Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Catalyst-free selenylation of imidazoheterocycles

Sourav Jana, Amrita Chakraborty, Susmita Mondal and Alakananda Hajra*

Department of Chemistry, Visva-Bharati (A Central University),

Santiniketan-731235, India

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1. **Experimental Section**

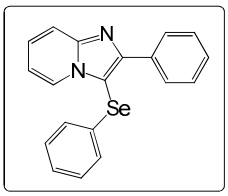
A. General:

^{1}H NMR spectra were determined on a Bruker 400 (400 MHz) spectrometer as solutions in $CDCl_3$. Chemical shifts are expressed in parts per million (δ) and the signals were reported as s (singlet), d (doublet), t (triplet), m (multiplet) and coupling constants *J* were given in Hz. ^{13}C NMR spectra were recorded at 100 MHz in $CDCl_3$ solution. Chemical shifts are expressed in parts per million (δ) and are referenced to $CDCl_3$ (δ = 7.16 for ^{1}H and δ = 77.16 for ^{13}C NMR) as internal standard. TLC was done on silica gel coated glass slide (Merck, Silica gel G for TLC). All solvents were dried and distilled before use. Commercially available substrates were freshly distilled before the reaction. Solvents, reagents and chemicals were purchased from Aldrich, Fluka, Merck, SRL, Spectrochem and Process Chemicals. All reactions involving moisture sensitive reactants were executed using oven dried glassware. All the imidazoheterocycles were prepared by our reported methods.[1,2]

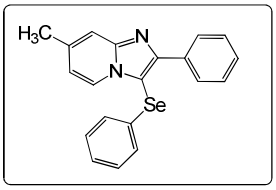
B. Typical Experimental Procedure:

A 1:3 mixture of polyethylene glycol (PEG 400) and water (H_2O) (2 mL) was added to a mixture of 2-phenylimidazo[1,2-*a*]pyridine (39 mg, 0.2 mmol), and phenylselenyl bromide (52 mg, 0.22 mmol) and the mixture was stirred at room temperature for 3 h. Then the reaction mixture was extracted with ethyl acetate. After evaporation of solvent under reduced pressure the crude residue was obtained which was purified by column chromatography on silica gel (60-120 mesh) using petroleum ether:ethylacetate = 9:1 as an eluent to afford the pure product **(3a)** (66 mg, 95%) as a light yellow solid, mp: 48-49 ^{o}C.

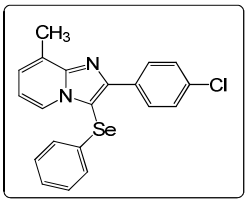
C. <u>Characterization Data of the synthesized compounds:</u>



2-Phenyl-3-(phenylselenyl)imidazo[1,2-*a*]pyridine (3a): Yellow solid (66 mg, 95%), mp: 48-49 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.25 (d, J = 8.4 Hz, 1H), 8.08-8.05 (m, 2H), 7.64 (d, J = 9.2 Hz, 1H), 7.37-7.33 (m, 2H), 7.30-7.26 (m, 1H), 7.23-7.19 (m, 1H), 7.09-7.05 (m, 3H), 7.02-7.00 (m, 2H), 6.77-6.73 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 151.7, 147.7, 133.7, 130.9, 129.7, 128.8, 128.6, 128.4, 128.3, 126.8, 126.6, 125.7, 117.5, 113.1, 103.0; Anal. Calcd for $C_{19}H_{14}N_2Se$: C, 65.33; H, 4.04; N, 8.02%. Found C, 65.14; H, 3.87; N, 7.86%.

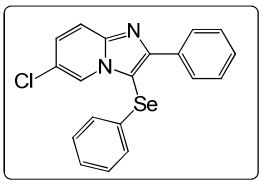


7-Methyl-2-phenyl-3-(phenylselenyl)imidazo[1,2-*a*]pyridine (3b): Yellow solid (68 mg, 93%), mp: 99-101 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.11-8.04 (m, 3H), 7.38-7.24 (m, 4H), 7.08-6.98 (m, 5H), 6.57-6.55 (m, 1H), 2.32 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 151.7, 148.1, 137.7, 133.9, 131.2, 129.7, 128.7, 128.4, 128.3, 128.2, 126.6, 124.8, 116.0, 115.7, 102.0, 21.4; Anal. Calcd for $C_{20}H_{16}N_2Se$: C, 66.12; H, 4.44; N, 7.71%. Found C, 66.04; H, 4.30; N, 7.54%.

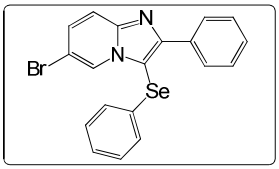


2-(4-Chlorophenyl)-8-methyl-3-(phenylselenyl)imidazo[1,2-*a*]pyridine (3c): White solid (76 mg, 96%), mp: 82-83 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.12 (d, J = 6.8 Hz, 1H), 8.01 (d, J = 8.4 Hz, 2H), 7.30 (d, J = 8.4 Hz, 2H), 7.09-7.05 (m, 3H), 7.03-6.97 (m, 3H), 6.68 (t, J = 6.8 Hz, 1H), 2.61 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 150.0, 147.9, 134.4, 132.3,

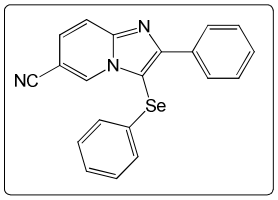
130.8, 130.2, 129.8, 128.5, 128.3, 127.6, 126.8, 125.8, 123.5, 113.3, 103.5, 17.0; Anal. Calcd for $C_{20}H_{15}ClN_2Se$: C, 60.39; H, 3.80; N, 7.04%. Found C, 60.24; H, 3.69; N, 6.89%.



6-Chloro-2-phenyl-3-(phenylselenyl)imidazo[1,2-*a*]pyridine (3d): Yellow solid (67 mg, 87%), mp: 89-91 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.32 (s, 1H), 8.07-8.05 (m, 2H), 7.59 (d, J = 9.6 Hz, 1H), 7.38-7.34 (m, 2H), 7.32-7.30 (m, 1H), 7.20 (s, 1H), 7.13-7.09 (m, 3H), 7.04-7.01 (m, 2H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 152.5, 146.0, 133.3, 130.4, 129.9, 128.8, 128.8, 128.5, 128.0, 127.9, 127.1, 123.7, 121.6, 117.9, 103.9; Anal. Calcd for $C_{19}H_{13}ClN_2Se$: C, 59.47; H, 3.41; N, 7.30%. Found C, 59.34; H, 3.22; N, 7.14%.

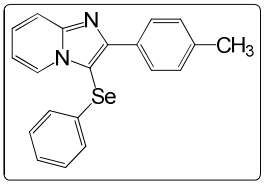


6-Bromo-2-phenyl-3-(phenylselenyl)imidazo[1,2-*a*]pyridine (3e): Brown solid (76 mg, 89%), mp: 118-120 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.42 (s, 1H), 8.06 (d, J = 7.6 Hz, 2H), 7.53 (d, J = 9.2 Hz, 1H), 7.37-7.27 (m, 4H), 7.18-7.10 (m, 3H), 7.03-7.01 (m, 2H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 152.2, 146.1, 133.2, 131.0, 130.4, 130.2, 129.9, 128.9, 128.8, 128.5, 127.1, 125.9, 118.2, 108.1, 103.7; Anal. Calcd for $C_{19}H_{13}BrN_2Se$: C, 53.30; H, 3.06; N, 6.54%. Found C, 53.12; H, 2.94; N, 6.39%.

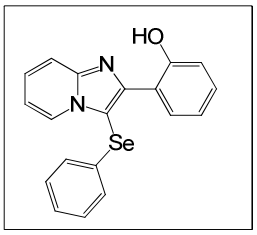


2-Phenyl-3-(phenylselenyl)imidazo[1,2-*a*]pyridine-6-carbonitrile (3f): Orange solid (69 mg, 93%), mp: 114-115 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.70 (s, 1H), 8.12-8.10 (m, 2H), 7.72 (d, J = 9.2 Hz, 1H), 7.41-7.32 (m, 4H), 7.15-7.13 (m, 3H), 7.06-7.03 (m, 2H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 153.6, 146.9, 132.5, 131.8, 130.1, 129.4, 128.9, 128.8, 128.6, 128.5,

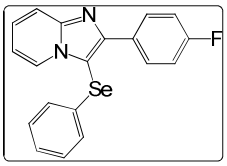
127.6, 126.5, 118.5, 116.5, 105.4, 99.4; Anal. Calcd for $C_{20}H_{13}N_3Se$: C, 64.18; H, 3.50; N, 11.23%. Found C, 65.08; H, 3.34; N, 11.09%.



3-(Phenylselenyl)-2-(*p*-tolyl)imidazo[1,2-*a*]pyridine (3g): Orange solid (65 mg, 89%), mp: 66-68 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.22 (d, J = 6.80 Hz, 1H), 7.95 (d, J = 8.00 Hz, 2H), 7.64 (d, J = 8.80 Hz, 1H), 7.20-7.14 (m, 3H), 7.07-6.98 (m, 3H), 6.99 (t, J = 5.20 Hz, 2H), 6.73-6.70 (m, 1H), 2.28 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 151.8, 147.6, 138.4, 130.9, 130.7, 129.7, 129.1, 128.7, 128.2, 126.7, 126.6, 125.6, 117.4, 113.0, 102.6, 21.4; Anal. Calcd for $C_{20}H_{16}N_2Se$: C, 66.12; H, 4.44; N, 7.71%. Found C, 66.03; H, 4.29; N, 7.59%.

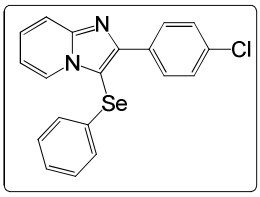


2-(3-(phenylselenyl)imidazo[1,2-*a*]pyridin-2-yl)phenol (3h): Brown solid (63 mg, 86%), mp: 64-66 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 12.91 (brs, 1H), 8.54 (d, J = 7.6 Hz, 1H), 8.34 (d, J = 6.8 Hz, 1H), 7.55 (d, J = 8.8 Hz, 1H), 7.27-7.23 (m, 1H), 7.21-7.15 (m, 1H), 7.10-7.00 (m, 5H), 6.97 (d, J = 8.0 Hz, 1H), 6.85-6.75 (m, 2H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 158.5, 149.4, 145.4, 130.6, 130.4, 129.8, 128.5, 128.1, 127.3, 127.0, 125.4, 118.7, 117.8, 116.6, 116.5, 113.7, 101.8; Anal. Calcd for $C_{19}H_{14}N_2OSe$: C, 62.47; H, 3.86; N, 7.67%. Found C, 62.34; H, 3.79; N, 7.50%.

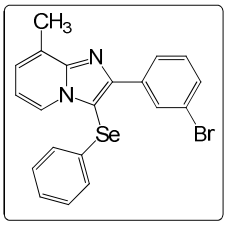


2-(4-Fluorophenyl)-3-(phenylselenyl)imidazo[1,2-*a*]pyridine (3i): Yellow solid (67 mg, 91%), mp: 68-70 °C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.23 (d, J = 8.0 Hz, 1H), 8.06-8.01 (m, 2H), 7.62 (d, J = 9.2 Hz, 1H), 7.22-7.18 (m, 1H), 7.09-6.96 (m, 7H), 6.76-6.72 (m, 1H); ^{13}C

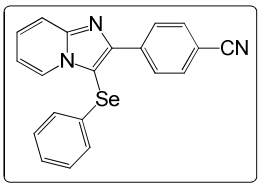
NMR ($CDCl_3$, 100 MHz): δ 163.0 (d, $J_{C\text{-}F}$ = 247 Hz), 150.8, 147.7, 130.7, 130.6, 130.5, 129.8 (d, $J_{C\text{-}F}$ = 3 Hz), 129.8, 128.2, 126.8 (d, $J_{C\text{-}F}$ = 8 Hz), 125.6, 117.4, 115.3 (d, $J_{C\text{-}F}$ = 22 Hz), 113.2, 102.7; Anal. Calcd for $C_{19}H_{13}FN_2Se$: C, 62.13; H, 3.57; N, 7.63%. Found C, 62.01; H, 3.41; N, 7.50%.



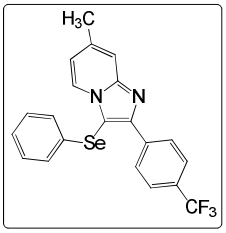
2-(4-Chlorophenyl)-3-(phenylselenyl)imidazo[1,2-*a*]pyridine (3j): Yellow solid (74 mg, 97%), mp: 82-84 ^oC; ^1H NMR ($CDCl_3$, 400 MHz): δ 8.25-8.23 (m, 1H), 8.03-8.00 (m, 2H), 7.64-7.62 (m, 1H), 7.33-7.28 (m, 2H) , 7.23-7.19 (m, 1H),7.09-7.05 (m, 3H), 7.01-6.96 (m, 2H), 6.77-6.74 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 150.4, 147.7, 134.5, 132.2, 130.6, 130.0, 129.8, 128.6, 128.3, 126.9, 126.8, 125.6, 117.5, 113.3, 103.1; Anal. Calcd for $C_{19}H_{13}ClN_2Se$: C, 59.47; H, 3.41; N, 7.30%. Found C, 59.27; H, 3.30; N, 7.16%.



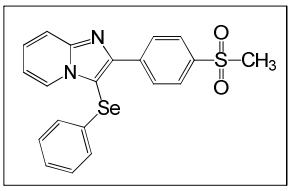
2-(3-Bromophenyl)-8-methyl-3-(phenylselenyl)imidazo[1,2-*a*]pyridine (3k): Yellow solid (79 mg, 89%), mp: 67-69 ^oC; ^1H NMR ($CDCl_3$, 400 MHz): δ 8.25 (s, 1H), 8.14 (d, J = 6.8 Hz, 1H), 8.02-8.00 (m, 1H), 7.41-7.38 (m, 1H), 7.22-7.17 (m, 1H), 7.09-7.03 (m, 3H), 7.02-6.99 (m, 3H), 6.69 (t, J = 6.8 Hz, 1H), 2.62 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 149.6, 148.0, 136.2, 131.8, 131.3, 130.9, 129.8, 129.8, 128.5, 127.8, 127.4, 126.9, 125.6, 123.5, 122.5, 113.3, 103.9, 16.9; Anal. Calcd for $C_{20}H_{15}BrN_2Se$: C, 54.32; H, 3.42; N, 6.33%. Found C, 54.15; H, 3.31; N, 6.18%.



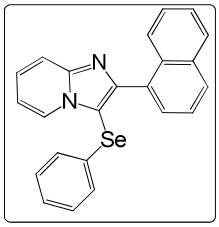
4-(3-(Phenylselenyl)imidazo[1,2-*a*]pyridin-2-yl)benzonitrile (3l): Yellow solid (70 mg, 93%), mp: 93-95 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.28-8.22 (m, 3H), 7.63-7.59 (m, 3H), 7.27-7.23 (m, 1H), 7.09-7.08 (m, 3H), 7.00-6.97 (m, 2H), 6.82-6.78 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 149.2, 147.8, 138.3, 132.1, 130.2, 129.9, 129.0, 128.3, 127.2, 127.1, 125.7, 129.0, 117.8, 113.6, 111.7, 104.2; Anal. Calcd for $C_{20}H_{13}N_3Se$: C, 64.18; H, 3.50; N, 11.23%. Found C, 64.05; H, 3.39; N, 11.14%.



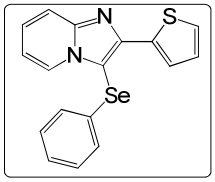
7-Methyl-3-(phenylselenyl)-2-(4-(trifluoromethyl)phenyl)imidazo[1,2-*a*]pyridine (3m): White solid (78 mg, 90%), mp: 78-80 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.19 (d, J = 8.4 Hz, 2H), 8.11 (d, J = 7.2 Hz, 1H), 7.56 (d, J = 8.4 Hz, 2H), 7.37 (s, 1H), 7.07-7.04 (m, 3H), 6.99-6.96 (m, 2H), 6.59-6.57 (m, 1H), 2.31 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 149.8, 148.1, 138.3, 137.4, 130.7, 130.1 (d, $J_{C\text{-}F}$ = 32 Hz), 129.8, 128.8, 128.2, 126.9, 125.2 (d, $J_{C\text{-}F}$ = 4 Hz), 124.8, 124.3 (d, $J_{C\text{-}F}$ = 267 Hz), 116.1, 116.1, 103.0, 21.4; Anal. Calcd for $C_{21}H_{15}F_3N_2Se$: C, 58.48; H, 3.51; N, 6.49%. Found C, 58.21; H, 3.39; N, 6.31%.



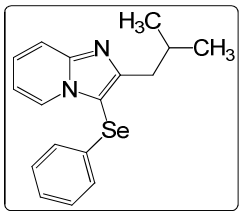
2-(4-(Methylsulfonyl)phenyl)-3-(phenylselenyl)imidazo[1,2-*a*]pyridine (3n): Yellow solid (67mg, 78%), mp: 68-70 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.34-8.30 (m, 3H), 7.92-7.90 (m, 2H), 7.66 (d, J = 9.2 Hz, 1H), 7.31-7.26 (m, 1H), 7.11-7.09 (m, 3H), 7.02-6.99 (m, 2H), 6.85-6.82 (m, 1H), 2.99 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 149.1, 147.8, 139.8, 139.1, 130.2, 129.9, 129.4, 128.4, 127.4, 127.3, 127.1, 125.8, 117.8, 113.7, 104.5, 44.6; Anal. Calcd for $C_{20}H_{16}N_2O_2SSe$: C, 56.21; H, 3.77; N, 6.55%. Found C, 56.07; H, 3.55; N, 6.32%.



2-(Naphthalen-1-yl)-3-(phenylselenyl)imidazo[1,2-*a*]pyridine (3o): Yellow solid (75 mg, 94%), mp: 84-86 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.56 (s, 1H), 8.25-8.22 (m, 2H), 7.79-7.77 (m, 2H), H), 7.73-7.70 (m, 1H), 7.64 (d, J = 8.8 Hz, 1H), 7.37-7.33 (m, 2H), 7.20-7.13 (m, 1H), 7.03 (s, 5H) 6.72-6.68 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 151.4, 147.7, 133.3, 131.1, 130.9, 129.7, 128.7, 128.5, 128.4, 128.2, 127.9, 127.6, 126.8, 126.7, 126.4, 126.4, 126.1, 125.6, 117.4, 113.1, 103.5; Anal. Calcd for $C_{23}H_{16}N_2S$: C, 69.17; H, 4.04; N, 7.01%. Found C, 69.04; H, 3.89; N, 6.84%.

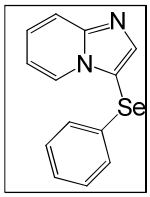


3-(Phenylselenyl)-2-(thiophen-2-yl)imidazo[1,2-*a*]pyridine (3p):Yellow solid (46 mg, 64%,), mp: 105-107 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.24 (d, J = 8.0 Hz, 1H), 7.95-7.94 (m, 1H), 7.60 (d, J = 8.8 Hz, 1H), 7.27 (dd, J = 4.8, 1.2 Hz, 1H), 7.22-7.18 (m, 1H), 7.07 (s, 5H), 7.04-7.00 (m, 1H), 6.77-6.73 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 147.5, 146.8, 136.6, 130.4, 129.7, 128.7, 127.7, 127.0, 126.9, 126.8, 126.8, 125.5, 117.2, 113.2, 102.3; Anal. Calcd for $C_{17}H_{12}N_2SSe$: C, 57.46; H, 3.40; N, 7.88%. Found C, 57.33; H, 3.21; N, 7.71%.

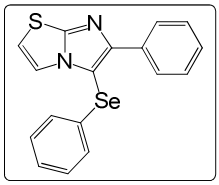


2-Isobutyl-3-(phenylselenyl)imidazo[1,2-*a*]pyridine(3q): Yellow liquid, (48 mg, 73%); ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.12-8.10 (m, 1H), 7.57-7.54 (m, 1H), 7.19-7.13 (m, 1H), 7.05 (t, J = 3.2 Hz, 3H), 6.96-6.94 (m, 2H), 6.71-6.68 (m, 1H), 2.75 (d, J = 7.2, 2H), 2.17-2.10 (m, 1H), 0.86 (d, J = 6.4 Hz, 6H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 154.5, 147.5, 131.0, 129.5,

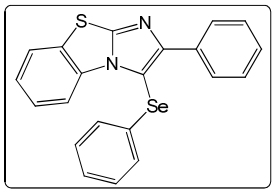
128.3, 126.6, 125.9, 125.3, 116.9, 112.6, 104.8, 37.6, 29.1, 22.6; Anal. Calcd for $C_{17}H_{18}N_2Se$: C, 62.01; H, 5.51; N, 8.51%. Found C, 61.87; H, 5.42; N, 8.39%.



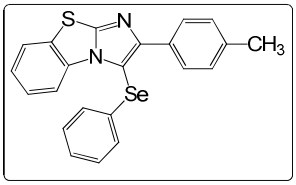
2-(Phenylselenyl)imidazo[1,2-*a*]pyridine (3r): Yellow liquid, (43 mg, 78%); ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.21 (d, J = 6.8 Hz, 1H), 7.91 (s, 1H), 7.65 (d, J = 9.2 Hz, 1H), 7.25-7.21 (m, 1H), 7.12-7.06 (m, 5H), 6.80 (t, J = 6.8 Hz, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 148.1, 142.6, 130.4, 129.6, 129.1, 127.0, 126.1, 125.3, 117.9, 113.3, 106.7; Anal. Calcd for $C_{13}H_{10}N_2Se$: C, 57.15; H, 3.69; N, 10.25%. Found C, 57.02; H, 3.51; N, 10.14%.



6-Phenyl-5-(phenylselenyl)imidazo[2,1-*b*]thiazole (5a): Yellow solid (53 mg, 74%), mp: 67-69 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.00-7.98 (m, 2H),7.33-7.29 (m, 3H), 7.24-7.20 (m, 1H), 7.12-7.04 (m, 5H), 6.70 (d, J = 4.4 Hz, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 152.8, 151.6, 133.8, 131.4, 129.7, 128.5, 128.4, 128.1, 127.8, 126.8, 118.8, 112.6, 102.6; Anal. Calcd for $C_{17}H_{12}N_2SSe$: C, 57.46; H, 3.40; N, 7.88%. Found C, 57.32; H, 3.31; N, 7.71%.



2-Phenyl-3-(phenylselenyl)benzo[*d*]imidazo[2,1-*b*]thiazole (5b): Orange solid (76 mg, 92%), mp: 87-89 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.44-8.41 (m, 1H), 7.94 (d, J = 7.2 Hz, 2H), 7.58-7.56 (m, 1H), 7.32 (t, J = 7.2 Hz, 2H), 7.27-7.16 (m, 5H), 7.12-7.06 (m, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 154.2, 151.5, 133.9, 133.6, 132.5, 130.3, 129.9, 128.5, 128.3, 128.3, 128.2, 126.8, 126.2, 125.0, 124.0, 114.6, 104.2; Anal. Calcd for $C_{21}H_{14}N_2SSe$: C, 62.22; H, 3.48; N, 6.91%. Found C, 62.08; H, 3.31; N, 6.75%.

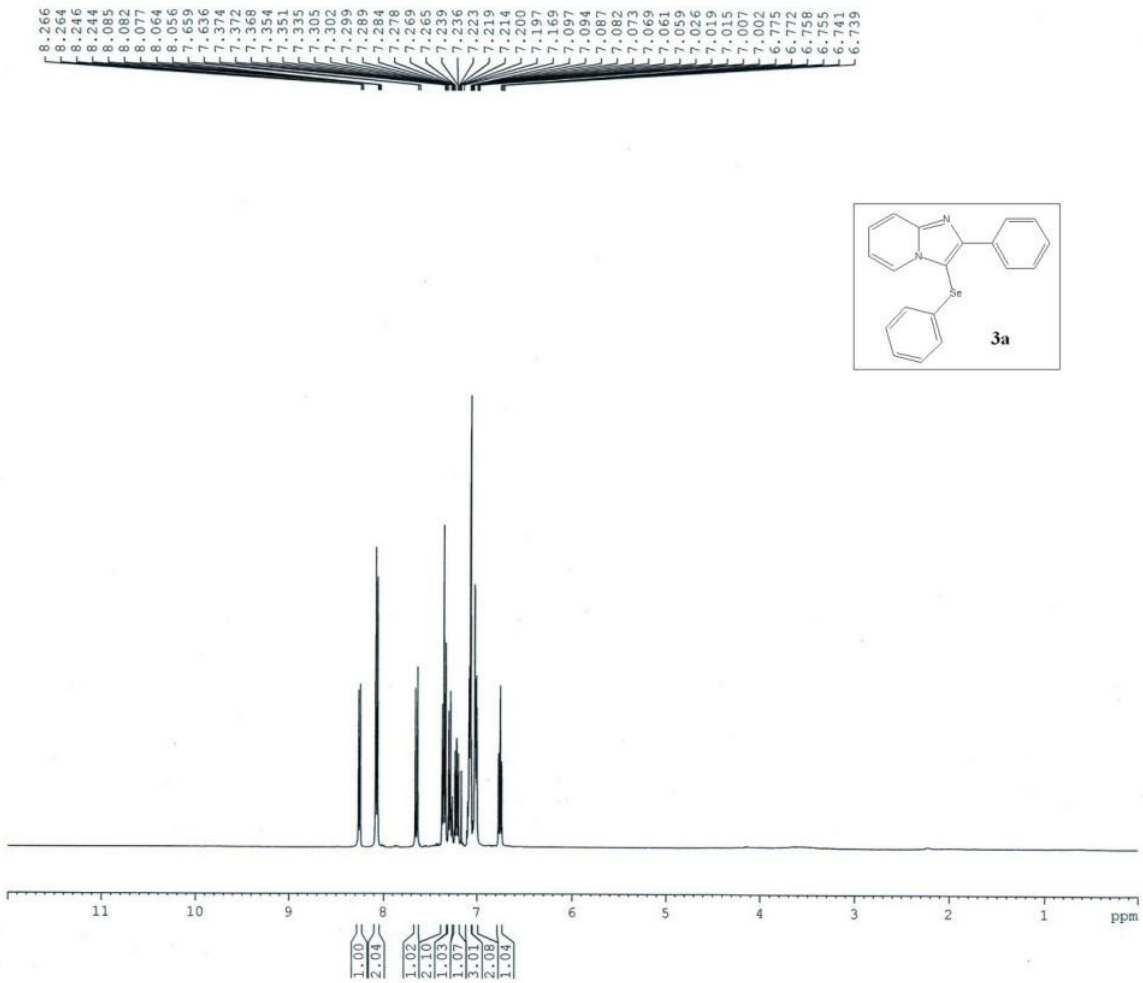


3-(Phenylselenyl)-2-(*p*-tolyl)benzo[*d*]imidazo[2,1-*b*]thiazole (5c): Orange solid (70 mg, 84%), mp: 110-112 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ 8.46-8.44 (m, 1H), 7.84 (d, J = 8.0 Hz, 2H), 7.62-7.59 (m, 1H), 7.28-7.21 (m, 2H), 7.19-7.08 (m, 7H), 2.30 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ 154.0, 151.3, 138.3, 133.9, 132.5, 130.5, 130.3, 129.9, 129.1, 128.3, 128.2, 126.8, 126.2, 125.0, 124.1, 114.6, 104.0, 21.4; Anal. Calcd for $C_{22}H_{16}N_2SSe$: C, 63.00; H, 3.85; N, 6.68%. Found C, 62.85; H, 3.67; N, 6.51%.

References:

1. (a) S. Santra, A. Majee and A. Hajra, *Tetrahedron Lett.,* 2011, **52**, 3825; (*b*) S. Das, M. Rahman, D. Kundu, A. Majee and A. Hajra, *Can. J. Chem.,* 2010, **88**, 150.
2. M. Mirza-Aghayan, A. Moradi, M. Bolourtchain and R. Boukherroub, *Synthetic Commun*., 2010, **40**, 8.
3. B. Kaur and R. Kaur, *Arkivoc,* 2007, **xv,** 315.

^{1}H and ^{13}C NMR spectra of Compounds



BRUKER

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                210
PROCNO                 1

F2 - Acquisition Parameters
Date_           20150510
Time               14.44
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                    24
DS                     2
SWH             8223.685 Hz
FIDRES          0.250967 Hz
AQ              1.9923444 sec
RG                 62.69
DW                60.800 usec
DE                 6.50 usec
TE                298.0 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 14.75 usec
PLW1         11.99499989 W
SFO1         400.1524711 MHz

F2 - Processing parameters
SI                 16384
SF           400.1500455 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
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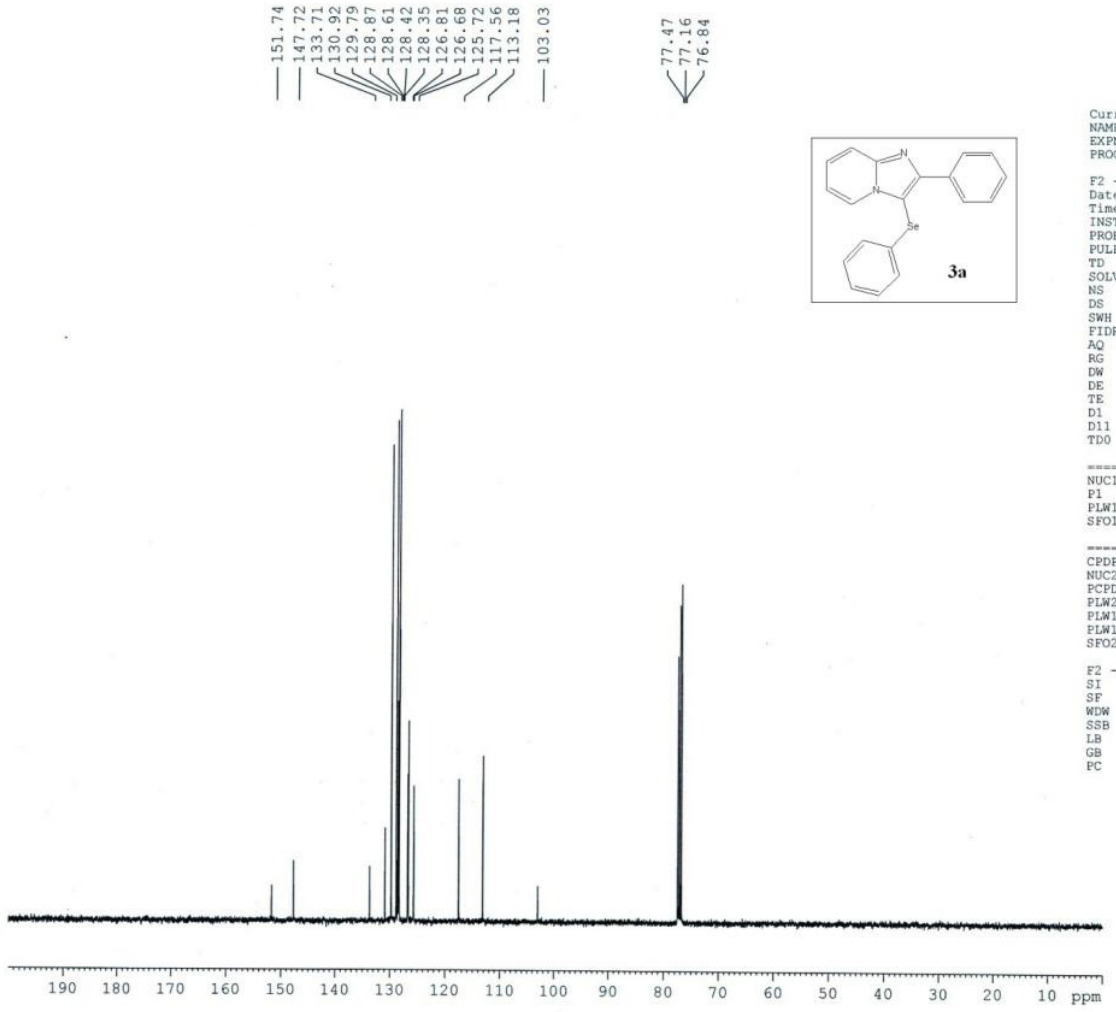


BRUKER

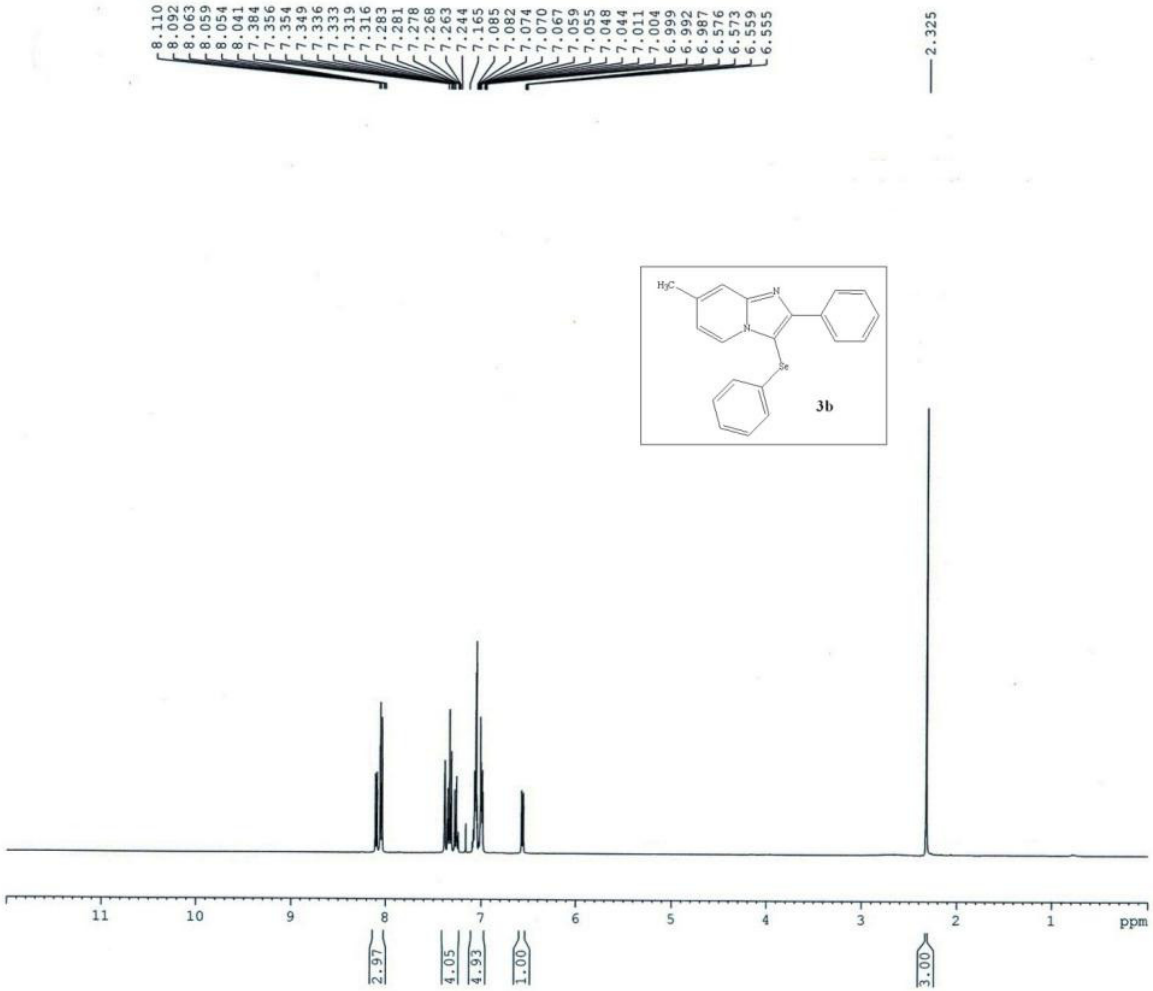
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 211
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150510
Time 15.03
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 320
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6816244 sec
RG 62.69
DW 20.800 usec
DE 6.50 usec
TE 299.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W
SFO1 100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PLW2 12.00000000 W
PLW12 0.40792999 W
PLW13 0.26107001 W
SFO2 400.1516006 MHz

F2 - Processing parameters
SI 16384
SF 100.6177894 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



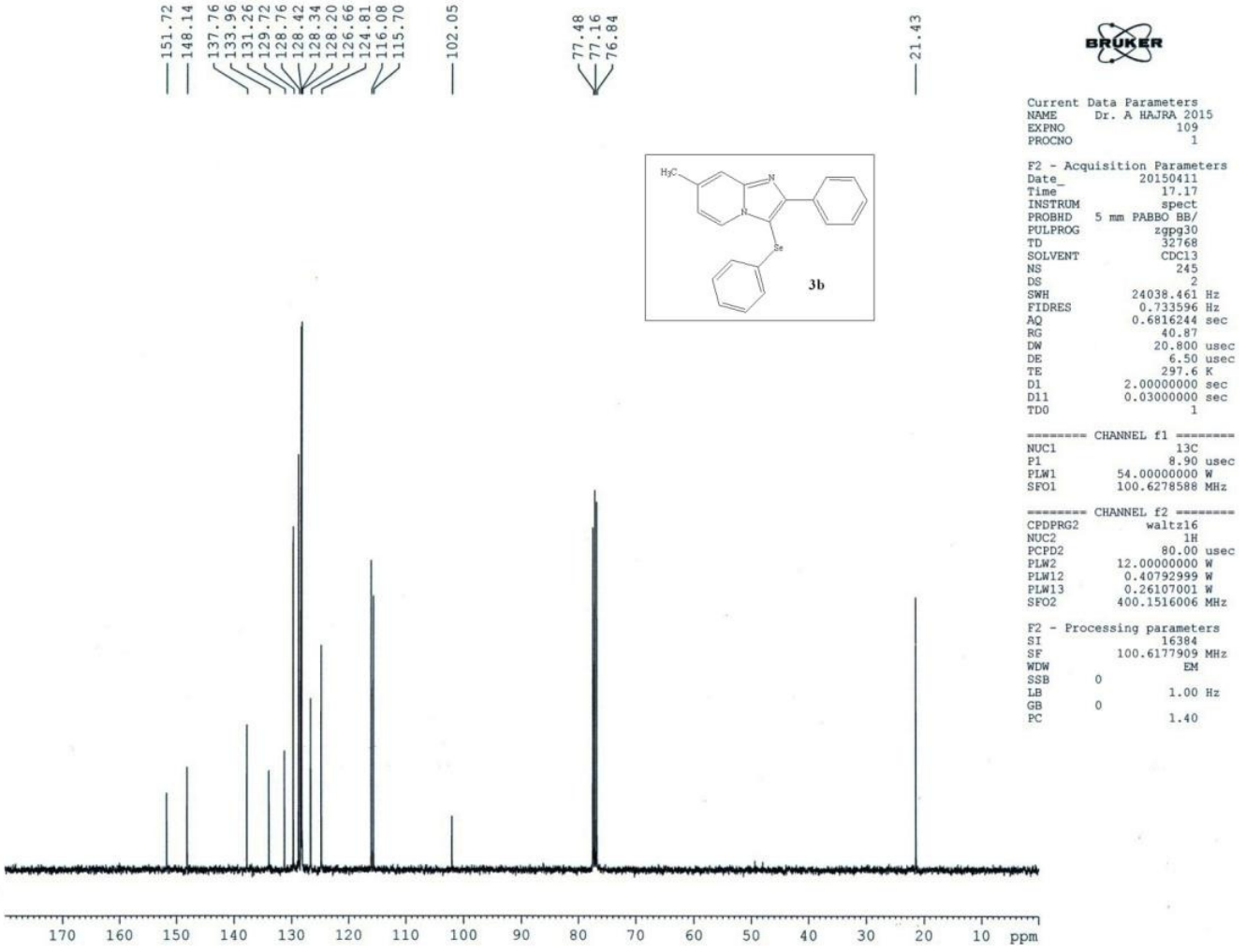
BRUKER

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO              105
PROCNO               1

F2 - Acquisition Parameters
Date_          20150411
Time              15.50
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   24
DS                    2
SWH            8223.685 Hz
FIDRES         0.250967 Hz
AQ             1.9923444 sec
RG                40.87
DW               60.800 usec
DE                6.50 usec
TE               296.1 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                 1H
P1                14.75 usec
PLW1         11.99499989 W
SFO1         400.1524711 MHz

F2 - Processing parameters
SI                16384
SF           400.1500472 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```



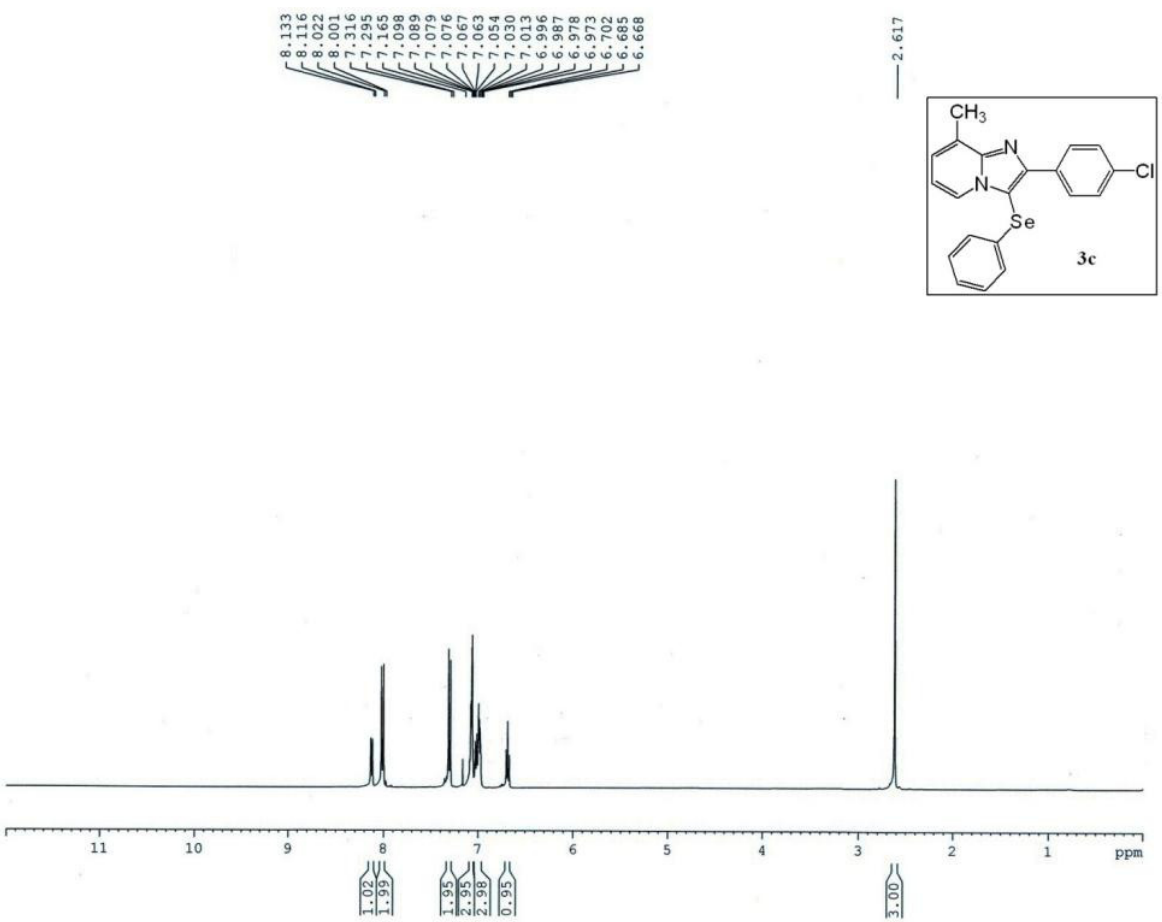

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                109
PROCNO                 1

F2 - Acquisition Parameters
Date_           20150411
Time               17.17
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD                32768
SOLVENT           CDCl3
NS                  245
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6816244 sec
RG                 40.87
DW                20.800 usec
DE                 6.50 usec
TE                297.6 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                13C
P1                 8.90 usec
PLW1        54.00000000 W
SFO1       100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2                1H
PCPD2             80.00 usec
PLW2        12.00000000 W
PLW12        0.40792999 W
PLW13        0.26107001 W
SFO2       400.1516006 MHz

F2 - Processing parameters
SI                 16384
SF          100.6177909 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```



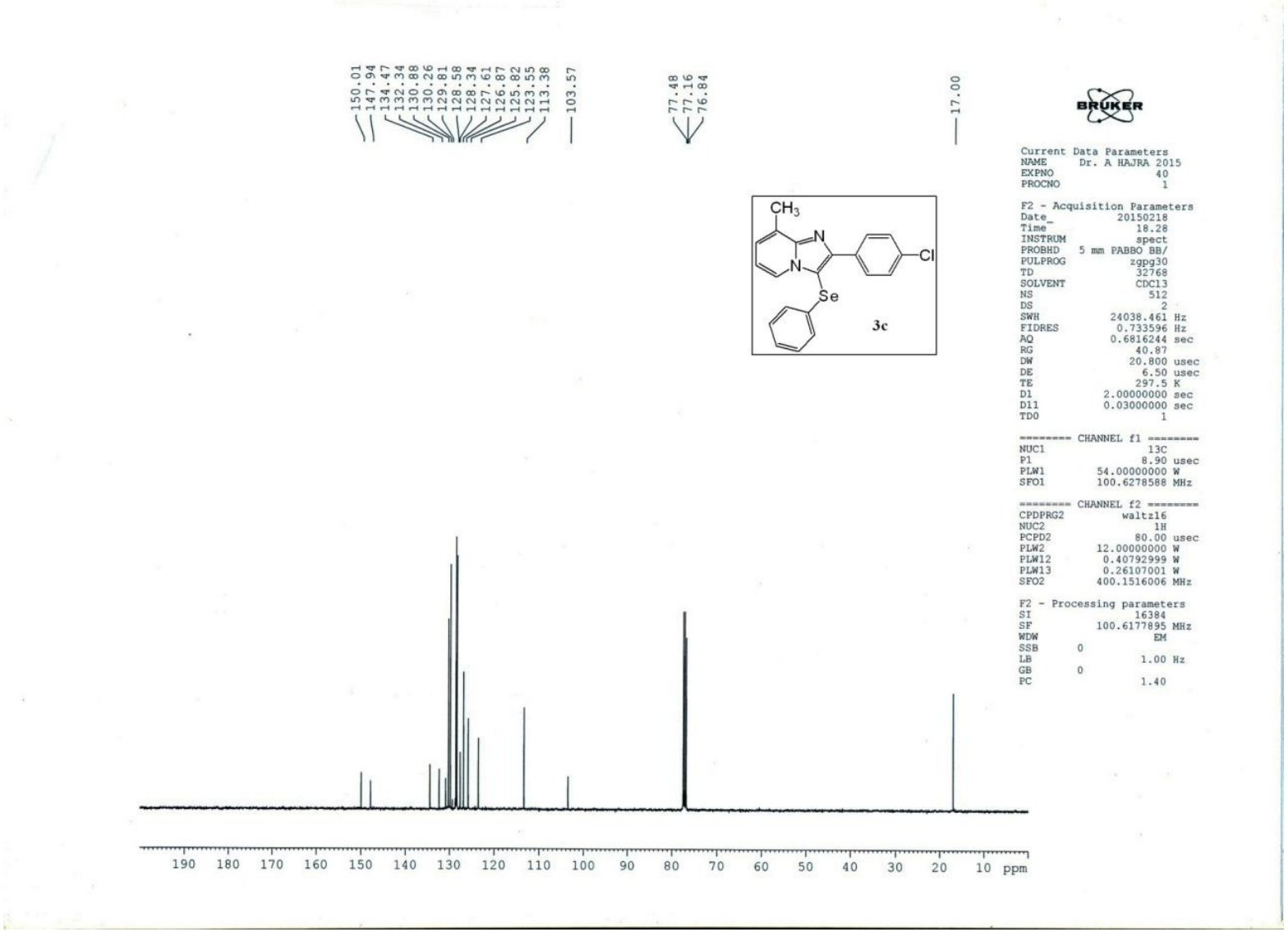
BRUKER

Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 39
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150218
Time 17.59
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 2
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 40.87
DW 60.800 usec
DE 6.50 usec
TE 296.4 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 14.75 usec
PLW1 11.99499989 W
SFO1 400.1524711 MHz

F2 - Processing parameters
SI 16384
SF 400.1500471 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



BRUKER

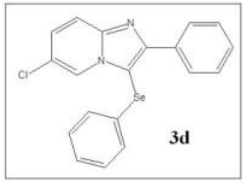
```
Current Data Parameters
NAME        Dr. A HAJRA 2015
EXPNO                   40
PROCNO                   1

F2 - Acquisition Parameters
Date_             20150218
Time                 18.28
INSTRUM              spect
PROBHD   5 mm PABBO BB/
PULPROG              zgpg30
TD                    32768
SOLVENT               CDCl3
NS                      512
DS                        2
SWH              24038.461 Hz
FIDRES            0.733596 Hz
AQ                0.6816244 sec
RG                    40.87
DW                20.800 usec
DE                 6.50 usec
TE                   297.5 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                       1

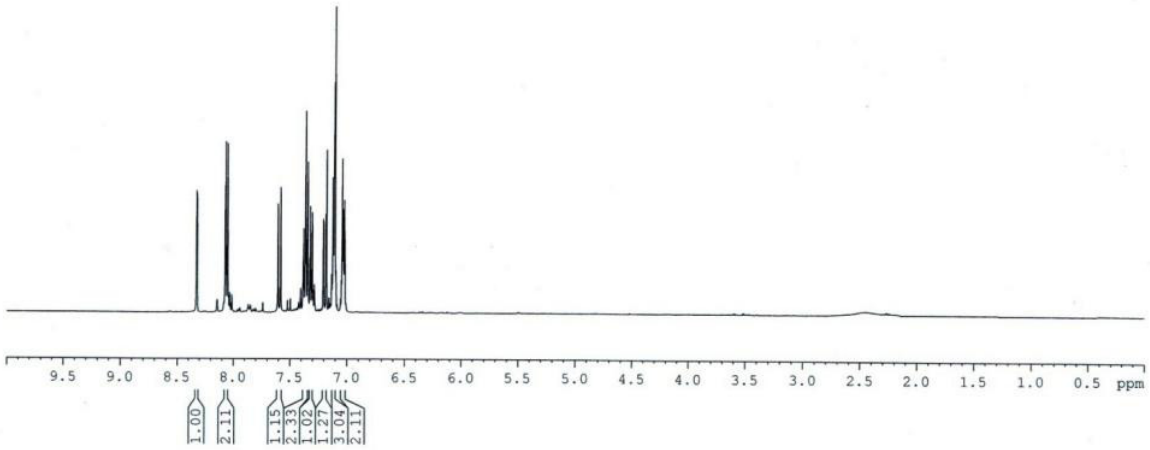
======== CHANNEL f1 ========
NUC1                    13C
P1                   8.90 usec
PLW1          54.00000000 W
SFO1         100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2              waltz16
NUC2                    1H
PCPD2               80.00 usec
PLW2          12.00000000 W
PLW12          0.40792999 W
PLW13          0.26107001 W
SFO2         400.1516006 MHz

F2 - Processing parameters
SI                    16384
SF           100.6177895 MHz
WDW                      EM
SSB       0
LB                    1.00 Hz
GB        0
PC                    1.40
```



3d




```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                130
PROCNO                 1

F2 - Acquisition Parameters
Date_           20150417
Time              16.30
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   24
DS                    2
SWH            8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9923444 sec
RG                93.46
DW               60.800 usec
DE                6.50 usec
TE               297.7 K
D1            1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                  1H
P1                14.75 usec
PLW1        11.99499989 W
SFO1        400.1524711 MHz

F2 - Processing parameters
SI                16384
SF          400.1500419 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
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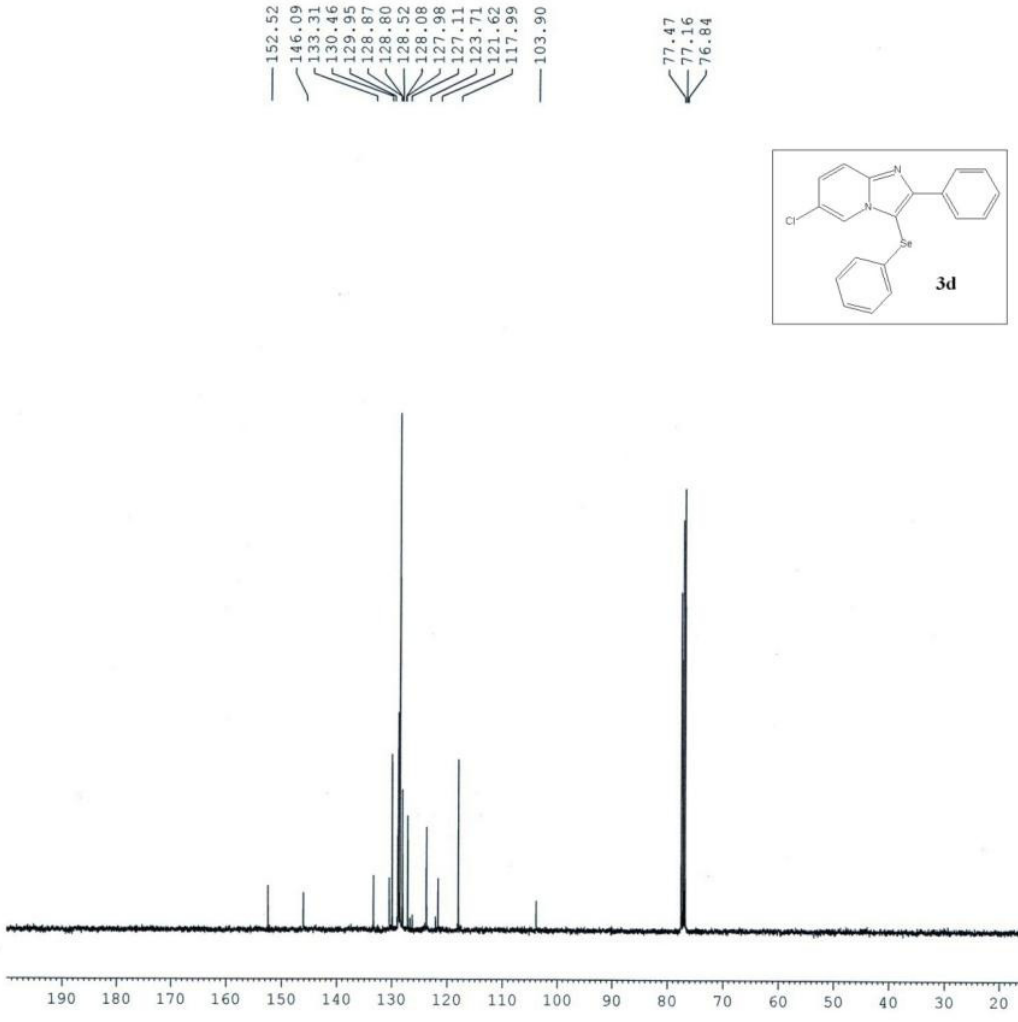


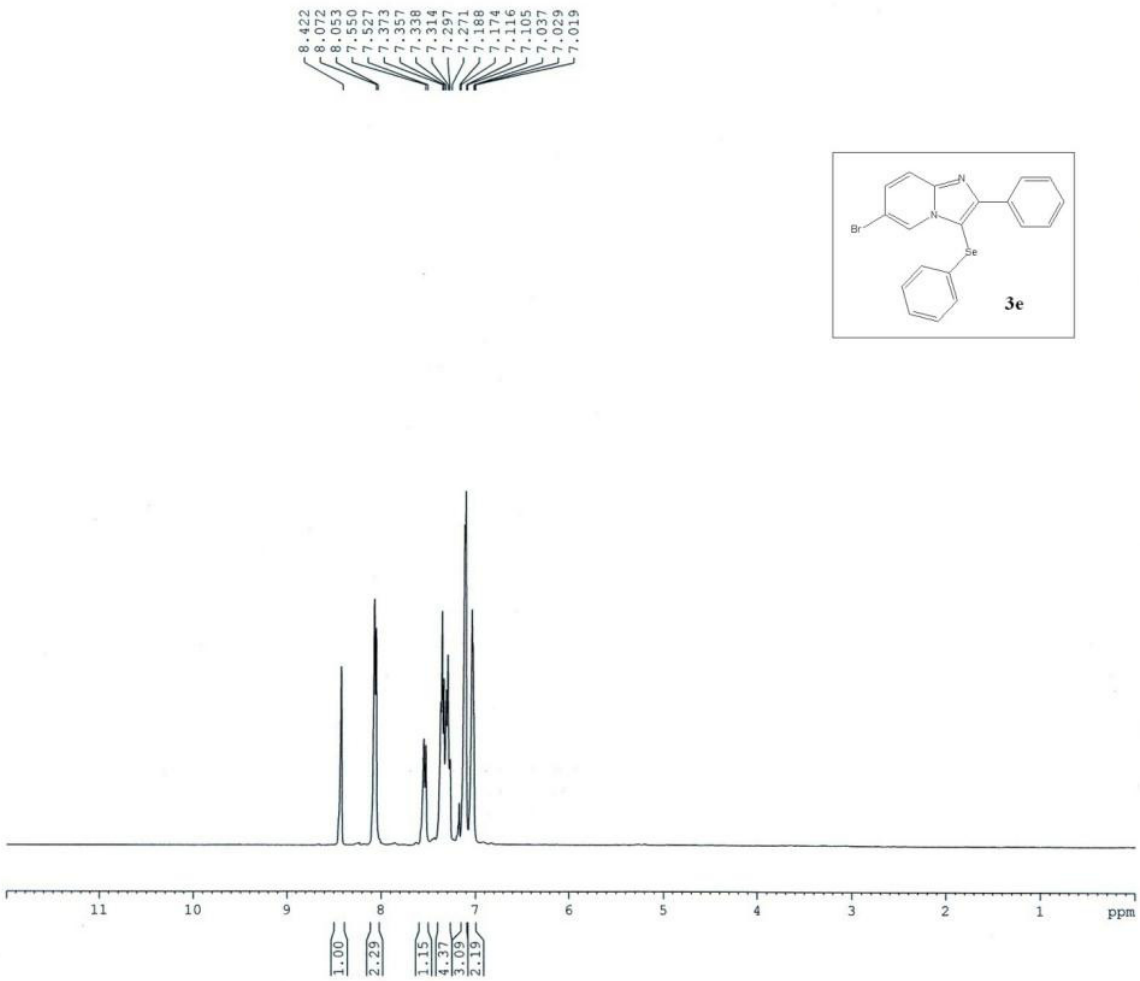

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO              131
PROCNO               1

F2 - Acquisition Parameters
Date_           20150417
Time              16.57
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD                32768
SOLVENT           CDCl3
NS                  512
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6816244 sec
RG                87.66
DW                20.800 usec
DE                 6.50 usec
TE                298.9 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                13C
P1                 8.90 usec
PLW1         54.00000000 W
SFO1        100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                1H
PCPD2              80.00 usec
PLW2         12.00000000 W
PLW12         0.40792999 W
PLW13         0.26107001 W
SFO2        400.1516006 MHz

F2 - Processing parameters
SI                 16384
SF          100.6177865 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```



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```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                172
PROCNO                 1

F2 - Acquisition Parameters
Date_           20150430
Time              12.53
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   32
DS                    2
SWH            8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9923444 sec
RG                77.59
DW               60.800 usec
DE                6.50 usec
TE               296.6 K
D1           1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                14.75 usec
PLW1         11.99499989 W
SFO1        400.1524711 MHz

F2 - Processing parameters
SI                16384
SF          400.1500432 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
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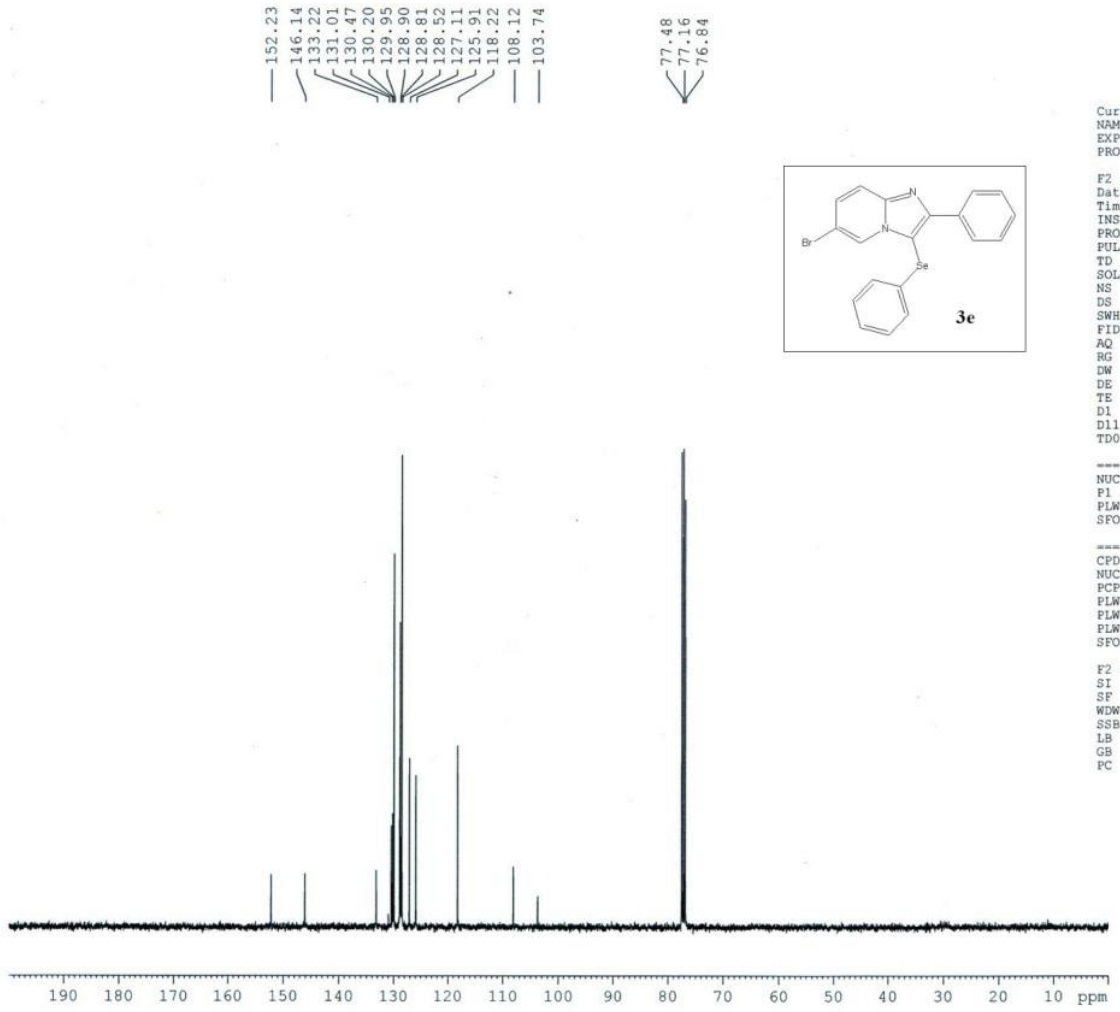


```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO              173
PROCNO               1

F2 - Acquisition Parameters
Date_           20150430
Time              13.24
INSTRUM           spect
PROBHD    5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT          CDCl3
NS                 512
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6816244 sec
RG              186.42
DW               20.800 usec
DE                6.50 usec
TE               297.9 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1               13C
P1                8.90 usec
PLW1        54.00000000 W
SFO1       100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2                1H
PCPD2            80.00 usec
PLW2        12.00000000 W
PLW12        0.40792999 W
PLW13        0.26107001 W
SFO2       .400.1516006 MHz

F2 - Processing parameters
SI                 16384
SF          100.6177880 MHz
WDW                   EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
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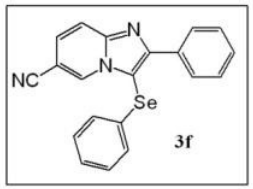

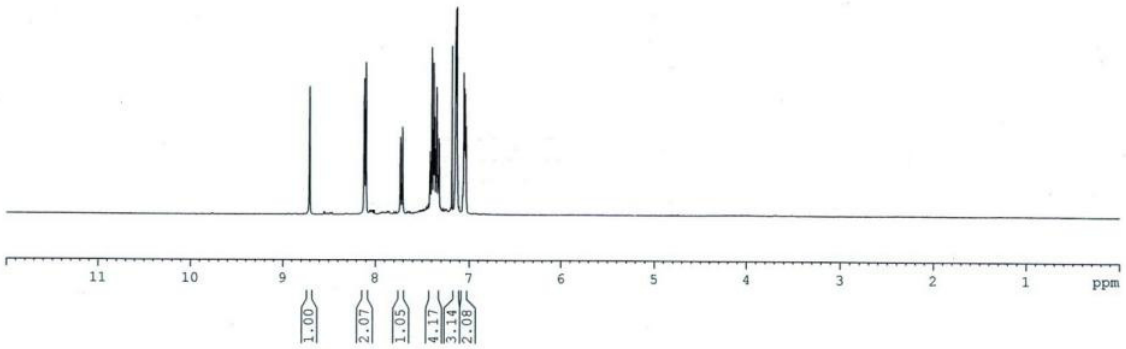


```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                163
PROCNO                 1

F2 - Acquisition Parameters
Date_           20150429
Time              12.31
INSTRUM           spect
PROBHD    5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDC13
NS                  32
DS                   2
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ           1.9923444 sec
RG              93.46
DW              60.800 usec
DE               6.50 usec
TE              297.0 K
D1           1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                1H
P1               14.75 usec
PLW1        11.99499989 W
SFO1       400.1524711 MHz

F2 - Processing parameters
SI                16384
SF          400.1500382 MHz
WDW                 EM
SSB       0
LB              0.30 Hz
GB        0
PC                1.00
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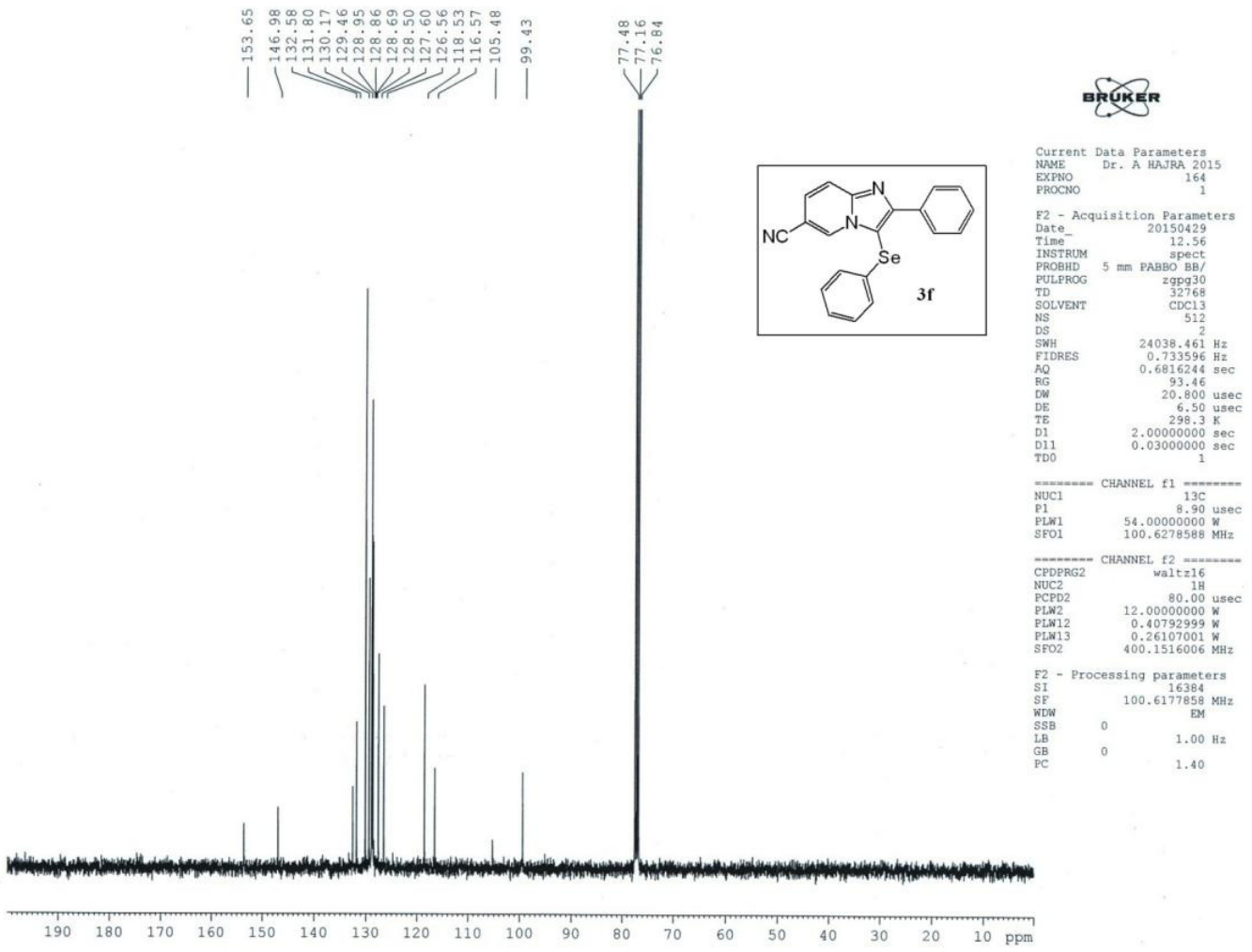


BRUKER

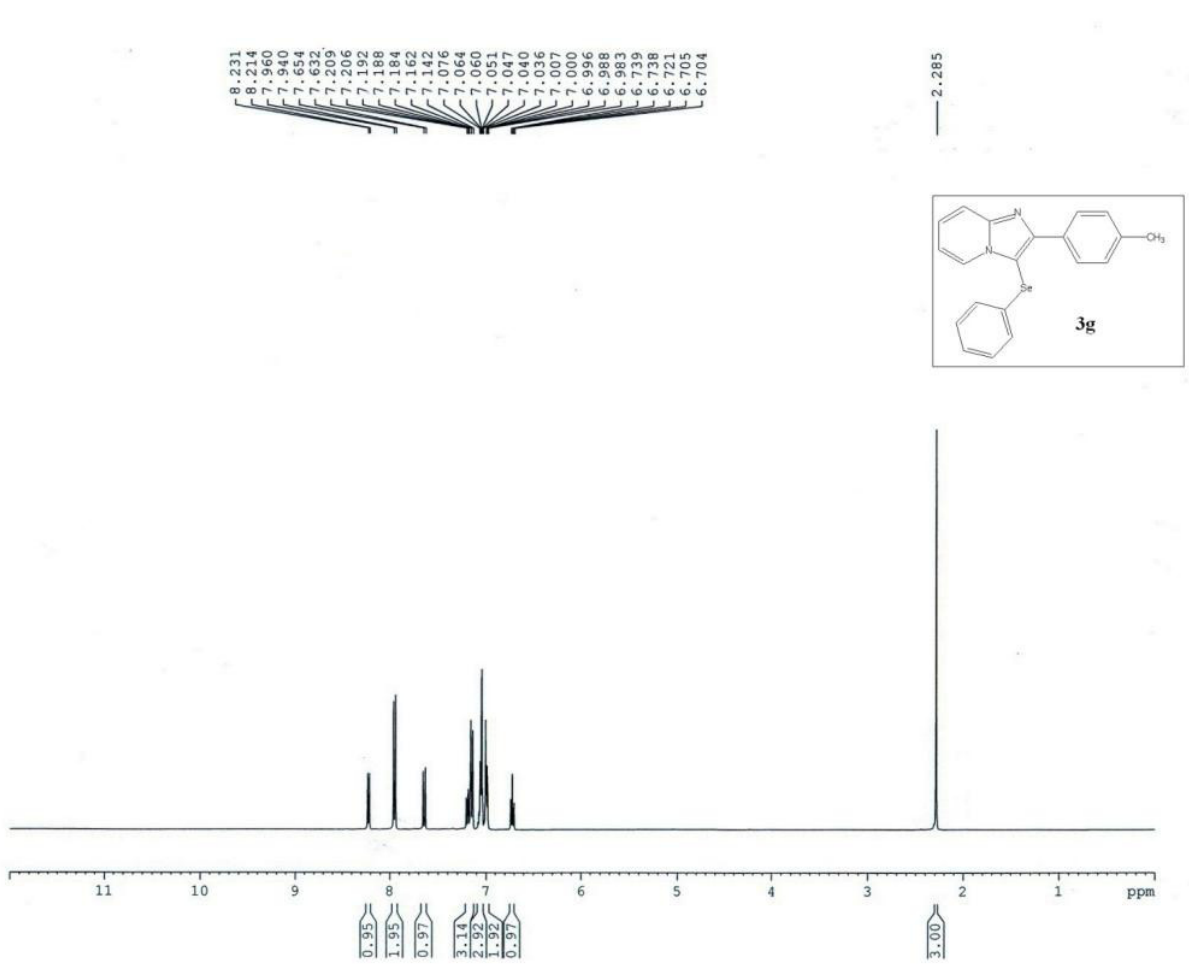
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 164
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150429
Time 12.56
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 512
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6816244 sec
RG 93.46
DW 20.800 usec
DE 6.50 usec
TE 298.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W
SFO1 100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PLW2 12.00000000 W
PLW12 0.40792999 W
PLW13 0.26107001 W
SFO2 400.1516006 MHz

F2 - Processing parameters
SI 16384
SF 100.6177858 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



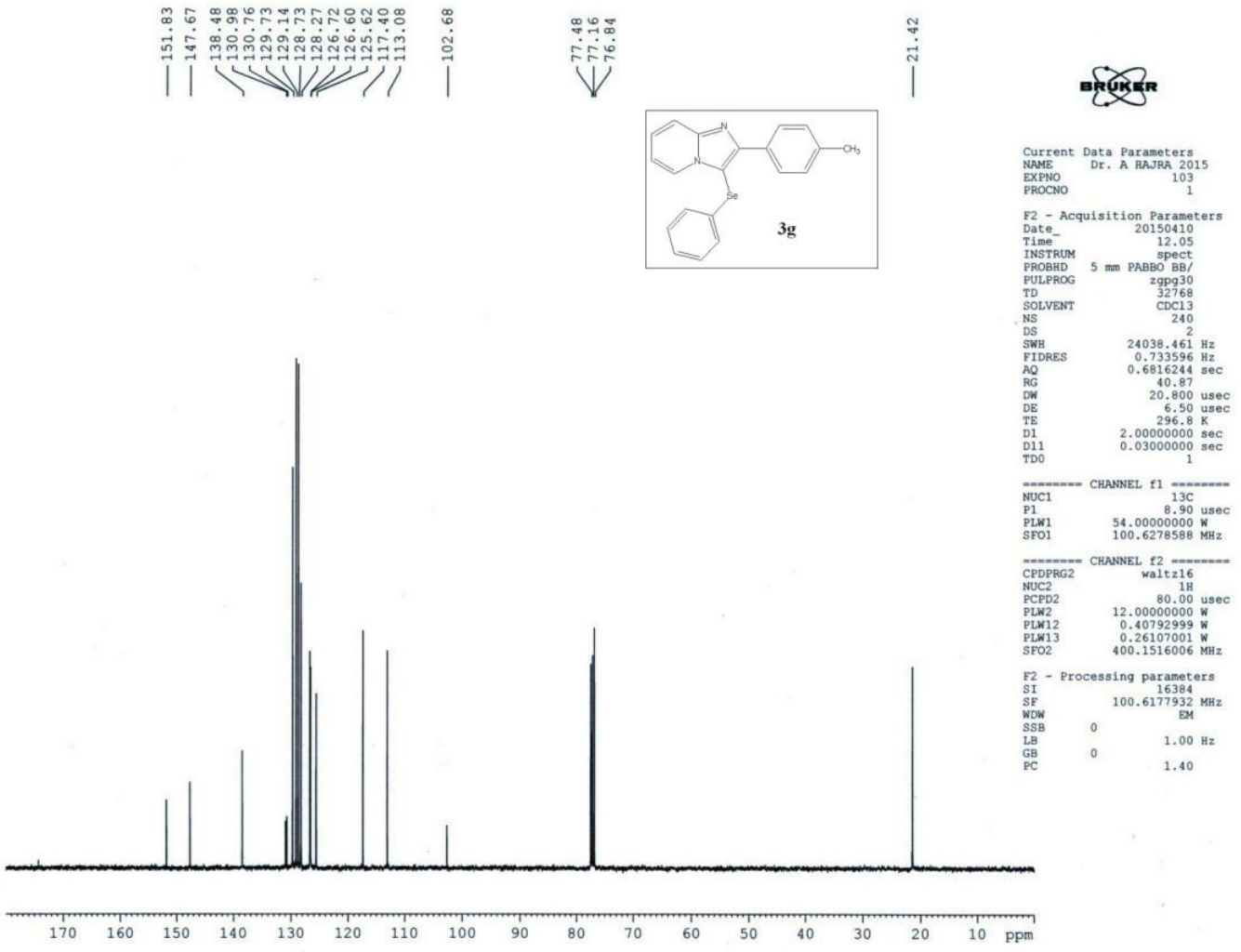
BRUKER

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO              100
PROCNO               1

F2 - Acquisition Parameters
Date_          20150409
Time              19.42
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDC13
NS                   32
DS                    2
SWH            8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9923444 sec
RG                40.87
DW               60.800 usec
DE                6.50 usec
TE               297.6 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                 1H
P1                14.75 usec
PLW1        11.99499989 W
SFO1        400.1524711 MHz

F2 - Processing parameters
SI                16384
SF          400.1500505 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```



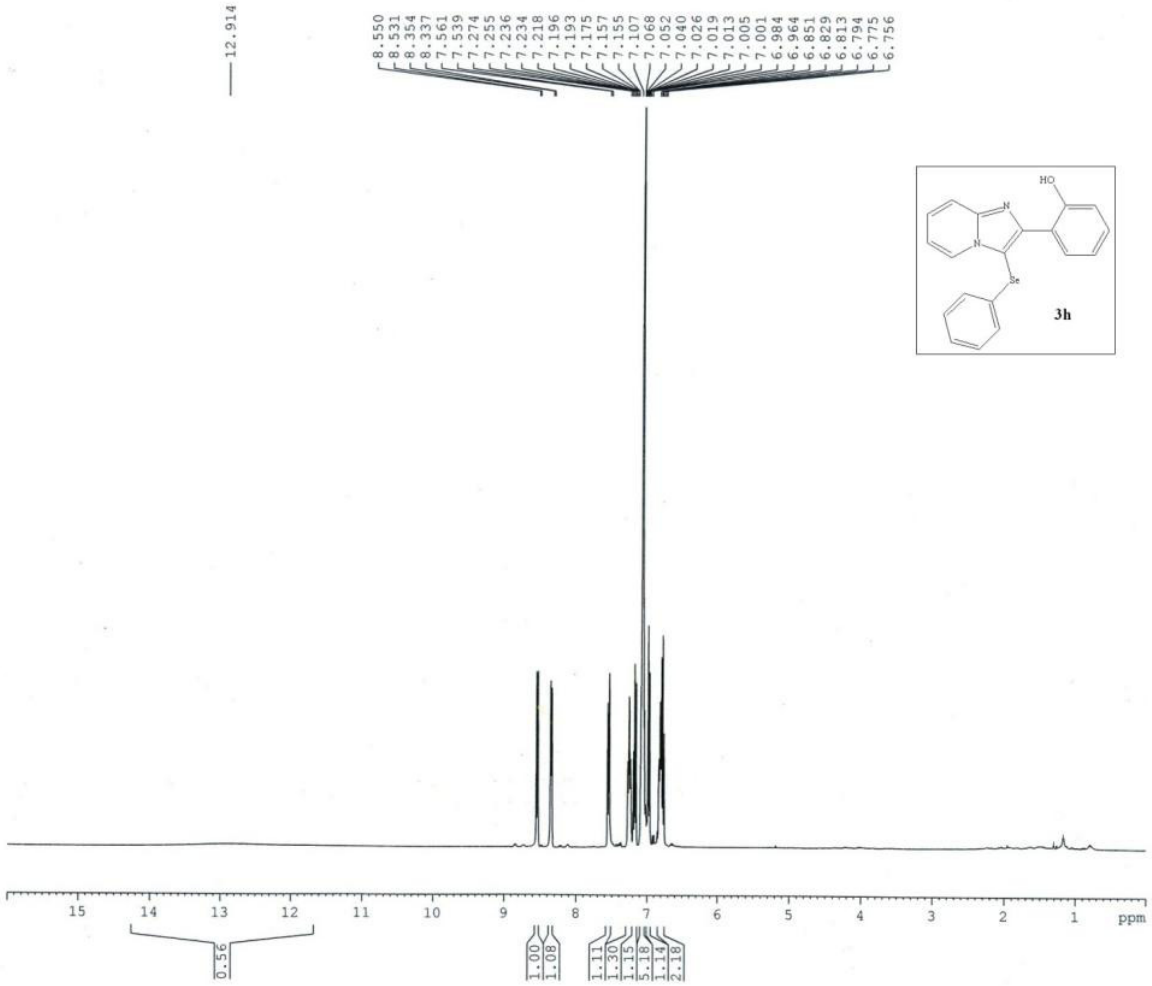

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO              103
PROCNO               1

F2 - Acquisition Parameters
Date_          20150410
Time             12.05
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT          CDCl3
NS                 240
DS                   2
SWH          24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6816244 sec
RG                40.87
DW              20.800 usec
DE               6.50 usec
TE              296.8 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1               13C
P1                8.90 usec
PLW1        54.00000000 W
SFO1       100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2               1H
PCPD2           80.00 usec
PLW2        12.00000000 W
PLW12        0.40792999 W
PLW13        0.26107001 W
SFO2       400.1516006 MHz

F2 - Processing parameters
SI                16384
SF         100.6177932 MHz
WDW                EM
SSB       0
LB              1.00 Hz
GB        0
PC              1.40
```



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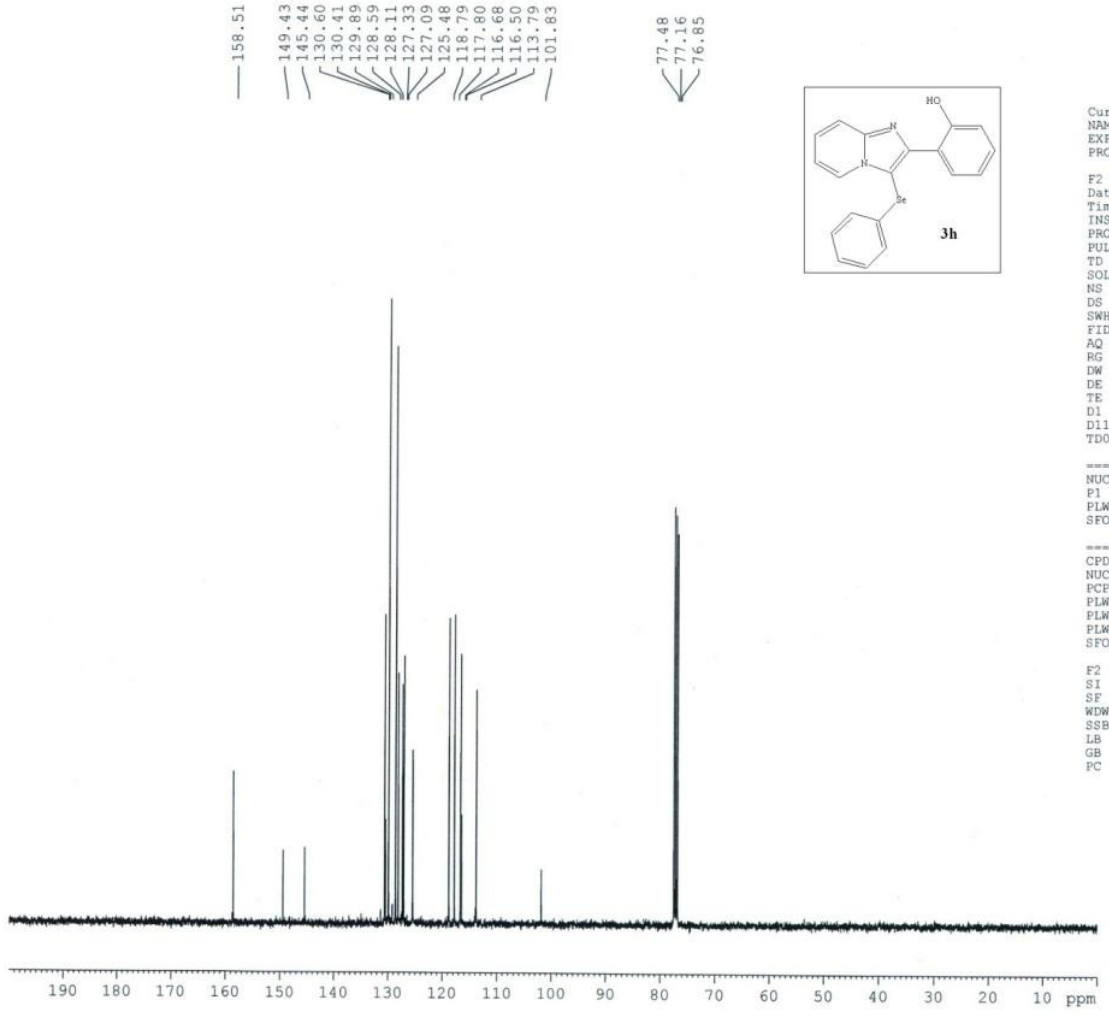
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 385
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150716
Time 17.43
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDC13
NS 32
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 67.81
DW 60.800 usec
DE 6.50 usec
TE 298.1 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 14.75 usec
PLW1 11.99499989 W
SFO1 400.1524711 MHz

F2 - Processing parameters
SI 16384
SF 400.1500511 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



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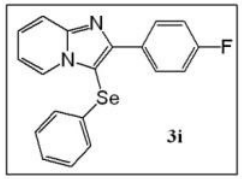
```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                386
PROCNO                 1

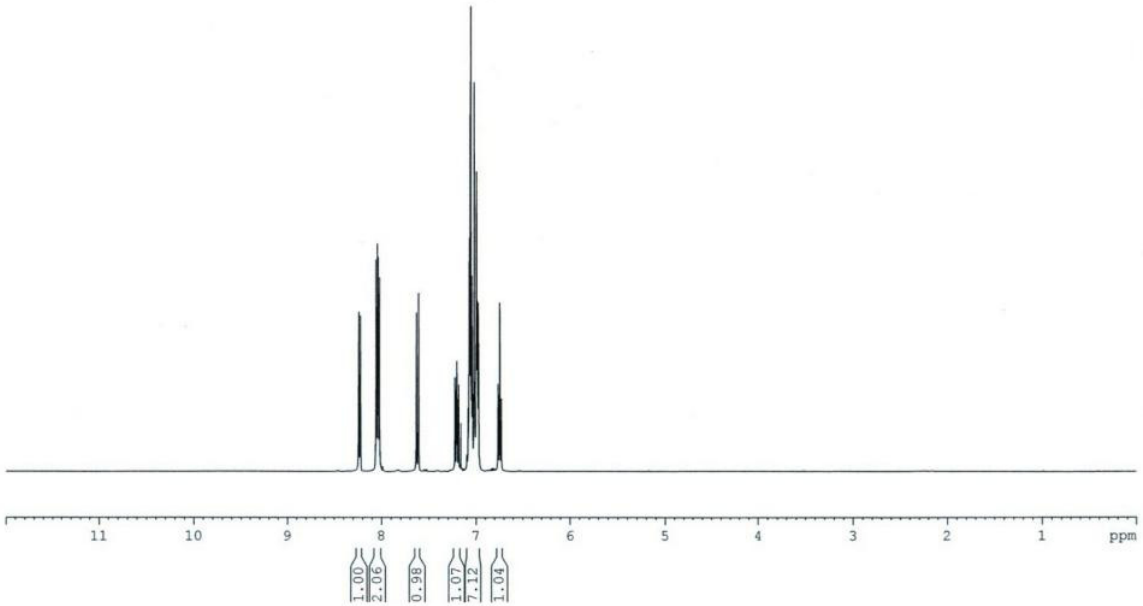
F2 - Acquisition Parameters
Date_           20150716
Time              18.13
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD               32768
SOLVENT          CDCl3
NS                 512
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6816244 sec
RG                47.25
DW               20.800 usec
DE                6.50 usec
TE               299.2 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                13C
P1                 8.90 usec
PLW1        54.00000000 W
SFO1       100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2                1H
PCPD2           80.00 usec
PLW2        12.00000000 W
PLW12        0.40792999 W
PLW13        0.26107001 W
SFO2       400.1516006 MHz

F2 - Processing parameters
SI                 16384
SF         100.6177880 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```



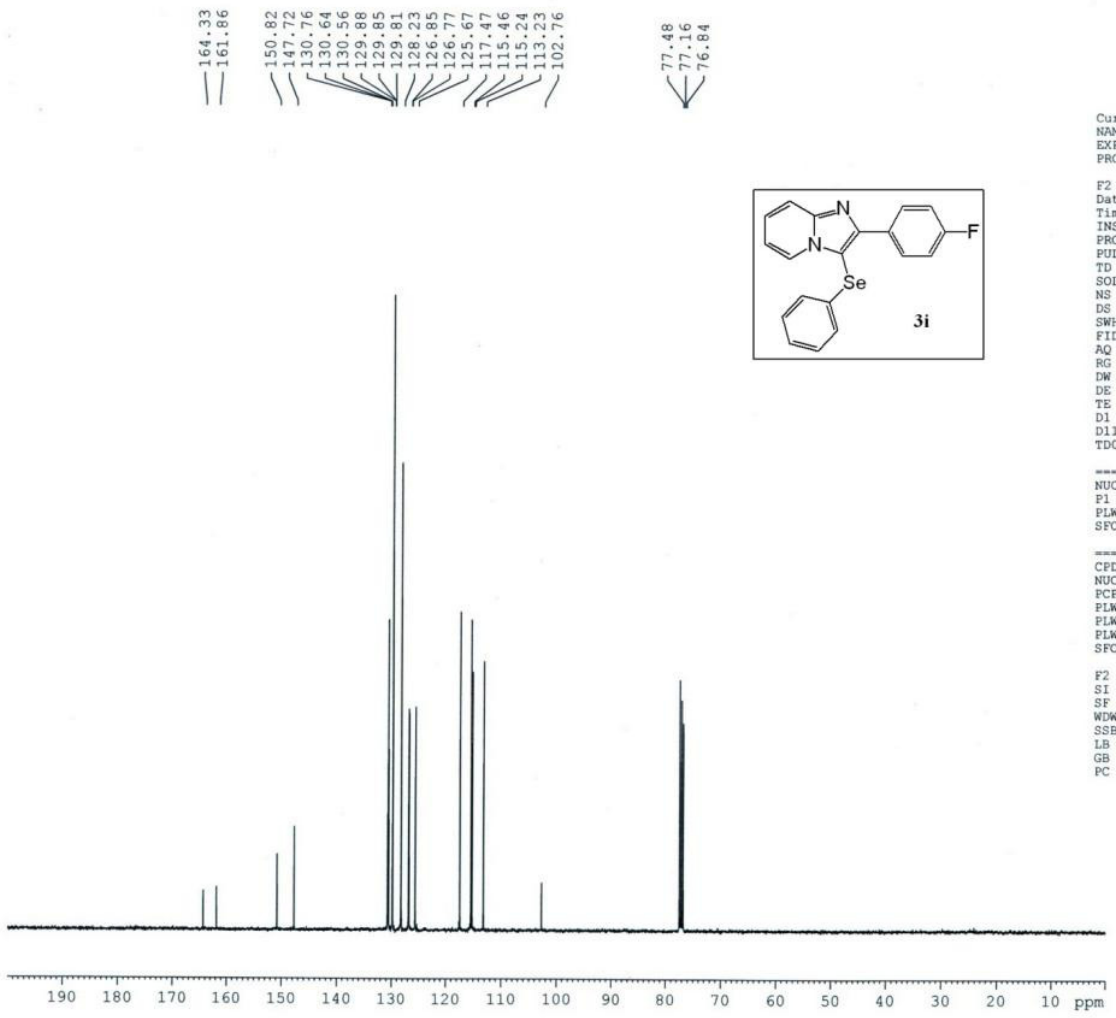



```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                 107
PROCNO                  1

F2 - Acquisition Parameters
Date_           20150411
Time              16.03
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   24
DS                    2
SWH            8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9923444 sec
RG                40.87
DW               60.800 usec
DE                6.50 usec
TE               296.1 K
D1           1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                14.75 usec
PLW1         11.99499989 W
SFO1        400.1524711 MHz

F2 - Processing parameters
SI                16384
SF          400.1500473 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```



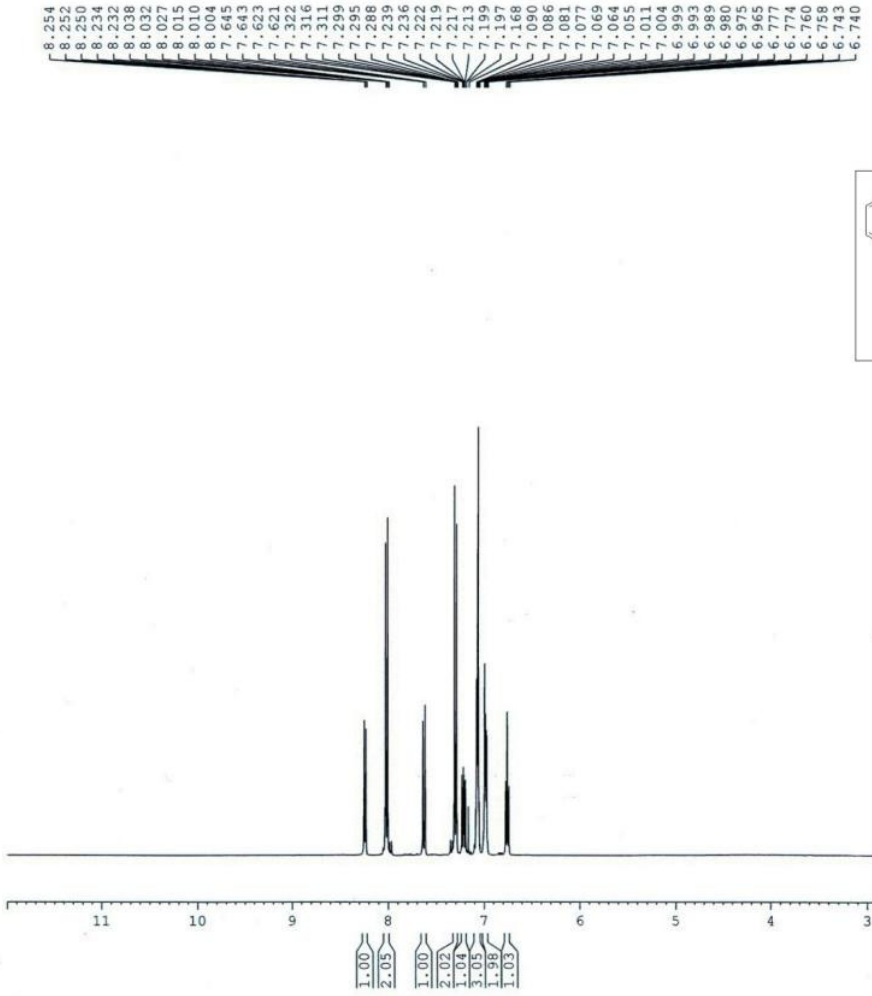
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 114
PROCNO 1

F2 - Acquisition Parameters
Date_ 20150412
Time 12.28
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 512
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6816244 sec
RG 87.66
DW 20.800 usec
DE 6.50 usec
TE 296.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W
SFO1 100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PLW2 12.00000000 W
PLW12 0.40792999 W
PLW13 0.26107001 W
SFO2 400.1516006 MHz

F2 - Processing parameters
SI 16384
SF 100.6177930 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



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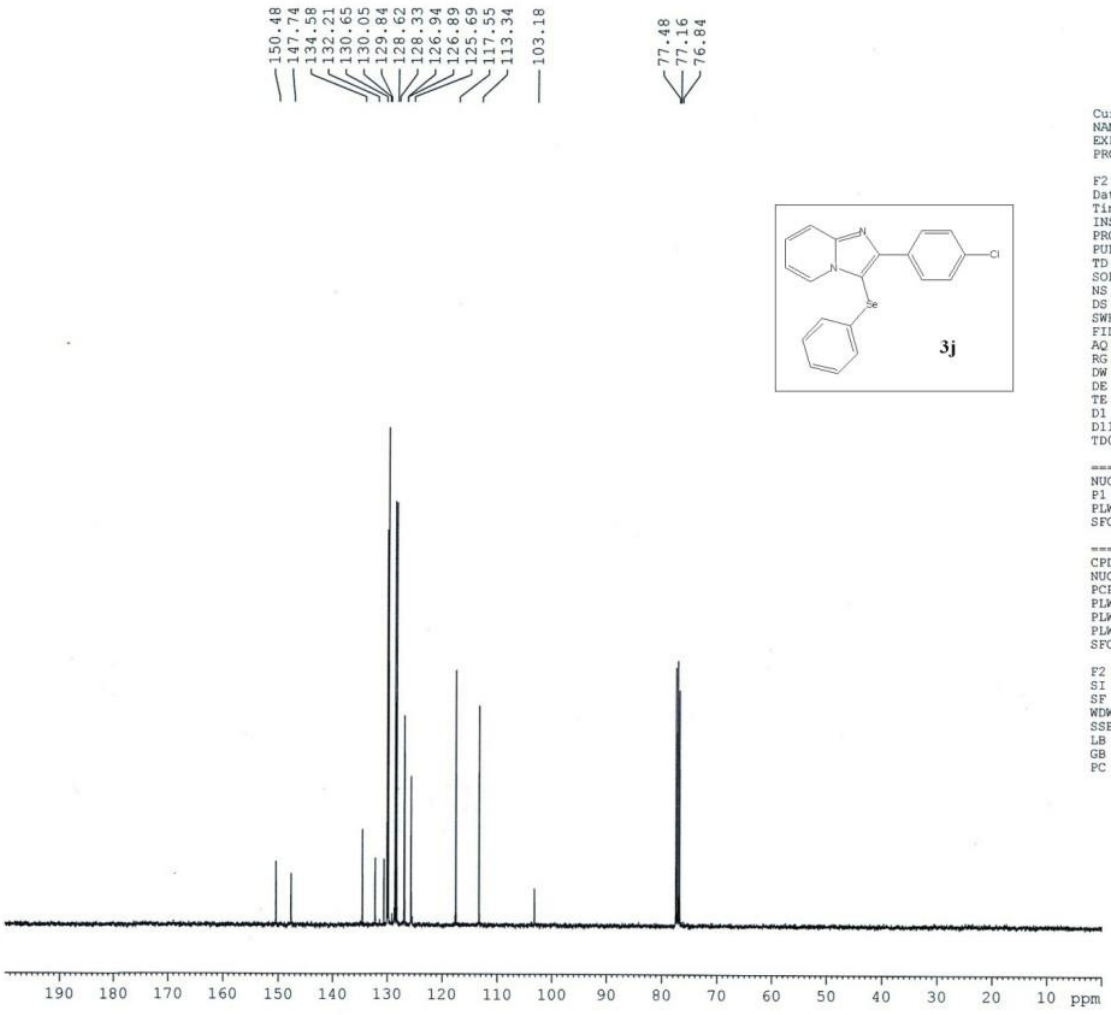
```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                 106
PROCNO                  1

F2 - Acquisition Parameters
Date_           20150411
Time              15.56
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   24
DS                    2
SWH            8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9923444 sec
RG                40.87
DW               60.800 usec
DE                6.50 usec
TE               296.1 K
D1           1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                14.75 usec
PLW1         11.99499989 W
SFO1        400.1524711 MHz

F2 - Processing parameters
SI                16384
SF          400.1500458 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```



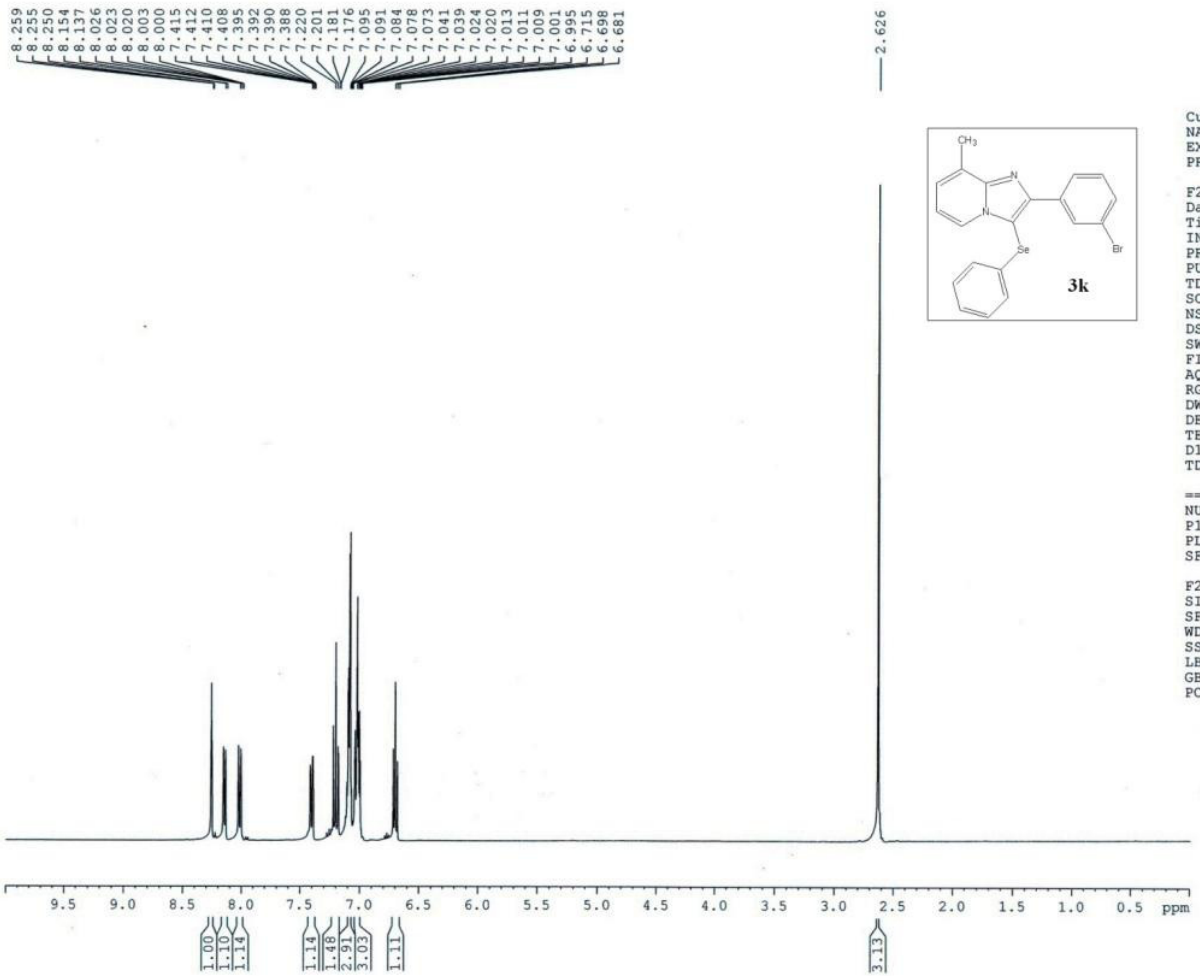

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO              111
PROCNO               1

F2 - Acquisition Parameters
Date_           20150411
Time              17.51
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD               32768
SOLVENT          CDCl3
NS                 320
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6816244 sec
RG                40.87
DW               20.800 usec
DE                6.50 usec
TE               297.7 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1               13C
P1                8.90 usec
PLW1       54.00000000 W
SFO1      100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2               1H
PCPD2            80.00 usec
PLW2       12.00000000 W
PLW12       0.40792999 W
PLW13       0.26107001 W
SFO2      400.1516006 MHz

F2 - Processing parameters
SI               16384
SF        100.6177909 MHz
WDW                EM
SSB       0
LB               1.00 Hz
GB        0
PC               1.40
```



3k

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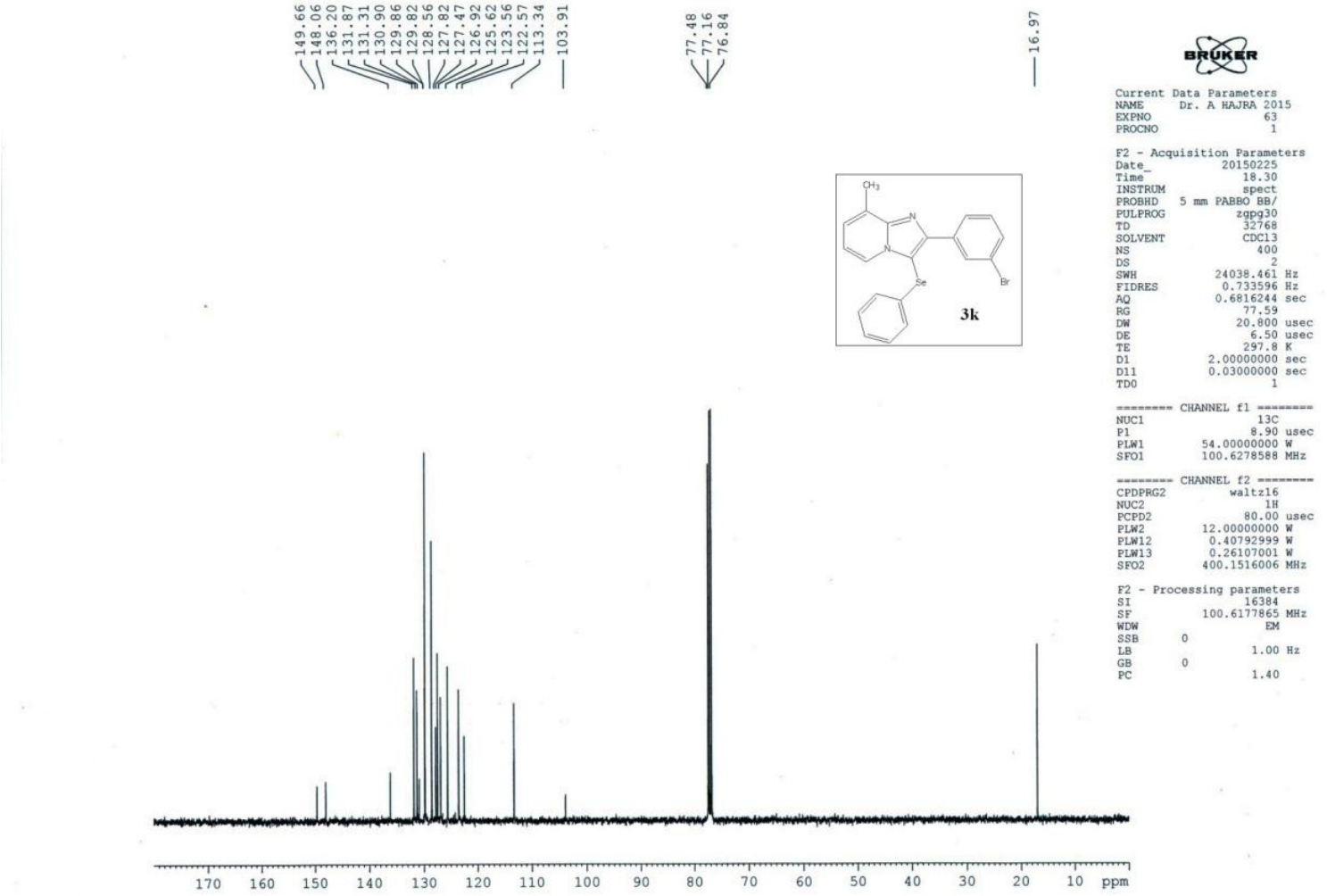
```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                  61
PROCNO                  1

F2 - Acquisition Parameters
Date_            20150225
Time                18.02
INSTRUM             spect
PROBHD   5 mm PABBO BB/
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                    24
DS                     2
SWH             8223.685 Hz
FIDRES          0.250967 Hz
AQ             1.9923444 sec
RG                 87.66
DW                60.800 usec
DE                 6.50 usec
TE                296.7 K
D1            1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 14.75 usec
PLW1         11.99499989 W
SFO1        400.1524711 MHz

F2 - Processing parameters
SI                 16384
SF          400.1500423 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```



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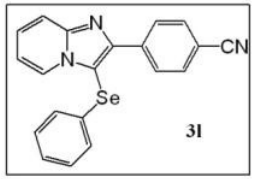
```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                 63
PROCNO                 1

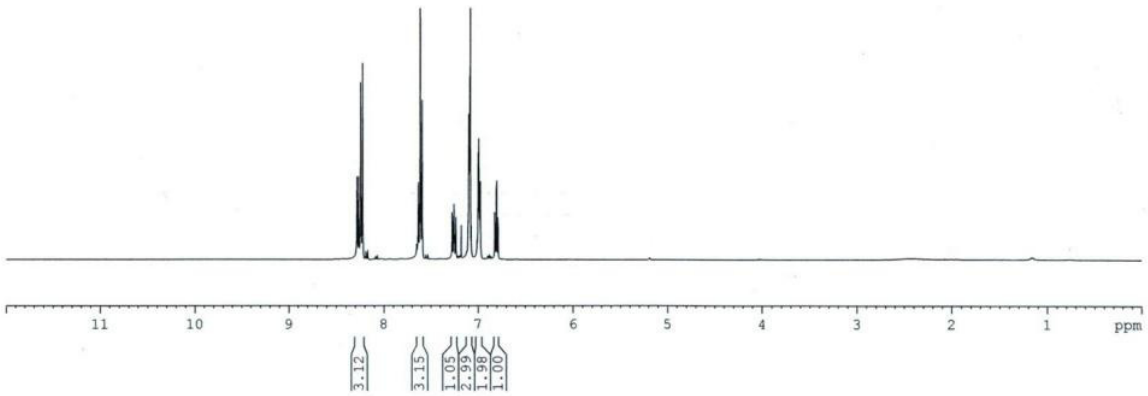
F2 - Acquisition Parameters
Date_           20150225
Time              18.30
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT           CDCl3
NS                  400
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6816244 sec
RG                77.59
DW               20.800 usec
DE                6.50 usec
TE               297.8 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  8.90 usec
PLW1         54.00000000 W
SFO1        100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                 1H
PCPD2              80.00 usec
PLW2         12.00000000 W
PLW12         0.40792999 W
PLW13         0.26107001 W
SFO2        400.1516006 MHz

F2 - Processing parameters
SI                16384
SF          100.6177865 MHz
WDW                  EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```



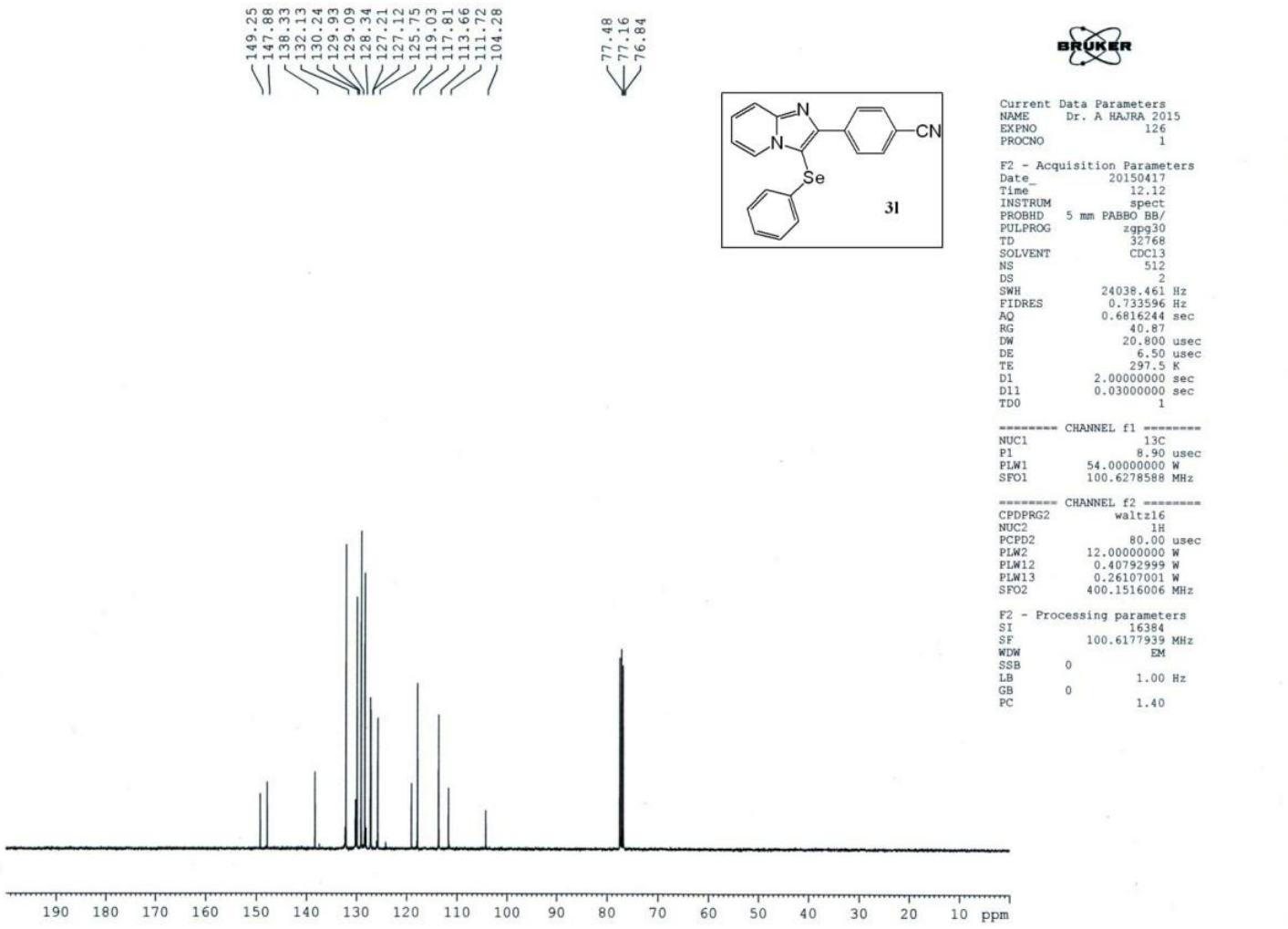



```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                  125
PROCNO                   1

F2 - Acquisition Parameters
Date_             20150417
Time                 11.46
INSTRUM              spect
PROBHD    5 mm PABBO BB/
PULPROG              zg30
TD                  32768
SOLVENT             CDCl3
NS                     32
DS                      2
SWH               8223.685 Hz
FIDRES            0.250967 Hz
AQ                1.9923444 sec
RG                    40.87
DW                   60.800 usec
DE                    6.50 usec
TE                   296.2 K
D1                1.00000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                    1H
P1                   14.75 usec
PLW1          11.99499989 W
SFO1          400.1524711 MHz

F2 - Processing parameters
SI                   16384
SF            400.1500413 MHz
WDW                     EM
SSB       0
LB                    0.30 Hz
GB        0
PC                    1.00
```



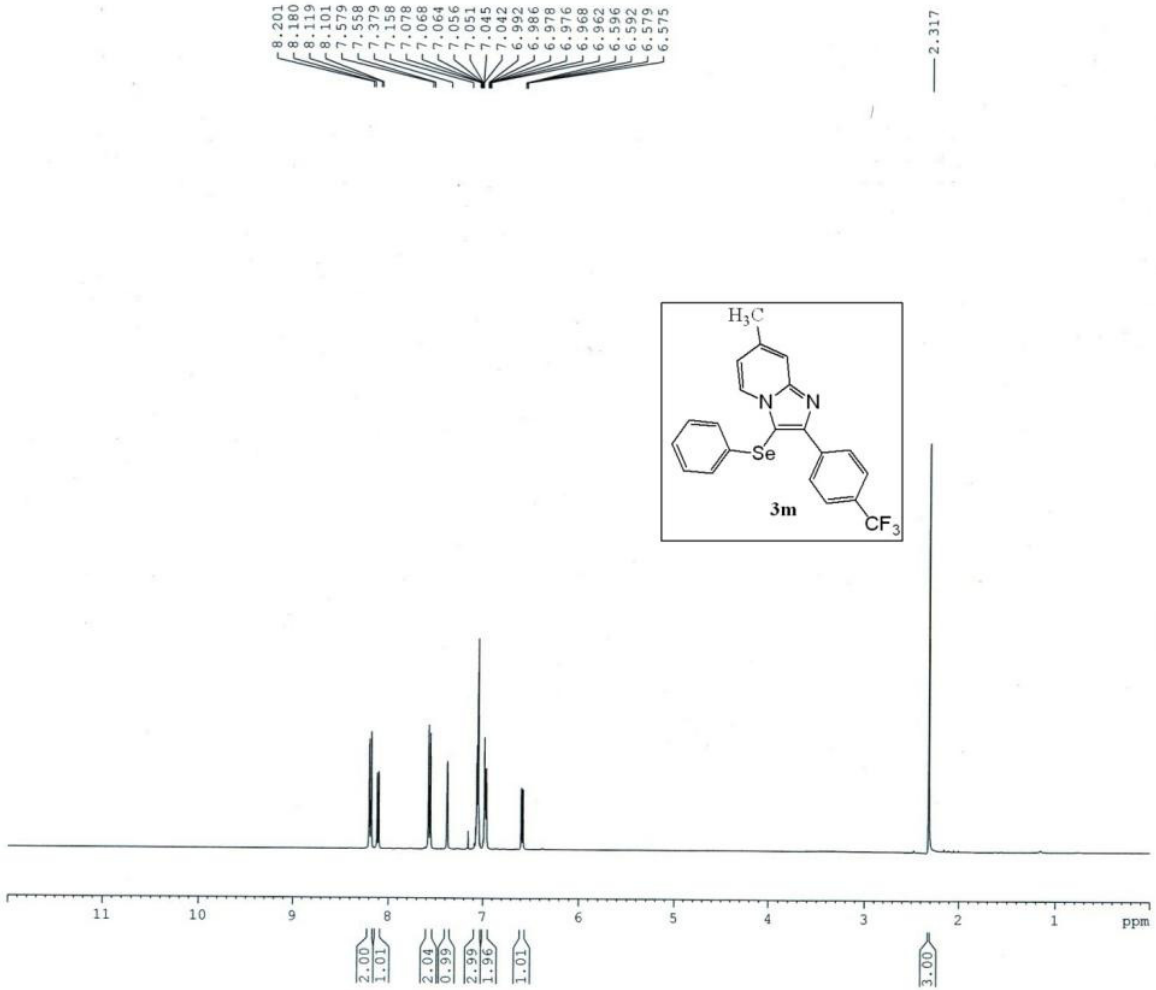

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                 126
PROCNO                  1

F2 - Acquisition Parameters
Date_           20150417
Time              12.12
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT           CDCl3
NS                  512
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6816244 sec
RG                40.87
DW               20.800 usec
DE                6.50 usec
TE               297.5 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  8.90 usec
PLW1        54.00000000 W
SFO1       100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                 1H
PCPD2              80.00 usec
PLW2        12.00000000 W
PLW12        0.40792999 W
PLW13        0.26107001 W
SFO2       400.1516006 MHz

F2 - Processing parameters
SI                16384
SF          100.6177939 MHz
WDW                  EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```



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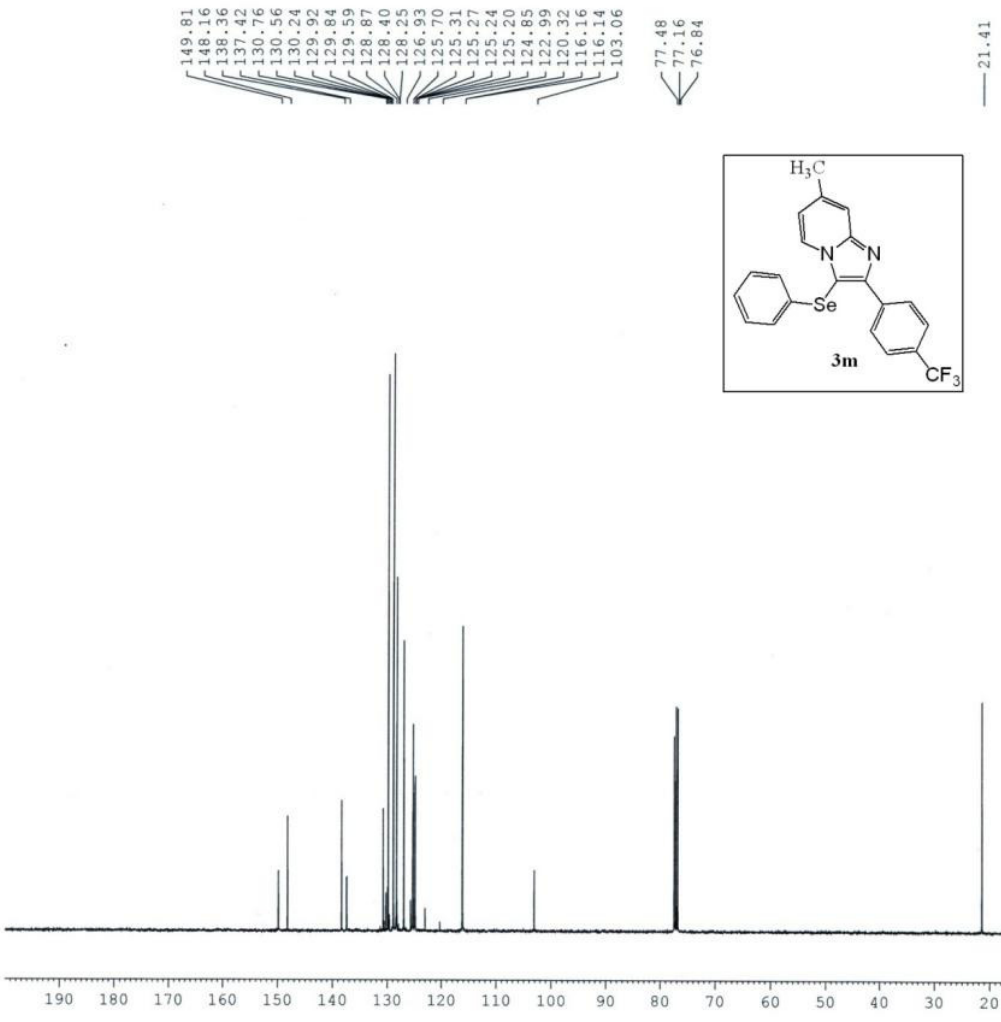
```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO              170
PROCNO               1

F2 - Acquisition Parameters
Date_          20150430
Time             12.08
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                  32
DS                   2
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9923444 sec
RG                40.87
DW                60.800 usec
DE                 6.50 usec
TE                296.3 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                1H
P1                14.75 usec
PLW1        11.99499989 W
SFO1        400.1524711 MHz

F2 - Processing parameters
SI                16384
SF          400.1500497 MHz
WDW                 EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```



BRUKER

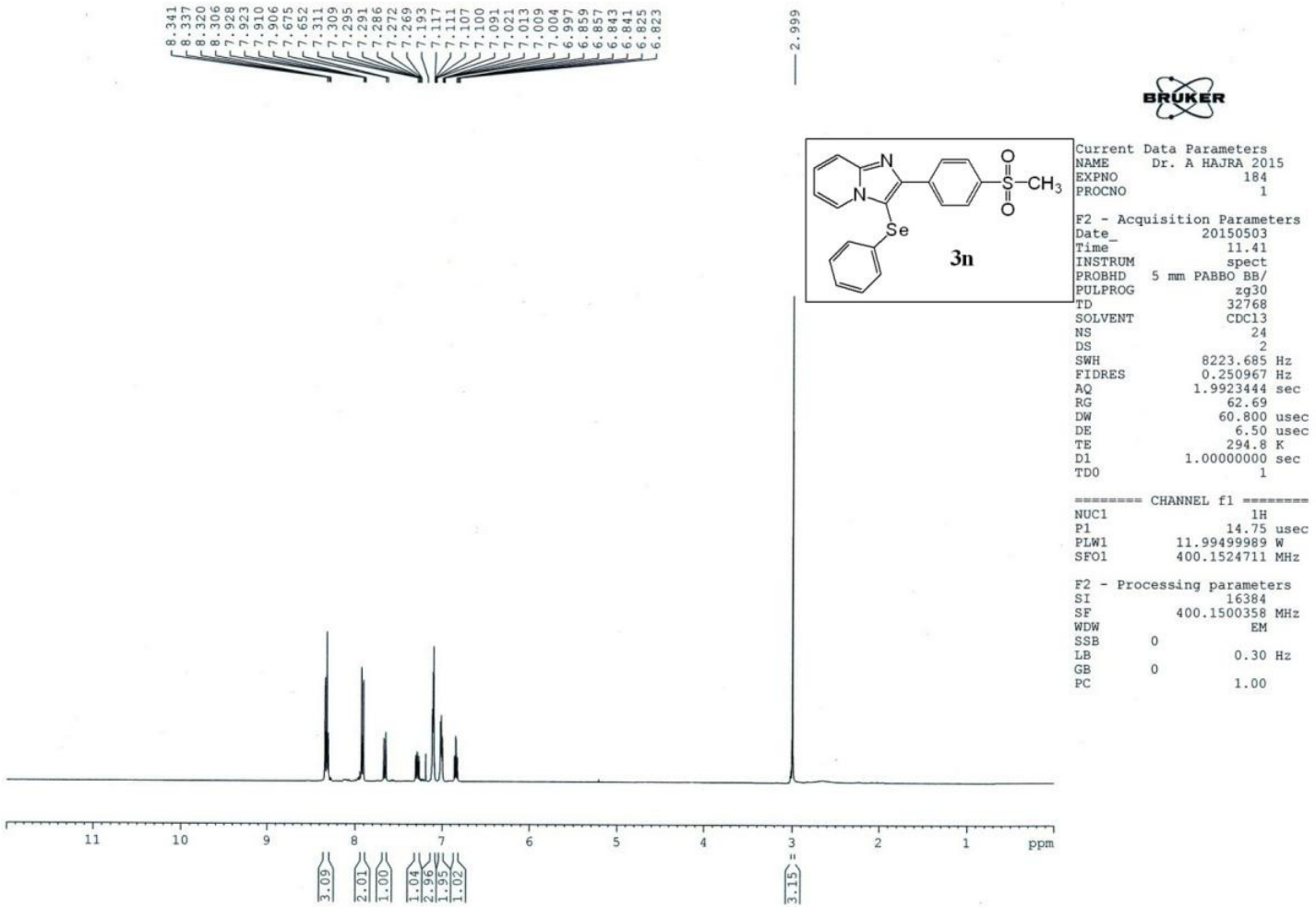
```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                 171
PROCNO                  1

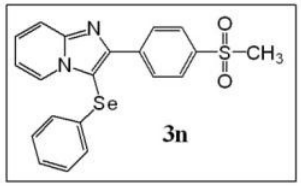
F2 - Acquisition Parameters
Date_              20150430
Time                  12.37
INSTRUM               spect
PROBHD   5 mm PABBO BB/
PULPROG             zgpg30
TD                   32768
SOLVENT              CDCl3
NS                     512
DS                       2
SWH            24038.461 Hz
FIDRES          0.733596 Hz
AQ              0.6816244 sec
RG                  47.25
DW                 20.800 usec
DE                  6.50 usec
TE                 297.6 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                      1

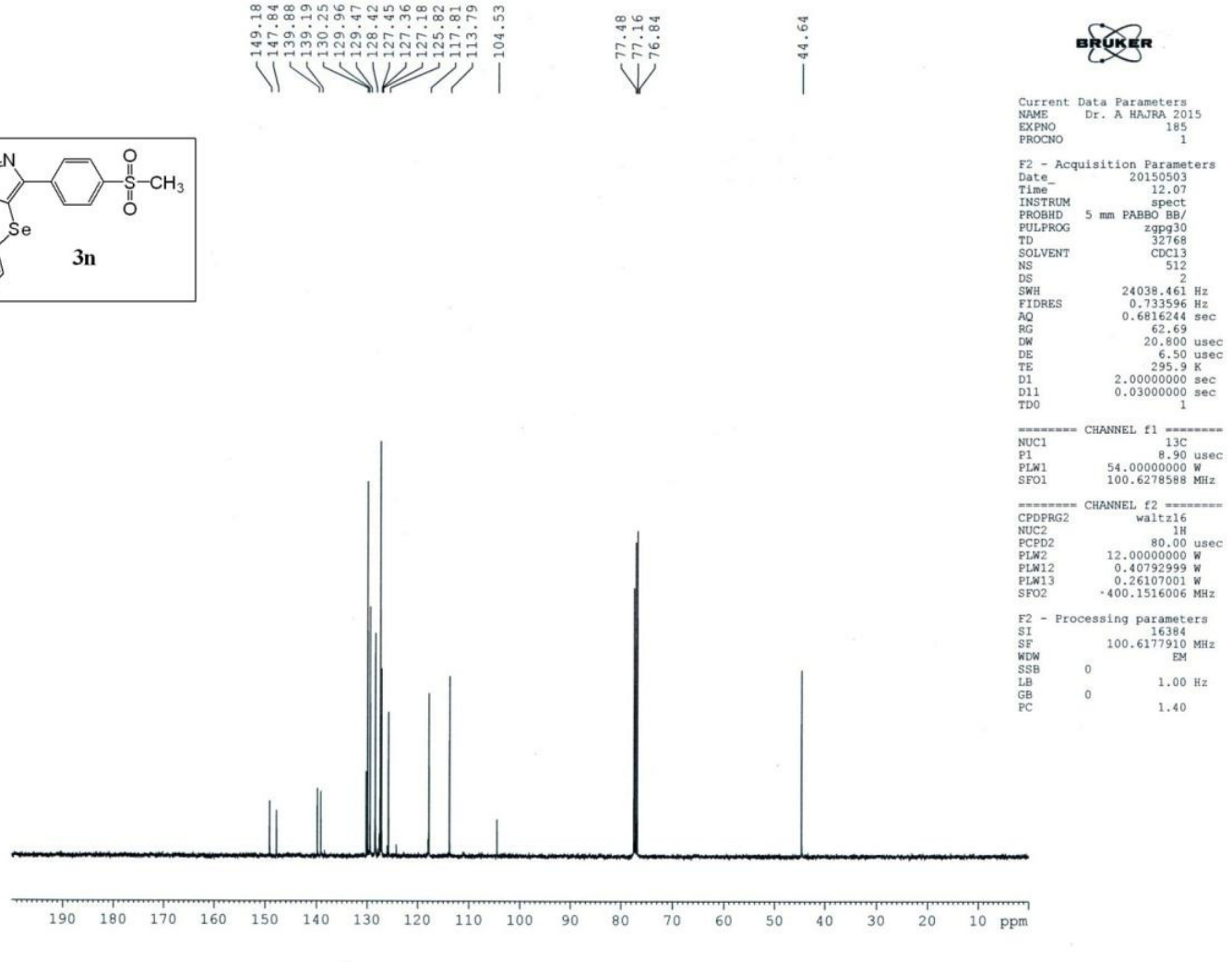
======== CHANNEL f1 ========
NUC1                   13C
P1                    8.90 usec
PLW1          54.00000000 W
SFO1         100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                   1H
PCPD2                80.00 usec
PLW2          12.00000000 W
PLW12          0.40792999 W
PLW13          0.26107001 W
SFO2         400.1516006 MHz

F2 - Processing parameters
SI                   16384
SF           100.6177909 MHz
WDW                     EM
SSB       0
LB                    1.00 Hz
GB        0
PC                    1.40
```


8.341
8.337
8.320
8.306
7.928
7.923
7.910
7.906
7.675
7.652
7.311
7.309
7.295
7.291
7.286
7.272
7.269
7.193
7.117
7.111
7.107
7.100
7.091
7.021
7.013
7.009
7.004
6.997
6.859
6.857
6.843
6.841
6.825
6.823
2.999
3n
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 184
PROCNO 1
F2 - Acquisition Parameters
Date_ 20150503
Time 11.41
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 24
DS 2
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9923444 sec
RG 62.69
DW 60.800 usec
DE 6.50 usec
TE 294.8 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 14.75 usec
PLW1 11.99499989 W
SFO1 400.1524711 MHz
F2 - Processing parameters
SI 16384
SF 400.1500358 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
11
10
9
8
7
6
5
4
3
2
1
ppm
3.09
2.01
1.00
1.04
2.96
1.95
1.02
3.15





BRUKER

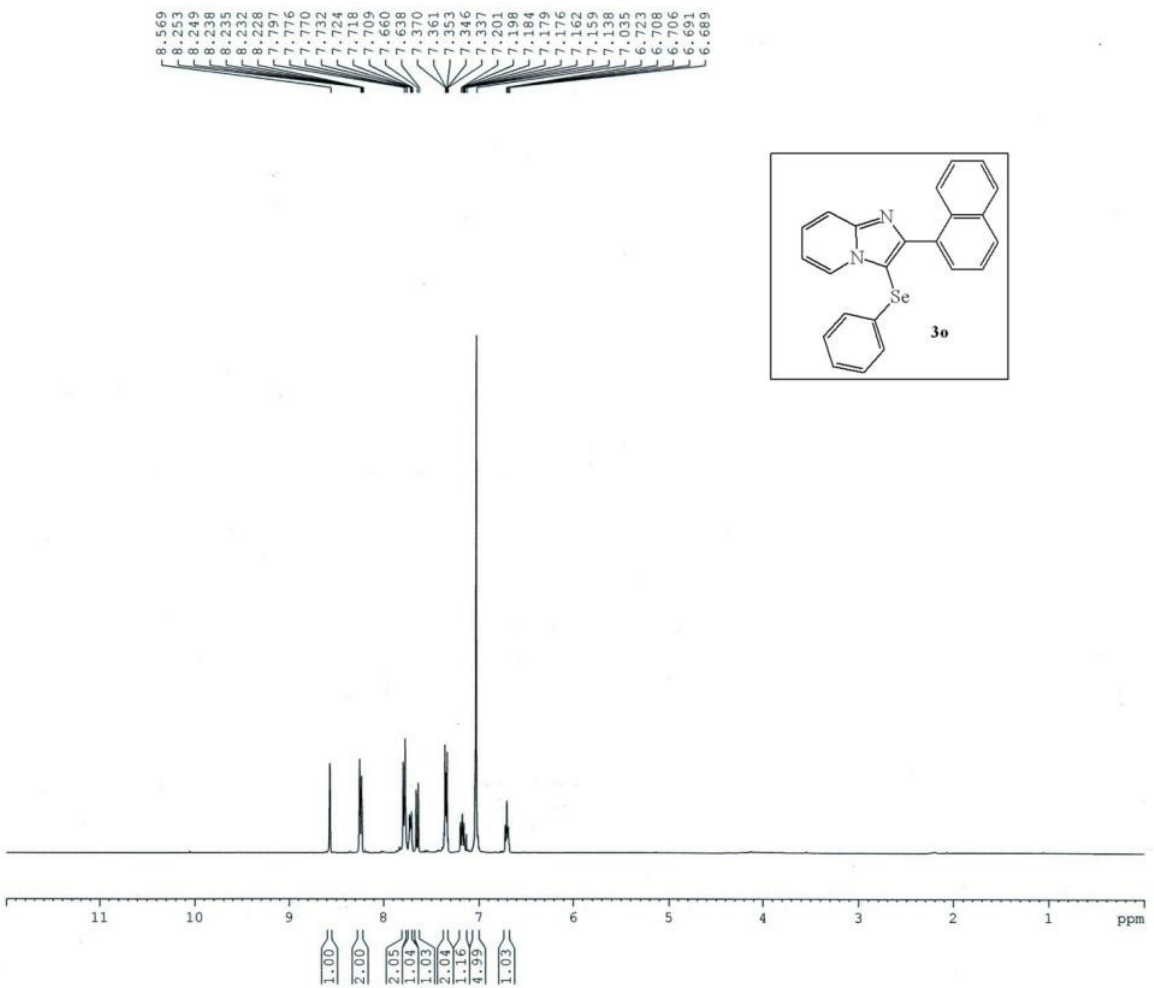
```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO              185
PROCNO               1

F2 - Acquisition Parameters
Date_          20150503
Time              12.07
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD                32768
SOLVENT           CDCl3
NS                  512
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6816244 sec
RG                62.69
DW               20.800 usec
DE                6.50 usec
TE               295.9 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 8.90 usec
PLW1         54.00000000 W
SFO1        100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                 1H
PCPD2             80.00 usec
PLW2         12.00000000 W
PLW12         0.40792999 W
PLW13         0.26107001 W
SFO2        400.1516006 MHz

F2 - Processing parameters
SI                16384
SF          100.6177910 MHz
WDW                  EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```



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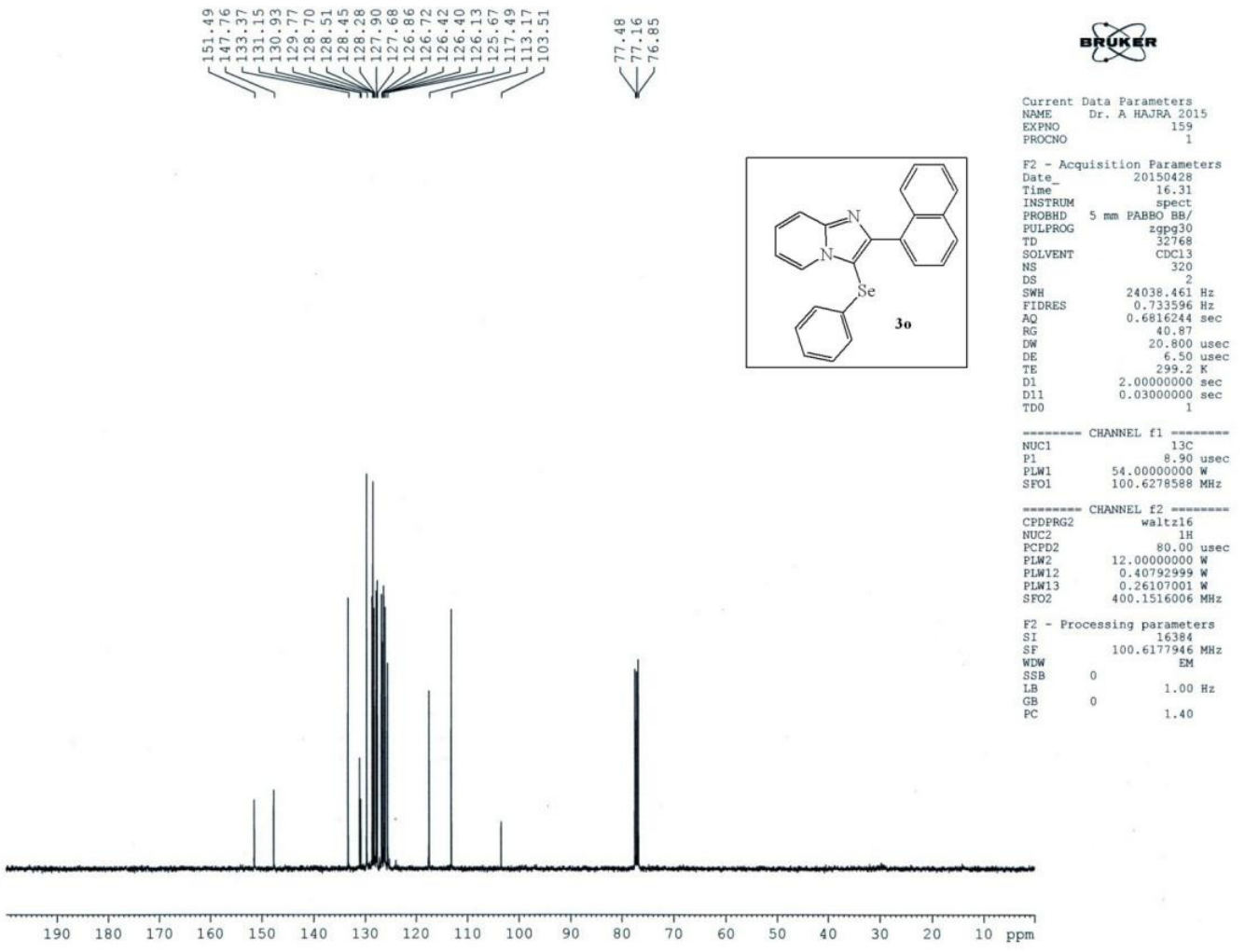
```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                158
PROCNO                 1

F2 - Acquisition Parameters
Date_           20150428
Time               16.12
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                    24
DS                     2
SWH             8223.685 Hz
FIDRES          0.250967 Hz
AQ              1.9923444 sec
RG                 40.87
DW                60.800 usec
DE                 6.50 usec
TE                298.1 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 14.75 usec
PLW1          11.99499989 W
SFO1         400.1524711 MHz

F2 - Processing parameters
SI                 16384
SF           400.1500589 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```



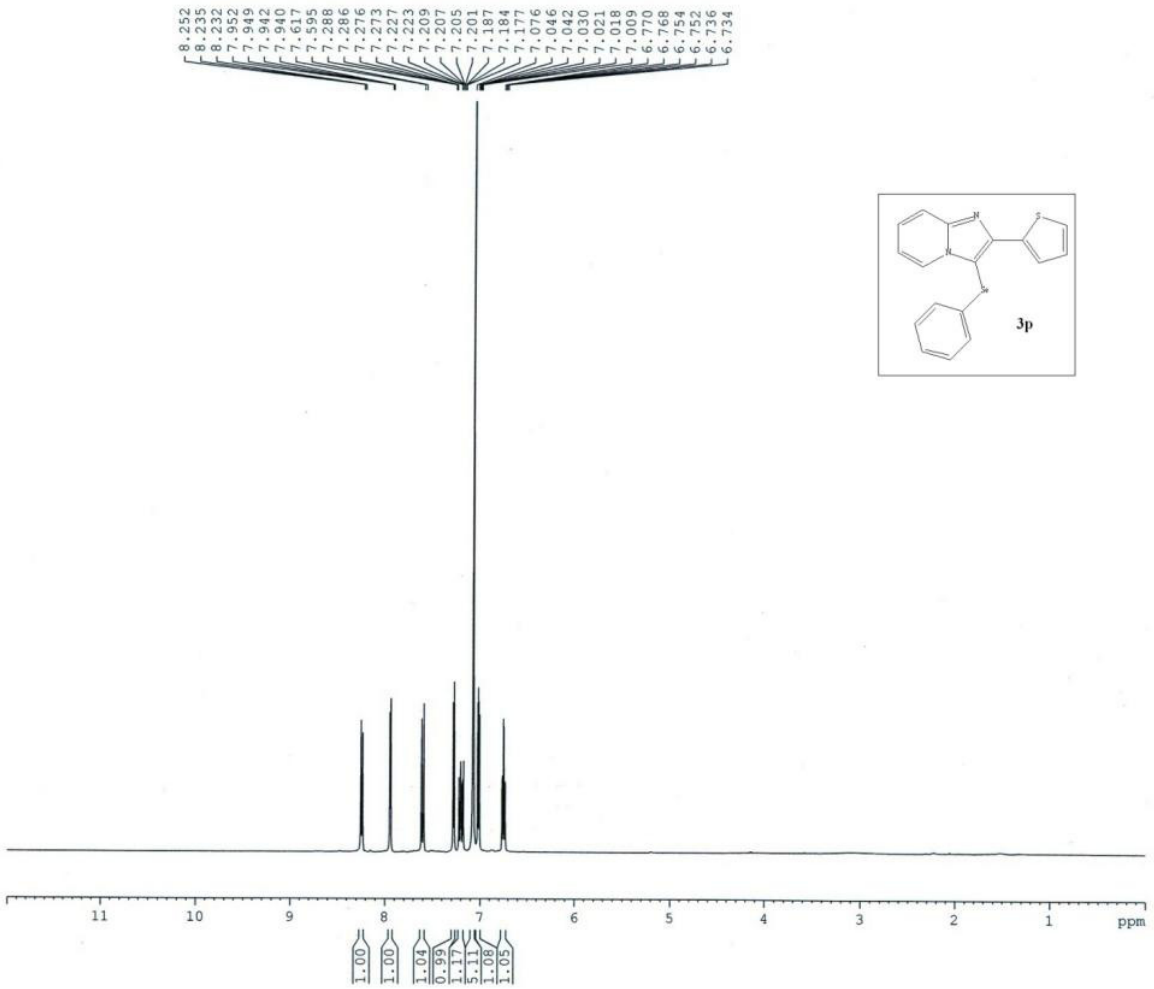

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                 159
PROCNO                  1

F2 - Acquisition Parameters
Date_           20150428
Time              16.31
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT           CDCl3
NS                  320
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6816244 sec
RG                40.87
DW                20.800 usec
DE                 6.50 usec
TE                299.2 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                13C
P1                 8.90 usec
PLW1       54.00000000 W
SFO1      100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2                1H
PCPD2             80.00 usec
PLW2       12.00000000 W
PLW12       0.40792999 W
PLW13       0.26107001 W
SFO2      400.1516006 MHz

F2 - Processing parameters
SI                16384
SF          100.6177946 MHz
WDW                  EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```



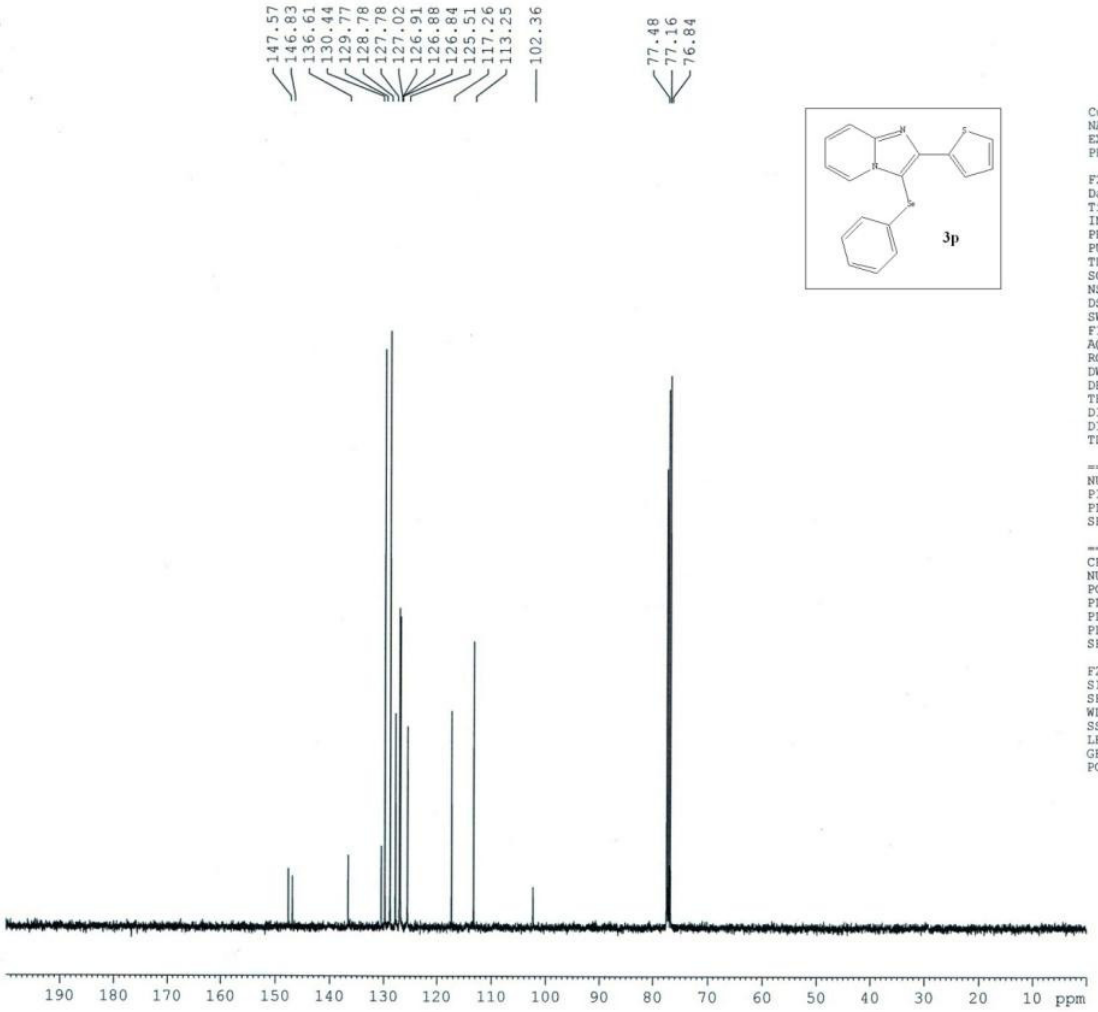
BRUKER

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                189
PROCNO                 1

F2 - Acquisition Parameters
Date_           20150504
Time               17.37
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   24
DS                    2
SWH             8223.685 Hz
FIDRES          0.250967 Hz
AQ              1.9923444 sec
RG                 77.59
DW                60.800 usec
DE                 6.50 usec
TE                296.1 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 14.75 usec
PLW1          11.99499989 W
SFO1         400.1524711 MHz

F2 - Processing parameters
SI                 16384
SF           400.1500423 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```



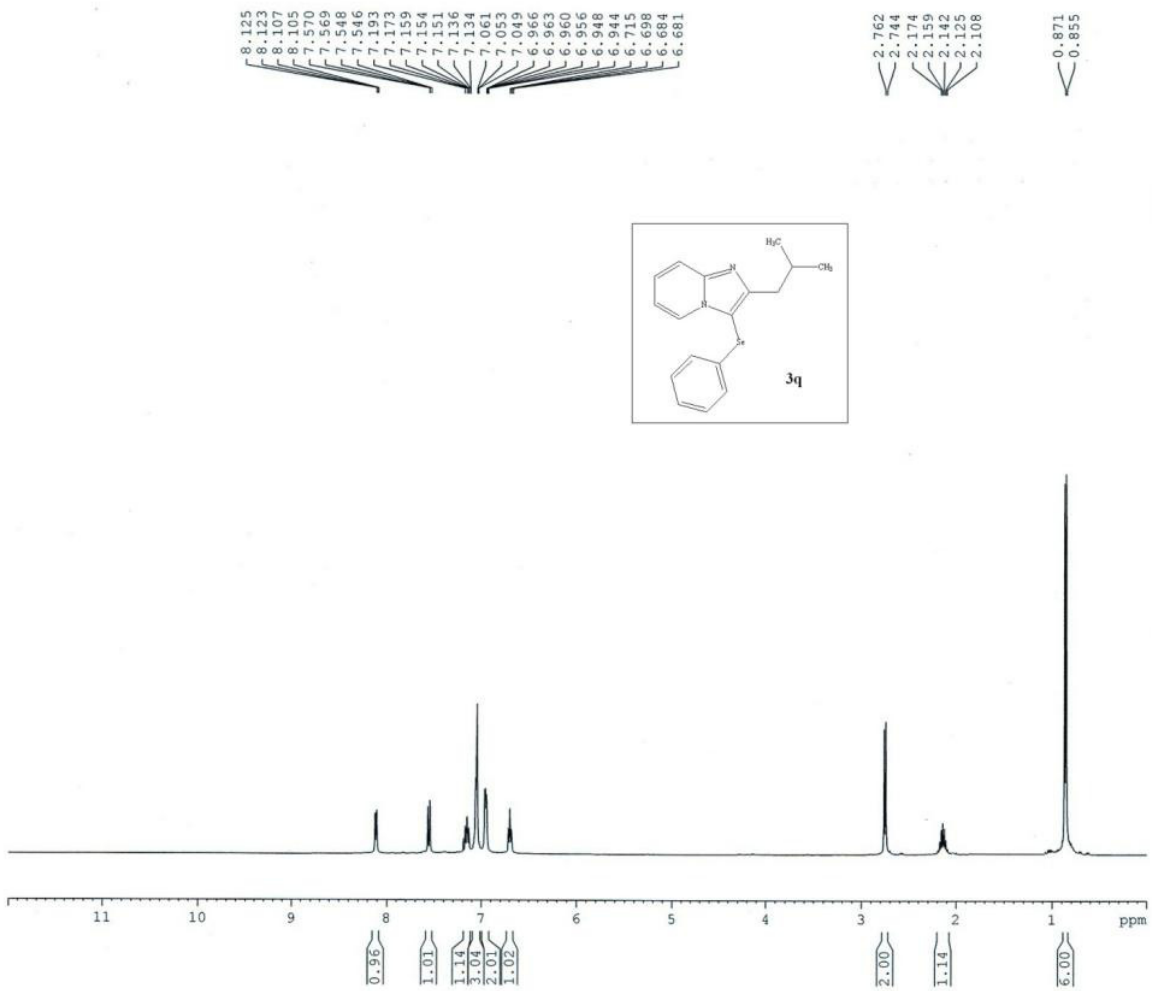

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                190
PROCNO                 1

F2 - Acquisition Parameters
Date_           20150504
Time               18.01
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG          zgpg30
TD                32768
SOLVENT           CDCl3
NS                  320
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6816244 sec
RG                77.59
DW               20.800 usec
DE                6.50 usec
TE                297.3 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  8.90 usec
PLW1         54.00000000 W
SFO1        100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                 1H
PCPD2             80.00 usec
PLW2         12.00000000 W
PLW12         0.40792999 W
PLW13         0.26107001 W
SFO2        400.1516006 MHz

F2 - Processing parameters
SI                  16384
SF          100.6177895 MHz
WDW                    EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

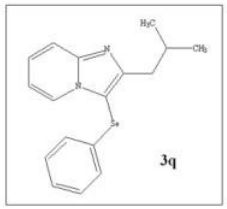


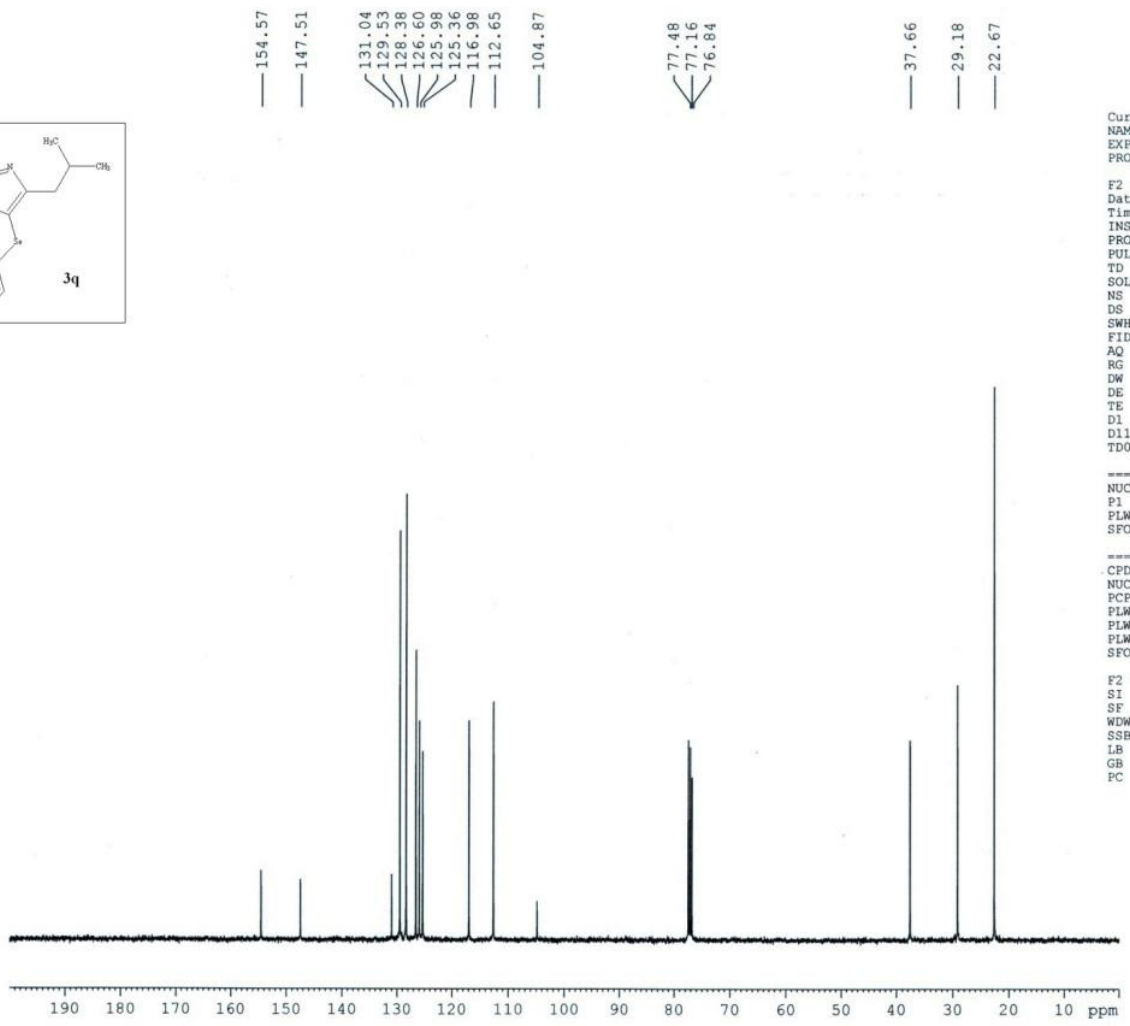

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                 156
PROCNO                  1

F2 - Acquisition Parameters
Date_           20150427
Time               12.47
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                    24
DS                     2
SWH             8223.685 Hz
FIDRES          0.250967 Hz
AQ              1.9923444 sec
RG                 40.87
DW                60.800 usec
DE                 6.50 usec
TE                297.4 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 14.75 usec
PLW1         11.99499989 W
SFO1        400.1524711 MHz

F2 - Processing parameters
SI                 16384
SF          400.1500362 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```





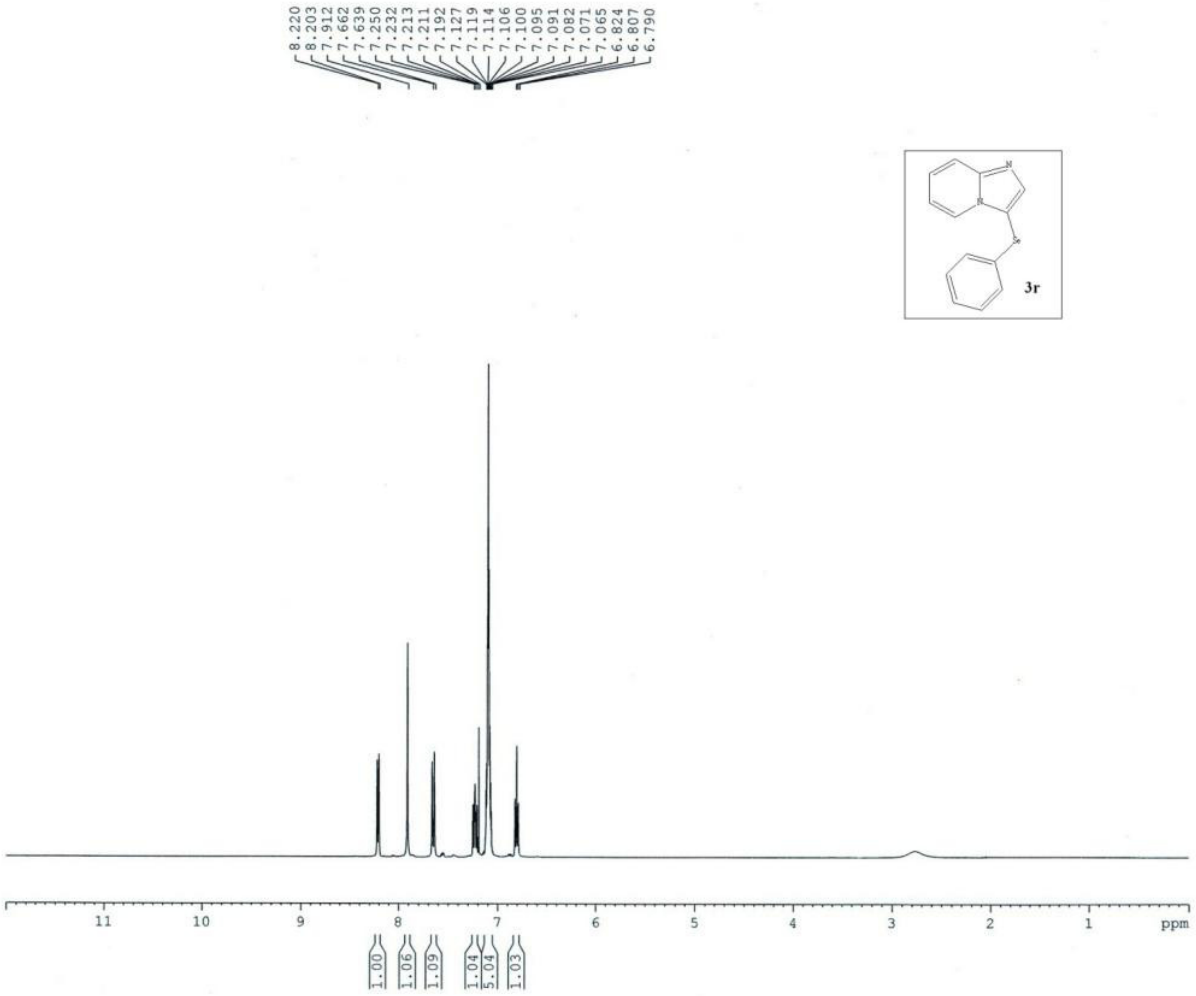

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO              157
PROCNO               1

F2 - Acquisition Parameters
Date_          20150427
Time             13.05
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG        zgpg30
TD               32768
SOLVENT          CDCl3
NS                 320
DS                   2
SWH          24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6816244 sec
RG                40.87
DW               20.800 usec
DE                6.50 usec
TE               300.3 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                13C
P1                8.90 usec
PLW1        54.00000000 W
SFO1       100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                1H
PCPD2            80.00 usec
PLW2        12.00000000 W
PLW12        0.40792999 W
PLW13        0.26107001 W
SFO2       400.1516006 MHz

F2 - Processing parameters
SI                 16384
SF          100.6177927 MHz
WDW                   EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

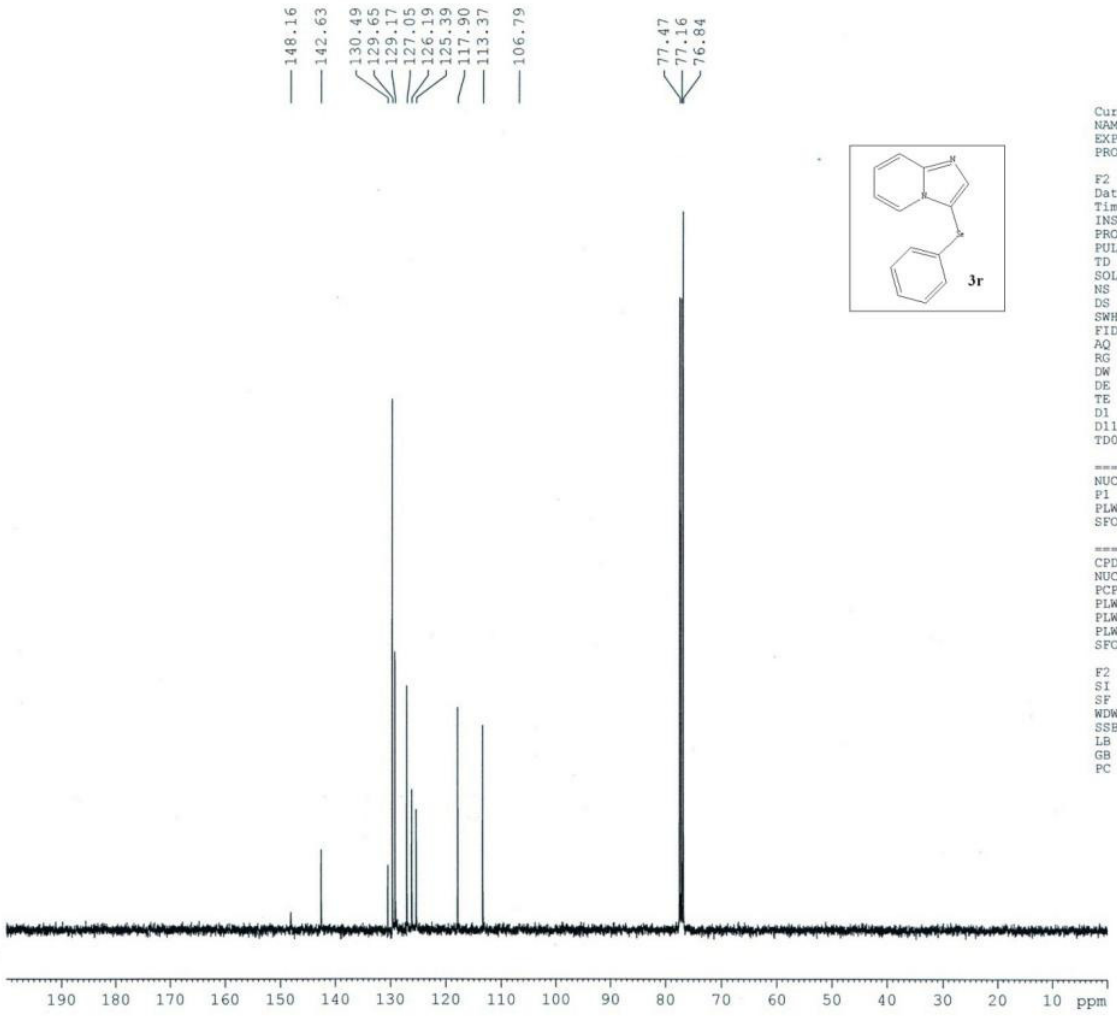



```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                 199
PROCNO                  1

F2 - Acquisition Parameters
Date_           20150506
Time              11.03
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   24
DS                    2
SWH            8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9923444 sec
RG               106.66
DW               60.800 usec
DE                6.50 usec
TE               295.6 K
D1           1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                14.75 usec
PLW1        11.99499989 W
SFO1       400.1524711 MHz

F2 - Processing parameters
SI                16384
SF         400.1500362 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```



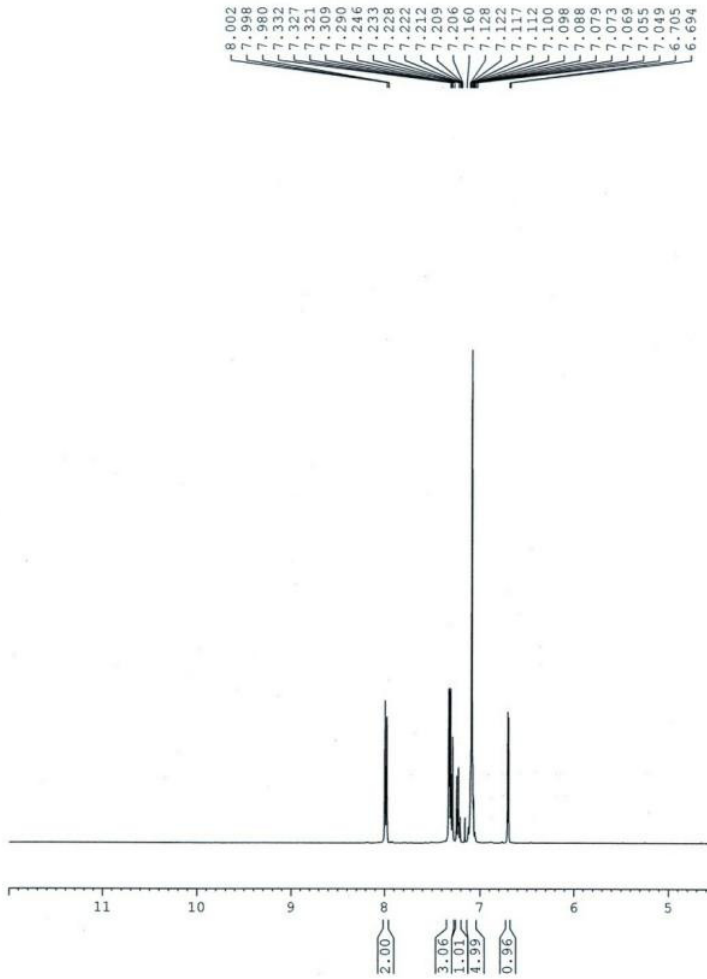

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                  200
PROCNO                   1

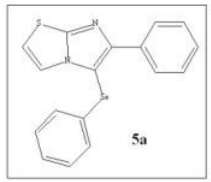
F2 - Acquisition Parameters
Date_           20150506
Time              11.29
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT           CDCl3
NS                  512
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6816244 sec
RG                47.25
DW                20.800 usec
DE                 6.50 usec
TE                297.0 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  8.90 usec
PLW1         54.00000000 W
SFO1        100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                 1H
PCPD2              80.00 usec
PLW2         12.00000000 W
PLW12         0.40792999 W
PLW13         0.26107001 W
SFO2        400.1516006 MHz

F2 - Processing parameters
SI                  16384
SF          100.6177865 MHz
WDW                    EM
SSB       0
LB                  1.00 Hz
GB        0
PC                  1.40
```



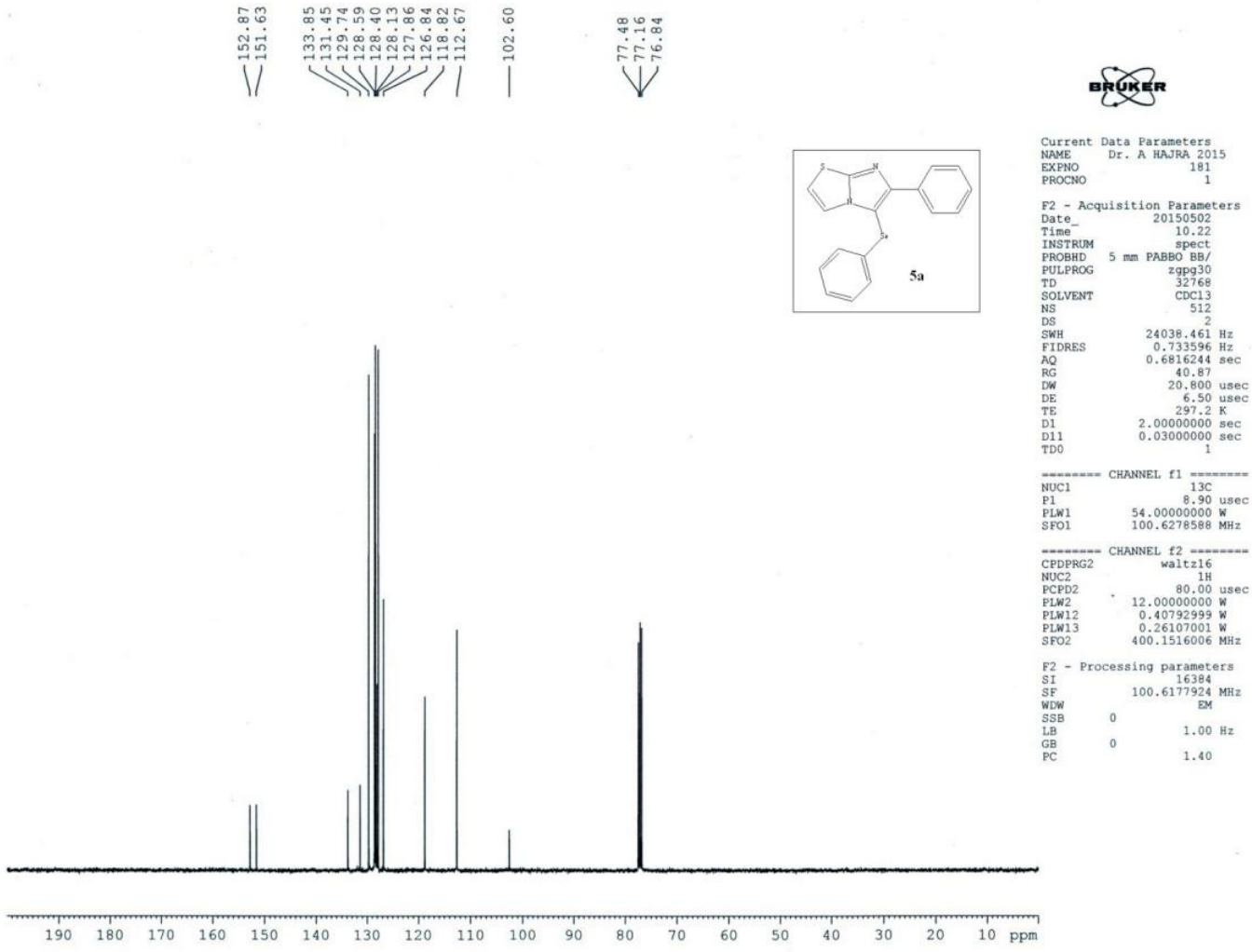


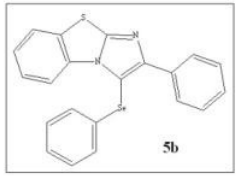

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                180
PROCNO                 1

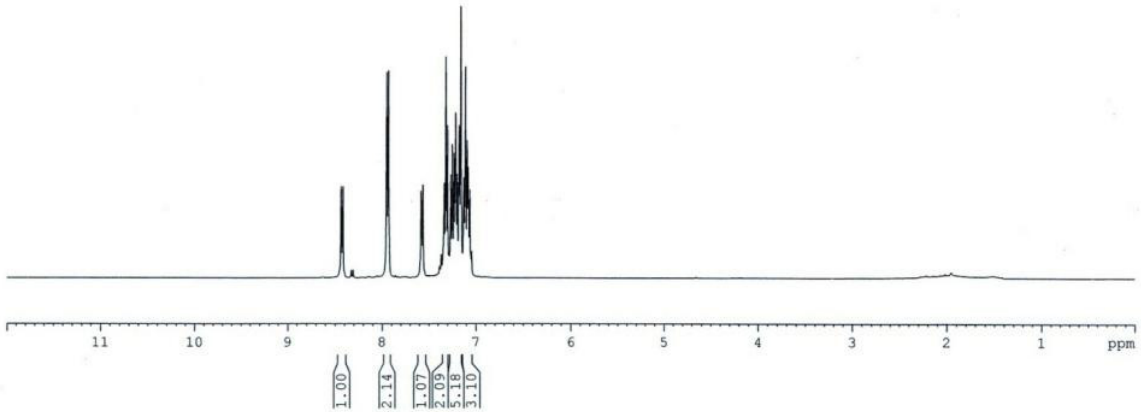
F2 - Acquisition Parameters
Date_           20150502
Time                9.57
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG             zg30
TD                 32768
SOLVENT            CDC13
NS                    24
DS                     2
SWH             8223.685 Hz
FIDRES          0.250967 Hz
AQ              1.9923444 sec
RG                 40.87
DW                60.800 usec
DE                 6.50 usec
TE                295.7 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 14.75 usec
PLW1         11.99499989 W
SFO1         400.1524711 MHz

F2 - Processing parameters
SI                 16384
SF           400.1500492 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```


152.87
151.63
133.85
131.45
129.74
128.59
128.40
128.13
127.86
126.84
118.82
112.67
102.60
77.48
77.16
76.84
5a
BRUKER
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 181
PROCNO 1
F2 - Acquisition Parameters
Date_ 20150502
Time 10.22
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 512
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6816244 sec
RG 40.87
DW 20.800 usec
DE 6.50 usec
TE 297.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W
SFO1 100.6278588 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PLW2 12.00000000 W
PLW12 0.40792999 W
PLW13 0.26107001 W
SFO2 400.1516006 MHz
F2 - Processing parameters
SI 16384
SF 100.6177924 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm





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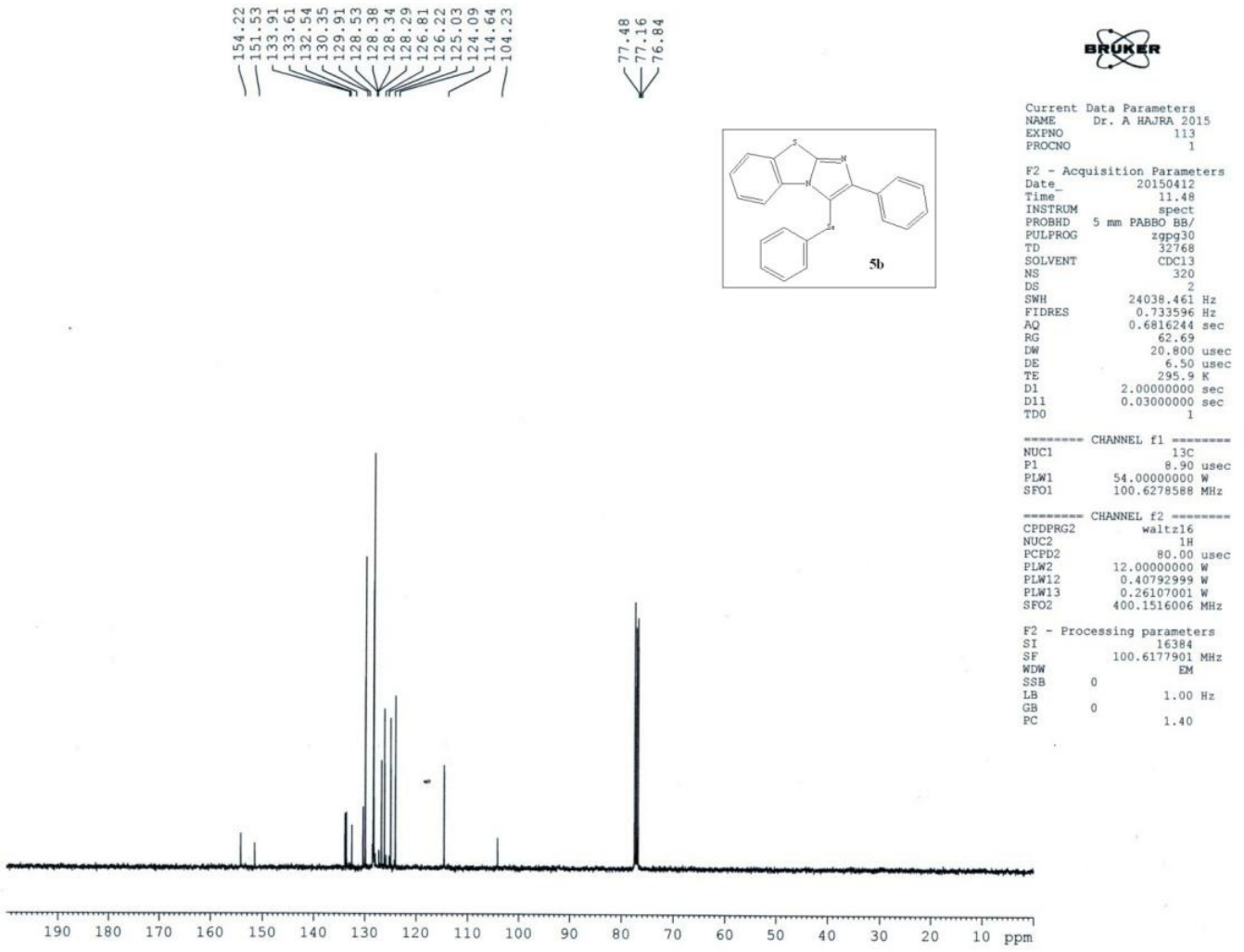
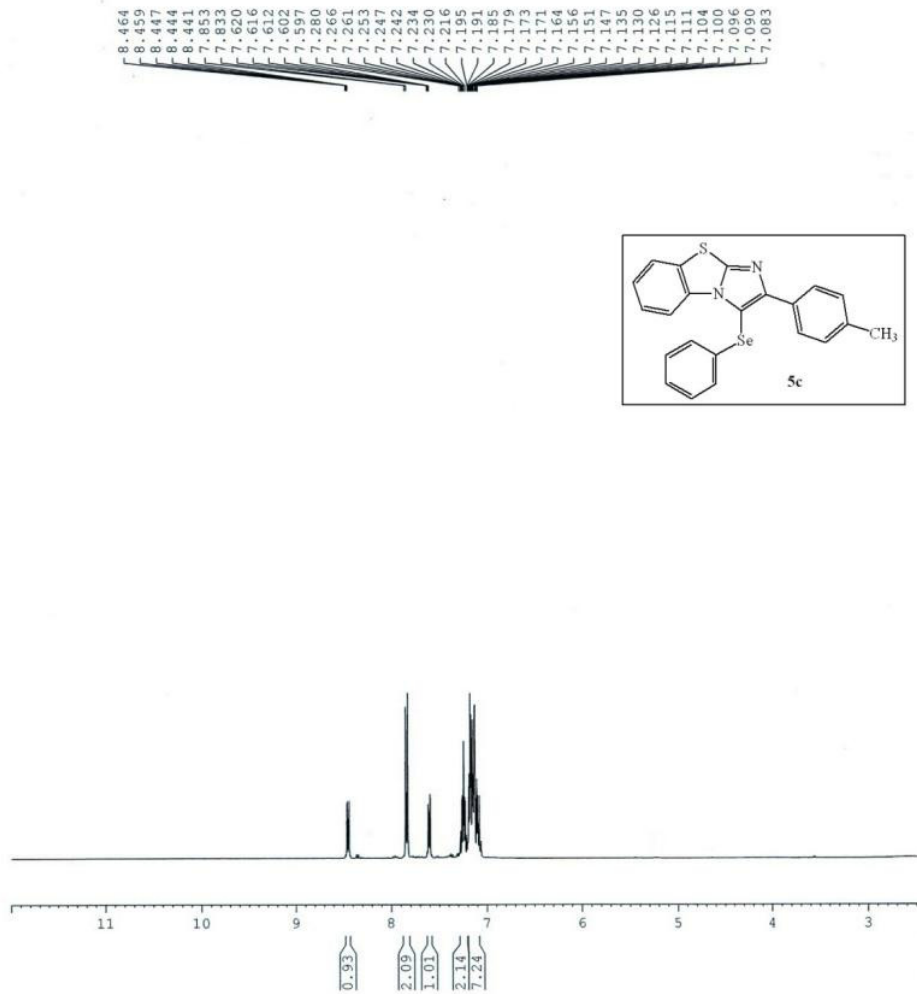
```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                 112
PROCNO                  1

F2 - Acquisition Parameters
Date_           20150412
Time              11.31
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   32
DS                    2
SWH            8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9923444 sec
RG                67.81
DW               60.800 usec
DE                6.50 usec
TE               294.7 K
D1           1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                14.75 usec
PLW1         11.99499989 W
SFO1         400.1524711 MHz

F2 - Processing parameters
SI                16384
SF           400.1500487 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```


154.22
151.53
133.91
133.61
132.54
130.35
129.91
128.53
128.38
128.34
128.29
126.81
126.22
125.03
124.09
114.64
104.23
77.48
77.16
76.84
5b
Current Data Parameters
NAME Dr. A HAJRA 2015
EXPNO 113
PROCNO 1
F2 - Acquisition Parameters
Date_ 20150412
Time 11.48
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 320
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6816244 sec
RG 62.69
DW 20.800 usec
DE 6.50 usec
TE 295.9 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W
SFO1 100.6278588 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PLW2 12.00000000 W
PLW12 0.40792999 W
PLW13 0.26107001 W
SFO2 400.1516006 MHz
F2 - Processing parameters
SI 16384
SF 100.6177901 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm



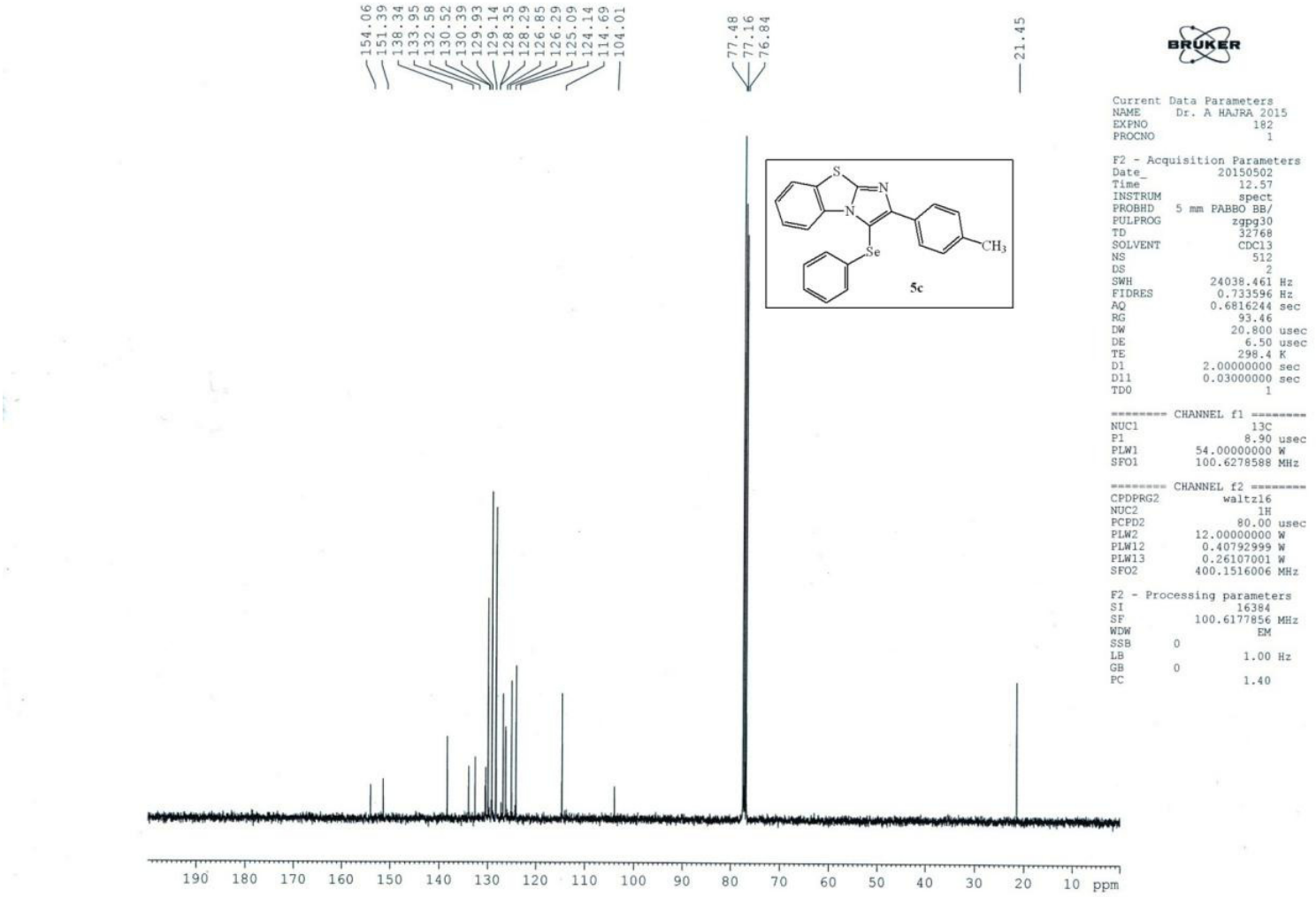
BRUKER

```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO              175
PROCNO               1

F2 - Acquisition Parameters
Date_          20150501
Time             10.43
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                  32
DS                   2
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9923444 sec
RG                93.46
DW               60.800 usec
DE                6.50 usec
TE               295.3 K
D1           1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                1H
P1               14.75 usec
PLW1        11.99499989 W
SFO1       400.1524711 MHz

F2 - Processing parameters
SI                16384
SF         400.1500412 MHz
WDW                  EM
SSB       0
LB             0.30 Hz
GB        0
PC             1.00
```




```
Current Data Parameters
NAME      Dr. A HAJRA 2015
EXPNO                182
PROCNO                 1

F2 - Acquisition Parameters
Date_           20150502
Time                12.57
INSTRUM             spect
PROBHD   5 mm PABBO BB/
PULPROG          zgpg30
TD                32768
SOLVENT           CDCl3
NS                  512
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6816244 sec
RG                93.46
DW               20.800 usec
DE                6.50 usec
TE                298.4 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  8.90 usec
PLW1        54.00000000 W
SFO1       100.6278588 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2              80.00 usec
PLW2        12.00000000 W
PLW12        0.40792999 W
PLW13        0.26107001 W
SFO2       400.1516006 MHz

F2 - Processing parameters
SI                 16384
SF            100.6177856 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```