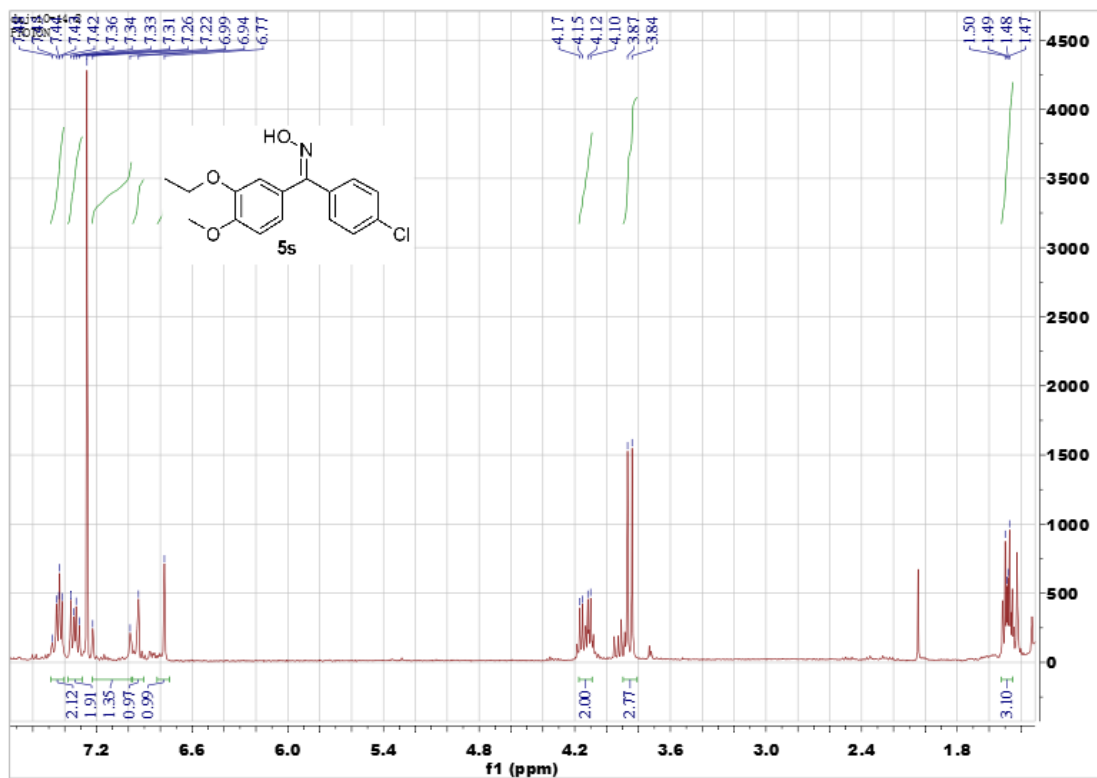




5r

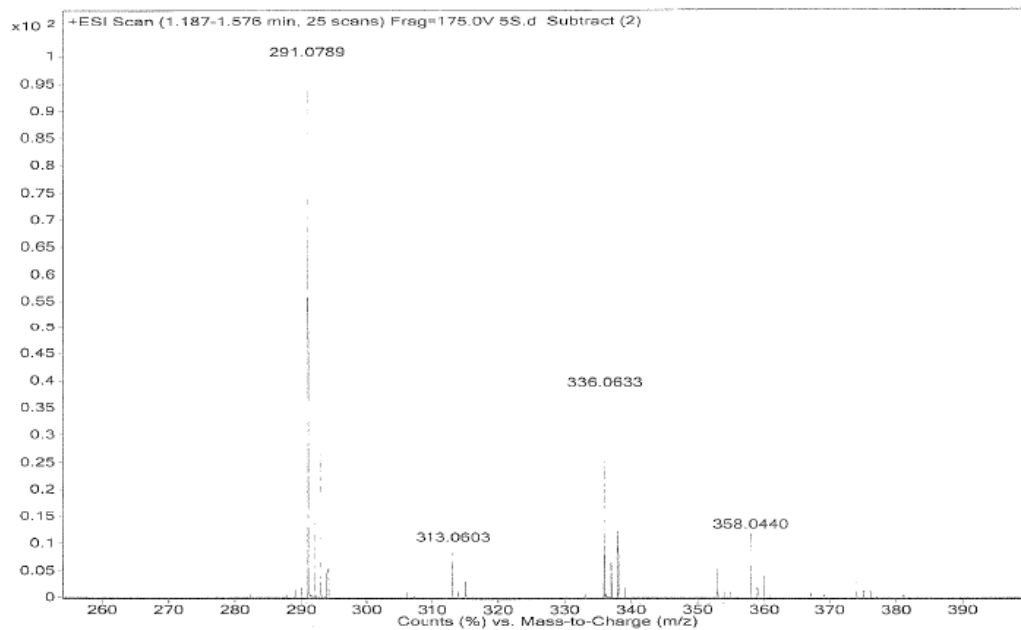
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Data Filename	SR.d	ACQ Method	chen-ims.m	Comment		Acquired Time

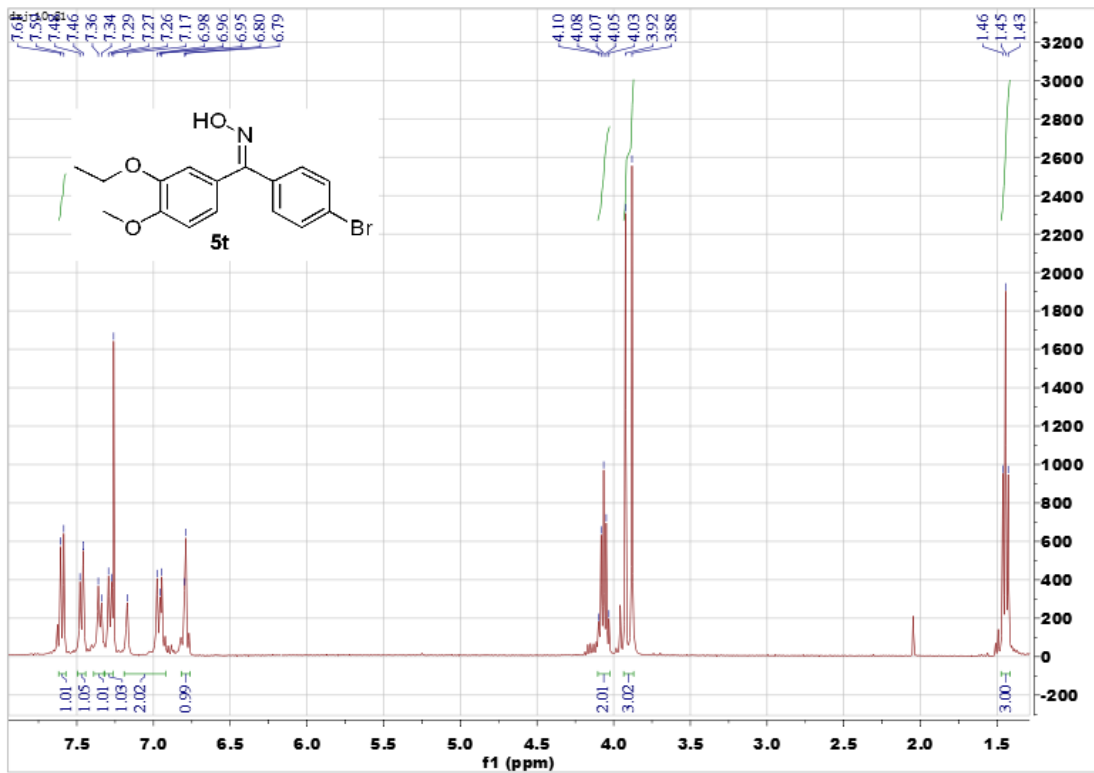




5s

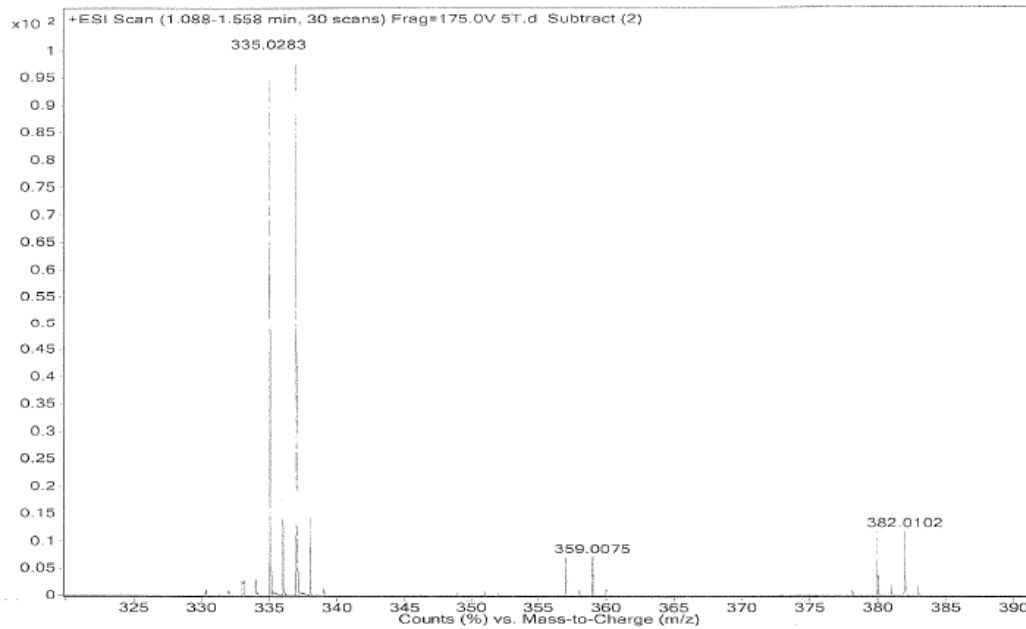
Sample Name	IC/MS	Position	P1-A4	Instrument Name	Instrument 1	User Name	IRM Calibration Status	Some Ions Missed
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status		2/28/2014 4:42:25 PM
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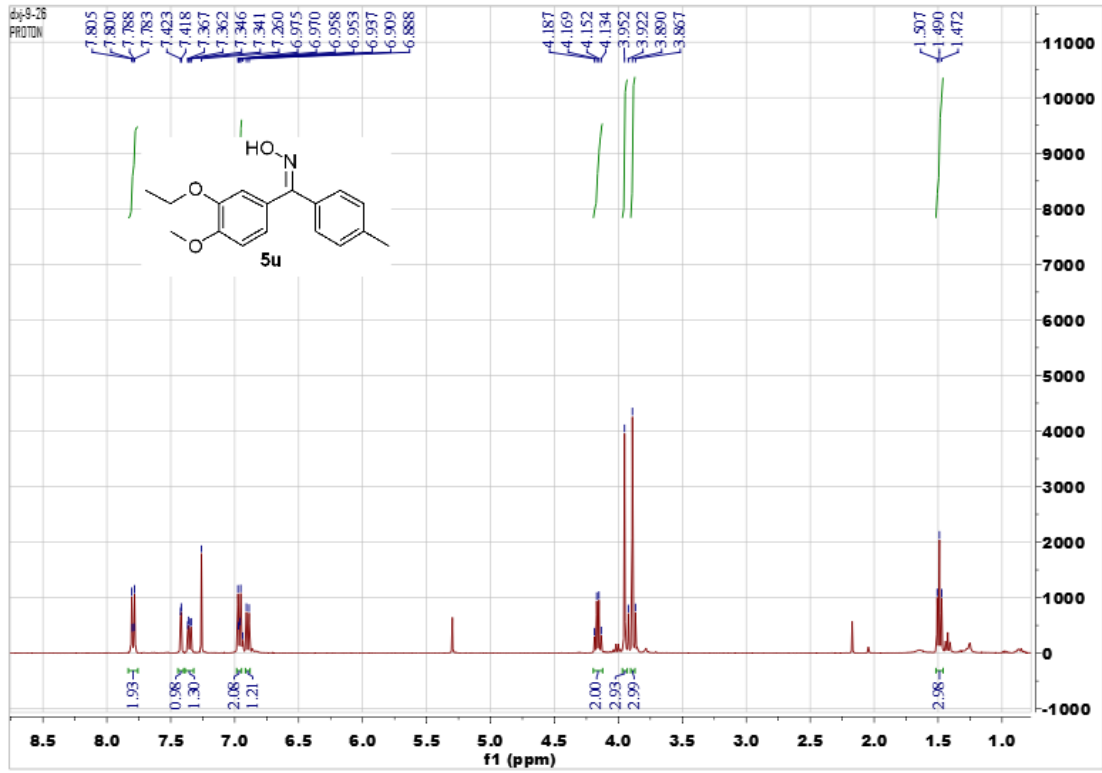




5t

Sample Name	lc/ms	Position	PI-A5	Instrument Name	Instrument 1	User Name	IRM Calibration Status	Some Ions Missed
Inj Vol	1	Inj Position		Sample Type	Sample			
Data Filename	5T.d	ACQ Method	chen-ms.m	Comment		Acquired Time		2/28/2014 4:46:07 PM

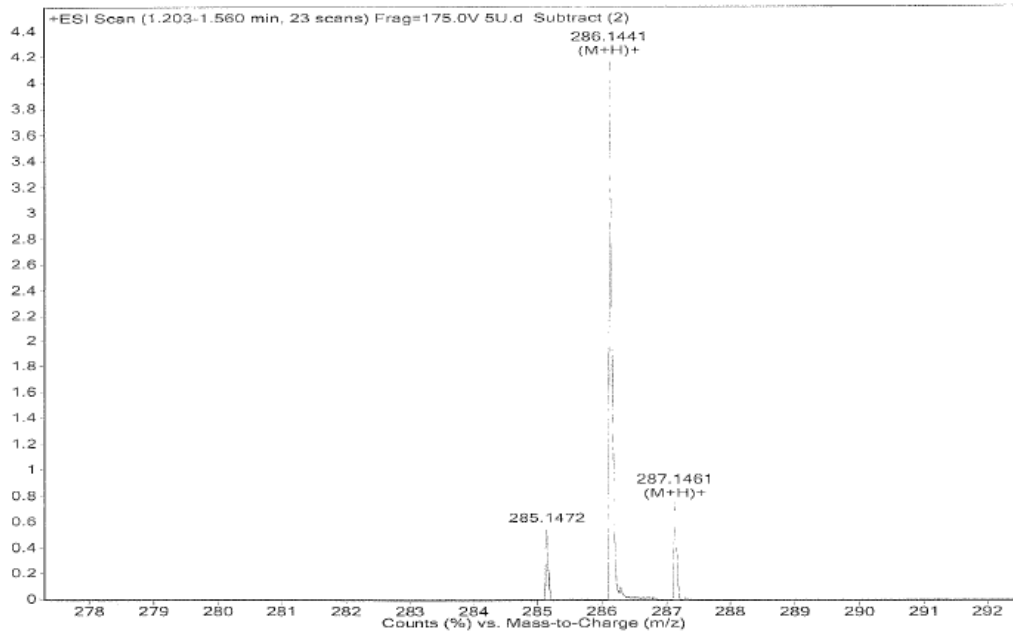


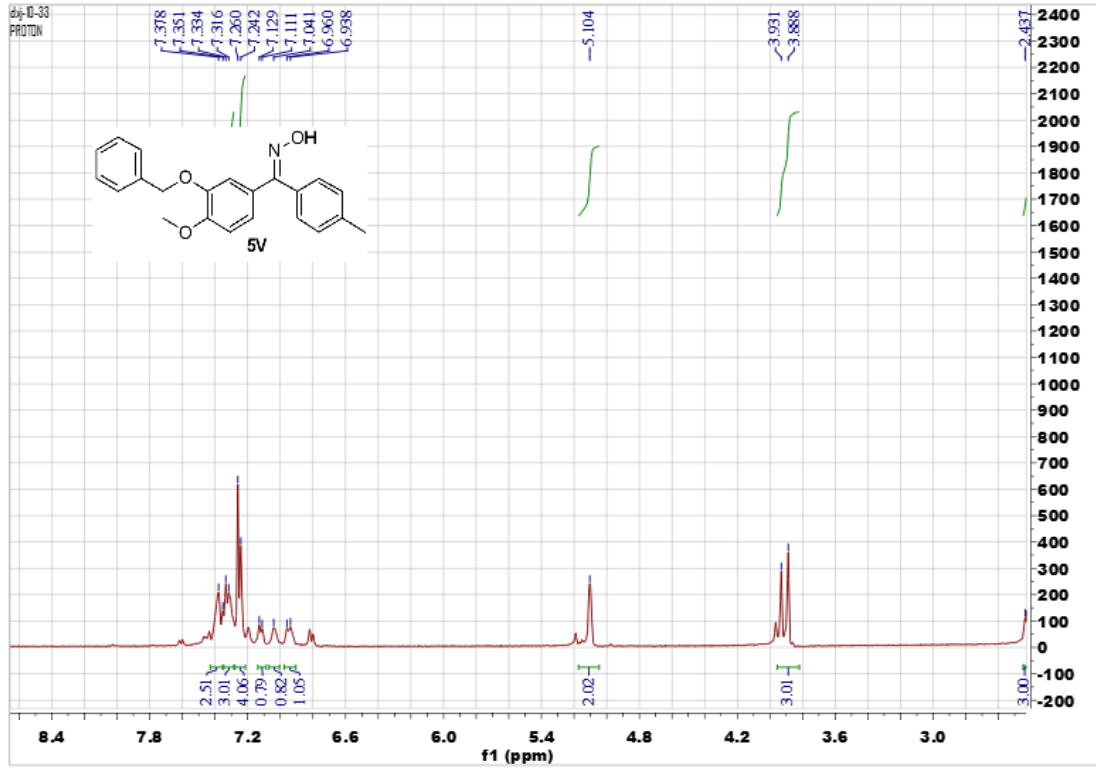


5u

Sample Name	lc/ms	Position	P1-A5	Instrument Name	Instrument 1	User Name
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status
Data Filename	5U.d	ACQ Method	chen-ins.m	Comment		Acquired Time

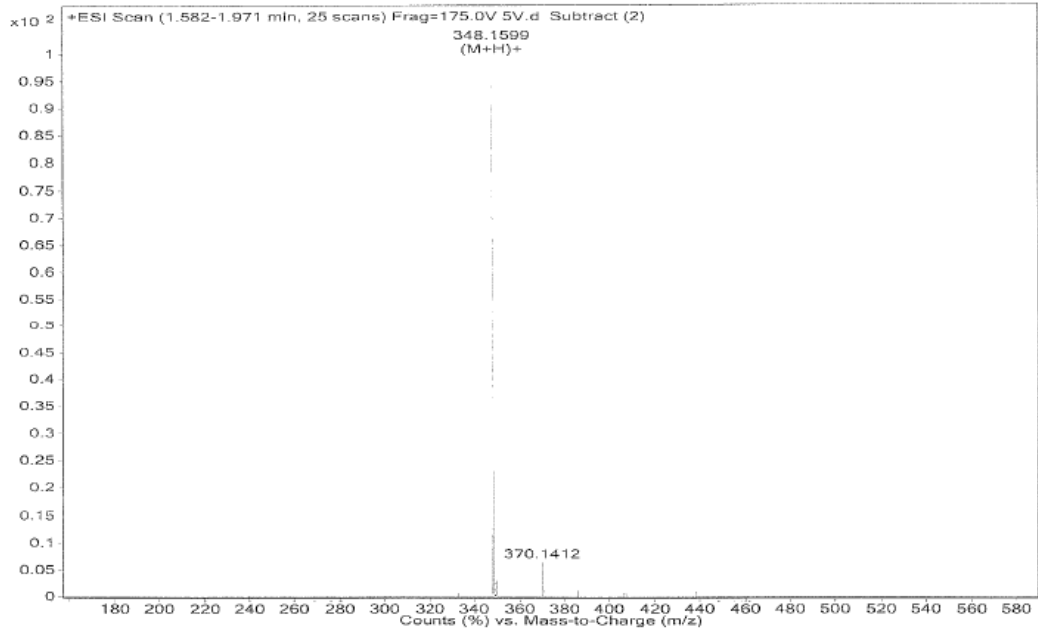
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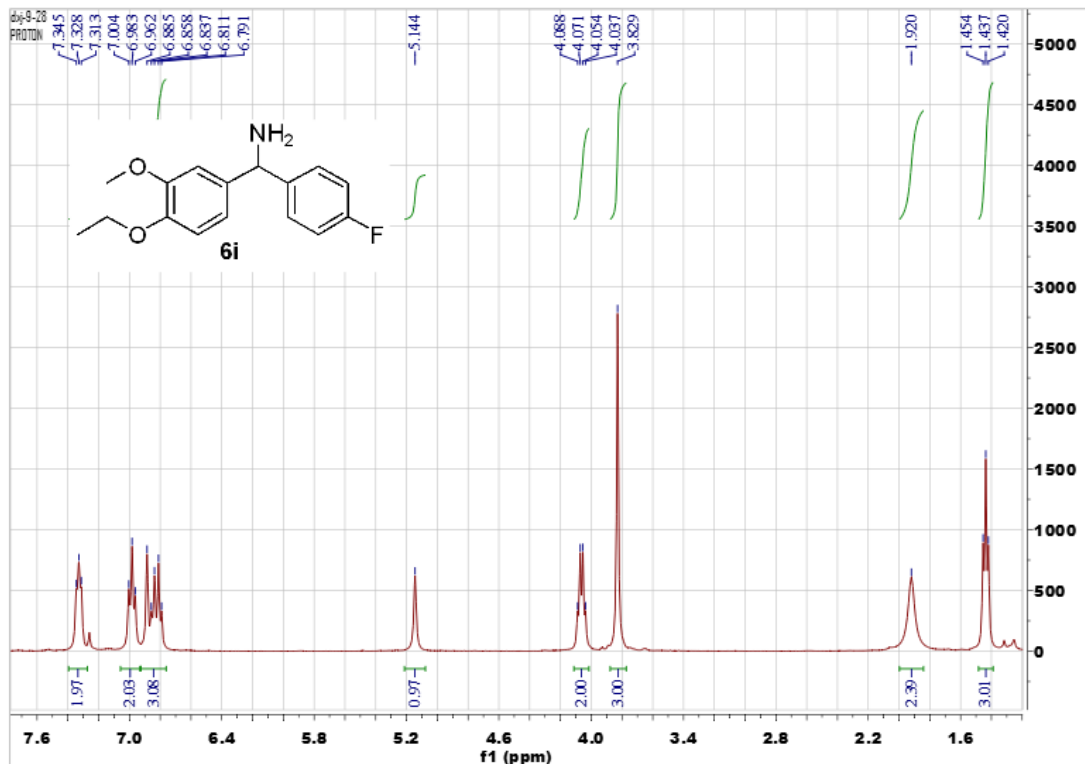




5v

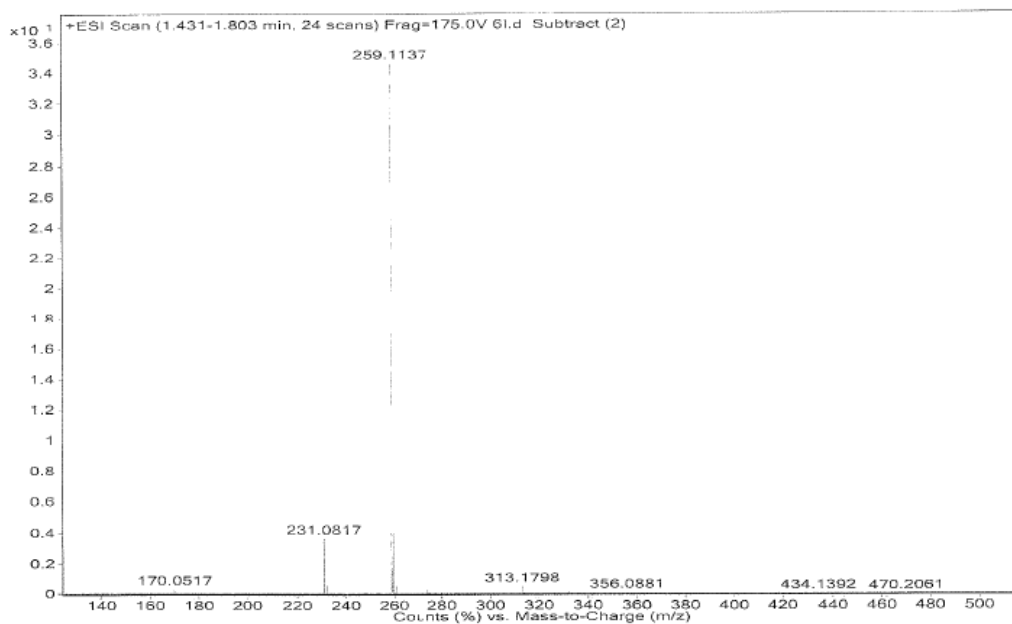
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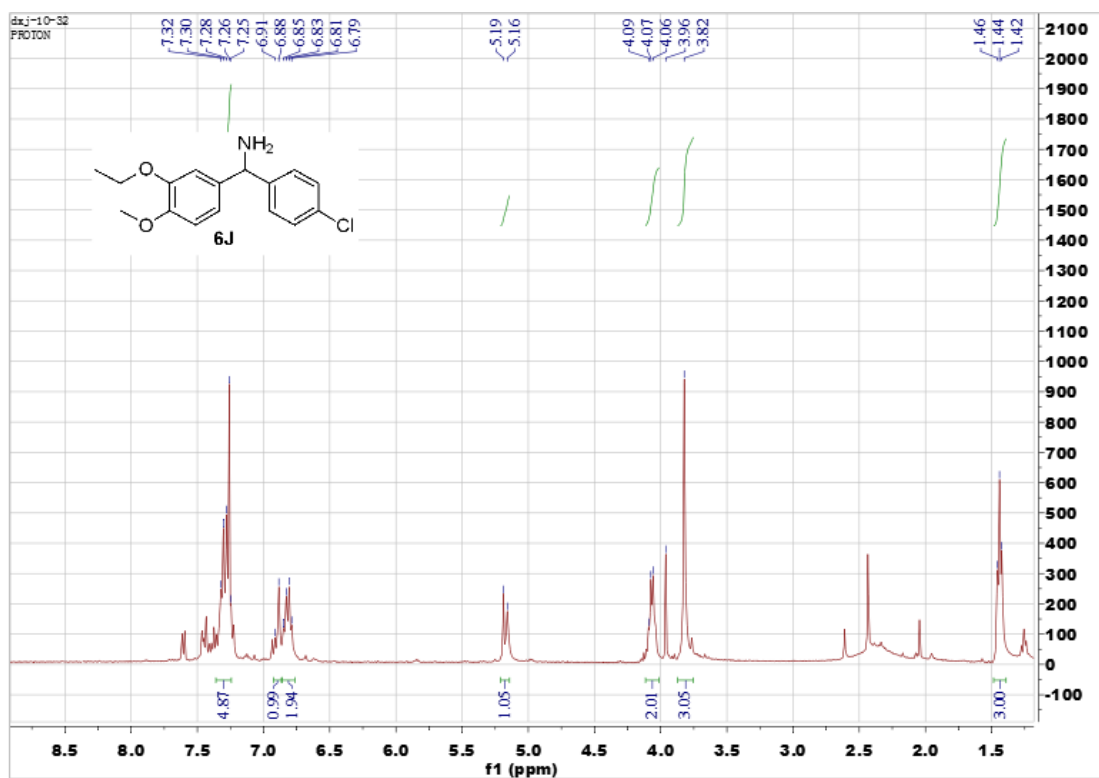




6i

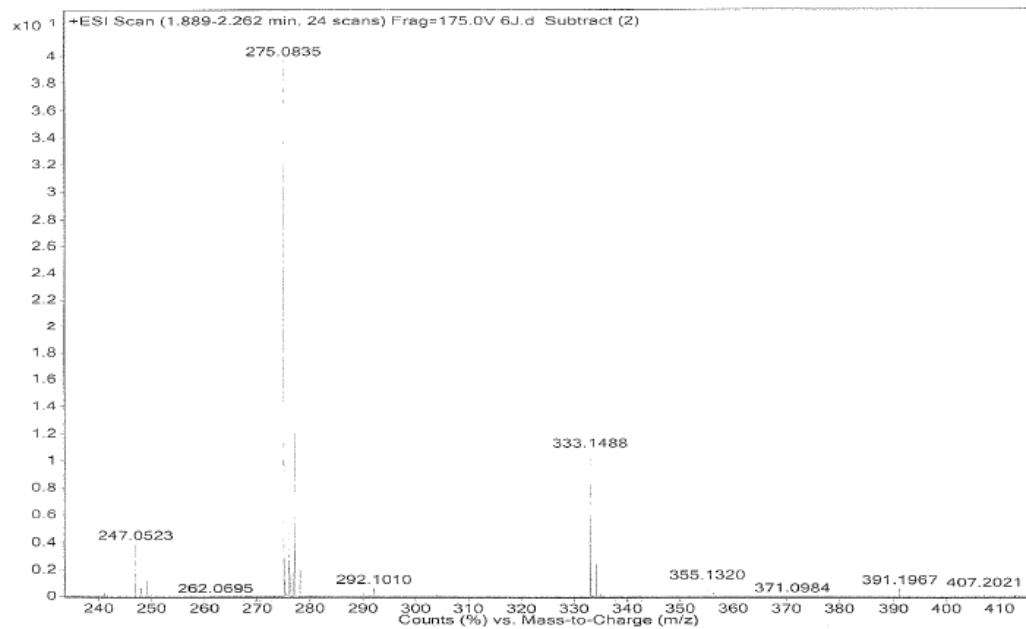
Sample Name	IC/MS	Position	P1-A3	Instrument Name	Instrument 1	User Name	IRM Calibration Status	Some Ions Missed
Inj Vol	1	InjPosition		SampleType	Sample			
Data Filename	61.d	ACQ Method	chen-ms.m	Comment		Acquired Time		2/28/2014 5:23:37 PM

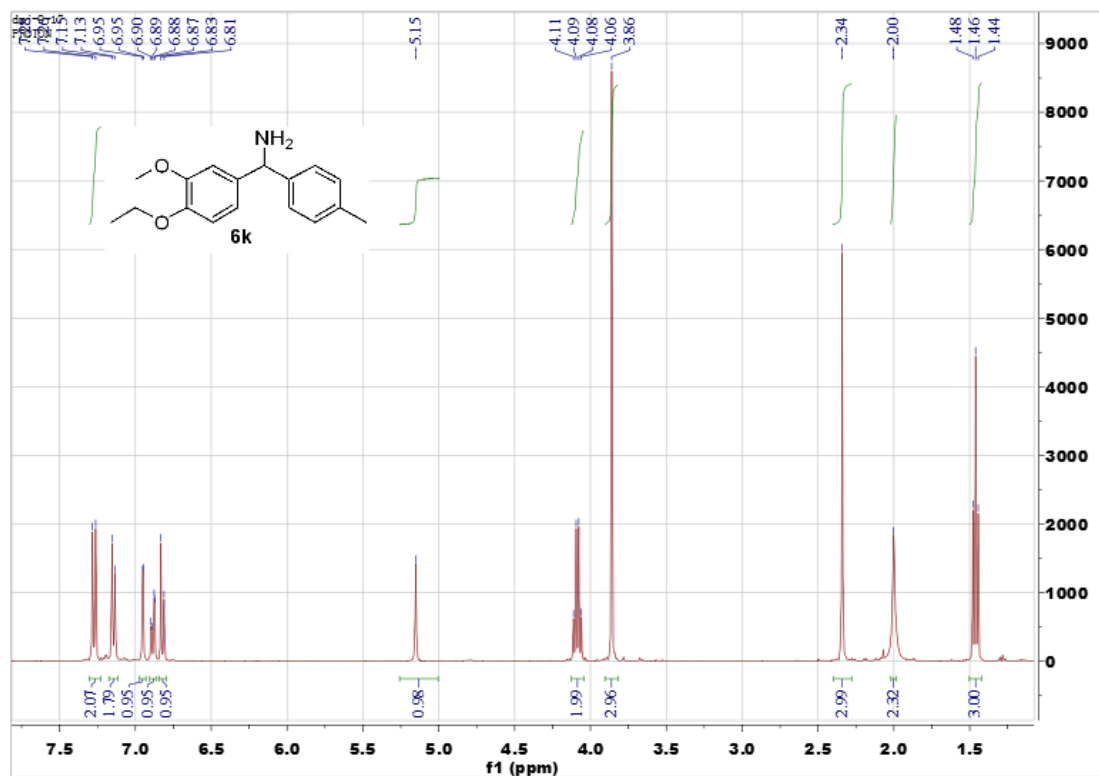




6j

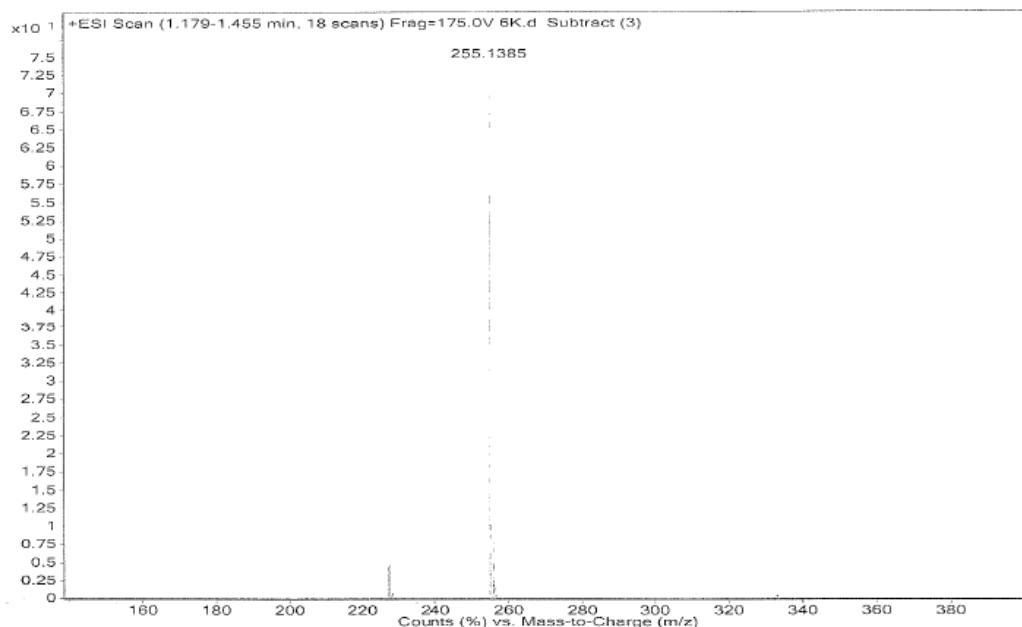
Sample Name	lc/ms	Position	P1-A4	Instrument Name	Instrument 1	User Name	IRM Calibration Status	Some Ions Missed
Inj Vol	1	InjPosition		SampleType	Sample			
Data Filename	6j.d	ACQ Method	chem-ms.m	Comment		Acquired Time		2/28/2014 5:27:20 PM

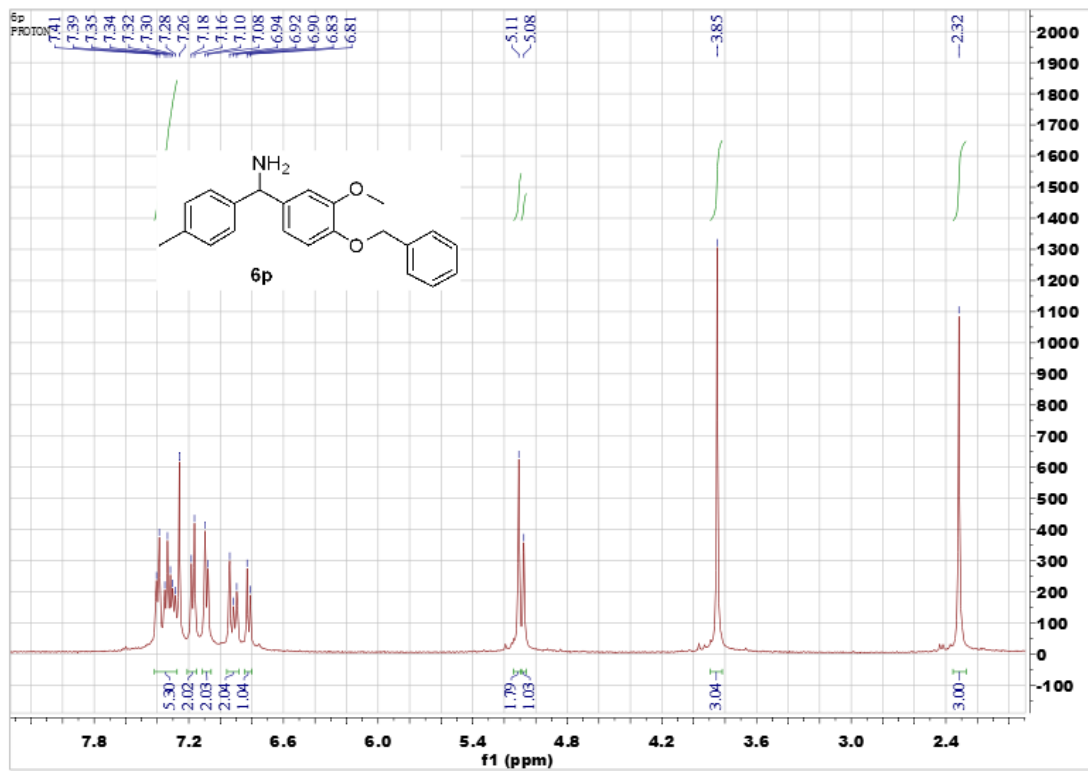




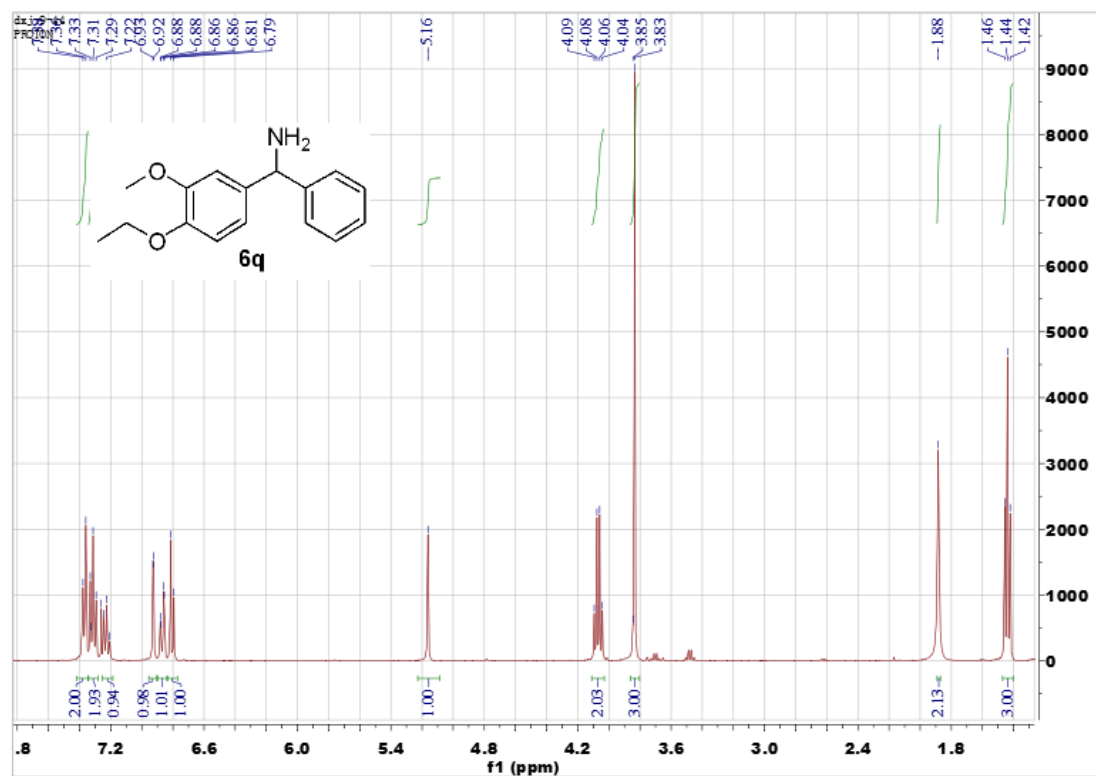
6k

Sample Name	lc/ms	Position	PI-AL	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	6K.d	ACQ Method	chen-ms.m	Comment		Acquired Time	3/3/2014 8:56:45 AM



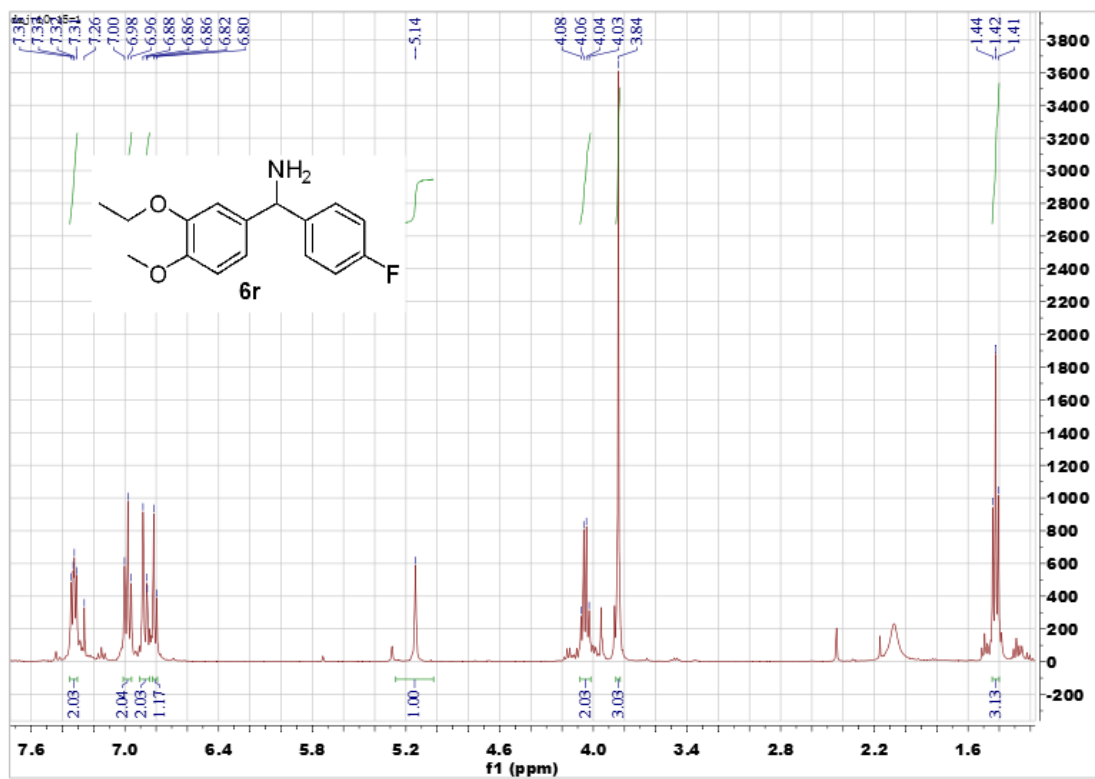
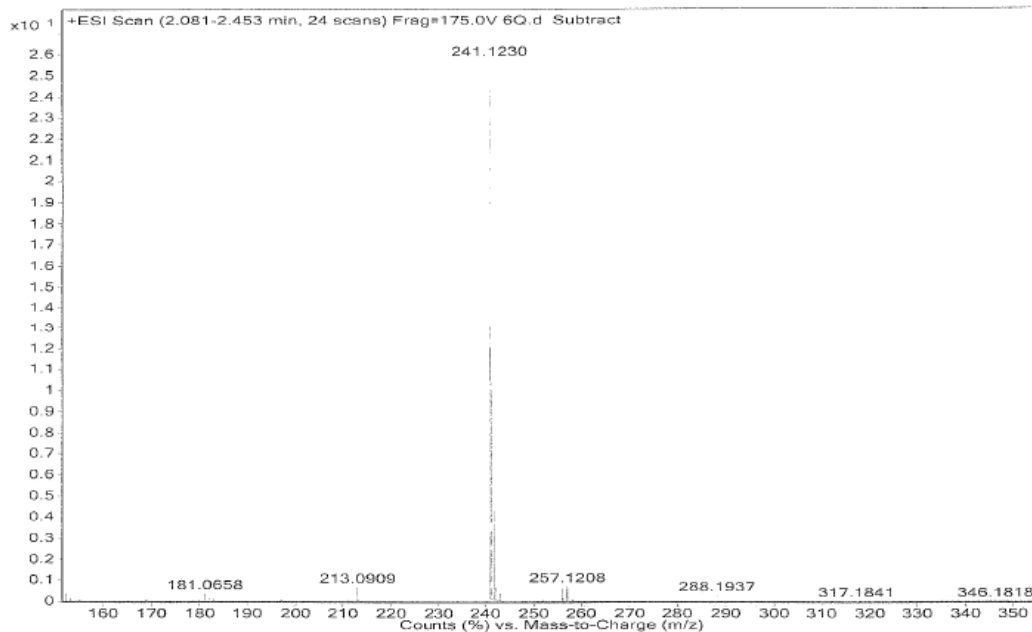


6p



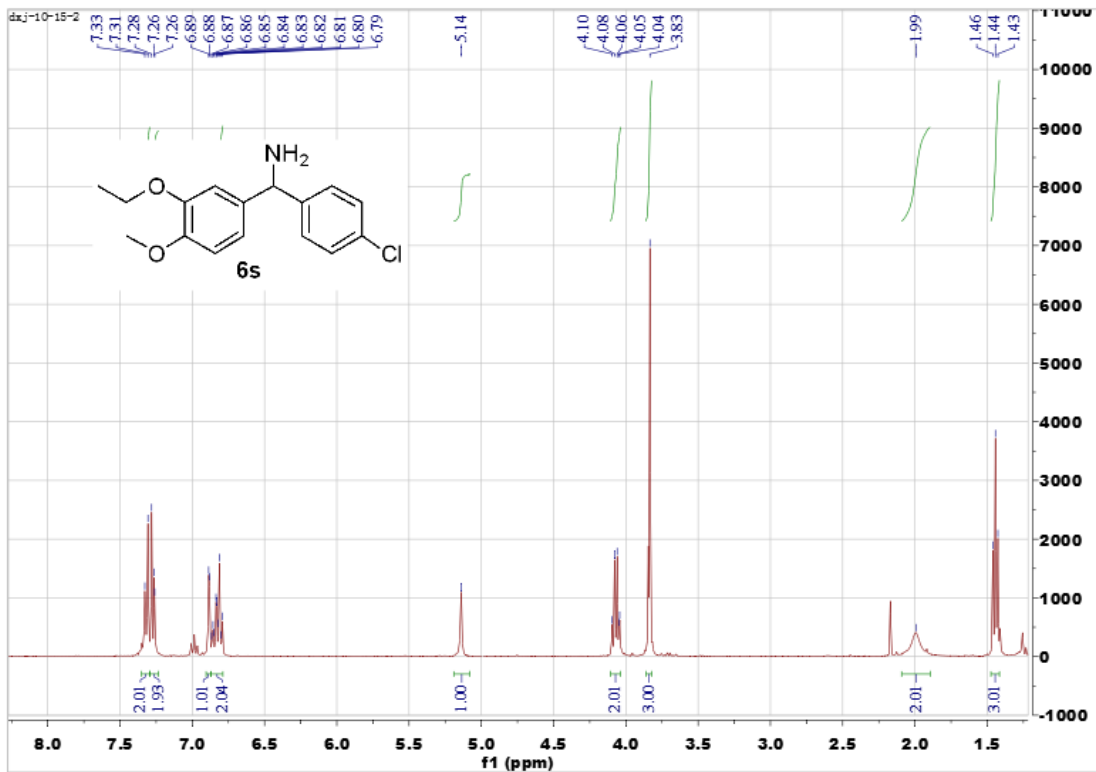
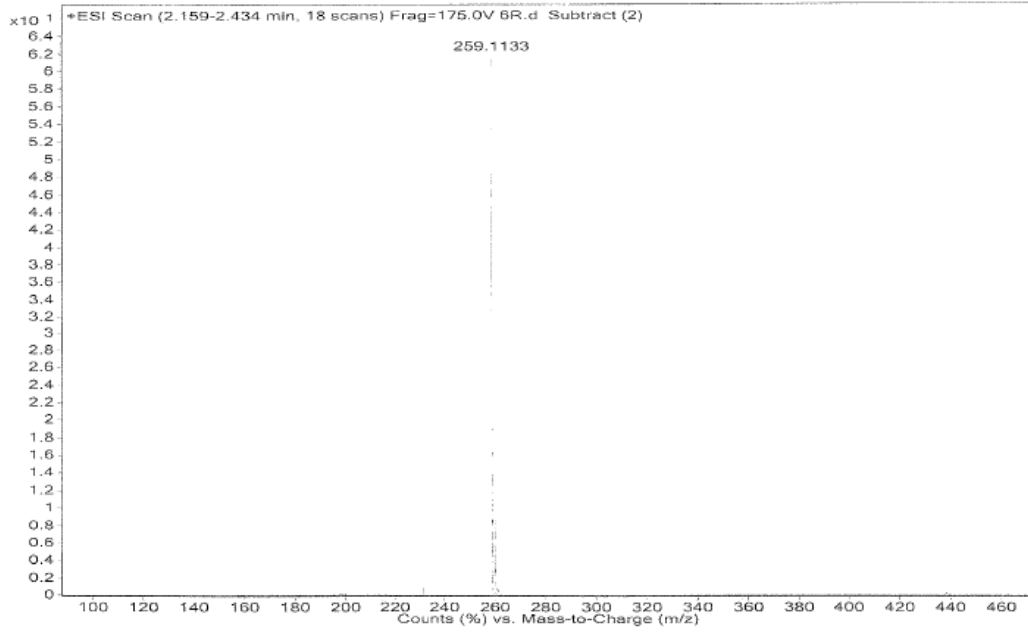
6q

Sample Name	lc/ms	Position	P1-A2	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	6Q.d	ACQ Method	chem-ms.m	Comment		Acquired Time	3/3/2014 9:00:26 AM



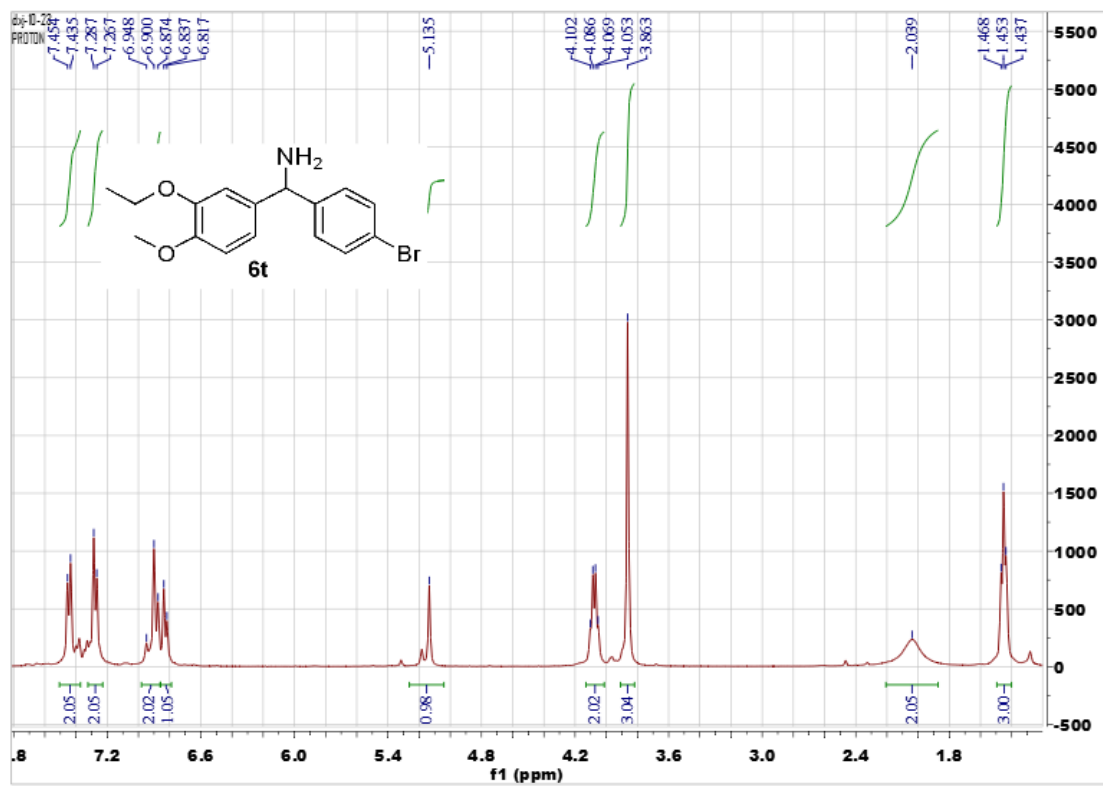
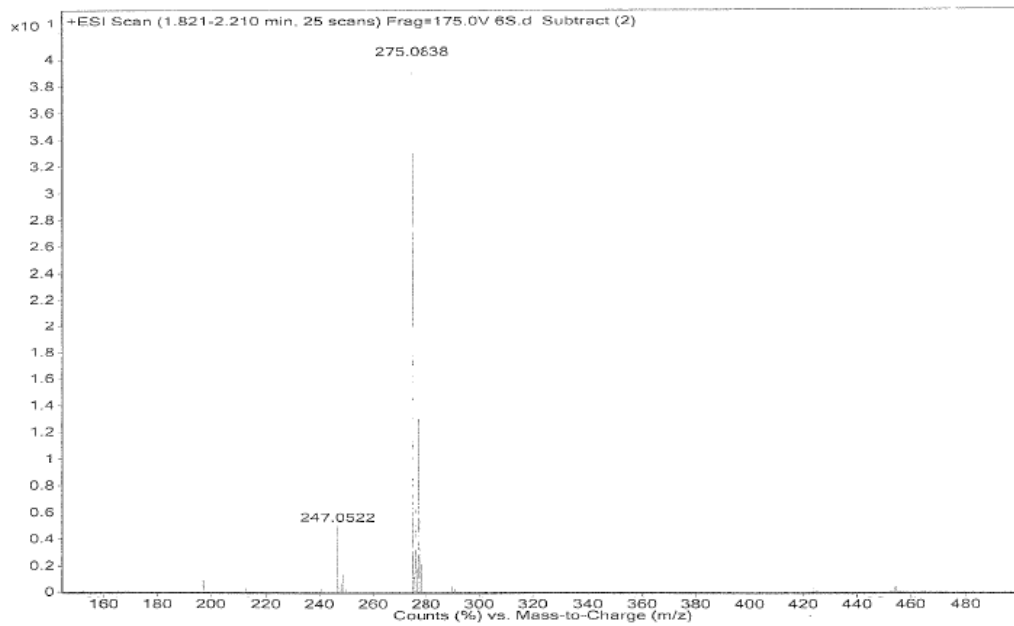
6r

Sample Name	k/ms	Position	P1-A3	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	6R.d	ACQ Method	chem-ms.m	Comment		Acquired Time	3/3/2014 9:04:08 AM



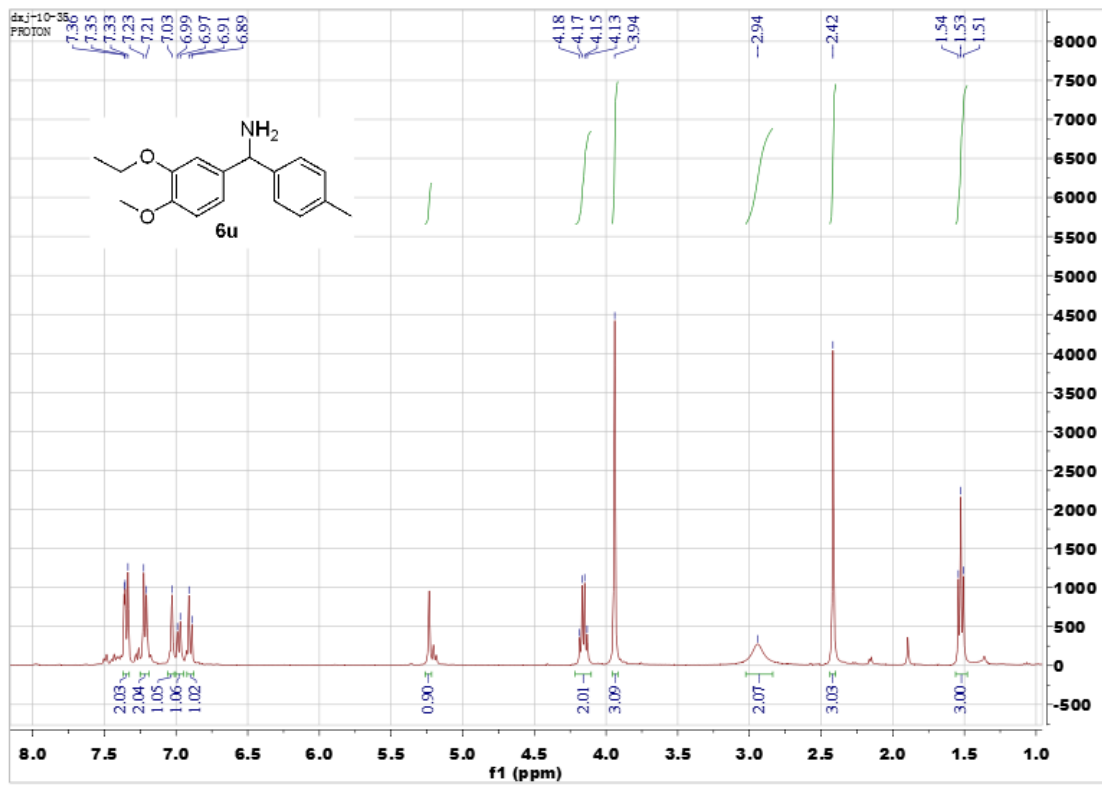
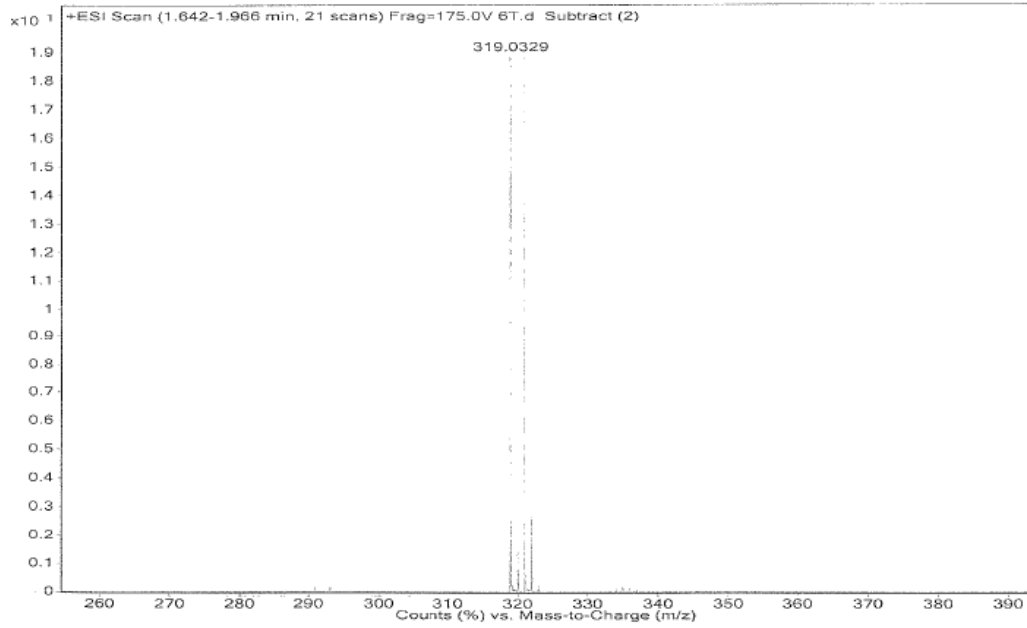
6s

Sample Name	lc/ms	Position	P1-A4	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	6S.d	ACQ Method	chem-ims.m	Comment		Acquired Time	3/3/2014 9:07:49 AM



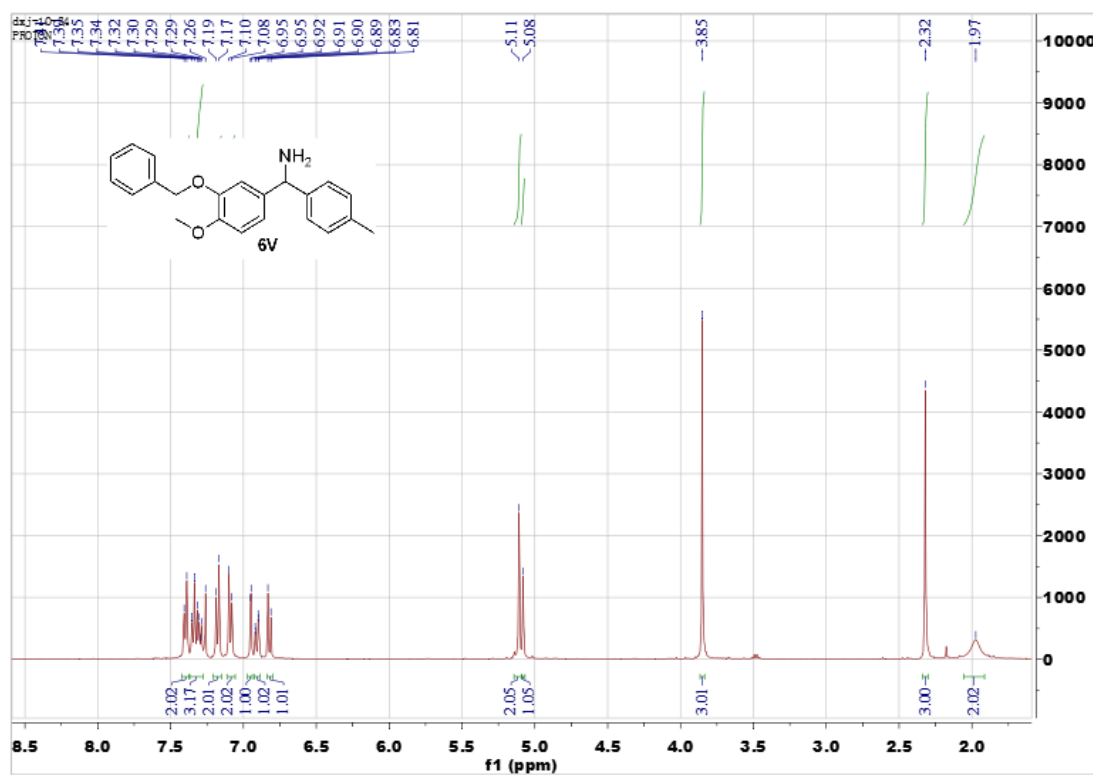
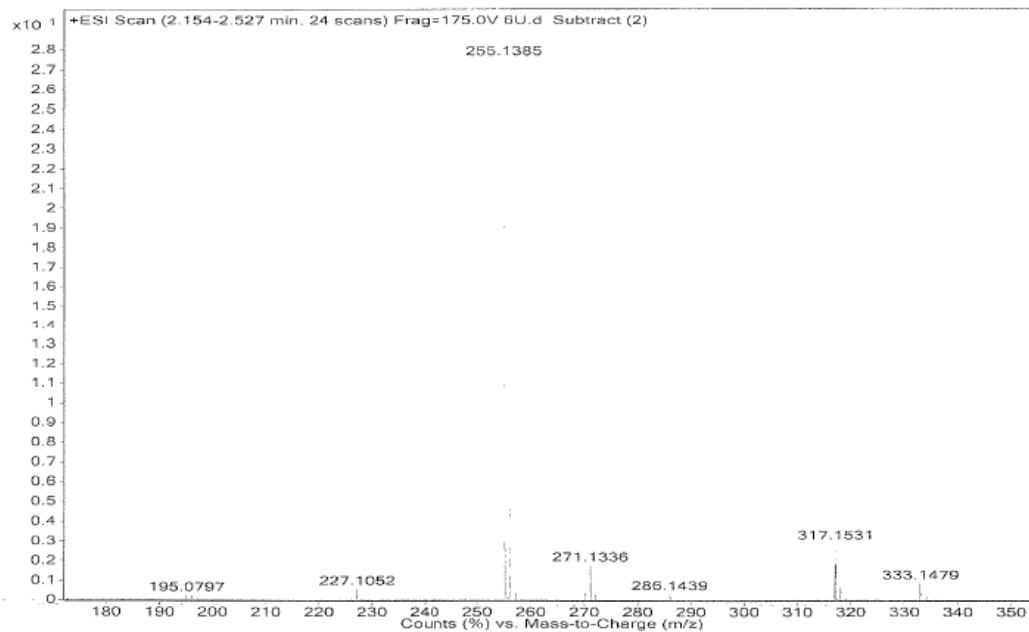
6t

Sample Name	lc/ms	Position	PI-A5	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	6T.d	ACQ Method	chem-ims.m	Comment		Acquired Time	3/3/2014 9:11:31 AM



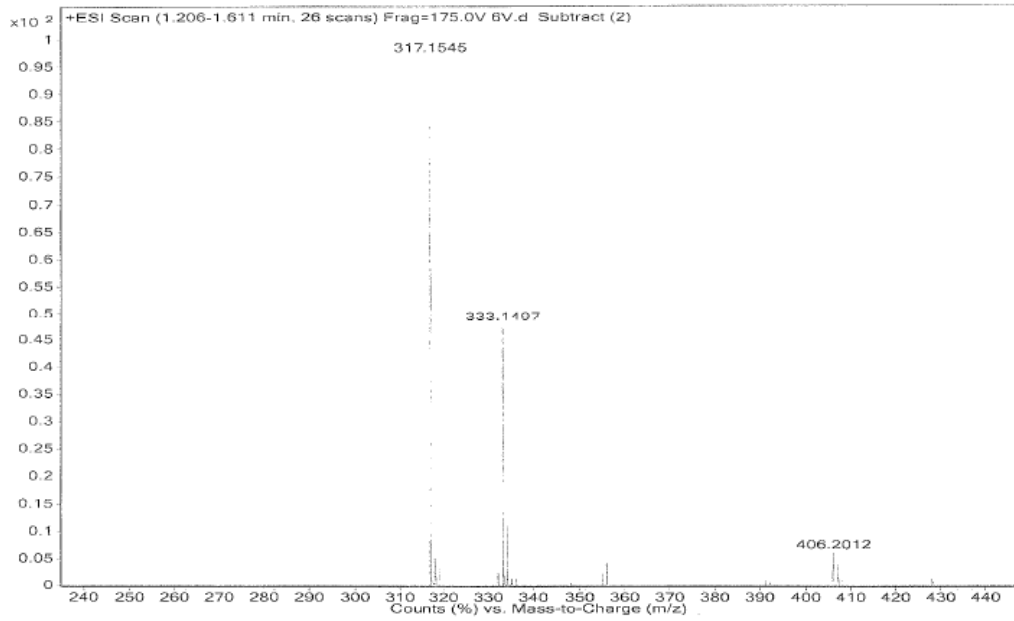
6u

Sample Name	l2/ms	Position	P1-A6	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	6U.d	ACQ Method	chen-ms.m	Comment		Acquired Time	3/3/2014 9:15:14 AM

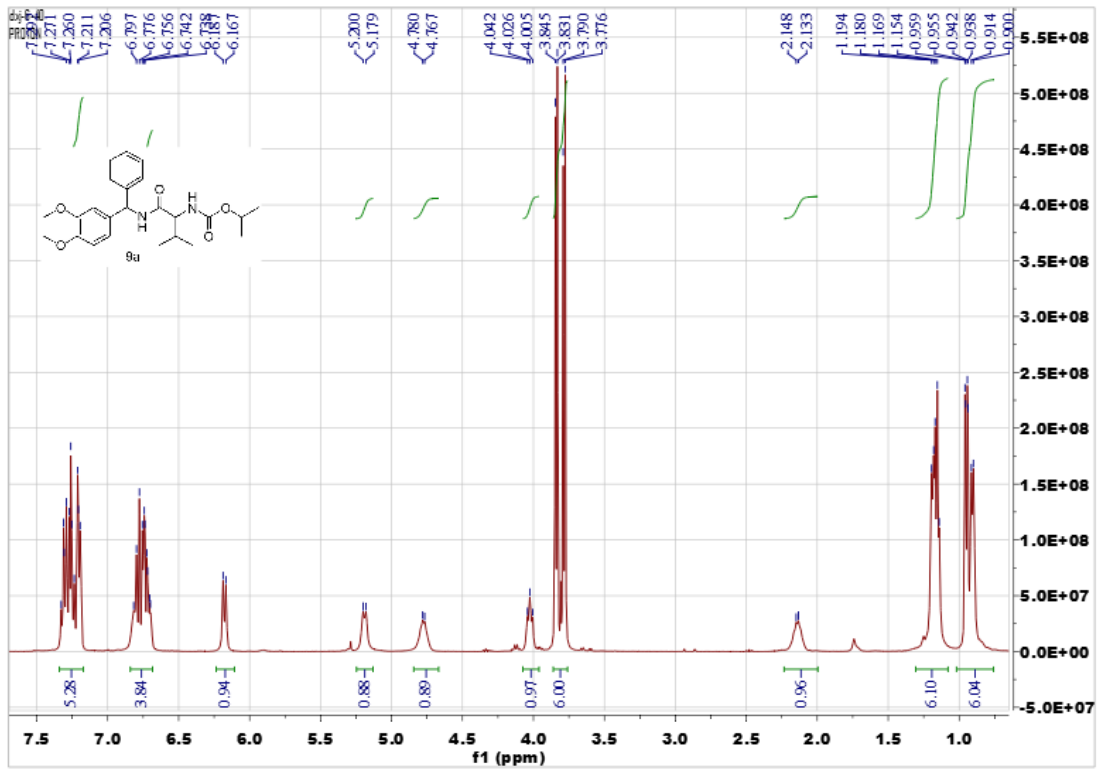


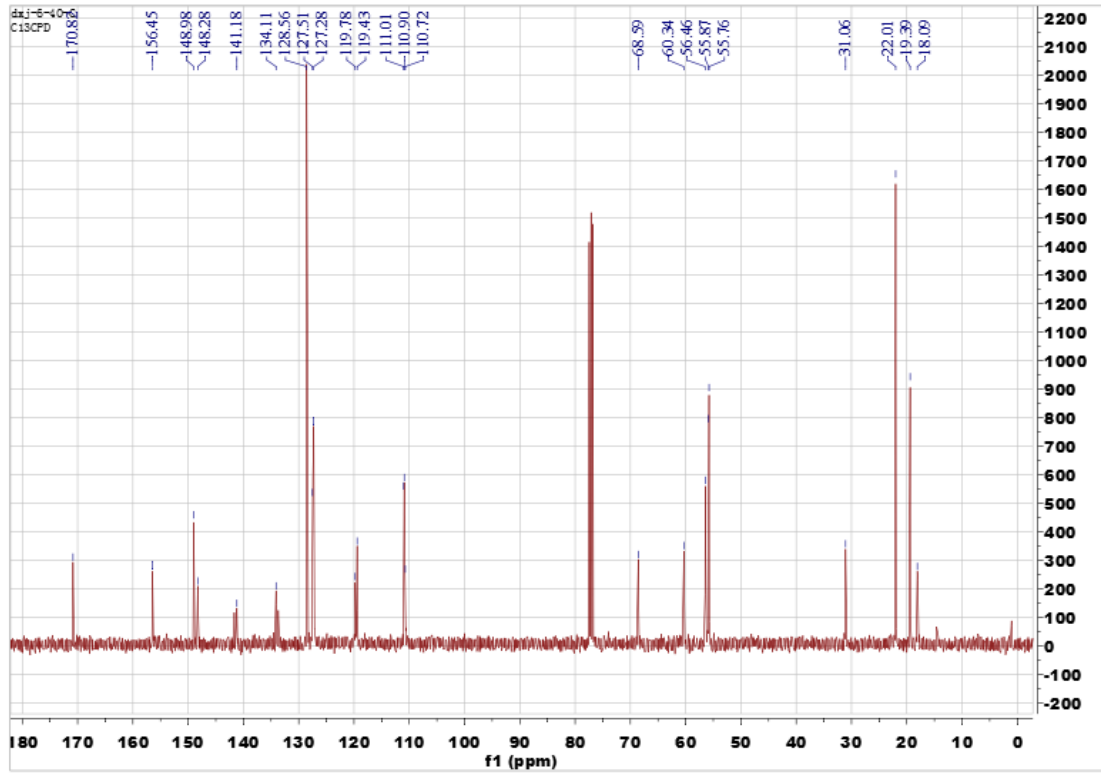
6V

Sample Name	k/ms	Position	P1-A7	Instrument Name	Instrument 1	User Name	
Inj Vol	1	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	6V.d	ACQ Method	chen-ms.m	Comment		Acquired Time	3/3/2014 9:18:54 AM

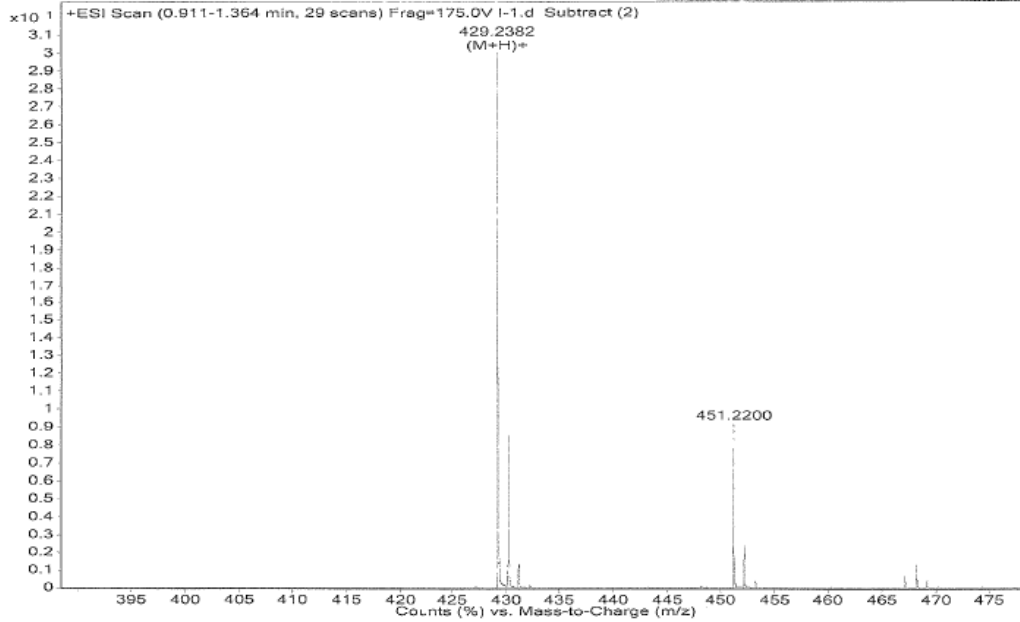


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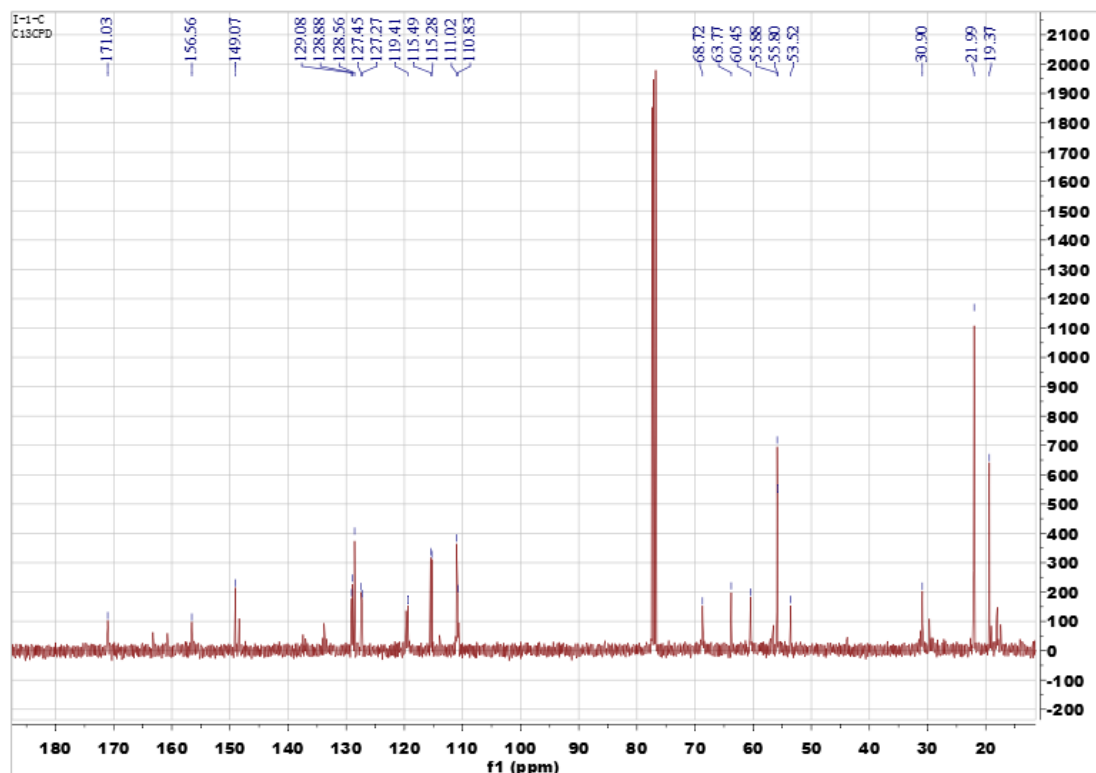
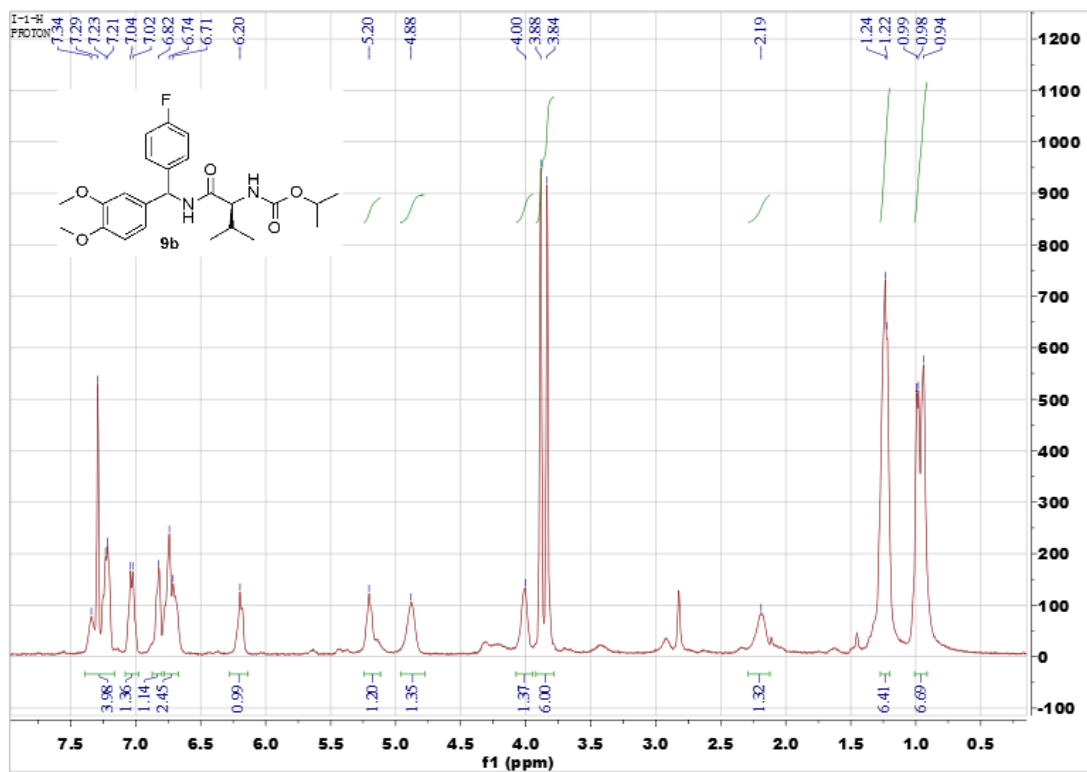


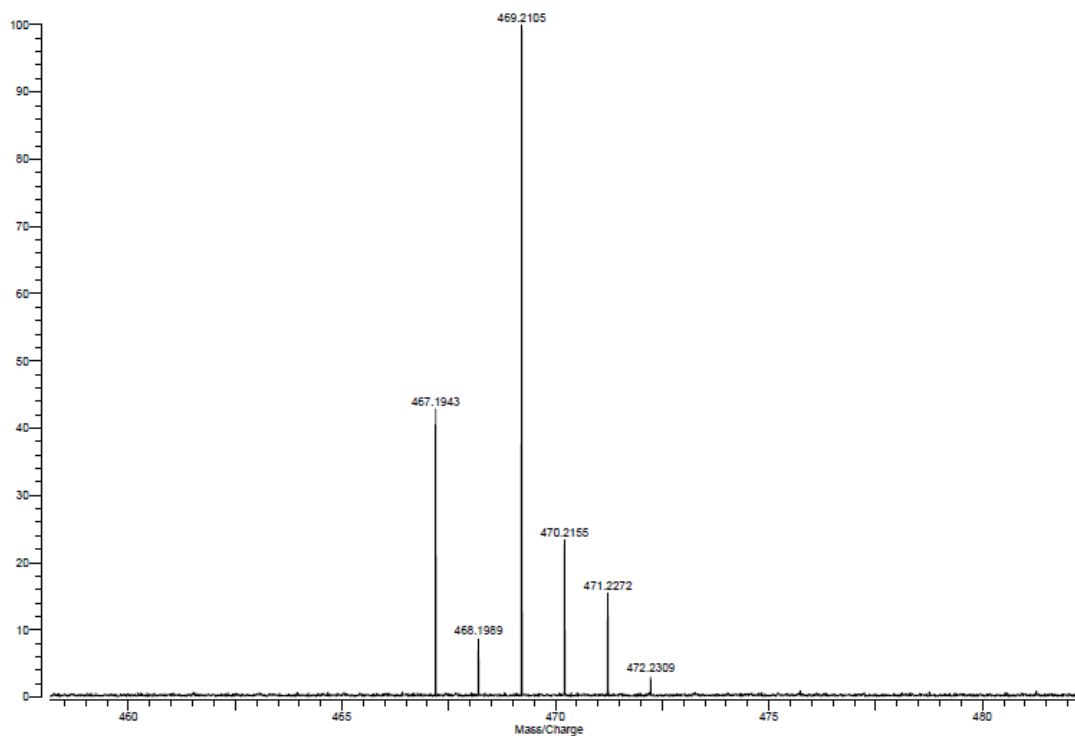


Sample Name	k/ms	Position	P1-A1	Instrument Name	Instrument 1	User Name	Some Ions Missed
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status	9/23/2013 10:19:27 AM
Data Filename	I-1.d	ACQ Method	chen-ms.m	Comment		Acquired Time	

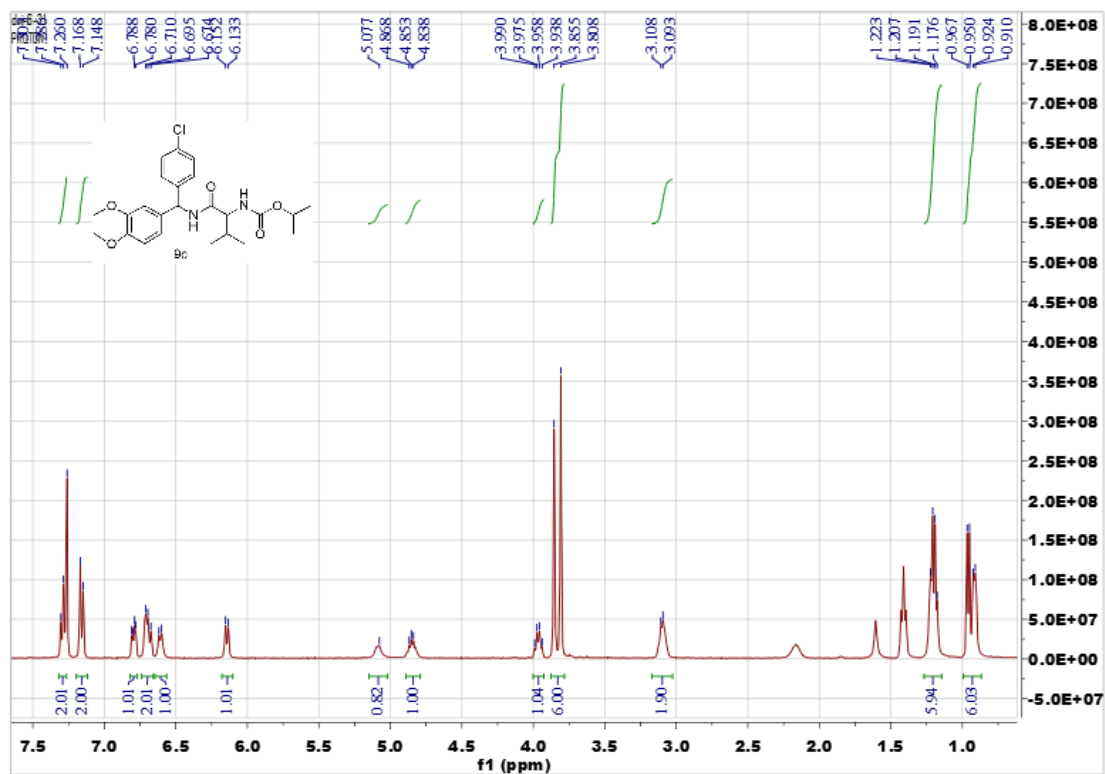


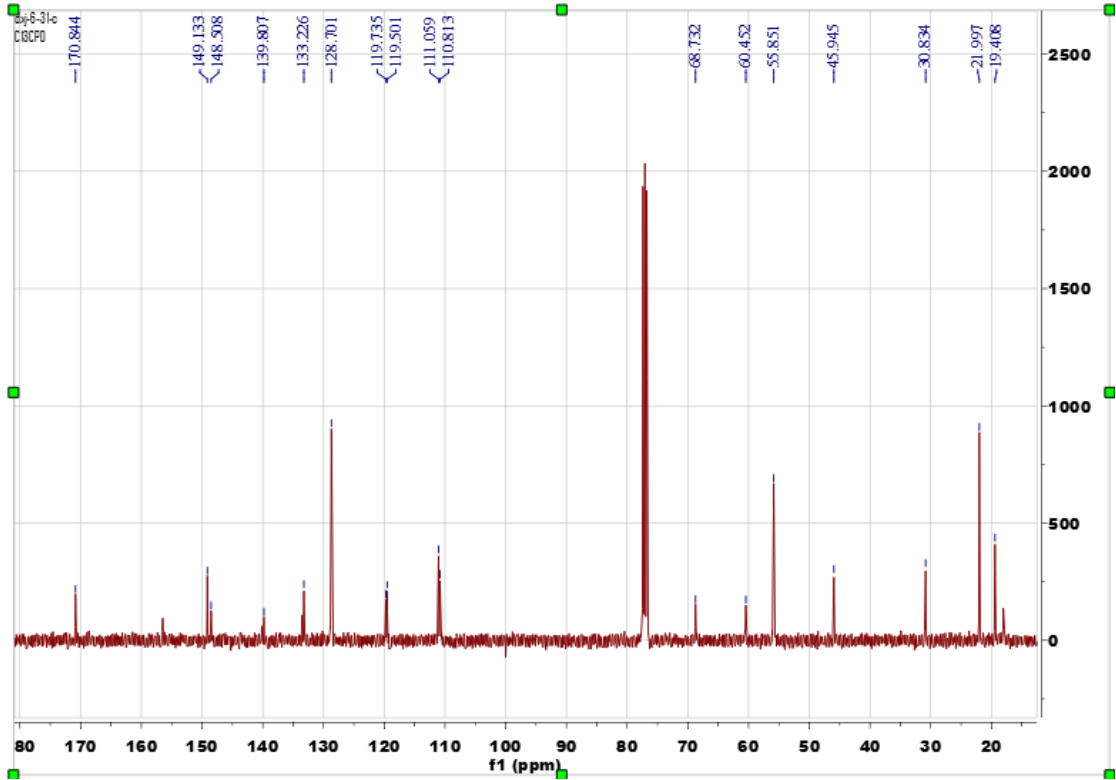
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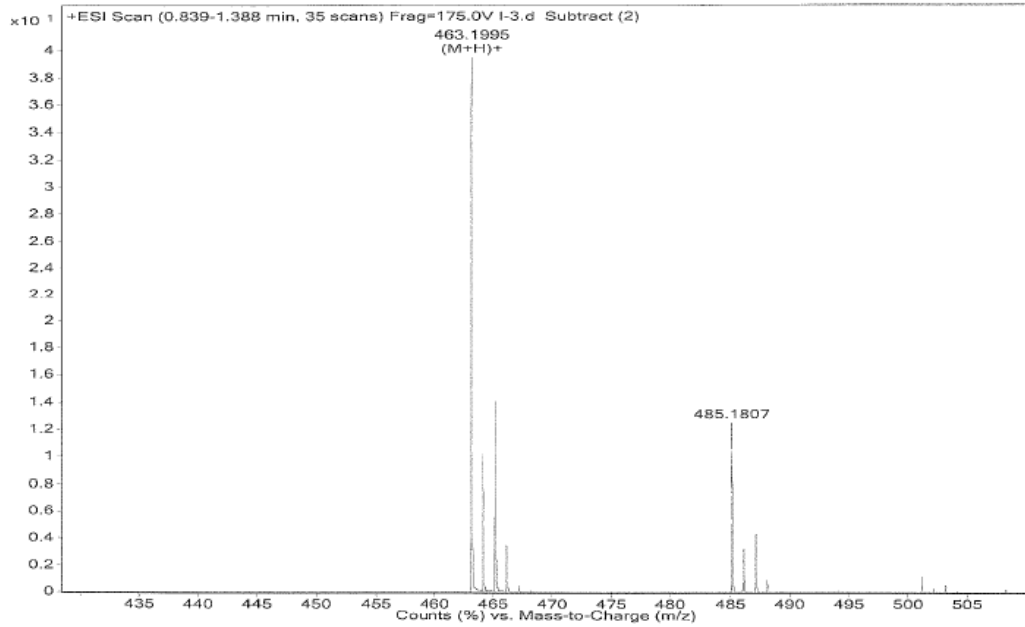


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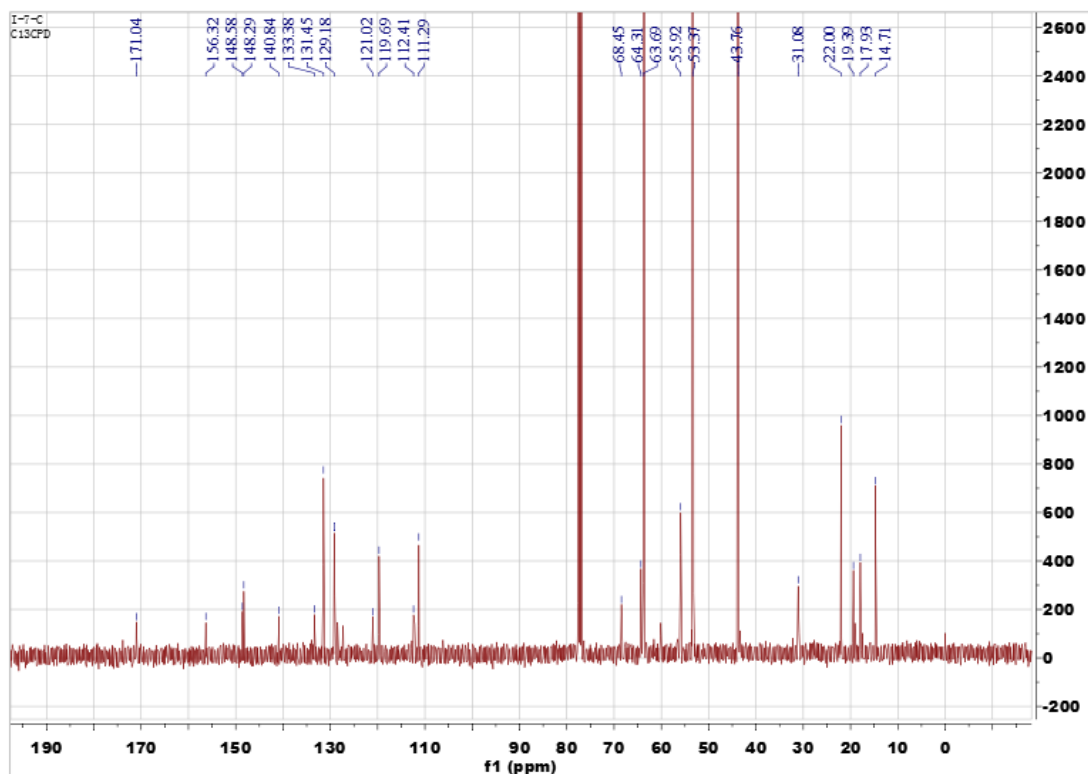
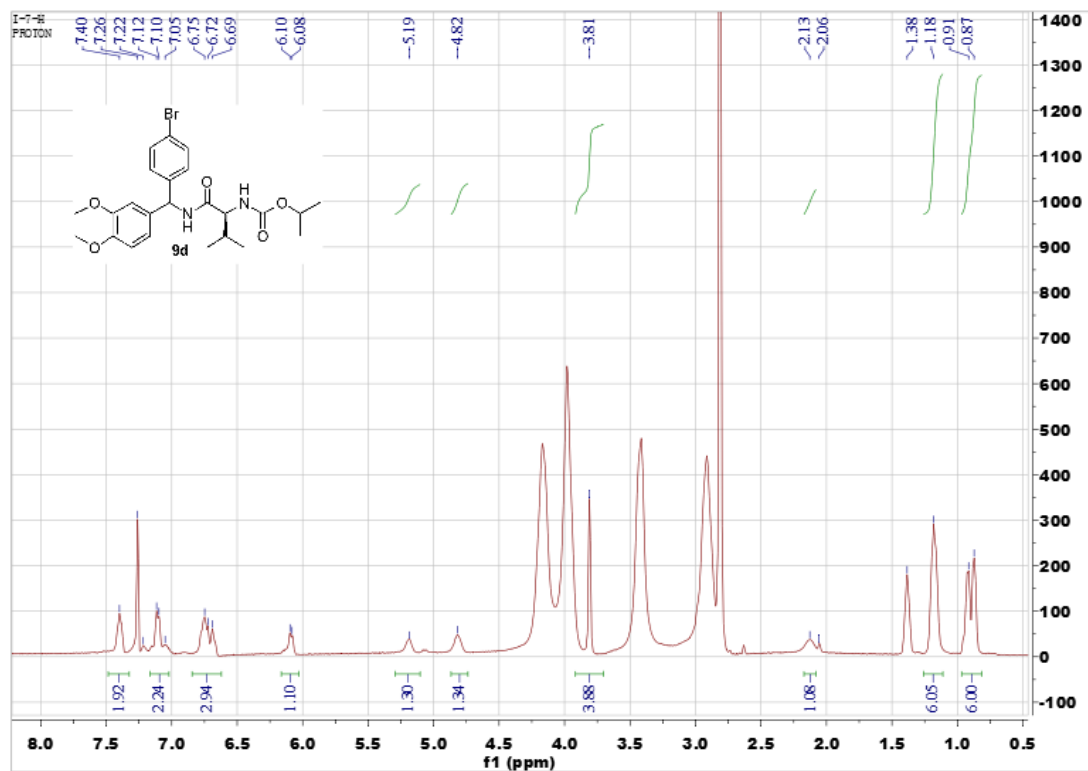




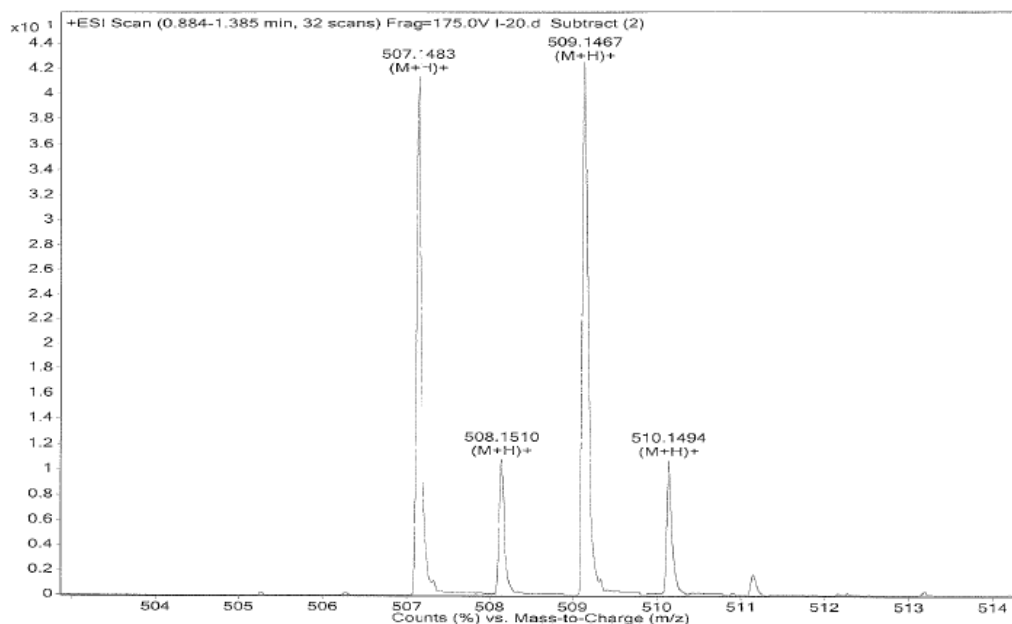
Sample Name	lc/ms	Position	PI-A2	Instrument Name	Instrument 1	User Name	
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	1-3.d	ACQ Method	chen-ms.m	Comment		Acquired Time	9/23/2013 10:23:13 AM



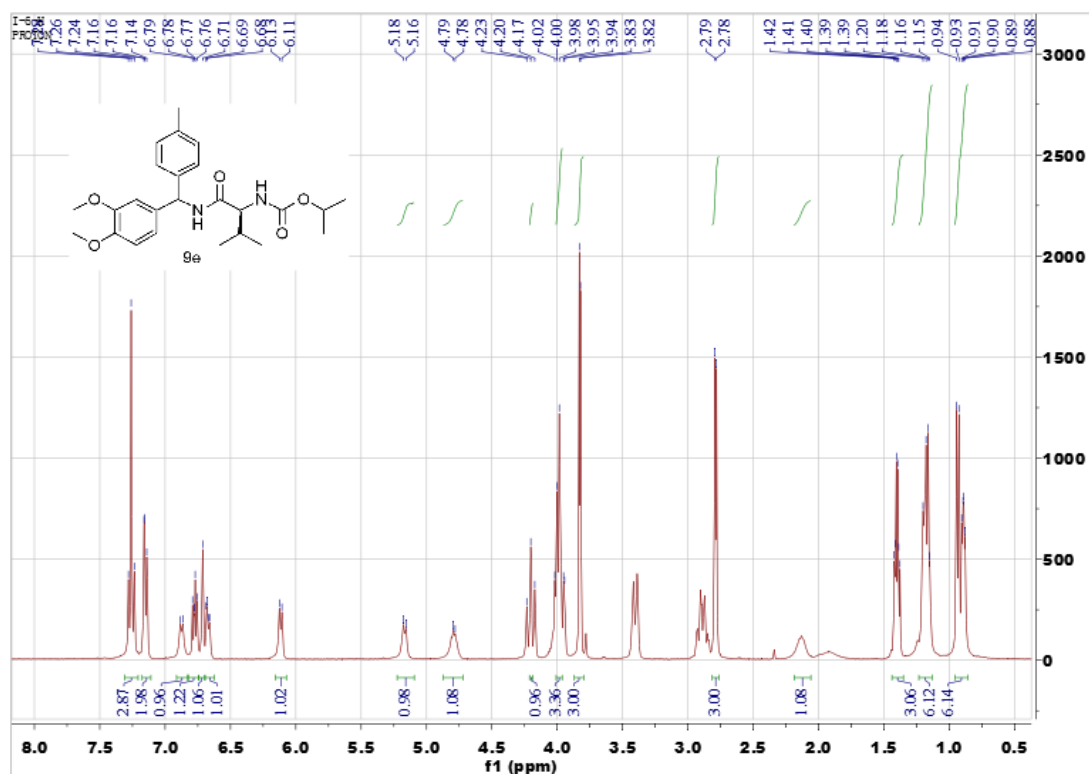
9d

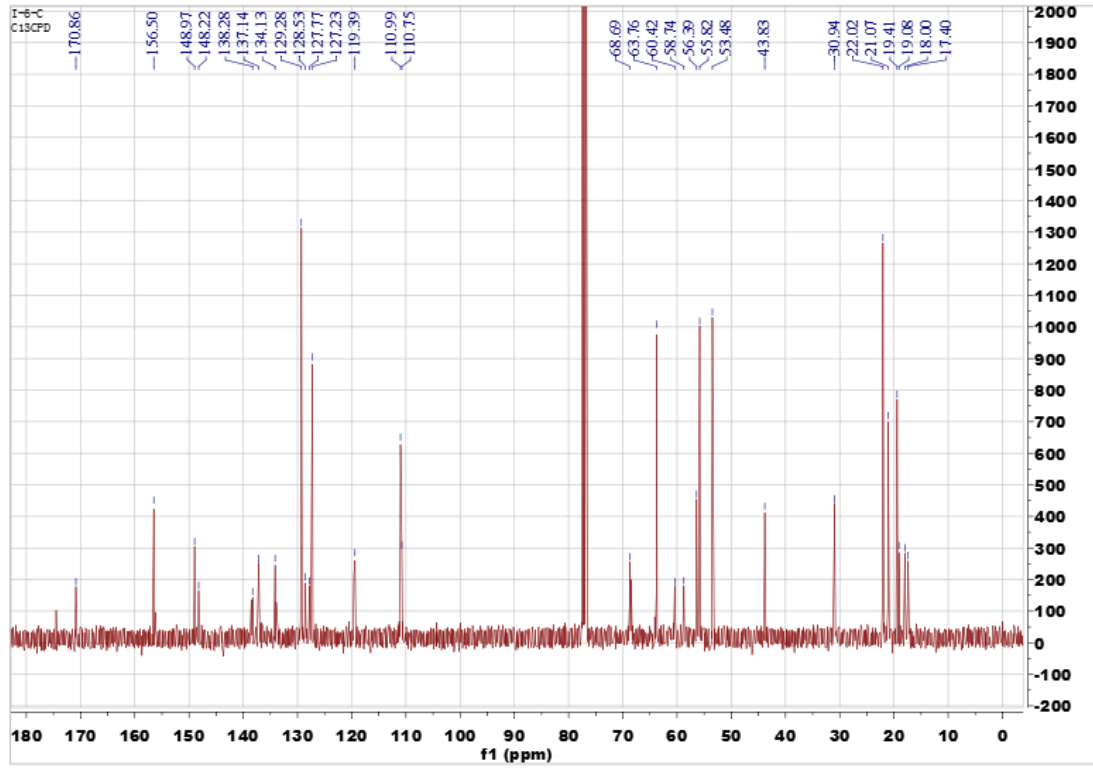


Sample Name	lc/ms	Position	P1-A2	Instrument Name	Instrument 1	User Name	
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	1-14.d	ACQ Method	chen-rms.m	Comment		Acquired Time	9/23/2013 11:44:54 AM



9e

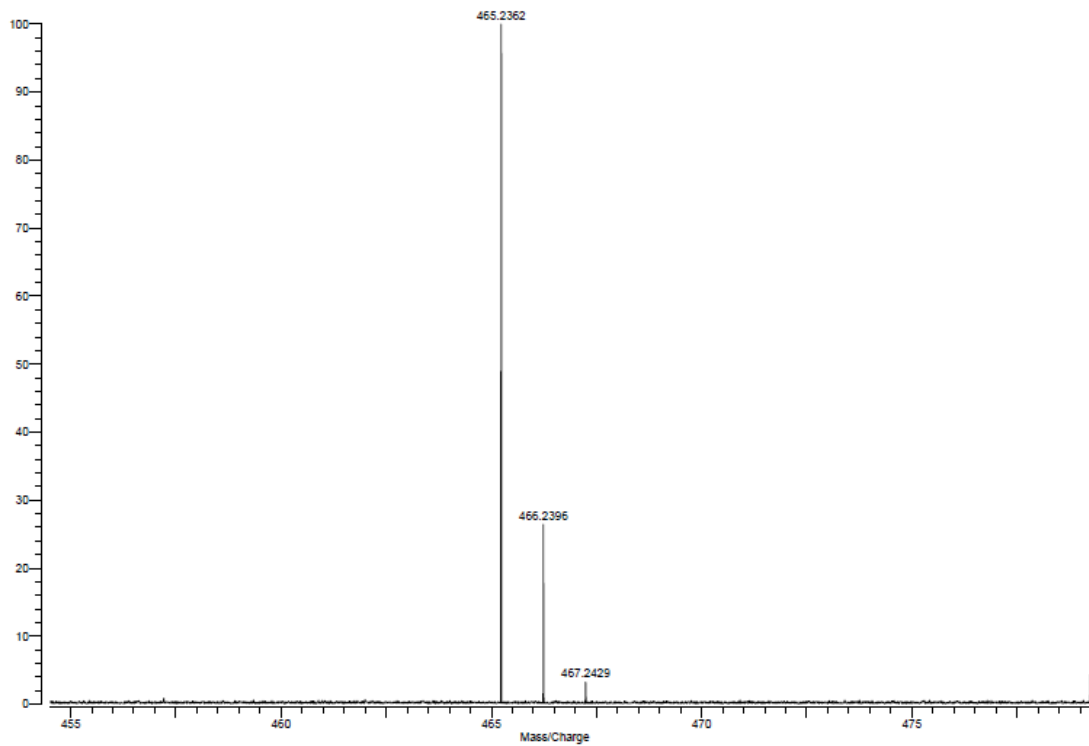




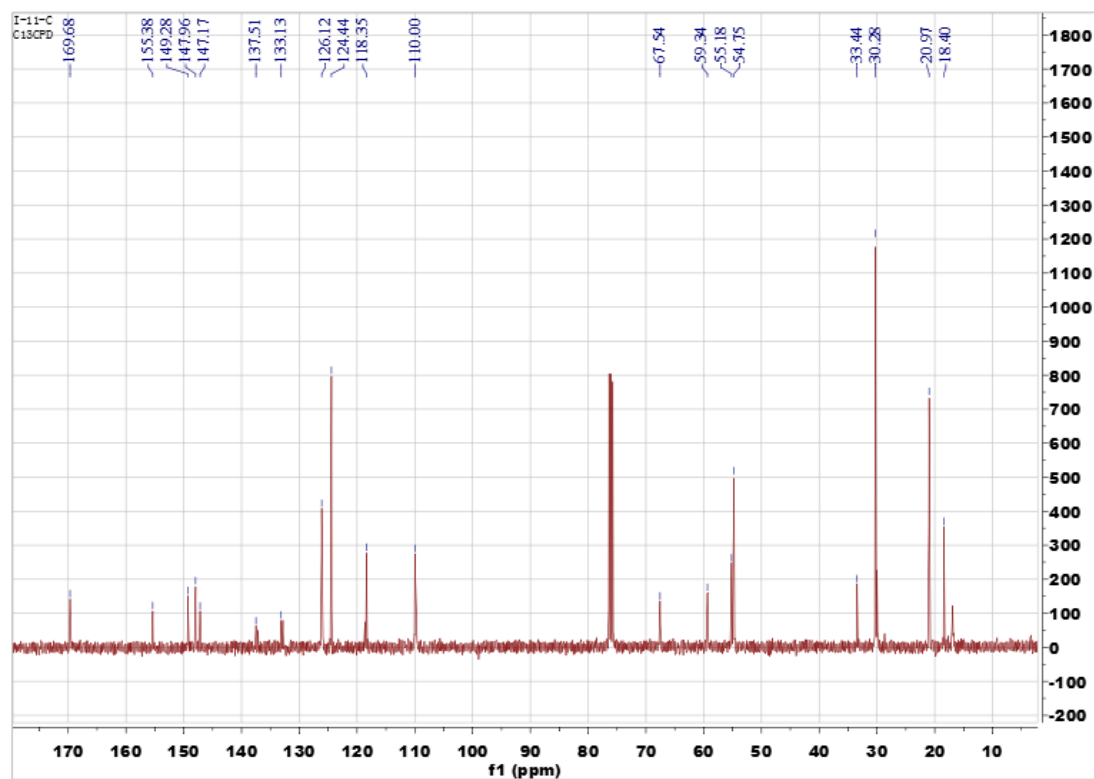
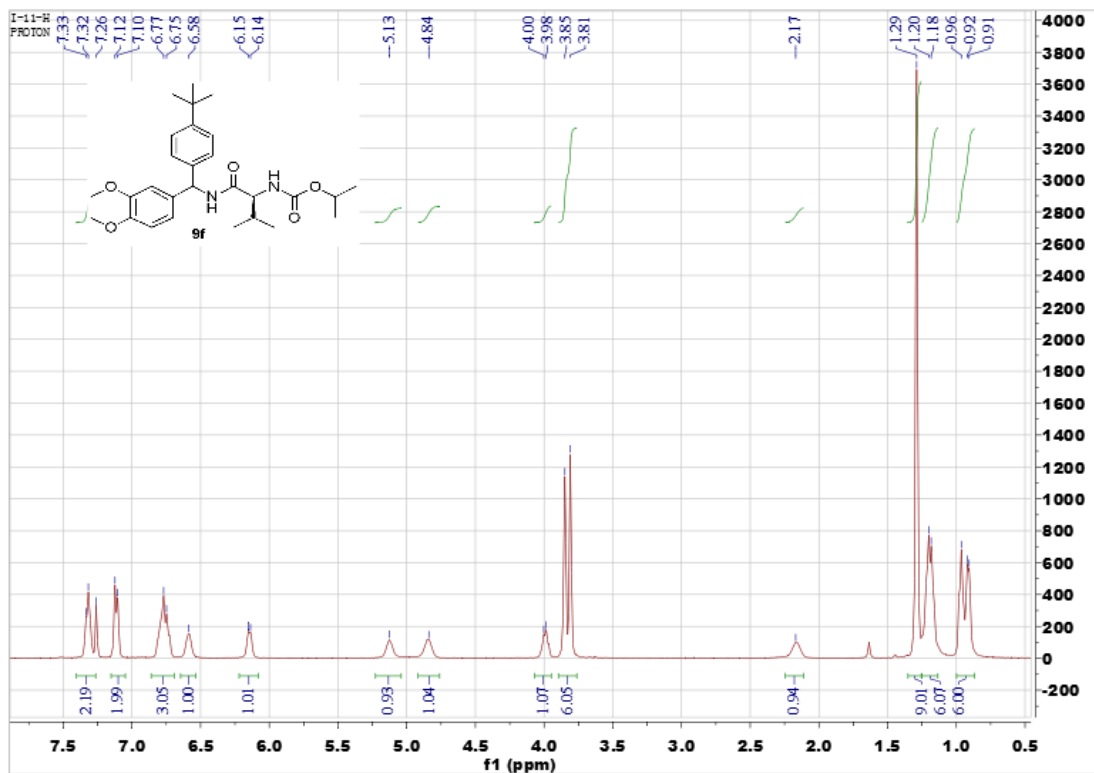
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Mode: Positive
Scans: 1

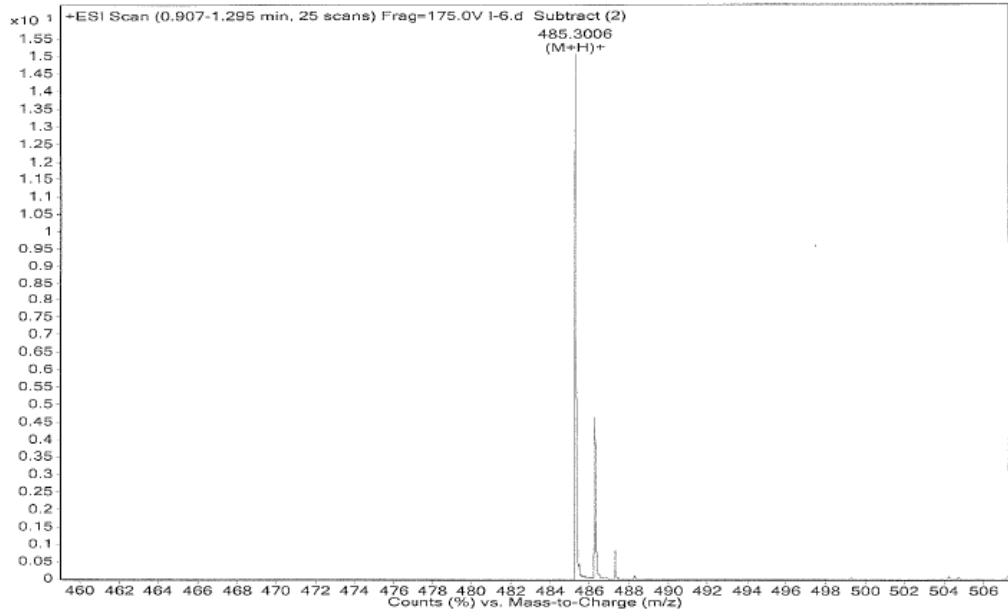
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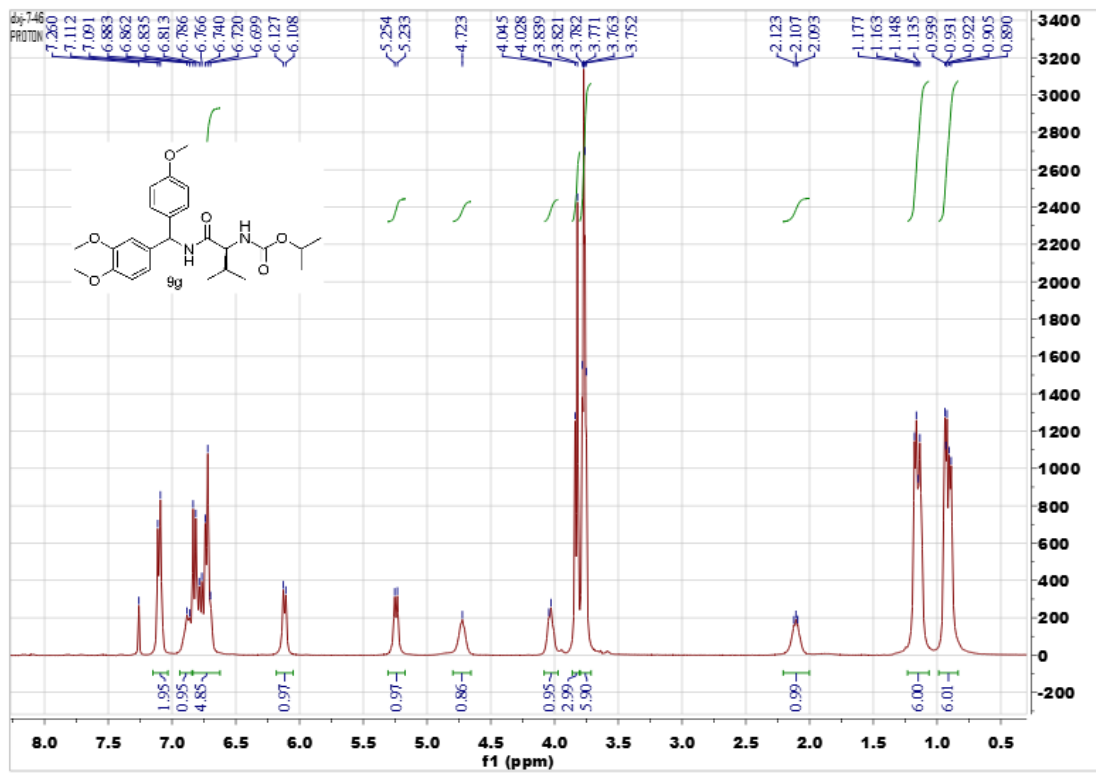
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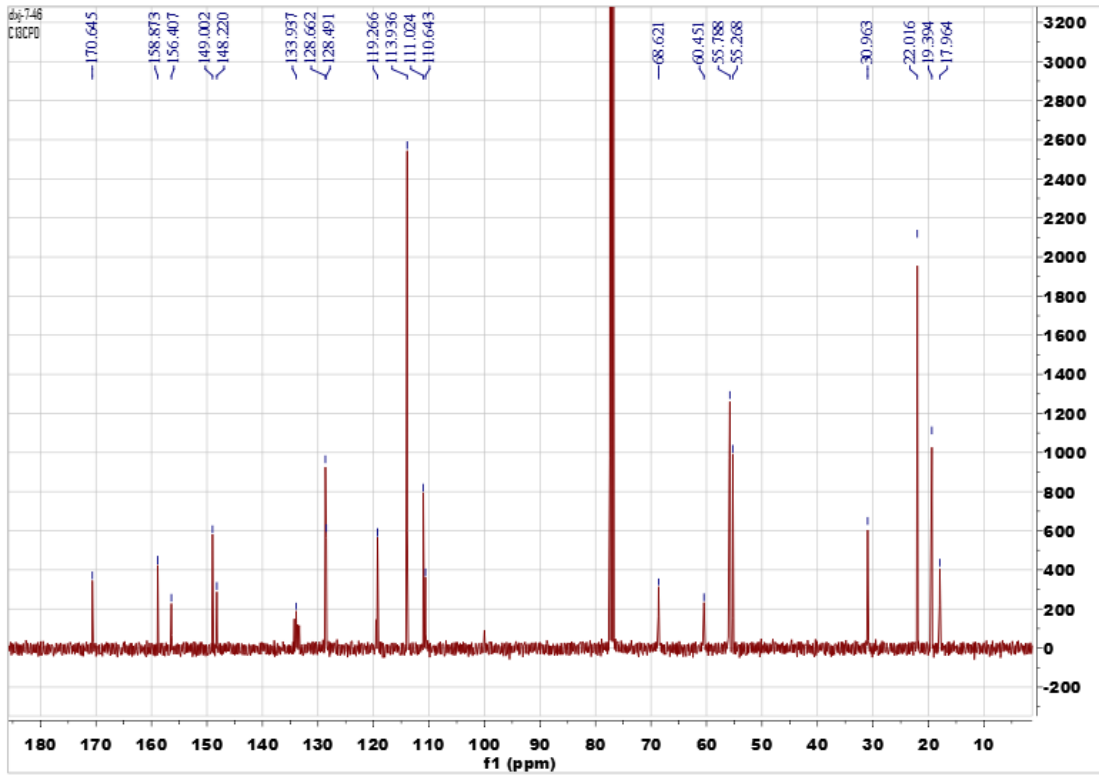


Sample Name	lc/mrs	Position	P1-A4	Instrument Name	Instrument 1	User Name	
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	1-6.d	ACQ Method	chen-ms.m	Comment		Acquired Time	9/23/2013 10:30:44 AM

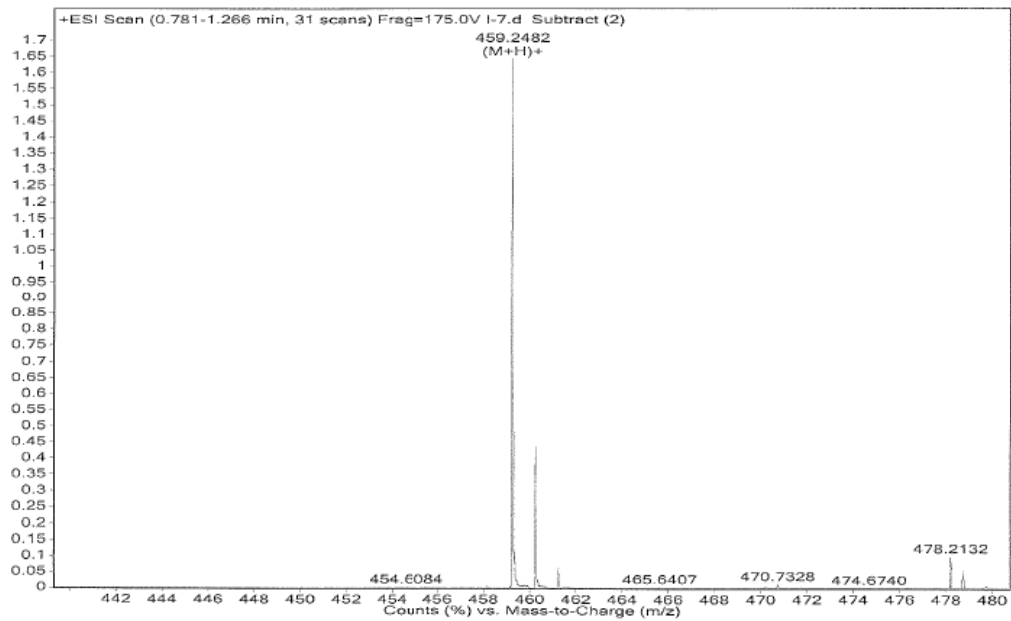


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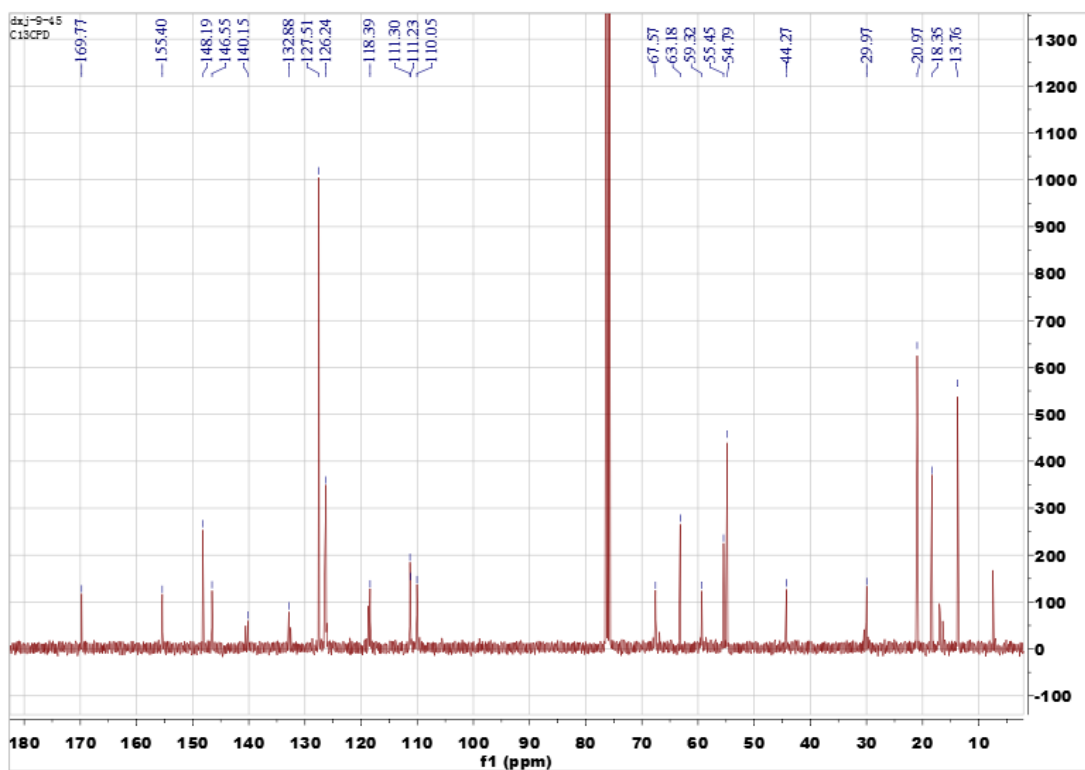
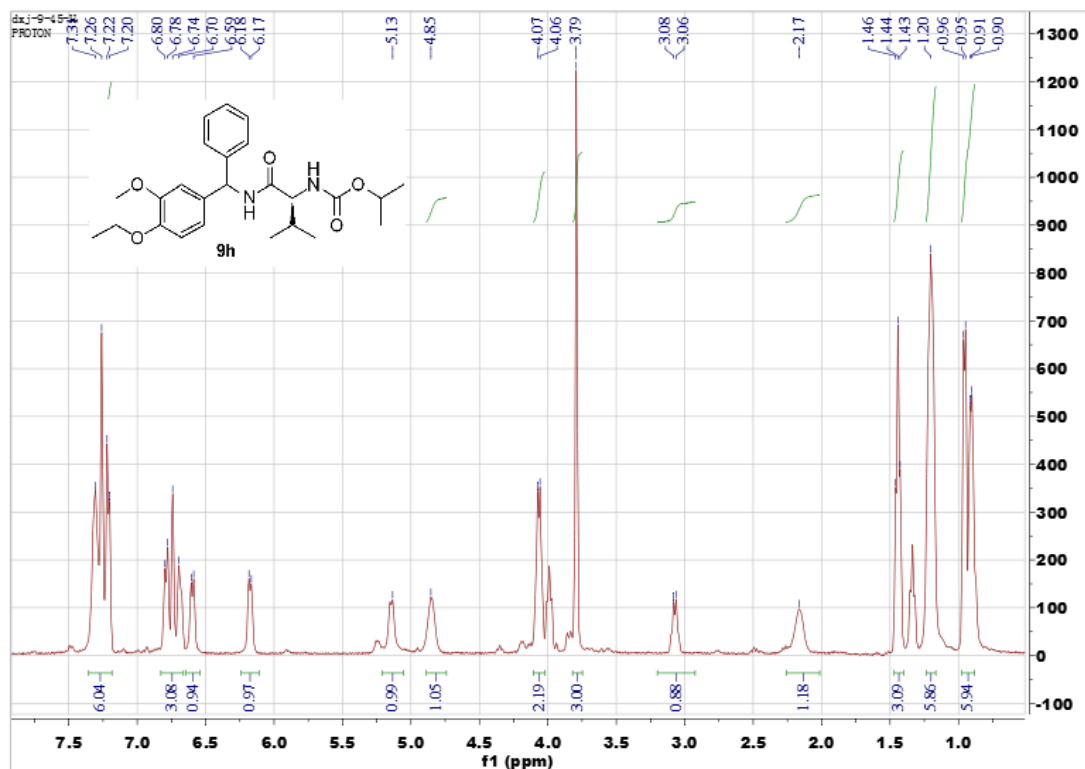




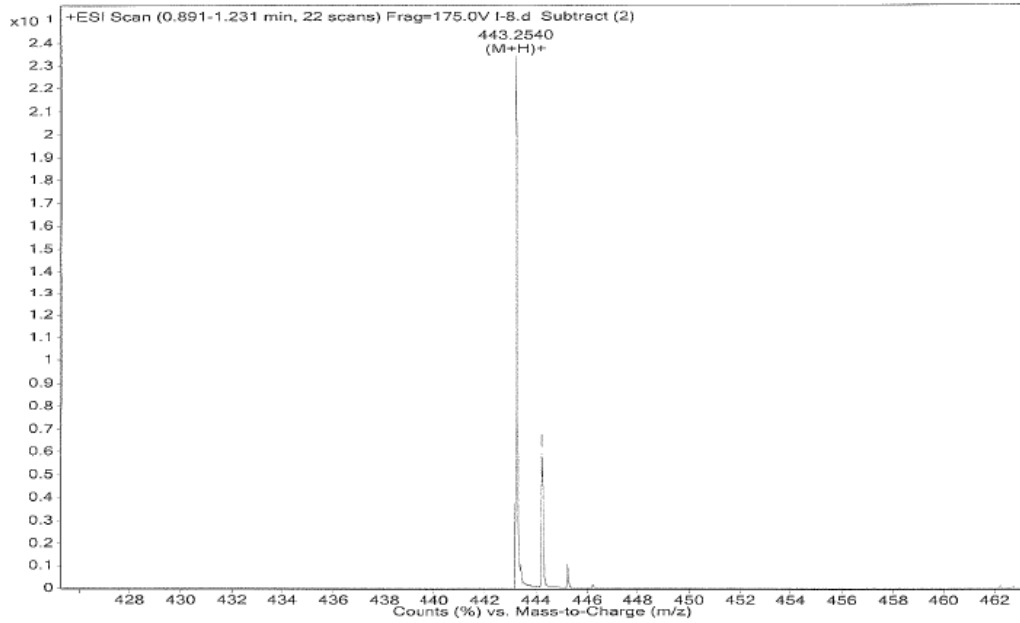
Sample Name	lc/ms	Position	PI-A5	Instrument Name	Instrument 1	User Name	IRM Calibration Status	Some Ions Missed
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status		9/23/2013 10:34:32 AM
Data Filename	I-7.d	ACQ Method	chem-ms.m	Comment		Acquired Time		



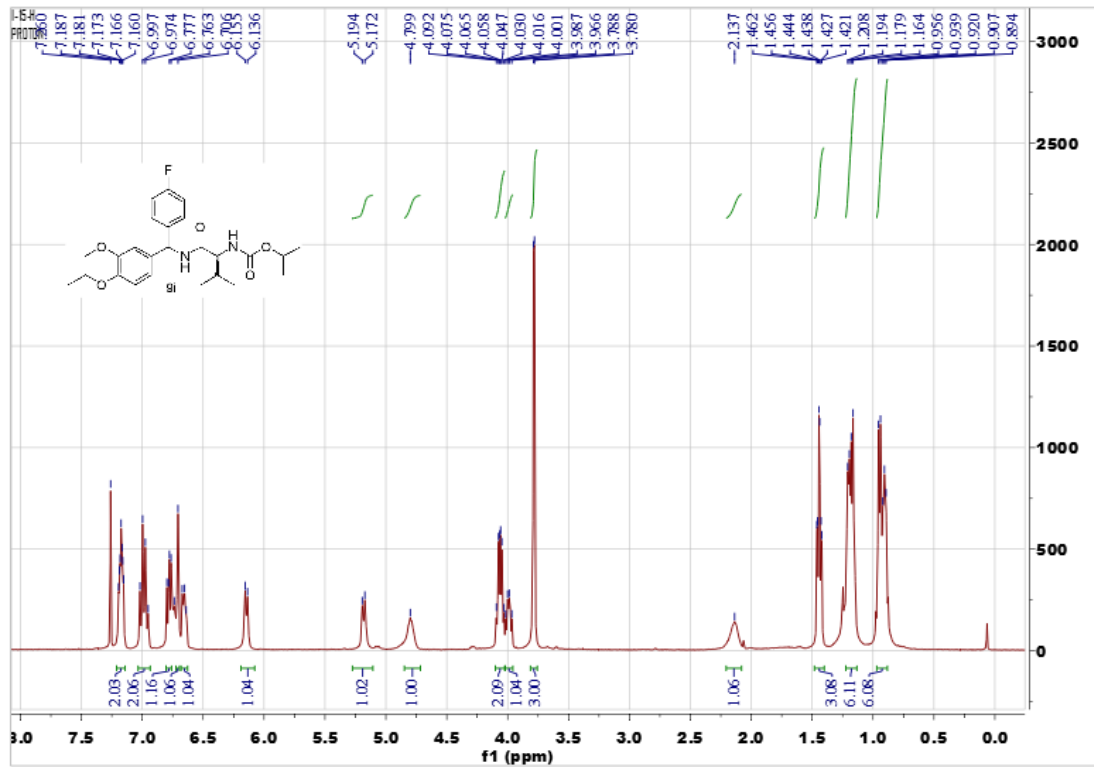
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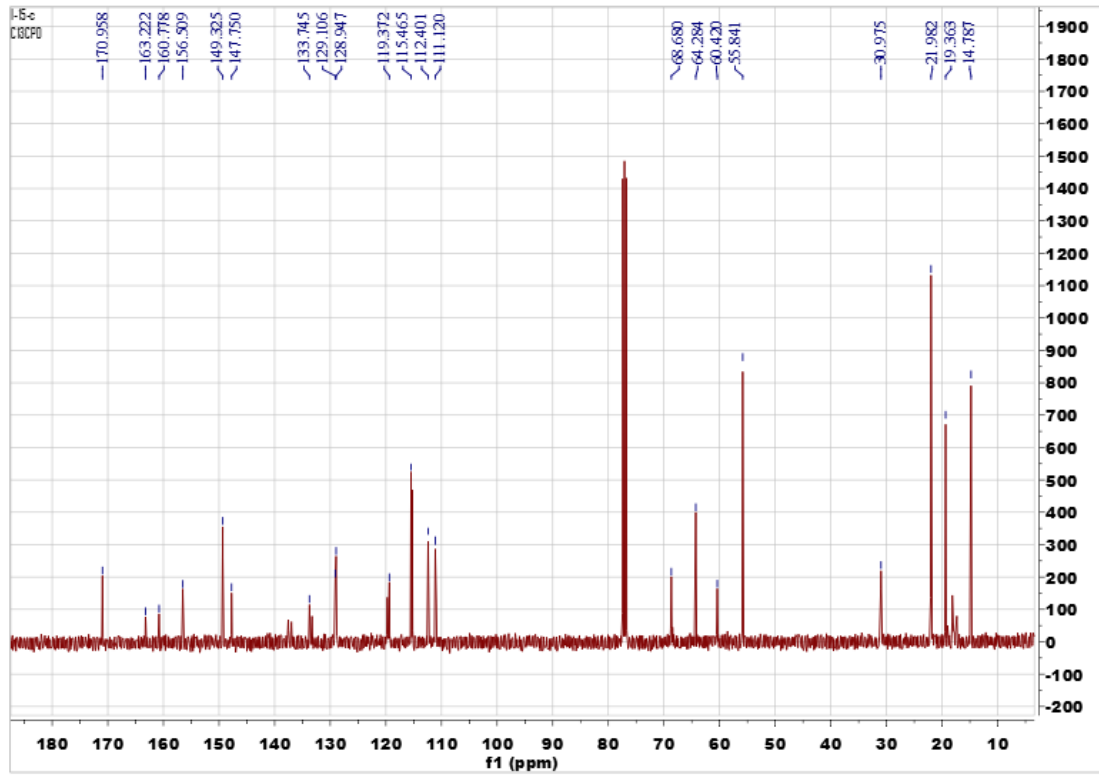


Sample Name	lc/ms	Position	P1-A6	Instrument Name	Instrument 1	User Name	
Inj Vol	2	Inj Position		Sample Type	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	l-8.d	ACQ Method	chen-ms.m	Comment		Acquired Time	9/23/2013 10:38:19 AM

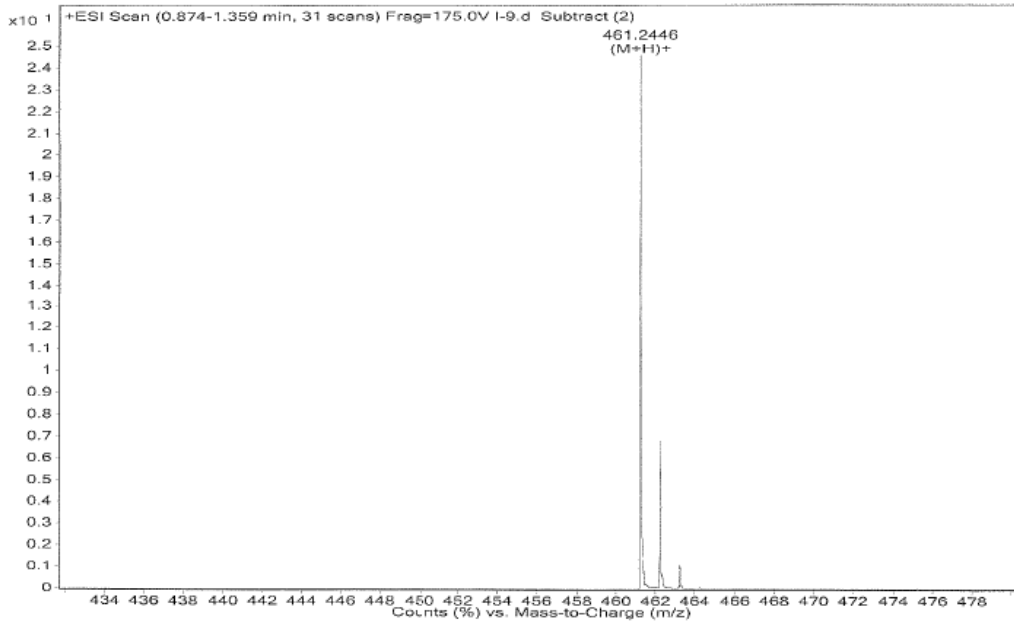


9i

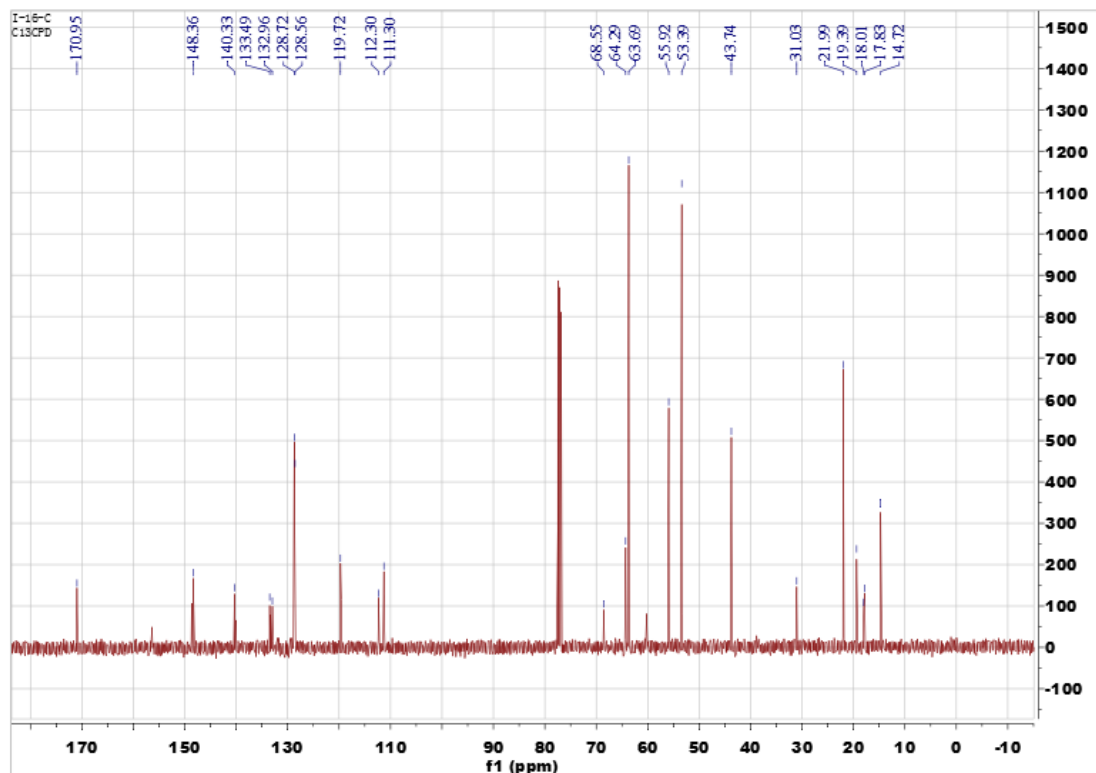
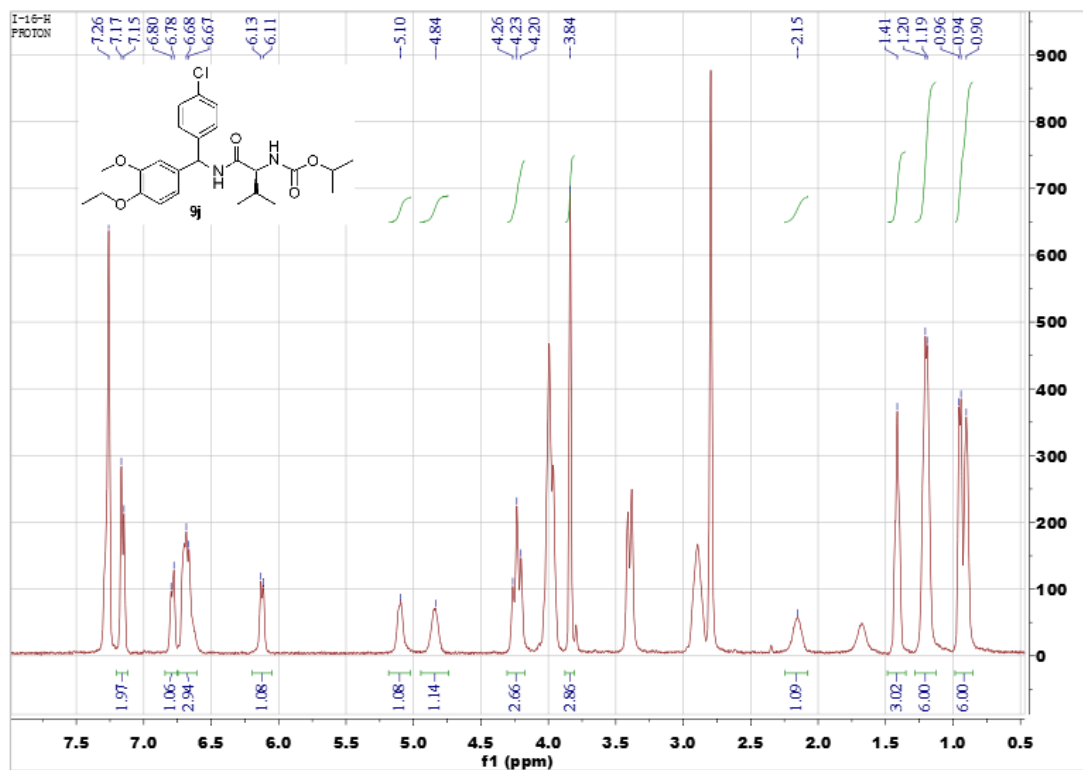




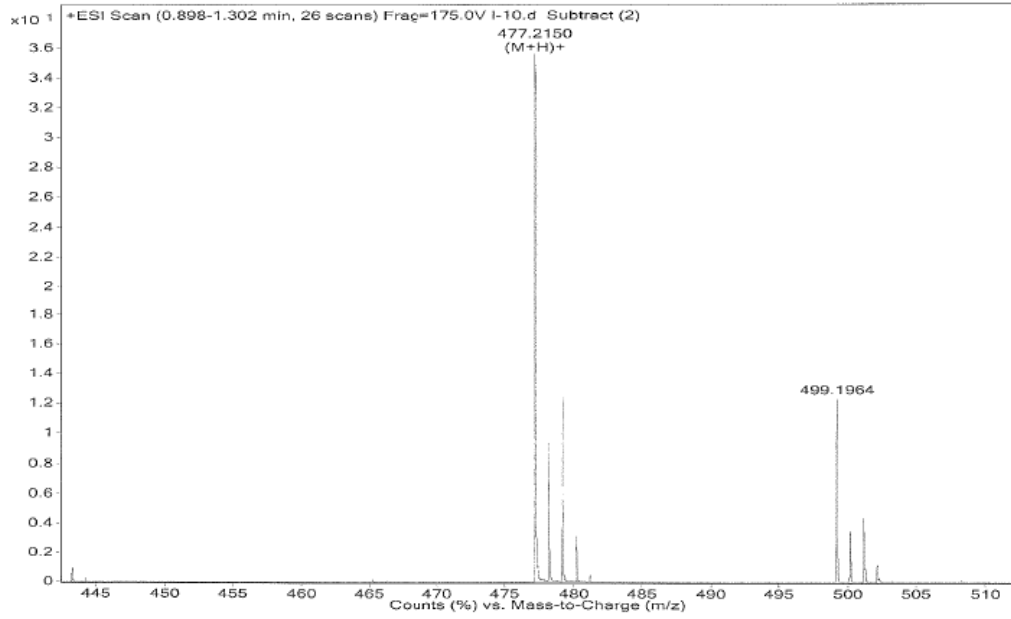
Sample Name	lc/ms	Position	P1-A7	Instrument Name	Instrument 1	User Name	
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	I-9.d	ACQ Method	chen-ms.m	Comment		Acquired Time	9/23/2013 10:42:04 AM



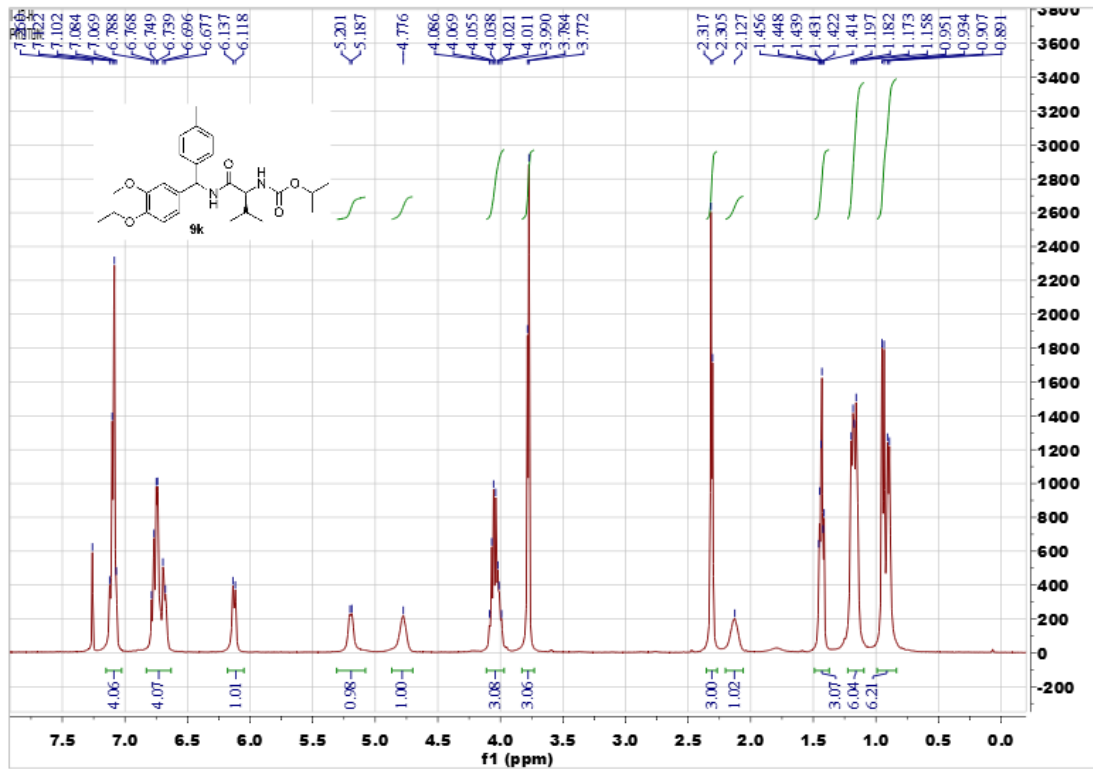
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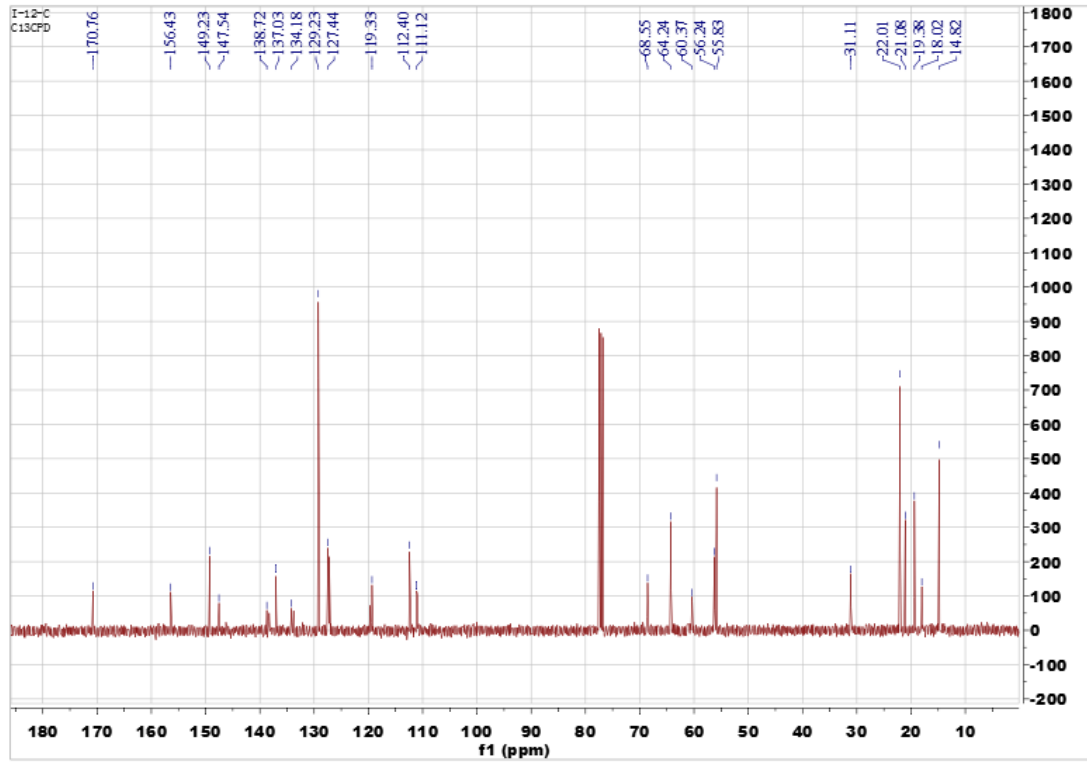


Sample Name	Ic/irs	Position	PI-A1	Instrument Name	Instrument 1	User Name	
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	1-10.d	ACQ Method	chen-irs.m	Comment		Acquired Time	9/23/2013 11:13:24 AM



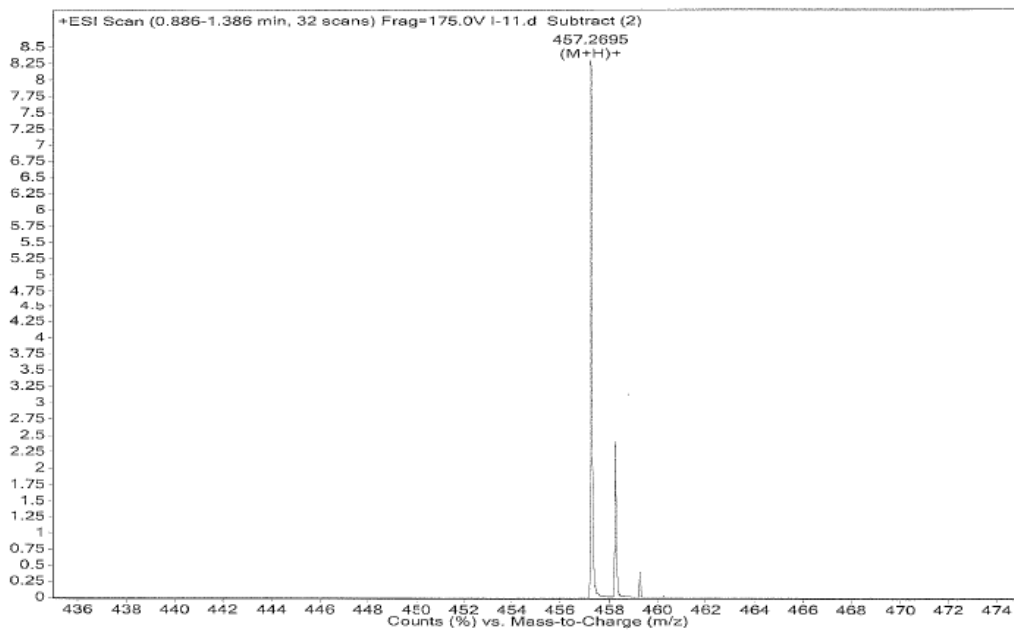
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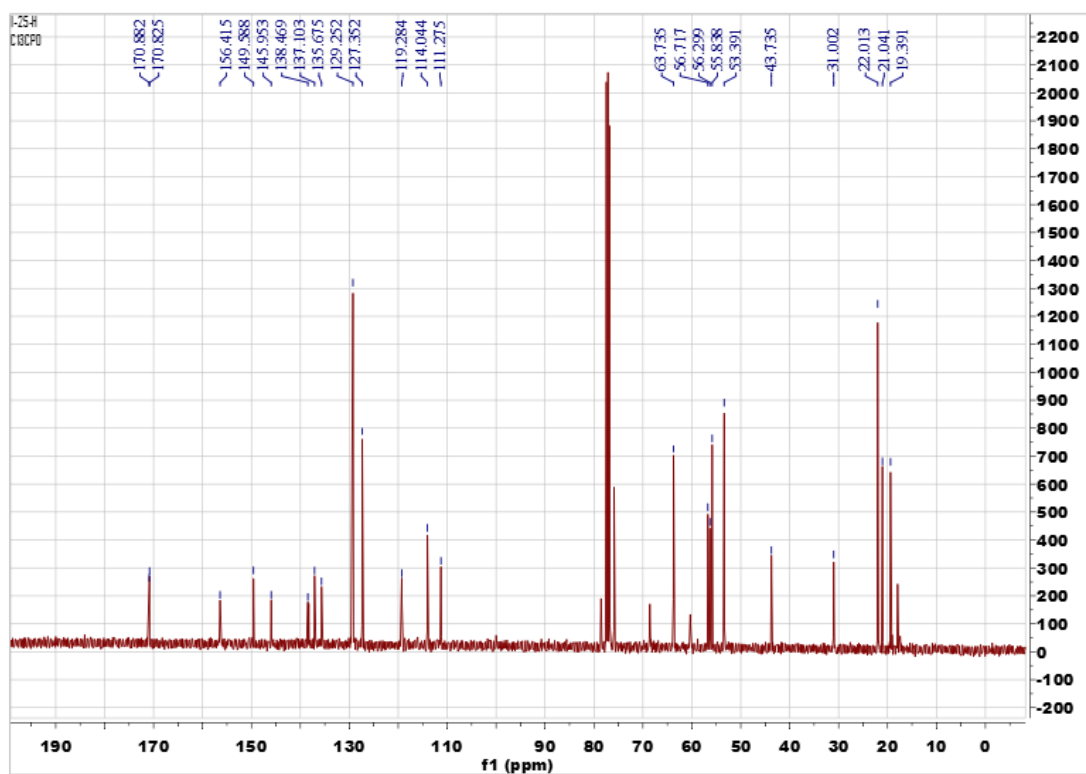
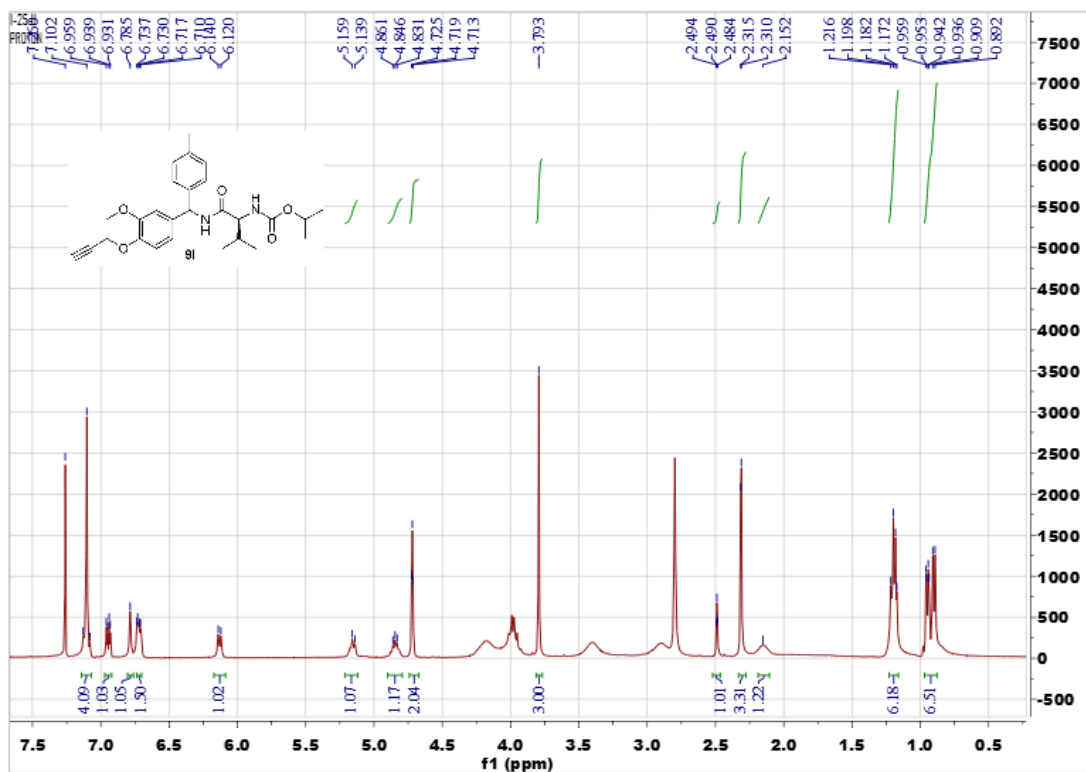




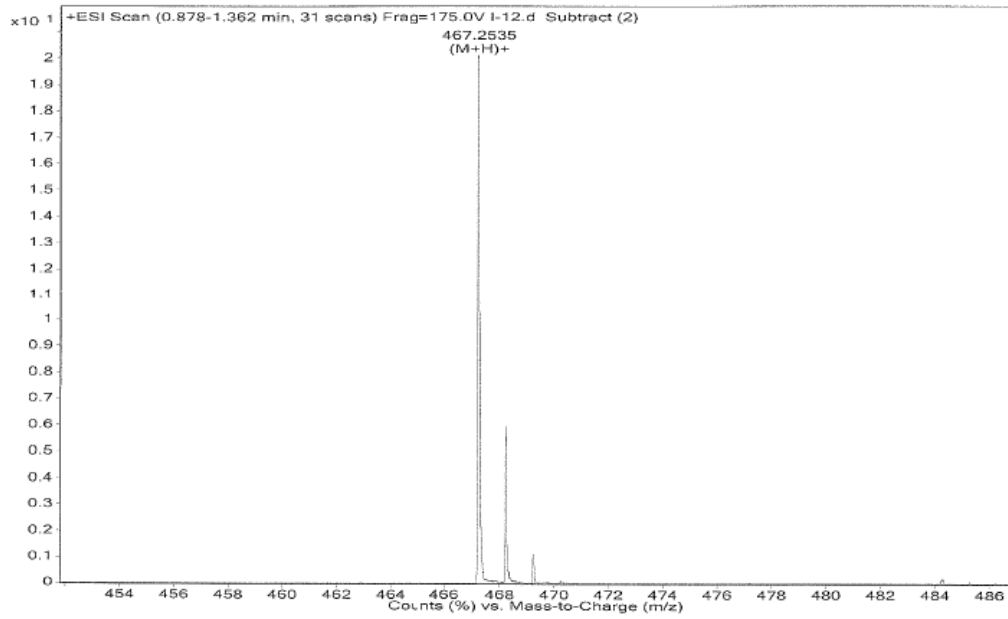
Sample Name	lc/ms	Position	PI-A2	Instrument Name	Instrument 1	User Name
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status
Data Filename	I-11.d	ACQ Method	chen-ms.m	Comment		Acquired Time

Some Ions Missed
9/23/2013 11:17:10 AM

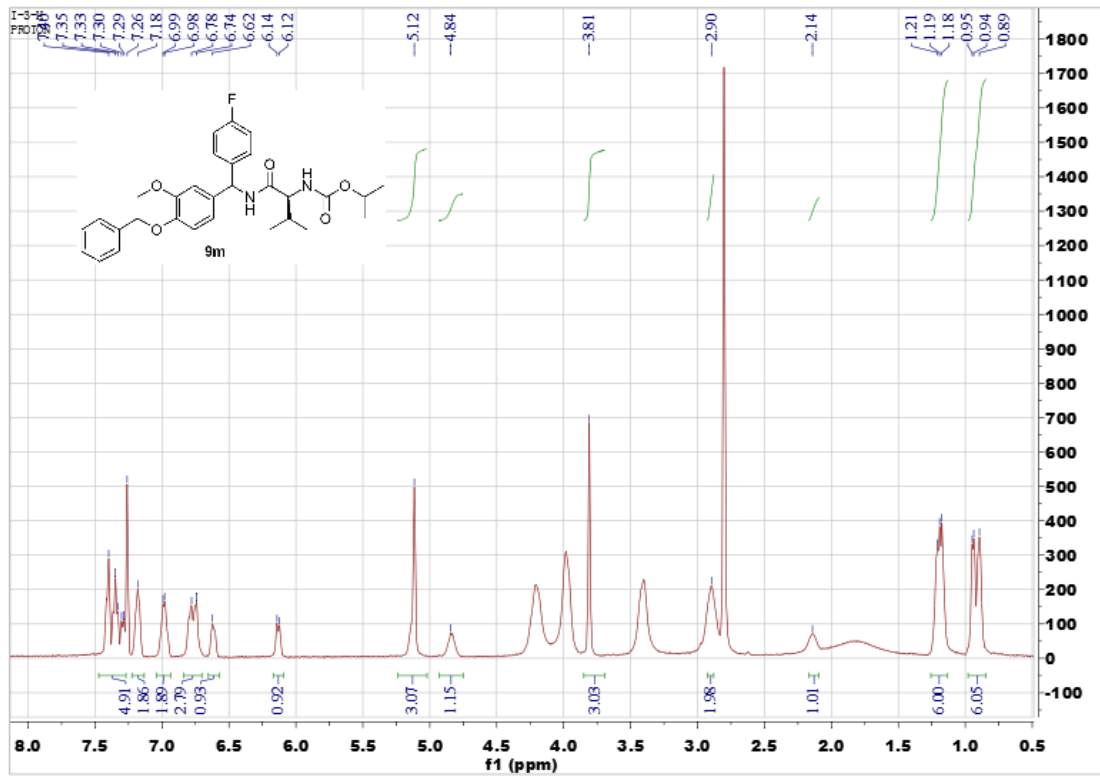


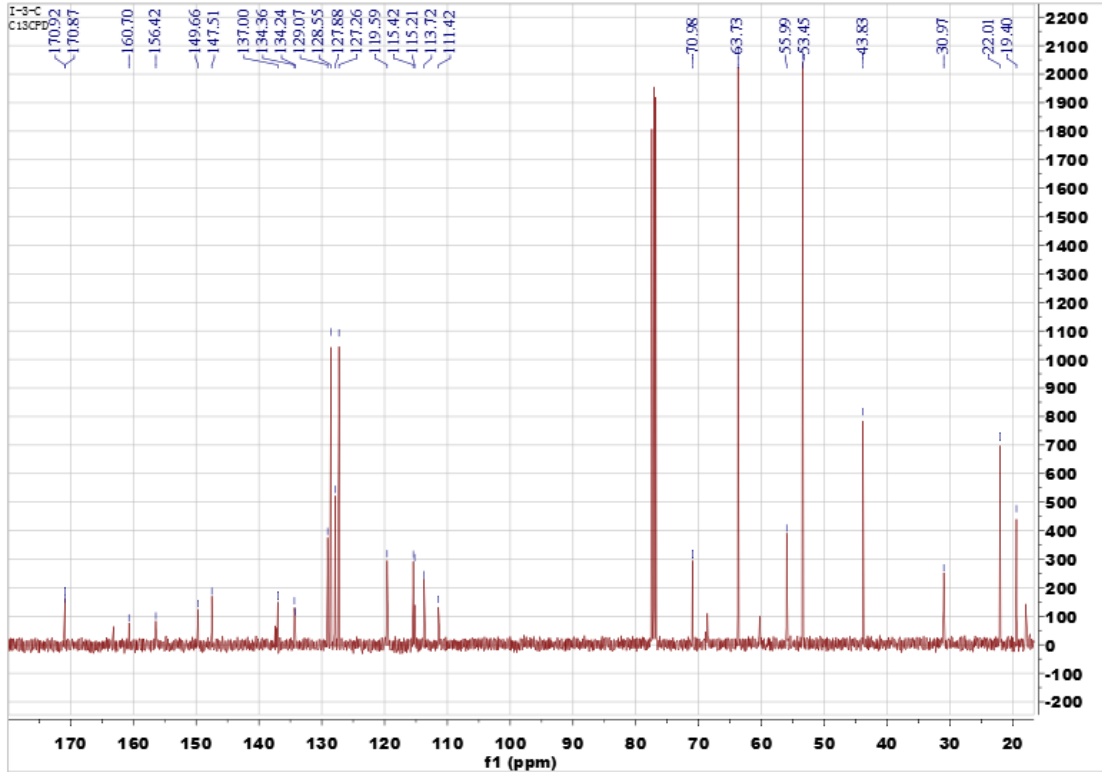


Sample Name	lc/ms	Position	P1-A3	Instrument Name	Instrument 1	User Name	
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	I-12.d	ACQ Method	chen-ms.m	Comment		Acquired Time	9/23/2013 11:20:56 AM



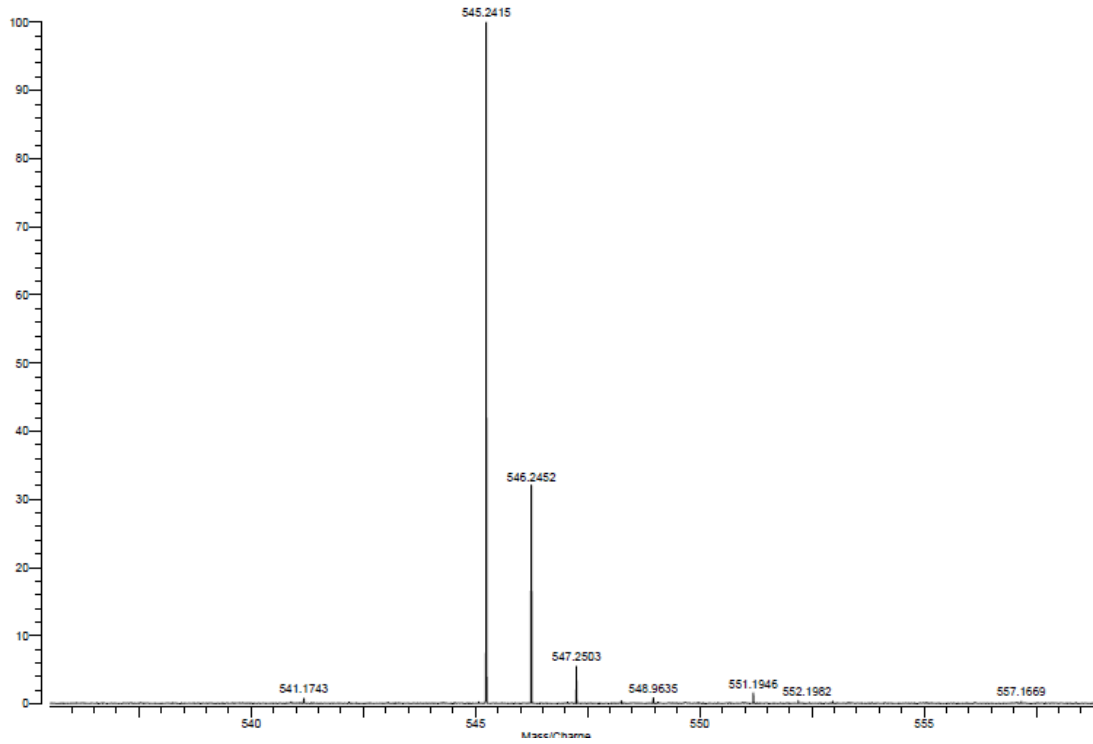
9m



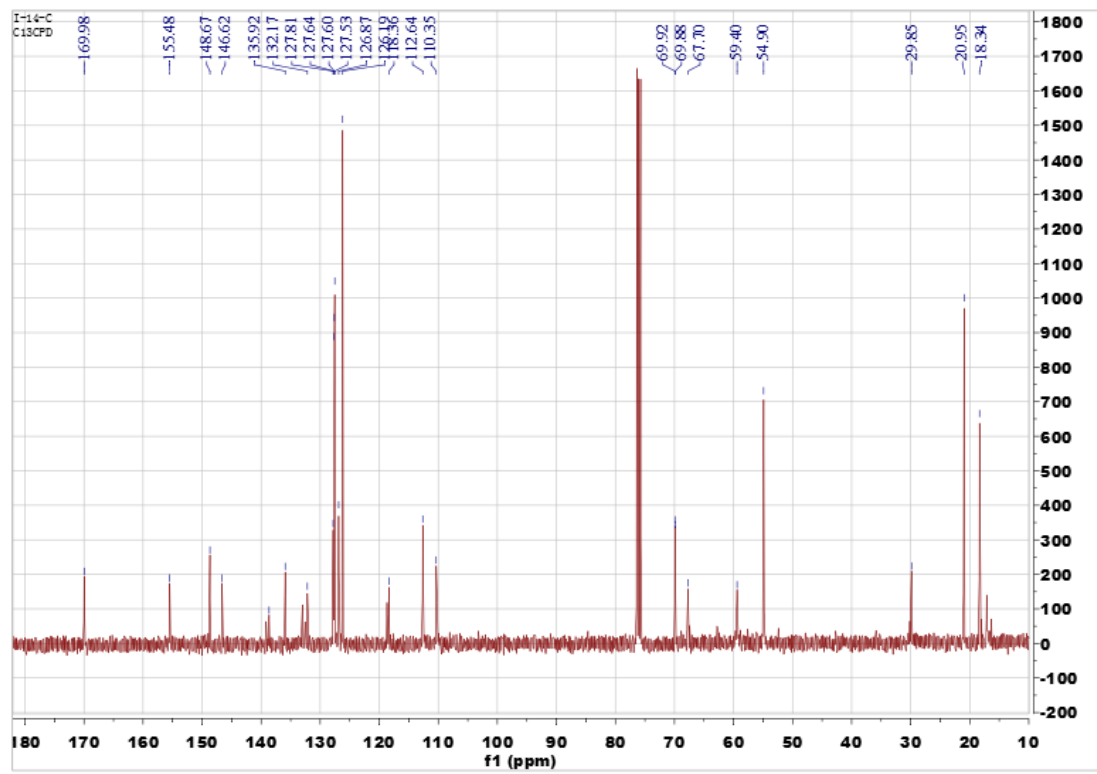
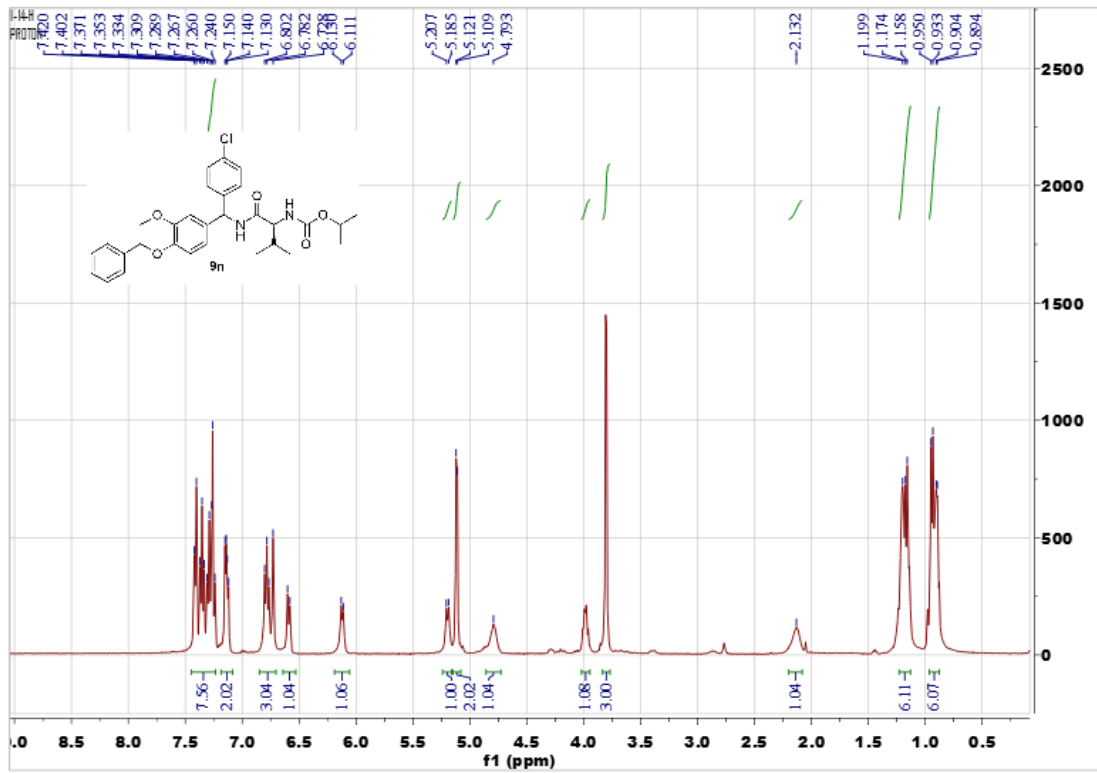


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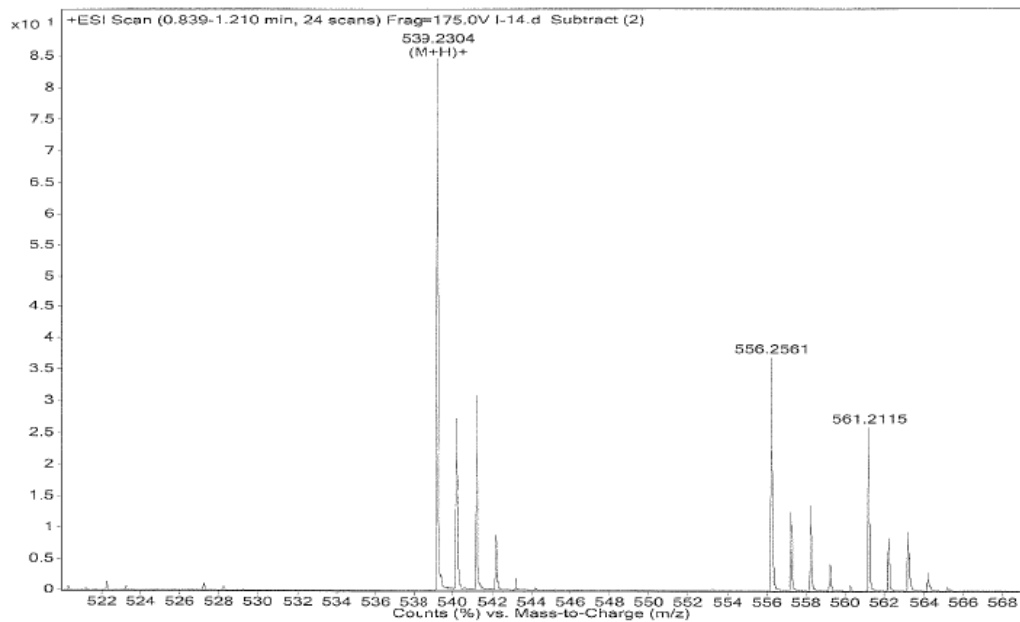
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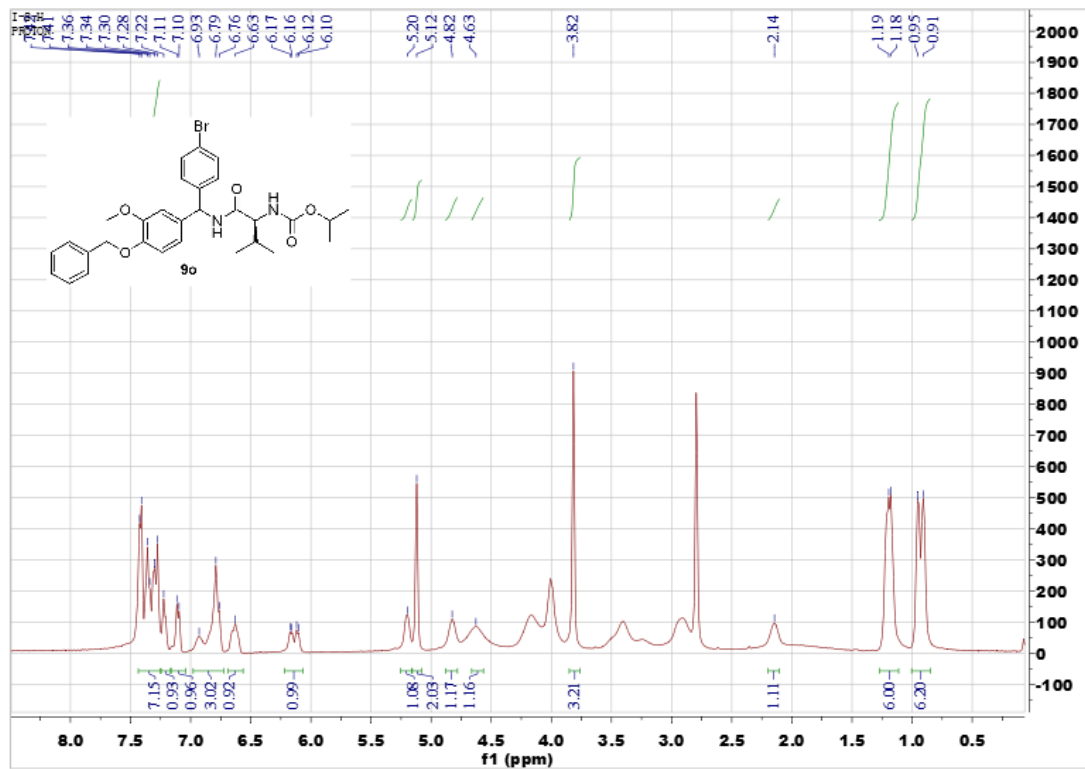
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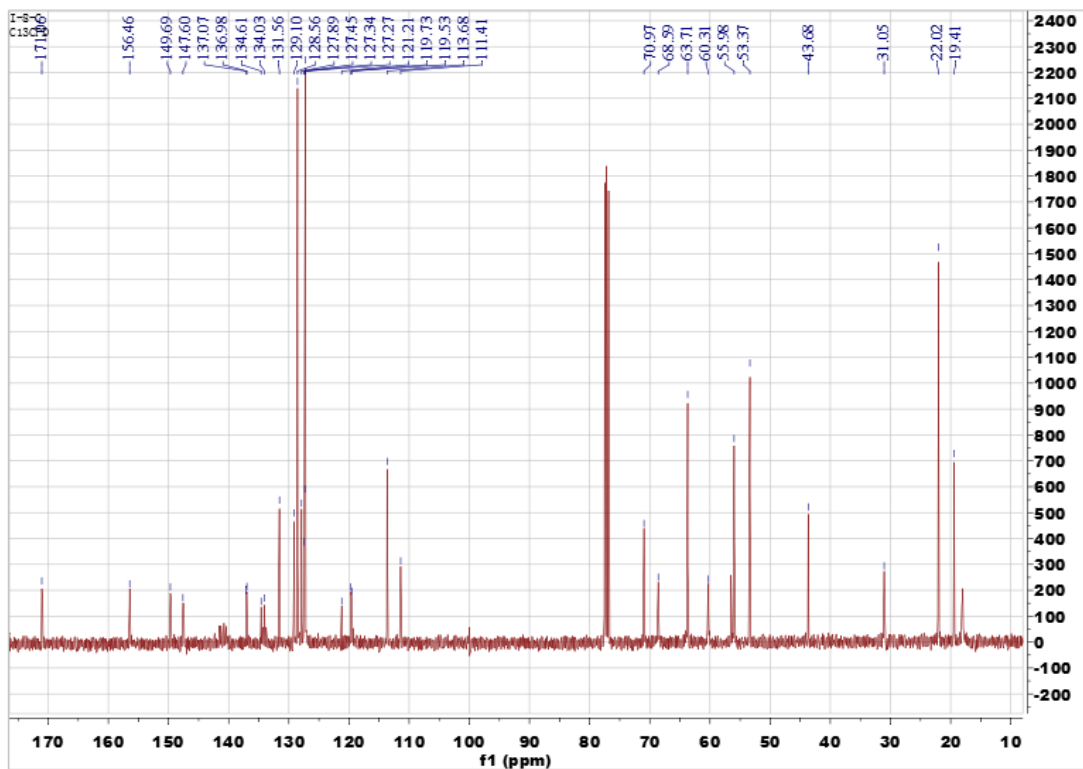


Sample Name	lc/ms	Position	P1-A4	Instrument Name	Instrument 1	User Name	
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	I-14.d	ACQ Method	chen-ms.m	Comment		Acquired Time	9/23/2013 11:24:42 AM

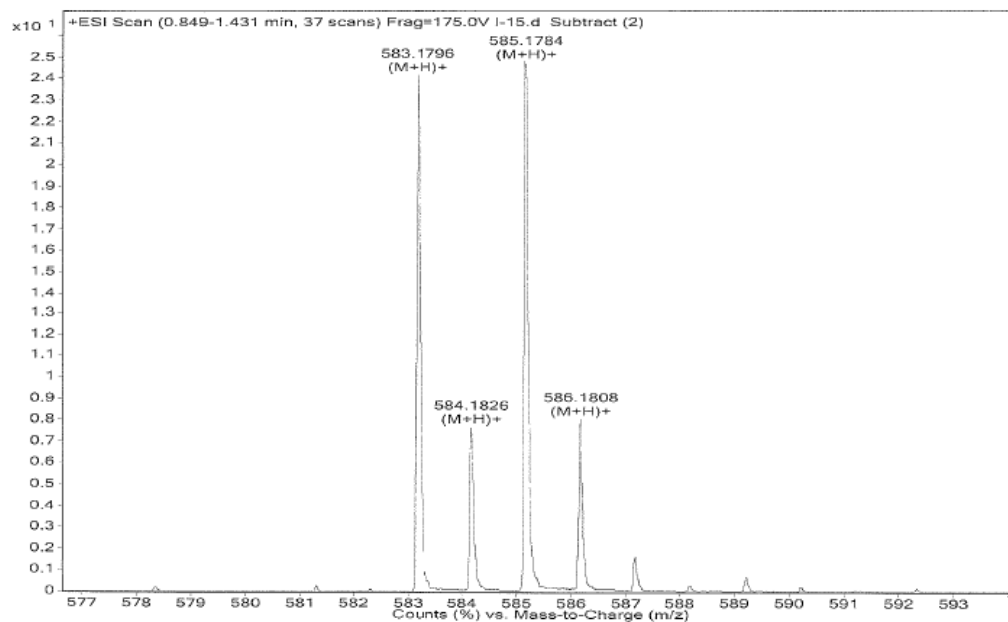


9o

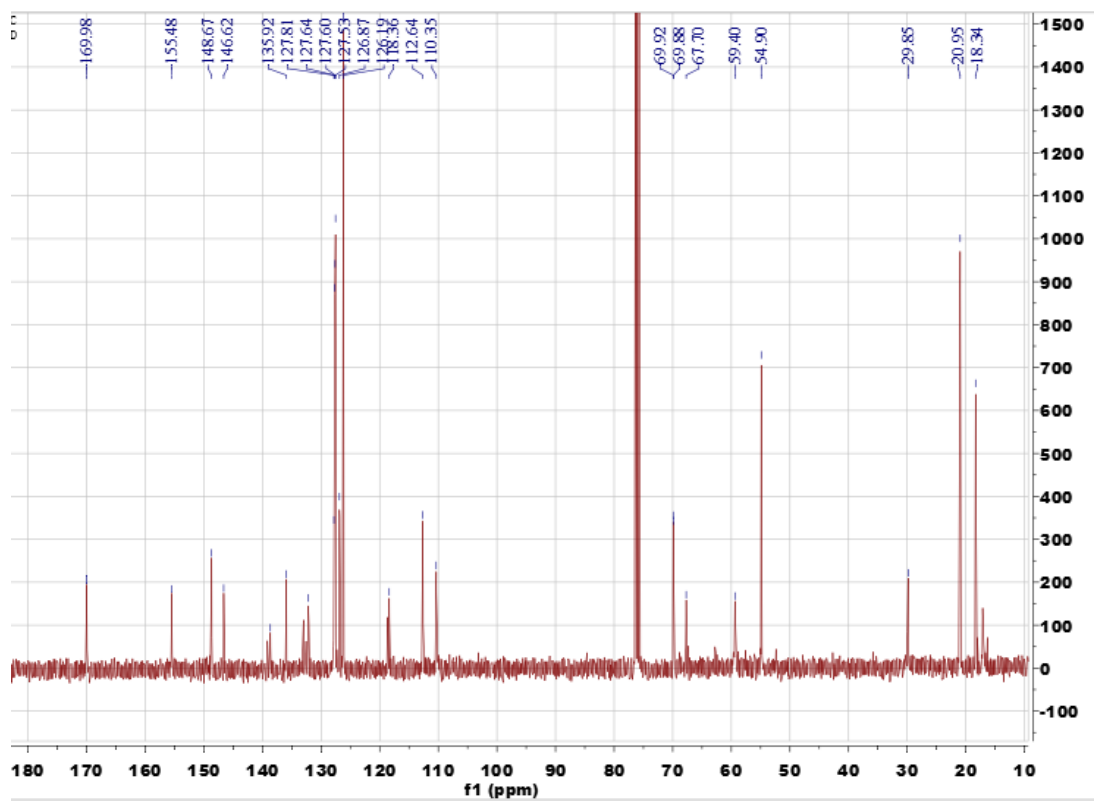
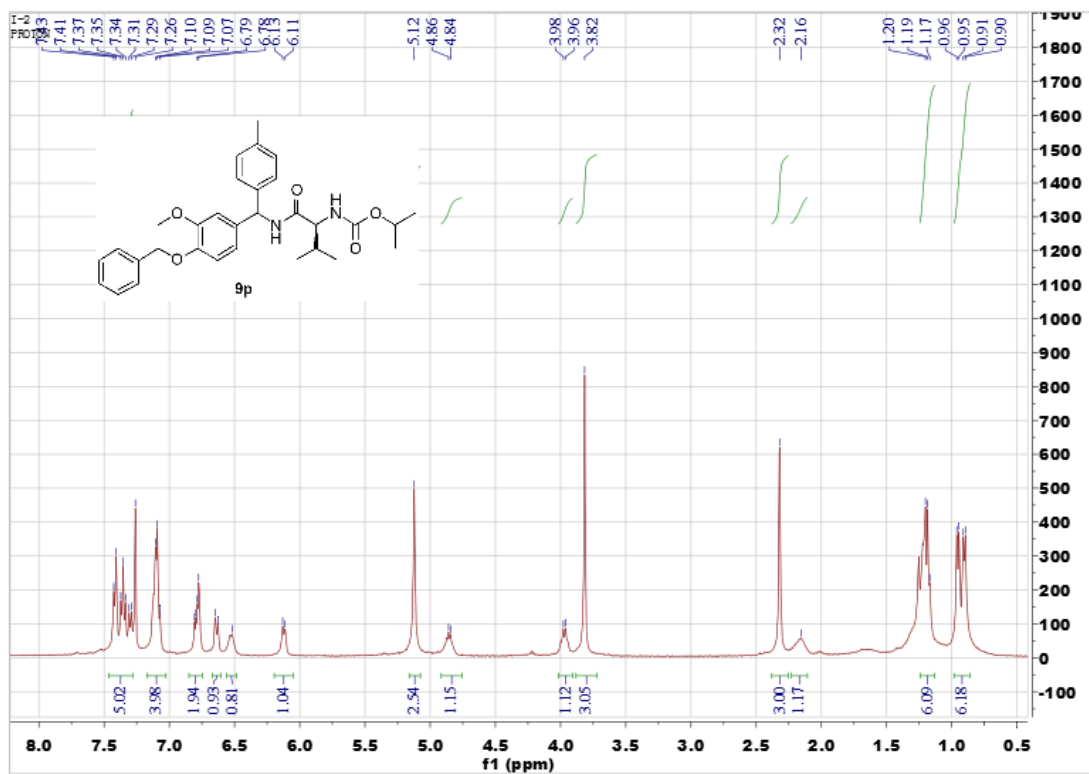


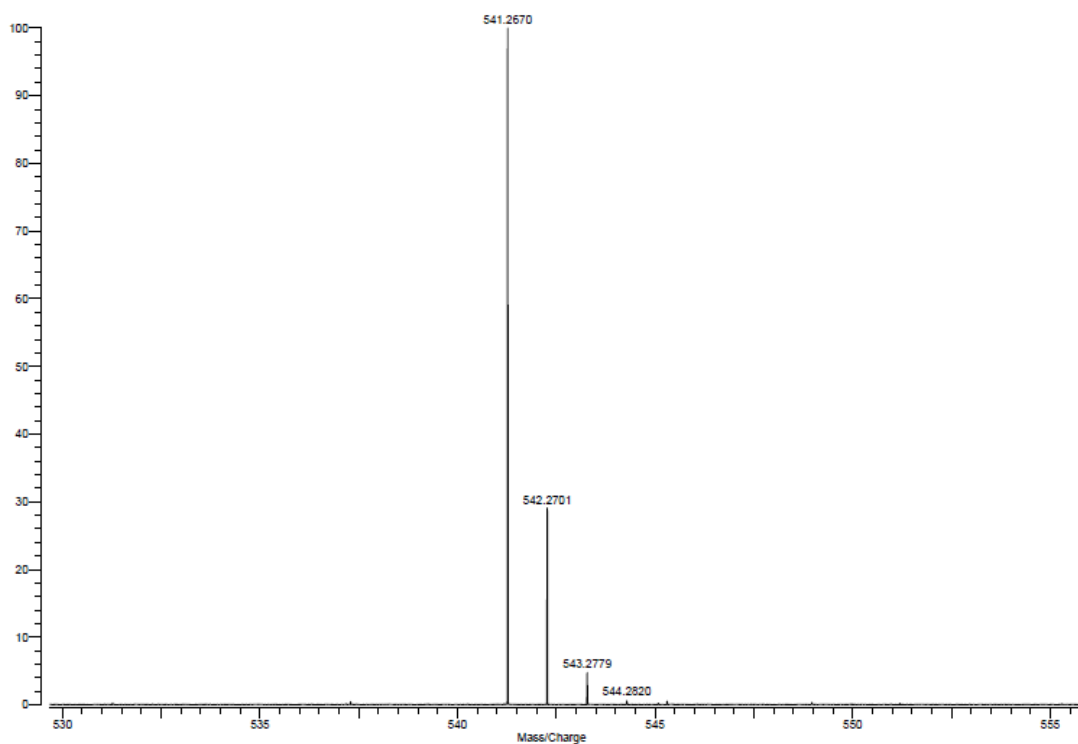


Sample Name	lc/ms	Position	P1-A5	Instrument Name	Instrument 1	User Name	
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	I-15.d	ACQ Method	cheri-ms.m	Comment		Acquired Time	9/23/2013 11:28:28 AM

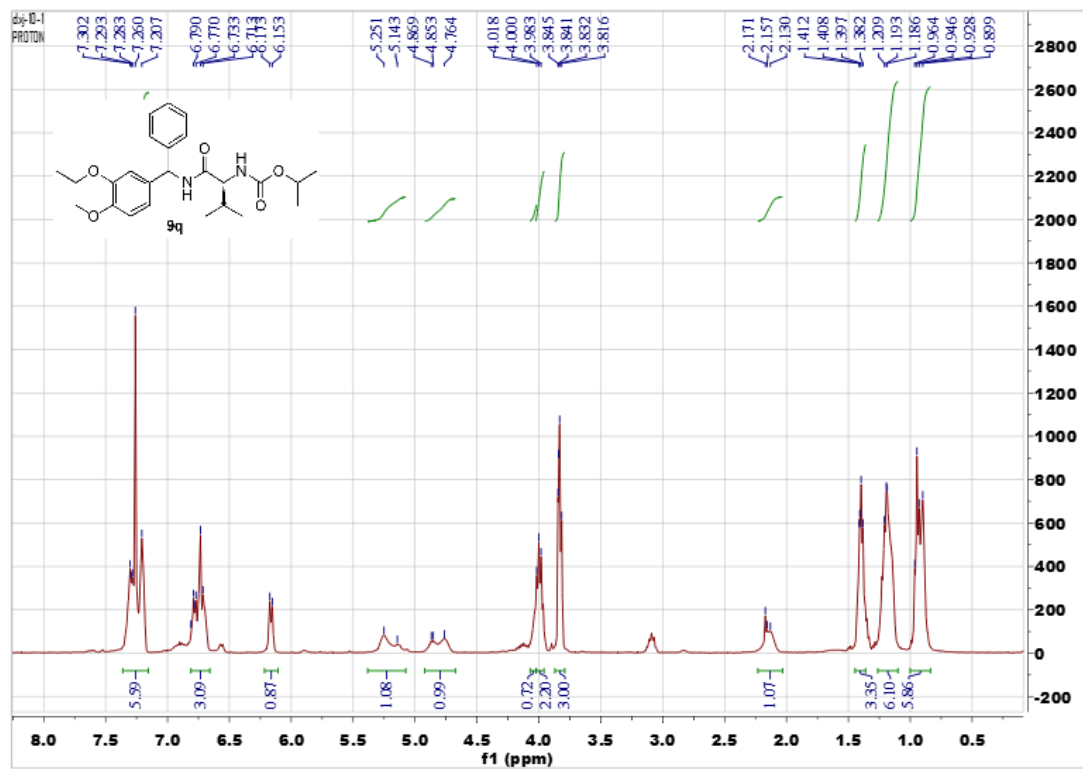


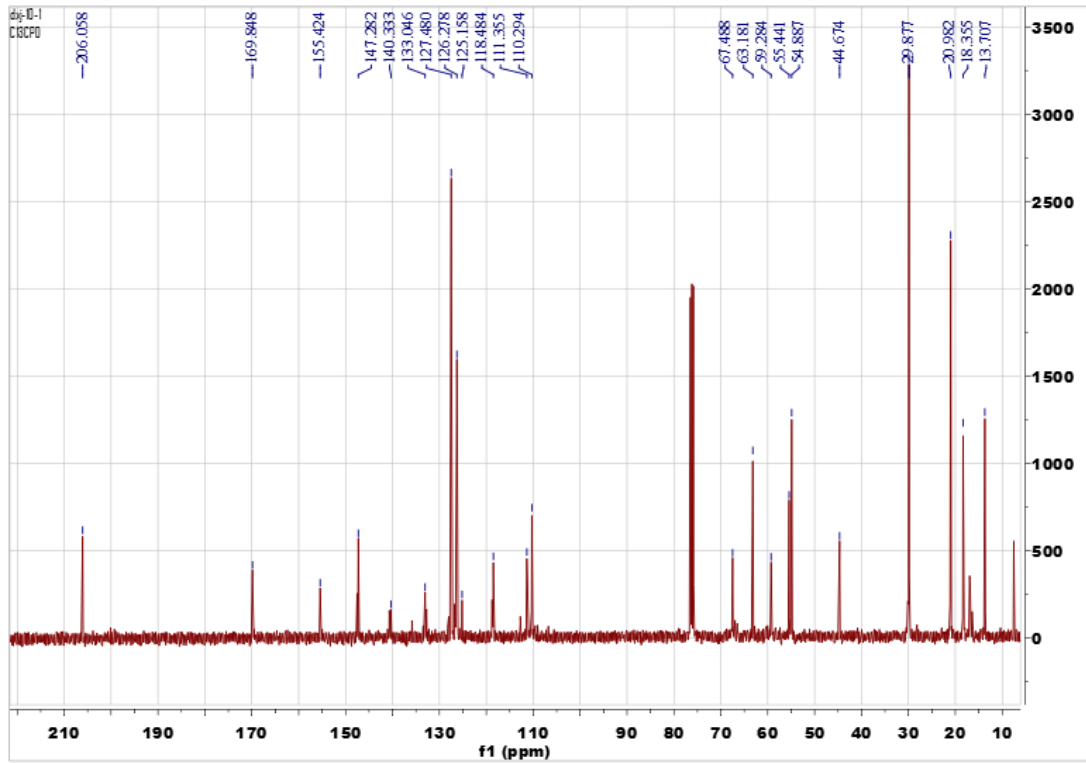
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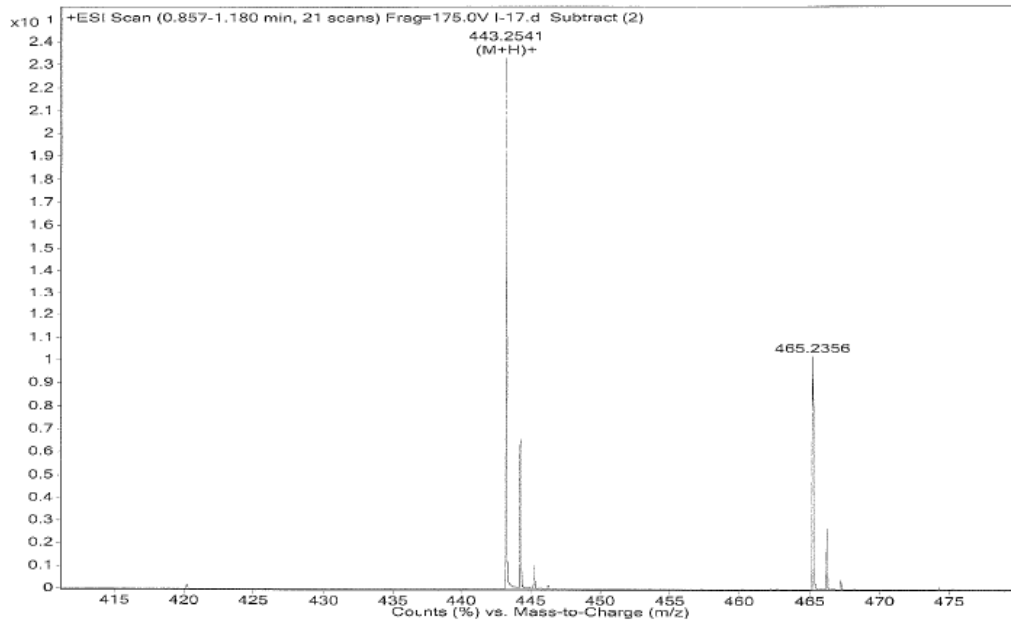


9q

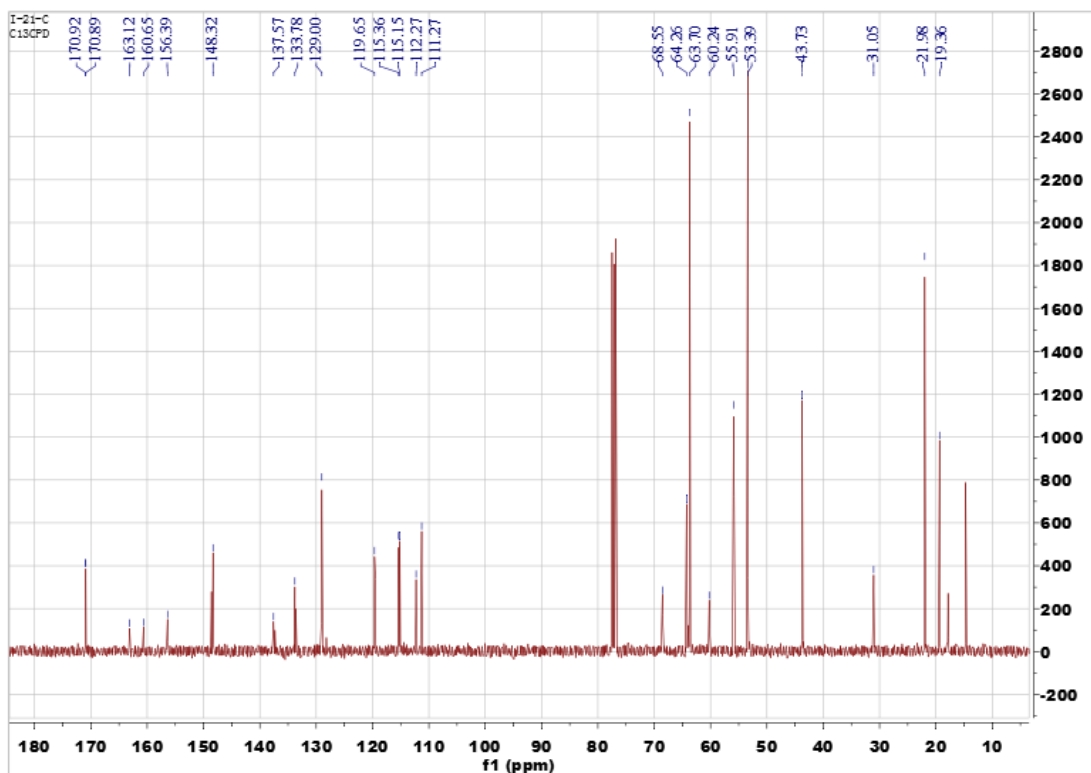
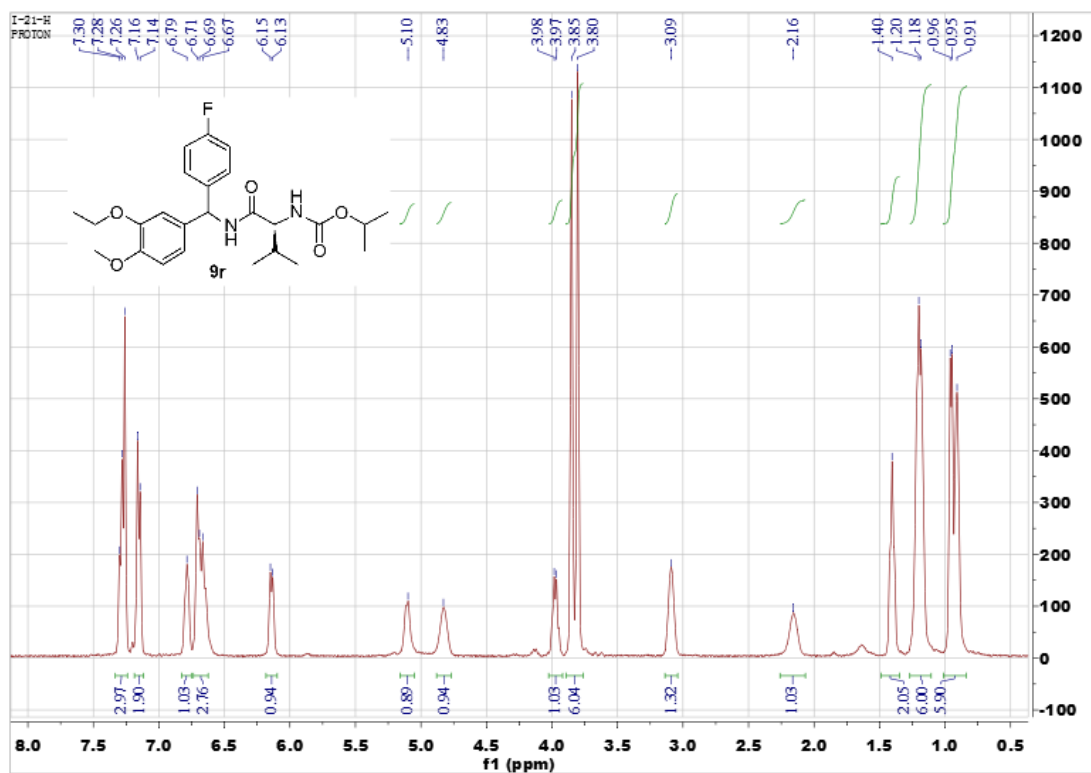




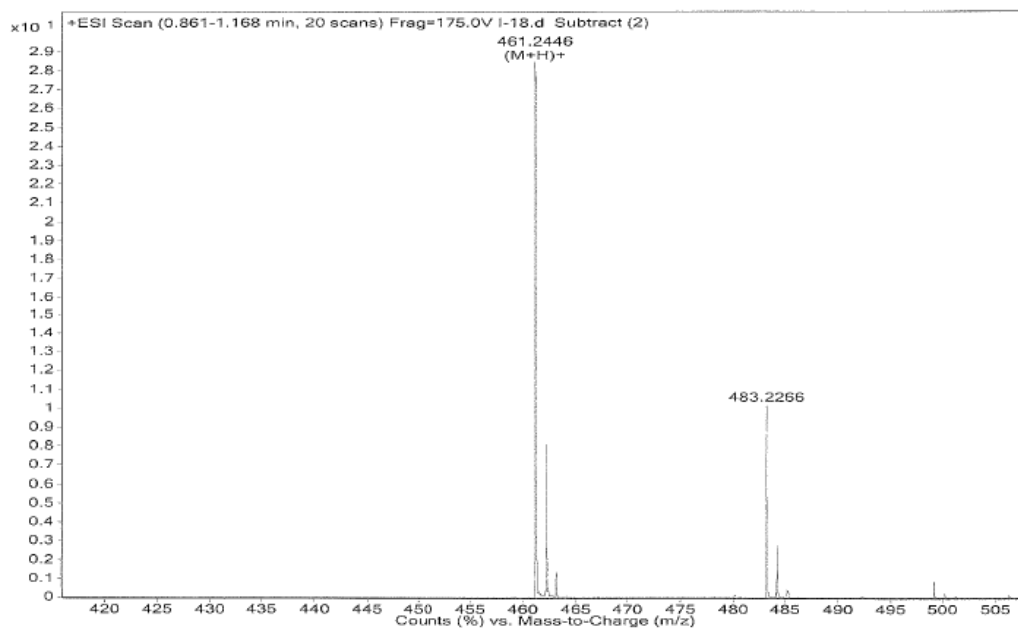
Sample Name	lc/ms	Position	P1-A6	Instrument Name	Instrument 1	User Name	
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status	Some Iores Missed
Data Filename	I-17.d	ACQ Method	chen-ms.m	Comment		Acquired Time	9/23/2013 11:32:14 AM



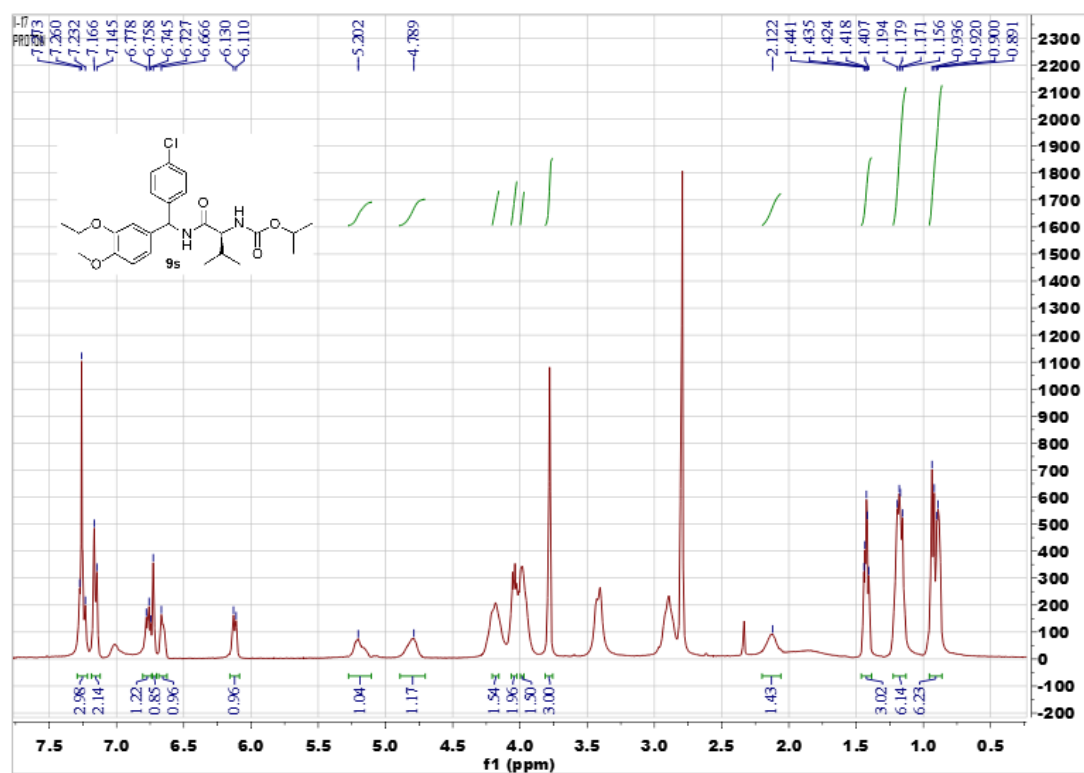
9r

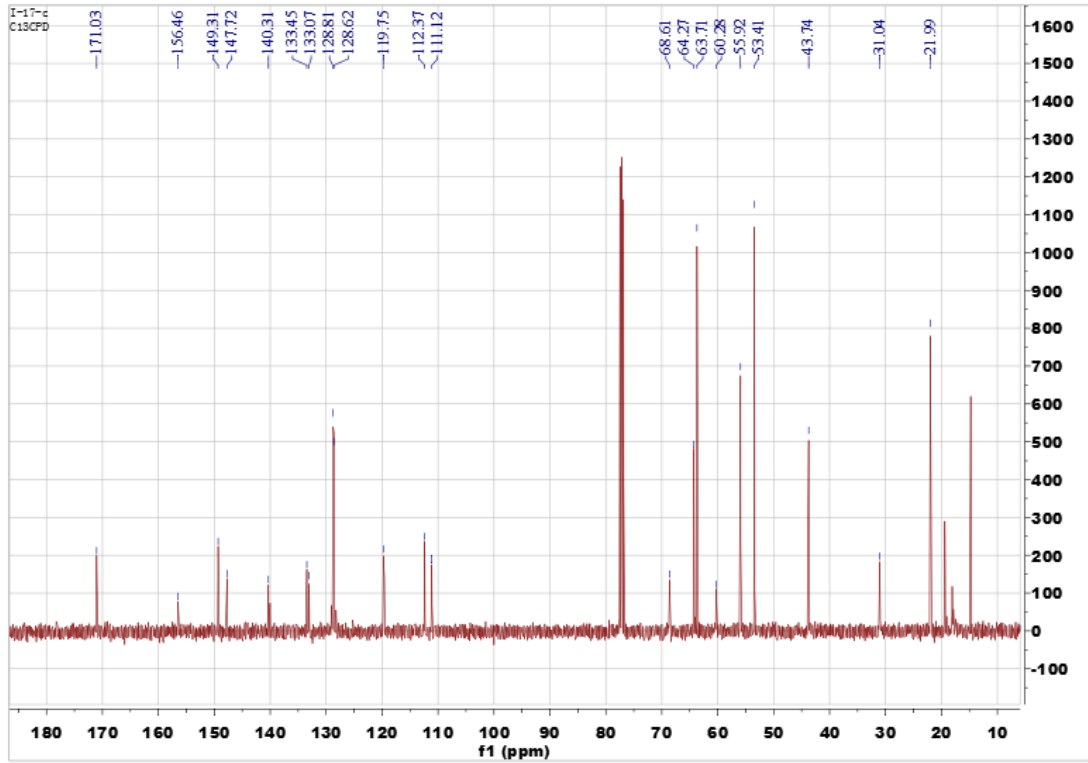


Sample Name	Unavailable	Position	Unavailable	Instrument Name	Unavailable	User Name	Unavailable
Inj Vol	Unavailable	InjPosition	Unavailable	SampleType	Unavailable	IRM Calibration Status	Some Ions Missed
Data Filename	1-18.d	ACQ Method		Comment	Sample information is unavailable	Acquired Time	Unavailable



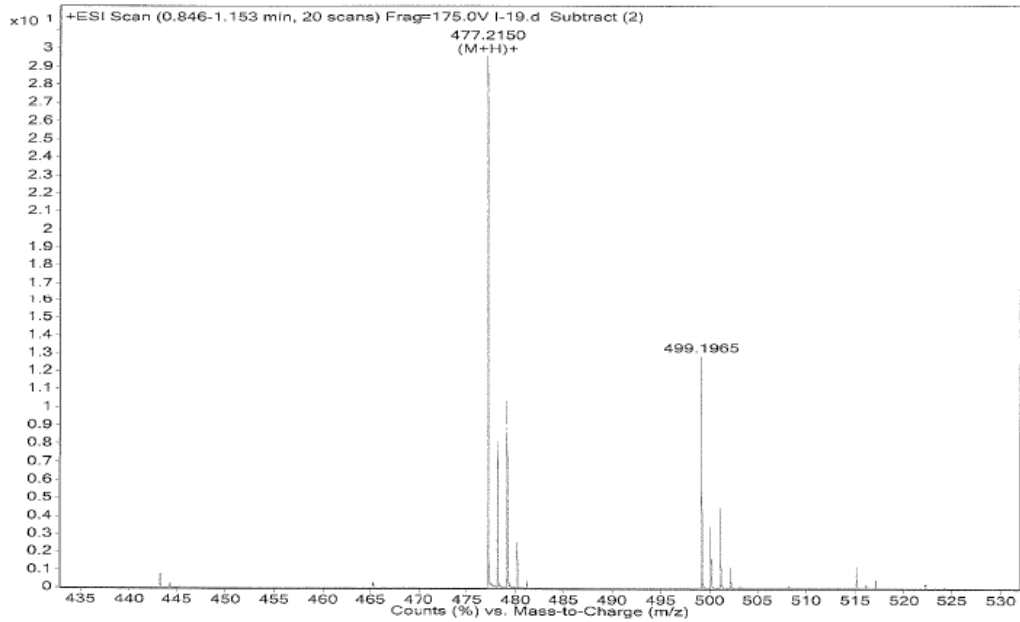
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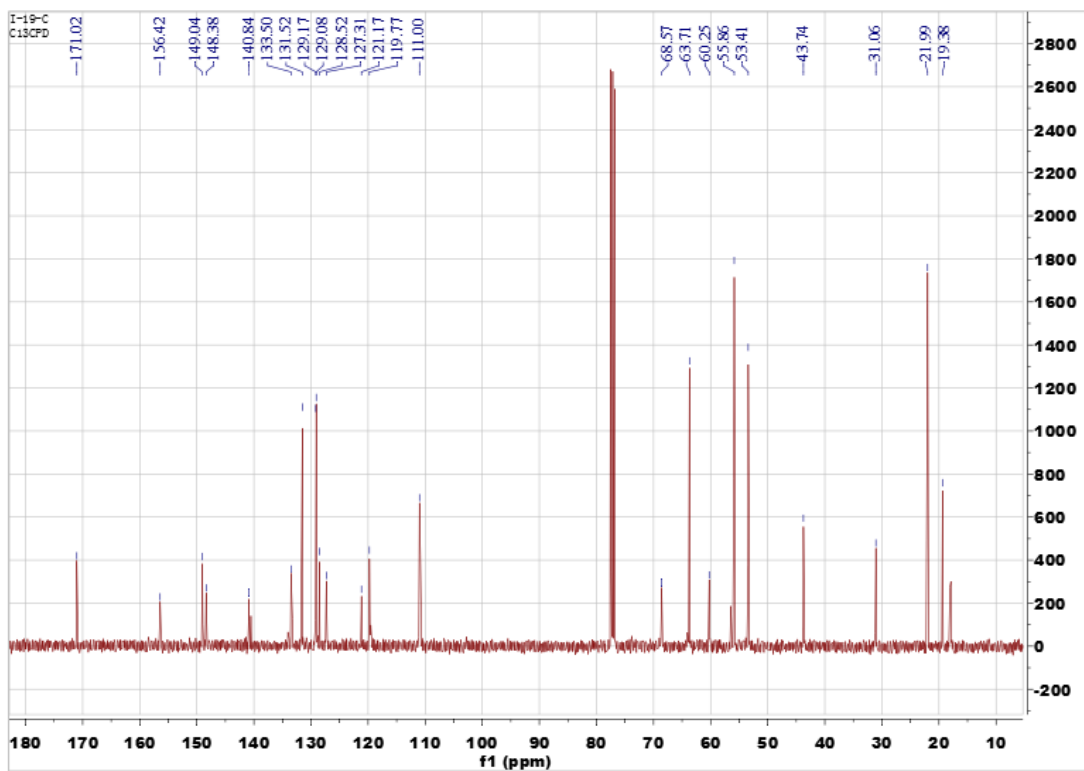
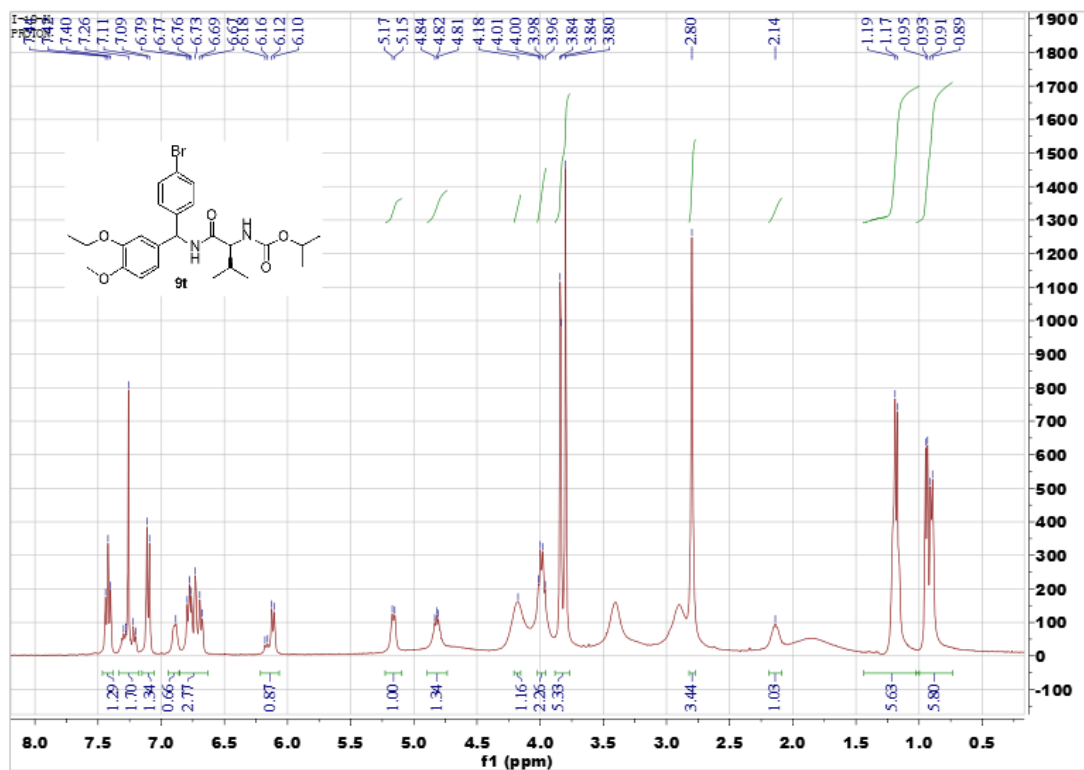


Sample Name	lc/ms	Position	P1-A1	Instrument Name	Instrument 1	User Name
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status
Data Filename	I-19.d	ACQ Method	chen-rs.m	Comment		Acquired Time

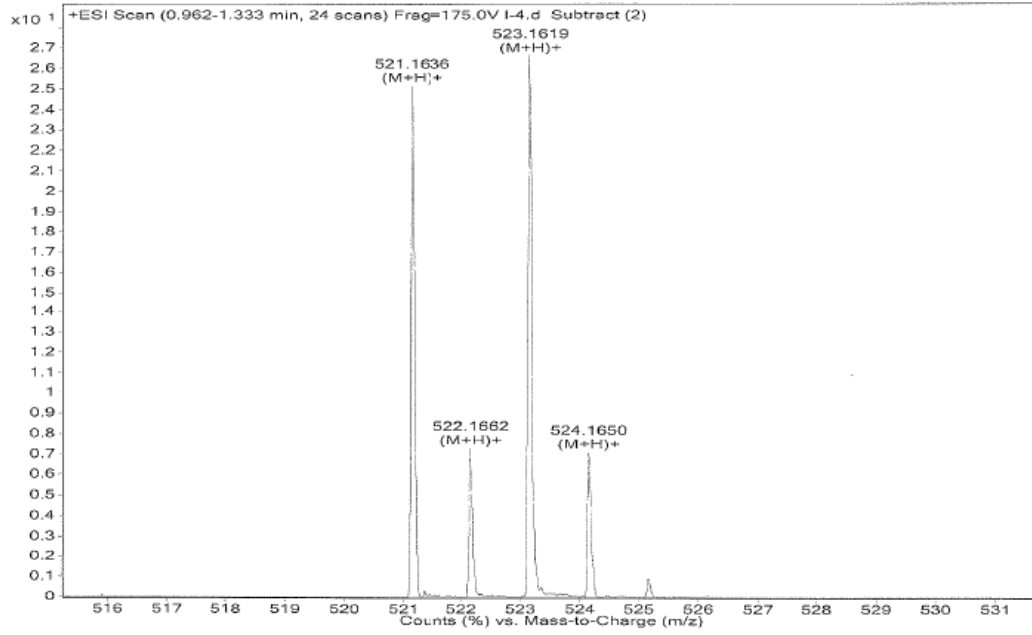
Some Ions Missed
9/23/2013 11:41:07 AM



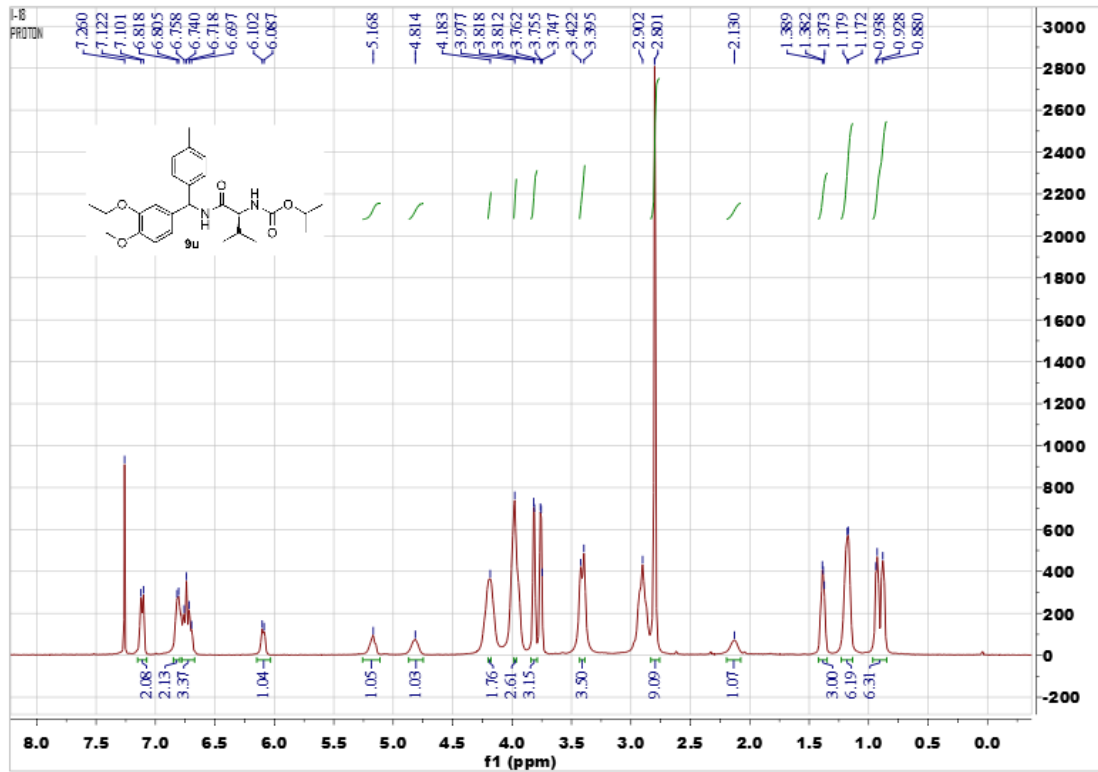
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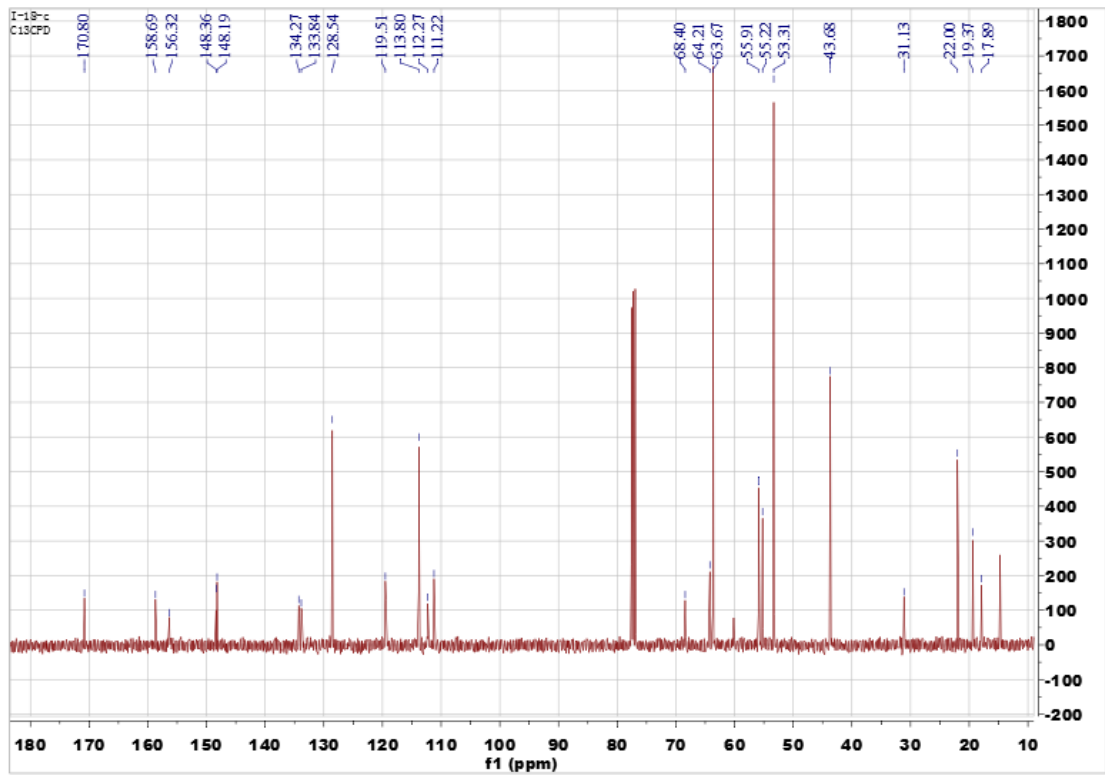


Sample Name	lc/ms	Position	P1-A3	Instrument Name	Instrument 1	User Name
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status
Data Filename	130d	ACQ Method	chen-ms.m	Comment		Acquired Time

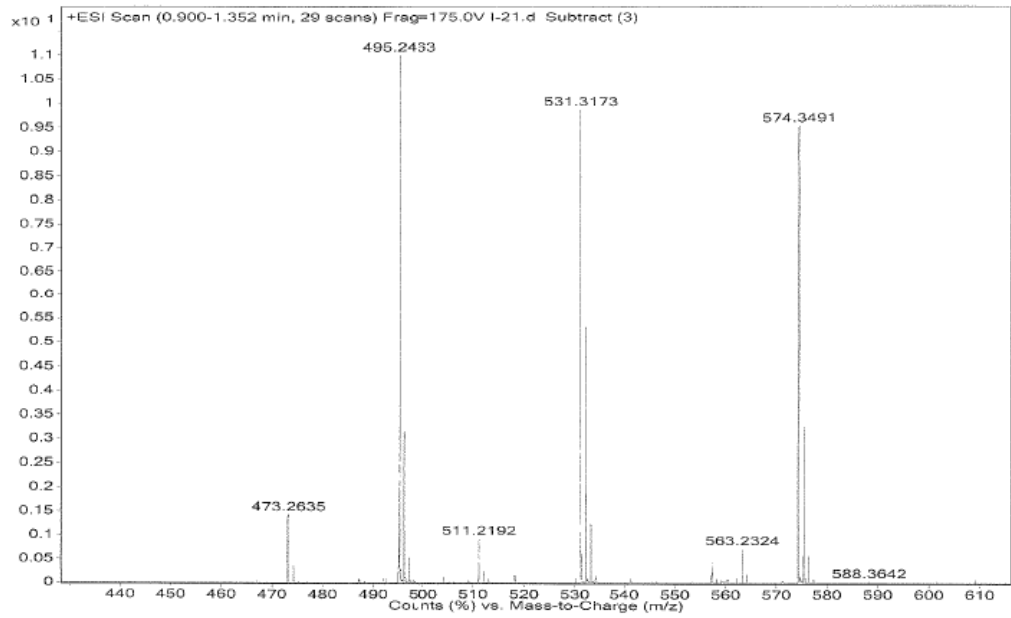


9u

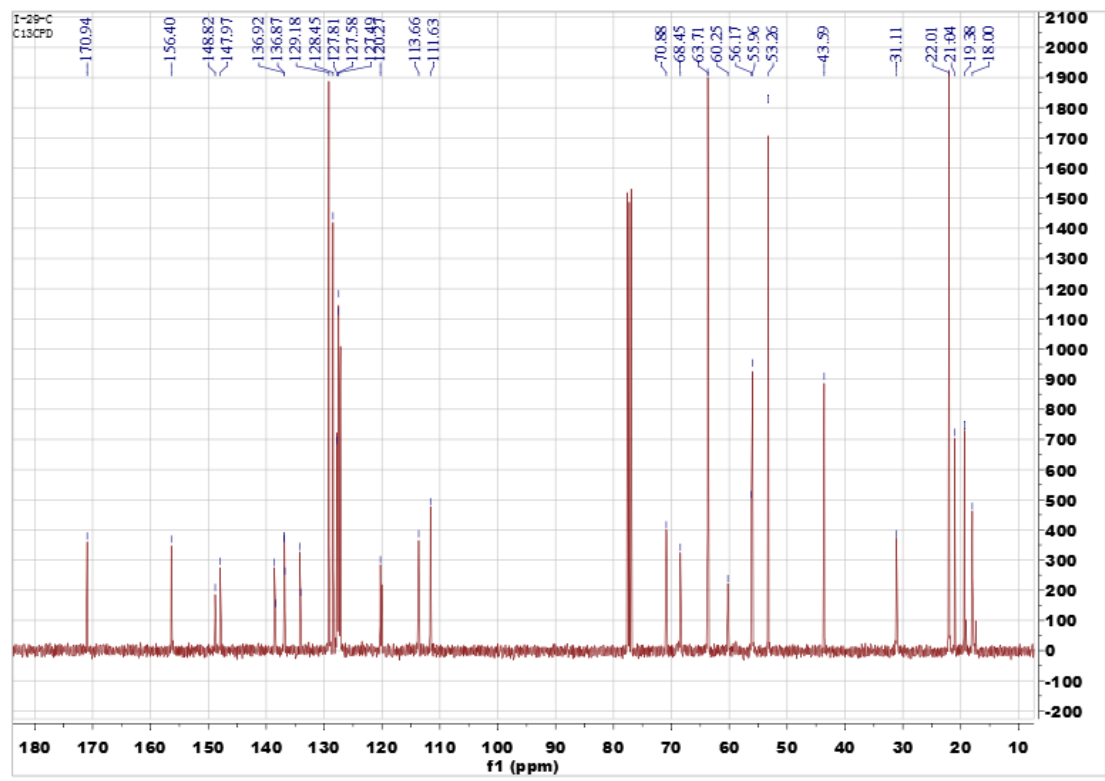
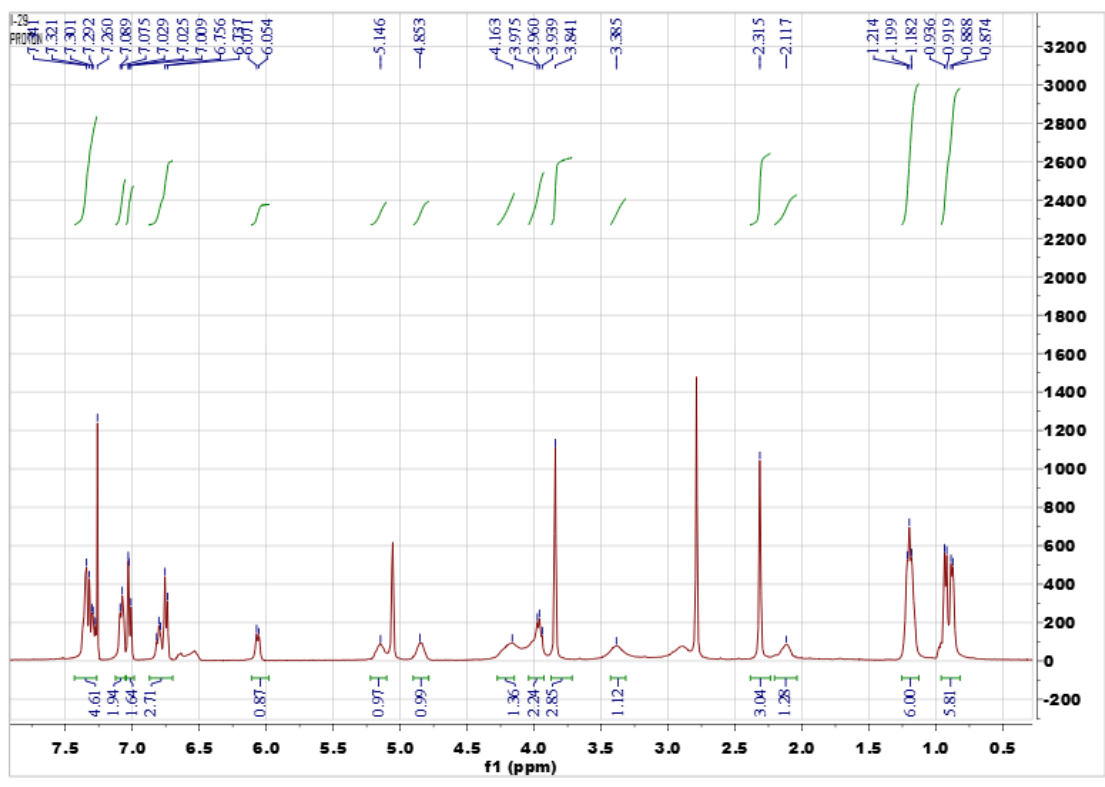




Sample Name	lc/ms	Position	P1-A3	Instrument Name	Instrument 1	User Name	
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	I-21.d	ACQ Method	chen-ms.m	Comment		Acquired Time	9/23/2013 11:48:40 AM



9v



Sample Name	lc/ms	Position	P1-M	Instrument Name	Instrument 1	User Name	
Inj Vol	2	InjPosition		SampleType	Sample	IRM Calibration Status	Some Ions Missed
Data Filename	1-22.d	ACQ Method	chen-ms.m	Comment		Acquired Time	9/23/2013 11:52:25 AM

