# Supporting information

## Metal-Free, Iodine/DMSO-Promoted Oxidative C($sp^2$)−H Difunctionalization: Synthesis of Aminochalcogenylated indoles

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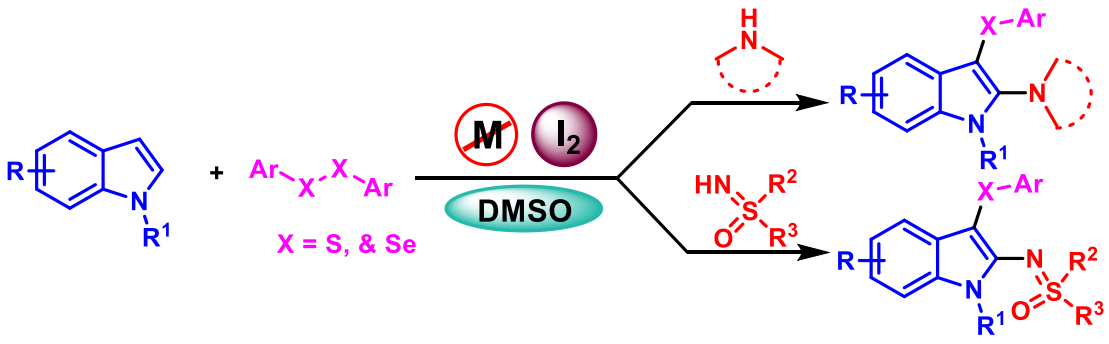
## 1. Experimental Section

### *General Information*

$^{1}H$ 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. $^{13}C\{^{1}H\}$ 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 = 77.16) as an internal standard. TLC was done on a silica gel-coated glass slide (Merck, Silica gel G for TLC). Silica gel (60-120 mesh, SRL, India) was used for column chromatography. Petroleum ether refers to the fraction boiling in the range of 60-80 °C unless otherwise mentioned. 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, Merck, and Spectrochem Chemicals. All reactions involving moisture-sensitive reactants were executed using oven-dried glassware. All the *NH*- sulfoximines[1] were prepared according to the reported method. A borosilicate glass tube was used as a reaction tube.

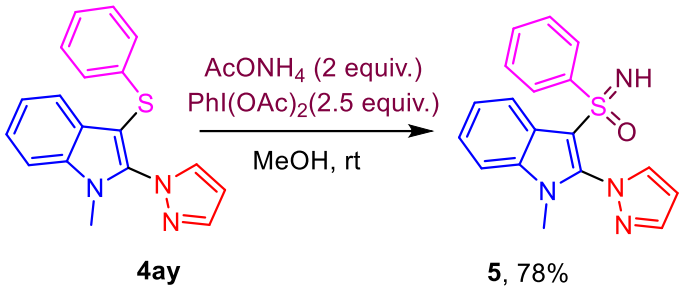
## 2. Scheme 1. General experimental procedure for the synthesis of 4aa-4ay.




A mixture of indole (**1**, 1 mmol), amines (**2**, 1 mmol) and diaryl disulfide (**3**, 0.75 mmol) was stirred in the presence of 2 mL of DMSO as solvent and $I_2$ catalyst (20 mol%) at 80 °C for 8 h. After the completion of the reaction, confirmed by TLC, the mixture was cooled to room temperature and then diluted with saturated saline water (3×15 mL), saturated sodium thiosulfate solution (2×15 mL) and extracted with ethyl acetate. The combined organic layer was collected and dried over anhydrous $Na_2SO_4$. The residue was purified by column chromatography on silica gel to afford the desired products (eluent: ethyl acetate/petroleum ether).

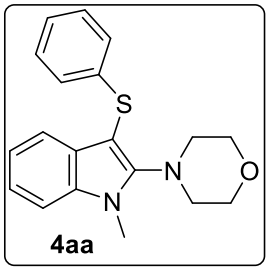
## 3. General procedure for the application (5)[1]:

A mixture of **4ay**, $PhI(OAc)_2$ (2.5 equiv) and $AcONH_4$ (2 equiv) was stirred in the presence of MeOH as solvent at room temperature. After the completion of the reaction, confirmed by TLC, the solvent is removed by rotary evaporator. Then, the mixture was cooled to room temperature and then diluted with saturated saline water (3×15 mL), saturated sodium thiosulfate solution (2×15 mL) and extracted with ethyl acetate. The combined organic layer was collected and dried over anhydrous $Na_2SO_4$. The residue was purified by column chromatography on silica gel to afford the desired products (eluent: DCM/MeOH).



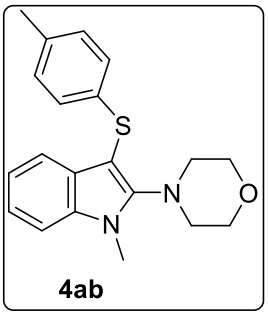

**4ay** **5**, 78%

## 4. Characterization data of the synthesized compounds:



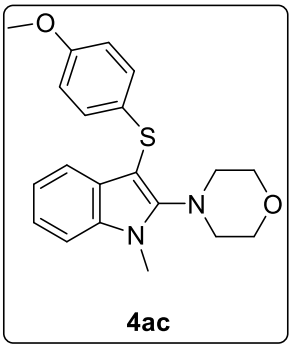

**4aa**

***4-(1-methyl-3-(phenylthio)-1H-indol-2-yl)morpholine*** (**4aa**)[2]: Yield: 83%; 268 mg; yellowish white solid; m.p.: 121-122 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/14); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.62 (d, $J$=7.6 Hz, 1H), 7.34-7.32 (m, 2H), 7.26-7.20 (m, 3H), 7.15-7.11 (m, 3H), 3.90- 3.88 (m, 4H), 3.80 (s, 3H), 3.42- 3.40 (m, 4H); $^{13}$C{$^1$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 150.7, 140.4, 134.8, 129.6, 128.8, 125.2, 124.5, 122.2, 120.8, 118.7, 109.5, 90.9, 67.7, 51.6, 29.1.



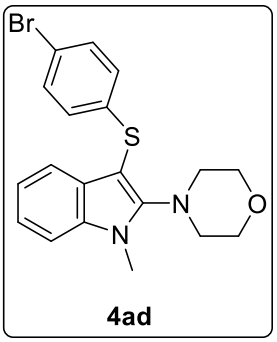

**4ab**

***4-(1-methyl-3-(p-tolylthio)-1H-indol-2-yl)morpholine*** (**4ab**): Yield: 80%, 270 mg; white solid; m.p.: 127-129 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/10); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.54 (d, $J$=7.6 Hz, 1H), 7.30-7.22 (m, 2H), 7.15-7.11 (m, 1H), 6.99-6.95 (m, 4H), 3.82-3.80 (m, 4H), 3.71 (s, 3H), 3.33- 3.31 (m, 4H), 2.26 (s, 3H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 150.6, 136.8, 134.8, 134.2, 129.7, 129.6, 125.3, 122.1, 120.7, 118.8, 109.5, 91.4, 67.7, 51.6, 29.1, 20.9. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{20}H_{23}N_2OS]^+$ : 339.1526; Found : 339.1532.



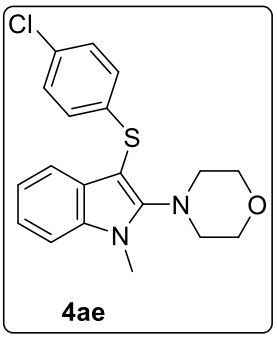

**4ac**

***4-(3-((4-methoxyphenyl)thio)-1-methyl-1H-indol-2-yl)morpholine*** (**4ac**): Yield: 80%, 270 mg; yellowish white solid; m.p.: 158-160 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/8); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.60 (d, $J$=7.6 Hz, 1H), 7.31-7.25 (m, 2H), 7.18-7.14 (m, 1H), 7.06-7.04 (m, 2H), 6.77-6.75 (m, 2H), 3.84-3.82 (m, 4H), 3.74 (s, 3H), 3,71 (s, 3H), 3.35- 3.33 (m, 4H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 156.4, 149.4, 133.7, 130.1, 128.7, 126.1, 121.0, 119.6, 117.7, 113.6, 108,4, 91.2, 66.6, 54.4, 50.6, 28.0. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{20}H_{23}N_2O_2S]^+$ : 355.1475; Found : 355.1482.



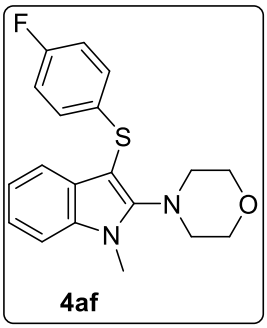

**4ad**

***4-(3-((4-bromophenyl)thio)-1-methyl-1H-indol-2-yl)morpholine*** (**4ad**): Yield: 79%, 317 mg; white solid; m.p.: 166-168 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/8); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.46 (d, $J$=7.6 Hz, 1H), 7.28-7.21 (m, 4H), 7.13-7.09 (m, 1H), 6.89-6.86 (m, 2H), 3.78-3.76 (m, 4H), 3.67 (s, 3H), 3.27- 3.25 (m, 4H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 150.8, 139.8, 134.9, 131.8, 129.4, 126.7, 122.3, 121.0, 118.5, 118.0, 109.6, 90.2, 67.6, 51.6, 29.2. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{19}H_{20}BrN_2OS]^+$ : 403.0474; Found : 403.0488.



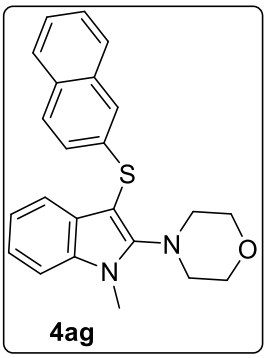

**4ae**

***4-(3-((4-chlorophenyl)thio)-1-methyl-1H-indol-2-yl)morpholine*** (**4ae**): Yield: 80%, 286 mg; yellowish white solid; m.p.: 138-140 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/8); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.50 (d, $J$=7.6 Hz, 1H), 7.31-7.24 (m, 2H), 7.16-7.10 (m, 3H), 6.98-6.96 (m, 2H), 3.82-3.80 (m, 4H), 3.71 (s, 3H), 3.31- 3.19 (m, 4H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 150.8, 139.1, 134.8, 130.2, 129.4, 128.9, 126.4, 122.3, 120.9, 118.6, 109.6, 90.4, 67.6, 51.6, 29.2. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{19}H_{20}ClN_2OS]^+$ : 359.0979; Found : 359.0981.




**4af**

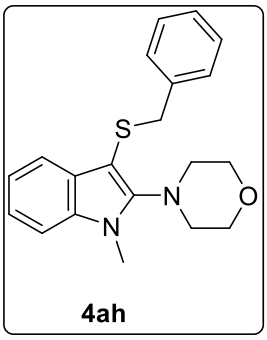
***4-(3-((4-fluorophenyl)thio)-1-methyl-1H-indol-2-yl)morpholine*** (**4af**): Yield: 82%, 280 mg; brown solid; m.p.: 117-119 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/12); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.45 (d, $J$=7.6 Hz, 1H), 7.22-7.15 (m, 2H), 7.05-7.05 (m, 1H), 6.95-6.92 (m, 2H), 6.80-6.76 (m, 2H), 3.74-3.72 (m, 4H), 3.62 (s, 3H), 3.22 (m, 4H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 160.7 (d, $J$=241Hz), , 159.5, 150.6, 135.4, 134.8, 129.5, 126.8 (d, $J$=7 Hz), , 122.2, 120.8, 118.5, 115.8 (d, $J$=22 Hz), , 109.6, 91.2, 67.6, 51.5, 29.1. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{19}H_{20}FN_2OS]^+$ : 343.1275; Found : 343.1283.




**4ag**

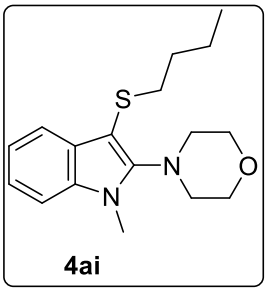
***4-(1-methyl-3-(naphthalen-2-ylthio)-1H-indol-2-yl)morpholine*** (**4ag**): Yield: 76%, 284 mg; brown solid; m.p.: 96-98 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/12); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.63 (d, $J$=7.6 Hz, 1H), 7.55 (d, $J$=8.4 Hz, 1H), 7.47 (d, $J$=7.6 Hz, 2H), 7.32 (s, 1H), 7.29-7.22 (m, 3H), 7.19-7.14 (m, 2H), 7.06-7.02 (m, 1H), 3.70-3.68 (m, 4H), 3.64 (s, 3H), 3.26-3.24 (m, 4H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 150.9, 138.1, 134.9, 133.9, 131.3, 129.8, 129.4, 128.4, 127.8, 126.9, 126.4, 125.0, 124.3, 122.5, 122.2,

120.9, 118.8, 109.6, 67.6, 51.6, 29.2. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{23}H_{23}N_2OS]^+$ : 375.1526; Found : 375.1526.




**4ah**

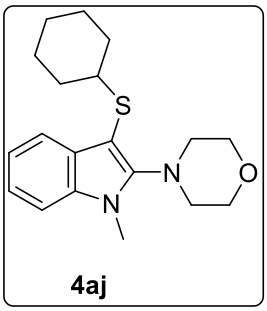
***4-(3-(benzylthio)-1-methyl-1H-indol-2-yl)morpholine*** (**4ah**): Yield: 79%, 267 mg; brown solid; m.p.: 128-130 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/12); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.65 (d, $J$=7.6 Hz, 1H), 7.25-7.21 (m, 3H), 7.20-7.18 (m, 2H), 7.17-7.15 (m, 1H), 7.03-7.01 (m, 2H), 3.85 (s, 2H), 3.71-3.69 (m, 4H), 3.58 (m, 3H), 2.97 (s, 4H); $^{13}$C{$^1$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 150..6, 138.9, 134.8, 132.6, 129.2, 128.3, 126.7, 121.8, 120.3, 118.5, 109.5, 93.5, 67.7, 51.9, 41.1, 28.9. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{20}H_{23}N_2OS]^+$ : 339.1526; Found : 339.1537.




**4ai**

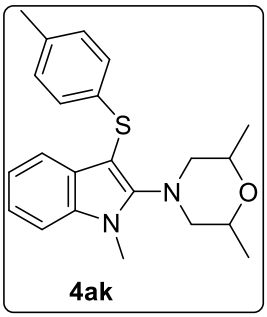
***4-(3-(butylthio)-1-methyl-1H-indol-2-yl)morpholine*** **(4ai)**: Yield: 77%, 234 mg; colourless oil; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/15); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.71 (d, $J$=7.6 Hz, 1H), 7.25-7.23 (m, 2H), 7.21-7.19 (m, 1H), 3.89-3.87 (m, 4H), 3.65 (s, 3H), 3.42-4.40 (m, 4H), 2.7-2.69 (m, 2H), 1.64-1.57 (m, 2H), 1,49-1.40 (m, 2H), 0.92 (t, $J$=7.6, 3H); $^{13}$C{$^1$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 149.6, 134.5, 129.9, 121.7, 120.1, 118.7,

109.3, 95.4, 67.7, 52.1, 37.4, 32.1, 28.8, 22.1, 13.8. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{17}H_{25}N_2OS]^+$ : 305.1682; Found : 305.1693.




**4aj**

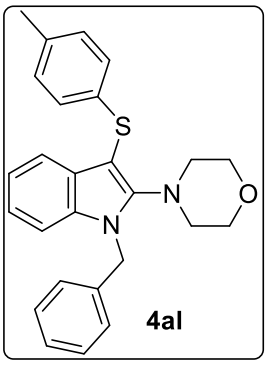
***4-(3-(cyclohexylthio)-1-methyl-1H-indol-2-yl)morpholine*** (**4aj**): Yield: 76%; 250 mg; colourless oil; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/15); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.70 (d, $J$=7.6 Hz, 1H), 7.23-7.17 (m, 3H), 3.88-3.86 (m, 4H), 3.65 (s, 3H), 3.41-4.39 (m, 4H), 2.87-2.79 (m, 1H), 1.98-1.93 (m, 2H), 1.79-1.74 (m, 2H), 1,63-1.58 (m, 1H), 1.45-1.35 (m, 2H), 1.28-1.19 (m, 3H); $^{13}$C{$^1$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 149.9, 134.5, 130.6, 121.7, 120.1, 119.1, 109.2, 94.0, 67.8, 52.3, 48.8, 33.9, 29.0, 26.4, 25.9. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{19}H_{27}N_2OS]^+$ : 331.1839; Found : 331.1856.



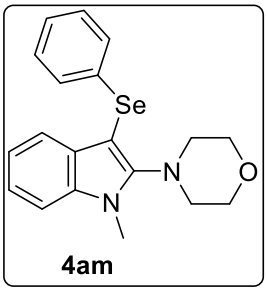

**4ak**

***2,6-dimethyl-4-(1-methyl-3-(p-tolylthio)-1H-indol-2-yl)morpholine*** (**4ak**): Yield: 78%, 285 mg; yellow gummy mass; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/8); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.54 (d, $J$=8 Hz, 1H), 7.30-7.23 (m, 2H), 7.16-7.12 (m, 1H), 6.99 (s, 6H), 3.85-3.82 (m, 4H), 3.69 (s, 3H), 3.27-3.21 (m, 2H), 3.00-2.97 (m, 2H), 2.27 (s, 3H), 1.20 (s, 3H), 1.18 (s, 3H); $^{13}$C{$^1$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 150.4, 136.7, 134.7,

134.1, 129.5, 121.9, 120.6, 118.7, 109.4, 91.2, 72.6, 56.9, 29.2, 20.9, 18.9. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{22}H_{27}N_2OS]^+$ : 367.1839; Found : 367.1851.

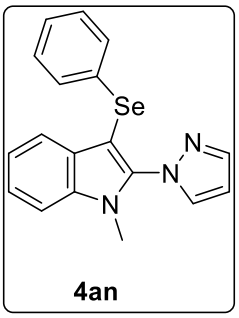



***4-(1-benzyl-3-(p-tolylthio)-1H-indol-2-yl)morpholine*** (**4al**)*:* Yield: 78 %; 298 mg; yellowish white solid; m.p.: 132-134 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/10); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.32-7.29 (m, 2H), 7.25-7.22 (m, 1H), 7.20-7.16 (m, 2H), 7.14-7.08 (m, 4H), 6.98-6.95 (m, 3H), 5.40 (s, 2H), 3.67-3.65 (m, 4H), 3.20 (s, 4H), 2.25 (s, 3H); $^{13}$C{$^1$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 150.7, 138.1, 136.4, 1346, 134.3, 129.7, 129.7, 128.9, 127.5, 126.3, 125.4, 122.6, 120.9, 119.0, 110.4, 93.5, 67.7, 51.8, 46.2, 21.0. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{26}H_{27}N_2OS]^+$ : 415.1839; Found : 415.1851.



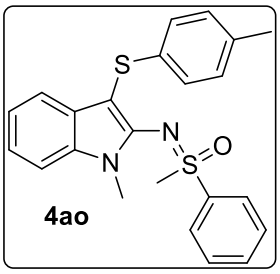

***4-(1-methyl-3-(phenylselanyl)-1H-indol-2-yl)morpholine*** (**4am**)[2]: Yield: 78%; 290 mg; red liquid; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/15); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.59 (d, $J$=7.6 Hz, 1H), 7.32-7.26 (m, 2H), 7.22-7.18 (m, 2H), 7.16-7.10 (m, 4H), 3.84-3.82 (m, 4H), 3.74 (s, 3H), 3.34 (s, 4H); $^{13}$C{$^1$H} NMR ($CDCl_3$, 100 MHz): $\delta$

150.5, 135.2, 135.0, 130.4, 129.0, 128.1, 125.4, 122.1, 120.6, 119.6, 109.4, 87.2, 67.7, 51.8, 29.0.



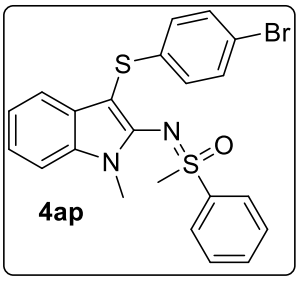
**4an**

***1-methyl-3-(phenylselanyl)-2-(1H-pyrazol-1-yl)-1H-indole*** (**4an**)[2]: Yield: 81 %; 285 mg; white solid; m.p.: 97-98 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/8); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.88 (d, $J$=1.6 Hz, 1H), 7.76 (d, $J$=8 Hz, 1H), 7.71 (d, $J$=2.4 Hz, 1H), 7.47-7.43 (m, 2H), 7.32-7.25 (m, 4H), 7.21-7.19 (m, 3H), 3.78 (s, 3H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 142.3, 139.2, 135.7, 133.7, 133.4, 129.3, 128.9, 125.9, 124.2, 123.8, 121.5, 121.4, 121.2, 110.1, 106.7, 92.5, 30.7.



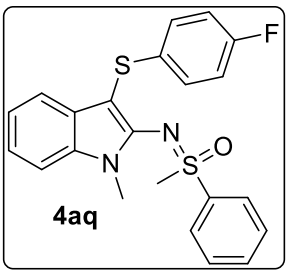
**4ao**

***methyl((1-methyl-3-(p-tolylthio)-1H-indol-2-yl)imino)(phenyl)-λ$^6$-sulfanone*** (**4ao**): Yield: 81%; 328 mg; yellowish solid; m.p.: 129-131 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/5); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 8.43 (d, $J$=7.6 Hz, 1H), 7.93-7.89 (m, 1H), 7.83-7.79 (m, 4H), 7.64-7.61 (m, 2H), 7.56-7.52 (m, 2H), 7.47-7.43 (m, 2H), 4.16 (s, 3H), 3.56 (s, 3H), 2.58 (s, 3H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 139.7, 136.2, 135.2, 133.9, 129.7, 129.4, 129.4, 128.3, 125.5, 121.1, 120.4, 118.5, 109.1, 45.0, 29.9, 21.0. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{23}H_{23}N_2OS_2]^+$ : 407.1246; Found : 407.1259.




***((3-((4-bromophenyl)thio)-1-methyl-1H-indol-2-yl)imino)(methyl)(phenyl)-λ⁶-sulfanone***

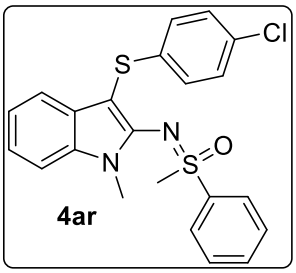
(**4ap**): Yield: 76%; 357 mg; brown solid; m.p.: 150-152 °C column chromatography done (eluent: ethyl acetate/petroleum ether = 1/5); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.98-7.96 (m, 2H), 7.54-7.50 (m, 1H), 7.42-7.36 (m, 3H), 7.29-7.26 (m, 1H), 7.21-7.19 (m, 1H), 7.15-7.13 (m, 2H), 7.11-7.07 (m, 1H), 6.76-6.74 (m, 2H), 3.80 (s, 3H), 3.24 (s, 3H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 139.5. 139.4, 135.1, 133.5, 131.5, 129.5, 129.3, 128.0, 126.7, 126.6, 121.2, 120.7, 118.1, 117.6, 109.1, 45.8, 29.8. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{22}H_{20}BrN_2OS_2]^+$ : 471.0195; Found : 471.0201.



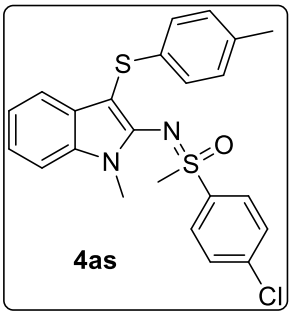

***((3-((4-fluorophenyl)thio)-1-methyl-1H-indol-2-yl)imino)(methyl)(phenyl)-λ⁶-sulfanone***

(**4aq**): Yield: 80%; 328 mg; brown solid; m.p.: 119-121 °C column chromatography done (eluent: ethyl acetate/petroleum ether = 1/5); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 8.02 (d, $J$=7.6 Hz, 2H), 7.56-7.52 (m, 1H), 7.45-7.41 (m, 3H), 7.28-7.26 (m, 1H), 7.21-7.17 (m, 1H), 7.12-7.08 (m, 1H), 6.90-6.87 (m, 2H), 6.80-6.75 (m, 2H), 3.80 (s, 3H), 3.25 (s, 3H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 144.3, 139.6, 137.6, 135.2, 133.6, 130.4, 129.5, 129.4, 128.1, 127.6, 126.8

(d, *J*=5 Hz), 121.3 (d, *J*=13 Hz), 120.6, 118.2, 115.9, 115.6 (d, *J*=22 Hz), 109.1, 45.6, 29.9. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{22}H_{20}FN_2OS_2]^+$ : 411.0996; Found : 411.1004.

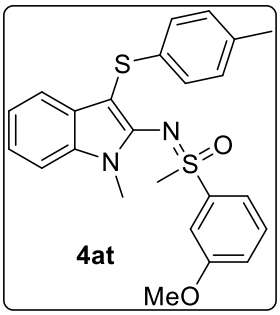



***((3-((4-chlorophenyl)thio)-1-methyl-1H-indol-2-yl)imino)(methyl)(phenyl)-λ⁶-sulfanone*** (**4ar**): Yield: 81%; 345 mg; brown solid; m.p.: 132-134 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/5); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.98 (d, *J*=8 Hz, 2H), 7.54-7.51 (m, 1H), 7.43-7.37 (m, 3H), 7.29-7.26 (m, 1H), 7.21-7.17 (m, 1H), 7.11-7.08 (m, 1H), 7.02-6.99 (m, 2H), 6.83-6.81 (m, 2H), 3.80 (s, 3H), 3.25 (s, 3H); $^{13}$C{$^1$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 139.5, 135.2, 133.5, 129.9, 129.5, 129.3, 128.6, 128.0, 126.4, 122.5, 121.3, 121.2, 120.6, 118.2, 109.1, 108.2, 45.8, 29.8. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{22}H_{20}ClN_2OS_2]^+$ : 427.0700; Found : 427.0709.



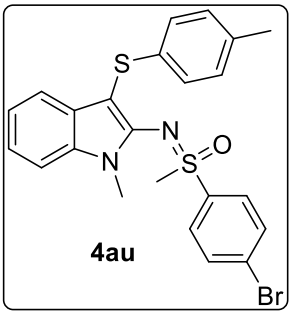

***(4-chlorophenyl)(methyl)((1-methyl-3-(p-tolylthio)-1H-indol-2-yl)imino)-λ⁶-sulfanone*** (**4as**): Yield: 77%; 338 mg; yellow solid; m.p.: 128-130 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/5); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.91 (d, *J*=8.4 Hz, 2H), 7.41 (d, *J*=7.6 Hz, 2H), 7.29-7.26 (m, 3H), 7.20-7.16 (m, 1H), 7.09-7.06 (m, 1H), 6.86 (d, *J*=7.6, 2H), 6.74 (d, *J*=8.4, 2H), 3.79 (s, 3H), 3.23 (s, 3H), 2.24 (s, 3H); $^{13}$C{$^1$H} NMR ($CDCl_3$,

100 MHz): $\delta$ 140.2, 138.1, 136.2, 135.1, 133.9, 129.7, 129.6, 129.4, 125.0, 121.1, 120.5, 118.4, 109.0, 45.9, 29.8, 21.0. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{23}H_{20}ClN_2OS_2]^+$ : 441.0857; Found : 441.0861.




***(3-methoxyphenyl)(methyl)((1-methyl-3-(p-tolylthio)-1H-indol-2-yl)imino)-λ⁶-sulfanone***

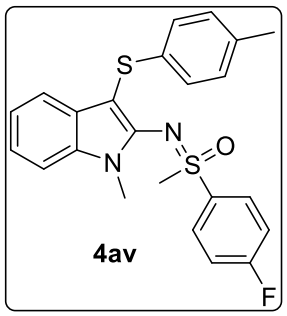
(**4at**): Yield: 79%; 344 mg; red gummy mass; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/5); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.64-7.62 (m, 2H), 7.47 (d, $J$=8 Hz, 2H), 7.37-7.33 (m, 1H), 7.30-7.26 (m, 1H), 7.21-7.18 (m, 1H), 7.12-7.09 (m, 1H), 7.06-7.04 (m, 1H), 6.91-6.87 (m, 4H), 3.82 (s, 3H), 3.69 (s, 3H), 3.21(s, 3H), 2.23 (s, 3H); $^{13}$C{$^1$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 160.1, 144.3, 136.2, 135.1, 133.8, 130.4, 129.6, 129.4, 125.2, 121.0, 120.5, 120.4, 120.3, 118.4, 112.4, 109.0, 88.2, 55.5, 44.9, 29.8, 20.9. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{24}H_{25}N_2O_2S_2]^+$ : 437.1352; Found : 437.1363.




***(4-bromophenyl)(methyl)((1-methyl-3-(p-tolylthio)-1H-indol-2-yl)imino)-λ⁶-sulfanone***

**(4au):** Yield: 77%; 344 mg; brown solid; m.p.: 162-164 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/5); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.66 (d, $J$=7.6 Hz,

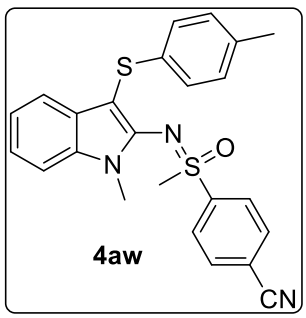
2H), 7.29-7.26 (m, 3H), 7.28-7.25 (m, 3H), 7.11 (d, *J*=9.2 Hz, 1H), 7.05-7.01 (m, 1H), 6.95-6.91 (m, 1H), 6.70 (d, *J*=8 Hz, 2H), 6.56 (d, *J*=8 Hz, 2H), 3.64 (s, 3H), 3.08 (s, 3H), 2.10 (s, 3H); $^{13}C\{^{1}H\}$ NMR ($CDCl_3$, 100 MHz): $\delta$ 143.8, 138.5, 136.2, 135.1, 133.9, 132.5, 129.6, 129.4, 128.7, 125.2, 124.9, 121.1, 120.5, 118.4, 108.9, 87.0, 46.0, 29.8, 21.0. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{23}H_{22}BrN_2OS_2]^+$ : 485.0351; Found : 485.0364.



**4av**

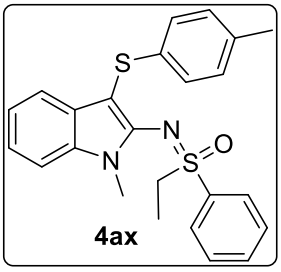
***(4-fluorophenyl)(methyl)((1-methyl-3-(p-tolylthio)-1H-indol-2-yl)imino)-λ⁶-sulfanone***

**(4av):** Yield: 75%; 331 mg; yellow solid; m.p.: 132-134 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/5); $^{1}H$ NMR ($CDCl_3$, 400 MHz): $\delta$ 8.05-8.02 (m, 2H), 7.43 (d, *J*=8.4 Hz, 1H), 7.29-7.26 (m, 1H), 7.21-7.17 (m, 1H), 7.11-7.02 (m, 3H), 6.89 (d, *J*=8 Hz, 2H), 6.8 (d, *J*=8 Hz, 2H), 3.79 (s, 3H), 3.22 (s, 3H), 2.23 (s, 3H); $^{13}C\{^{1}H\}$ NMR ($CDCl_3$, 100 MHz): $\delta$ 164.5, 143.8, 135.6 (d, *J*=106 Hz), 134.0, 131.2, 131.2, 129.6 (d, *J*=10 Hz), 128.5, 125.2, 120.9 (d, *J*=67 Hz), 118.5, 116.6 (d, *J*=23 Hz), 109.1, 88.1, 45.5, 29.9, 20.9. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{23}H_{22}FN_2OS_2]^+$ : 424.1079; Found : 424.1081.



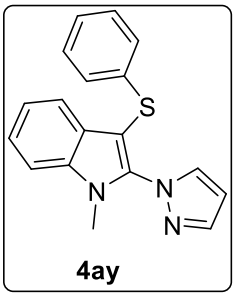
**4aw**

***4-(S-methyl-N-(1-methyl-3-(p-tolylthio)-1H-indol-2-yl)sulfonimidoyl)benzonitrile*** **(4aw):** Yield: 47%; 202 mg; brown solid; m.p.: 152-153 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/4); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.99 (d, $J$=7.6 Hz, 2H), 7.46 (d, $J$=8 Hz, 2H), 7.34 (d, $J$=8 Hz, 1H), 7.27-7.26 (m, 1H), 7.20-7.16 (m, 1H), 7.08-7.04 (m, 1H), 6.81 (d, $J$=8.4 Hz, 2H), 6.54(d, $J$=7.6 Hz, 2H), 3.79 (s, 3H), 3.29 (s, 3H), 2.26 (s, 3H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 143.9, 132.9, 129.5, 129.3, 128.5, 124.6, 121.2, 120.6, 118.4, 117.3, 116.5, 108.9, 46.4, 29.7, 20.9. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{23}H_{22}BrN_2OS_2]^+$ : 431.1126; Found : 431.1133.

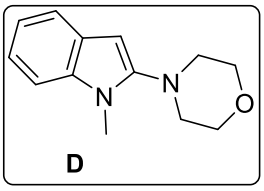


**4ax**

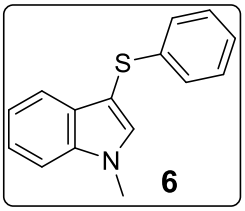
***ethyl((1-methyl-3-(p-tolylthio)-1H-indol-2-yl)imino)(phenyl)-λ$^6$-sulfanone*** (**4ax**): Yield: 76%; 319 mg; yellow solid; m.p.: 102-104 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/5); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.95 (d, $J$=7.6 Hz, 2H), 7.50-7.47 (m, 1H), 7.41-7.36 (m, 3H), 7.26-7.24 (m, 1H), 7.17-7.14 (m, 1H), 7.08- 7.04 (m, 1H), 6.87-6.80 (m, 4H), 3.80 (s, 3H), 3.41-3.36 (m, 2H), 2.22 (s, 3H), 1.21 (t, $J$=7.6 Hz, 3H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 137.6, 136.5, 135.1, 133.7, 133.3, 129.8, 129.3, 129.3, 128.9, 125.4, 120.8, 120.3, 118.3, 108.8, 87.6, 52.0, 29.8, 21.0, 8.2. HRMS (ESI-TOF) m/z: $[M+H]^+$ Calculated for $[C_{24}H_{25}N_2OS_2]^+$ : 421.1403; Found : 421.1415.



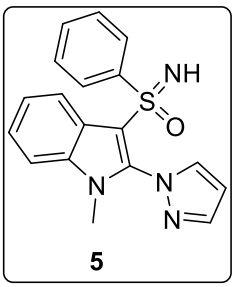

***1-methyl-3-(phenylthio)-2-(1H-pyrazol-1-yl)-1H-indole*** (**4ay**)[2]*:* Yield: 78%; 337 mg; yellow solid; m.p.: 112-114 °C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/8); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.86 (d, *J*=1.6 Hz, 1H), 7.71-7.69 (m, 1H), 7.47-7.40 (m, 3H), 7.27-7.24 (m, 1H), 7.20-7.16 (m, 2H), 7.09-7.08 (m, 3H), 6.47-6.46 (m, 1H), 3.78 (s, 3H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 142.4, 139.1, 138.6, 135.4, 133.6, 129.0, 128.2, 125.2, 123.9, 121.6, 120.3, 110.2, 106.9, 95.6, 30.8.




***4-(1-methyl-1H-indol-2-yl)morpholine*** (**D**)[3]*:* Yield: 89%; 192 mg; white solid; mp: 101-102°C; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/10); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.52 (d, *J*=7.6 Hz, 1H), 7.25 (d, *J*=8 Hz, 1H), 7.19-7.15 (m,1H), 7.12-7.08 (m, 1H), 5.97 (s,1H), 3.92-3.90 (m, 4H), 3.64 (s, 3H) 3.06-3.03 (m, 4H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 150.1, 135.4, 127.6, 120.5, 119.7, 119.5, 108.8, 87.1, 67.0, 52.9, 29.2.



***1-methyl-3-(phenylthio)-1H-indole*** (**6**)[4]*:* Yield: 21%; 50 mg; colourless oil; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/25); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.62 (d, $J$ = 8 Hz, 1H), 7.39 (d, $J$ = 8.4 Hz, 1H), 7.34-7.29 (m, 2H), 7.19-7.14 (m, 3H), 7.11-7.09 (m, 2H), 7.07-7.04 (m, 1H), 3.86 (s, 3H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 139.8, 137.6, 135.2, 129.9, 128.8, 125.8, 124.8, 122.7, 120.6, 119.9, 109.9, 100.5, 33.3.



**5**

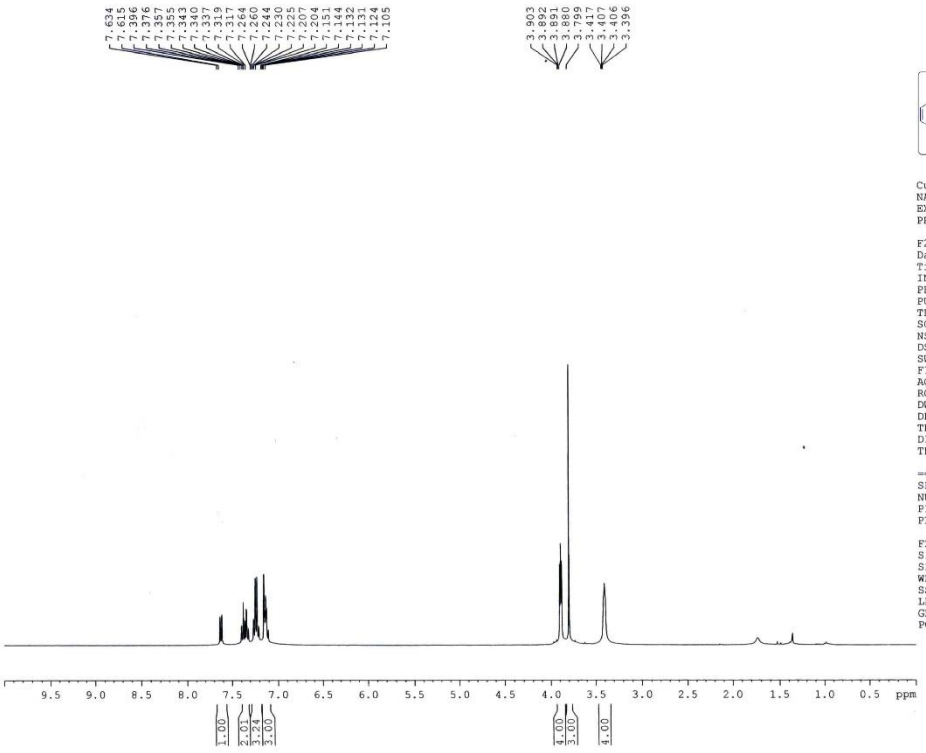
***imino(1-methyl-2-(1H-pyrazol-1-yl)-1H-indol-3-yl)(phenyl)-l6-sulfanone*** (**5**)*:* Yield: 78%; 262 mg; yellow gummy mass; column chromatography done (eluent: ethyl acetate/petroleum ether = 1/8); $^{1}$H NMR ($CDCl_3$, 400 MHz): $\delta$ 8.40-8.48 (m,1H), 7.94-7.92 (m, 2H), 7.82 (d, $J$=2.4 Hz, 1H), 7.43-7.33 (m, 6H), 6.57-6.56 (m, 1H), 3.43 (s, 3H), 2.62 (S, 1H); $^{13}$C{$^{1}$H} NMR ($CDCl_3$, 100 MHz): $\delta$ 133.9, 142.6, 135.9, 135.2, 133.9, 132.4, 128.9, 127.2, 124.8, 123.6, 123.1, 121.5, 111.9, 110.3, 107.2, 29.9. Anal. Calcd. For $C_{18}H_{16}N_4OS$: C, 64.27; H, 4.79; N, 16.65%; Found: C, 64.34; H, 4.89; N, 16.58%.

## 5. References:

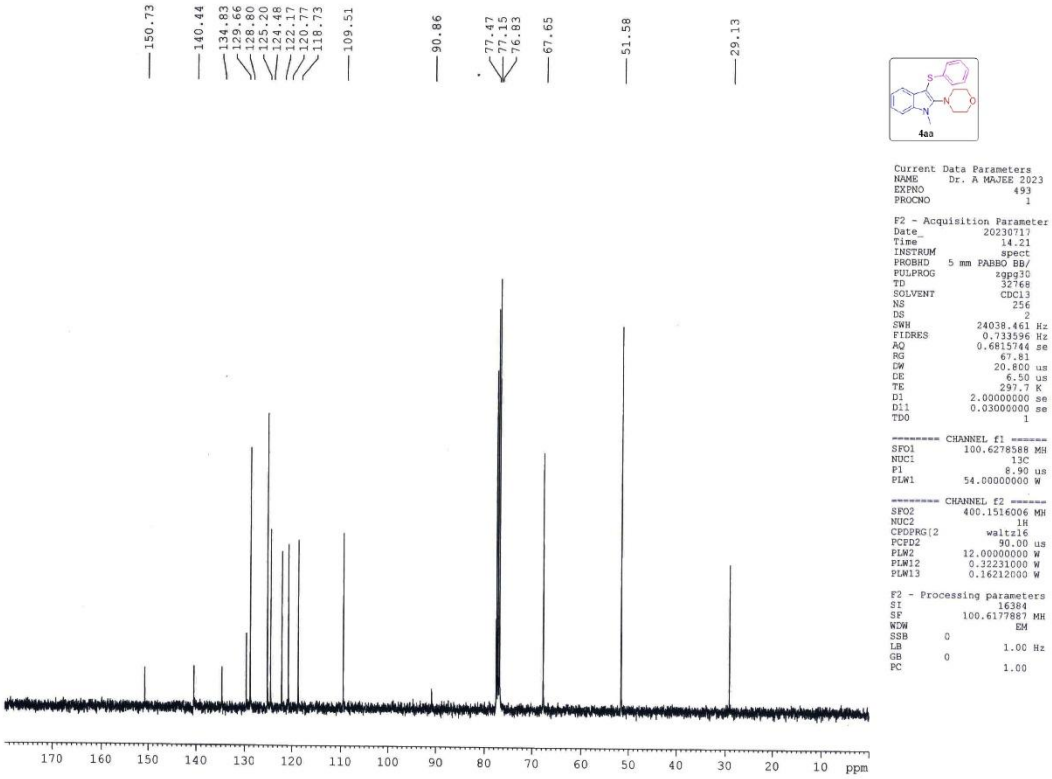

1. A. Tota, M. Zenzola, S. J. Chawner, S. S. John-Campbell, C. Carlucci, G. Romanazzi, L. Degennaro, J. A. Bull and R. Luisi, *Chem. Commun. (Camb.)*, 2016, **53**, 348–351.
2. X. Zhang, C. Liu, Y. Zhang, F. Shen, W. Wei, Z. Zhang and T. Liang, *Org. Chem. Front.*, 2023, **10**, 5886–5894.
3. Y.-X. Li, K.-G. Ji, H.-X. Wang, S. Ali and Y.-M. Liang, *J. Org. Chem.*, 2011, **76**, 744–747.
4. P. Sharma and N. Jain, *J. Org. Chem.*, 2019, **84**, 13045–13052.

# 6. NMR spectra [$^{1}$H, and $^{13}$C{$^{1}$H}] of synthesized products:

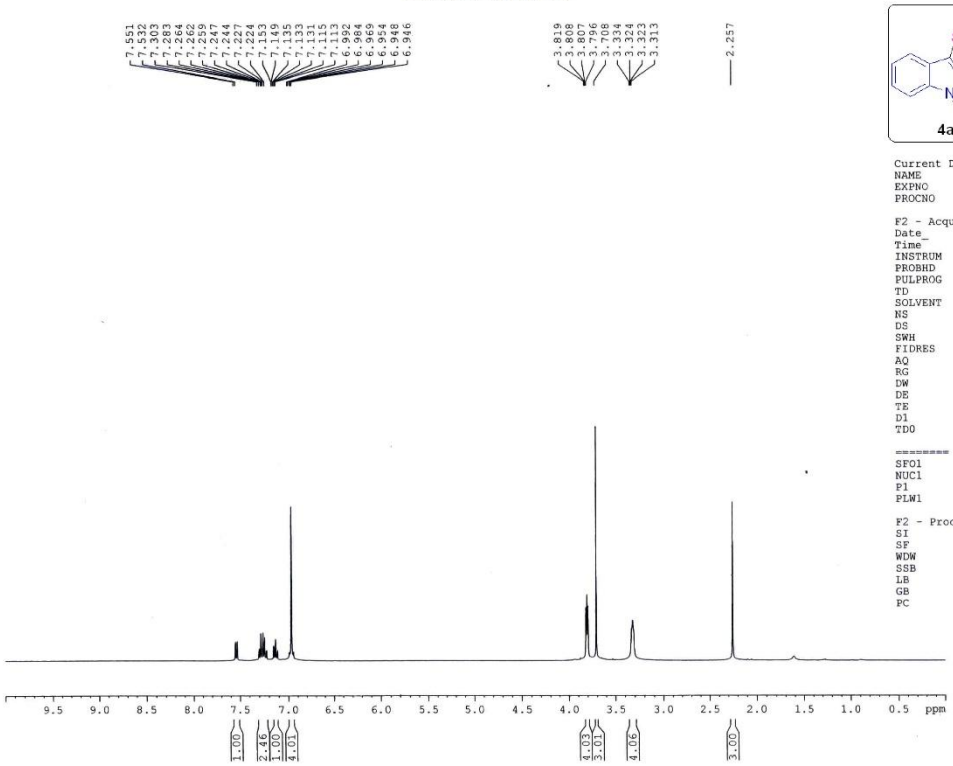
$^{1}$H NMR: 400 MHz; Solvent: CDCl$_3$




$^{13}$C{$^{1}$H} NMR: 100 MHz; Solvent: CDCl$_3$



$^1$H NMR: 400 MHz; Solvent: $CDCl_3$





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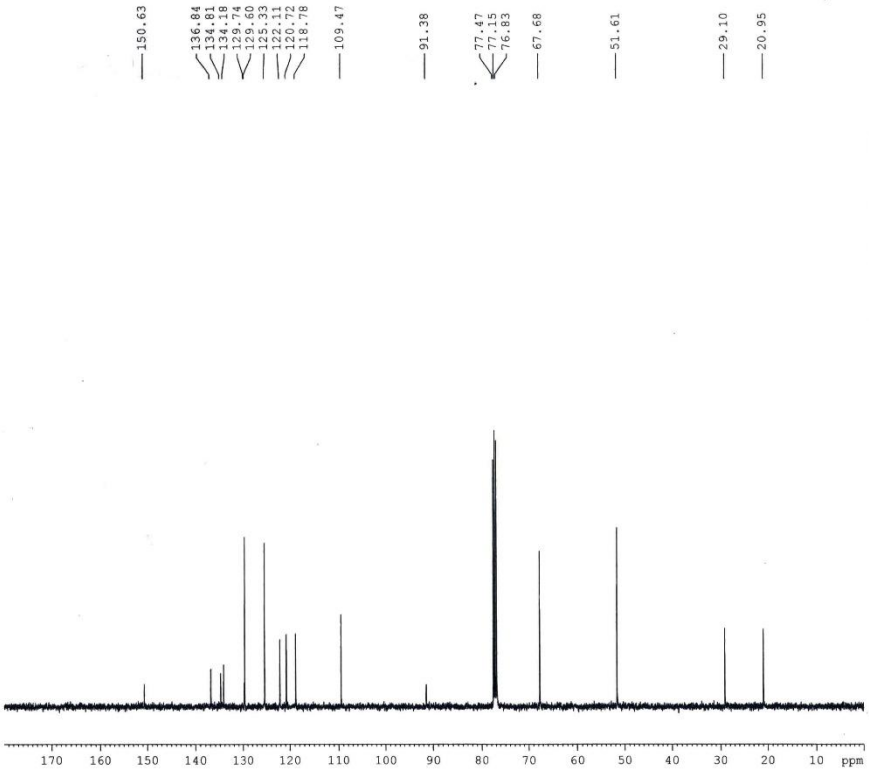


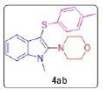


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NAME      Dr. A MAJEE 2023
EXPNO                  361
PROCNO                   1

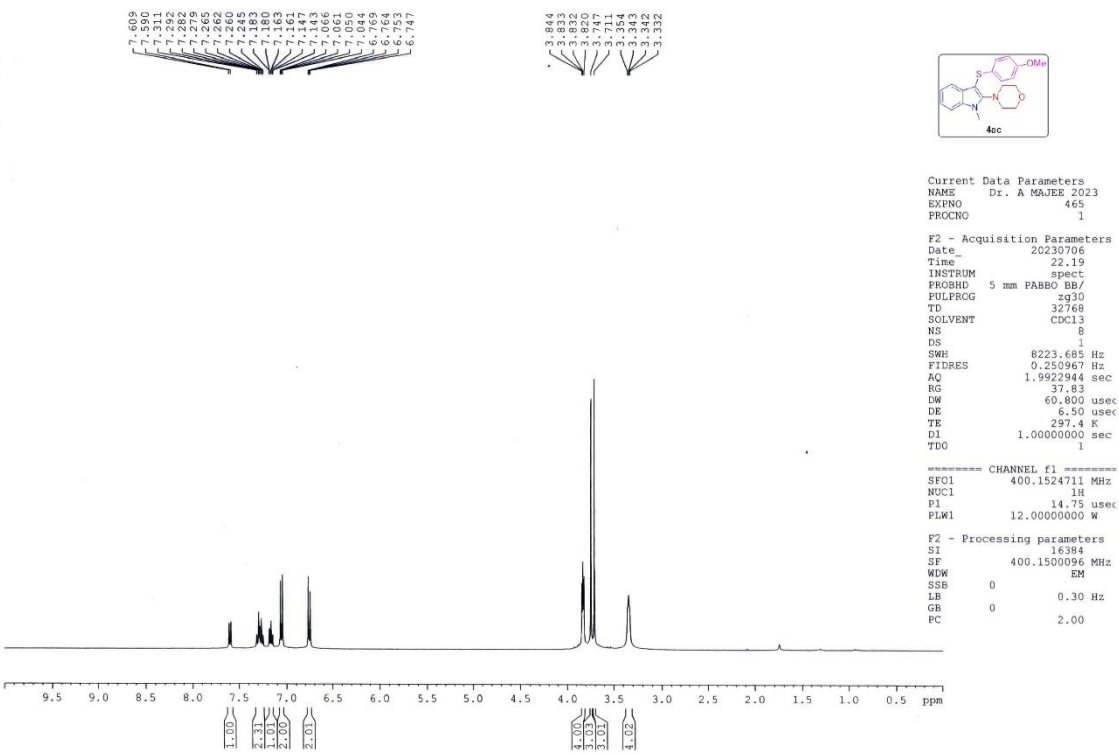
F2 - Acquisition Parameters
Date_           20230603
Time              13.08
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD               32768
SOLVENT          CDCl3
NS                 240
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG               87.66
DW               20.800 usec
DE                6.50 usec
TE              299.1 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                  1

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

======== CHANNEL f2 ========
SFO2          400.1516006 MHz
NUC2                 1H
CPDPRG[2          waltz16
PCPD2            90.00 usec
PLW2         12.00000000 W
PLW12         0.32231000 W
PLW13         0.16212000 W

F2 - Processing parameters
SI                16384
SF          100.6177873 MHz
WDW                  EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.00
```

$^1$H NMR: 400 MHz; Solvent: CDCl$_3$



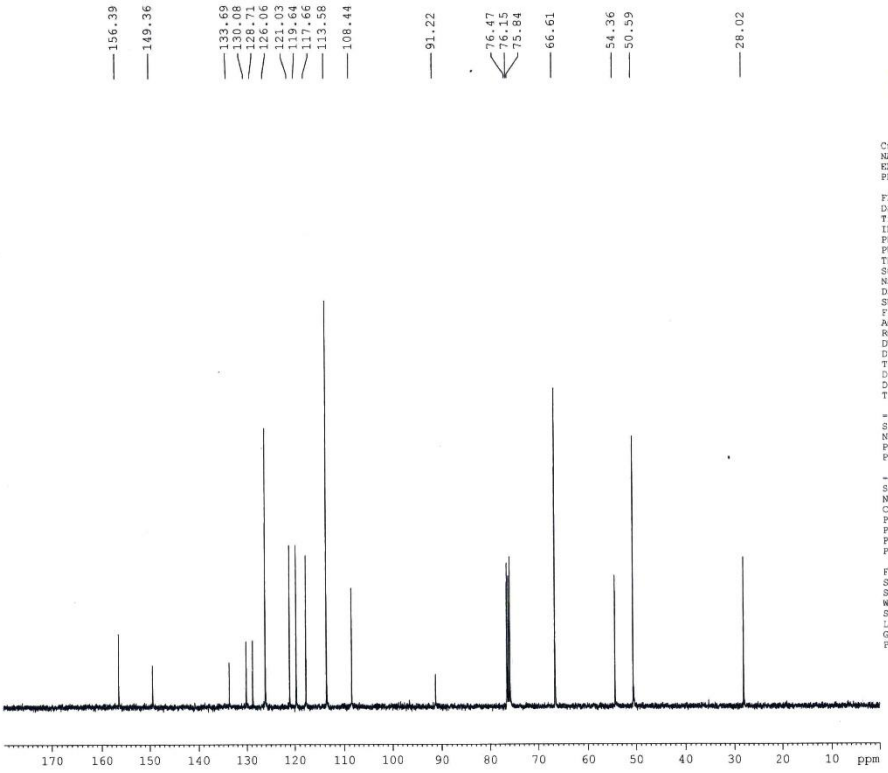

Current Data Parameters
NAME Dr. A MAJEE 2023
EXPNO 465
PROCNO 1

F2 - Acquisition Parameters
Date_ 20230706
Time 22.19
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 8
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9922944 sec
RG 37.83
DW 60.800 usec
DE 6.50 usec
TE 297.4 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.1524711 MHz
NUC1 1H
P1 14.75 usec
PLW1 12.00000000 W

F2 - Processing parameters
SI 16384
SF 400.1500096 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 2.00

$^{13}$C{$^1$H} NMR: 100 MHz; Solvent: CDCl$_3$




Current Data Parameters
NAME Dr. A MAJEE 2023
EXPNO 466
PROCNO 1

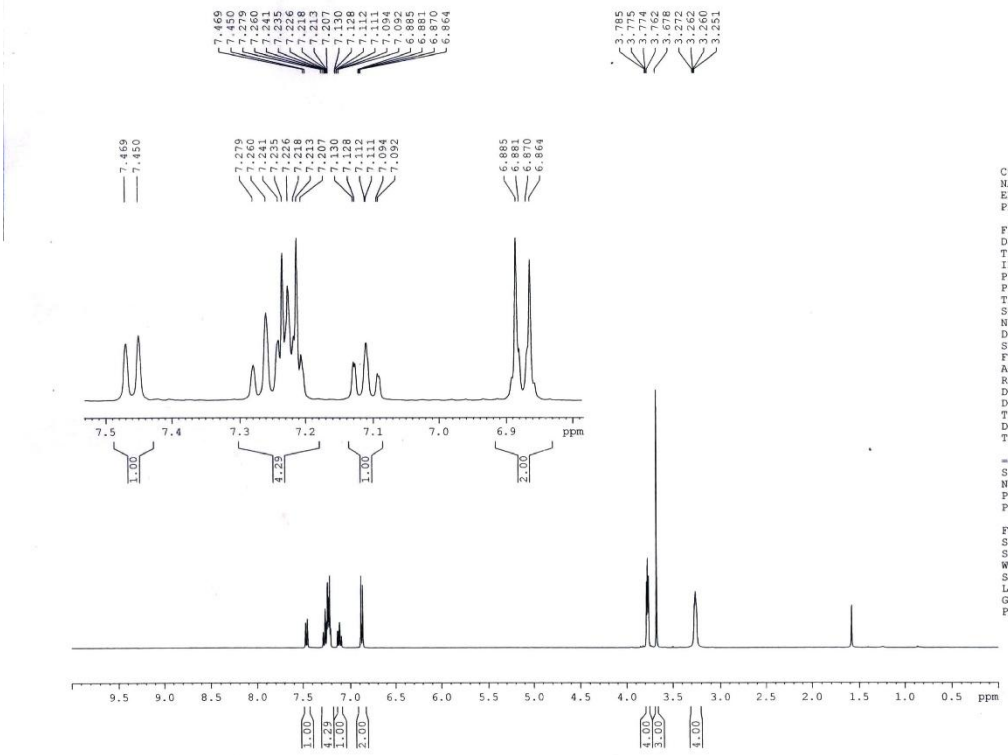
F2 - Acquisition Parameters
Date_ 20230706
Time 22.26
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 120
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 37.83
DW 20.800 use
DE 6.50 use
TE 297.9 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

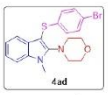
======== CHANNEL f1 ========
SFO1 100.6278588 MHz
NUC1 13C
P1 8.90 use
PLW1 54.00000000 W

======== CHANNEL f2 ========
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 use
PLW2 12.00000000 W
PLW12 0.32231000 W
PLW13 0.16212000 W

F2 - Processing parameters
SI 16384
SF 100.6178975 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.00

$^1$H NMR: 400 MHz; Solvent: CDCl$_3$



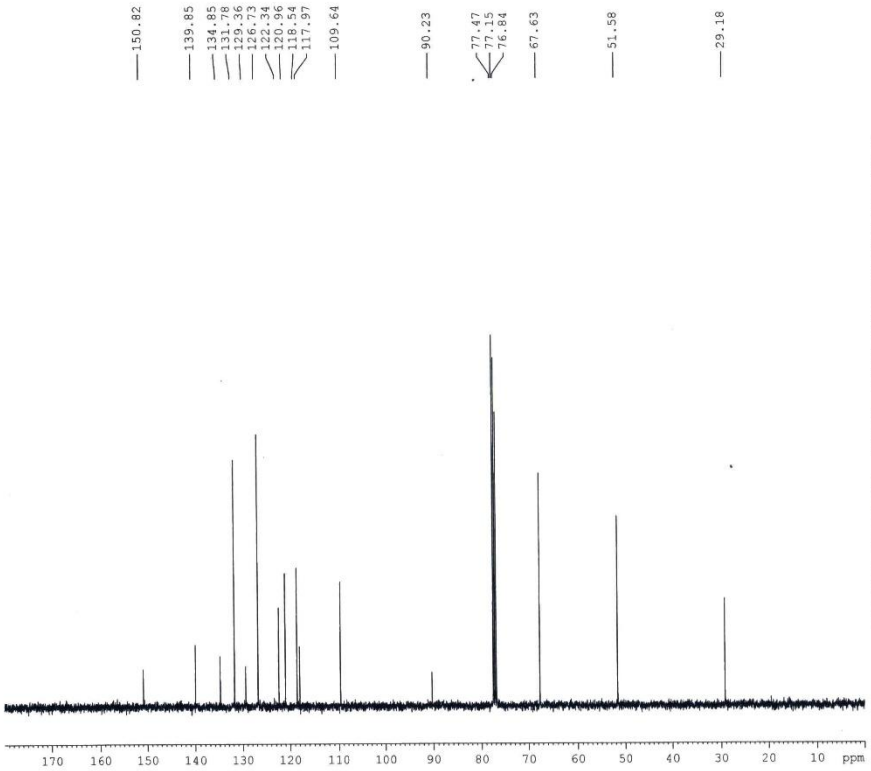

```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              536
PROCNO               1

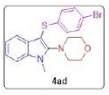
F2 - Acquisition Parameters
Date_          20230727
Time             13.28
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                   8
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG               67.81
DW               60.800 use
DE                6.50 use
TE              296.8 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1          400.1524711 MHz
NUC1                 1H
P1                14.75 use
PLW1         12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500228 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                2.00
```

$^{13}$C{$^1$H} NMR: 100 MHz; Solvent: CDCl$_3$




```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              537
PROCNO               1

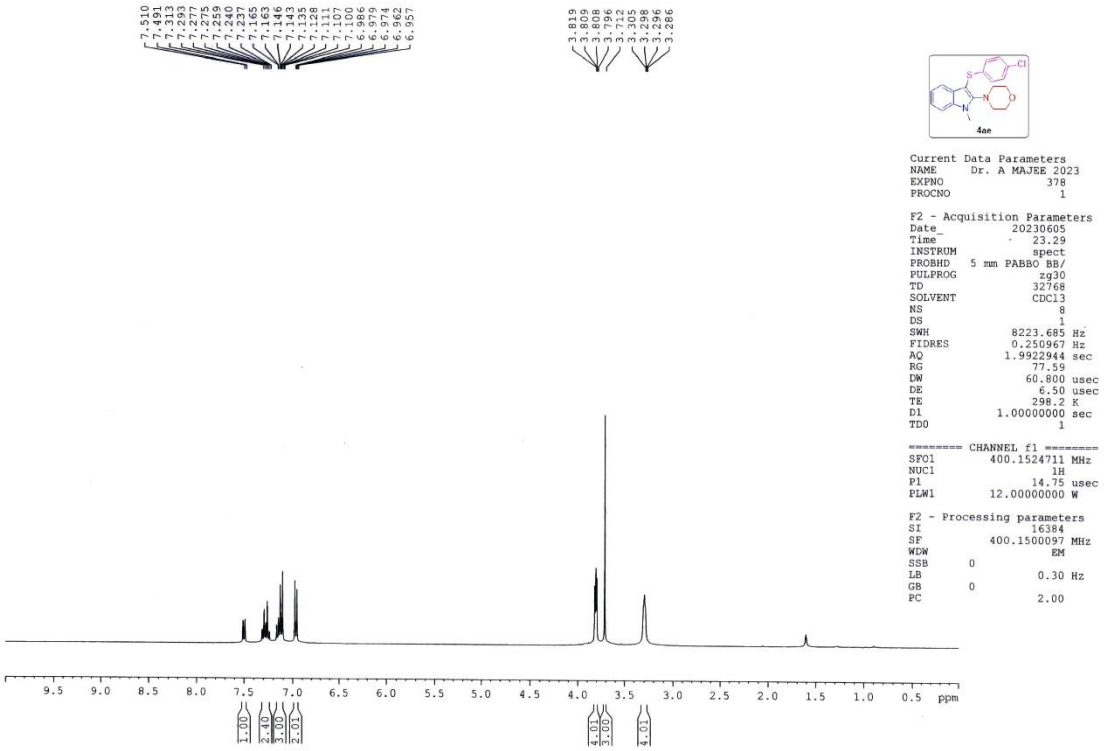
F2 - Acquisition Parameters
Date_          20230727
Time             13.39
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG        zgpg30
TD              32768
SOLVENT          CDCl3
NS                 160
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG               67.81
DW               20.800 usec
DE                6.50 usec
TE              297.1 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                  1

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

======== CHANNEL f2 ========
SFO2          400.1516006 MHz
NUC2                 1H
CPDPRG[2          waltz16
PCPD2             90.00 usec
PLW2         12.00000000 W
PLW12         0.32231000 W
PLW13         0.16212000 W

F2 - Processing parameters
SI               16384
SF          100.6177873 MHz
WDW                  EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.00
```

$^{1}$H NMR: 400 MHz; Solvent: CDCl$_3$



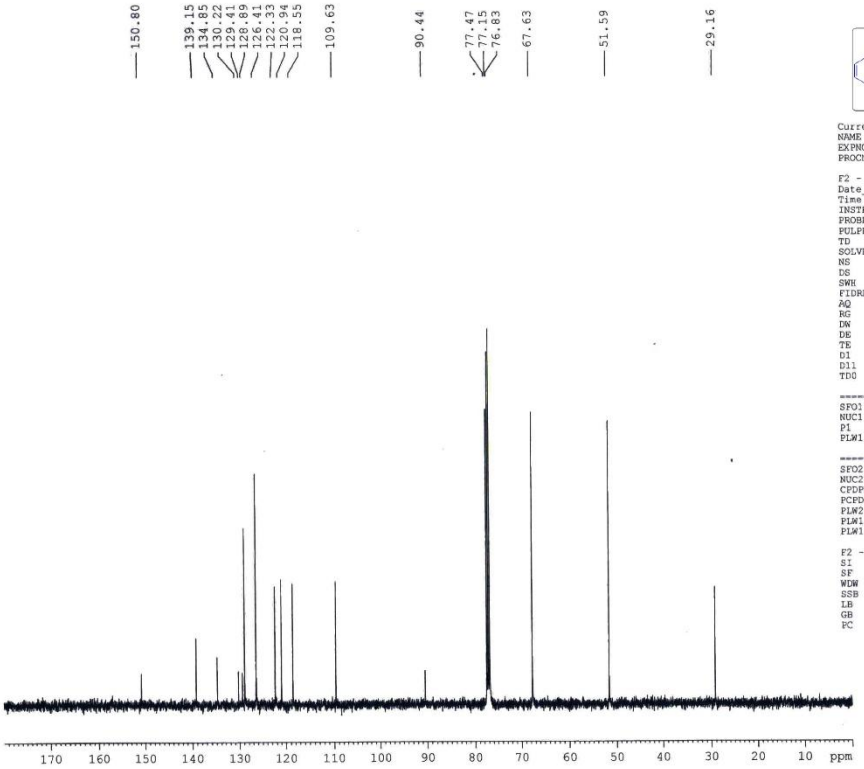

```
Current Data Parameters
NAME       Dr. A MAJEE 2023
EXPNO                  378
PROCNO                   1

F2 - Acquisition Parameters
Date_           20230605
Time               23.29
INSTRUM             spect
PROBHD   5 mm PABBO BB/
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                     8
DS                     1
SWH             8223.685 Hz
FIDRES          0.250967 Hz
AQ              1.9922944 sec
RG                 77.59
DW                60.800 usec
DE                 6.50 usec
TE                298.2 K
D1              1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
SFO1          400.1524711 MHz
NUC1                   1H
P1                 14.75 usec
PLW1          12.00000000 W

F2 - Processing parameters
SI                 16384
SF            400.1500097 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 2.00
```

$^{13}$C{$^{1}$H} NMR: 100 MHz; Solvent: CDCl$_3$




```
Current Data Parameters
NAME       Dr. A MAJEE 2023
EXPNO                  379
PROCNO                   1

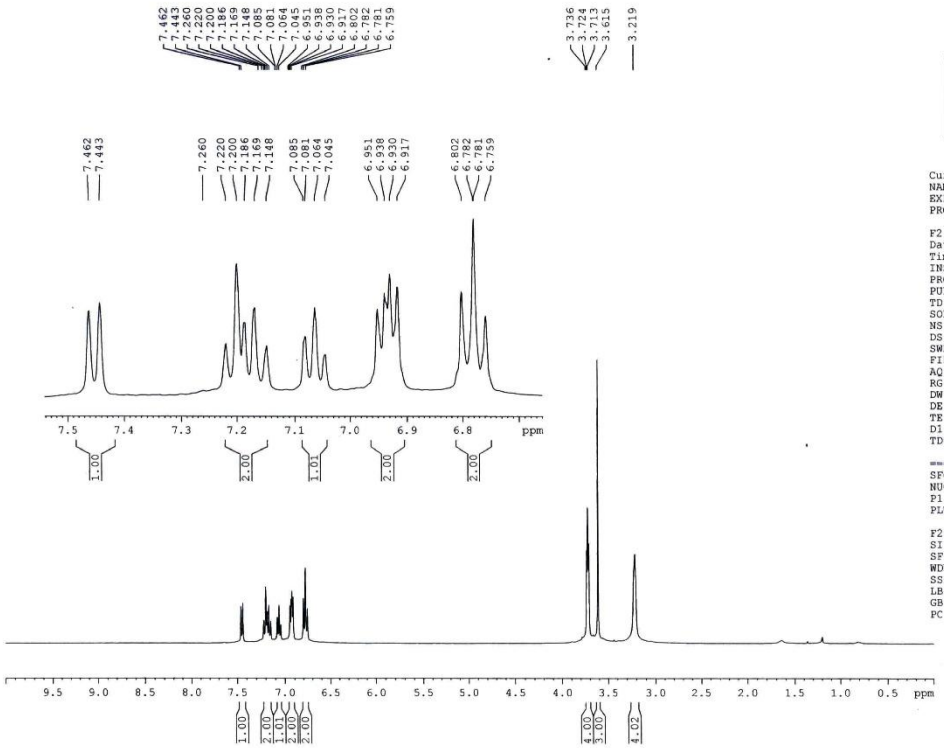
F2 - Acquisition Parameters
Date_           20230605
Time               23.42
INSTRUM             spect
PROBHD   5 mm PABBO BB/
PULPROG          zgpg30
TD                 32768
SOLVENT            CDCl3
NS                   240
DS                     2
SWH            24038.461 Hz
FIDRES          0.733596 Hz
AQ              0.6815744 sec
RG                 77.59
DW                20.800 usec
DE                 6.50 usec
TE                298.9 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                    1

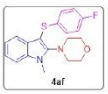
======== CHANNEL f1 ========
SFO1          100.6278588 MHz
NUC1                   13C
P1                  8.90 usec
PLW1          54.00000000 W

======== CHANNEL f2 ========
SFO2          400.1516006 MHz
NUC2                   1H
CPDPRG[2          waltz16
PCPD2              90.00 usec
PLW2          12.00000000 W
PLW12          0.32231000 W
PLW13          0.16212000 W

F2 - Processing parameters
SI                 16384
SF            100.6177873 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.00
```

$^{1}$H NMR: 400 MHz; Solvent: CDCl$_3$



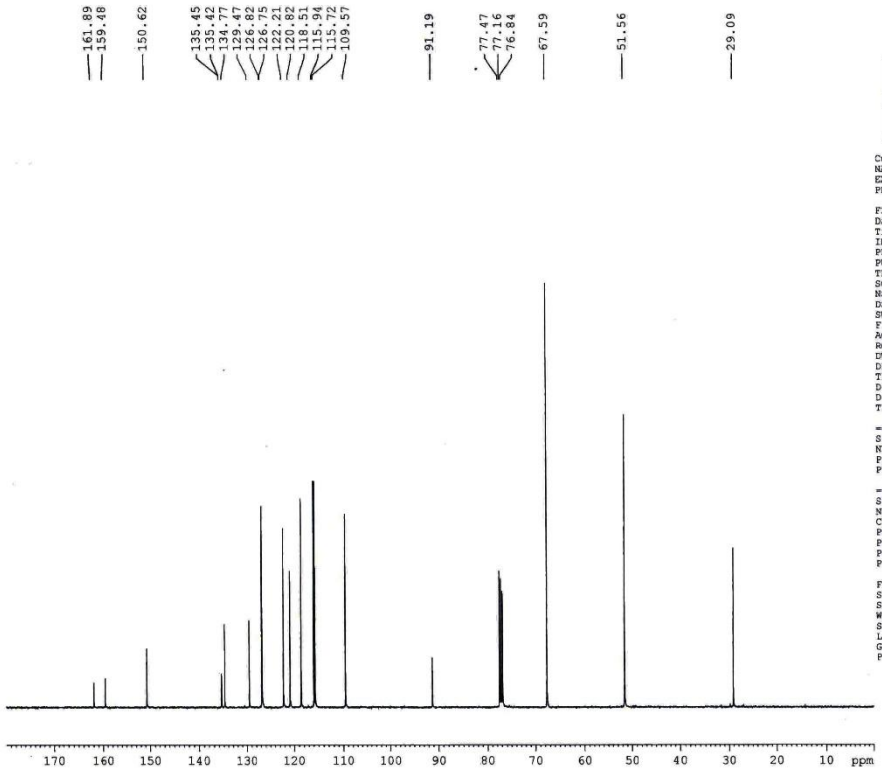

```
Current Data Parameters
NAME        Dr. A MAJEE 2023
EXPNO                  523
PROCNO                   1

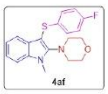
F2 - Acquisition Parameters
Date_              20230726
Time                 10.45
INSTRUM              spect
PROBHD   5 mm PABBO BB/
PULPROG              zg30
TD                  32768
SOLVENT              CDCl3
NS                       8
DS                       1
SWH               8223.685 Hz
FIDRES            0.250967 Hz
AQ                1.9922944 sec
RG                    26.53
DW                   60.800 use
DE                    6.50 use
TE                  294.0 K
D1                1.00000000 sec
TD0                      1

======== CHANNEL f1 ========
SFO1            400.1524711 MHz
NUC1                    1H
P1                    14.75 use
PLW1           12.00000000 W

F2 - Processing parameters
SI                   16384
SF              400.1500548 MHz
WDW                     EM
SSB          0
LB                    0.30 Hz
GB           0
PC                    2.00
```

$^{13}$C{$^{1}$H} NMR: 100 MHz; Solvent: CDCl$_3$




```
Current Data Parameters
NAME        Dr. A MAJEE 2023
EXPNO                  529
PROCNO                   1

F2 - Acquisition Parameters
Date_              20230726
Time                 12.32
INSTRUM              spect
PROBHD   5 mm PABBO BB/
PULPROG            zgpg30
TD                  32768
SOLVENT              CDCl3
NS                    1024
DS                       2
SWH              24038.461 Hz
FIDRES            0.733596 Hz
AQ                0.6815744 sec
RG                   186.42
DW                   20.800 usec
DE                    6.50 usec
TE                  296.0 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                      1

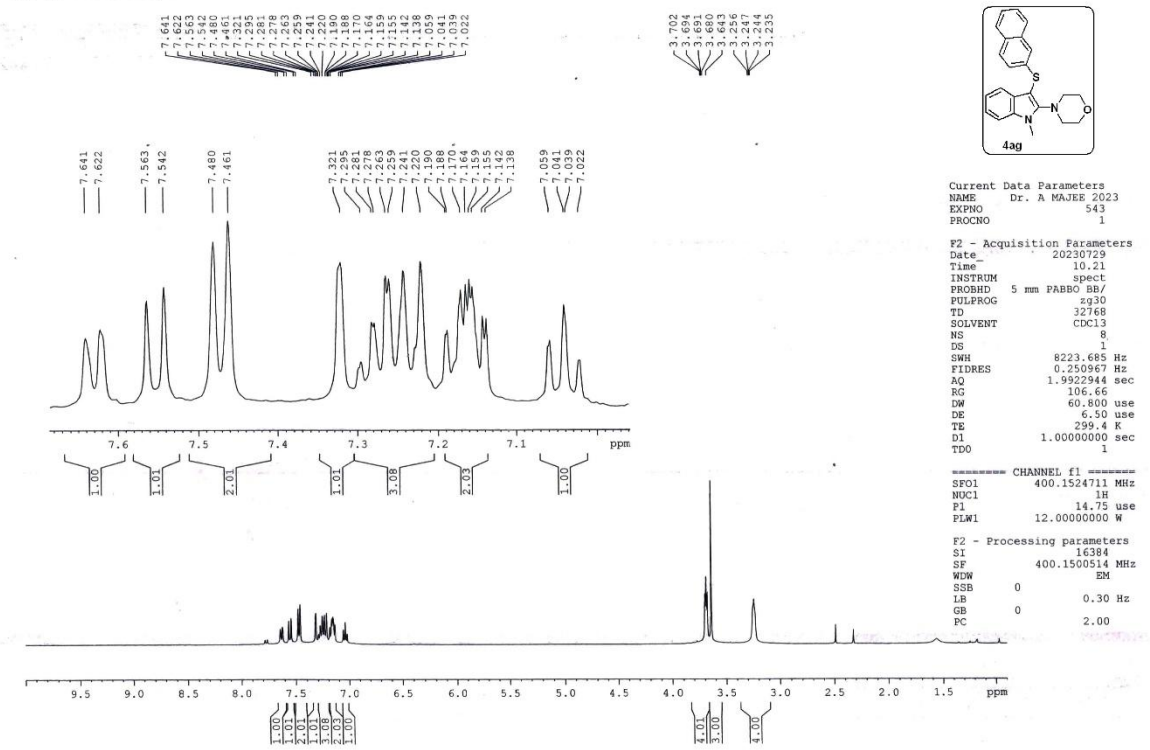
======== CHANNEL f1 ========
SFO1            100.6278588 MHz
NUC1                    13C
P1                    8.90 usec
PLW1           54.00000000 W

======== CHANNEL f2 ========
SFO2            400.1516006 MHz
NUC2                    1H
CPDPRG[2          waltz16
PCPD2                90.00 usec
PLW2           12.00000000 W
PLW12           0.32231000 W
PLW13           0.16212000 W

F2 - Processing parameters
SI                   16384
SF              100.6177961 MHz
WDW                     EM
SSB          0
LB                    1.00 Hz
GB           0
PC                    1.00
```

1H of VBSP-283/12

$^{1}$H NMR: 400 MHz; Solvent: CDCl$_3$







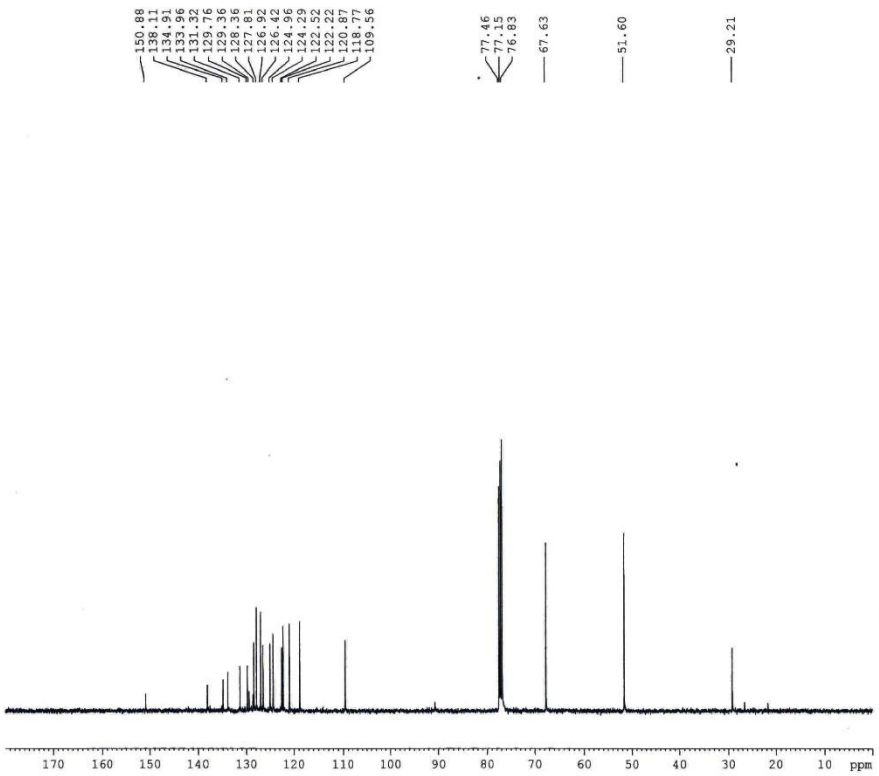
```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              543
PROCNO               1

F2 - Acquisition Parameters
Date_          20230729
Time             10.21
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                   8
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG              106.66
DW               60.800 use
DE                6.50 use
TE              299.4 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 =======
SFO1        400.1524711 MHz
NUC1               1H
P1               14.75 use
PLW1        12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500514 MHz
WDW                EM
SSB          0
LB               0.30 Hz
GB           0
PC               2.00
```

$^{13}$C{$^{1}$H} NMR: 100 MHz; Solvent: CDCl$_3$





```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              544
PROCNO               1

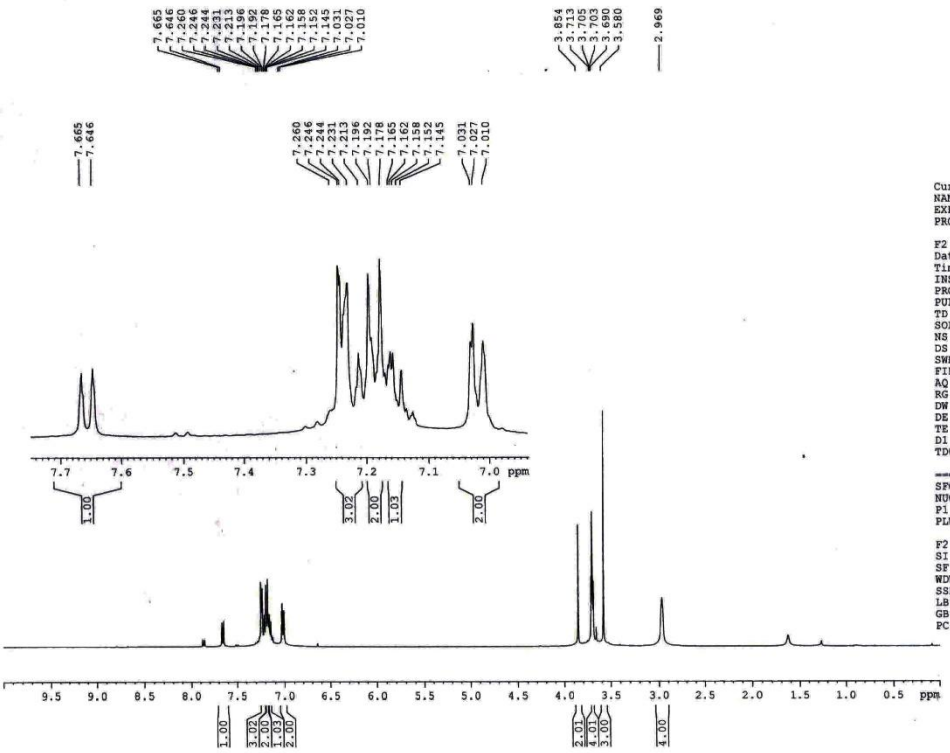
F2 - Acquisition Parameters
Date_          20230729
Time             11.10
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT          CDCl3
NS                 720
DS                   2
SWH           24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG              106.66
DW               20.800 use
DE                6.50 use
TE              299.6 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                  1

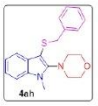
======== CHANNEL f1 =======
SFO1        100.6278568 MHz
NUC1               13C
P1                8.90 use
PLW1        54.00000000 W

======== CHANNEL f2 =======
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2             90.00 use
PLW2        12.00000000 W
PLW12        0.32231000 W
PLW13        0.16212000 W

F2 - Processing parameters
SI               16384
SF          100.6177887 MHz
WDW                EM
SSB          0
LB               1.00 Hz
GB           0
PC               1.00
```

$^1$H NMR: 400 MHz; Solvent: $CDCl_3$




```
Current Data Parameters
NAME        Dr. A MAJEE 2023
EXPNO                  534
PROCNO                   1

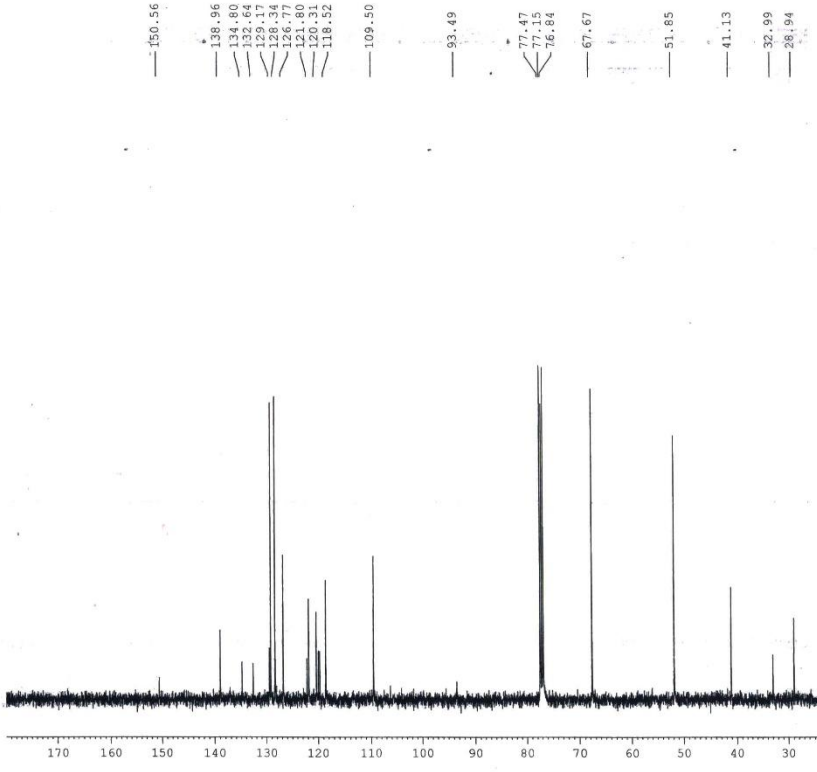
F2 - Acquisition Parameter
Date_               20230726
Time                  21.42
INSTRUM               spect
PROBHD   5 mm PABBO BB/
PULPROG               zg30
TD                   32768
SOLVENT              CDCl3
NS                       8
DS                       1
SWH                8223.685 Hz
FIDRES            0.250967 Hz
AQ                1.9922944 se
RG                    67.81
DW                   60.800 us
DE                    6.50 us
TE                   296.1 K
D1                1.00000000 se
TD0                      1

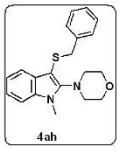
======== CHANNEL f1 =======
SFO1           400.1524711 MH
NUC1                    1H
P1                   14.75 us
PLW1          12.00000000 W

F2 - Processing parameters
SI                   16384
SF             400.1500147 MH
WDW                     EM
SSB          0
LB                    0.30 Hz
GB           0
PC                    2.00
```

13C of VBSP-283/3

$^{13}C\{^1H\}$ NMR: 100 MHz; Solvent: $CDCl_3$




```
Current Data Parameters
NAME        Dr. A MAJEE 2023
EXPNO                  535
PROCNO                   1

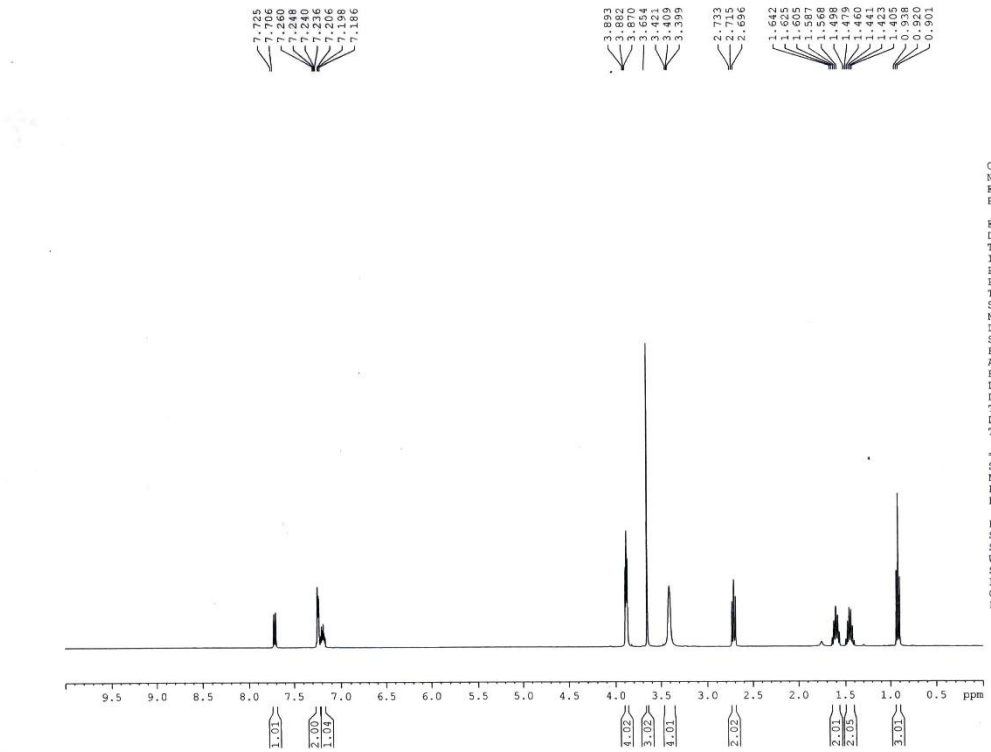
F2 - Acquisition Parameters
Date_               20230726
Time                  22.03
INSTRUM               spect
PROBHD   5 mm PABBO BB/
PULPROG             zgpg30
TD                   32768
SOLVENT              CDCl3
NS                     120
DS                       2
SWH               24038.461 Hz
FIDRES            0.733596 Hz
AQ                0.6815744 sec
RG                    67.81
DW                   20.800 usec
DE                    6.50 usec
TE                   296.8 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                      1

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

======== CHANNEL f2 =======
SFO2           400.1516006 MHz
NUC2                    1H
CPDPRG[2            waltz16
PCPD2                90.00 usec
PLW2          12.00000000 W
PLW12          0.32231000 W
PLW13          0.16212000 W

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

$^{1}$H NMR: 400 MHz; Solvent: $CDCl_3$



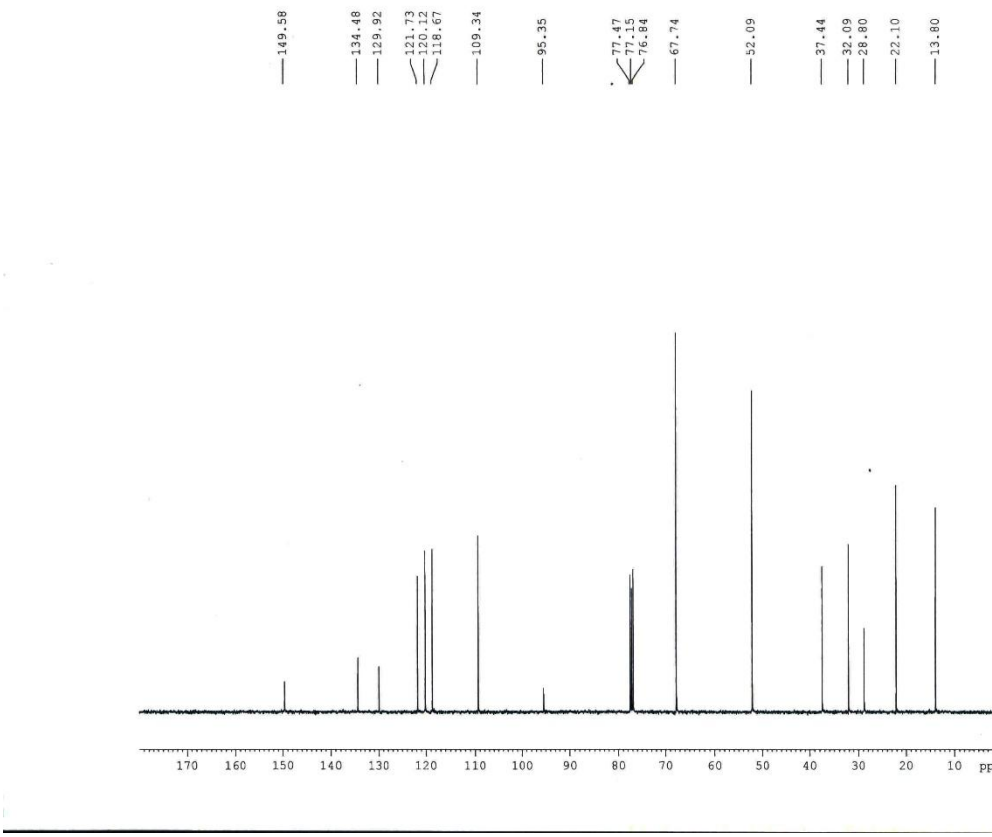

```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              487
PROCNO               1

F2 - Acquisition Parameters
Date_          20230712
Time              0.25
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                   8
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG                32.25
DW                60.800 usec
DE                 6.50 usec
TE               298.2 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1               1H
P1                14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI                16384
SF          400.1500122 MHz
WDW                EM
SSB       0
LB                0.30 Hz
GB        0
PC                2.00
```

$^{13}C\{^{1}H\}$ NMR: 100 MHz; Solvent: $CDCl_3$




```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              488
PROCNO               1

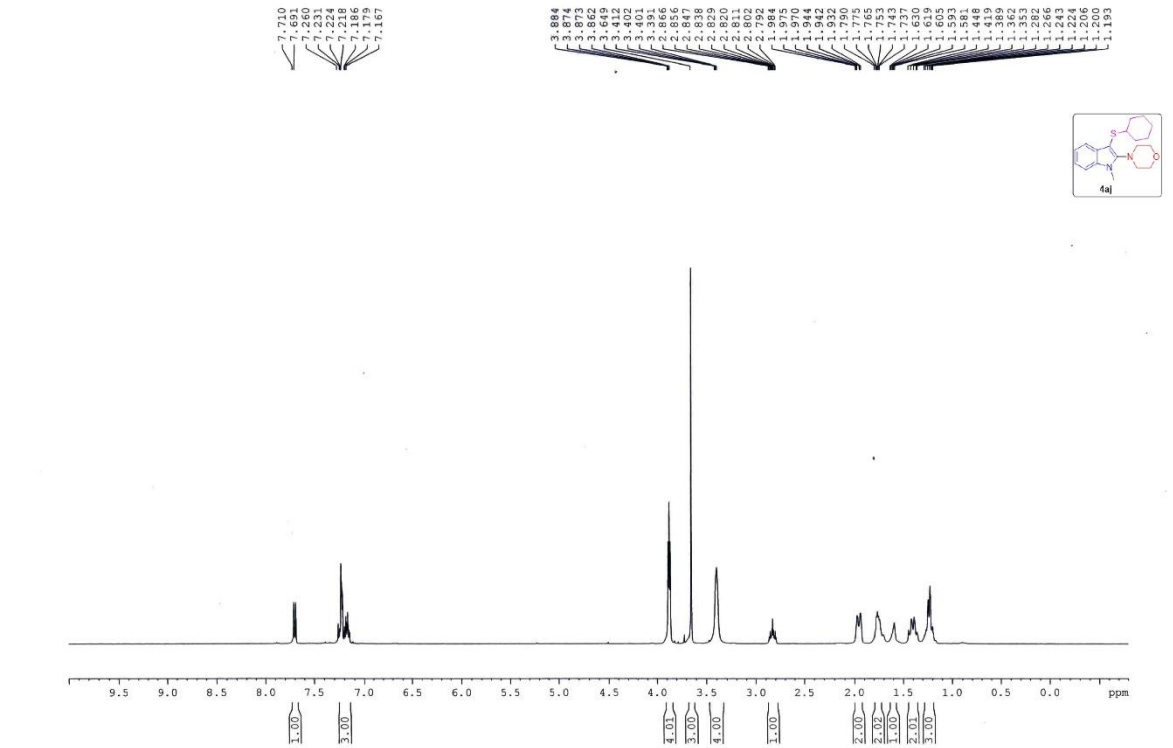
F2 - Acquisition Parameters
Date_          20230712
Time              0.39
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG        zgpg30
TD              32768
SOLVENT          CDCl3
NS                 256
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG                32.25
DW                20.800 usec
DE                 6.50 usec
TE               298.5 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                  1

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

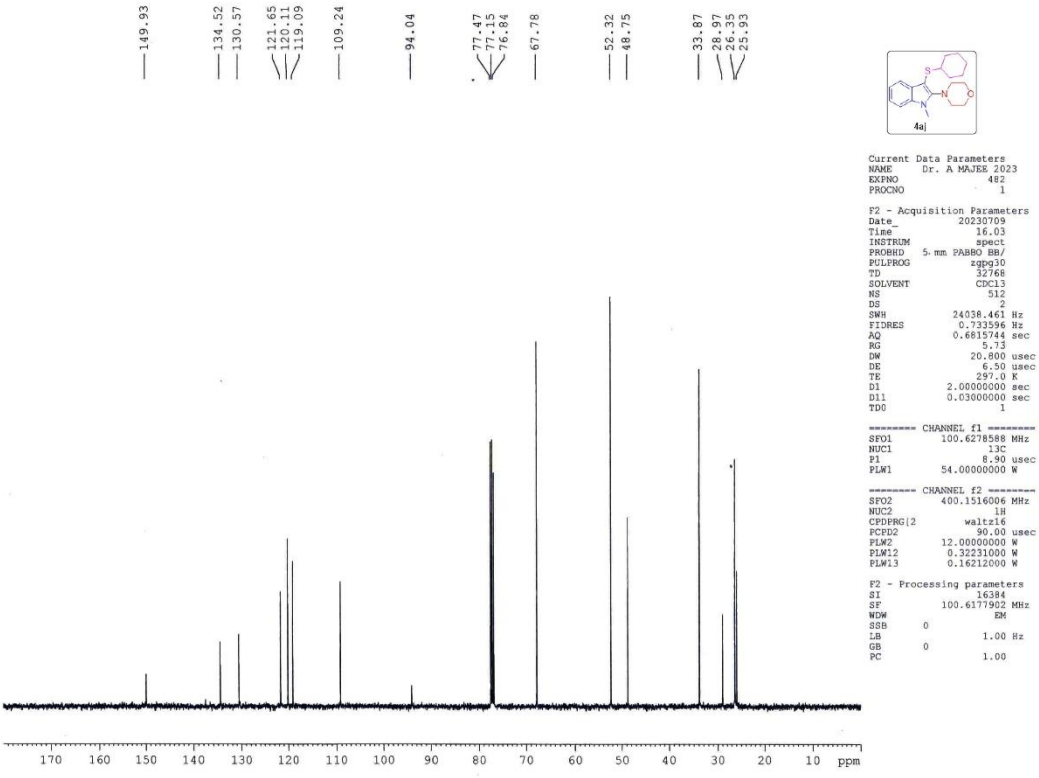
======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG[2         waltz16
PCPD2             90.00 usec
PLW2        12.00000000 W
PLW12        0.32231000 W
PLW13        0.16212000 W

F2 - Processing parameters
SI                16384
SF          100.6177955 MHz
WDW                EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.00
```

$^{1}$H NMR: 400 MHz; Solvent: CDCl$_3$




$^{13}$C{$^{1}$H} NMR: 100 MHz; Solvent: CDCl$_3$




```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              482
PROCNO               1

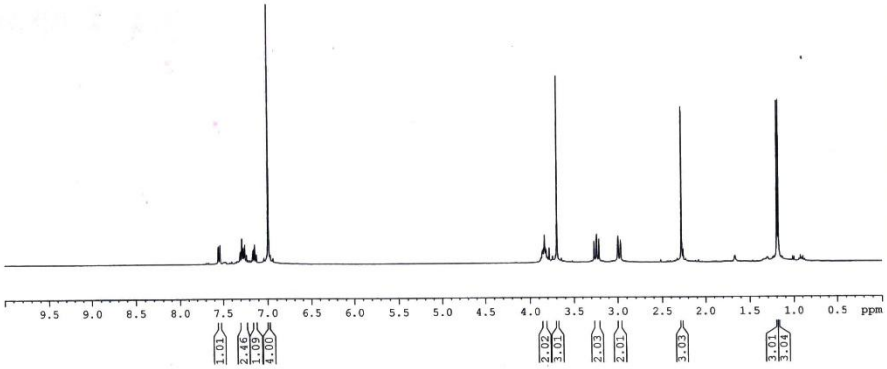
F2 - Acquisition Parameters
Date_           20230709
Time              16.03
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT           CDCl3
NS                  512
DS                    2
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6815744 sec
RG                 5.73
DW               20.800 usec
DE                6.50 usec
TE               297.0 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                  1

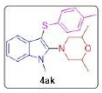
======== CHANNEL f1 ========
SFO1         100.6278588 MHz
NUC1               13C
P1                8.90 usec
PLW1         54.00000000 W

======== CHANNEL f2 ========
SFO2         400.1516006 MHz
NUC2               1H
CPDPRG[2         waltz16
PCPD2             90.00 usec
PLW2         12.00000000 W
PLW12         0.32231000 W
PLW13         0.16212000 W

F2 - Processing parameters
SI                16384
SF           100.6177902 MHz
WDW                 EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.00
```

$^1$H NMR: 400 MHz; Solvent: CDCl$_3$

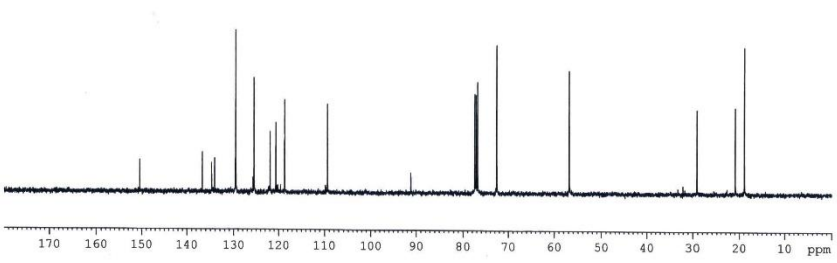

```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              870
PROCNO               1

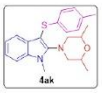
F2 - Acquisition Parameters
Date_          20231203
Time               0.58
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                   8
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG                40.87
DW               60.800 usec
DE                6.50 usec
TE               292.6 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1               1H
P1                14.75 usec
PLW1       12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500097 MHz
WDW                 EM
SSB      0
LB                0.30 Hz
GB       0
PC                2.00
```

$^{13}$C{$^1$H} NMR: 100 MHz; Solvent: CDCl$_3$

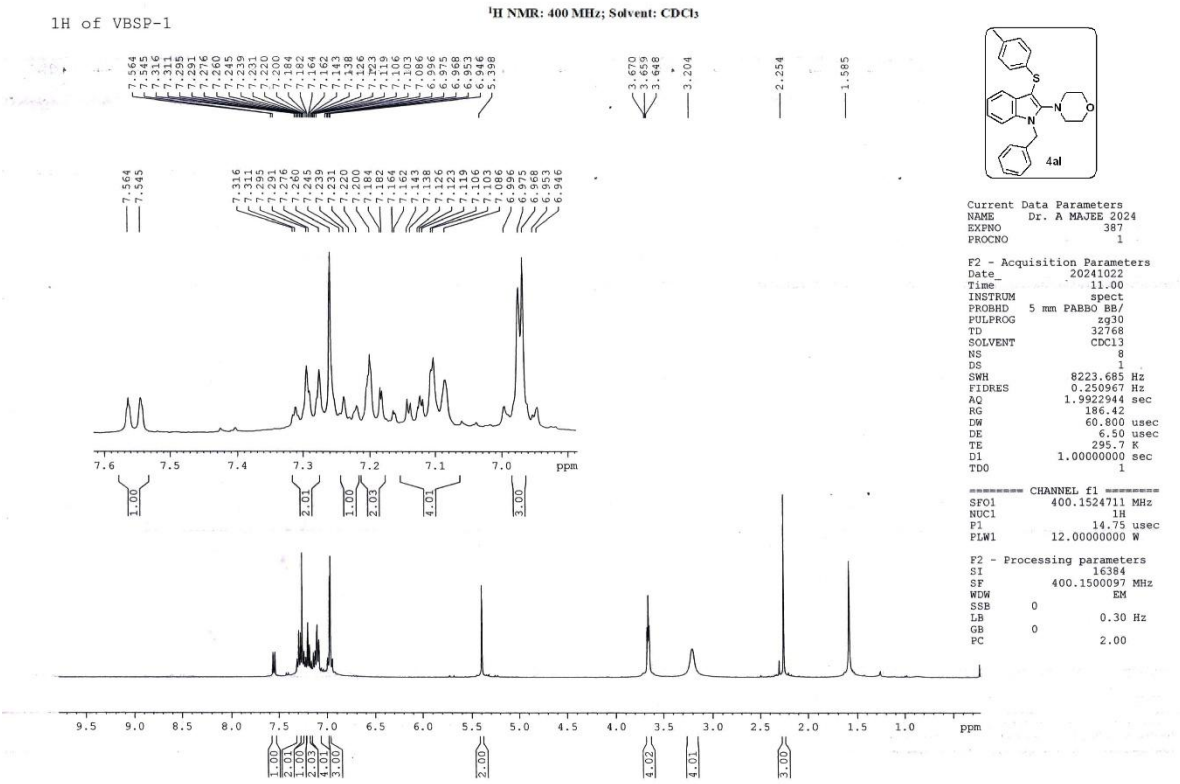

```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              871
PROCNO               1

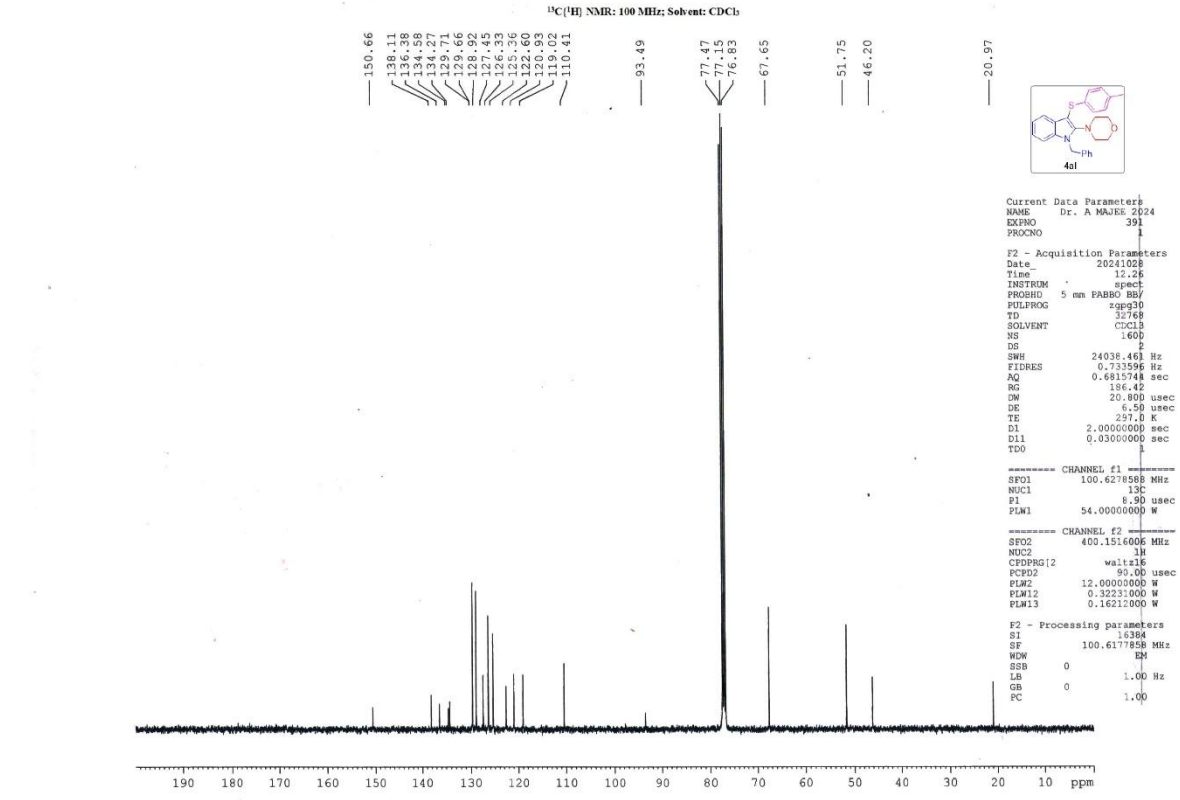
F2 - Acquisition Parameters
Date_          20231203
Time               1.10
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD               32768
SOLVENT          CDCl3
NS                 120
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG                40.87
DW               20.800 usec
DE                6.50 usec
TE               293.6 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                  1

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

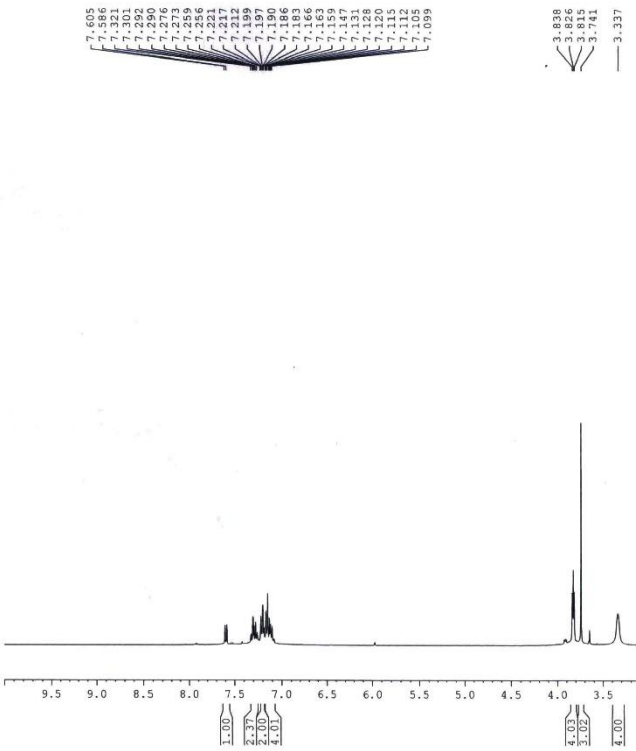
======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG[2         waltz16
PCPD2             90.00 usec
PLW2       12.00000000 W
PLW12       0.32231000 W
PLW13       0.16212000 W

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


1H of VBSP-1
$^1$H NMR: 400 MHz; Solvent: CDCl$_3$
4al
Current Data Parameters
NAME Dr. A MAJEE 2024
EXPNO 387
PROCNO 1
F2 - Acquisition Parameters
Date_ 20241022
Time 11.00
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 8
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9922944 sec
RG 186.42
DW 60.800 usec
DE 6.50 usec
TE 295.7 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1524711 MHz
NUC1 1H
P1 14.75 usec
PLW1 12.00000000 W
F2 - Processing parameters
SI 16384
SF 400.1500097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 2.00


$^{13}$C{$^1$H} NMR: 100 MHz; Solvent: CDCl$_3$
4al
Current Data Parameters
NAME Dr. A MAJEE 2024
EXPNO 391
PROCNO 1
F2 - Acquisition Parameters
Date_ 20241028
Time 12.26
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 1600
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 186.42
DW 20.800 usec
DE 6.50 usec
TE 297.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6276588 MHz
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W
======== CHANNEL f2 ========
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 12.00000000 W
PLW12 0.32231000 W
PLW13 0.16212000 W
F2 - Processing parameters
SI 16384
SF 100.6177858 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.00

$^1$H NMR: 400 MHz; Solvent: $CDCl_3$





```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO                494
PROCNO                 1

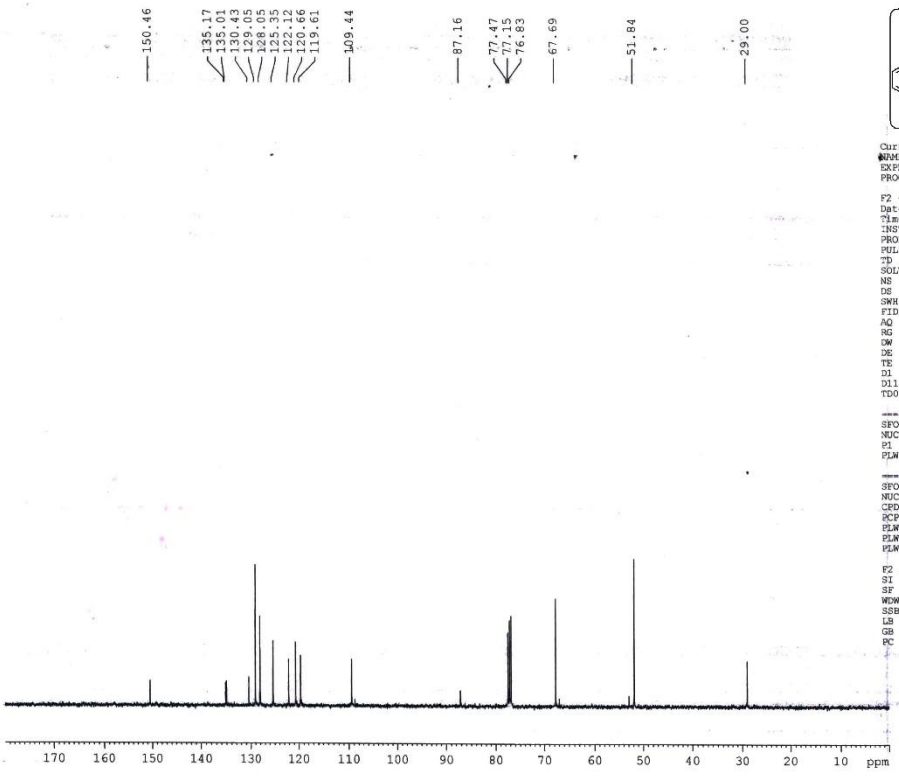
F2 - Acquisition Parameter
Date_              20230718
Time                  14.33
INSTRUM               spect
PROBHD  5 mm PABBO BB/
PULPROG               zg30
TD                   32768
SOLVENT              CDCl3
NS                       8
DS                       1
SWH             8223.685 Hz
FIDRES          0.250967 Hz
AQ              1.9922944 se
RG                   54.07
DW                60.800 us
DE                 6.50 us
TE                299.4 K
D1              1.00000000 se
TD0                      1

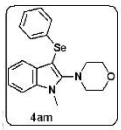
======== CHANNEL f1 =======
SFO1          400.1524711 MH
NUC1                    1H
P1                   14.75 us
PLW1         12.00000000 W

F2 - Processing parameters
SI                   16384
SF          400.1500097 MH
WDW                     EM
SSB       0
LB                0.30 Hz
GB        0
PC                2.00
```

13C of VBSP-283/8

$^{13}C\{^1H\}$ NMR: 100 MHz; Solvent: $CDCl_3$




```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO                496
PROCNO                 1

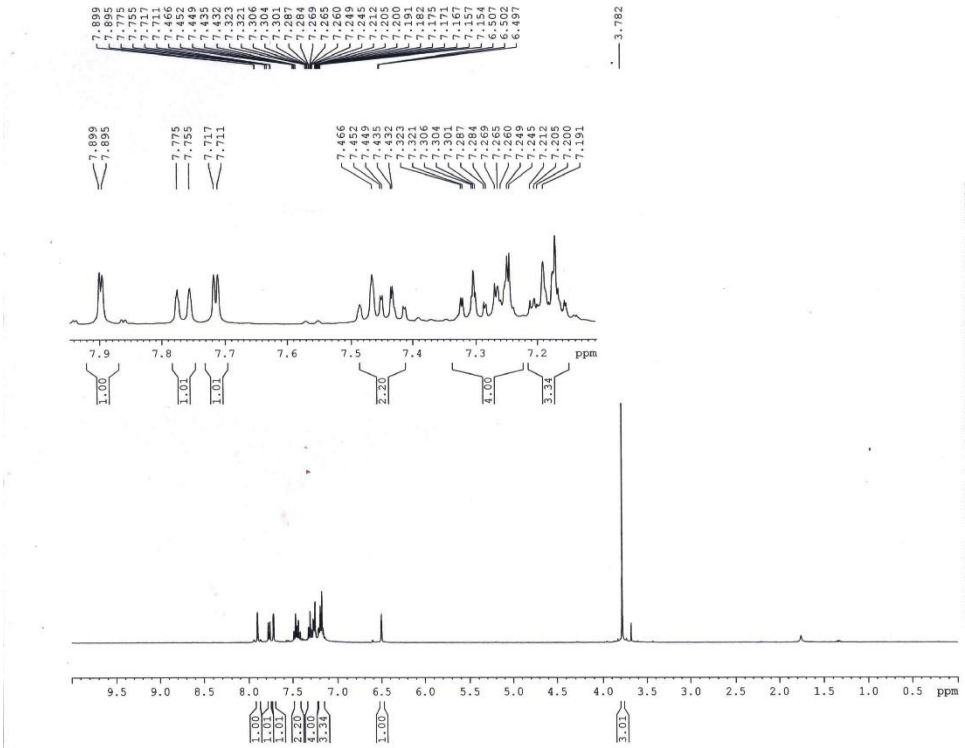
F2 - Acquisition Parameters
Date_              20230718
Time                  14.56
INSTRUM               spect
PROBHD  5 mm PABBO BB/
PULPROG             zgpg30
TD                   32768
SOLVENT              CDCl3
NS                     120
DS                       2
SWH            24038.461 Hz
FIDRES          0.733596 Hz
AQ              0.6815744 sec
RG                   54.07
DW               20.800 usec
DE                 6.50 usec
TE                299.9 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                      1

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

======== CHANNEL f2 ========
SFO2          400.1516006 MHz
NUC2                   1H
CPDPRG[2          waltz16
PCPD2               90.00 usec
PLW2         12.00000000 W
PLW12         0.32231000 W
PLW13         0.16212000 W

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

$^1$H NMR: 400 MHz; Solvent: $CDCl_3$





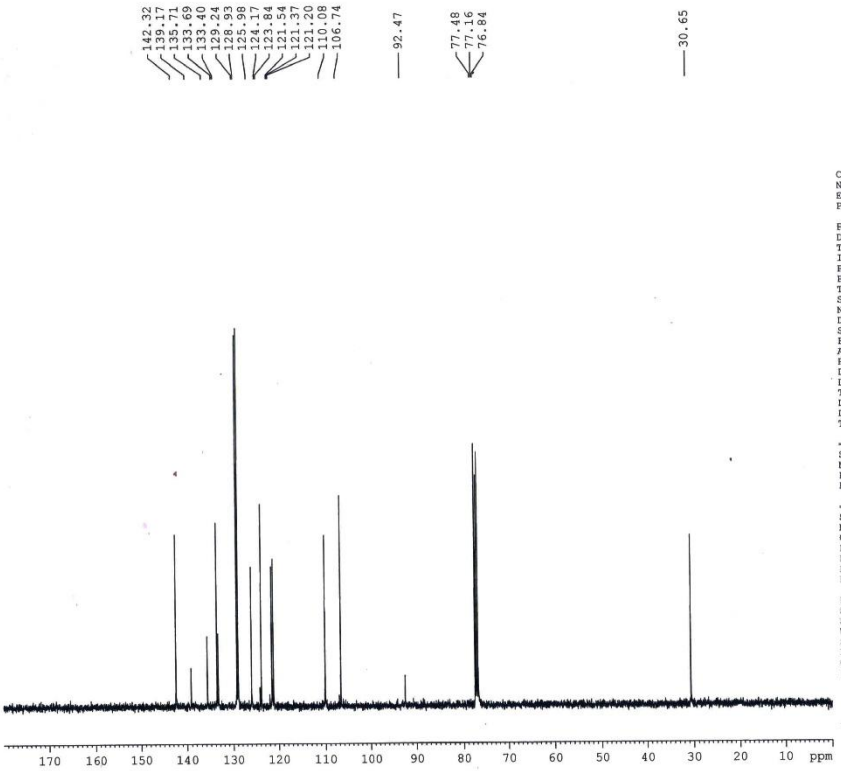
```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO                761
PROCNO                 1

F2 - Acquisition Parameters
Date_          20231102
Time               17.23
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                    8
DS                    1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG                93.46
DW               60.800 usec
DE                6.50 usec
TE                293.6 K
D1            1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
SFO1         400.1524711 MHz
NUC1                   1H
P1                 14.75 usec
PLW1         12.00000000 W

F2 - Processing parameters
SI                 16384
SF           400.1499916 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 2.00
```

$^{13}C\{^1H\}$ NMR: 100 MHz; Solvent: $CDCl_3$





```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO                762
PROCNO                 1

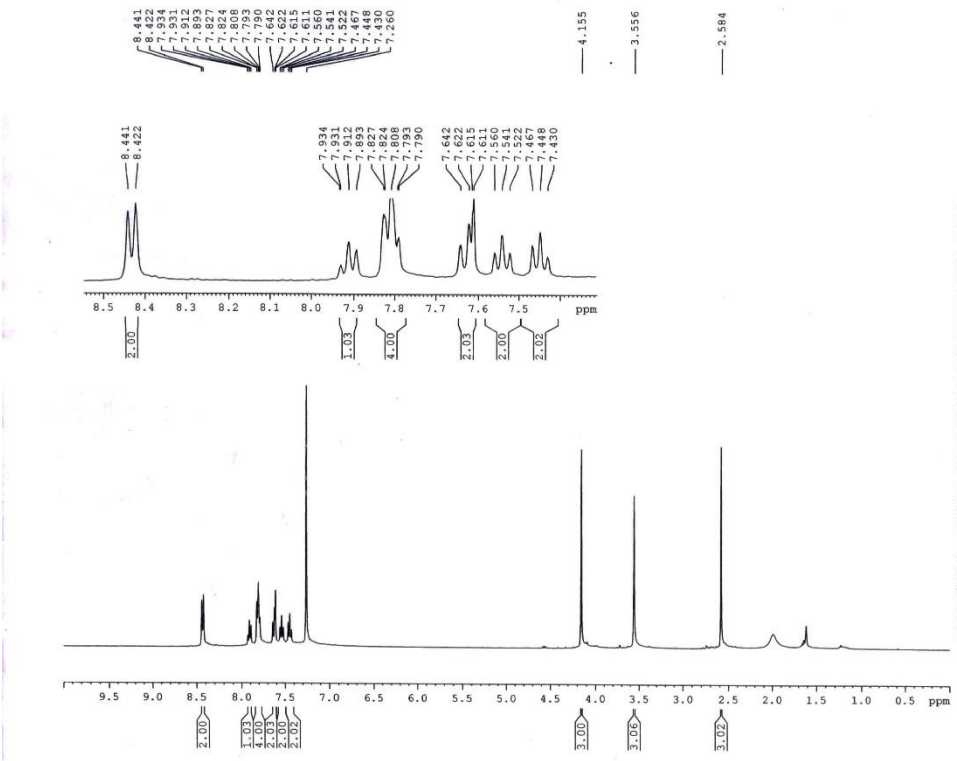
F2 - Acquisition Parameters
Date_          20231102
Time               17.39
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG          zgpg30
TD                32768
SOLVENT           CDCl3
NS                  256
DS                    2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG                93.46
DW               20.800 usec
DE                6.50 usec
TE                293.7 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

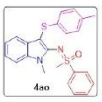
======== CHANNEL f1 ========
SFO1         100.6278588 MHz
NUC1                  13C
P1                 8.90 usec
PLW1         54.00000000 W

======== CHANNEL f2 ========
SFO2         400.1516006 MHz
NUC2                   1H
CPDPRG[2          waltz16
PCPD2             90.00 usec
PLW2         12.00000000 W
PLW12         0.32231000 W
PLW13         0.16212000 W

F2 - Processing parameters
SI                 16384
SF           100.6177916 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.00
```

$^{1}$H NMR: 400 MHz; Solvent: CDCl$_3$



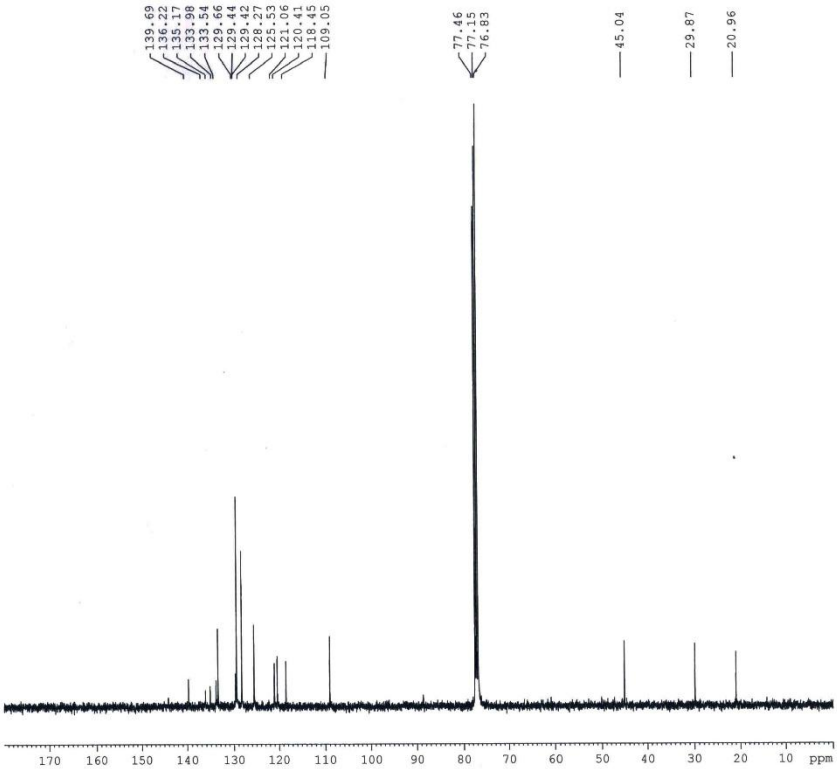

```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              748
PROCNO               1

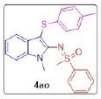
F2 - Acquisition Parameters
Date_          20231018
Time              13.10
INSTRUM           spect
PROBHD  5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                   8
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG              186.42
DW              60.800 usec
DE               6.50 usec
TE              297.2 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1               1H
P1               14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1498687 MHz
WDW                EM
SSB       0
LB               0.30 Hz
GB        0
PC               2.00
```

$^{13}$C{$^{1}$H} NMR: 100 MHz; Solvent: CDCl$_3$




```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              749
PROCNO               1

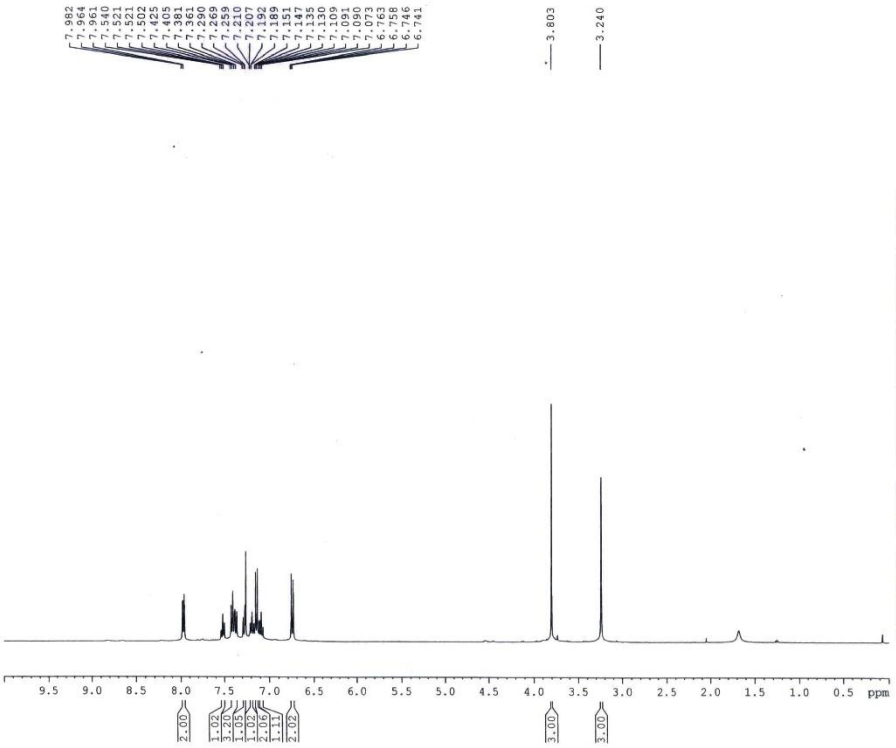
F2 - Acquisition Parameters
Date_          20231018
Time              14.13
INSTRUM           spect
PROBHD  5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT          CDCl3
NS                1200
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG              186.42
DW              20.800 usec
DE               6.50 usec
TE              299.1 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                  1

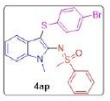
======== CHANNEL f1 ========
SFO1        100.6278588 MHz
NUC1               13C
P1               8.90 usec
PLW1        54.00000000 W

======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2        12.00000000 W
PLW12        0.32231000 W
PLW13        0.16212000 W

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

$^1$H NMR: 400 MHz; Solvent: $CDCl_3$



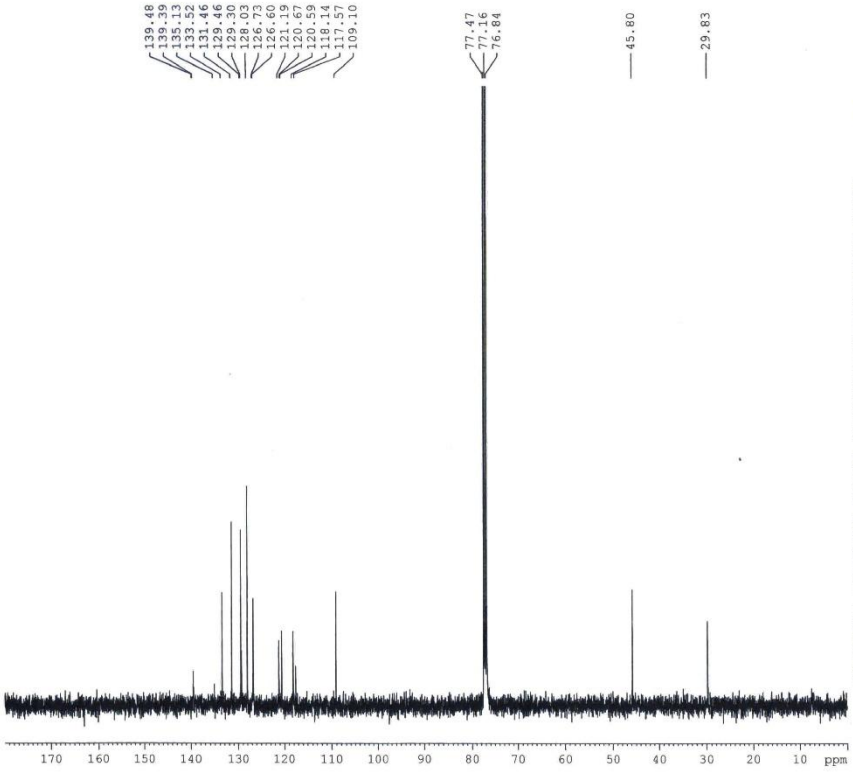

```
Current Data Parameters
NAME        Dr. A MAJEE 2024
EXPNO                 36
PROCNO                 1

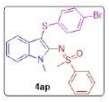
F2 - Acquisition Parameters
Date_           20240203
Time              20.29
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                   8
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG                135.7
DW               60.800 usec
DE                6.50 usec
TE               290.4 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1               1H
P1               14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500097 MHz
WDW                EM
SSB       0
LB               0.30 Hz
GB        0
PC               2.00
```

$^{13}$C{$^1$H} NMR: 100 MHz; Solvent: $CDCl_3$




```
Current Data Parameters
NAME        Dr. A MAJEE 2024
EXPNO                 37
PROCNO                 1

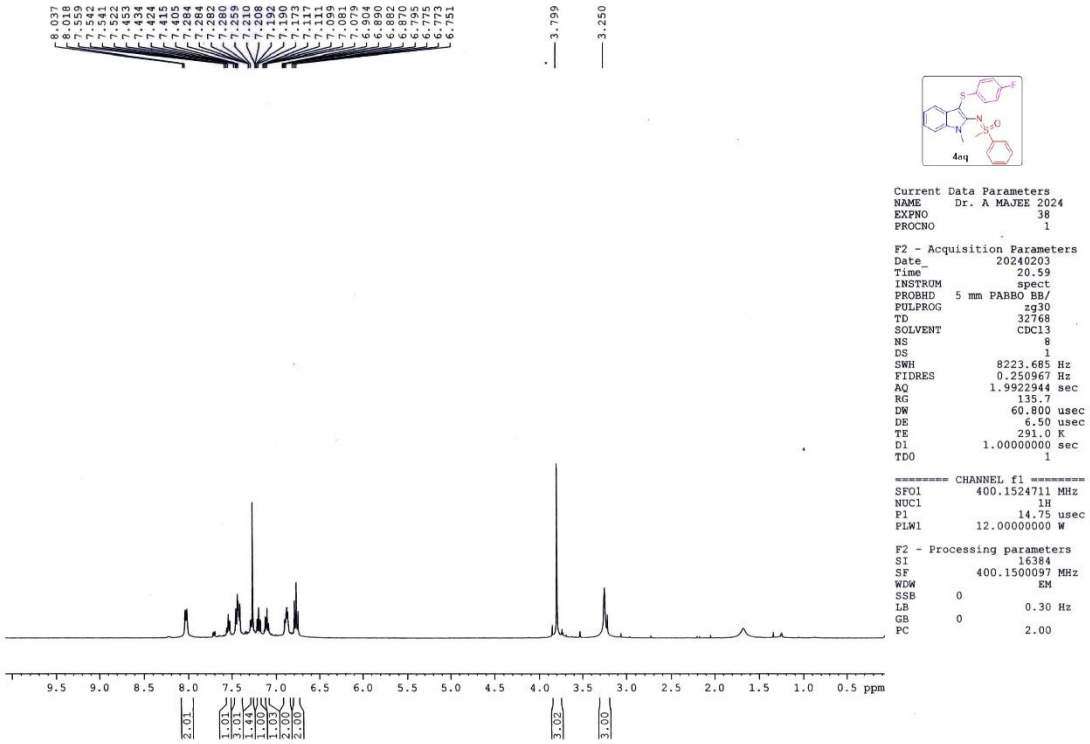
F2 - Acquisition Parameters
Date_           20240203
Time              20.49
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG          zgpg30
TD               32768
SOLVENT          CDCl3
NS                 360
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG                135.7
DW               20.800 usec
DE                6.50 usec
TE               291.3 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                  1

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

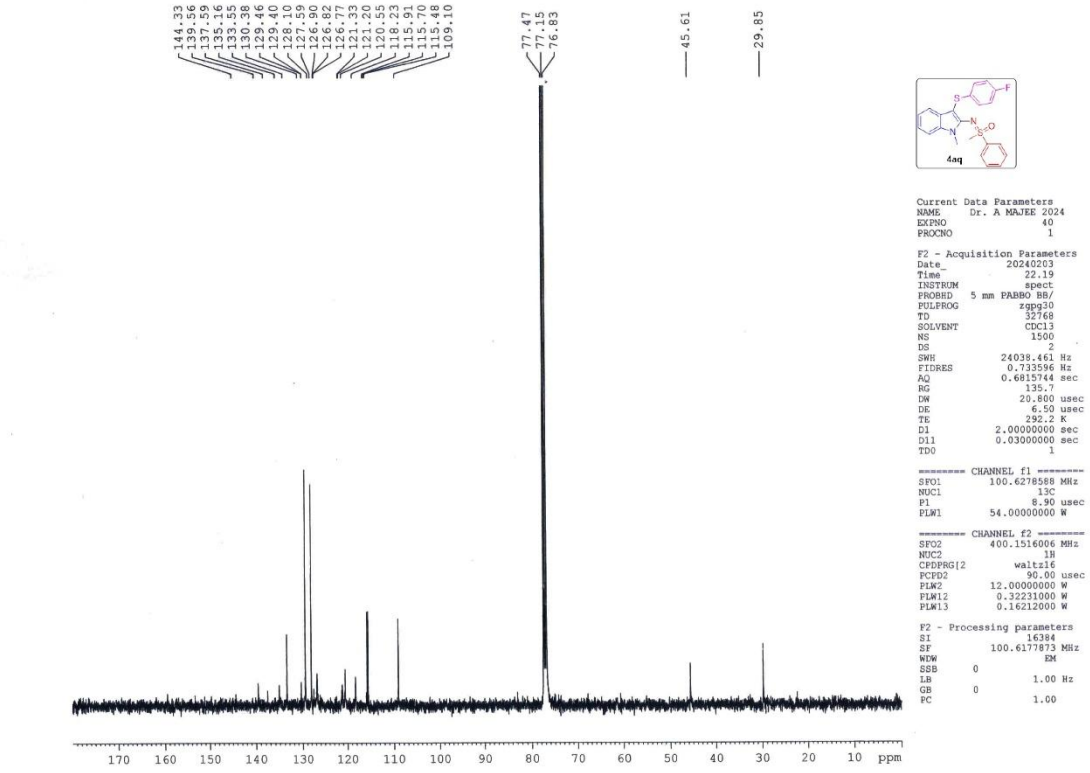
======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG[2         waltz16
PCPD2             90.00 usec
PLW2        12.00000000 W
PLW12        0.32231000 W
PLW13        0.16212000 W

F2 - Processing parameters
SI               16384
SF          100.6177876 MHz
WDW                EM
SSB       0
LB               1.00 Hz
GB        0
PC               1.00
```

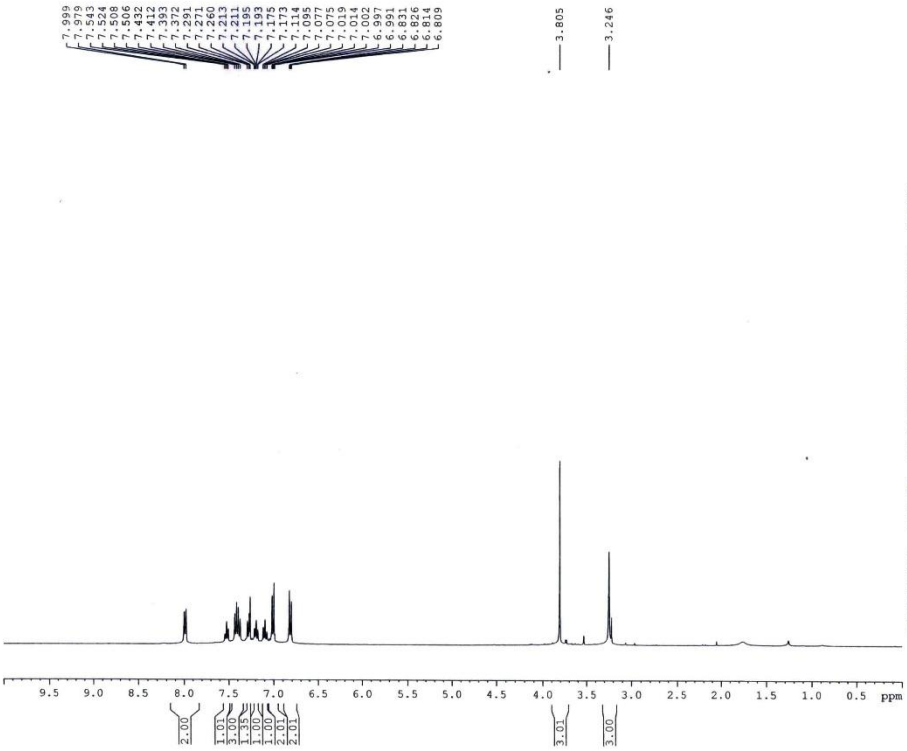
$^1$H NMR: 400 MHz; Solvent: CDCl$_3$

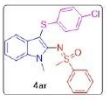



$^{13}$C{$^1$H} NMR: 100 MHz; Solvent: CDCl$_3$



$^1$H NMR: 400 MHz; Solvent: $CDCl_3$



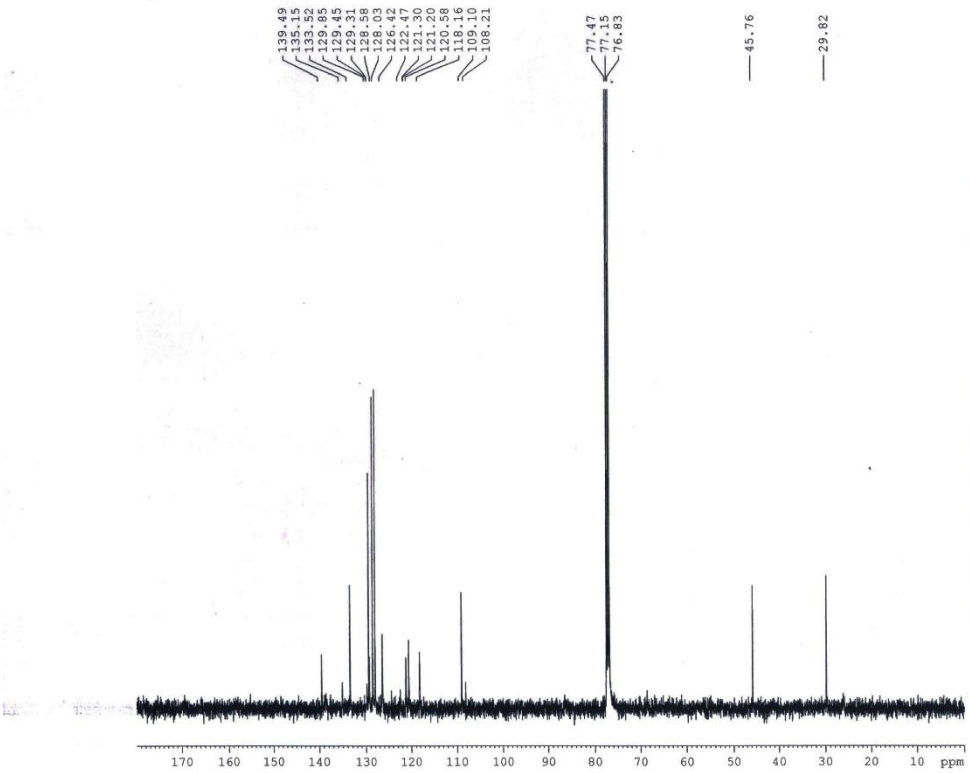

Current Data Parameters
NAME Dr. A MAJEE 2024
EXPNO 44
PROCNO 1

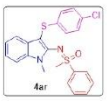
F2 - Acquisition Parameters
Date_ 20240204
Time 18.57
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 8
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9922944 sec
RG 106.66
DW 60.800 usec
DE 6.50 usec
TE 290.8 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.1524711 MHz
NUC1 1H
P1 14.75 usec
PLW1 12.00000000 W

F2 - Processing parameters
SI 16384
SF 400.1500092 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 2.00

$^{13}$C{$^1$H} NMR: 100 MHz; Solvent: $CDCl_3$




Current Data Parameters
NAME Dr. A MAJEE 2024
EXPNO 45
PROCNO 1

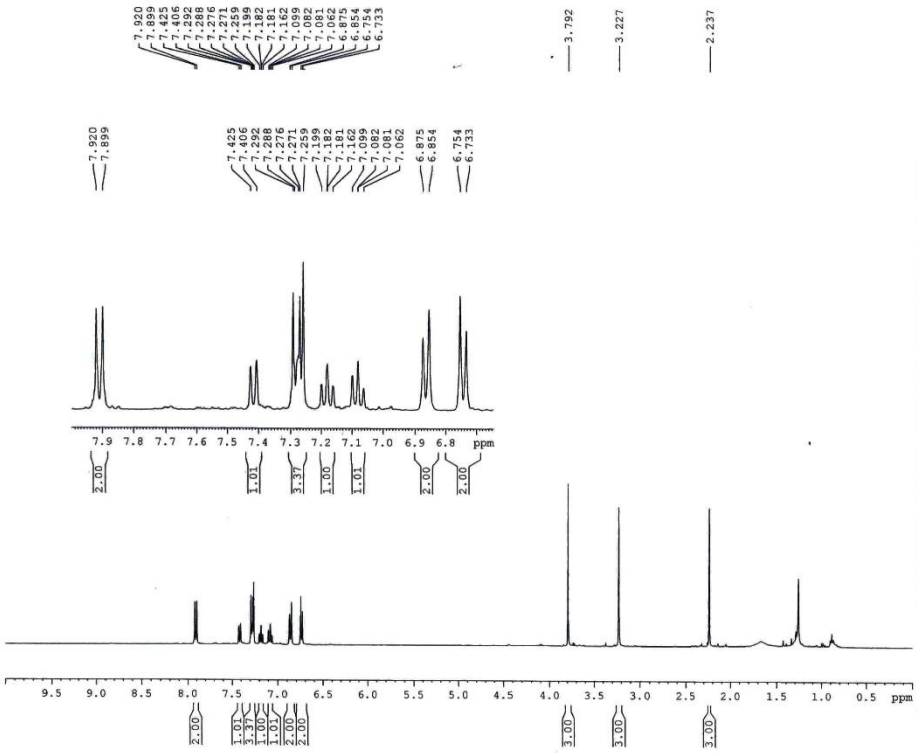
F2 - Acquisition Parameters
Date_ 20240204
Time 19.18
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 400
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 106.66
DW 20.800 usec
DE 6.50 usec
TE 292.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

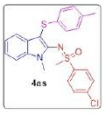
======== CHANNEL f1 ========
SFO1 100.6278588 MHz
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W

======== CHANNEL f2 ========
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 12.00000000 W
PLW12 0.32231000 W
PLW13 0.16212000 W

F2 - Processing parameters
SI 16384
SF 100.6177887 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.00

$^{1}$H NMR: 400 MHz; Solvent: CDCl$_3$



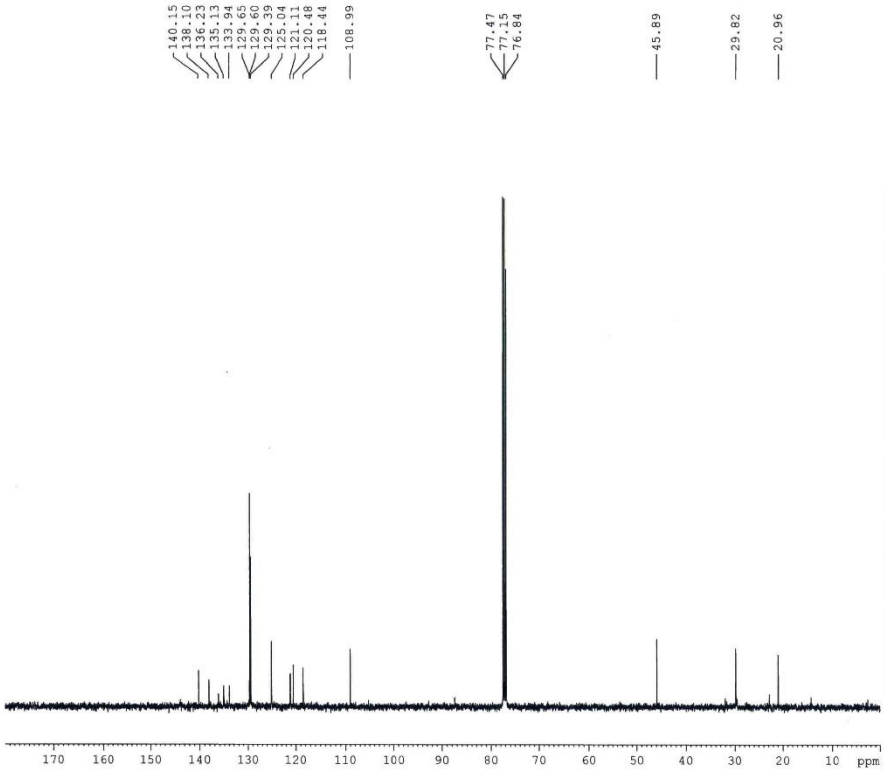

```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              506
PROCNO               1

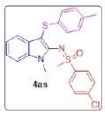
F2 - Acquisition Parameters
Date_          20230719
Time             17.18
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                   8
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG               93.46
DW              60.800 usec
DE               6.50 usec
TE              297.3 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1         400.1524711 MHz
NUC1               1H
P1               14.75 usec
PLW1         12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500097 MHz
WDW                EM
SSB      0
LB               0.30 Hz
GB       0
PC               2.00
```

$^{13}$C{$^{1}$H} NMR: 100 MHz; Solvent: CDCl$_3$




```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              507
PROCNO               1

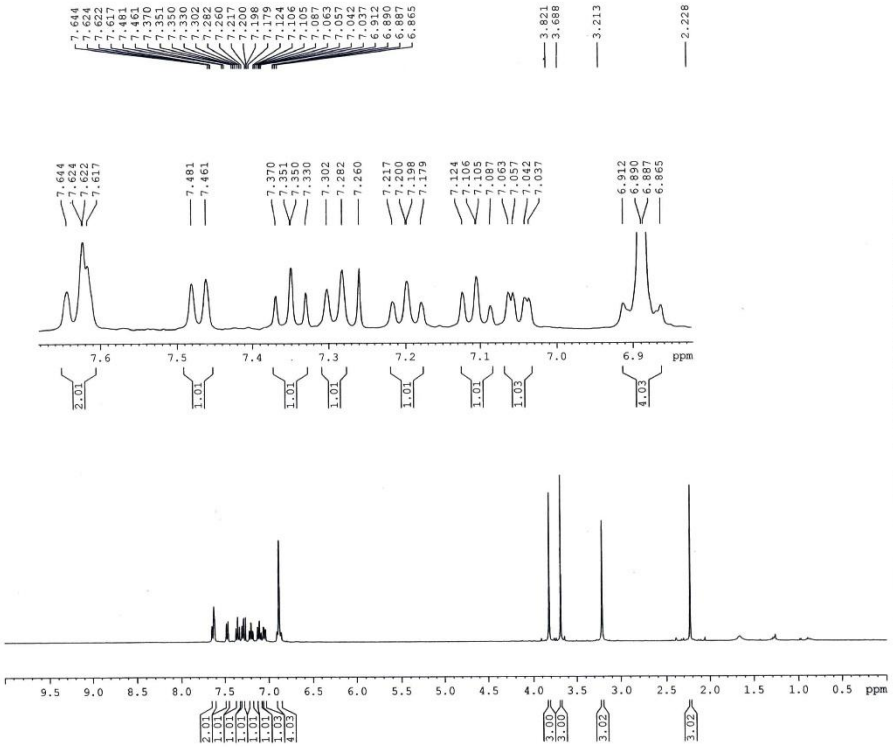
F2 - Acquisition Parameter
Date_          20230719
Time             17.53
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT          CDCl3
NS                 512
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 se
RG               93.46
DW              20.800 us
DE               6.50 us
TE              297.7 K
D1            2.00000000 se
D11           0.03000000 se
TD0                  1

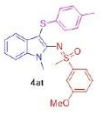
======== CHANNEL f1 ======
SFO1         100.6278588 MH
NUC1               13C
P1                8.90 us
PLW1         54.00000000 W

======== CHANNEL f2 ======
SFO2         400.1516006 MH
NUC2               1H
CPDPRG[2         waltz16
PCPD2            90.00 us
PLW2         12.00000000 W
PLW12         0.32231000 W
PLW13         0.16212000 W

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

$^1$H NMR: 400 MHz; Solvent: CDCl$_3$



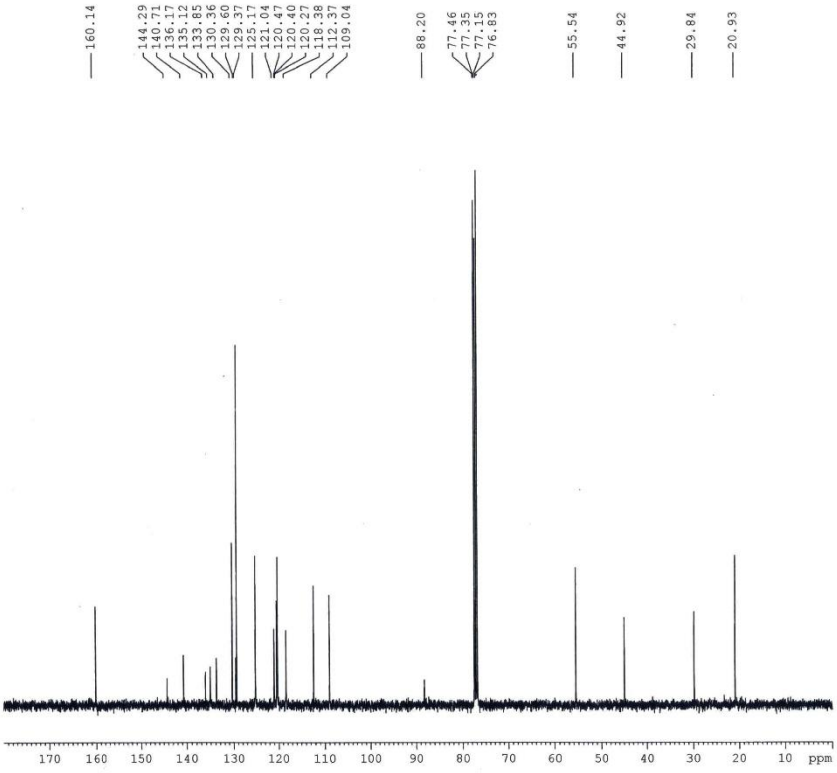

```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              874
PROCNO               1

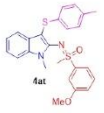
F2 - Acquisition Parameters
Date_          20231203
Time              20.06
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                   8
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG               93.46
DW              60.800 usec
DE               6.50 usec
TE              293.3 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1               1H
P1               14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI                16384
SF          400.1500092 MHz
WDW                EM
SSB       0
LB                0.30 Hz
GB        0
PC                2.00
```

$^{13}$C{$^1$H} NMR: 100 MHz; Solvent: CDCl$_3$




```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              875
PROCNO               1

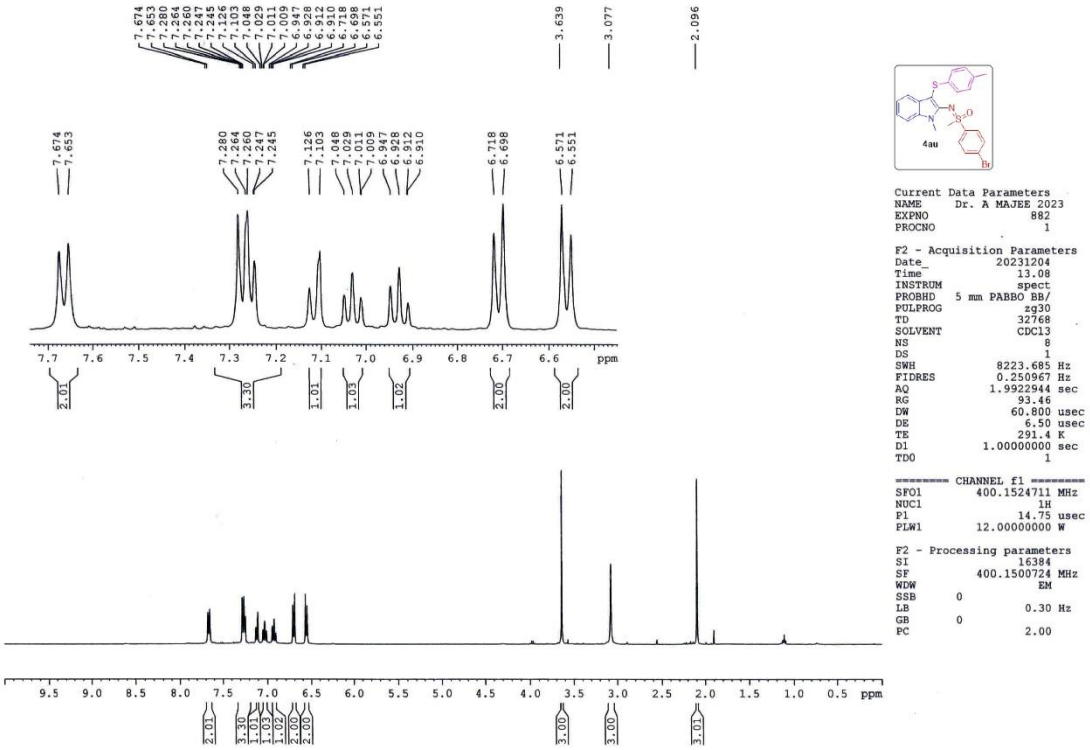
F2 - Acquisition Parameters
Date_          20231203
Time              20.25
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG        zgpg30
TD              32768
SOLVENT          CDCl3
NS                 320
DS                   2
SWH           24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG               93.46
DW              20.800 usec
DE               6.50 usec
TE              292.9 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                  1

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

======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2             90.00 usec
PLW2        12.00000000 W
PLW12        0.32231000 W
PLW13        0.16212000 W

F2 - Processing parameters
SI                16384
SF          100.6177902 MHz
WDW                EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.00
```

$^{1}$H NMR: 400 MHz; Solvent: CDCl$_3$







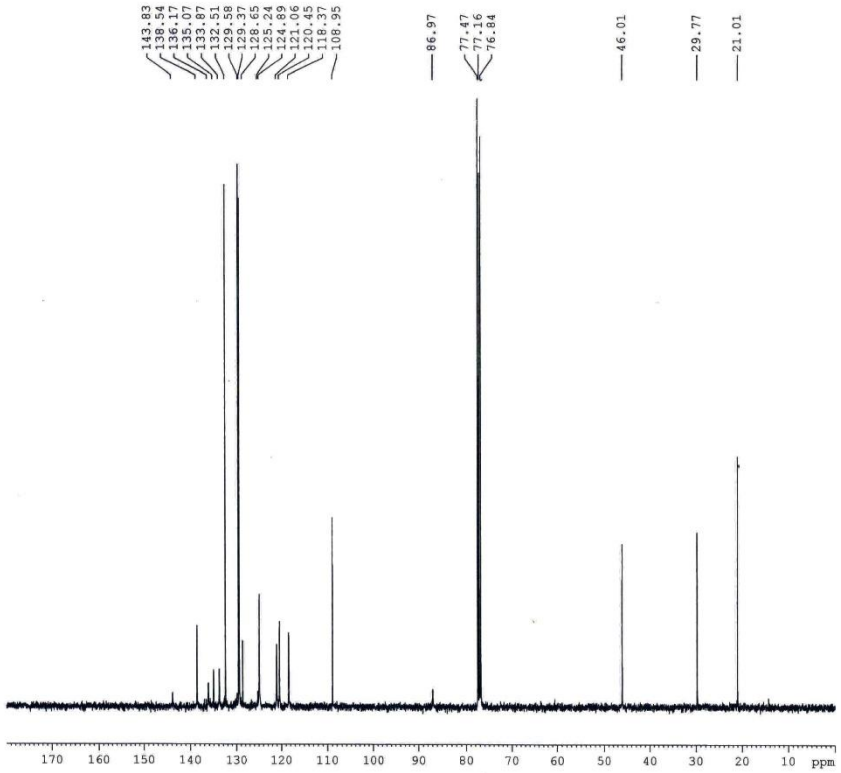
```
Current Data Parameters
NAME          Dr. A MAJEE 2023
EXPNO                    882
PROCNO                     1

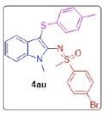
F2 - Acquisition Parameters
Date_               20231204
Time                   13.08
INSTRUM                spect
PROBHD   5 mm PABBO BB/
PULPROG                zg30
TD                    32768
SOLVENT               CDCl3
NS                        8
DS                        1
SWH                8223.685 Hz
FIDRES            0.250967 Hz
AQ                1.9922944 sec
RG                    93.46
DW                   60.800 usec
DE                    6.50 usec
TE                   291.4 K
D1                1.00000000 sec
TD0                       1

======== CHANNEL f1 ========
SFO1          400.1524711 MHz
NUC1                      1H
P1                    14.75 usec
PLW1          12.00000000 W

F2 - Processing parameters
SI                    16384
SF            400.1500724 MHz
WDW                      EM
SSB                       0
LB                     0.30 Hz
GB                        0
PC                     2.00
```

$^{13}$C{$^{1}$H} NMR: 100 MHz; Solvent: CDCl$_3$



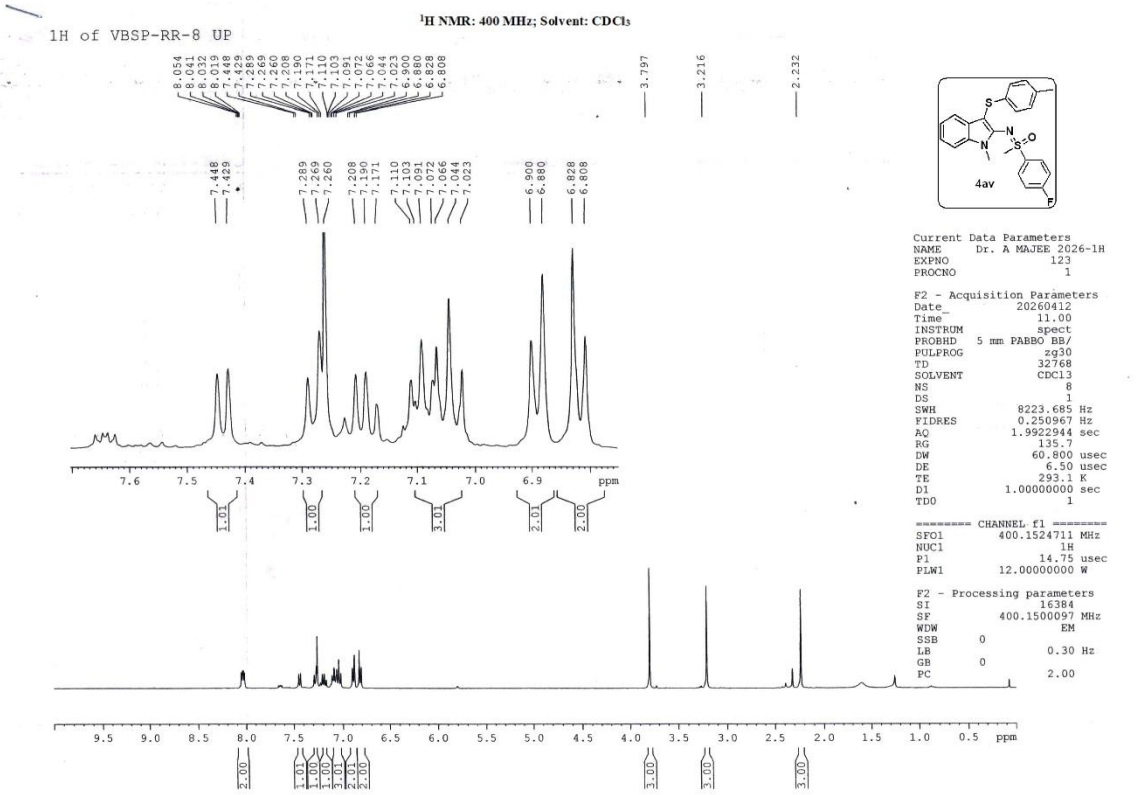

```
Current Data Parameters
NAME          Dr. A MAJEE 2023
EXPNO                    883
PROCNO                     1

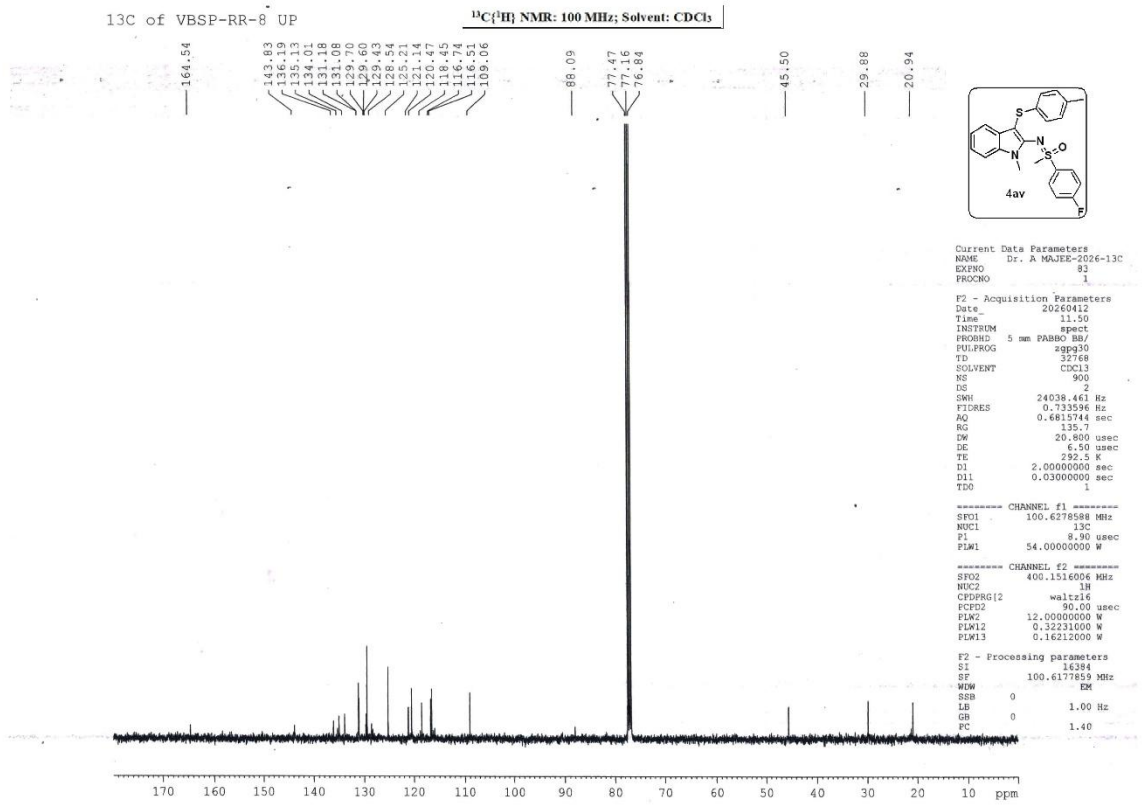
F2 - Acquisition Parameters
Date_               20231204
Time                   13.45
INSTRUM                spect
PROBHD   5 mm PABBO BB/
PULPROG             zgpg30
TD                    32768
SOLVENT               CDCl3
NS                      720
DS                        2
SWH               24038.461 Hz
FIDRES            0.733596 Hz
AQ                0.6815744 sec
RG                    93.46
DW                   20.800 usec
DE                    6.50 usec
TE                   292.0 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                       1

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

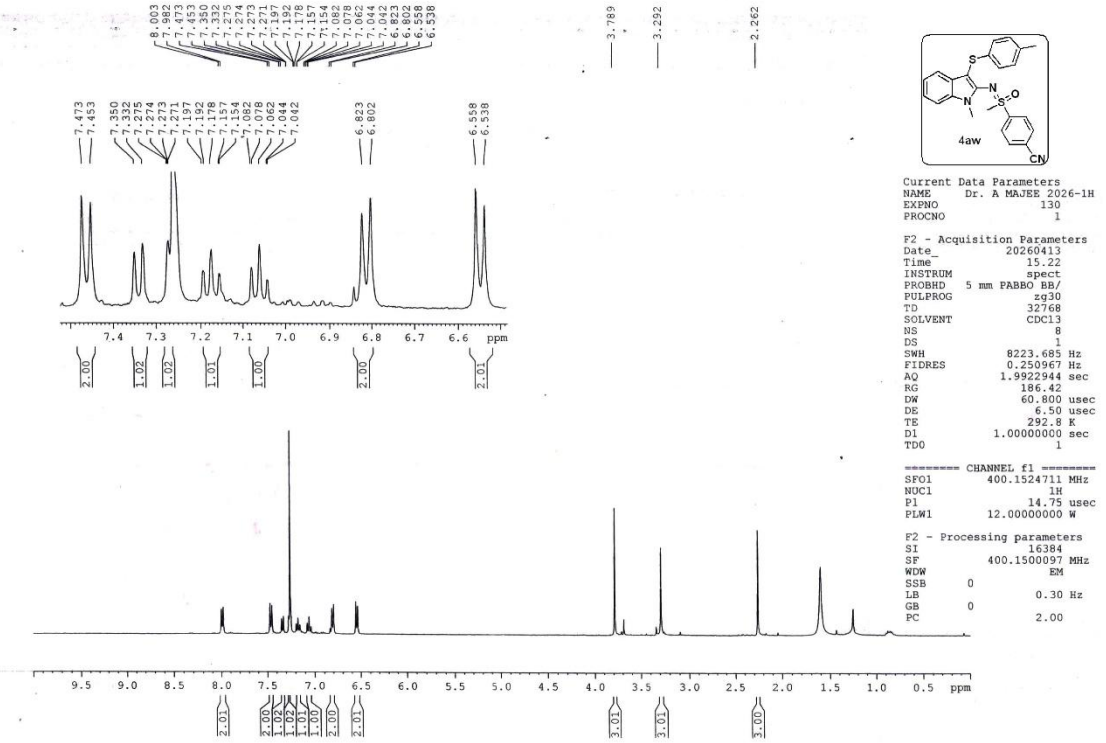
======== CHANNEL f2 ========
SFO2          400.1516006 MHz
NUC2                      1H
CPDPRG[2          waltz16
PCPD2                90.00 usec
PLW2          12.00000000 W
PLW12          0.32231000 W
PLW13          0.16212000 W

F2 - Processing parameters
SI                    16384
SF            100.6177917 MHz
WDW                      EM
SSB                       0
LB                     1.00 Hz
GB                        0
PC                     1.00
```

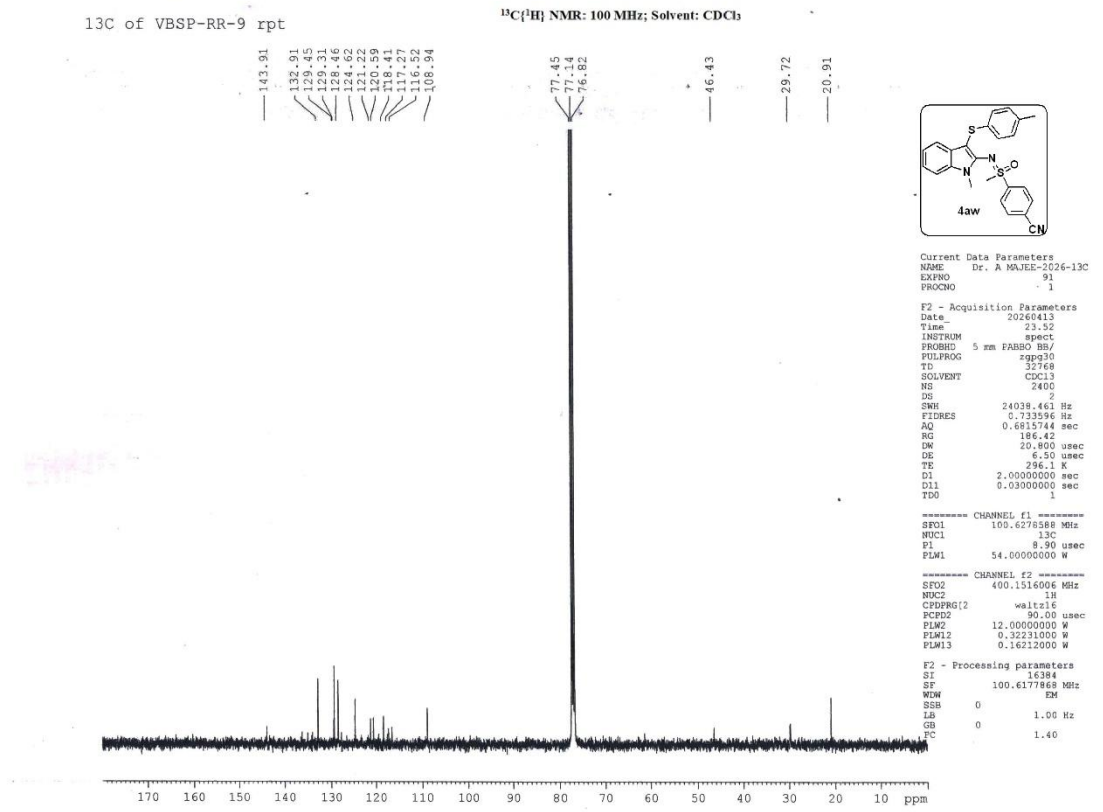

$^1$H NMR: 400 MHz; Solvent: CDCl$_3$
1H of VBSP-RR-8 UP
4av
Current Data Parameters
NAME Dr. A MAJEE 2026-1H
EXPNO 123
PROCNO 1
F2 - Acquisition Parameters
Date_ 20260412
Time 11.00
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 8
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9922944 sec
RG 135.7
DW 60.800 usec
DE 6.50 usec
TE 293.1 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.1524711 MHz
NUC1 1H
P1 14.75 usec
PLW1 12.00000000 W
F2 - Processing parameters
SI 16384
SF 400.1500097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 2.00


$^{13}$C{$^1$H} NMR: 100 MHz; Solvent: CDCl$_3$
13C of VBSP-RR-8 UP
4av
Current Data Parameters
NAME Dr. A MAJEE-2026-13C
EXPNO 83
PROCNO 1
F2 - Acquisition Parameters
Date_ 20260412
Time 11.50
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 900
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 135.7
DW 20.800 usec
DE 6.50 usec
TE 292.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6278588 MHz
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W
======== CHANNEL f2 ========
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 12.00000000 W
PLW12 0.32231000 W
PLW13 0.16212000 W
F2 - Processing parameters
SI 16384
SF 100.6177859 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

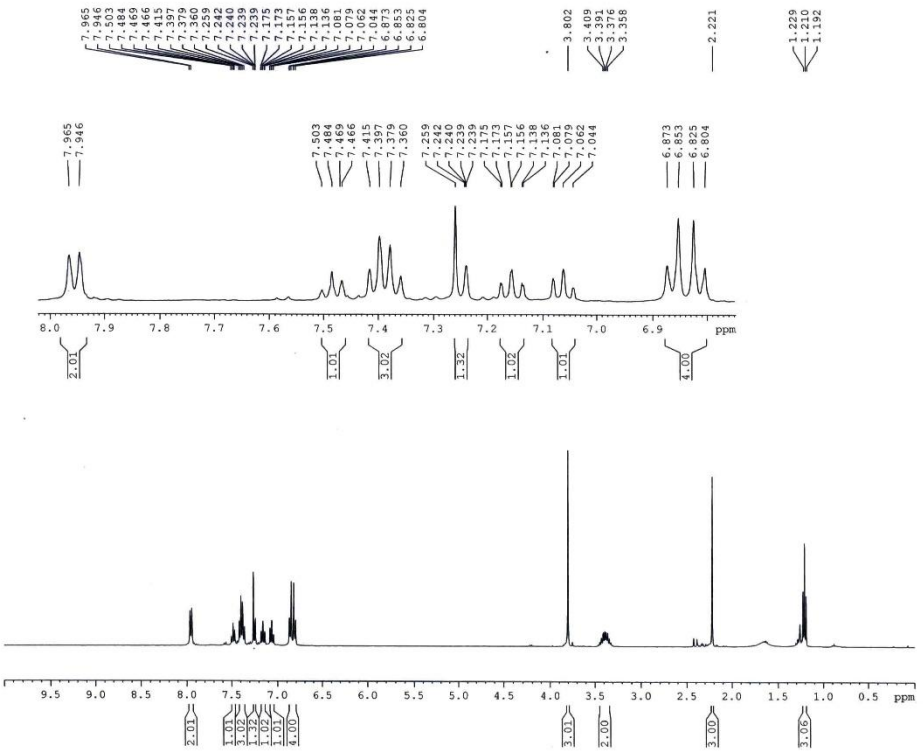
$^{1}$H NMR: 400 MHz; Solvent: CDCl$_3$

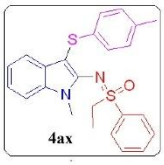



$^{13}$C{$^{1}$H} NMR: 100 MHz; Solvent: CDCl$_3$



$^1$H NMR: 400 MHz; Solvent: CDCl$_3$



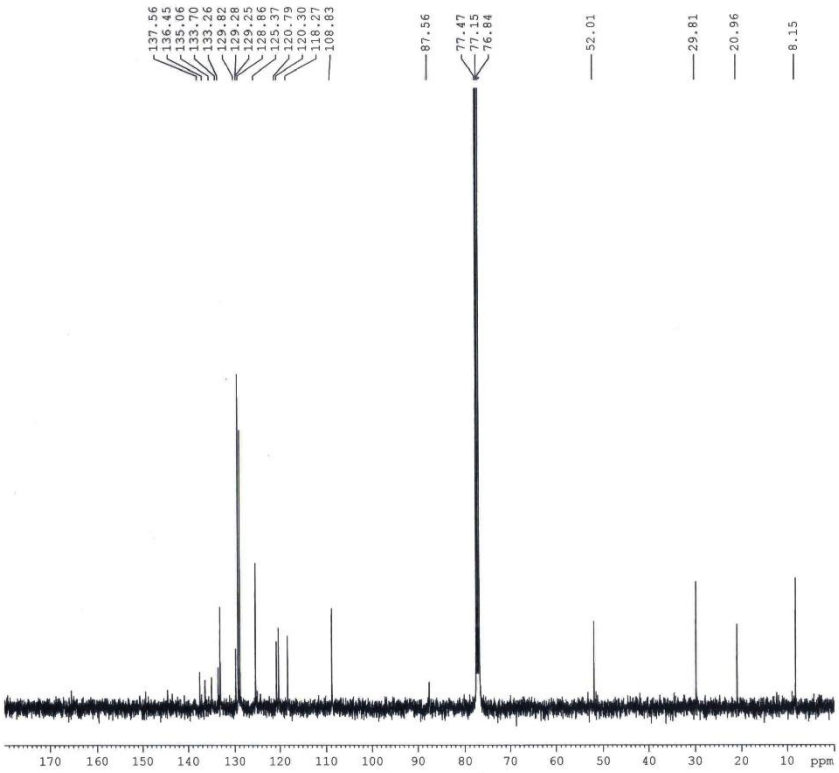

```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              751
PROCNO               1

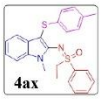
F2 - Acquisition Parameters
Date_          20231018
Time_             14.36
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                   8
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG                135.7
DW               60.800 use
DE                6.50 use
TE              297.3 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1               1H
P1               14.75 use
PLW1       12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500097 MHz
WDW                EM
SSB       0
LB               0.30 Hz
GB        0
PC               2.00
```

$^{13}$C{$^1$H} NMR: 100 MHz; Solvent: CDCl$_3$




```
Current Data Parameters
NAME      Dr. A MAJEE 2023
EXPNO              752
PROCNO               1

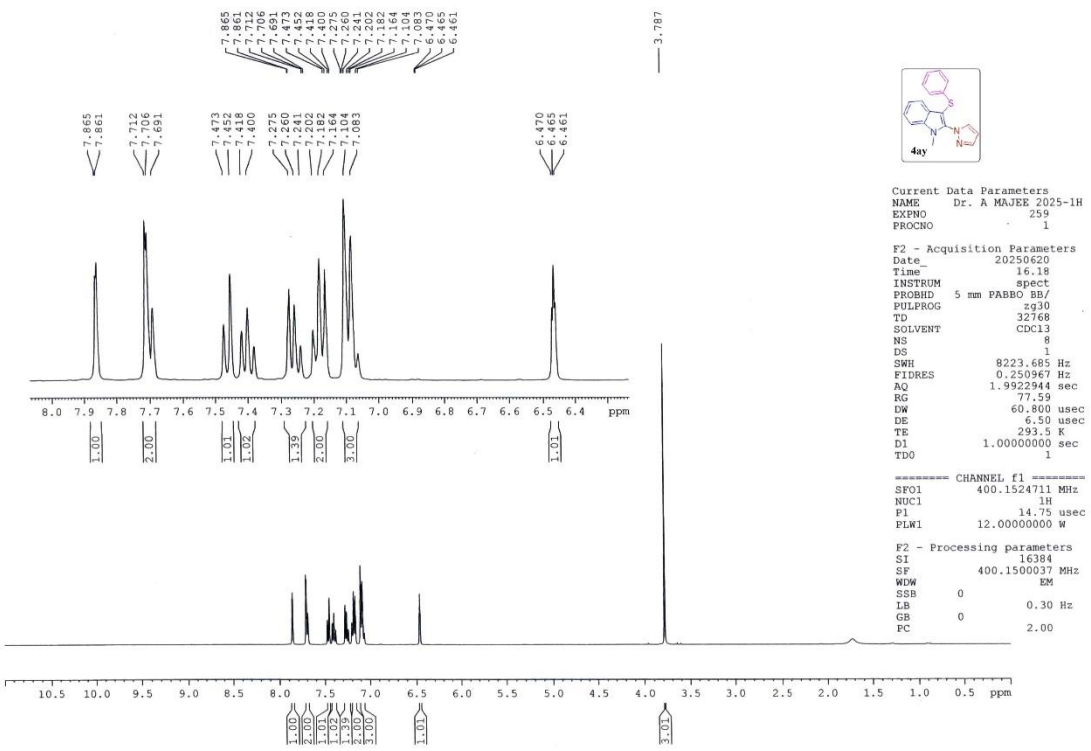
F2 - Acquisition Parameters
Date_          20231018
Time               15.09
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD               32768
SOLVENT          CDCl3
NS                 512
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG                135.7
DW              20.800 usec
DE               6.50 usec
TE              297.4 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                  1

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

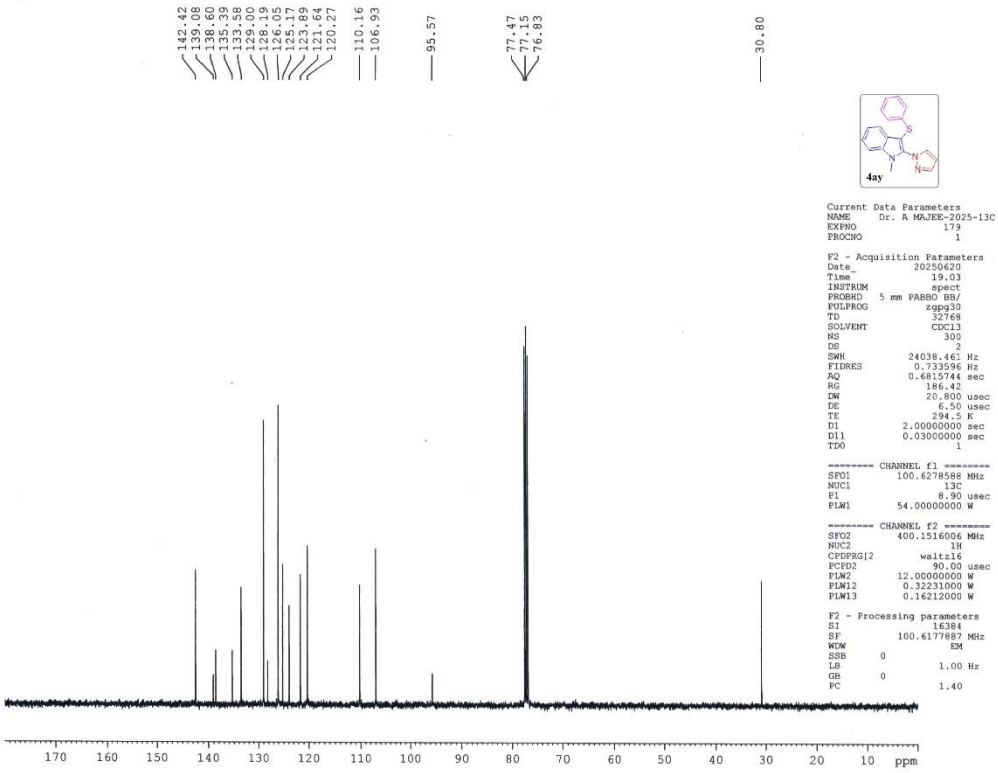
======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2       12.00000000 W
PLW12       0.32231000 W
PLW13       0.16212000 W

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

$^{1}$H NMR: 400 MHz; Solvent: CDCl$_3$

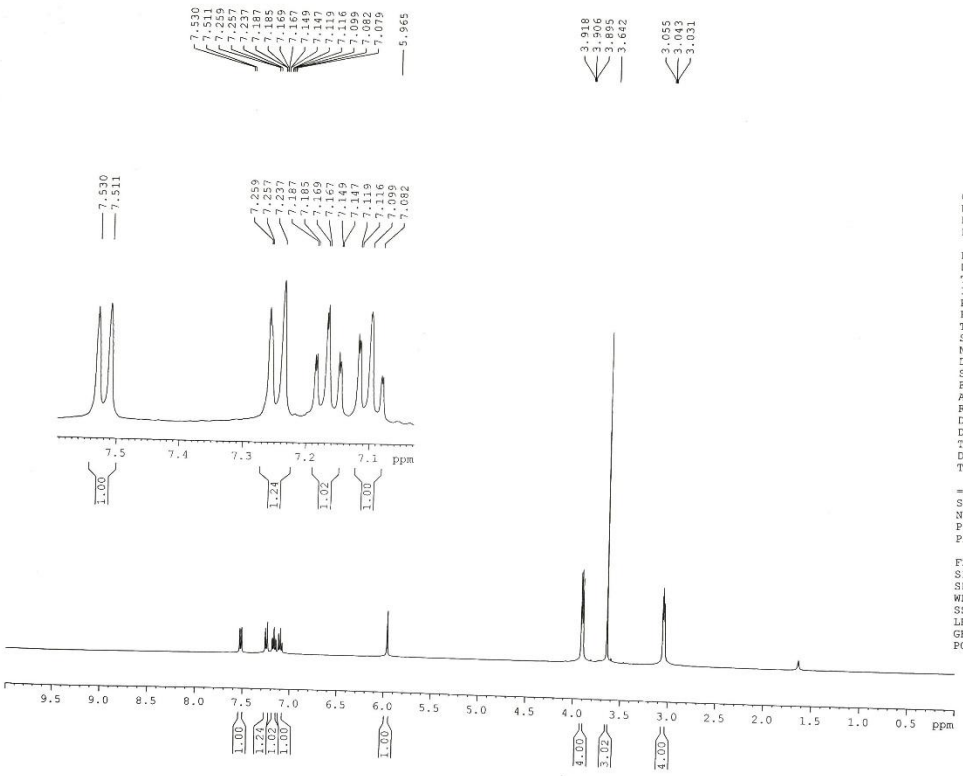


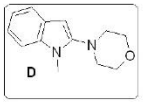

$^{13}$C{$^{1}$H} NMR: 100 MHz; Solvent: CDCl$_3$



1H of VBSP-283/INT

$^1$H NMR: 400 MHz; Solvent: $CDCl_3$




```
Current Data Parameters
NAME        Dr. A MAJEE 2023
EXPNO                  513
PROCNO                   1

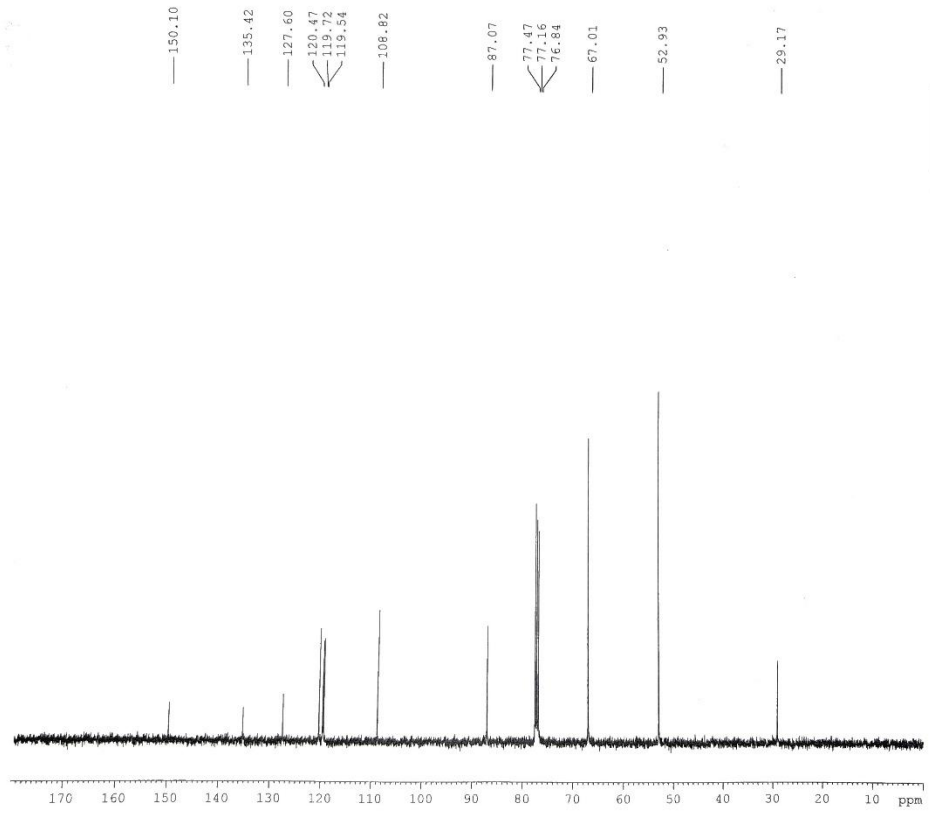
F2 - Acquisition Parameters
Date_             20230721
Time                13.26
INSTRUM             spect
PROBHD   5 mm PABBO BB/
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                     8
DS                     1
SWH              8223.685 Hz
FIDRES           0.250967 Hz
AQ               1.9922944 sec
RG                  62.69
DW                 60.800 usec
DE                  6.50 usec
TE                 300.2 K
D1              1.00000000 sec
TD0                    1

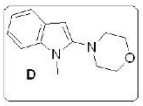
======== CHANNEL f1 ========
SFO1            400.1524711 MHz
NUC1                   1H
P1                  14.75 usec
PLW1            12.00000000 W

F2 - Processing parameters
SI                 16384
SF              400.1500092 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  2.00
```

13C of VBSP-283/INT

$^{13}$C{$^1$H} NMR: 100 MHz; Solvent: $CDCl_3$



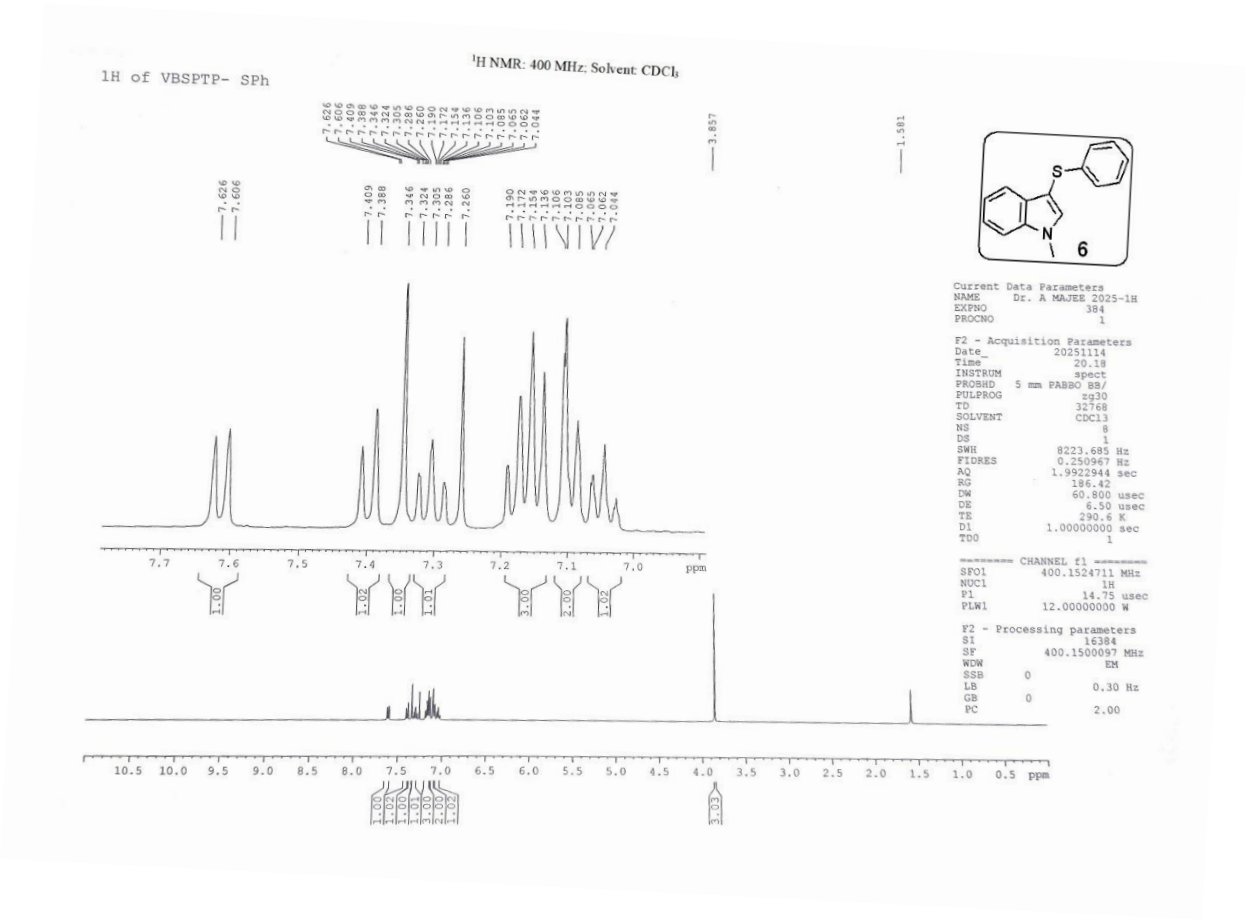

```
Current Data Parameters
NAME        Dr. A MAJEE 2023
EXPNO                  514
PROCNO                   1

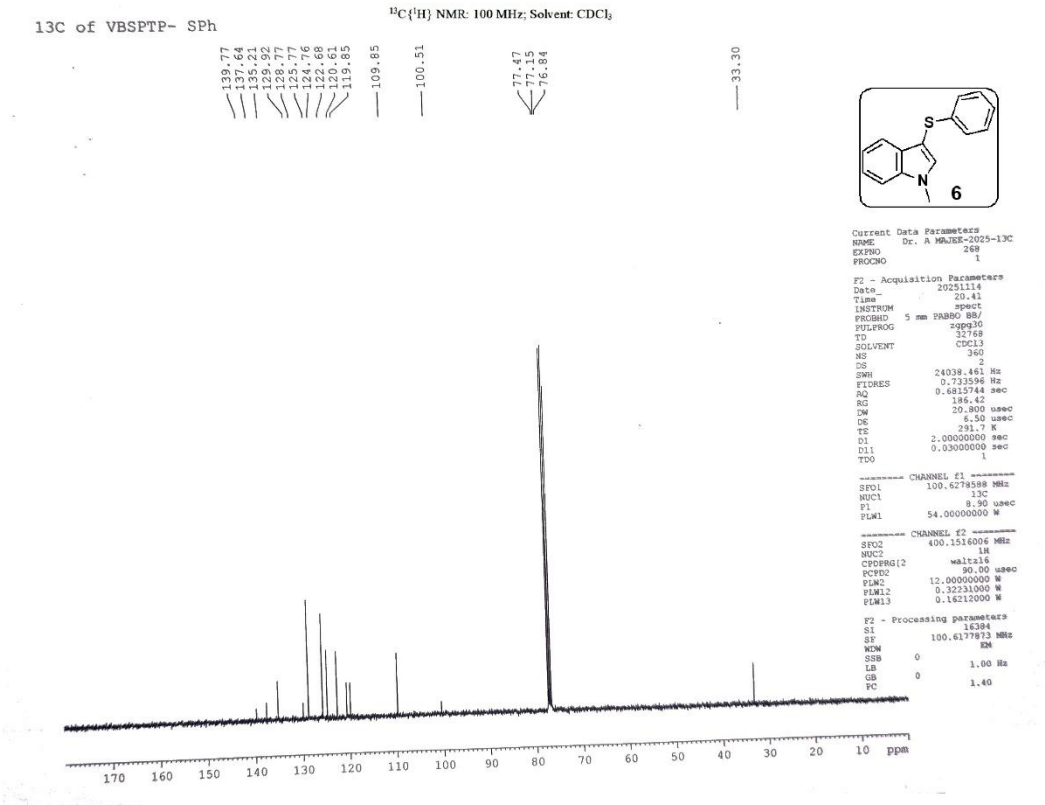
F2 - Acquisition Parameters
Date_             20230721
Time                13.39
INSTRUM             spect
PROBHD   5 mm PABBO BB/
PULPROG           zgpg30
TD                 32768
SOLVENT            CDCl3
NS                   120
DS                     2
SWH             24038.461 Hz
FIDRES           0.733596 Hz
AQ               0.6815744 sec
RG                 186.42
DW                 20.800 usec
DE                  6.50 usec
TE                 300.3 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                    1

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

======== CHANNEL f2 ========
SFO2            400.1516006 MHz
NUC2                   1H
CPDPRG[2          waltz16
PCPD2              90.00 usec
PLW2            12.00000000 W
PLW12            0.32231000 W
PLW13            0.16212000 W

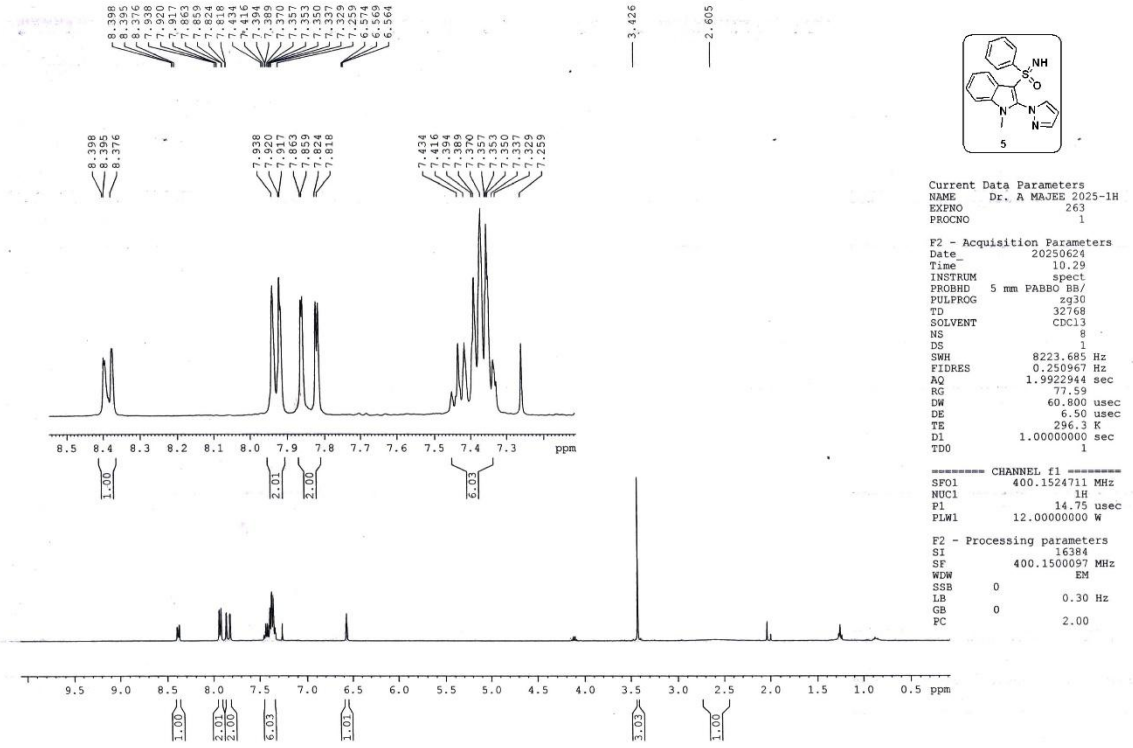
F2 - Processing parameters
SI                 16384
SF              100.6177887 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.00
```


1H of VBSPTP- SPh
$^1$H NMR: 400 MHz; Solvent: CDCl$_3$
7.626
7.606
7.409
7.388
7.346
7.324
7.305
7.286
7.260
7.190
7.172
7.154
7.136
7.106
7.103
7.085
7.065
7.062
7.044
3.857
1.581
6
Current Data Parameters
NAME Dr. A MAJEE 2025-1H
EXPNO 384
PROCNO 1
F2 - Acquisition Parameters
Date_ 20251114
Time_ 20.18
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 8
DS 1
SWH 8223.685 Hz
FIDRES 0.250967 Hz
AQ 1.9922944 sec
RG 186.42
DW 60.800 usec
DE 6.50 usec
TE 290.6 K
D1 1.00000000 sec
TD0 1
CHANNEL f1
SFO1 400.1524711 MHz
NUC1 1H
P1 14.75 usec
PLW1 12.00000000 W
F2 - Processing parameters
SI 16384
SF 400.1500097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 2.00
ppm
1.00
1.02
1.00
1.01
1.01
3.00
2.00
1.02
3.03


13C of VBSPTP- SPh
$^{13}$C{$^1$H} NMR: 100 MHz; Solvent: CDCl$_3$
139.77
137.64
135.21
129.92
128.77
125.76
122.68
120.61
119.85
109.85
100.51
77.47
77.15
76.84
33.30
6
Current Data Parameters
NAME Dr. A MAJEE-2025-13C
EXPNO 268
PROCNO 1
F2 - Acquisition Parameters
Date_ 20251114
Time_ 20.41
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 360
DS 2
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 0.6815744 sec
RG 186.42
DW 20.800 usec
DE 6.50 usec
TE 291.7 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
CHANNEL f1
SFO1 100.6278588 MHz
NUC1 13C
P1 8.90 usec
PLW1 54.00000000 W
CHANNEL f2
SFO2 400.1516006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 12.00000000 W
PLW12 0.32231000 W
PLW13 0.16212000 W
F2 - Processing parameters
SI 16384
SF 100.6177813 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
ppm

Prof.A.Majee
SP-21 9 (0.169) Cm (2:31)
100
%
0
306.835
306.840
306.845
306.850
306.855
306.860
306.865
306.870
m/z
HRMS
Se
I
+
Na+
[M+Na]+
[C6H5INaSe]+ Exact Mass: 306.8493
Found: 306.8485
306.8485
Visva-Bharati University
Ph-Se-I
TOF MS ES+
306.8696 6.44e3

$^{1}$H NMR: 400 MHz; Solvent: CDCl$_3$







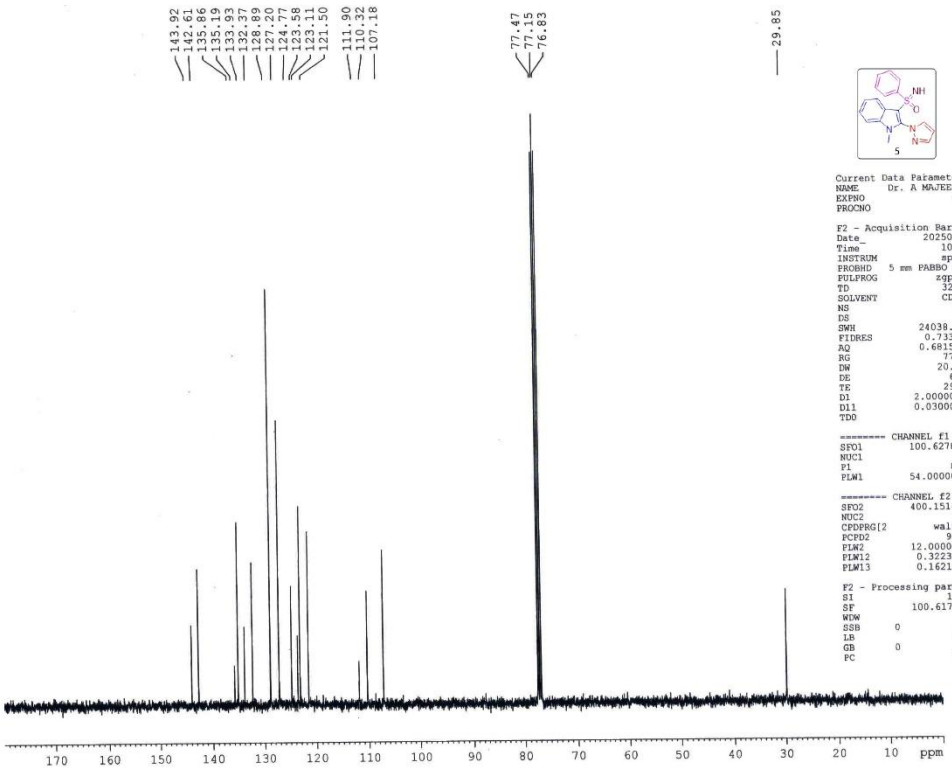
```
Current Data Parameters
NAME      Dr. A MAJEE 2025-1H
EXPNO              263
PROCNO               1

F2 - Acquisition Parameters
Date_          20250624
Time_             10.29
INSTRUM           spect
PROBHD  5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                   8
DS                   1
SWH           8223.685 Hz
FIDRES        0.250967 Hz
AQ            1.9922944 sec
RG               77.59
DW              60.800 usec
DE               6.50 usec
TE              296.3 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        400.1524711 MHz
NUC1               1H
P1               14.75 usec
PLW1        12.00000000 W

F2 - Processing parameters
SI               16384
SF          400.1500097 MHz
WDW                EM
SSB       0
LB               0.30 Hz
GB        0
PC               2.00
```

$^{13}$C{$^{1}$H} NMR: 100 MHz; Solvent: CDCl$_3$







```
Current Data Parameters
NAME      Dr. A MAJEE-2025-13C
EXPNO              181
PROCNO               1

F2 - Acquisition Parameters
Date_          20250624
Time              10.51
INSTRUM           spect
PROBHD  5 mm PABBO BB/
PULPROG         zgpg30
TD               32768
SOLVENT          CDCl3
NS                 300
DS                   2
SWH          24038.461 Hz
FIDRES        0.733596 Hz
AQ            0.6815744 sec
RG               77.59
DW              20.800 usec
DE               6.50 usec
TE              296.2 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                  1

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

======== CHANNEL f2 ========
SFO2        400.1516006 MHz
NUC2               1H
CPDPRG[2         waltz16
PCPD2             90.00 usec
PLW2        12.00000000 W
PLW12        0.32231000 W
PLW13        0.16212000 W

F2 - Processing parameters
SI               16384
SF          100.6177887 MHz
WDW                EM
SSB       0
LB               1.00 Hz
GB        0
PC               1.40
```