Supporting Information

Visible-light-mediated synthesis of α,β-diamino esters *via* coupling of *N*,*N*-dimethylanilines and glyoxalic oxime ethers

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Contents

1. General Information

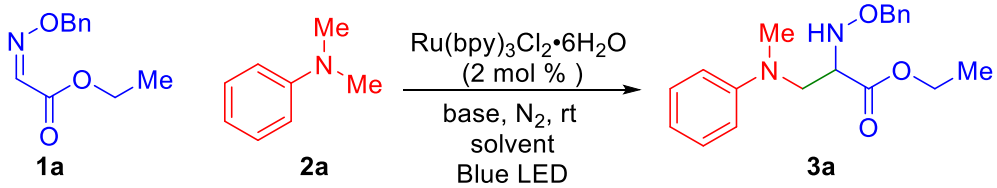
Unless otherwise noted, all chemicals were purchased from commercial sources and used without further purification. Yields refer to chromatographically pure material. All solvents were used as purchased, without purification. MeCN were used as after drying and distillation. Reactions were monitored by thin-layer chromatography (TLC) performed on 0.25 mm Merck silica gel plates (60F-254) using UV light. Merck silica gel (mesh size 100-200) was used for flash column

chromatography. Reactions were performed using LED strip lights wrapped around a 250 mL glass beaker (200 cm; 18 W).

NMR spectra were recorded on JEOL 500 (^{1}H: 500 MHz, ^{13}C: 125 MHz) or 400 (^{1}H: 400 MHz, ^{13}C: 100 MHz) spectrometer in $CDCl_3$ having TMS 0.03% as internal standard. Mass spectrometric data were obtained using WATERS-Q-TOF Premier-ESI-MS and GC-MS. The following abbreviations were used to explain the multiplicities: s = singlet, d = doublet, t = triplet, q = quartet, dd = doublet of doublet, ddd = doublet of a doublet of doublet, m = multiplet. Glyoxylic oxime ether and dimethyl aniline derivatives were prepared according to the literature reports.

2. Additional Optimization Experiments

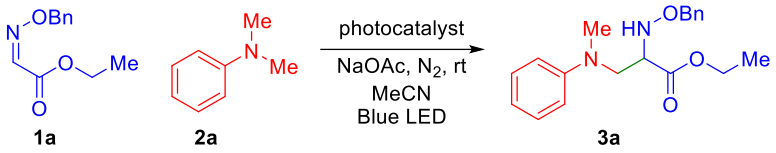
a) Survey of solvents and base



Entry	Base (0.5 Equiv.)	Solvent (2mL)	Time (h)	Yield 3a (%)
1	K_2HPO_4	MeCN	24	52
2	Li_2CO_3	MeCN	24	trace
3	DBU	MeCN	24	trace
4	Et_3N	MeCN	24	43%
5	Cs_2CO_3	MeCN	24	47
6	**NaOAc**	**MeCN**	**24**	**90**
7	NaOAc	THF	24	trace
8	NaOAc	Toluene	24	trace
9	NaOAc	DMF	15	81
10	NaOAc	DMSO	15	85
11	NaOAc	DCE	24	trace

b) Survey of photocatalysts

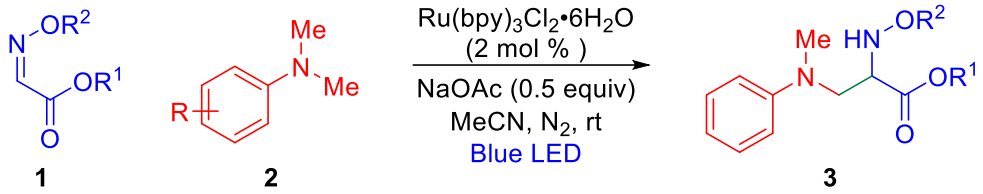
c)



d)

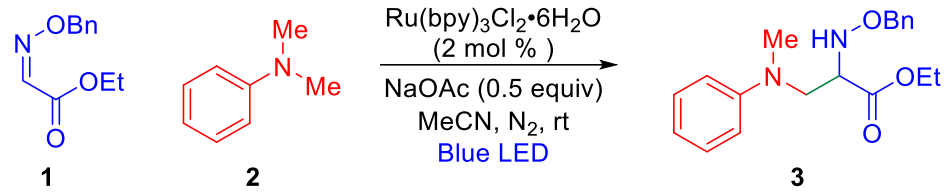
S. No.	Photocatalyst	$E_{1/2}(PC^*/PC^-)$	Yield 3a, (%)
1	Eosin Y	+0.83	0
2	$Ru(bpy)_3Cl_2.6H_2O$	+0.77	90
3	4-CzIPN	+1.35	Trace

3. General Procedure for the Synthesis of 3



An oven dried vial equipped with a magnetic stir bar was charged with imine derivatives (0.33 mmol), aniline (3.0 equiv.), NaOAc (50 mol%), and $Ru(bpy)_3Cl_2 \cdot 6H_2O$ (2 mol%), and then distilled dry MeCN (2 mL) was added. The reaction mixture was then purged with nitrogen for 30 minutes and stirred under nitrogen atmosphere (N_2 balloon) at rt under blue light. After the completion of reaction (confirmed by TLC), the reaction mixture was concentrated under reduced pressure. The residue was purified by flash column chromatography on silica gel (ethyl acetate/petroleum ether).

4. Gram scale synthesis of 3a



A dried 100 mL round bottom flask equipped with a magnetic stir bar was charged with glyoxylic oxime **1a** (1g, 4.83 mmol), *N*,*N*-dimethylaniline **2a** (1.75 g, 14.48 mmol), NaOAc (198 mg, 2.41 mmol), $Ru(bpy)_3Cl_2 \cdot 6H_2O$ (72.3 mg, 0.096 mmol) and 30 ml acetonitrile. The mixture was spurged with nitrogen for 30 min and the reaction mixture was stirred and irradiated with blue LED at room temperature. After completion of reaction (confirmed by TLC), reaction mixture was concentrated in vacuum. The residue was purified by column chromatography on silica gel using 5% ethyl acetate in petroleum ether to afford **3a** as a yellow liquid (1.4 g, 88%).

5. Procedure for Experiment with TEMPO

An oven dried vial equipped with a magnetic stir bar was charged with imine derivatives (70 mg, 0.33 mmol), aniline (123 mg, 1.01 mmol), NaOAc (14 mg, 0.165 mmol), TEMPO (211 mg, 1.35 mmol) and $Ru(bpy)_3Cl_2 \cdot 6H_2O$ (5 mg, 6.6 μmol), then distilled dry MeCN (2 mL) was added. After addition of solvent,

reaction mixture was purged with nitrogen for 30 minutes and stirred under nitrogen atmosphere (N_2 balloon) at rt under blue light. The reaction was observed by TLC. No product formation was observed.

6. Fluorescence Quenching Experiments and Electrochemical Characterization of 1a and 2a

a) Fluorescence spectra was recorded using Agilent photoluminescence spectrophotometer. The Stern-Volmer fluorescence quenching studies were run with freshly prepared $Ru(bpy)_3Cl_2$ (0.16 μM solution in CH_3CN) at room temperature. The solution was irradiated at 450 nm and fluorescence was measured from 500 to 800 nm. Control experiments showed that $Ru(bpy)_3Cl_2$ fluorescence was quenched by glyoxalic oxime ether **1a**.

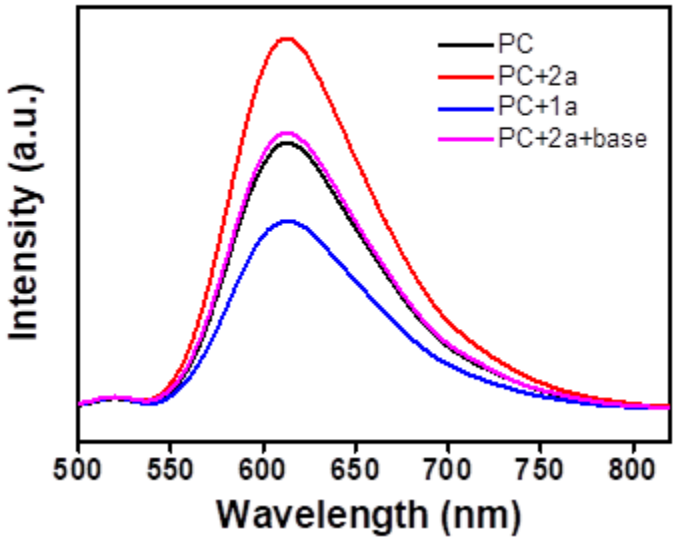


Figure S1. Fluorescence intensity of a $Ru(bpy)_3Cl_2$ solution (0.16 μM solution in CH_3CN) containing glyoxalic oxime ether (**1a**), *N*,*N*-dimethylaniline (**2a**) or **2a** + NaOAc in CH_3CN (excitation wavelength: 450 nm). Peak descriptors: $Ru(bpy)_3Cl_2$ (0.16 μM) in CH_3CN (black line), $Ru(bpy)_3Cl_2$ (0.16 μM) with **1a** (0.72 Mm) in CH_3CN (blue line), $Ru(bpy)_3Cl_2$ (0.16 μM) with **2a** (0.72 mM) in CH_3CN (red line), $Ru(bpy)_3Cl_2$ (0.16 μM) with **2a** (0.72 Mm) and NaOAc (0.72 mM) in CH_3CN (pink line).

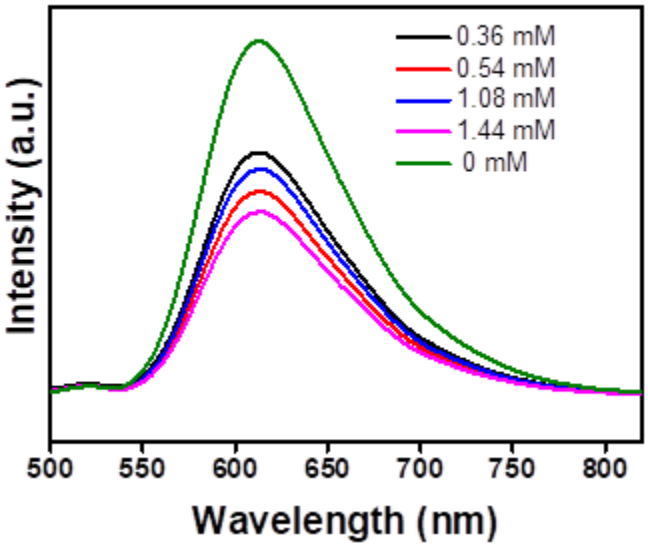


Figure S2. Fluorescence intensity of a $Ru(bpy)_3Cl_2$ solution (0.16 μM solution in CH_3CN) containing varying amounts of glyoxalic oxime ether (**1a**) (excitation wavelength: 450 nm).

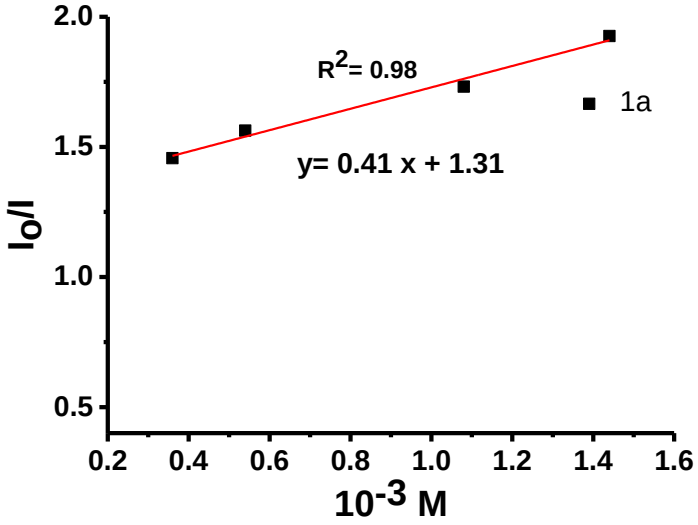


Figure S3. Stern-Volmer plot for the fluorescence quenching studies of $Ru(bpy)_3Cl_2$ by glyoxalic oxime ether (**1a**).

b) Cyclic voltammetry was performed using DCM solution with 0.1 M tetrabutylammonium tetrafluoroborate electrolyte solution. Platinum wire and platinum were used as counter and working electrode, respectively while Ag/AgCl was used as reference electrode. All the measurements were recorded at scan rate of 50 mV/s. Figure S4 shows the typical CV response of the **1a** and **2a** and the obtained values of E_{ox}^{onset} and E_{red} were referenced to Ag/AgCl which have been converted to SCE by subtracting 0.03 V. The results obtained for **2a** are in agreement with previous report and **1a** shows no significant redox activity.

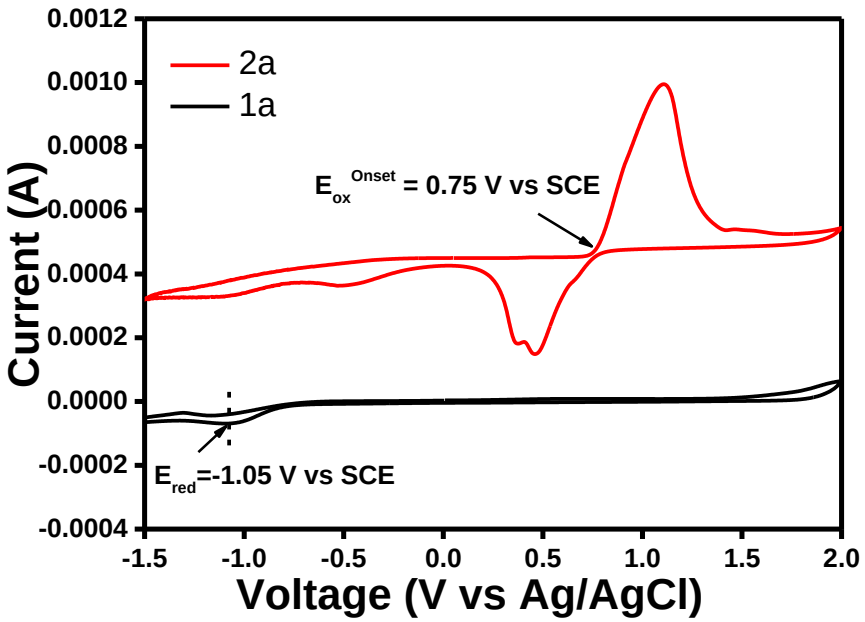
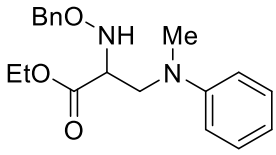
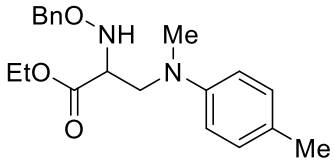


Figure S4. Cyclic Voltammogram of glyoxalic oxime ether (**1a**) and *N*,*N*-dimethylaniline (**2a**).

7. Analytical data of synthesized products

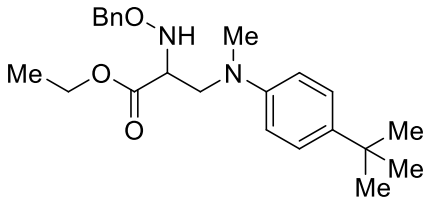


Ethyl 2-(benzyloxyamino)-3-(methyl(phenyl)amino)propanoate (3a): According to the general procedure **2**, ethyl 2-(benzyloxyimino)acetate (70 mg, 0.337 mmol) and *N*,*N*-dimethyl aniline (3.0 equiv, 1.01 mmol) provided **3a** after flash column chromatography (5% ethyl acetate in petroleum ether) as yellow liquid (100 mg, 90%). R_f = 0.2 (10% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1}: 2927, 2252, 1730, 1600, 1506, 1454, 1370, 904, 724, 696, 648. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.28 – 7.33 (m, 5H), 7.24 (t, *J* = 7.9 Hz, 2H), 6.74 (t, *J* = 9.0 Hz, 3H), 4.71 (s, 2H), 4.25 – 4.12 (m, 2H), 3.93 (dd, *J* = 7.3, 5.9 Hz, 1H), 3.62 (dd, *J* = 15.0, 5.8 Hz, 1H), 3.48 (dd, *J* = 15.1, 7.4 Hz, 1H), 2.92 (s, 3H), 1.26 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, Chloroform-*d*) δ 172.7, 148.8, 137.6, 129.3, 128.6, 128.4, 128.0, 117.0, 112.5, 76.4, 62.6, 61.4, 52.5, 39.3, 14.3. HRMS: exact mass calculated for $C_{19}H_{25}N_2O_3$ $[M+H]^+$ 329.1860, found 329.1848.

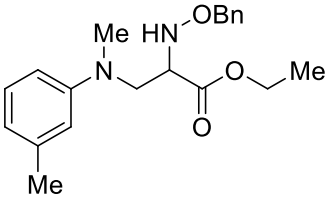


Ethyl 2-(benzyloxyamino)-3-(methyl(*p*-tolyl)amino)propanoate (3b): According to the general procedure **2**, ethyl 2-(benzyloxyimino)acetate (70 mg, 0.337 mmol) and *N*,*N*,4-trimethylaniline (3.0 equiv, 1.01 mmol) provided **3b** after flash column chromatography (5% Ethyl acetate in petroleum ether) as a yellow liquid (95 mg, 82%). R_f = 0.45 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1}: 2918, 2851, 1732, 1618, 1521, 1454, 1368, 1265, 1192, 1024, 735, 699. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.36 – 7.29 (m, 5H), 7.07 (d, *J* = 8.4 Hz, 2H), 6.68 (d, *J* = 8.6 Hz, 2H), 4.73 (s, 2H), 4.16 – 4. 26 (m, 2H), 3.96 (dd, *J* = 7.4, 5.8 Hz, 1H), 3.60 (dd, *J* = 15.0, 5.8 Hz, 1H), 3.47 (dd, *J* = 14.9, 7.5 Hz, 1H), 2.92 (s, 3H), 2.29 (s, 3H), 1.29 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-*d*)

δ 172.8, 146.9, 137.8, 129.8, 128.5, 128.3, 127.1, 126.3, 112.1, 76.4, 62.7, 61.2, 52.1, 39.4, 20.3, 14.2. HRMS: exact mass calculated for $C_{20}H_{27}N_2O_3$ $[M+H]^+$ 343.2016, found 343.2012.

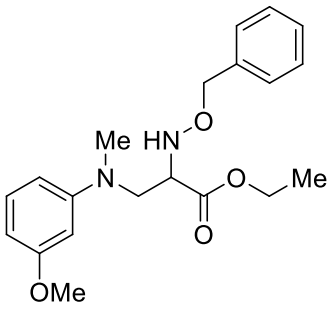


Ethyl 2-(benzyloxyamino)-3-((4-*tert*-butylphenyl)(methyl)amino)propanoate (3c): According to the general procedure **2**, ethyl 2-(benzyloxyimino)acetate (70 mg, 0.337 mmol) and 4-*tert*-butyl-*N*,*N*-dimethylaniline (3.0 equiv, 1.01 mmol) provided **3c** after flash column chromatography (5% ethyl acetate in petroleum ether) as a yellow liquid (117 mg, 90%). R_f = 0.31 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1}: 1521, 1735, 2960, 2904, 2867, 3032, 3258. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.38 – 7.34 (m, 5H), 7.33 (d, *J* = 8.8 Hz, 2H), 6.75 (d, *J* = 8.8 Hz, 2H), 4.77 (s, 2H), 4.29 – 4.18 (m, 2H), 3.99 (dd, *J* = 7.3, 5.8 Hz, 1H), 3.66 (dd, *J* = 15.0, 5.7 Hz, 1H), 3.51 (dd, *J* = 15.0, 7.5 Hz, 1H), 2.97 (s, 3H), 1.37 (s, 9H), 1.31 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 172.7, 146.7, 139.7, 137.7, 128.5, 128.3, 127.9, 126.0, 76.4, 62.8, 61.2, 52.8, 39.3, 33.9, 31.7, 14.2. HRMS: exact mass calculated for $C_{23}H_{33}N_2O_3$ $[M+H]^+$ 385.2486, found 385.2488.

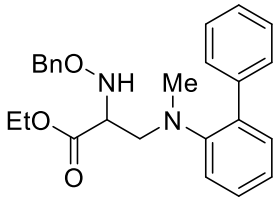


Ethyl 2-(benzyloxyamino)-3-(methyl(*m*-tolyl)amino)propanoate (3d): According to the general procedure **2**, ethyl 2-(benzyloxyimino)acetate (70 mg, 0.337 mmol) and *N*,*N*,3-trimethylaniline (3.0 equiv, 1.01 mmol) provided **3d** after flash column chromatography (5% ethyl acetate in petroleum ether) as a yellow liquid (98 mg, 85%). R_f = 0.45 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1} 1603, 1732, 2918, 2980, 3032,

3259, 3423. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.37 (d, *J* = 4.4 Hz, 4H), 7.35 – 7.32 (m, 1H), 7.17 (t, *J* = 7.6 Hz, 1H), 6.65 – 6.56 (m, 3H), 4.76 (s, 2H), 4.23 (qq, *J* = 10.8, 7.2 Hz, 2H), 3.98 (dd, *J* = 7.4, 5.8 Hz, 1H), 3.65 (dd, *J* = 15.0, 5.7 Hz, 1H), 3.51 (dd, *J* = 15.1, 7.5 Hz, 1H), 2.95 (s, 3H), 2.36 (s, 3H), 1.31 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 172.6, 148.2, 138.9, 137.7, 129.1, 128.5, 128.4, 127.9, 117.2, 113.3, 109.8, 76.4, 62.7, 61.3, 52.6, 39.3, 21.2, 14.2. HRMS: exact mass calculated for $C_{20}H_{27}N_2O_3$ $[M+H]^+$ 343.2016, found 343.2019.

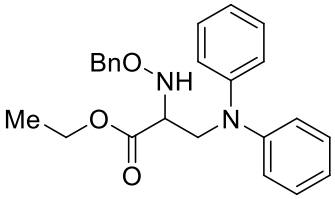


Ethyl 2-(benzyloxyamino)-3-((3-methoxyphenyl)(methyl)amino)propanoate (3e): According to the general procedure **2**, ethyl 2-(benzyloxyimino)acetate (70 mg, 0.337 mmol) and 3-methoxy-*N*,*N*-dimethylaniline (3.0 equiv, 1.01 mmol) provided **3e** after flash column chromatography (5% ethyl acetate in petroleum ether) as a yellow liquid (56 mg, 46%). R_f = 0.45 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1} 1611, 1732, 2918, 3031, 3259. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.40 – 7.23 (m, 5H), 7.14 (t, *J* = 8.1 Hz, 1H), 6.37 – 6.26 (m, 3H), 4.70 (s, 2H), 4.19 (qq, *J* = 10.8, 7.1 Hz, 2H), 3.96 – 3.89 (m, 1H), 3.78 (s, 3H), 3.61 (dd, *J* = 15.1, 5.6 Hz, 1H), 3.46 (dd, *J* = 15.1, 7.5 Hz, 1H), 2.91 (s, 3H), 1.26 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 172.6, 160.9, 150.2, 137.7, 129.2, 128.6, 128.4, 127.2, 105.5, 102.0, 99.0, 76.5, 62.7, 61.4, 55.2, 52.6, 39.5, 14.2. HRMS: exact mass calculated for $C_{20}H_{27}N_2O_4$ $[M+H]^+$ 359.1965, found 359.1975.

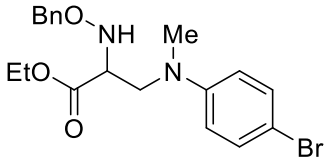


Ethyl 2-(benzyloxyamino)-3-(biphenyl-2-yl(methyl)amino)propanoate (3f): According to the general

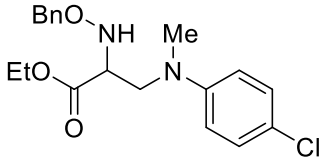
procedure **2**, ethyl 2-(benzyloxyimino)acetate (70 mg, 0.337 mmol) and *N*,*N*-dimethylbiphenyl-2-amine (3.0 equiv, 1.01) provided **3f** after flash column chromatography (5% ethyl acetate in petroleum ether) as a colorless liquid (127 mg, 93%). R_f = 0.65 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1}: 1737, 2923, 2853, 3060, 3030, 3261. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.48 (d, *J* = 7.2 Hz, 2H), 7.39 – 7.34 (m, 4H), 7.33 – 7.27 (m, 5H), 7.24 (dd, *J* = 7.5, 1.5 Hz, 1H), 7.14 – 7.08 (m, 2H), 4.68 – 4.62 (m, 2H), 4.19 – 4.07 (m, 2H), 3.74 (dd, *J* = 8.4, 5.1 Hz, 1H), 3.11 (dd, *J* = 13.7, 5.1 Hz, 1H), 2.99 (dd, *J* = 13.7, 8.4 Hz, 1H), 2.62 (s, 3H), 1.25 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 172.7, 149.7, 141.3, 137.1, 136.2, 131.7, 129.0, 128.4, 128.3, 128.3, 128.2, 127.9, 126.9, 123.0, 120.4, 76.3, 62.5, 61.0, 54.0, 42.4, 14.2. HRMS: exact mass calculated for $C_{25}H_{29}N_2O_3$ $[M+H]^+$ 405.2173, found 405.2175.



Ethyl 2-(benzyloxyamino)-3-(diphenylamino)propanoate (3g): According to the general procedure **2**, ethyl 2-(benzyloxyimino)acetate (70 mg, 0.337 mmol) and *N*-methyl-*N*-phenylaniline (3.0 equiv, 1.01 mmol) provided **3g** after flash column chromatography (5% ethyl acetate in petroleum ether) as yellow liquid (58 mg, 44%). R_f = 0.30 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1}: 1590, 1732, 2919, 2851, 3034, 3063, 3259. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.34 – 7.28 (m, 5H), 7.25 (dd, *J* = 8.5, 7.4 Hz, 4H), 7.02 – 6.94 (m, 6H), 4.68 (d, *J* = 2.5 Hz, 2H), 4.17 – 4.04 (m, 2H), 4.00 (dt, *J* = 11.7, 5.4 Hz, 2H), 3.92 (dd, *J* = 13.7, 6.3 Hz, 1H), 1.21 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 172.5, 147.9, 137.7, 129.4, 128.7, 128.4, 127.1, 121.1, 121.3, 76.4, 62.7, 61.3, 51.8, 14.2. HRMS: exact mass calculated for $C_{24}H_{27}N_2O_3$ $[M+H]^+$ 391.2016, found 391.2030.

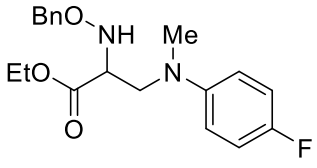


Ethyl 2-(benzyloxyamino)-3-((4-bromophenyl)(methyl)amino)propanoate (3h) : According to the general procedure **2**, ethyl 2-(benzyloxyimino)acetate (70 mg, 0.337 mmol) and 4-bromo-*N*,*N*-dimethylaniline (3.0 equiv, 1.01 mmol) provided **3h** after flash column chromatography (5% ethyl acetate in petroleum ether) as colorless liquid (128 mg, 93%). R_f = 0.3 (10% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1}: 2985, 1732, 1498, 1373, 1265, 1243, 1045, 847, 732, 702. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.32 – 7.27 (m, 7H), 6.56 (d, *J* = 9.1 Hz, 2H), 6.02 (s, 1H), 4.68 (s, 2H), 4.18 (qq, *J* = 10.7, 7.1 Hz, 2H), 3.88 – 3.83 (m, 1H), 3.57 (dd, *J* = 15.1, 5.7 Hz, 1H), 3.43 (dd, *J* = 15.1, 7.4 Hz, 1H), 2.87 (s, 3H), 1.26 (t, *J* = 7.2 Hz, 3H). ^{13}C NMR (125MHz, Chloroform-*d*) δ 172.4, 147.7, 137.5, 131.9, 128.5, 128.3, 127.1, 114.0, 108.9, 76.4, 62.3, 61.4, 52.3, 39.3, 14.2. HRMS: exact mass calculated for $C_{19}H_{24}BrN_2O_3$ $[M+H]^+$ 407.0965, found 407.0962.

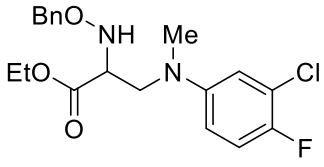


Ethyl 2-(benzyloxyamino)-3-((4-chlorophenyl)(methyl)amino)propanoate (3i): According to the general procedure **2**, ethyl 2-(benzyloxyimino)acetate (70 mg, 0.337 mmol) and 4-chloro-*N*,*N*-dimethylaniline (3.0 equiv, 1.01 mmol) provided **3i** after flash column chromatography (5% ethyl acetate in petroleum ether) as colorless liquid (119 mg, 97%). R_f = 0.29 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1}:1502, 1732, 2922, 2853, 3054, 3300. ^{1}H NMR (500 MHz, Chloroform-*d*) ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.36 – 7.28 (m, 5H), 7.17 (d, *J* = 9.1 Hz, 2H), 6.62 (d, *J* = 9.1 Hz, 2H), 4.70 (s, 2H), 4.20 (qq, *J* = 10.8, 7.0 Hz, 2H), 3.88 (dd, *J* = 7.2, 6.0 Hz, 1H), 3.58 (dd, *J* = 15.2, 5.8 Hz, 1H), 3.45

(dd, *J* = 15.1, 7.4 Hz, 1H), 2.90 (s, 3H), 1.27 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 172.7, 147.4, 137.7, 129.0, 128.7, 128.4, 128.0, 121.1, 113.7, 76.5, 62.5, 61.5, 52.6, 39.5, 14.3. HRMS: exact mass calculated for $C_{19}H_{24}ClN_2O_3$ $[M+H]^+$ 363.1470, found 363.1453.

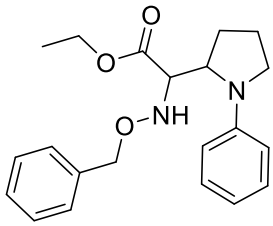


Ethyl 2-(benzyloxyamino)-3-((4-fluorophenyl)(methyl)amino)propanoate (3j): According to the general procedure **2**, ethyl 2-(benzyloxyimino)acetate (70 mg, 0.337 mmol) and 4-fluoro-*N*,*N*-dimethylaniline (3.0 equiv, 1.01 mmol) provided **3j** after flash column chromatography (5% ethyl acetate in petroleum ether) as yellow liquid (111 mg, 95%). R_f = 0.25 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1}: 1513, 1732, 2920, 2982, 3033, 3059, 3262. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.38 – 7.28 (m, 5H), 6.98 – 6.92 (m, 2H), 6.69 – 6.64 (m, 2H), 4.72 (s, 2H), 4.26 – 4.16 (m, 2H), 3.90 (dd, *J* = 7.2, 6.0 Hz, 1H), 3.56 (dd, *J* = 15.0, 5.8 Hz, 1H), 3.44 (dd, *J* = 15.0, 7.4 Hz, 1H), 2.89 (s, 3H), 1.28 (t, *J* = 7.2 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 172.7, 155.8 (d, *J* = 235.6 Hz), 145.5, 137.7, 128.6, 128.3, 127.1, 115.5 (d, *J* = 22.2 Hz), 113.8 (d, *J* = 7.2 Hz), 76.3, 62.5, 61.3, 53.1, 39.7, 14.2. HRMS: exact mass calculated for $C_{19}H_{24}FN_2O_3$ $[M+H]^+$ 347.1765, found 347.1771.

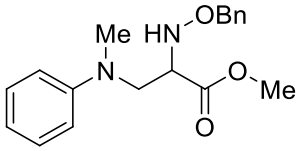


Ethyl 2-(benzyloxyamino)-3-((3-chloro-4-fluorophenyl)(methyl)amino)propanoate (3k) : According to the general procedure **2**, ethyl 2-(benzyloxyimino)acetate (70 mg, 0.337 mmol) and 3-chloro-4-fluoro-*N*,*N*-dimethylaniline (3.0 equiv, 1.01 mmol) provided **3k** after flash column chromatography (5% ethyl acetate in petroleum ether) as yellow liquid (53 mg, 41

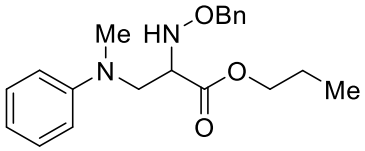
%). R_f = 0.23 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1}: 2927, 2253, 1731, 1612, 1454, 1508, 1242, 1198, 1022, 904, 724, 649. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.33 – 7. (d, *J* = 5.1 Hz, 5H), 6.97 (t, *J* = 9.0 Hz, 1H), 6.69 (dd, *J* = 6.0, 3.1 Hz, 1H), 6.51 (dt, *J* = 9.1, 3.4 Hz, 1H), 4.68 (d, *J* = 2.4 Hz, 2H), 4.25 – 4.15 (m, 2H), 3.84 – 3.80 (m, 1H), 3.53 (dd, *J* = 15.3, 5.6 Hz, 1H), 3.40 (dd, *J* = 15.3, 7.4 Hz, 1H), 2.85 (s, 3H), 1.28 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 172.4, 151.8, 146.0, 137.7, 128.7, 128.4, 128.0, 121.1 (d, *J* = 18.1 Hz), 116.7 (d, *J* = 21.5 Hz), 114.0, 111.8 (d, *J* = 6.1 Hz), 76.5, 62.5, 61.5, 52.1, 39.7, 14.2. HRMS: exact mass calculated for $C_{19}H_{23}ClFN_2O_3$ $[M+H]^+$ 381.1376, found 381.1377.



Ethyl 2-(benzyloxyamino)-2-(1-phenylpyrrolidin-2-yl)acetate (3l'): According to the general procedure 2, ethyl 2-(benzyloxyimino)acetate (70 mg, 0.337 mmol) and *N*,*N*-dimethyl aniline (3.0 equiv, 1.01 mmol) provided 3a after flash column chromatography (5% Ethyl acetate in petroleum ether) as yellow liquid (38 mg, 32 %). R_f = 0.5 (10% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1}:1600, 1730, 2985, 3054. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.27 (s, 4H), 7.18 (s, 1H), 7.13 (dd, *J* = 8.6, 7.4 Hz, 2H), 6.64 (t, *J* = 7.3 Hz, 1H), 6.51 (d, *J* = 8.1 Hz, 2H), 4.67 – 4.56 (m, 2H), 4.08 (qd, *J* = 7.1, 1.7 Hz, 2H), 3.98 (t, *J* = 6.1 Hz, 1H), 3.78 (d, *J* = 5.3 Hz, 1H), 3.40 – 3.27 (m, 1H), 3.04 (q, *J* = 8.1 Hz, 1H), 1.84 (d, *J* = 11.0 Hz, 4H), 1.14 (t, *J* = 7.1 Hz, 3H). ^{1}H NMR (125 MHz, Chloroform-*D*) δ 172.8, 147.4, 137.7, 129.3, 128.9, 128.4, 128.0, 116.9, 112.8, 76.5, 65.7, 61.2, 58.6, 49.2, 28.1, 23.6, 14.2. Exact mass calculated for $C_{21}H_{27}N_2O_3$ $[M+H]^+$: 355.2016; found: 355.2016.

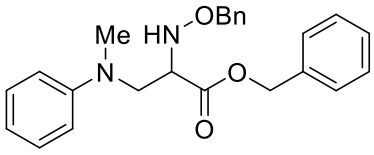


Methyl 2-(benzyloxyamino)-3-(methyl(phenyl)amino)propanoate (3m): According to the general procedure **2**, methyl 2-(benzyloxyimino)acetate (70 mg, 0.362 mmol) and *N*,*N*-dimethylaniline (3.0 equiv, 1.09 mmol) provided **3m** after flash column chromatography (5% ethyl acetate in petroleum ether) as yellow liquid (70 mg, 61%). R_f = 0.2 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1} 1599, 1737, 2918, 2951, 3030, 3062, 3259, 3463. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.42 – 7.30 (m, 5H), 7.30 – 7.23 (m, 2H), 6.75 (dd, *J* = 10.5, 7.8 Hz, 3H), 6.04 (dd, *J* = 7.5, 5.7 Hz, 1H), 4.72 (s, 2H), 3.96 (dd, *J* = 7.4, 5.8 Hz, 1H), 3.74 (s, 3H), 3.64 (dd, *J* = 15.1, 5.8 Hz, 1H), 3.50 (dd, *J* = 15.0, 7.5 Hz, 1H), 2.93 (s, 3H). ^{13}C NMR (126 MHz, Chloroform-*d*) δ 173.2, 148.8, 137.7, 129.3, 128.7, 128.4, 128.0, 117.1, 112.5, 76.5, 62.5, 52.6, 52.3, 39.4. HRMS: exact mass calculated for $C_{18}H_{23}N_2O_3$ $[M+H]^+$ 315.1703, found 315.1700.

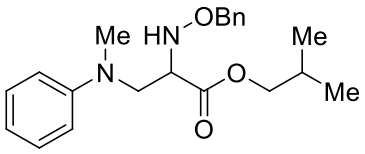


Propyl 2-(benzyloxyamino)-3-(methyl(phenyl)amino)propanoate (3n): According to the general procedure **2**, propyl 2-(benzyloxyimino)acetate (70 mg, 0.316 mmol) and *N*,*N*-dimethylaniline (3.0 equiv, 0.949 mmol) provided **3n** after flash column chromatography (5% ethyl acetate in petroleum ether) as yellow liquid (101 mg, 93%). R_f = 0.3 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1} 1599, 1732, 2919, 2965, 3030, 3063, 3089, 3444. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.34 (d, *J* = 4.4 Hz, 3H), 7.32 – 7.27 (m, 2H), 7.27 – 7.22 (m, 2H), 6.76 (dd, *J* = 11.5, 7.9 Hz, 3H), 6.07 (s, 1H), 4.73 (s, 2H), 4.19 – 4.04 (m, 2H), 3.96 (dd, *J* = 7.3, 5.9 Hz, 1H), 3.64 (dd, *J* = 15.1, 5.7 Hz,

1H), 3.49 (dd, *J* = 15.1, 7.5 Hz, 1H), 2.94 (s, 3H), 1.68 (h, *J* = 7.1 Hz, 2H), 0.96 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 172.8, 148.8, 137.7, 129.3, 128.6, 128.4, 127.9, 117.0, 112.5, 76.4, 66.2, 62.7, 52.6, 39.4, 22.0, 10.4. HRMS: exact mass calculated for $C_{20}H_{27}N_2O_3$ $[M+H]^+$ 343.2016, found 343.2017.

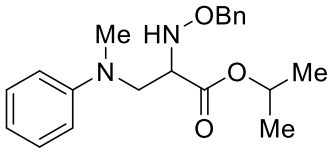


Benzyl 2-(benzyloxyamino)-3-(methyl(phenyl)amino)propanoate (3o): According to the general procedure **2**, benzyl 2-(benzyloxyimino)acetate (70 mg, 0.259 mmol) and *N*,*N*-dimethylaniline (3.0 equiv, 0.779 mmol) provided **3o** after flash column chromatography (5% ethyl acetate in petroleum ether) as yellow liquid (54 mg, 53%). R_f = 0.45 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1} 1600, 1737, 2919, 3033, 3063, 3090, 3262, 3425. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.31 (dd, *J* = 6.9, 2.3 Hz, 5H), 7.28 (d, *J* = 2.4 Hz, 4H), 7.25 – 7.17 (m, 3H), 6.71 (dd, *J* = 17.5, 7.7 Hz, 3H), 5.22 – 5.09 (m, 2H), 4.68 (s, 2H), 4.01 – 3.94 (m, 1H), 3.58 (s, 1H), 3.48 (dd, *J* = 15.0, 7.4 Hz, 1H), 2.85 (s, 3H). ^{13}C NMR (101 MHz, Chloroform-*d*) δ 172.6, 148.7, 141.0, 137.5, 135.5, 129.3, 128.7, 128.6, 128.6, 128.4, 127.9, 117.0, 112.5, 76.4, 67.0, 62.7, 52.5, 39.3. HRMS: exact mass calculated for $C_{24}H_{27}N_2O_3$ $[M+H]^+$ 391.2016, found 391.2019.

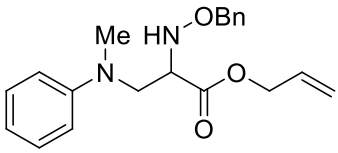


Isobutyl 2-(benzyloxyamino)-3-(methyl(phenyl)amino)propanoate (3p): According to the general procedure **2**, isobutyl 2-(benzyloxyimino)acetate (70 mg, 0.297 mmol) and *N*,*N*-dimethylaniline (3.0 equiv,

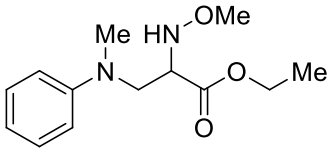
0.892 mmol) provided **3p** after flash column chromatography (5% ethyl acetate in petroleum ether) as yellow liquid (99 mg, 93%). R_f = 0.45 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1} 1600, 1733, 2960, 2918, 3030, 3063, 3258, 3450. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.35 – 7.28 (m, 5H), 7.27 – 7.21 (m, 2H), 6.77 – 6.72 (m, 3H), 6.05 (s, 1H), 4.71 (s, 2H), 4.00 – 3.86 (m, 3H), 3.64 (dd, *J* = 15.0, 5.6 Hz, 1H), 3.46 (dd, *J* = 15.1, 7.5 Hz, 1H), 2.93 (s, 3H), 1.95 (dp, *J* = 13.4, 6.7 Hz, 1H), 0.94 (d, *J* = 6.8 Hz, 6H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 172.8, 148.8, 137.8, 129.3, 128.7, 128.4, 127.1, 117.0, 112.5, 76.4, 71.4, 62.8, 52.6, 39.4, 27.8, 19.2. HRMS**:** exact mass calculated for $C_{21}H_{29}N_2O_3$ $[M+H]^+$ 357.2173, found 357.2173.



Isopropyl 2-(benzyloxyamino)-3-(methyl(phenyl)amino)propanoate (3q): According to the general procedure **2**, isopropyl 2-(benzyloxyimino)acetate (70 mg, 0.316 mmol) and *N*,*N*-dimethylaniline (3.0 equiv, 0.949 mmol) provided **3q** after flash column chromatography (5% ethyl acetate in petroleum ether) as a pale yellow liquid (102 mg, 94%). R_f = 0.3 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1} 1600, 1730, 2918, 2980, 3030, 3063, 3260, 3442. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.35 – 7.27 (m, 5H), 7.27 – 7.22 (m, 2H), 6.74 (d, *J* = 8.2 Hz, 3H), 6.05 (s, 1H), 5.09 (hept, *J* = 6.3 Hz, 1H), 4.71 (s, 2H), 3.91 (dd, *J* = 7.2, 6.0 Hz, 1H), 3.61 (dd, *J* = 15.0, 5.8 Hz, 1H), 3.47 (dd, *J* = 15.1, 7.4 Hz, 1H), 2.93 (s, 3H), 1.29 (d, *J* = 6.2 Hz, 3H), 1.23 (d, *J* = 6.2 Hz, 3H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 172.2, 148.9, 137.7, 129.3, 128.6, 128.4, 127.9, 117.0, 112.5, 76.4, 69.0, 62.8, 52.6, 39.4, 21.2. HRMS: exact mass calculated for $C_{20}H_{27}N_2O_3$ $[M+H]^+$ 343.2016, found 343.2014.

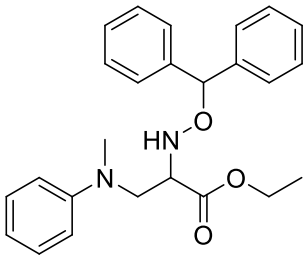


Allyl 2-(benzyloxyamino)-3-(methyl(phenyl)amino)propanoate (3r): According to the general procedure **2**, allyl 2-(benzyloxyimino)acetate (70 mg, 0.319 mmol) and *N*,*N*-dimethylaniline (3.0 equiv, 0.957 mmol) provided **3r** after flash column chromatography (5% ethyl acetate in petroleum ether) as yellow liquid (100 mg, 92 %). R_f = 0.45 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1} 1599, 1737, 2917, 3029, 3063, 3088, 3259, 3456. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 7.37 – 7.31 (m, 4H), 7.31 – 7.22 (m, 3H), 6.76 (dd, *J* = 14.2, 7.8 Hz, 3H), 6.07 (s, 1H), 5.91 (ddt, *J* = 16.2, 10.7, 5.7 Hz, 1H), 5.26 (d, *J* = 10.5 Hz, 1H), 4.75 – 4.58 (m, 4H), 4.02 – 3.95 (m, 1H), 3.66 (dd, *J* = 15.0, 5.8 Hz, 1H), 3.51 (dd, *J* = 15.1, 7.5 Hz, 1H), 2.94 (s, 3H). ^{13}C NMR (125 MHz, Chloroform-*d*) δ 172.4, 148.8, 137.7, 131.8, 129.3, 128.7, 128.4, 127.2, 118.8, 117.1, 112.6, 76.5, 65.2, 62.7, 52.6, 39.4. HRMS: exact mass calculated for $C_{20}H_{25}N_2O_3$ $[M+H]^+$ 341.1860, found 341.1861.

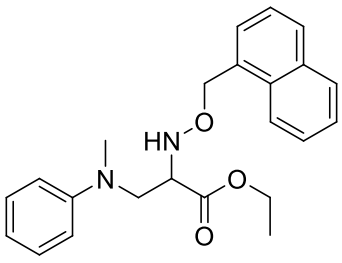


Ethyl 2-(methoxyamino)-3-(methyl(phenyl)amino)propanoate (3s) : According to the general procedure **2**, ethyl 2-(methoxyimino)acetate (70 mg, 0.53 mmol) and *N*,*N*-dimethylaniline (3.0 equiv, 1.60 mmol) provided **3s** after flash column chromatography (5% ethyl acetate in petroleum ether) as yellow liquid (127 mg, 94%). R_f = 0.35 (20% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1} 1599 ,1732, 2918, 3028, 3257, 3453. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.31 – 7.22 (m, 2H), 6.76 (dd, *J* = 13.6, 7.7 Hz, 3H), 4.28 – 4.12 (m, 2H), 3.97 (dd, *J* = 7.3, 5.9 Hz, 1H), 3.67 (dd, *J* = 15.0, 5.8 Hz, 1H), 3.54 (s, 4H), 2.99 (s, 3H), 1.27 (t, *J* = 7.1 Hz, 3H).^{13}C NMR (101 MHz, Chloroform-*d*) δ 172.7, 148.9,

129.3, 117.0, 112.5, 62.3, 62.1, 61.4, 52.5, 39.4, 14.2. HRMS: exact mass calculated for $C_{13}H_{21}N_2O_3$ $[M+H]^+$ 253.1547, found 253.1542.



Ethyl 2-(benzhydryloxyamino)-3-(methyl(phenyl)amino)propanoate (3t): According to the general procedure 2, ethyl 2-(benzhydryloxyimino)acetate (70 mg, 0.24 mmol) and *N*,*N*-dimethyl aniline (3.0 equiv, 1.01 mmol) provided **3t** after flash column chromatography (5% Ethyl acetate in petroleum ether) as yellow liquid (59 mg, 59 %). R_f = 0.5 (10% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1}:1601, 1732, 2927, 3054. ^1H NMR (500 MHz, Chloroform-*d*) δ 7.23 (d, *J* = 6.4 Hz, 5H), 7.19 – 7.10 (m, 7H), 6.62 (dd, *J* = 11.3, 8.1 Hz, 3H), 5.94 (s, 1H), 5.65 (s, 1H), 4.18 – 3.98 (m, 2H), 3.88 (t, *J* = 6.6 Hz, 1H), 3.53 (dd, *J* = 15.0, 5.9 Hz, 1H), 3.41 (dd, *J* = 15.0, 7.4 Hz, 1H), 2.79 (s, 3H), 1.16 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, Chloroform-*D*) δ 172.65, 148.8, 141.4, 129.3, 128.6, 128.5, 128.4, 127.7, 127.5, 127.3, 126.6, 117.0, 112.5, 87.0, 62.5, 61.3, 52.5, 39.4, 14.3. Exact mass calculated for $C_{25}H_{29}N_2O_3$ $[M+H]^+$: 405.2173; found: 405.2165.



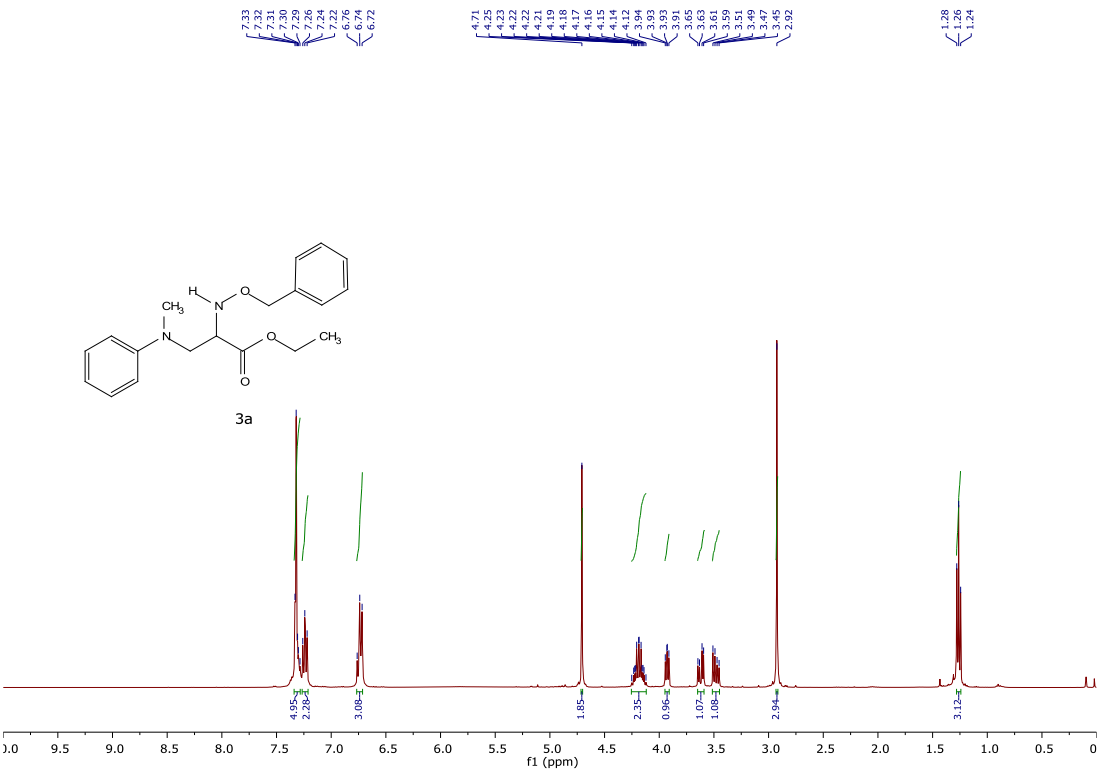
Ethyl 3-(methyl(phenyl)amino)-2-(naphthalen-1-ylmethoxyamino)propanoate (3u): According to the general procedure 2, ethyl 2-(naphthalen-1-ylmethoxyimino)acetate (70 mg, 0.337 mmol) and *N*,*N*-dimethyl aniline (3.0 equiv, 1.01 mmol) provided **3u** after flash column chromatography (5% Ethyl acetate in petroleum ether) as yellow liquid (100 mg, 90 %). R_f = 0.6 (10% ethyl acetate in petroleum ether). IR (neat): ν_{max}/cm^{-1}:1600,

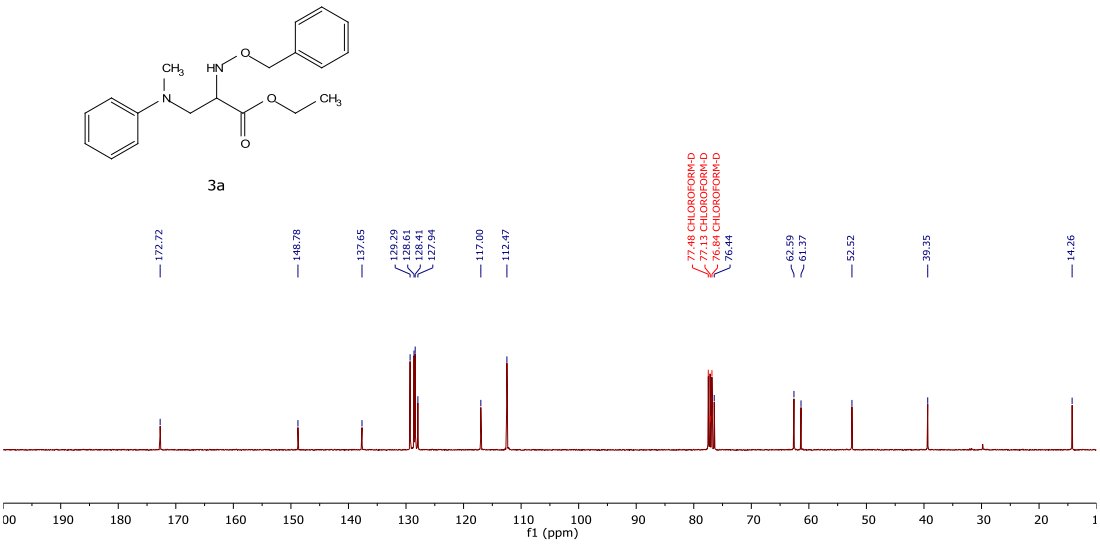
1732, 2988, 3054. ^{1}H NMR (500 MHz, Chloroform-*d*) δ 8.15 – 8.09 (m, 1H), 7.89 – 7.79 (m, 2H), 7.54 – 7.38 (m, 4H), 7.26 – 7.19 (m, 2H), 6.73 (dd, *J* = 21.5, 7.8 Hz, 3H), 5.23 – 5.13 (m, 2H), 4.15 (qq, *J* = 10.7, 7.2 Hz, 2H), 3.92 (dd, *J* = 7.4, 5.8 Hz, 1H), 3.61 (dd, *J* = 15.1, 5.7 Hz, 1H), 3.48 (dd, *J* = 15.0, 7.6 Hz, 1H), 2.89 (s, 3H), 1.22 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (125 MHz, CHLOROFORM-*D*) δ 172.64, 148.9, 133.8, 133.1, 132.1, 129.3, 129.0, 128.6, 127.7, 126.2, 125.8, 125.3, 124.3, 117.1, 112.5, 74.8, 62.7, 61.3, 52.6, 39.3, 14.24. Exact mass calculated for C23H26N2O3 $[M+H]^{+}$: 379.2016; found: 379.2013.

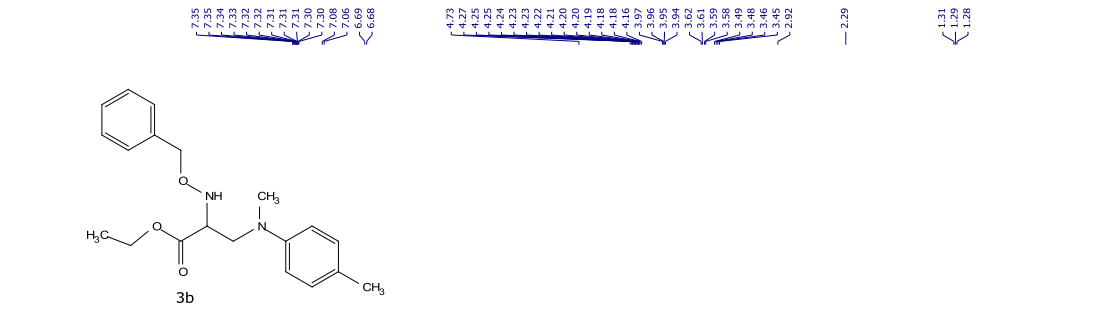
References:

1) Wu, Q.-L., et al. (2020). "Visible-light-promoted radical cross-coupling of para-quinone methides with N-substituted anilines: an efficient approach to 2,2-diarylethylamines." Organic & Biomolecular Chemistry **18**(5): 860-864.
2) Chiranjeevi, B., et al. (2014). "Iron(III)-Catalyzed C–H Functionalization: ortho-Benzoyloxylation of N,N-Dialkylanilines and Its Application to 1,4-Benzoxazepines." European Journal of Organic Chemistry **2014**(35): 7839-7849.
3) Godineau, E. and Y. Landais (2007). "Multicomponent Radical Processes: Synthesis of Substituted Piperidinones." Journal of the American Chemical Society **129**(42): 12662-12663.
4) Richaud, A. D. and S. P. Roche (2020). "Structure–Property Relationship Study of N-(Hydroxy)Peptides for the Design of Self-Assembled Parallel β-Sheets." The Journal of Organic Chemistry **85**(19): 12329-12342.

8. 1H and 13 C spectra of products



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4.27
4.25
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4.24
4.23
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4.20
4.19
4.18
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3.96
3.95
3.94
3.62
3.61
3.59
3.58
3.49
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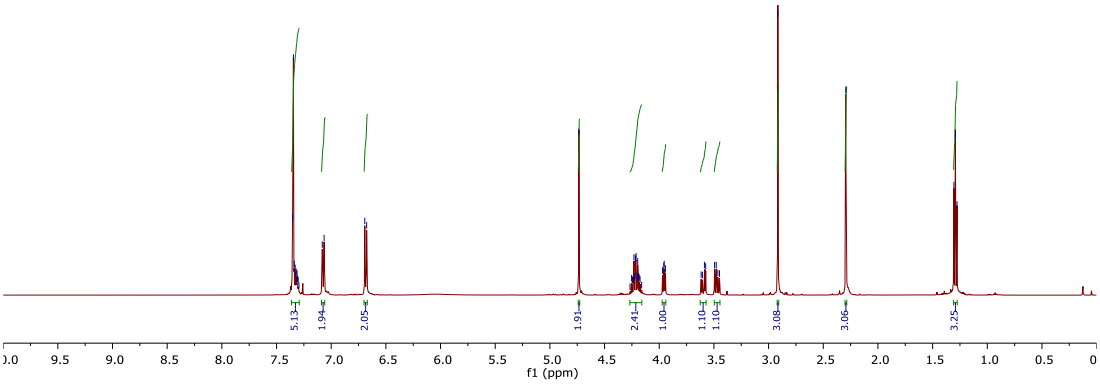
N
CH3
3b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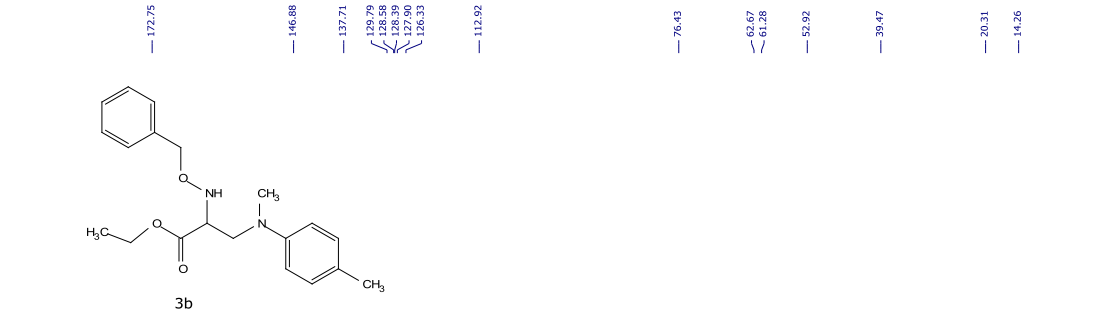
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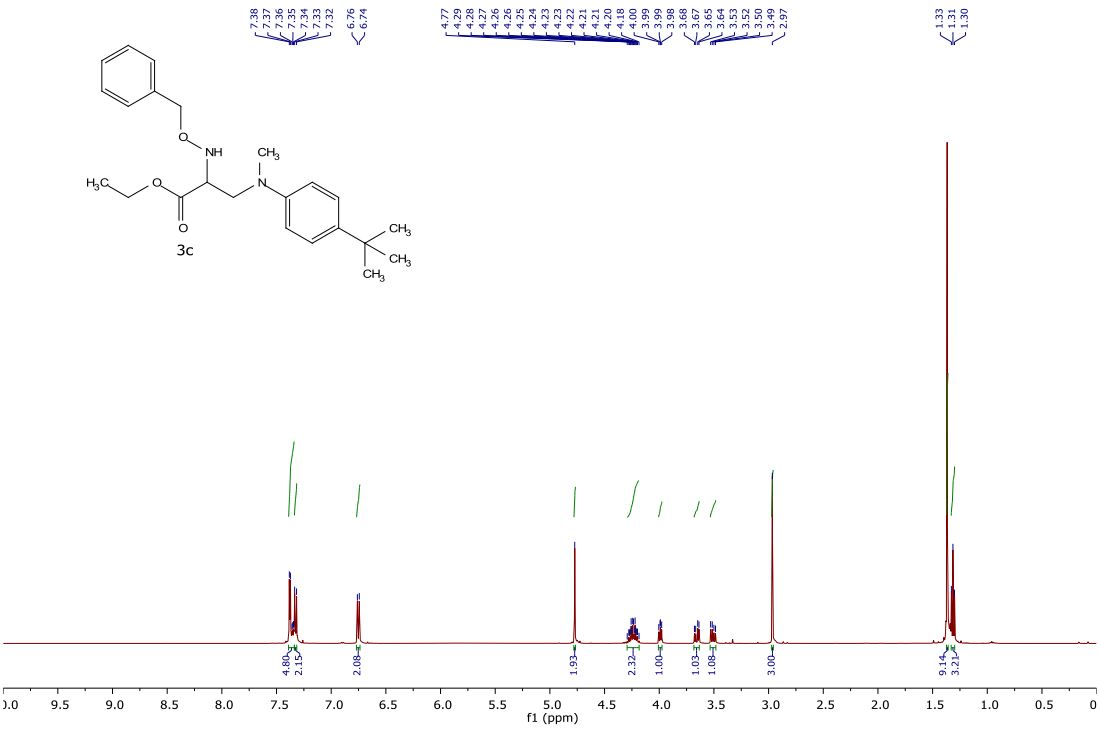
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3.99
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3.64
3.53
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H3C
O
O
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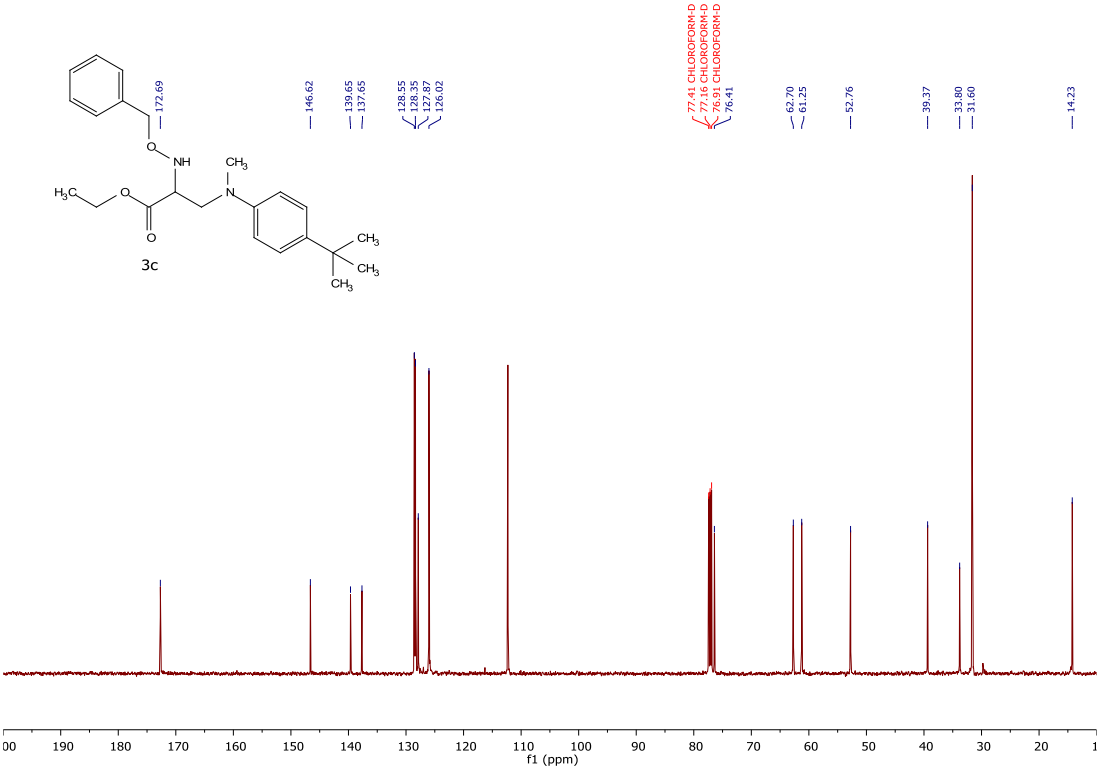
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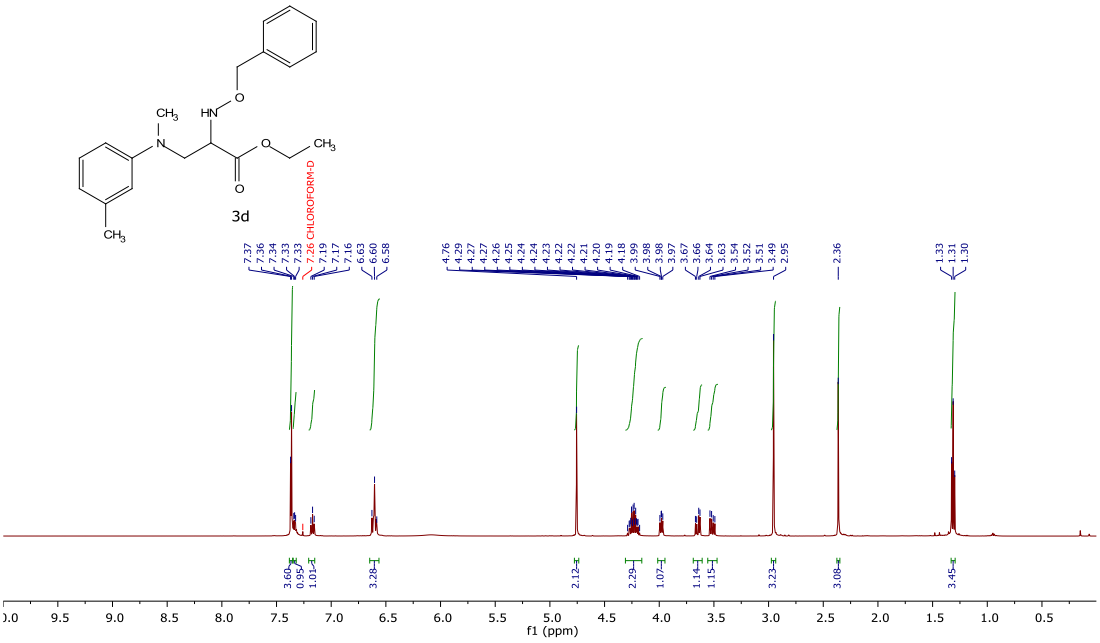
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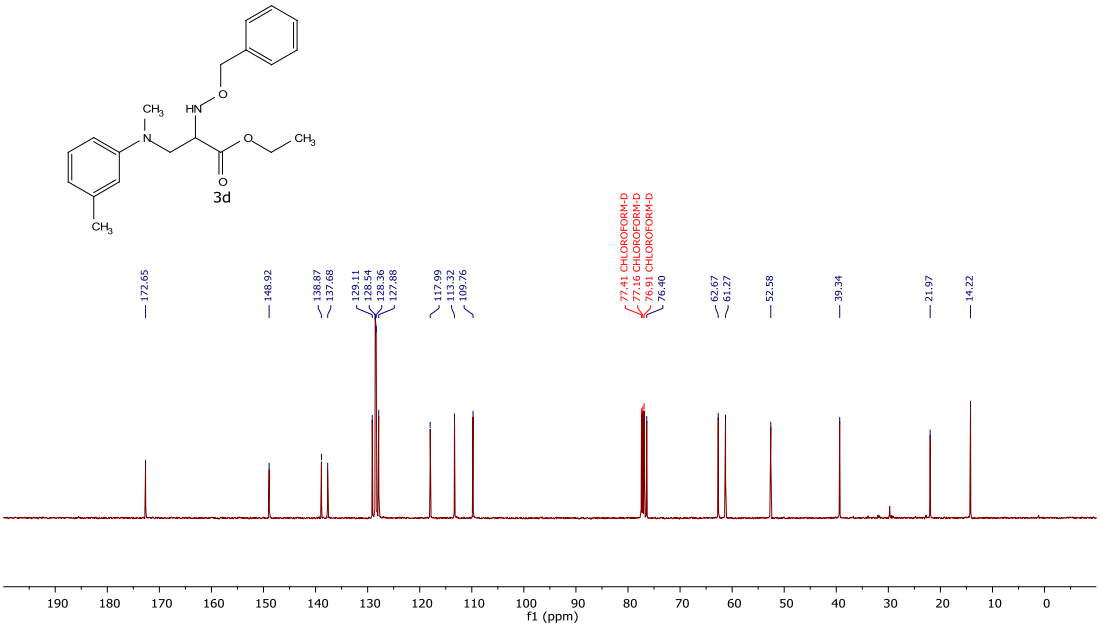
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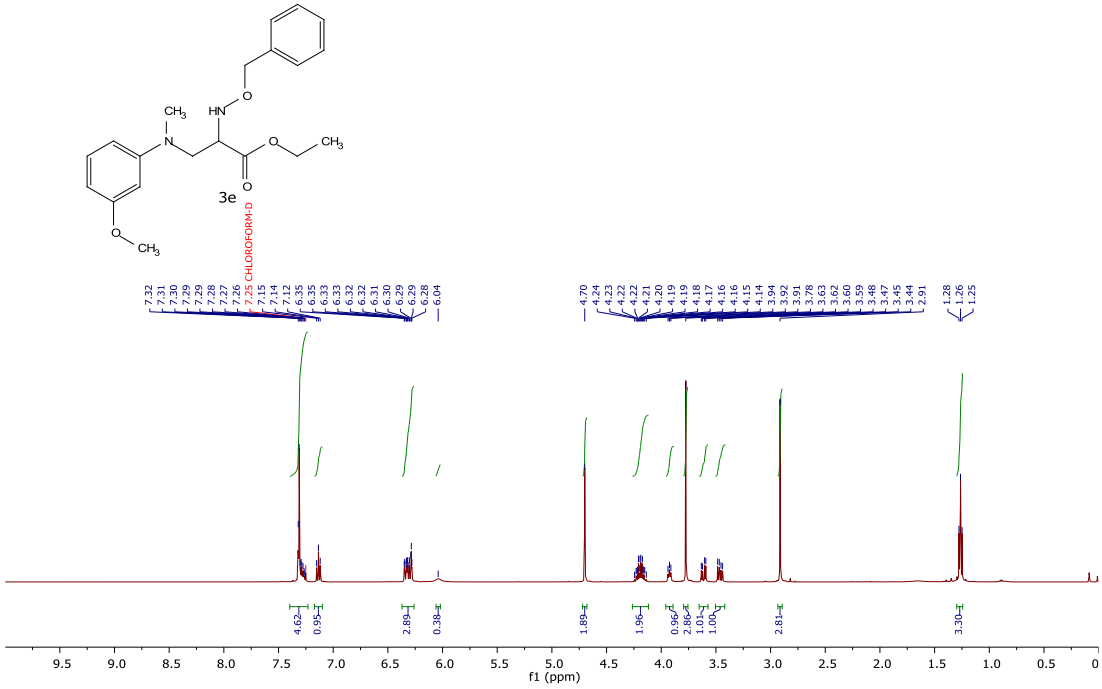
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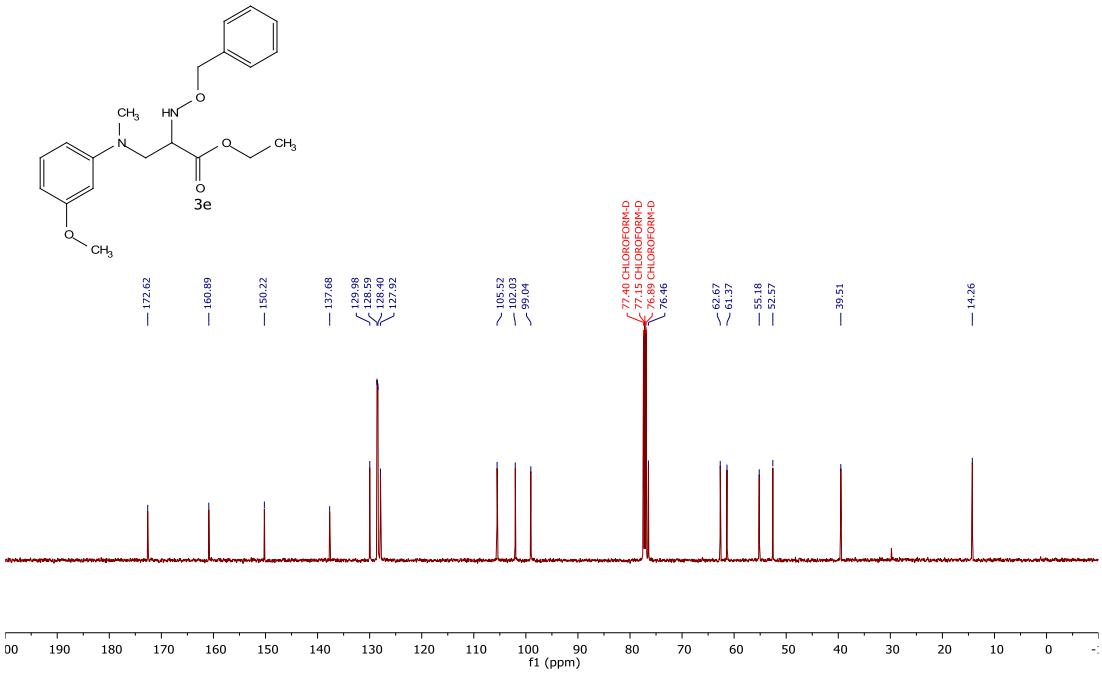
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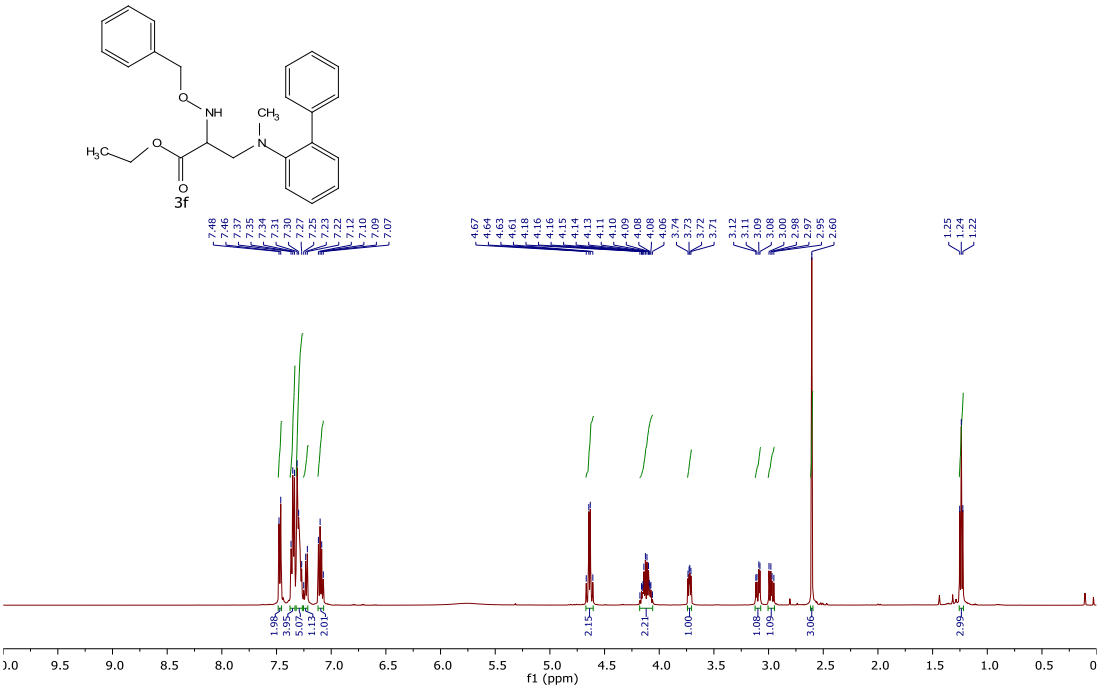
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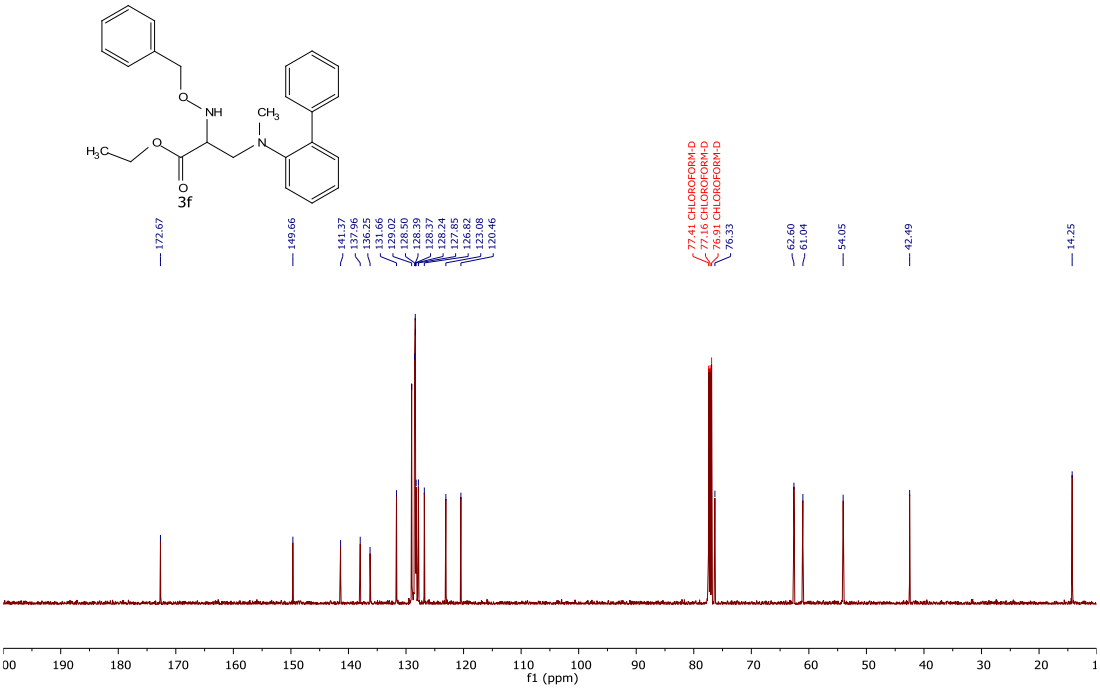
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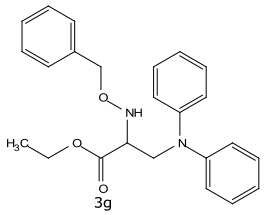
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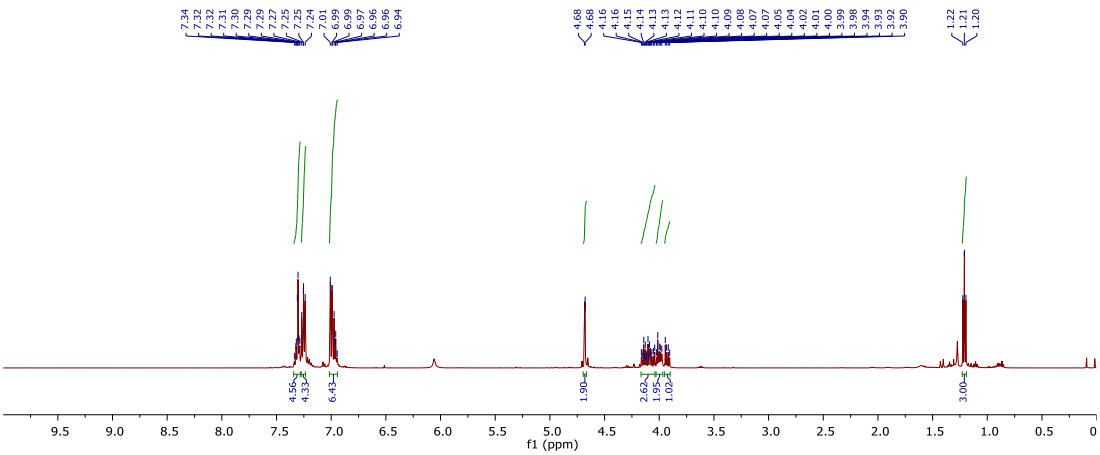
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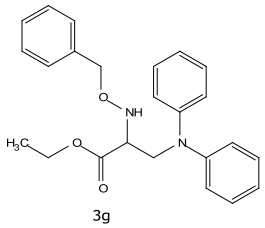
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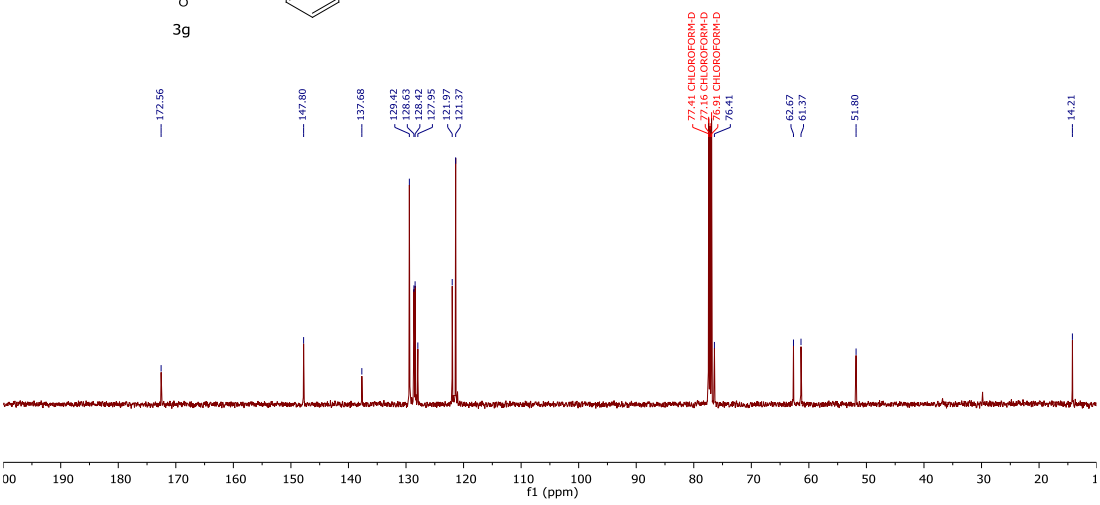
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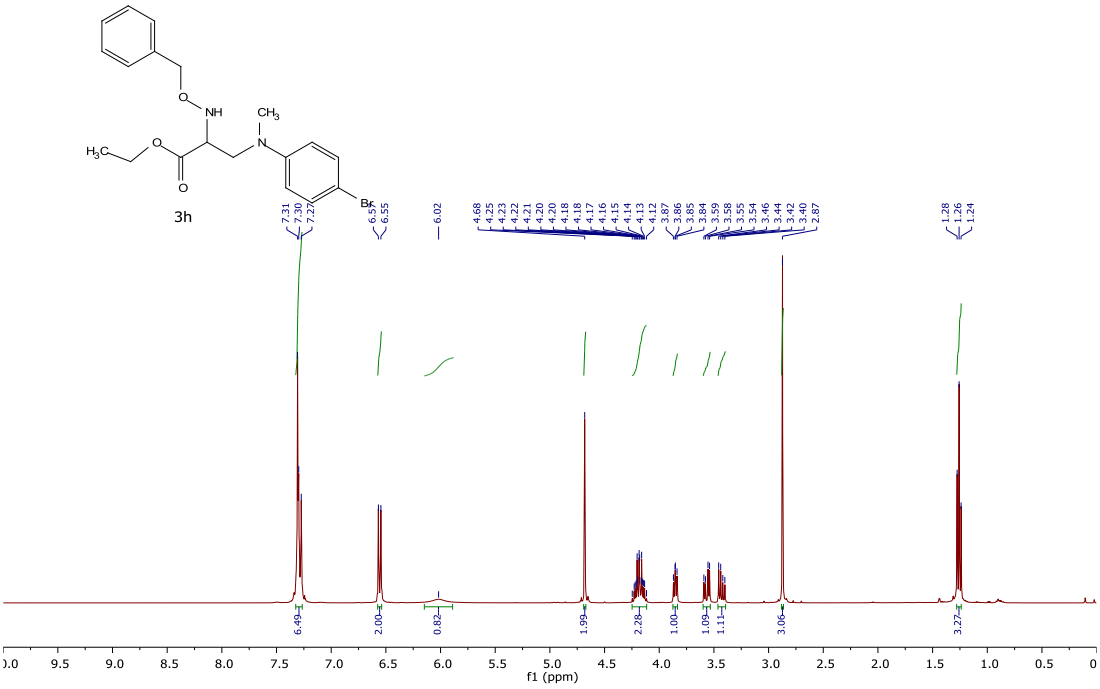
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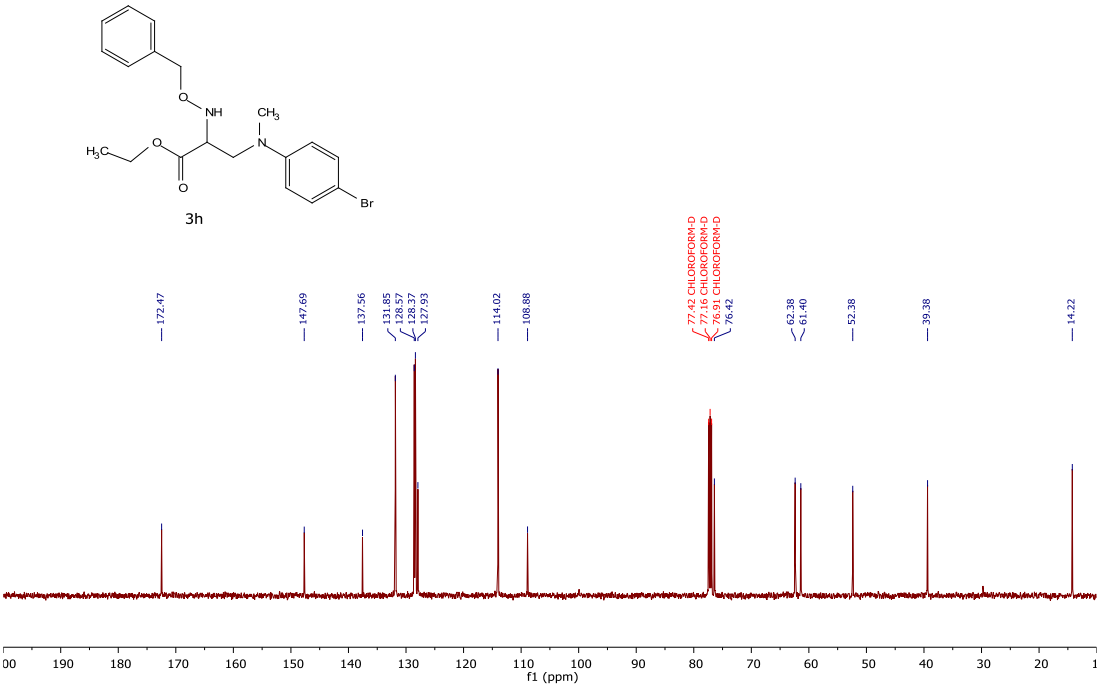
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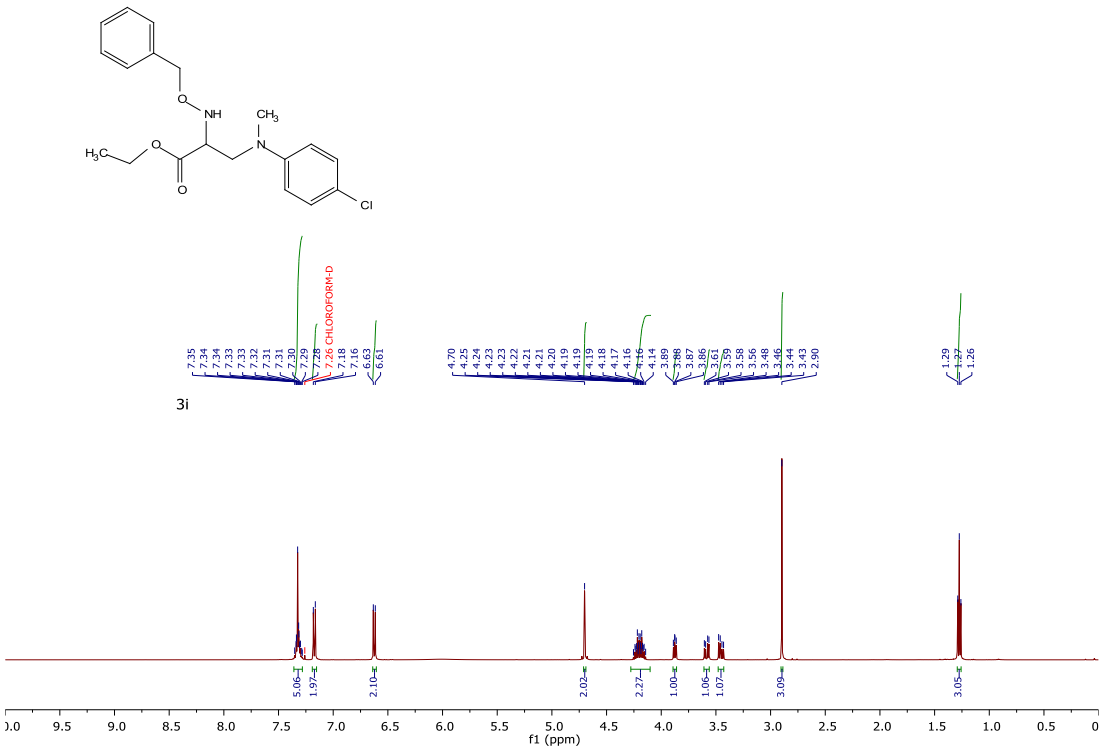
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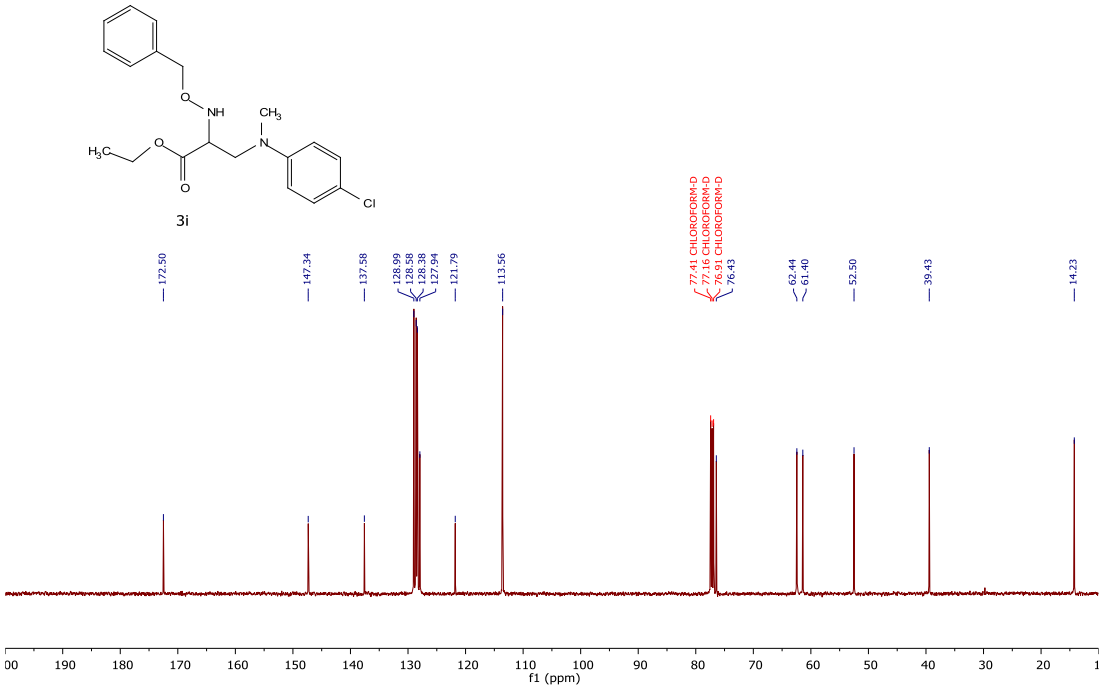
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77.16 CHLOROFORM-D
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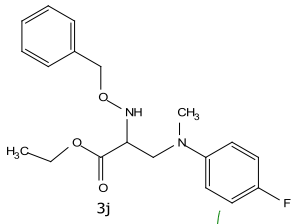
3i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F

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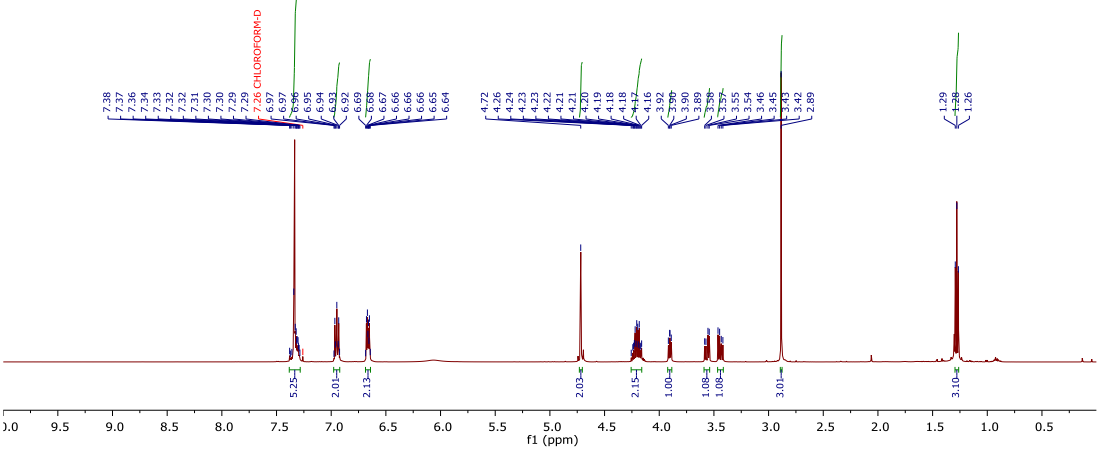
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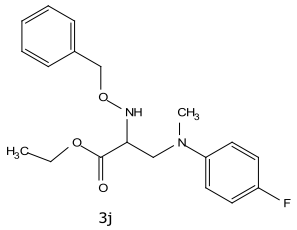
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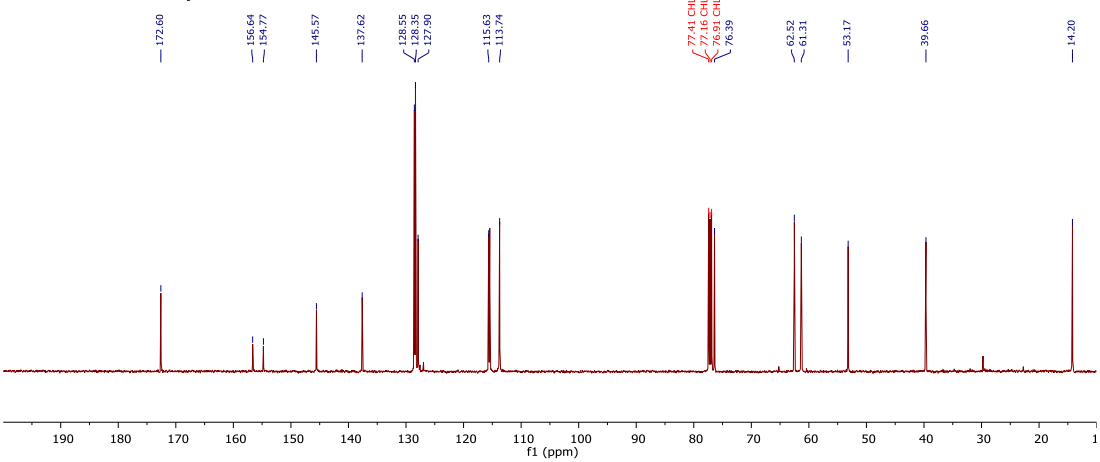
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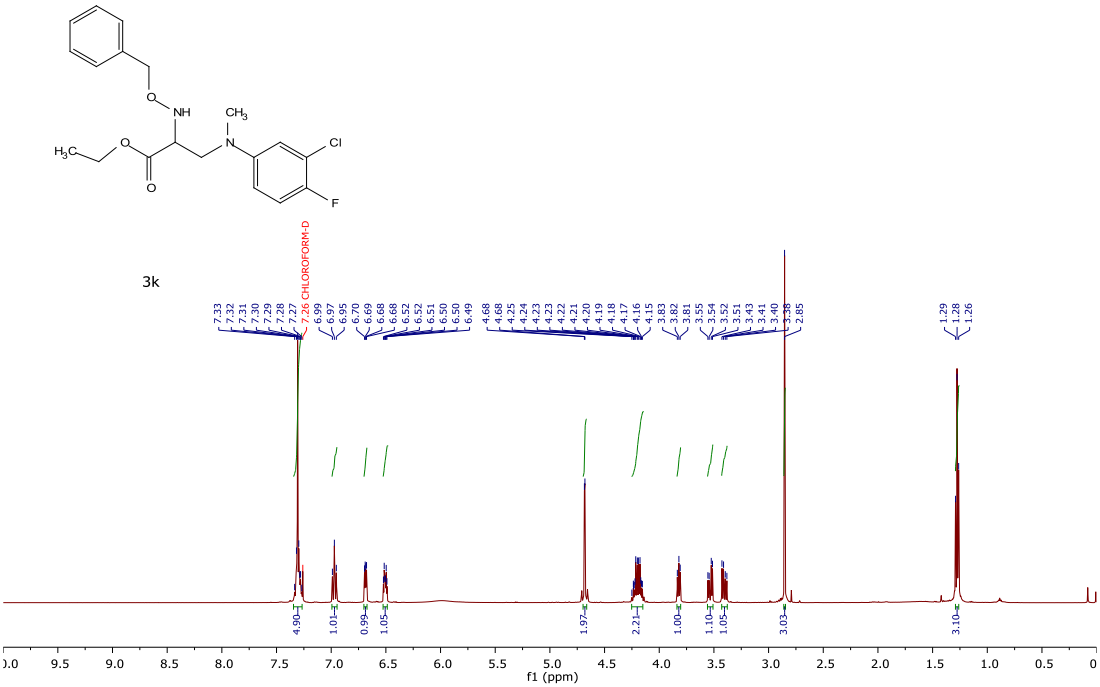
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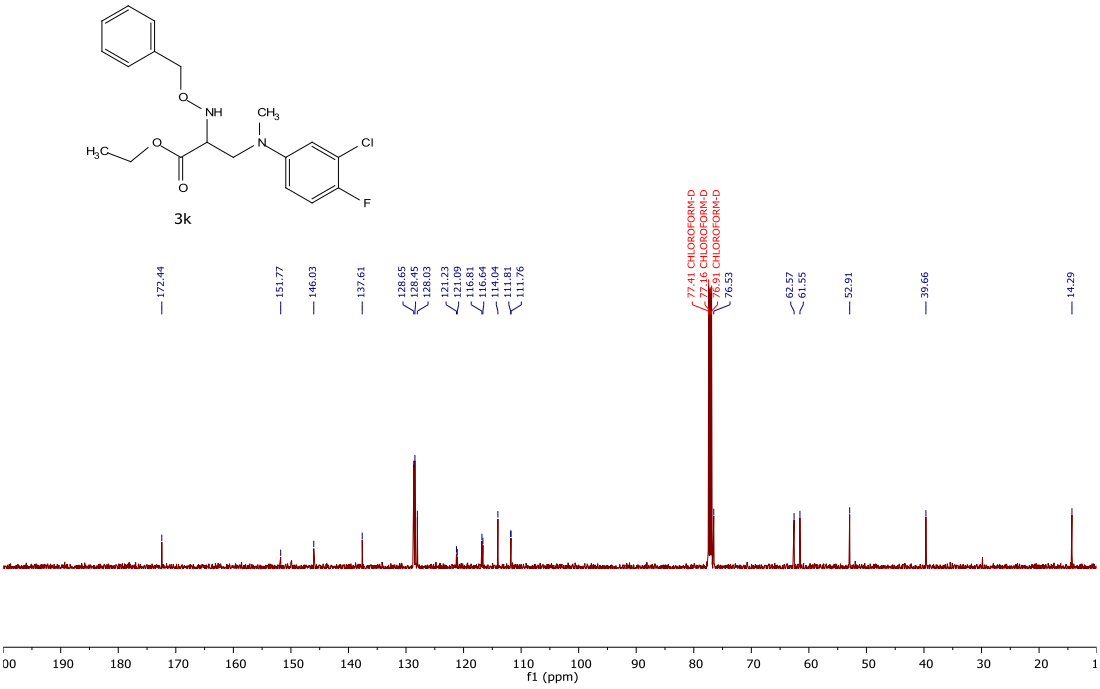
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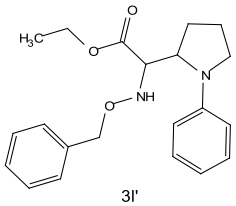
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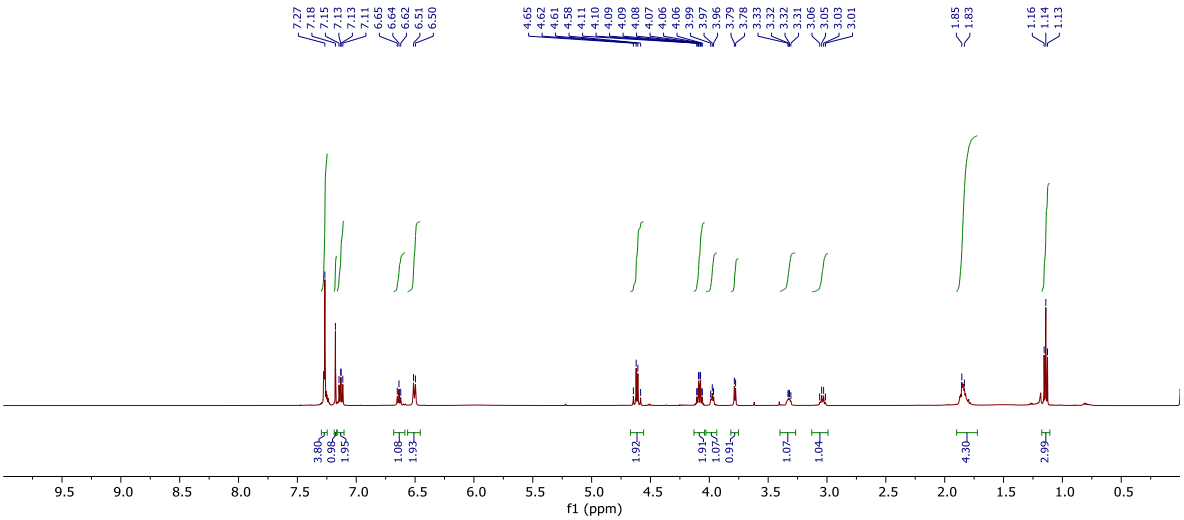
3l'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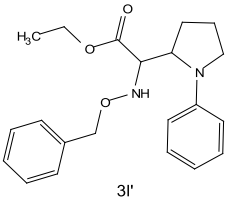
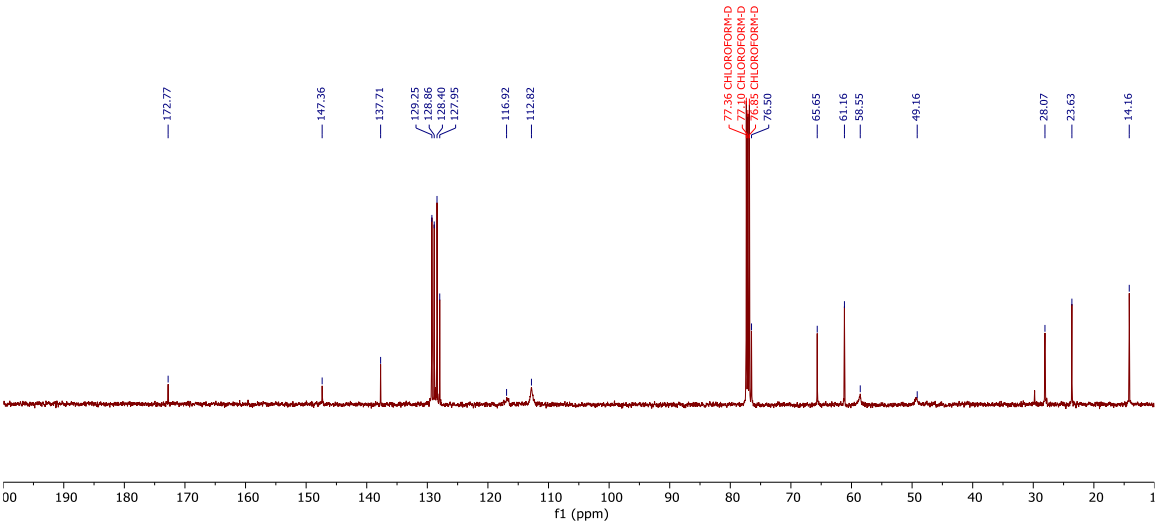
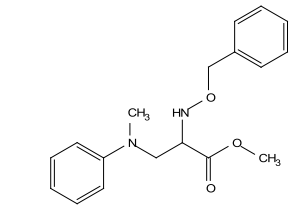
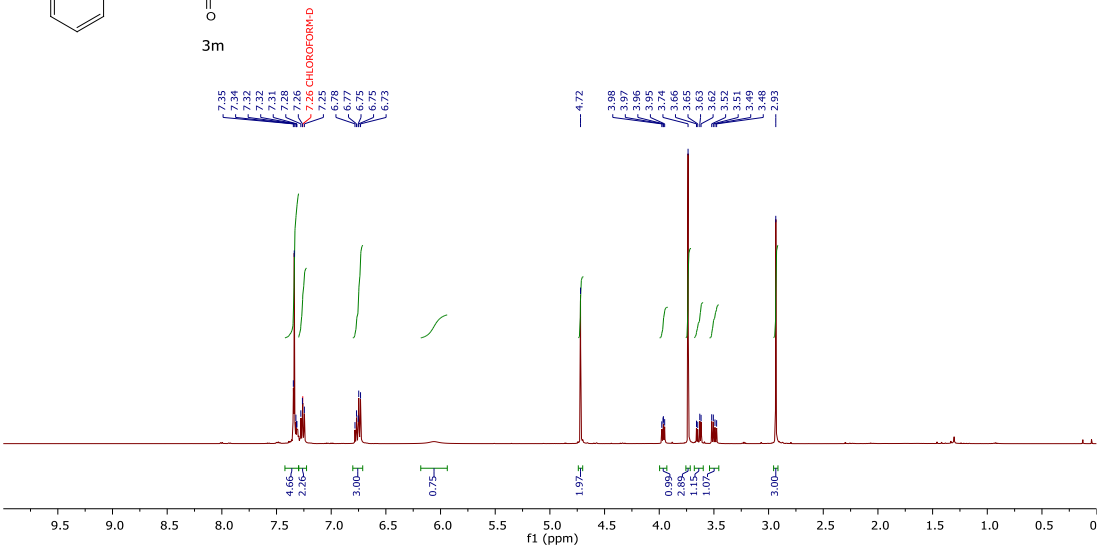

O
H3C
O
NH
O
N

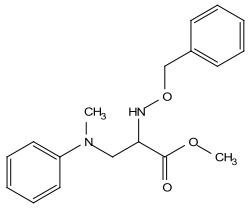
3l'


172.77
147.36
137.71
129.25
128.86
128.40
127.95
116.92
112.82
77.36 CHLOROFORM-D
77.10 CHLOROFORM-D
76.85 CHLOROFORM-D
76.50
65.65
61.16
58.55
49.16
28.07
23.63
14.16
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
f1 (ppm)

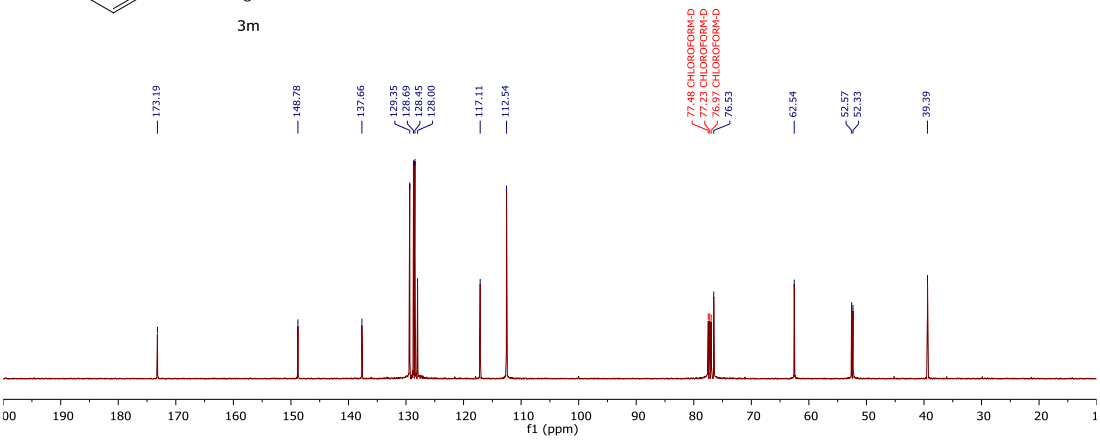

CH3
HN
O
N
O
CH3
O

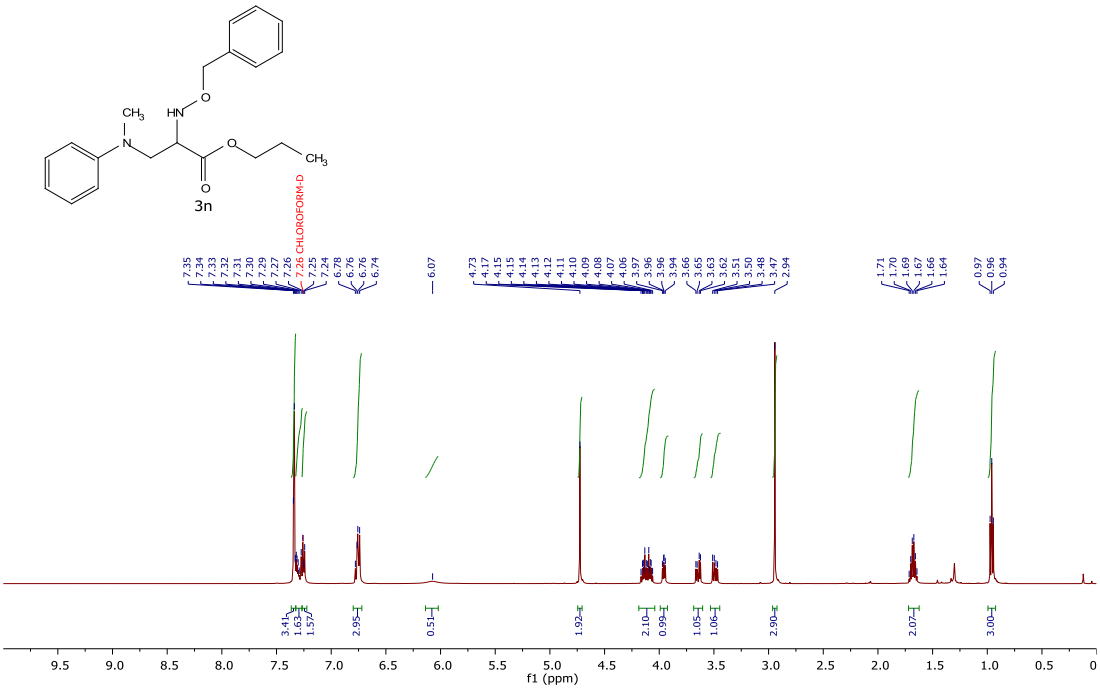
3m

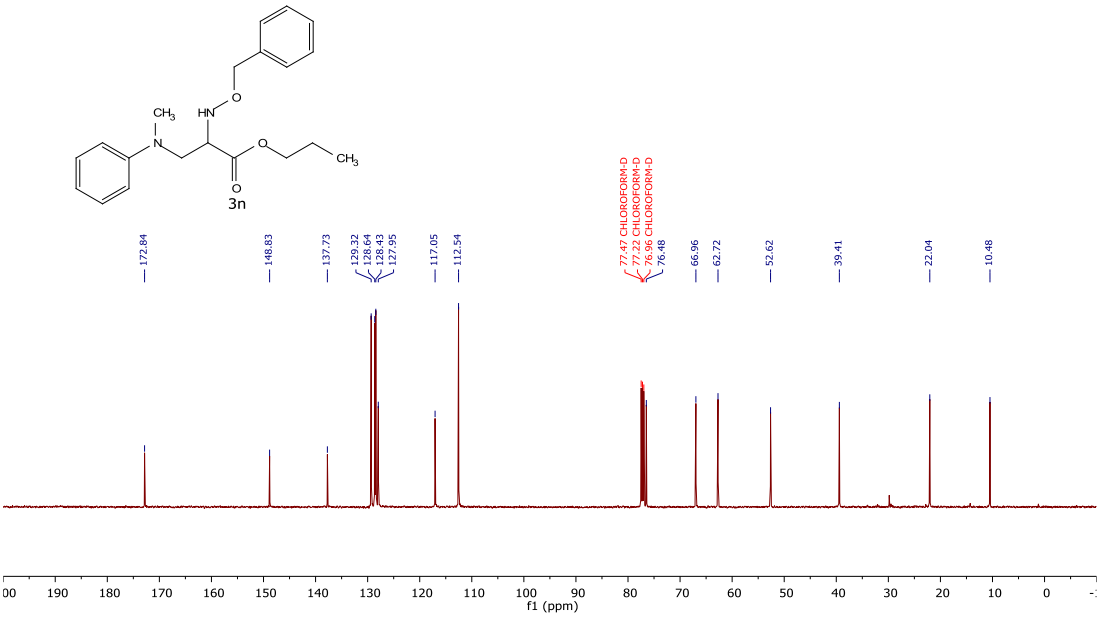

7.35
7.34
7.32
7.32
7.31
7.28
7.26
7.26 CHLOROFORM-D
7.25
6.78
6.77
6.75
6.75
6.73
4.72
3.98
3.97
3.96
3.95
3.74
3.66
3.65
3.63
3.62
3.52
3.51
3.49
3.48
2.93
4.66
2.26
3.00
0.75
1.97
0.99
2.89
1.15
1.07
3.00
f1 (ppm)

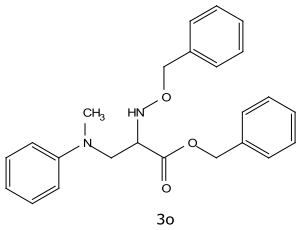

CH3
HN
O
N
O
CH3
O

3m

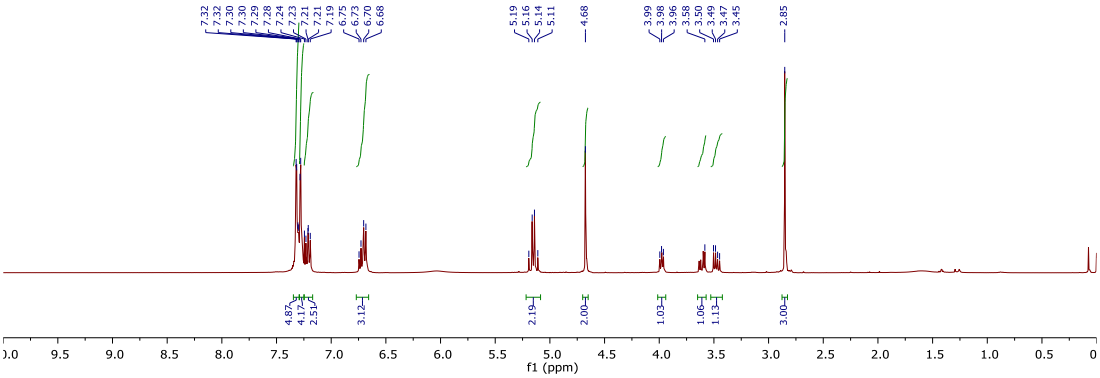

173.19
148.78
137.66
129.35
128.69
128.45
128.00
117.11
112.54
77.48 CHLOROFORM-D
77.23 CHLOROFORM-D
76.97 CHLOROFORM-D
76.53
62.54
52.57
52.33
39.39
f1 (ppm)

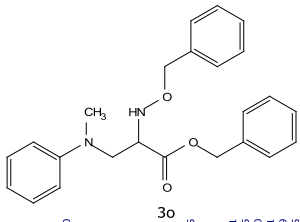

3n
CHLOROFORM-D
f1 (ppm)


3n
CHLOROFORM-D
f1 (ppm)

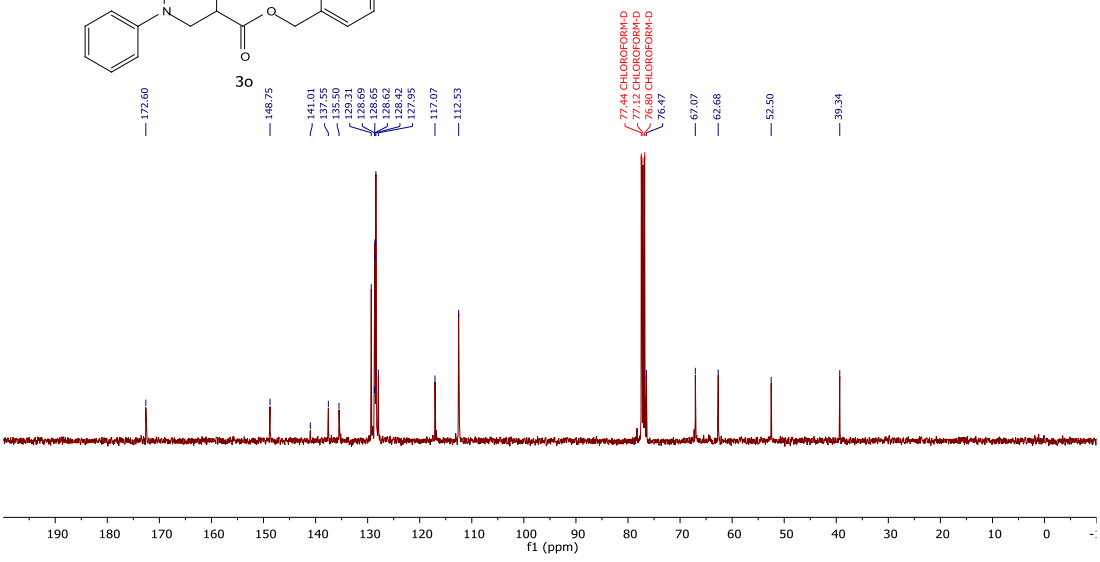

CH3
HN
O
N
O
O

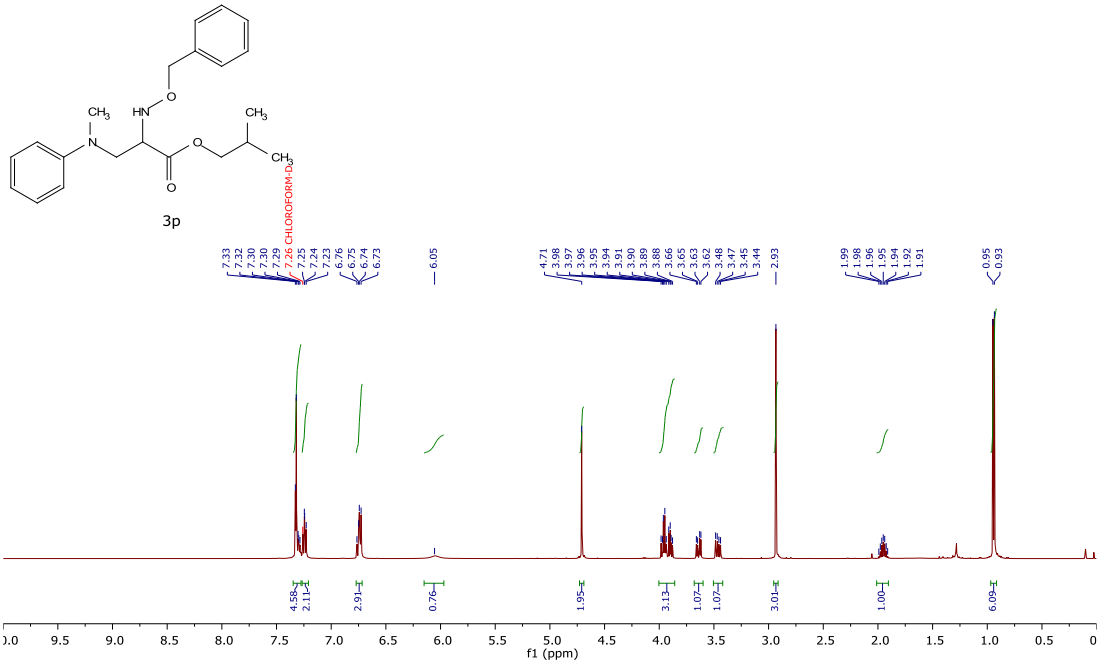
3o

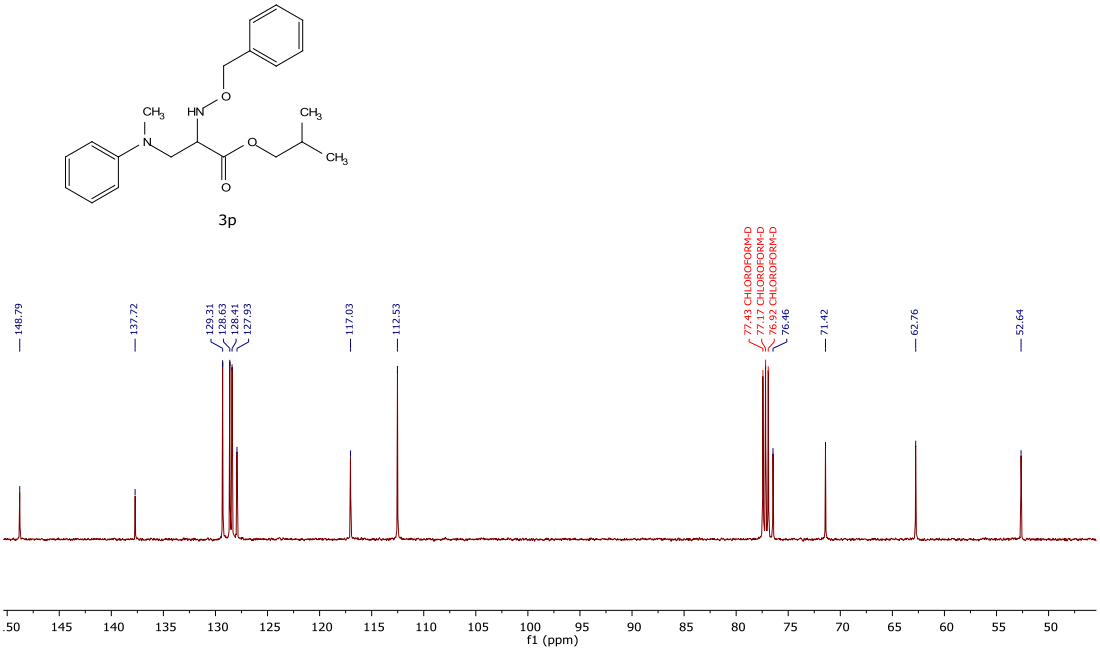

7.32
7.32
7.30
7.30
7.29
7.28
7.24
7.23
7.21
7.21
7.19
6.75
6.73
6.70
6.68
5.19
5.16
5.14
5.11
4.68
3.99
3.98
3.96
3.58
3.50
3.49
3.47
3.45
2.85
4.87
1.17
2.51
3.12
2.19
2.00
1.03
1.06
1.13
3.00
f1 (ppm)

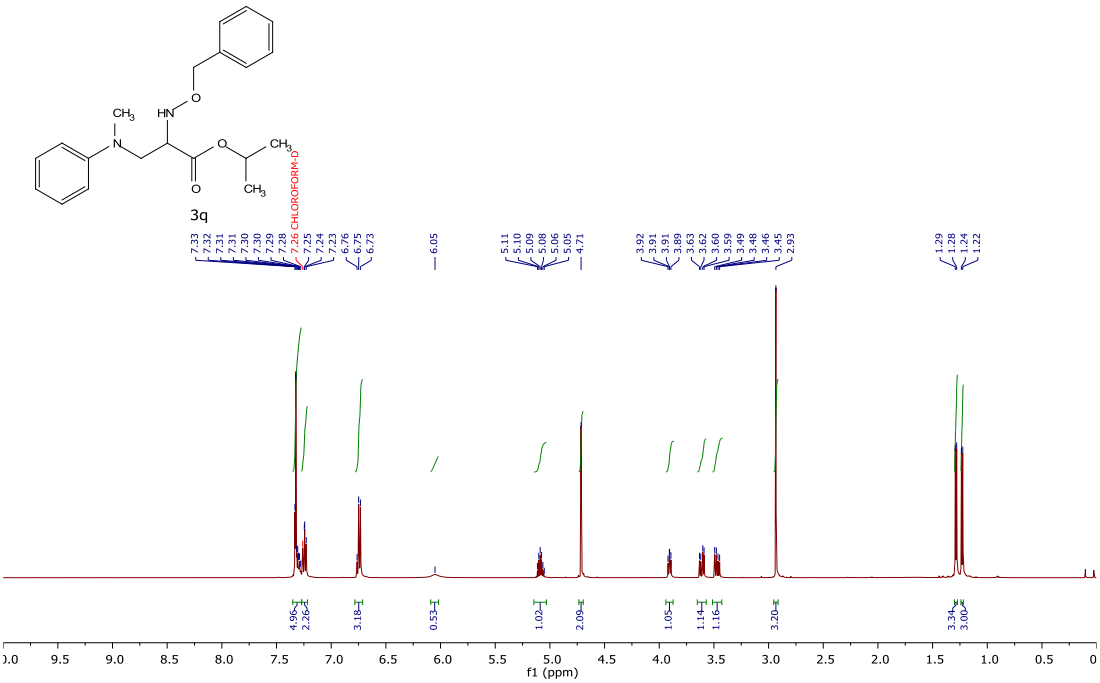

CH3
HN
O
N
O
O

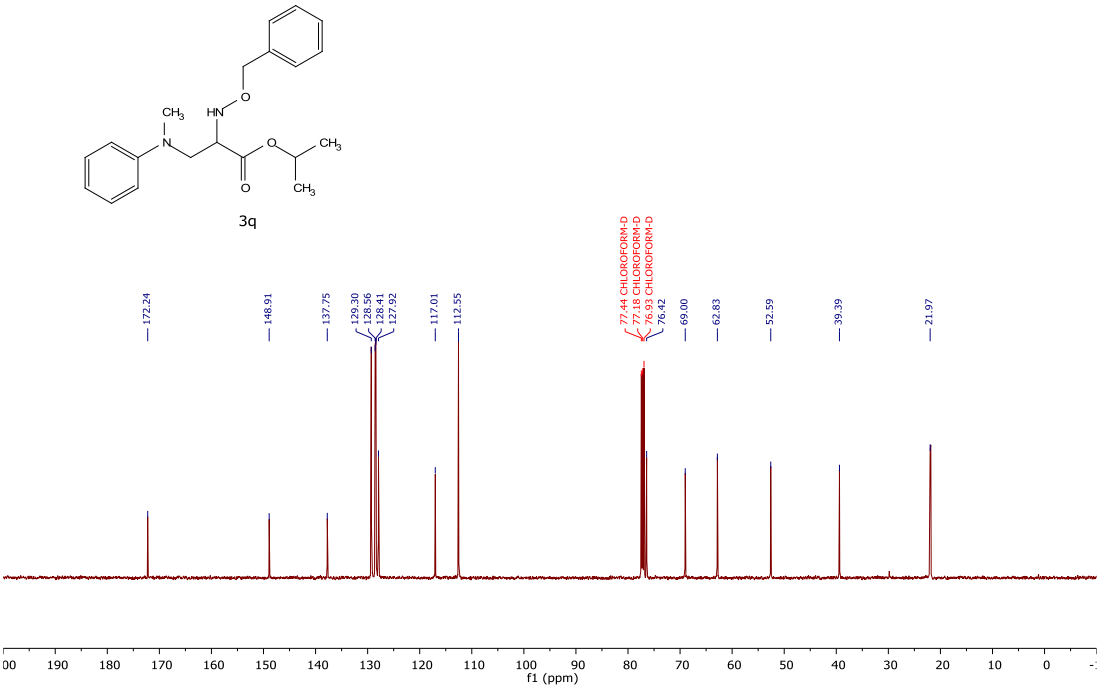
3o

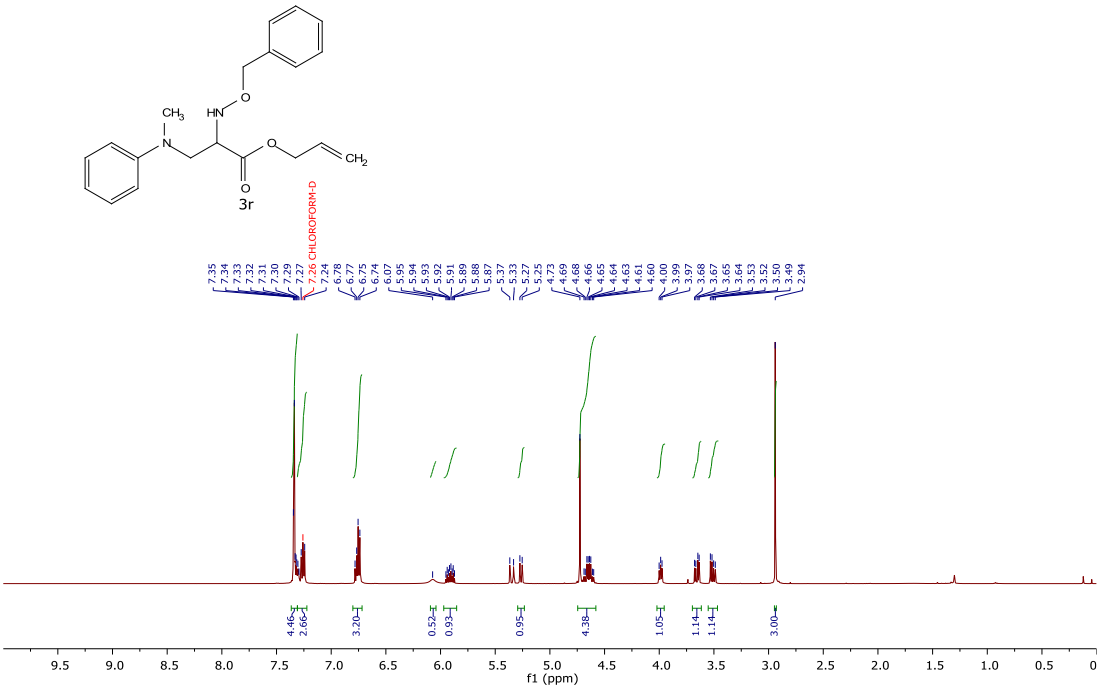

172.60
148.75
141.01
137.55
135.50
129.31
128.69
128.65
128.62
128.43
127.95
117.07
112.53
77.44 CHLOROFORM-D
77.12 CHLOROFORM-D
76.80 CHLOROFORM-D
76.47
67.07
62.68
52.50
39.34
f1 (ppm)

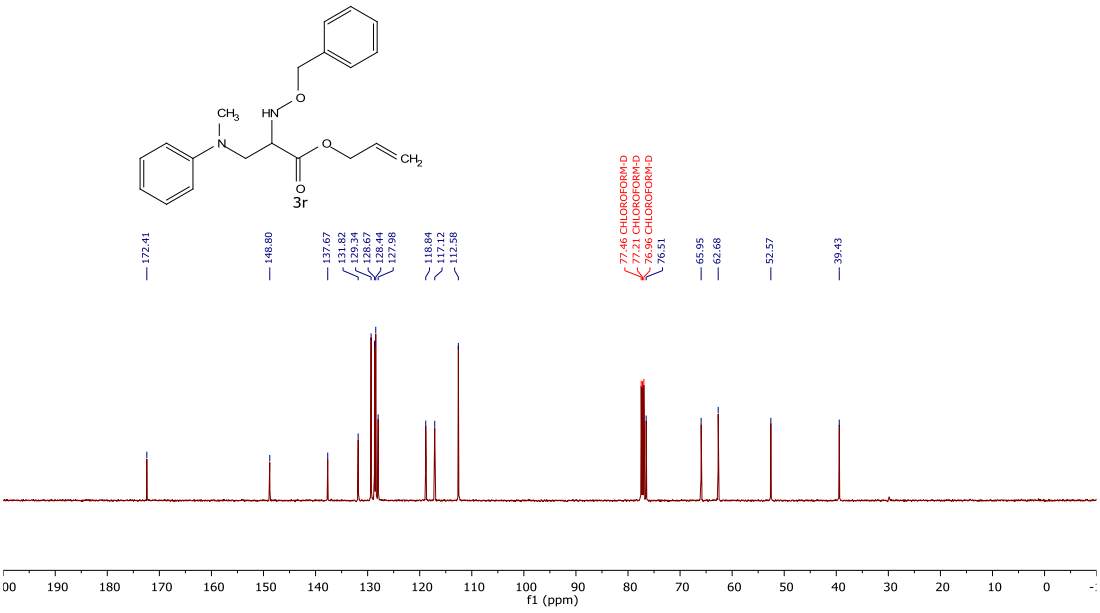

3p
7.33
7.32
7.30
7.30
7.29
7.26 CHLOROFORM-D
7.25
7.24
7.23
6.76
6.75
6.74
6.73
6.05
4.71
3.98
3.97
3.96
3.95
3.94
3.91
3.90
3.89
3.88
3.66
3.65
3.63
3.62
3.48
3.47
3.45
3.44
2.93
1.99
1.98
1.96
1.95
1.94
1.92
1.91
0.95
0.93
4.58
2.11
2.91
0.76
1.95
3.13
1.07
1.07
3.01
1.00
6.09
f1 (ppm)

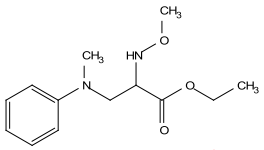

3p
148.79
137.72
129.31
128.63
128.41
127.93
117.03
112.53
77.43 CHLOROFORM-D
77.17 CHLOROFORM-D
76.92 CHLOROFORM-D
76.46
71.42
62.76
52.64
f1 (ppm)


3q
7.33
7.32
7.31
7.31
7.30
7.30
7.29
7.28
7.26 CHLOROFORM-D
7.25
7.24
7.23
6.76
6.75
6.73
6.05
5.11
5.10
5.09
5.08
5.06
5.05
4.71
3.92
3.91
3.91
3.89
3.63
3.62
3.60
3.59
3.49
3.48
3.46
3.45
2.93
1.29
1.28
1.24
1.22
4.96
2.26
3.18
0.53
1.02
2.09
1.05
1.14
1.16
3.20
3.34
3.00
f1 (ppm)

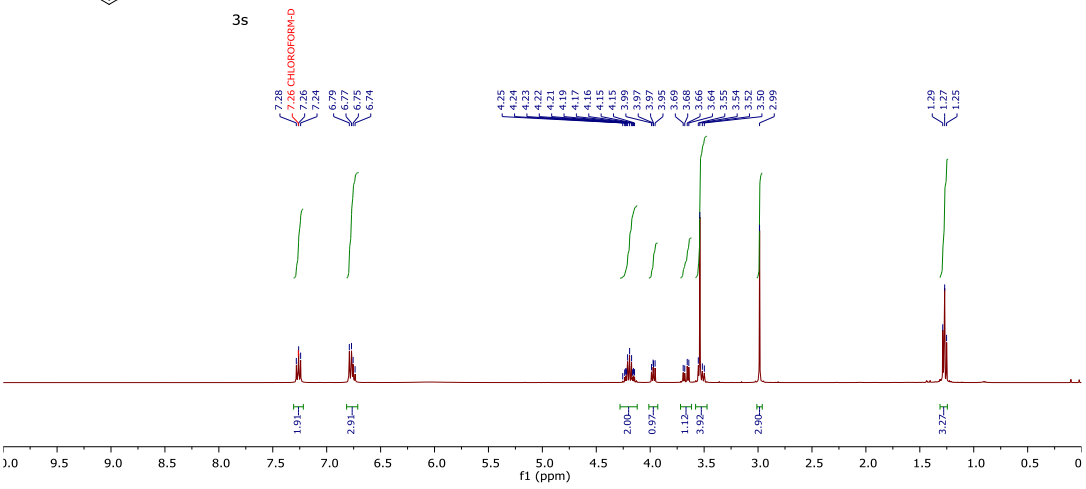

3q
172.24
148.91
137.75
129.30
128.56
128.41
127.92
117.01
112.55
77.44 CHLOROFORM-D
77.18 CHLOROFORM-D
76.93 CHLOROFORM-D
76.42
69.00
62.83
52.59
39.39
21.97
f1 (ppm)

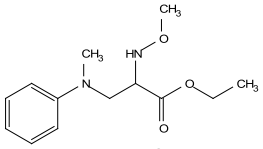

CH3
HN
O
N
O
CH2
O
3r
7.26 CHLOROFORM-D
f1 (ppm)


CH3
HN
O
N
O
CH2
O
3r
77.46 CHLOROFORM-D
77.21 CHLOROFORM-D
76.96 CHLOROFORM-D
f1 (ppm)

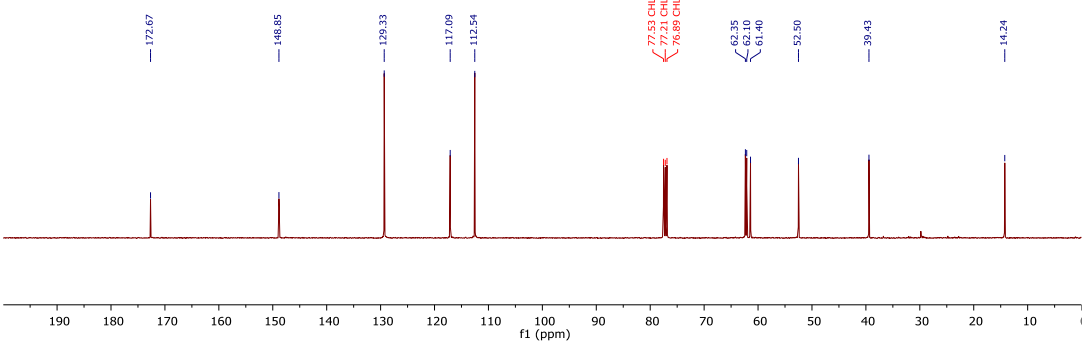

CH3
O
HN
CH3
N
O
CH3
O

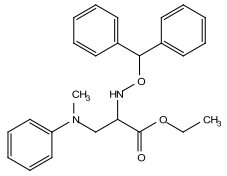
3s


7.28
7.26 CHLOROFORM-D
7.26
7.24
6.79
6.77
6.75
6.74
4.25
4.24
4.23
4.22
4.21
4.19
4.17
4.16
4.15
4.15
3.99
3.97
3.97
3.95
3.69
3.68
3.66
3.64
3.55
3.54
3.52
3.50
2.99
1.29
1.27
1.25
1.91
2.91
2.00
0.97
1.12
3.92
2.90
3.27
f1 (ppm)


CH3
O
HN
CH3
N
O
CH3
O

3s


172.67
148.85
129.33
117.09
112.54
77.53 CHLOROFORM-D
77.21 CHLOROFORM-D
76.89 CHLOROFORM-D
62.35
62.10
61.40
52.50
39.43
14.24
f1 (ppm)



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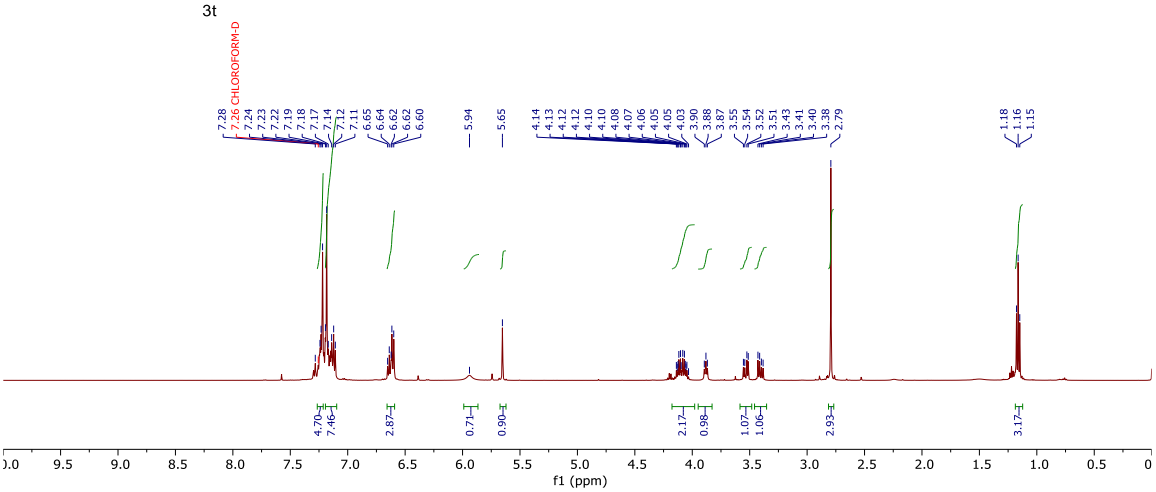
7.28
7.26 CHLOROFORM-D
7.24
7.23
7.22
7.19
7.18
7.17
7.14
7.12
7.11
6.65
6.64
6.62
6.62
6.60
5.94
5.65
4.14
4.13
4.12
4.12
4.10
4.10
4.08
4.07
4.06
4.05
4.05
4.03
3.90
3.88
3.87
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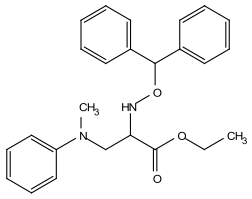
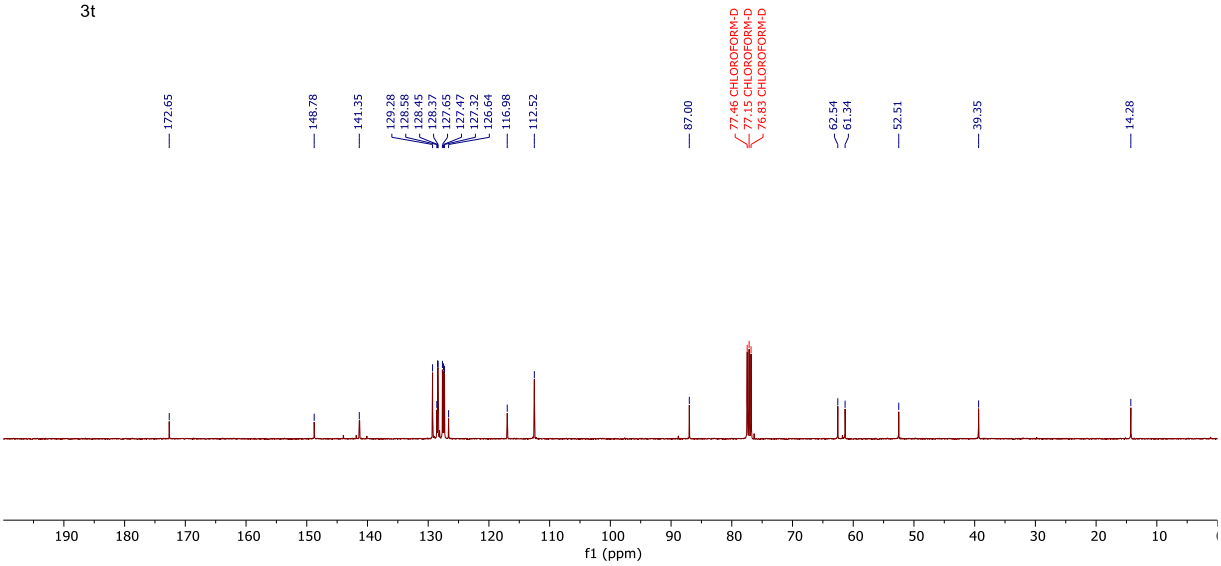
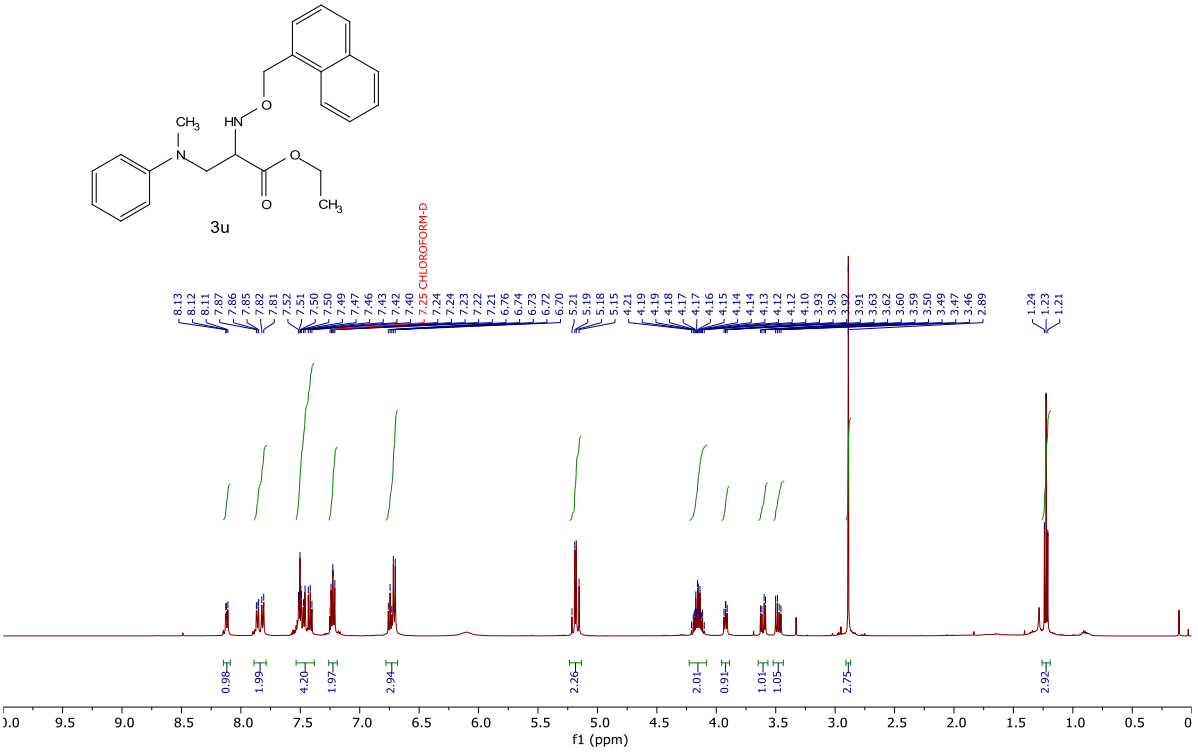
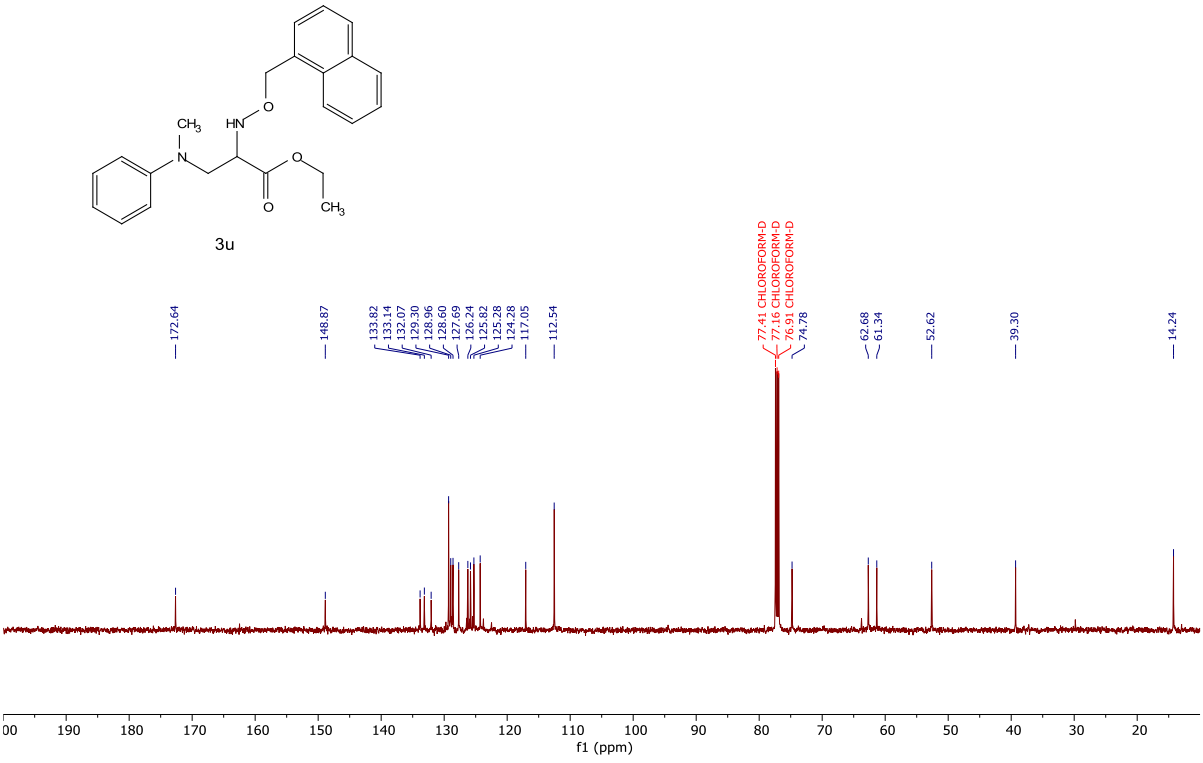
3.54
3.52
3.51
3.43
3.41
3.40
3.38
2.79
1.18
1.16
1.15
4.70
7.46
2.87
0.71
0.90
2.17
0.98
1.07
1.06
2.93
3.17
f1 (ppm)



3t


172.65
148.78
141.35
129.28
128.58
128.45
128.37
127.65
127.47
127.32
126.64
116.98
112.52
87.00
77.46 CHLOROFORM-D
77.15 CHLOROFORM-D
76.83 CHLOROFORM-D
62.54
61.34
52.51
39.35
14.28
f1 (ppm)


3u
7.25 CHLOROFORM-D
f1 (ppm)


3u
77.41 CHLOROFORM-D
77.16 CHLOROFORM-D
76.91 CHLOROFORM-D
f1 (ppm)