Supporting Information for

Control of Four Stereocenters in an Organocatalytic Domino Double Michael Reaction: Efficient Synthesis of Multisubstituted Cyclopentanes

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General Information: Analytical thin layer chromatography (TLC) was performed using Merck 60 F254 precoated silica gel plate (0.2 mm thickness). Subsequent to elution, plates were visualized using UV radiation (254 nm) on Spectroline Model ENF-24061/F 254 nm. Further visualization was possible by staining with basic solution of potassium permanganate or acidic solution of ceric molybdate.

Flash chromatography was performed using Merck silica gel 60 with freshly distilled solvents. Columns were typically packed as slurry and equilibrated with the appropriate solvent system prior to use.

Proton nuclear magnetic resonance spectra (^{1}H NMR) were recorded on Bruker AMX 400 spectrophotometer ($CDCl_3$ as solvent). Chemical shifts for ^{1}H NMR spectra are reported as δ in units of parts per million (ppm) downfield from $SiMe_4$ (δ 0.0) and relative to the signal of chloroform-d (δ 7.2600, singlet). Multiplicities were given as: s (singlet), d (doublet), t (triplet), dd (doublets of doublet) q (quartet) or m (multiplets). The number of protons (n) for a given resonance is indicated by nH. Coupling constants are reported as a *J* value in Hz. Carbon nuclear magnetic resonance spectra (^{13}C NMR) are reported as δ in units of parts per million (ppm) downfield

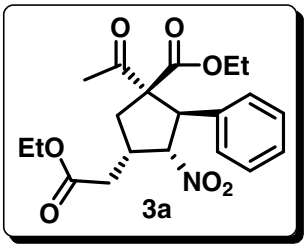
from $SiMe_4$ (δ 0.0) and relative to the signal of chloroform-d (δ 77.03, triplet).

Enantioselectivities were determined by High Performance Liquid Chromatography (HPLC) analysis (Shimadzu, LC-20AD) employing a Daicel Chirapak AD-H or AS-H column or Chiralcel OD-H. Optical rotations were measured in CH_2Cl_2 on a *Schmidt + Haensdch* polarimeter (Polartronic MH8) with a 10 cm cell (*c* given in g/100 mL).

High resolution mass spectrometry (HRMS) was recorded on Finnigan MAT 95 × P spectrometer.

Typical Procedure for Double-Michael Reactions: To a solution of diethyl 5-acetylhex-2-enedioate (**1a**, 0.3 mmol, 1.0 eq) and nitro olefin (0.45 mmol, 1.5 eq) in diethyl ether (0.4 mL) was added catalyst **V** (**Q-NH_2**) (0.045 mmol, 0.15 eq) at room temperature (22°C). The resulting mixture was stirred vigorously for 16-36 hours. After the reaction was completed (monitored by TLC and crude NMR), the product was afforded by flash chromatography over silica gel (Et_2O:Hexane = 1:10 to 1:4).

(1***R***,2***R***,3***R***,4***S***)-ethyl 4-((ethoxycarbonyl)methyl)-1-acetyl-3-nitro-2-phenylcyclopentanecarboxylate (**3a**)



The title compound was prepared according to the typical procedure, as described above in 91% yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.31-7.21 (m, 5H), 5.49 (dd, *J* =5.2, 7.6 Hz, 1H), 5.10 (d, *J* = 4.8 Hz, 1H), 4.26-4.14 (m, 2H), 3.80-3.72 (m, 1H), 3.68-3.58 (m, 1H), 3.41-3.33 (m, 1H), 2.88 (dd, *J* = 6.8, 12.8 Hz, 1H), 2.50 (dd, *J* = 7. 2, 16.8 Hz, 1H), 2.40 (dd, *J* = 7.6, 16.8 Hz, 1H), 2.20 (s, 3H), 2.01 (dd, *J* = 10.8, 12.8 Hz, 1H), 1.30 (t, *J* = 7.2 Hz, 3H), 0.76 (t, *J* = 7.2 Hz, 3H).

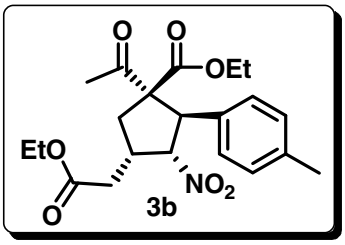
^{13}C-NMR (100 MHz, $CDCl_3$) δ 200.09, 170.87, 170.29, 137.16, 128.52, 128.48, 127.80,94.26, 71.28, 61.77, 61.05, 51.54, 40.27, 37.74, 34.20, 26.98, 14.16, 13.26.

HPLC: Chiralcel OD-H (hexane / *i*-PrOH = 80 / 20, flow rate 1 mL / min, λ = 230 nm), t_R (major) = 6.2 min, t_R (minor) = 8.9 min; 97% ee.

$[\alpha]_D^{22}$ = - 3.1 (*c* = 1.0, CH_2Cl_2).

HRMS (ESI) calcd for $C_{20}H_{26}NO_6$+H, m/z 392.1709, found 392.1707.

(1***R***,2***R***,3***R***,4***S***)-ethyl 4-((ethoxycarbonyl)methyl)-1-acetyl-3-nitro-2-*p*-tolylcyclopentanecarboxylate (**3b**)



The title compound was prepared according to the typical procedure, as described above in 89% yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.09 (m, 4H), 5.44 (dd, *J* =5.2, 7.6 Hz, 1H), 5.04 (d, *J* = 5.2 Hz, 1H), 4.24-4.15 (m, 2H), 3.80-3.75 (m, 1H), 3.63-3.57 (m, 1H), 3.45-3.41 (m, 1H), 2.87 (dd, *J* = 6.8, 12.8 Hz, 1H), 2.46 (dd, *J* = 7.2, 16.8 Hz, 1H), 2.40 (dd, *J* = 7.6, 17.2 Hz, 1H), 2.30 (s, 3H), 2.19 (s, 3H), 2.00 (dd, *J* = 10.8, 12.8 Hz, 1H), 1.29 (t, *J* = 7.2 Hz, 3H), 0.78 (t, *J* = 7.2 Hz, 3H).

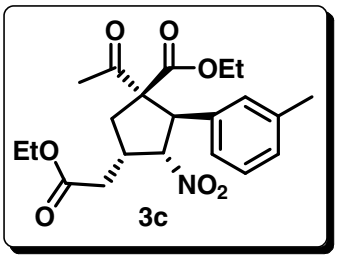
^{13}C-NMR (100 MHz, $CDCl_3$) δ 200.25, 170.89, 170.12, 137.52 ,133.97, 129.12, 128.32, 94.28, 71.13, 61.74, 61.02, 51.29, 40.04, 37.77, 34.26, 27.04, 20.99, 14.15, 13.25.

HPLC: Chiralcel OD-H (hexane / *i*-PrOH = 80 / 20, flow rate 1 mL / min, λ = 220 nm), t_R (major) = 6.1 min, t_R (minor) = 8.7 min; 96% ee.

$[\alpha]_D^{22}$ = - 5.7 (*c* = 1.3, CH_2Cl_2).

HRMS (ESI) calcd for $C_{21}H_{27}NO_7$+H, m/z 406.1866, found 406.1867.

(1***R***,2***R***,3***R***,4***S***)-ethyl 4-((ethoxycarbonyl)methyl)-1-acetyl-3-nitro-2-*m*-tolylcyclopentanecarboxylate (**3c**)



The title compound was prepared according to the typical procedure, as described above in 85% yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.20-7.17 (m, 1H), 7.10-6.97 (m, 3H), 5.46 (m, 1H), 5.05 (d, *J* = 5.2 Hz, 1H), 4.24-4.16 (m, 2H), 3.80-3.72 (m, 1H), 3.64-3.58 (m, 1H), 3.45-3.36 (m, 1H), 2.87 (dd, *J* = 6.8, 12.8 Hz, 1H), 2.48 (dd, *J* = 6.4, 17.2 Hz, 1H), 2.36 (dd, *J* = 7.6, 16.8 Hz, 1H), 2.32 (s, 3H), 2.19 (s, 3H), 2.00 (dd, *J* = 10.8, 12.8 Hz, 1H), 1.30 (t, *J* = 7.2 Hz, 3H), 0.77 (t, *J* = 7.2 Hz, 3H).

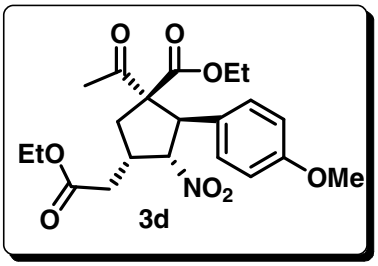
^{13}C-NMR (100 MHz, $CDCl_3$) δ 200.13, 170.88, 170.31, 138.13, 137.06, 129.33, 128.48, 128.41, 125.29, 94.36, 71.24, 61.71, 61.02, 51.53, 40.21, 37.77, 34.23, 26.99, 21.32, 14.16, 13.23.

HPLC: Chiralpak AD-H (hexane / *i*-PrOH = 90 / 10, flow rate 1 mL / min, λ = 210 nm), t_R (minor) = 10.6 min, t_R (major) = 12.0 min; 94% ee.

$[\alpha]_D^{22}$ = - 4.2 (*c* = 1.2, CH_2Cl_2).

HRMS (ESI) calcd for $C_{21}H_{27}NO_7$+H, m/z 406.1866, found 406.1858.

(1***R***,2***R***,3***R***,4***S***)-ethyl 4-((ethoxycarbonyl)methyl)-1-acetyl-2-(4-methoxyl phenyl)-3-nitro-cyclopentanecarboxylate (**3d**)



To a solution of diethyl 5-acetylhex-2-enedioate (**1a**, 0.3 mmol, 1.0 eq) and 1-methoxy-4-((*E*)-2-nitrovinyl)benzene (0.6 mmol, 2.0 eq) in diethyl ether (0.4 mL) was added catalyst **V** (**Q-NH$_2$**) (0.06 mmol, 0.2 eq) at room temperature (22°C). The resulting mixture was stirred vigorously for 24 hours, then the reaction was continued for about 6 hours after removal of the solvent. After the reaction was completed (monitored by TLC and crude NMR), the title product was afforded by flash chromatography over silica gel (Et_2O:Hexane = 1:10 to 1:3) in 83% yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.15 (d, *J* = 8.8 Hz, 2H), 6.82 (d, *J* =8.8, Hz, 2H), 5.44 (dd, *J* =5.6, 7.6 Hz, 1H), 5.02 (d, *J* = 5.2 Hz, 1H), 4.24-4.15 (m, 2H), 3.83-3.76 (m, 1H), 3.78 (s, 3H), 3.63-3.57 (m, 1H), 3.51-3.43 (m, 1H), 2.86 (dd, *J* = 6.8, 12.8 Hz, 1H), 2.48 (dd, *J* = 7. 6, 16.8 Hz, 1H), 2.40 (dd, *J* = 7.6, 16.8 Hz, 1H), 2.19 (s, 3H), 2.00 (dd, *J* = 10.8, 12.8 Hz, 1H), 1.30 (t, *J* = 7.2 Hz, 3H), 0.83 (t, *J* = 7.2 Hz, 3H).

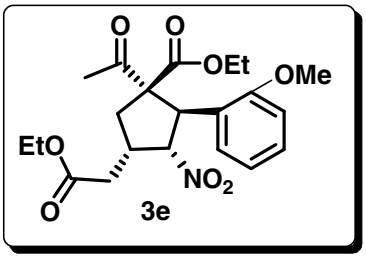
^{13}C-NMR (100 MHz, $CDCl_3$) δ 200.36, 170.90, 170.42, 159.14, 129.59, 128.96, 113.85, 94.32, 71.02, 61.77, 61.03, 55.31, 50.97, 39.88, 37.72, 34.27, 27.06, 14.15, 13.39.

HPLC: Chiralcel OD-H (hexane / *i*-PrOH = 80 / 20, flow rate 1 mL / min, λ = 220 nm), t_R (major) = 8.1 min, t_R (minor) = 12.2 min; 96% ee.

$[\alpha]_D^{22}$ = - 9.0 (*c* = 1.3, CH_2Cl_2).

HRMS (ESI) calcd for $C_{21}H_{27}NO_8$+H, m/z 422.1815, found 422.1810.

(1***R***,2***R***,3***R***,4***S***)-ethyl 4-((ethoxycarbonyl)methyl)-1-acetyl-2-(2-methoxyl phenyl)-3-nitro-cyclopentanecarboxylate (**3e**)



To a solution of diethyl 5-acetylhex-2-enedioate (**1a**, 0.3 mmol, 1.0 eq) and 1-methoxy-2-((*E*)-2-nitrovinyl)benzene (0.6 mmol, 2.0 eq) in diethyl ether (0.4 mL) was added catalyst **V** (**Q-NH$_2$**) (0.06 mmol, 0.2 eq) at room temperature (22°C). The resulting mixture was stirred vigorously for 24 hours, then the reaction was continued for about 6 hours after removal of the solvent. After the reaction was completed (monitored by TLC and crude NMR), the title product was afforded by flash chromatography over silica gel (Et_2O:Hexane = 1:10 to 1:3) in 81% yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.30-7.21 (m, 2H), 6.90-6.89 (m, 1H), 6.78 (d, *J* = 8.0 Hz, 1H), 5.55 (dd, *J* = 4.0, 7.2 Hz, 1H), 5.13 (d, *J* = 4.0 Hz, 1H), 4.21-4.13 (m, 2H), 3.90-3.84 (m, 1H), 3.77 (s, 3H), 3.65-3.59 (m, 1H), 3.53-3.45 (m, 1H), 2.89 (dd, *J* = 6.4, 12.4 Hz, 1H), 2.48 (dd, *J* = 6.4, 17.2 Hz, 1H), 2.34 (dd, *J* = 8.4, 16.8 Hz, 1H), 2.14 (s, 3H), 1.95 (m, 1H), 1.28 (t, *J* = 7.2 Hz, 3H), 0.78 (t, *J* = 7.2 Hz, 3H).

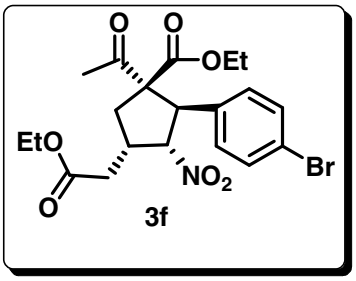
^{13}C-NMR (100 MHz, $CDCl_3$) δ 200.09, 171.03, 170.20, 157.31, 132.03, 129.12, 125.88, 120.85, 110.10, 94.46, 70.76, 61.39, 60.87, 54.90, 50.54, 39.78, 37.88, 34.10, 26.50, 14.19, 13.23.

HPLC: Chiralpak AD-H (hexane / *i*-PrOH = 90 / 10, flow rate 1 mL / min, λ = 210 nm), t_R (minor) = 12.4 min, t_R (major) = 14.6 min; 95% ee.

$[\alpha]_D^{22}$ = - 5.5 (*c* = 1.0, CH_2Cl_2).

HRMS (ESI) calcd for $C_{21}H_{27}NO_8$+H, m/z 422.1815, found 422.1823.

(1***R***,2***R***,3***R***,4***S***)-ethyl 4-((ethoxycarbonyl)methyl)-1-acetyl-2-(4-bromo phenyl)-3-nitro-cyclopentanecarboxylate (**3f**)



The title compound was prepared according to the typical procedure, as described above in 92% yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.43 (d, *J* = 8.4 Hz, 1H), 7.11 (dd, *J* =8.4 Hz, 1H), 5.44 (dd, *J* =5.6, 7.2 Hz, 1H), 5.04 (d, *J* = 5.2 Hz, 1H), 4.24-4.16 (m, 2H), 3.86-3.78 (m, 1H), 3.63-3.57 (m, 1H), 3.53-3.45 (m, 1H), 2.86 (dd, *J* = 6.8, 13.2 Hz, 1H), 2.49 (dd, *J* = 7.2, 16.8 Hz, 1H), 2.39 (dd, *J* = 7.6, 17.0 Hz, 1H), 2.19 (s, 3H), 2.00 (dd, *J* = 10.4, 12.4 Hz, 1H), 1.30 (t, *J* = 7.2 Hz, 3H), 0.84 (t, *J* = 7.2 Hz, 3H).

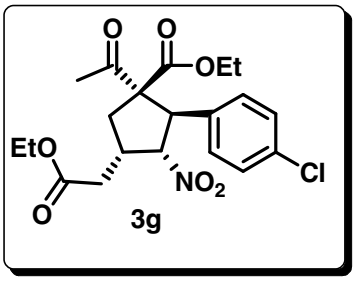
^{13}C-NMR (100 MHz, $CDCl_3$) δ 199.77, 170.81, 170.12, 136.02, 131.62, 130.21, 121.94, 93.72, 70.99, 61.96, 61.10, 50.93, 39.99, 37.70, 34.17, 26.96, 14.15, 13.33.

HPLC: Chiralcel OD-H (hexane / *i*-PrOH = 80 / 20, flow rate 1 mL / min, λ = 220 nm), t_R (major) = 7.6 min, t_R (minor) = 11.7 min; 97% ee.

$[\alpha]_D^{22}$ = - 19.0 (*c* = 0.8, CH_2Cl_2).

HRMS (ESI) calcd for $C_{20}H_{24}BrNO_7$+H, m/z 470.0814, found 470.0808.

(1***R***,2***R***,3***R***,4***S***)-ethyl 4-((ethoxycarbonyl)methyl)-1-acetyl-2-(4-chloro phenyl)-3-nitro-cyclopentanecarboxylate (**3g**)



The title compound was prepared according to the typical procedure, as described above in 88% yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.28 (d, *J* = 6.8 Hz, 1H), 7.16 (dd, *J* =2.0, 7.8 Hz, 1H), 5.44 (dd, *J* =5.6, 7.6 Hz, 1H), 5.05 (d, *J* = 5.2 Hz, 1H), 4.24-4.16 (m, 2H), 3.86-3.78 (m, 1H), 3.64-3.57 (m, 1H), 3.52-3.44 (m, 1H), 2.86 (dd, *J* = 6.8, 12.8 Hz, 1H), 2.48 (dd, *J* = 7. 4, 17.0 Hz, 1H), 2.39 (dd, *J* = 7.6, 17.0 Hz, 1H), 2.19 (s, 3H), 2.00 (dd, *J* = 10.4, 12.4 Hz, 1H), 1.30 (t, *J* = 7.2 Hz, 3H), 0.84 (t, *J* = 7.2 Hz, 3H).

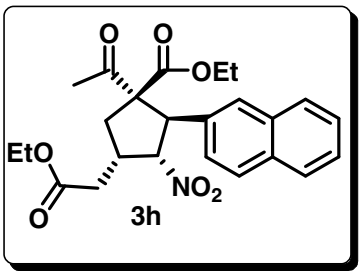
^{13}C-NMR (100 MHz, $CDCl_3$) δ 200.03, 170.81, 170.14, 135.49, 133.82, 129.88, 128.64, 93.79, 71.02, 61.92, 61.09, 50.86, 39.97, 37.70, 34.17, 26.97, 14.15, 13.33.

HPLC: Chiralcel OD-H (hexane / *i*-PrOH = 80 / 20, flow rate 1 mL / min, λ = 254 nm), t_R (major) = 7.1 min, t_R (minor) = 11.1 min; 96% ee.

$[\alpha]_D^{22}$ = - 11.4 (*c* = 1.0, CH_2Cl_2).

HRMS (ESI) calcd for $C_{20}H_{24}ClNO_7$+H, m/z 426.1320, found 426.1322.

(1***R***,2***R***,3***R***,4***S***)-ethyl 4-((ethoxycarbonyl)methyl)-1-acetyl-2-(naphthalen-3-yl)-3-nitro-cyclopentanecarboxylate (**3h**)



The title compound was prepared according to the typical procedure, as described above in 84% yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ7.82-7.76 (m, 3H), 7.69 (s, 1H), 7.49-7.47(m, 2H), 7.34 (d, *J* = 8.4 Hz, 1H), 5.64-5.61 (m, 1H), 5.27 (d, *J* = 5.2 Hz, 1H), 4.26-4.18(m, 2H), 3.75-3.63 (m, 2H), 3.26-3.18 (m, 1H), 2.93 (dd, *J* = 6.8, 12.8 Hz, 1H), 2.53 (dd, *J* =7.6, 16.8 Hz, 1H), 2.45 (dd, *J* = 7.6, 16.8 Hz, 1H), 2.21 (s, 3H), 2.45 (dd, *J* = 10.8, 12.8 Hz, 1H), 1.32 (t, *J* = 7.2 Hz, 3H), 0.52 (t, *J* = 7.2 Hz, 3H).

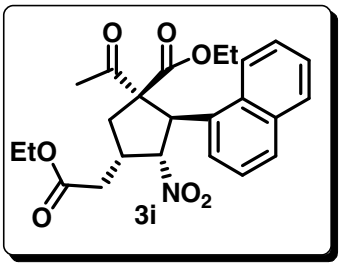
^{13}C-NMR (100 MHz, $CDCl_3$) δ 200.22, 170.91, 170.32, 128.17, 127.89, 127.48, 127.43, 126.40, 126.28, 126.26, 94.23, 71/30, 61.74, 61.08, 51.71, 40.19, 37.86, 34.29, 27.02, 14.18, 13.03.

HPLC: Chiralpak AD-H (hexane / *i*-PrOH = 80 / 20, flow rate 1 mL / min, λ = 254 nm), t_R (minor) = 20.5 min, t_R (major) = 33.5 min; 95% ee.

$[\alpha]_D^{22}$ = - 31.9 (*c* = 0.6, CH_2Cl_2).

HRMS (ESI) calcd for $C_{24}H_{27}NO_7$+H, m/z 442.1866, found 442.1861.

(1***R***,2***R***,3***R***,4***S***)-ethyl 4-((ethoxycarbonyl)methyl)-1-acetyl-2-(naphthalen-1-yl)-3-nitro-cyclopentanecarboxylate (**3i**)



The title compound was prepared according to the typical procedure, as described above in 87% yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ 8.58 (d, *J* = 7.6 Hz, 1H), 7.82 (d, *J* = 8.4 Hz, 1H), 7.77 (d, *J* = 8.4 Hz, 1H), 7.62-7.59 (m, 1H), 7.52-7.49 (m, 1H), 7.44-7.40(m, 1H), 7.23 (d, *J* = 7.2 Hz, 1H), 6.03 (d, *J* = 2.4 Hz, 1H), 5.60-5.58 (m, 1H), 4.30-4.17(m, 2H), 3.76-3.68 (m, 1H), 3.51-3.45 (m, 1H), 3.01 (dd, *J* = 6.8, 12.8 Hz, 1H), 2.88-2.83 (m, 1H), 2.62 (dd, *J* = 6.4, 17.2 Hz, 1H), 2.43 (dd, *J* = 8.4, 17.2 Hz, 1H), 2.19 (s, 3H), 1.16-2.10 (m, 1H), 1.32 (t, *J* = 7.2 Hz, 3H), 0.19 (t, *J* = 7.2 Hz, 3H).

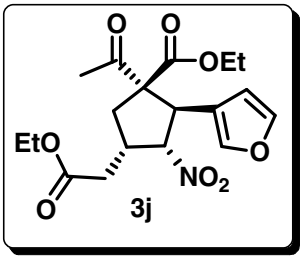
^{13}C-NMR (100 MHz, $CDCl_3$) δ 199.62, 170.91, 170.19, 135.23, 133.55, 132.51, 128.57, 126.75, 126.04, 124.99, 124.75, 124.57, 96.98, 72.47, 61.48, 61.11, 46.43, 37.98, 33.91, 26.81, 14.19, 12.51.

HPLC: Chiralcel OD-H (hexane / *i*-PrOH = 80 / 20, flow rate 1 mL / min, λ = 220 nm), t_R (major) = 7.7 min, t_R (minor) = 10.2 min; 95% ee.

$[\alpha]_D^{22}$ = - 29.0 (*c* = 1.0, CH_2Cl_2).

HRMS (ESI) calcd for $C_{24}H_{27}NO_7$+H, m/z 442.1866, found 442.1861.

(1***R***,2***R***,3***R***,4***S***)-ethyl 4-((ethoxycarbonyl)methyl)-1-acetyl-2-(furan-3-yl) 3-nitro-cyclopentanecarboxylate (**3j**)



The title compound was prepared according to the typical procedure, as described above in 86% yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.36-7.34 (m, 2H), 6.28 (s, 1H), 5.34-5.31(m, 1H), 4.82 (d, *J* = 6.8 Hz, 1H), 4.22-4.14(m, 2H), 4.03-3.95 (m, 1H), 3.88-3.81 (m, 1H), 3.58-3.52 (m, 1H), 2.83 (dd, *J* = 7.2, 13.2 Hz, 1H), 2.41 (d, *J* = 7.6 Hz, 1H), 2.21 (s, 3H), 1.96 (dd, *J* = 10.4, 12.8 Hz, 1H), 1.28 (t, *J* = 7.2 Hz, 3H), 1.02 (t, *J* = 7.2 Hz, 3H).

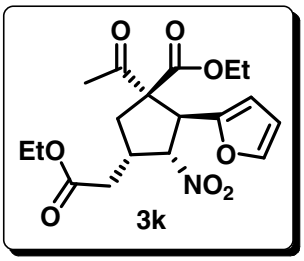
^{13}C-NMR (100 MHz, $CDCl_3$) δ 200.61, 170.86, 170.57, 143.15, 140.79, 120.66, 109.98, 93.37, 69.47, 61.91, 61.04, 43.71, 38.29, 37.85, 34.55, 27.21, 14.14, 13.48.

HPLC: Chiralpak AD-H (hexane / *i*-PrOH = 90 / 10, flow rate 1 mL / min, λ = 254 nm), t_R (minor) = 17.9 min, t_R (major) = 19.0 min; 94% ee.

$[\alpha]_D^{22}$ = 5.7 (*c* = 1.2, CH_2Cl_2).

HRMS (ESI) calcd for $C_{18}H_{23}NO_8$+H, m/z 382.1502, found 382.1499.

(1***R***,2***R***,3***R***,4***S***)-ethyl 4-((ethoxycarbonyl)methyl)-1-acetyl-2-(furan-2-yl) 3-nitro-cyclopentanecarboxylate (**3k**)



The title compound was prepared according to the typical procedure, as described above in 87% yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.31-7.28 (m, 1H), 6.31-6.26 (m, 2H), 5.45 (dd, *J* = 5.6, 7.6 Hz, 1H), 5.09 (d, *J* = 5.6 Hz, 1H), 4.22-4.15(m, 2H),

4.04-3.99 (m, 1H), 3.80-3.75 (m, 1H), 3.60-3.53 (m, 1H), 2.88 (dd, *J* = 6.8, 13.2 Hz, 1H), 2.41 (d, *J* = 7.6 Hz, 1H), 2.20 (s, 3H), 1.96-1.90 (m, 1H), 1.28 (t, *J* = 7.2 Hz, 3H), 1.03 (t, *J* = 7.2 Hz, 3H).

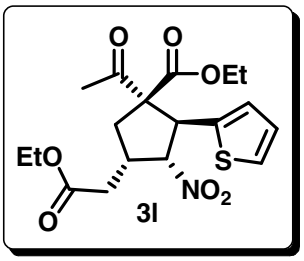
^{13}C-NMR (100 MHz, $CDCl_3$) δ 199.80, 170.76, 169.98, 149.81, 142.32, 110.73, 108.96, 92.07, 69.40, 62.32, 61.03, 46.32, 38.99, 37.50, 34.29, 26.73, 14.14, 13.60.

HPLC: Chiralcel OD-H (hexane / *i*-PrOH = 80 / 20, flow rate 1 mL / min, λ = 220 nm), t_R (major) = 7.2 min, t_R (minor) = 11.1min; 94% ee.

$[\alpha]_D^{22}$ = - 6.3 (*c* = 1.1, CH_2Cl_2).

HRMS (ESI) calcd for $C_{18}H_{23}NO_8$+Na, m/z 404.1321, found 404.1326.

(1***R***,2***R***,3***R***,4***S***) –ethyl 4-((ethoxycarbonyl)methyl)-1-acetyl-3-nitro-2-(thiophen-2-yl)cyclopentanecarboxylate (**3l**)



The title compound was prepared according to the typical procedure, as described above in 91% yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.21-7.20 (m, 1H), 6.93-6.92 (m, 2H), 5.52-4.48 (m, 1H), 5.21 (d, *J* = 7.2 Hz, 1H), 4.226-4.14 (m, 2H), 3.96-3.89 (m, 1H), 3.75-3.68 (m, 1H), 3.66-3.57 (m, 1H), 2.89 (dd, *J* = 7.2, 12.8 Hz,

1H), 2.41 (d, J = 7.6 Hz, 1H), 2.21 (s, 3H), 1.96 (dd, J = 10.0, 13.2 Hz, 1H), 1.29 (t, J = 7.2 Hz, 3H), 0.94 (t, J = 7.2 Hz, 3H).

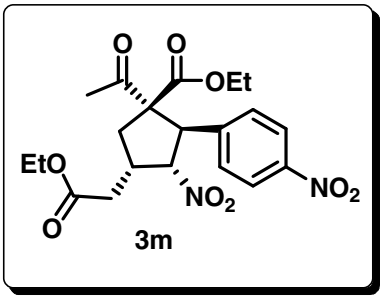
^{13}C-NMR (100 MHz, $CDCl_3$) δ 200.36, 170.76, 170.21, 138.64, 126.82, 126.27, 125.36, 94.23, 70.46, 62.10, 61.07, 47.35, 38.31, 37.70, 34.55, 27.14, 14.15, 13.48.

HPLC: Chiralpak AS-H (hexane / *i*-PrOH = 95 / 5, flow rate 1 mL / min, λ = 210 nm), t_R (minor) = 25.0 min, t_R (major) = 28.1 min; 94% ee.

$[\alpha]_D^{22}$ = - 4.3 (c = 1.2, CH_2Cl_2).

HRMS (ESI) calcd for $C_{18}H_{23}NO_7S$+Na, m/z 420.1093, found 420.1100.

(1***R***,2***R***,3***R***,4***S***)-ethyl 4-((ethoxycarbonyl)methyl)-1-acetyl-3-nitro-2-(4-nitrophenyl) cyclopentanecarboxylate (**3m**)



To a solution of diethyl 5-acetylhex-2-enedioate (**1a**, 0.3 mmol, 1.0 eq) and 1-nitro-4-((*E*)-2-nitrovinyl)benzene (0.6 mmol, 2.0 eq) in diethyl ether (0.4 mL) was added catalyst **V** (**Q-NH$_2$**) (0.06 mmol, 0.2 eq) at room temperature (22°C). The resulting mixture was stirred vigorously for 24 hours, then the reaction was continued for about 6 hours after removal of the solvent. After the reaction was completed (monitored by TLC and

crude NMR), the title product was afforded by flash chromatography over silica gel (Et_2O:Hexane = 1:10 to 1:3) in 81% yield.

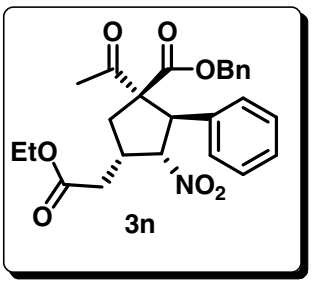
^{1}H-NMR (400 MHz, $CDCl_3$) δ 8.17 (d, *J* = 8.8 Hz, 1H), 7.44 (d, *J* = 8.8 Hz, 1H), 5.52-5.49 (m, 1H), 5.19 (d, *J* = 5.6 Hz, 1H), 4.25-4.16 (m, 2H), 3.86-3.80 (m, 1H), 3.69-3.62 (m, 1H), 3.49-3.43 (m, 1H), 2.89 (dd, *J* = 6.8, 13.2 Hz, 1H), 2.51 (dd, *J* = 7.2, 17.2 Hz, 1H), 2.40 (dd, *J* = 7.6, 17.2 Hz, 1H), 2.22 (s, 3H), 2.02 (dd, *J* = 10.8, 12.8 Hz, 1H), 1.30 (t, *J* = 7.2 Hz, 3H), 0.82 (t, *J* = 7.2 Hz, 3H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 199.79, 170.73, 169.82, 147.41, 144.35, 129.64, 123.60, 93.20, 71.10, 62.07, 61.21, 51.02, 40.01, 37.73, 34.09, 26.91, 14.15, 13.42.

HPLC: Chiralpak AS-H (hexane / *i*-PrOH = 80 / 20, flow rate 1 mL / min, λ = 210 nm), t_R (major) = 20.9 min, t_R (minor) = 25.4 min; 97% ee.

$[\alpha]_D^{22}$ = - 9.7 (*c* = 1.0, CH_2Cl_2).

(1***R***,2***R***,3***R***,4***S***)-benzyl 4-((ethoxycarbonyl)methyl)-1-acetyl-3-nitro-2-phenylcyclopentanecarboxylate (**3n**)



To a solution of 6-benzyl 1-ethyl 5-acetylhex-2-enedioate **1b** (0.3 mmol, 1.0 eq) and 1-((*E*)-2-nitrovinyl)benzene (0.45 mmol, 1.5 eq) in diethyl

ether (0.4 mL) was added catalyst **V** (**Q-NH_2**) (0.045 mmol, 0.15 eq) at room temperature (22°C). The resulting mixture was stirred vigorously for 16 hours, then the reaction was continued for about 6 hours after removal of the solvent. After the reaction was completed (monitored by TLC and crude NMR), the title product was afforded by flash chromatography over silica gel (Ethyl acetate:Hexane = 1:10 to 1:4) in 91 % yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.54-7.14 (m, 8H), 6.96-6.94 (m, 2H), 5.51 (dd, *J* = 5.2, 7.2 Hz, 1H), 5.11 (d, *J* = 5.2 Hz, 1H), 4.83 (d, *J* = 12.0 Hz, 1H), 4.25-4.16 (m, 2H), 4.10 (d, *J* = 12.0 Hz, 1H), 3.69-3.63 (m, 1H), 2.89 (dd, *J* = 6.8, 13.2 Hz, 1H), 2.49 (dd, *J* = 7.6, 16.8 Hz, 1H), 2.40 (dd, *J* = 7.6, 16.8 Hz, 1H), 2.11 (s, 3H), 2.02 (dd, *J* = 10.8, 12.8 Hz, 1H), 1.30 (t, *J* = 7.2 Hz, 3H).

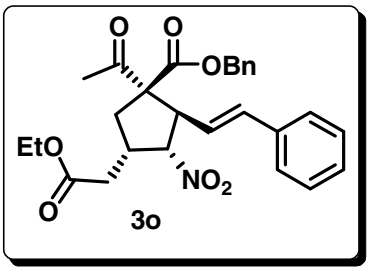
^{13}C-NMR (100 MHz, $CDCl_3$) δ 199.84, 170.86, 170.18, 137.04, 134.09, 128.63, 128.49, 128.45, 128.28, 127.91, 94.23, 71.41, 67.57, 61.07, 51.69, 40.20, 37.81, 34.22, 27.07, 14.17.

HPLC: Chiralcel OD-H (hexane / *i*-PrOH = 80 / 20, flow rate 1 mL / min, λ = 220 nm), t_R (major) = 7.7 min, t_R (minor) = 11.5 min; 97% ee.

$[\alpha]_D^{22}$ = - 5.0 (*c* = 0.9, CH_2Cl_2).

HRMS (ESI) calcd for $C_{25}H_{27}NO_7$+H, m/z 454.1866, found 454.1861.

(1***R***,2***R***,3***R***,4***S***)–benzyl 4-((ethoxycarbonyl)methyl)-1-acetyl-3-nitro-2-styrylcyclopentanecarboxylate (**3o**)



3o

To a solution of 6-benzyl 1-ethyl 5-acetylhex-2-enedioate (**1b**, 0.3 mmol, 1.0 eq) and 1-((1*E*,3*E*)-4-nitrobuta-1,3-dienyl)benzene (0.6 mmol, 2.0 eq) in diethyl ether (0.4 mL) was added catalyst **V** (**Q-NH_2**) (0.03 mmol, 0.2 eq) at room temperature (22°C). The resulting mixture was stirred vigorously for 24 hours, and then the reaction was continued for about 6 hours after removal of the solvent. After the reaction was completed (monitored by TLC and crude NMR), the title product was afforded by flash chromatography over silica gel (Et_2O:Hexane = 1:10 to 1:4) in 83% yield.

^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.32-7.22 (m, 10H), 6.55 (d, *J* = 16.0, 1H), 6.05 (dd, *J* = 8.8, 16.0 Hz, 1H), 5.21-5.17 (m, 1H), 5.18 (d, *J* = 12.0 Hz, 1H), 5.05 (d, *J* = 12.0 Hz, 1H), 4.08 (d, *J* = 12.4 Hz, 1H), 4.26-4.13 (m, 3H), 3.45-3.35 (m, 1H), 2.72 (dd, *J* = 7.2, 13.2 Hz, 1H), 2.43-2.40 (m, 2H), 2.18 (s, 3H), 2.07 (dd, *J* = 10.8, 13.2 Hz, 1H), 1.28 (t, *J* = 7.2 Hz, 3H).

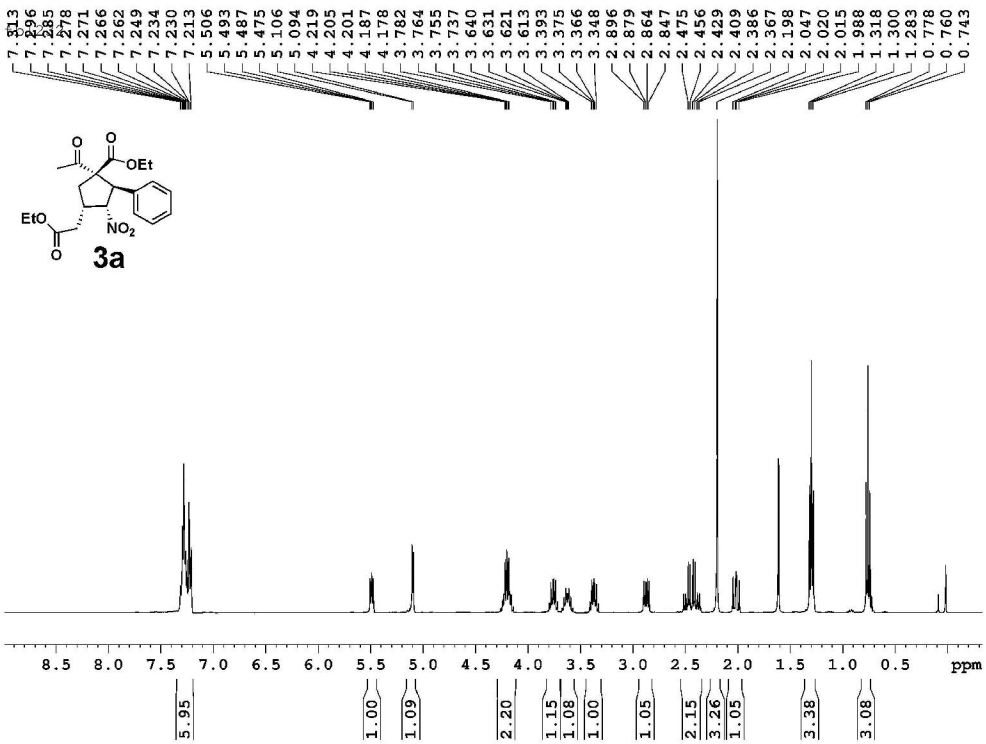
^{13}C-NMR (100 MHz, $CDCl_3$) δ 200.66, 170.89, 170.50, 135.91, 135.07, 134.36, 128.75, 128.73, 128.62, 128.60, 128.13, 126.55, 123.69, 92.81, 69.04, 67.85, 61.03, 51.55, 38.04, 37.63, 34.59, 27.64, 14.15.

HPLC: Chiralpak AD-H (hexane / *i*-PrOH = 90 / 10, flow rate 1 mL / min, λ = 254 nm), t_R (major) = 20.7 min, t_R (minor) = 22.8 min; 95% ee.

$[\alpha]_D^{22}$ = - 5.3 (*c* = 1.0, CH_2Cl_2).

HRMS (ESI) calcd for $C_{27}H_{29}NO_7$+H, m/z 480.2022, found 480.2017.

NMR Spectra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EtO
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2.15
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1.05
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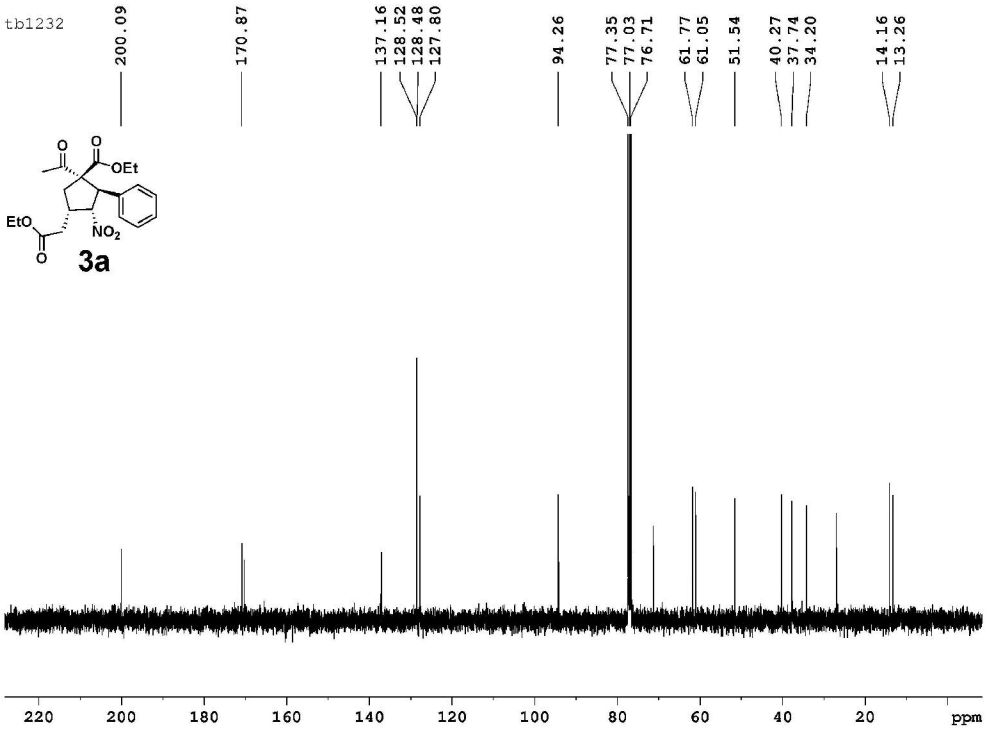
3.08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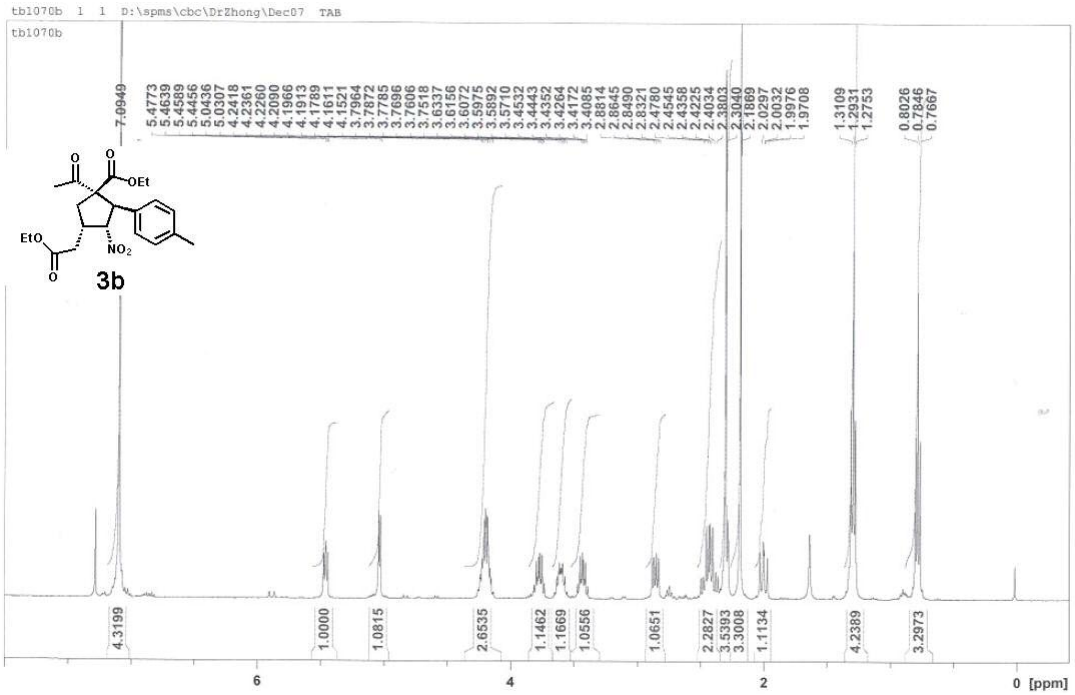
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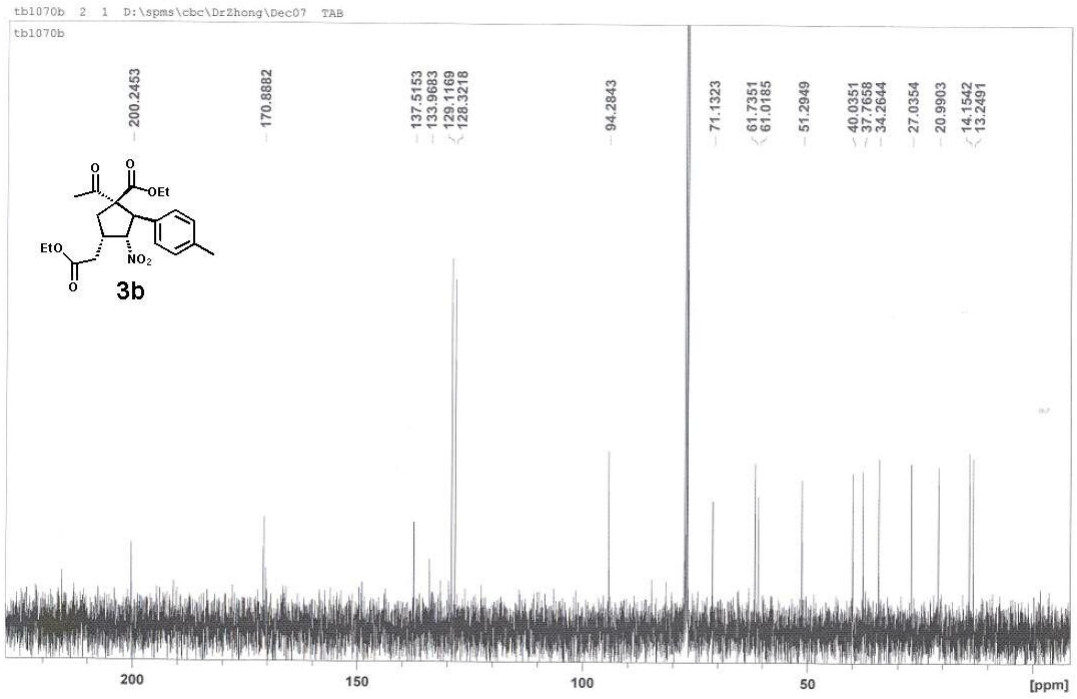
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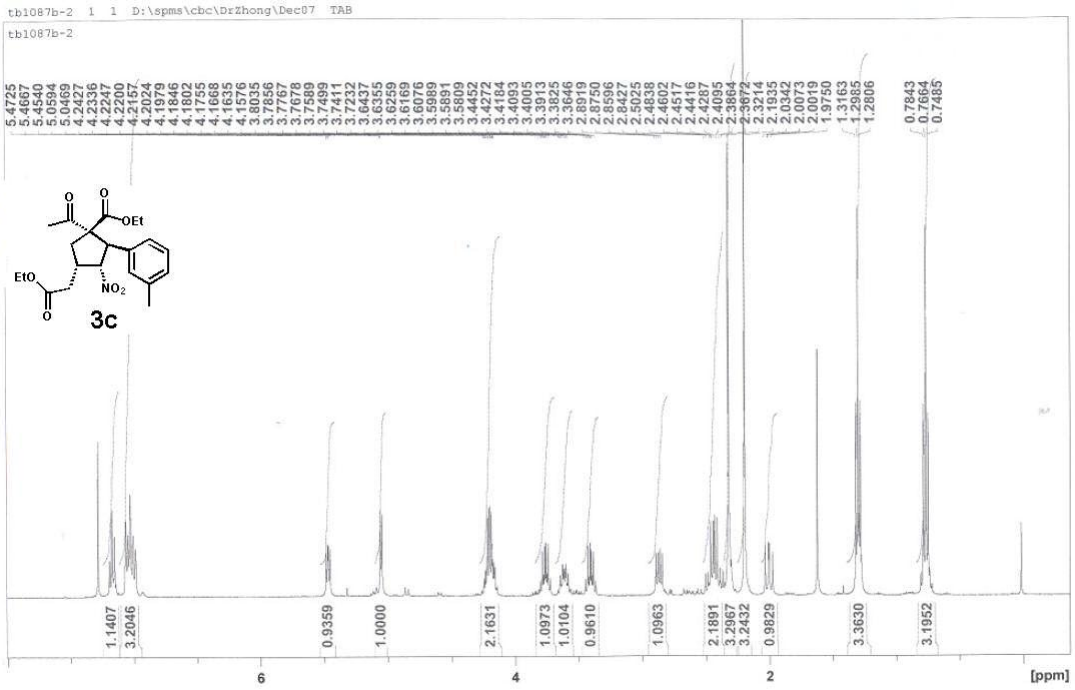
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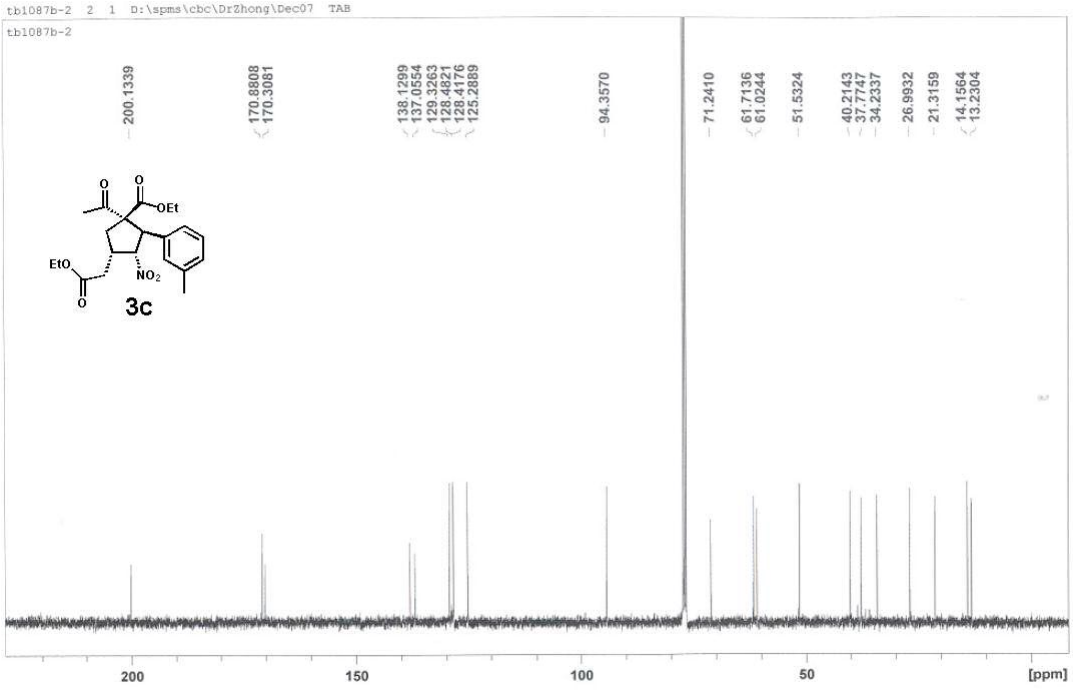
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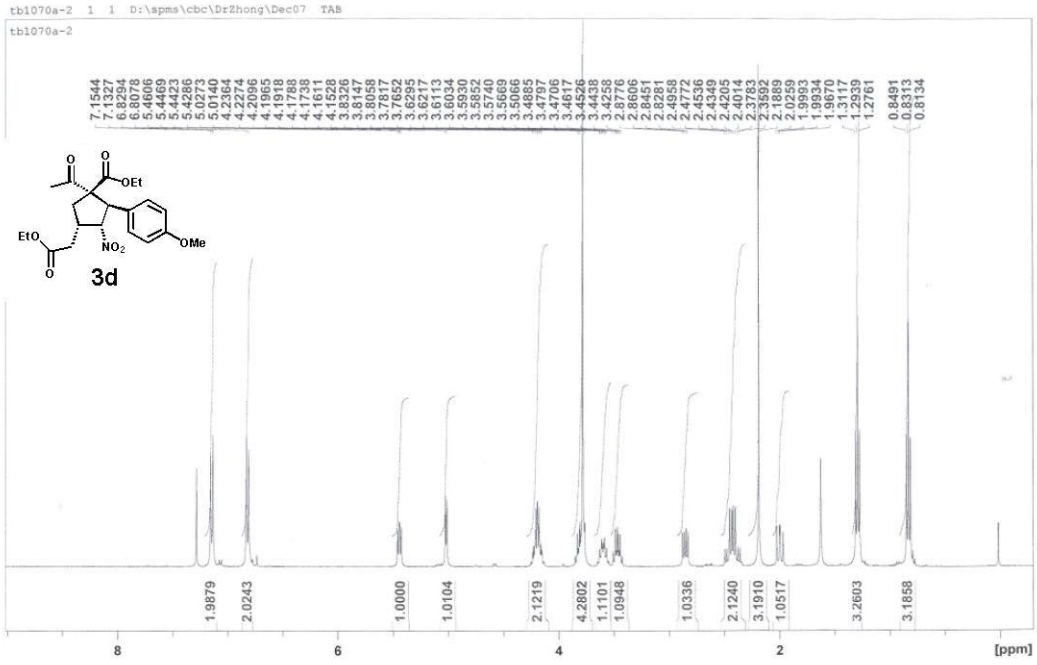
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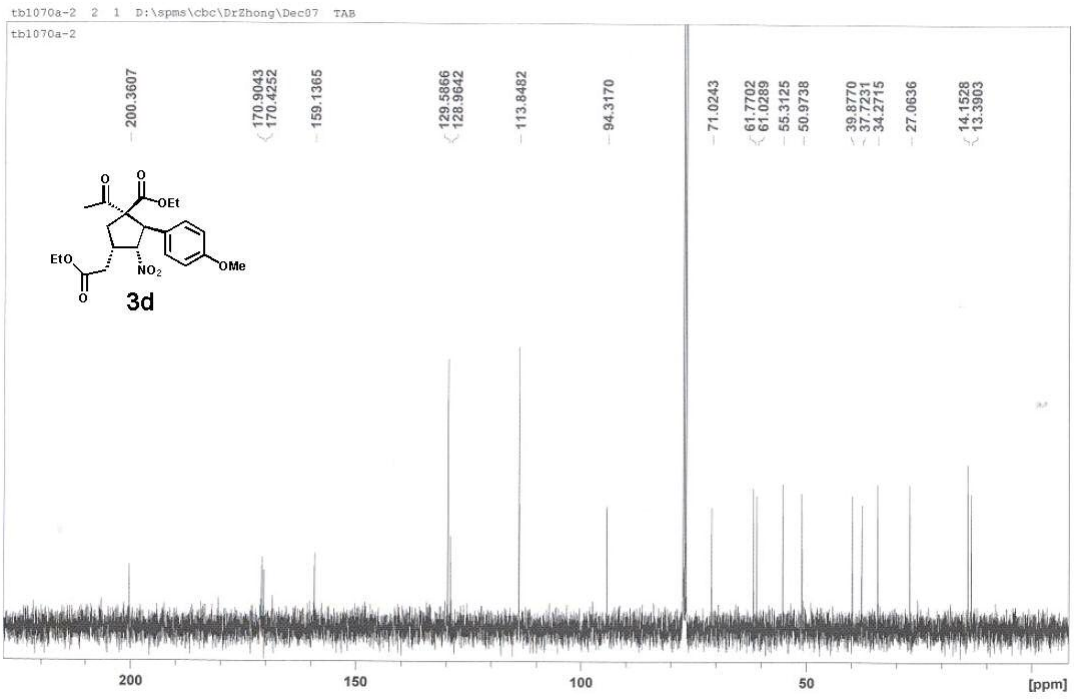
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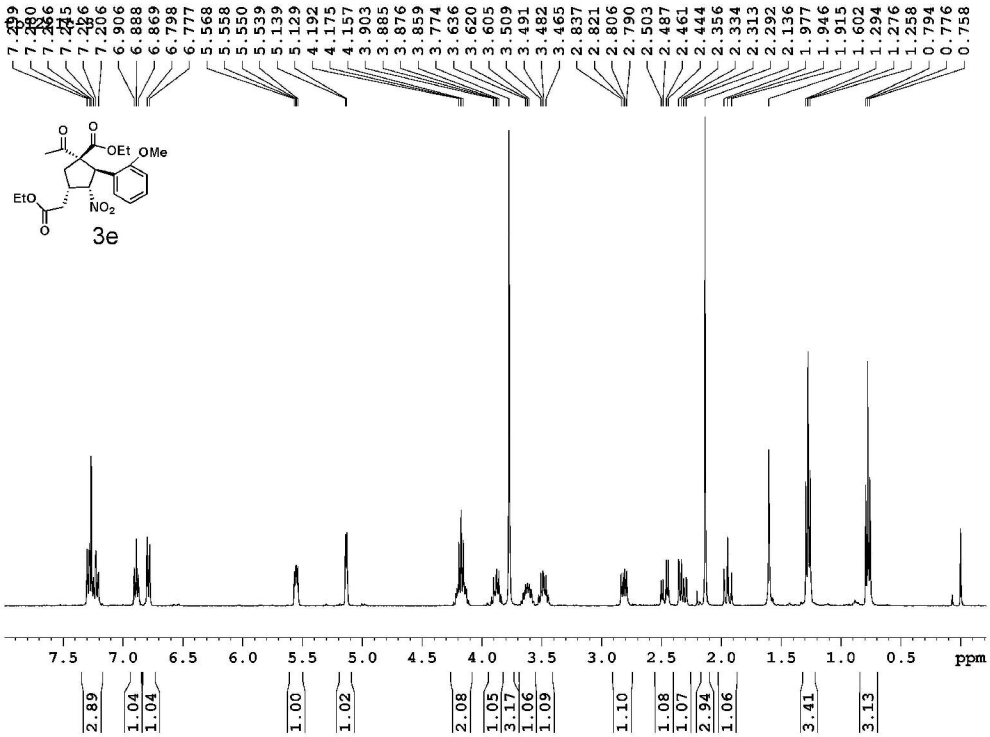
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6.888
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6.798
6.777
5.568
5.558
5.550
5.539
5.139
5.129
4.192
4.175
4.157
3.903
3.885
3.876
3.859
3.774
3.636
3.620
3.605
3.509
3.491
3.482
3.465
2.837
2.821
2.806
2.790
2.503
2.487
2.461
2.444
2.356
2.334
2.313
2.292
2.136
1.977
1.946
1.915
1.602
1.294
1.276
1.258
0.794
0.776
0.758
OEt
OMe
EtO
NO2
3e
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm
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1.04
1.04
1.00
1.02
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1.07
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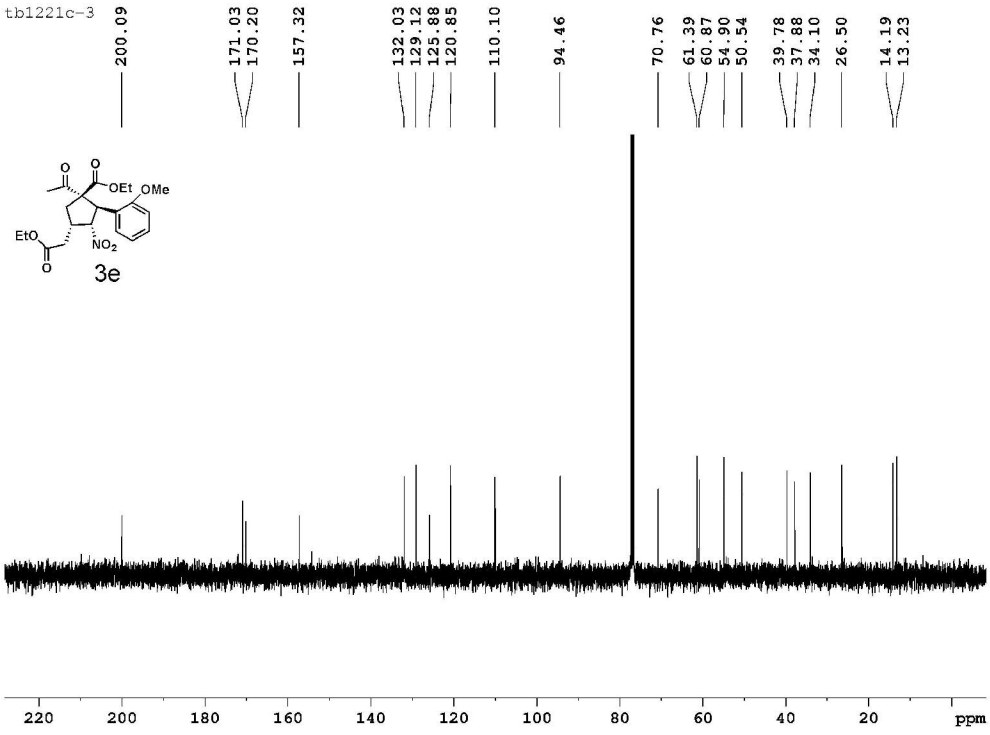
3.41
3.13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120.85
110.10
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70.76
61.39
60.87
54.90
50.54
39.78
37.88
34.10
26.50
14.19
13.23
OEt
OMe
EtO
NO2
3e
220
200
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140
120
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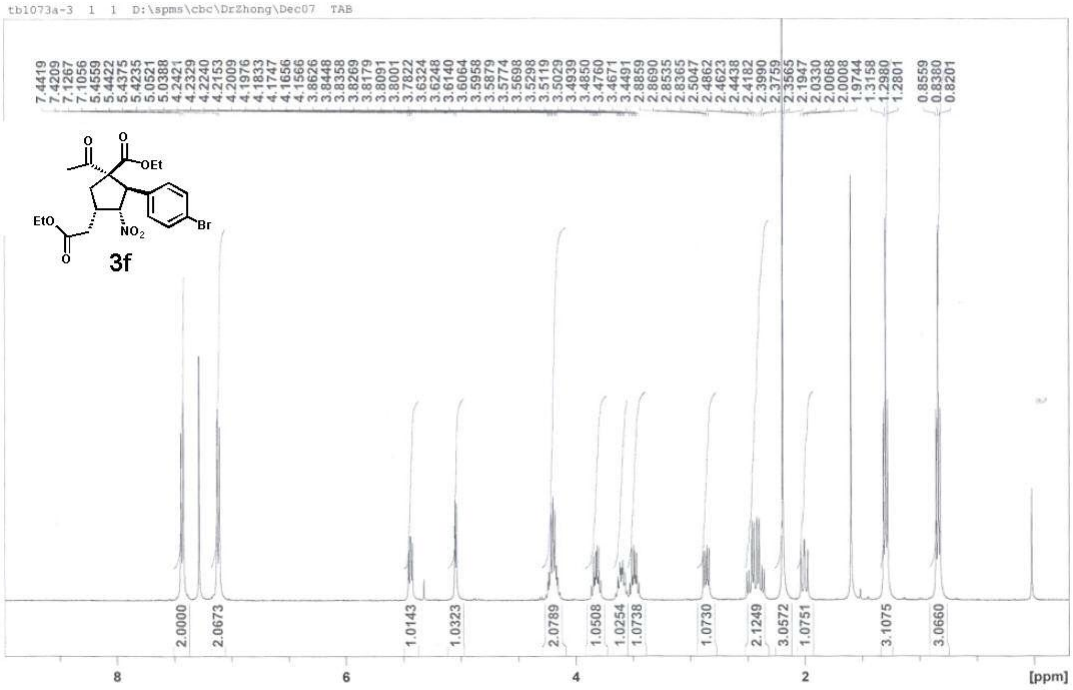
80
60
40
20
ppm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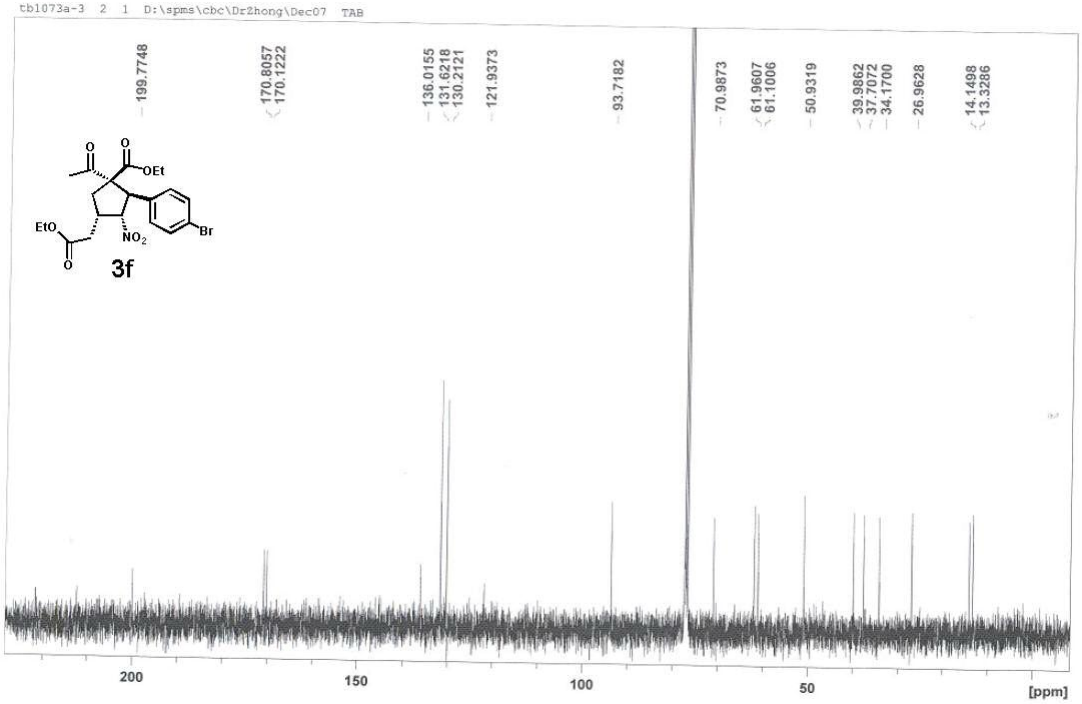
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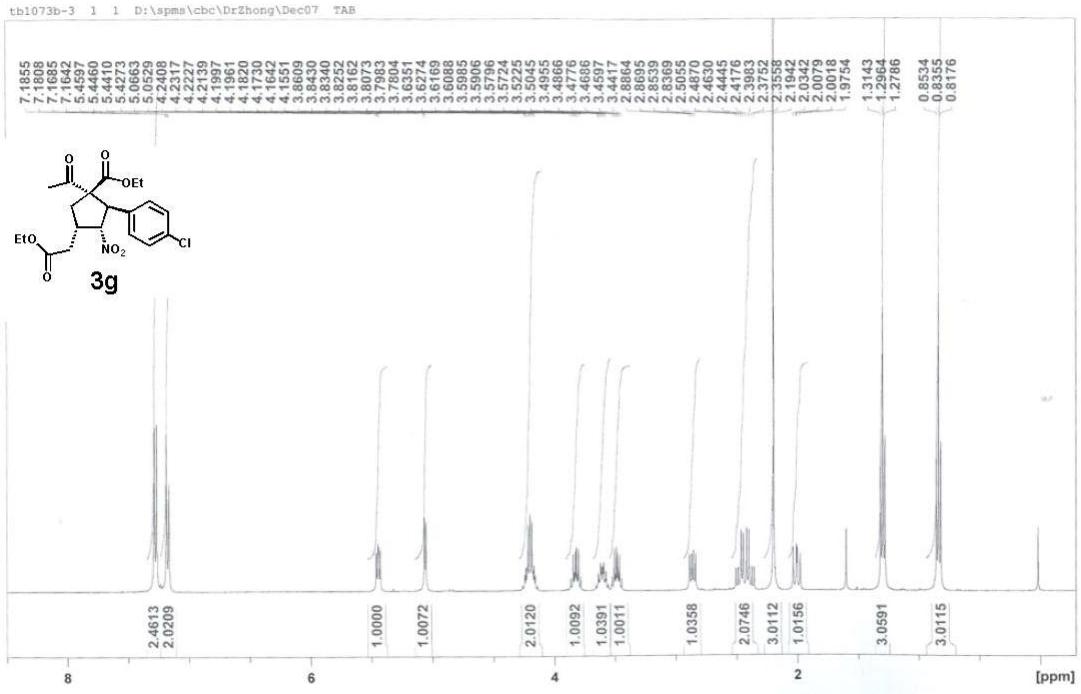
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3g
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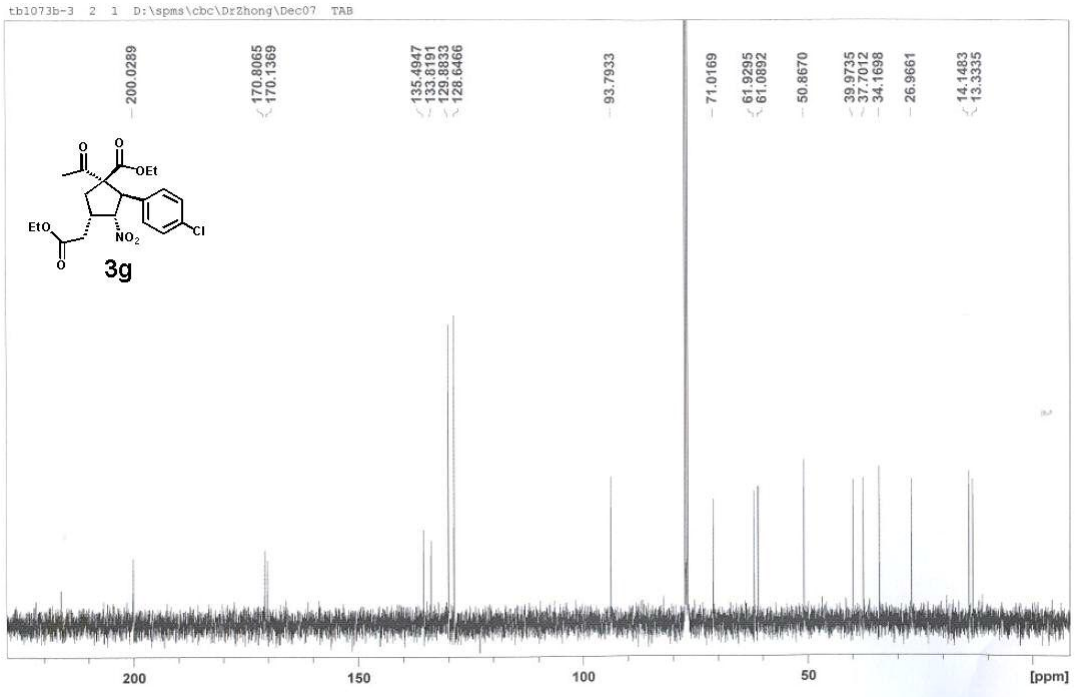
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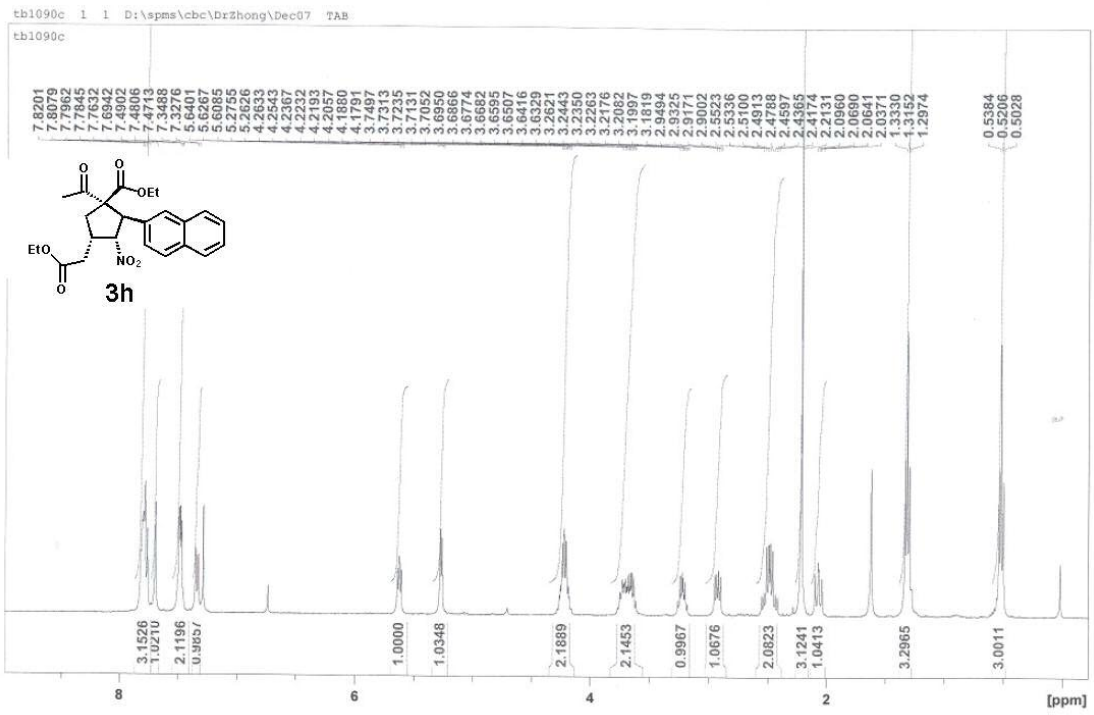
3g
[ppm]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3h
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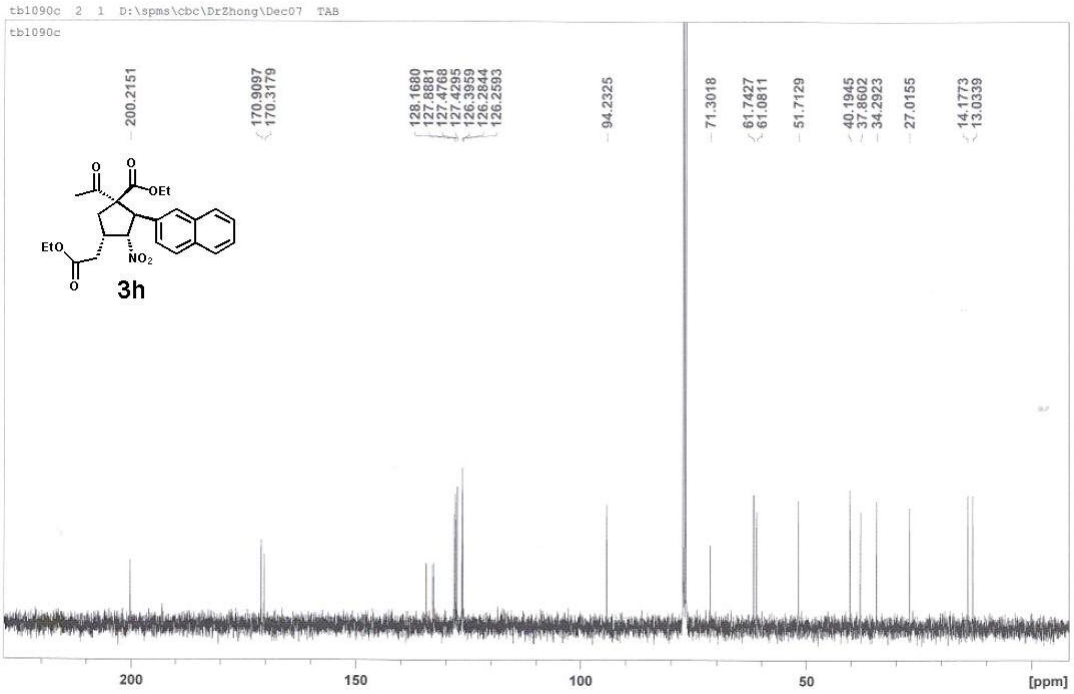
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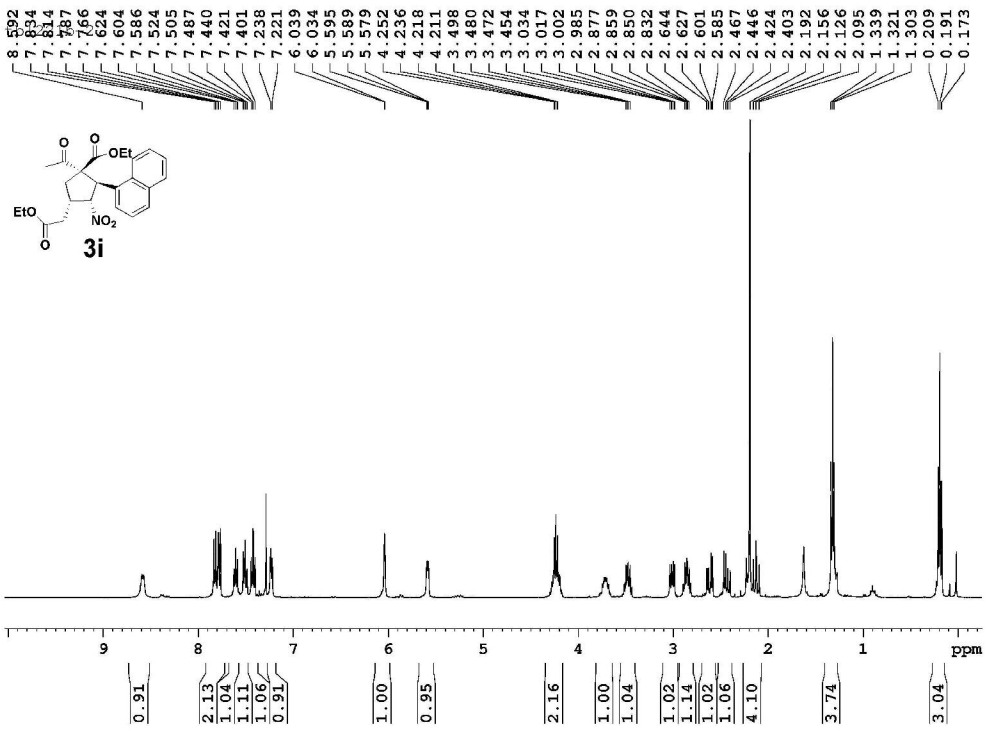
3h
[ppm]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7.440
7.421
7.401
7.238
7.221
6.039
6.034
5.595
5.589
5.579
4.252
4.236
4.218
4.211
3.498
3.480
3.472
3.454
3.034
3.017
3.002
2.985
2.877
2.859
2.850
2.832
2.644
2.627
2.601
2.585
2.467
2.446
2.424
2.403
2.192
2.156
2.126
2.095
1.339
1.321
1.303
0.209
0.191
0.173
OEt
EtO
NO2
3i
ppm
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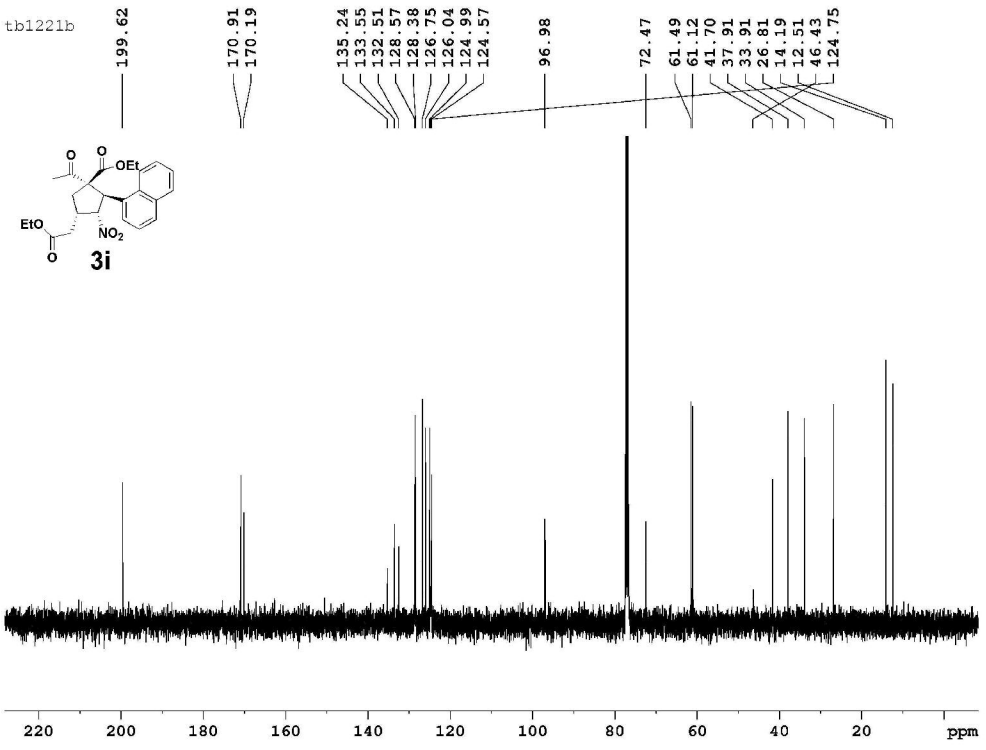
2.13
1.04
1.11
1.06
0.91
1.00
0.95
2.16
1.00
1.04
1.02
1.14
1.02
1.06
4.10
3.74
3.04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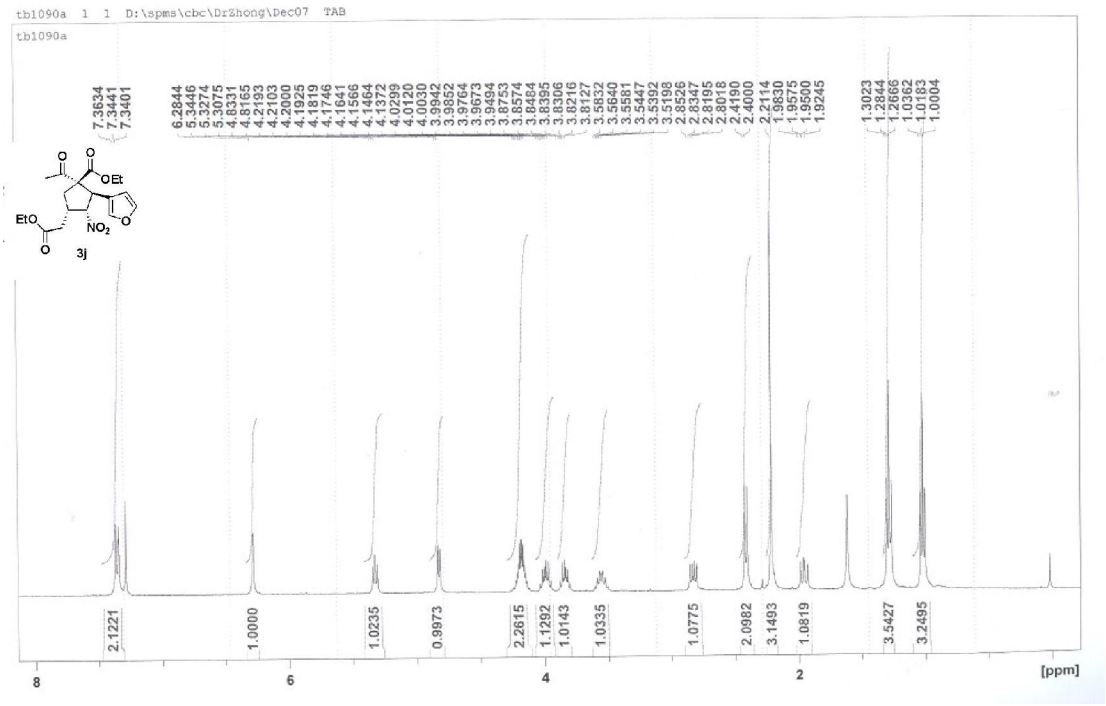
135.24
133.55
132.51
128.57
128.38
126.75
126.04
124.99
124.57
96.98
72.47
61.49
61.12
41.70
37.91
33.91
26.81
14.19
12.51
46.43
124.75
OEt
EtO
NO2
3i
ppm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7.3441
7.3401
6.2844
5.3446
5.3274
5.3075
4.8331
4.8165
4.2193
4.2103
4.2000
4.1925
4.1819
4.1746
4.1641
4.1566
4.1464
4.1372
4.0299
4.0120
4.0030
3.9942
3.9852
3.9764
3.9673
3.9494
3.8753
3.8574
3.8484
3.8395
3.8306
3.8216
3.8127
3.5832
3.5640
3.5581
3.5447
3.5392
3.5198
2.8526
2.8347
2.8195
2.8018
2.4190
2.4000
2.2114
1.9830
1.9575
1.9500
1.9245
1.3023
1.2844
1.2666
1.0362
1.0183
1.0004
OEt
EtO
NO2
O
3j
2.1221
1.0000
1.0235
0.9973
2.2615
1.1292
1.0143
1.0335
1.0775
2.0982
3.1493
1.0819
3.5427
3.2495
8
6
4
2
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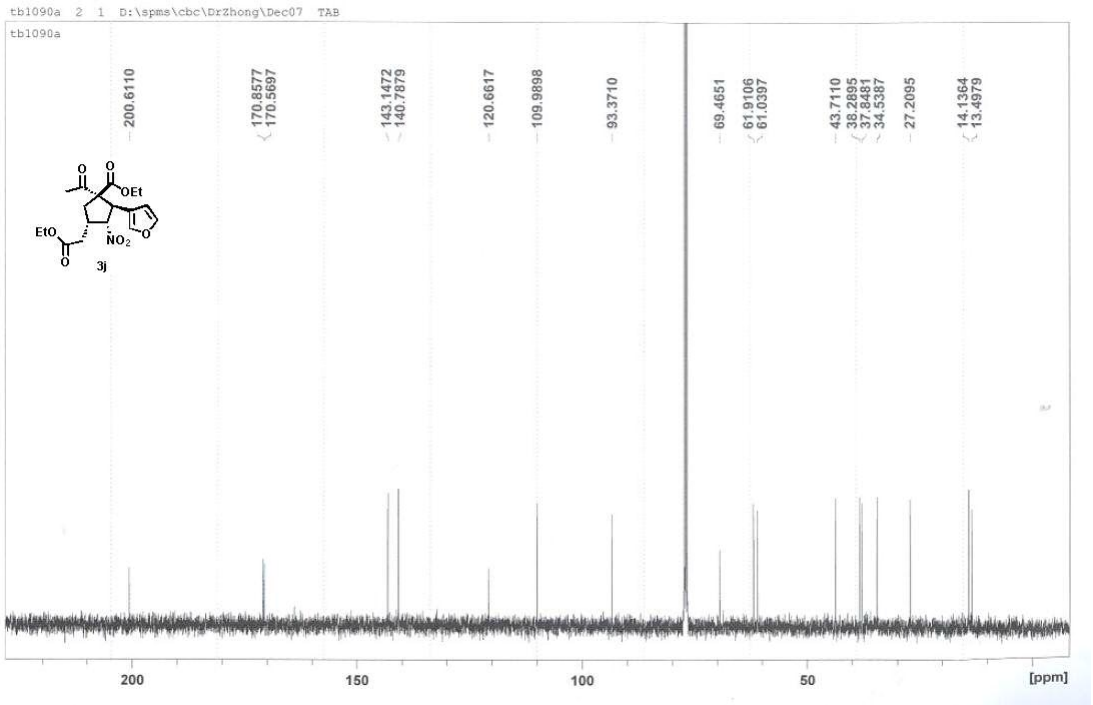
tb1090a 2 1 D:\spms\cbc\DrZhong\Dec07 TAB
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143.1472
140.7879
120.6617
109.9898
93.3710
69.4651
61.9106
61.0397
43.7110
38.2895
37.8481
34.5387
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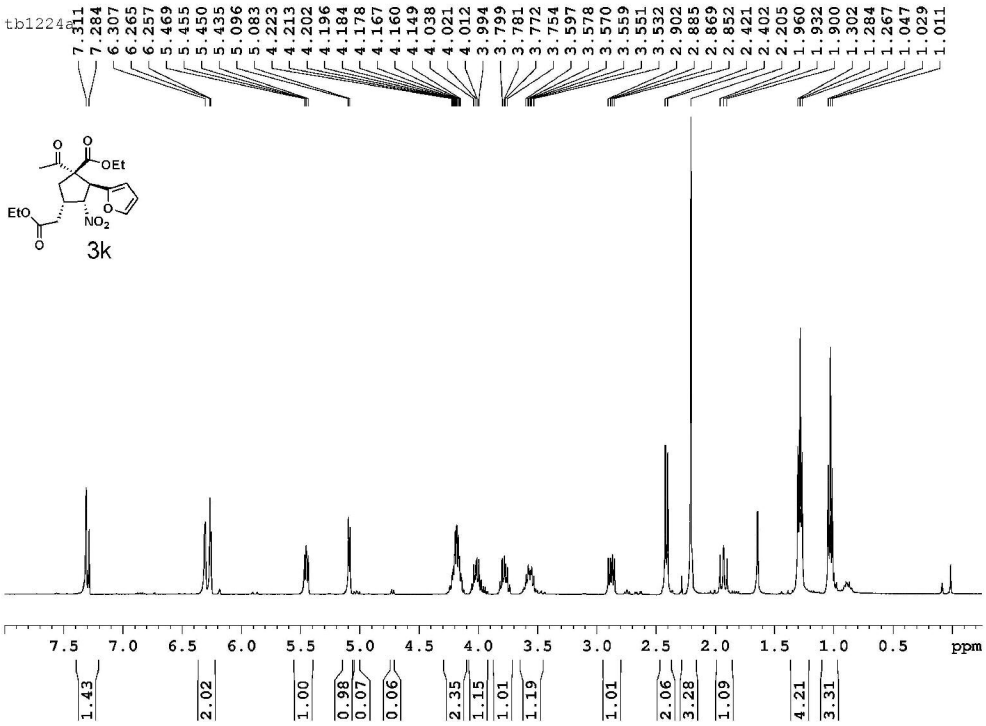
14.1364
13.4979
OEt
EtO
NO2
O
3j
200
150
100
50
[ppm]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5.450
5.435
5.096
5.083
4.223
4.213
4.202
4.196
4.184
4.178
4.167
4.160
4.149
4.038
4.021
4.012
3.994
3.799
3.781
3.772
3.754
3.597
3.578
3.570
3.559
3.551
3.532
2.902
2.885
2.869
2.852
2.421
2.402
2.205
1.960
1.932
1.900
1.302
1.284
1.267
1.047
1.029
1.011
OEt
EtO
NO2
3k
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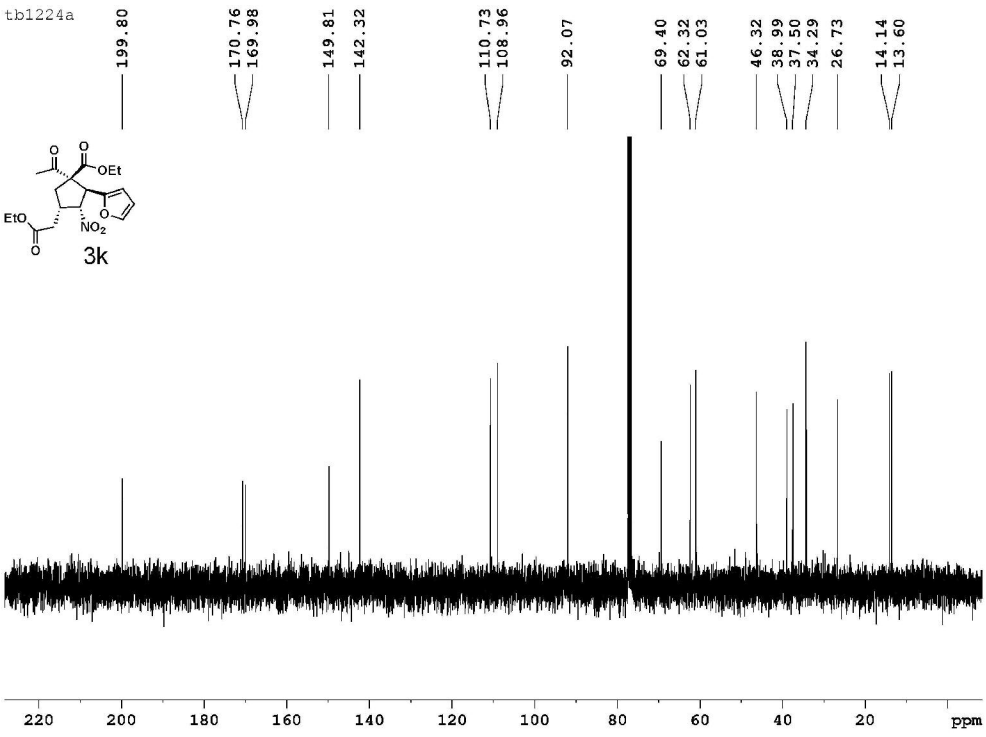
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm
1.43
2.02
1.00
0.98
0.07
0.06
2.35
1.15
1.01
1.19
1.01
2.06
3.28
1.09
4.21
3.31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110.73
108.96
92.07
69.40
62.32
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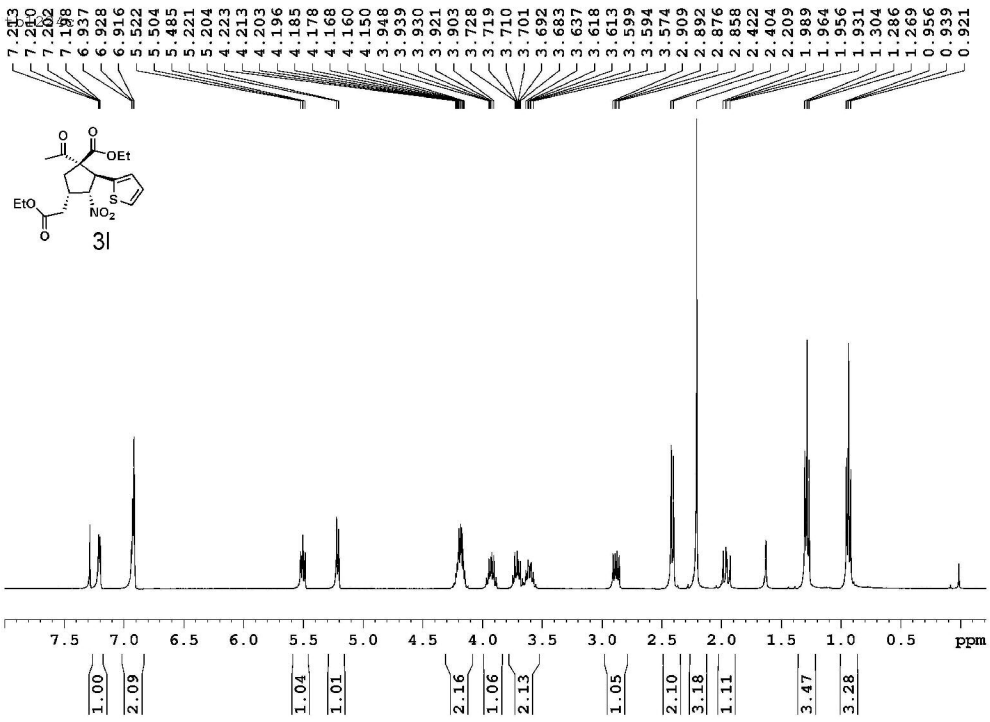
46.32
38.99
37.50
34.29
26.73
14.14
13.60
OEt
EtO
NO2
3k
220
200
180
160
140
120
100
80
60
40
20
ppm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5.485
5.221
5.204
4.223
4.213
4.203
4.196
4.185
4.178
4.168
4.160
4.150
3.948
3.939
3.930
3.921
3.903
3.728
3.719
3.710
3.701
3.692
3.683
3.637
3.618
3.613
3.599
3.594
3.574
2.909
2.892
2.876
2.858
2.422
2.404
2.209
1.989
1.964
1.956
1.931
1.304
1.286
1.269
0.956
0.939
0.921
OEt
EtO
NO2
3l
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm
1.00
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1.06
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1.05
2.10
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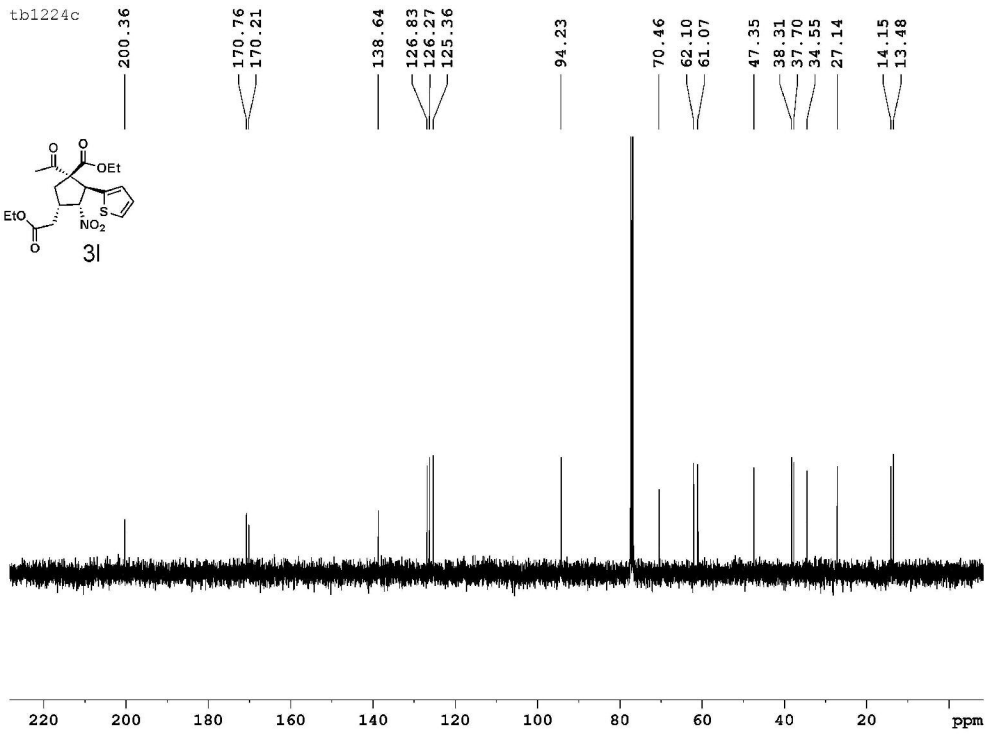
3.47
3.28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125.36
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70.46
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38.31
37.70
34.55
27.14
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13.48
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EtO
NO2
3l
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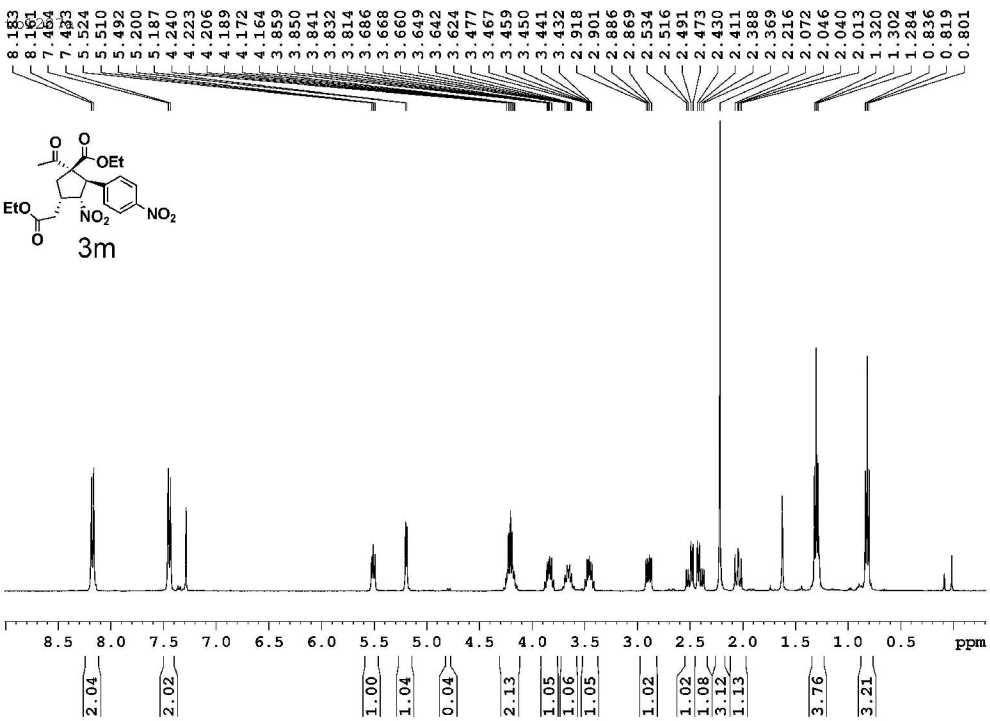
200
180
160
140
120
100
80
60
40
20
ppm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4.189
4.172
4.164
3.859
3.850
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3.832
3.814
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3.649
3.642
3.624
3.477
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3.459
3.450
3.441
3.432
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2.901
2.886
2.869
2.534
2.516
2.491
2.473
2.430
2.411
2.388
2.369
2.216
2.072
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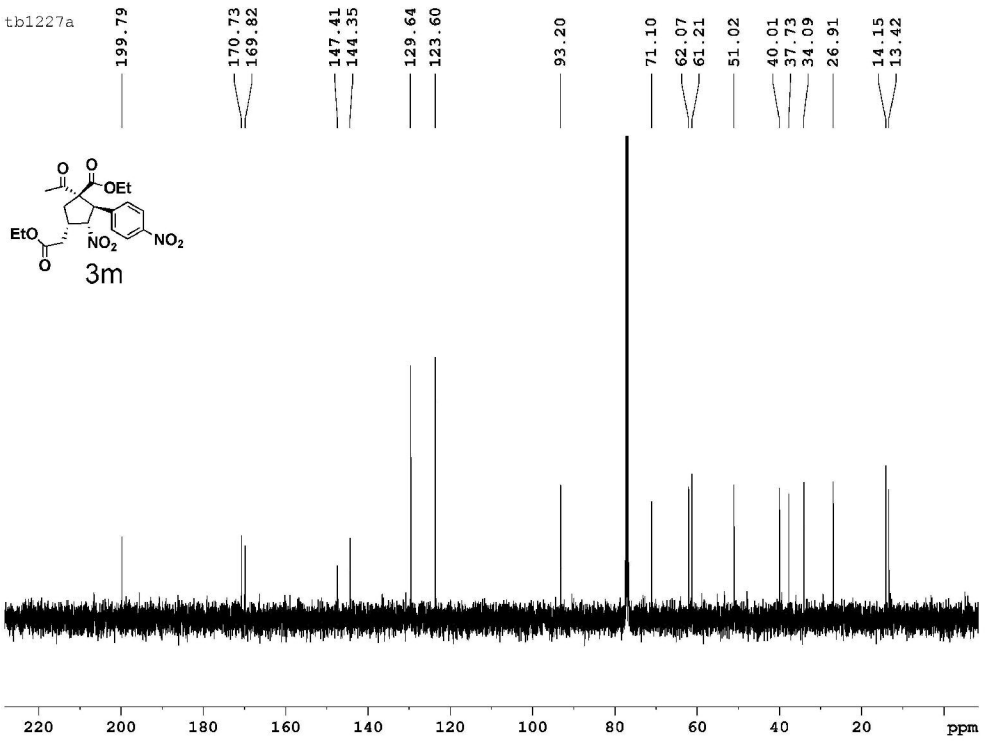
2.040
2.013
1.320
1.302
1.284
0.836
0.819
0.801
OEt
EtO
NO2
NO2
3m
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
2.04
2.02
1.00
1.04
0.04
2.13
1.05
1.06
1.05
1.02
1.02
1.08
3.12
1.13
3.76
3.21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123.60
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71.10
62.07
61.21
51.02
40.01
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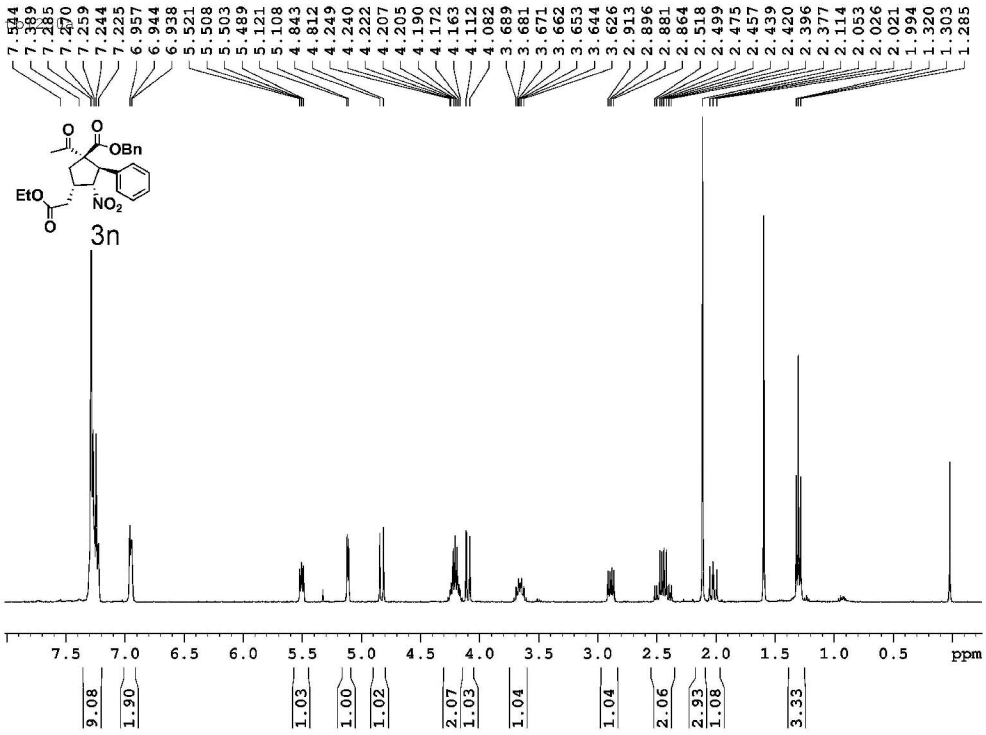
26.91
14.15
13.42
OEt
EtO
NO2
NO2
3m
220 200 180 160 140 120 100 80 60 40 20 ppm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5.503
5.489
5.121
5.108
4.843
4.812
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4.240
4.222
4.207
4.205
4.190
4.172
4.163
4.112
4.082
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3.681
3.671
3.662
3.653
3.644
3.626
2.913
2.896
2.881
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2.499
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2.396
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2.053
2.026
2.021
1.994
1.320
1.303
1.285
OBn
EtO
NO2
3n
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6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm
9.08
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1.02
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1.04
1.04
2.06
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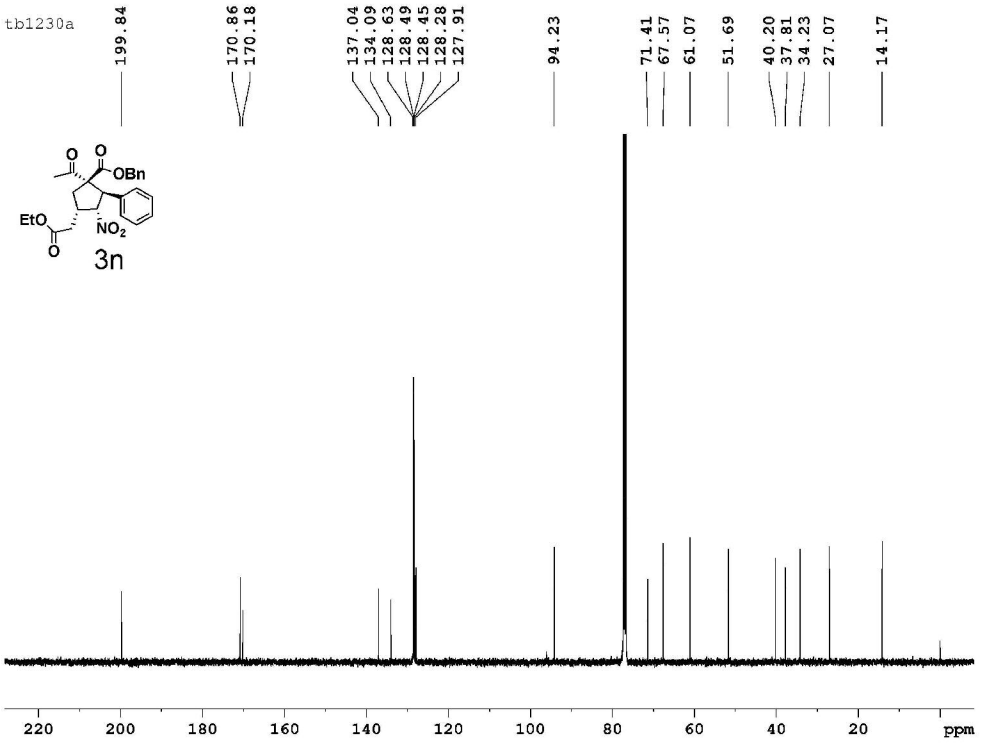
3.33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128.49
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128.28
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94.23
71.41
67.57
61.07
51.69
40.20
37.81
34.23
27.07
14.17
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EtO
NO2
3n
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140
120
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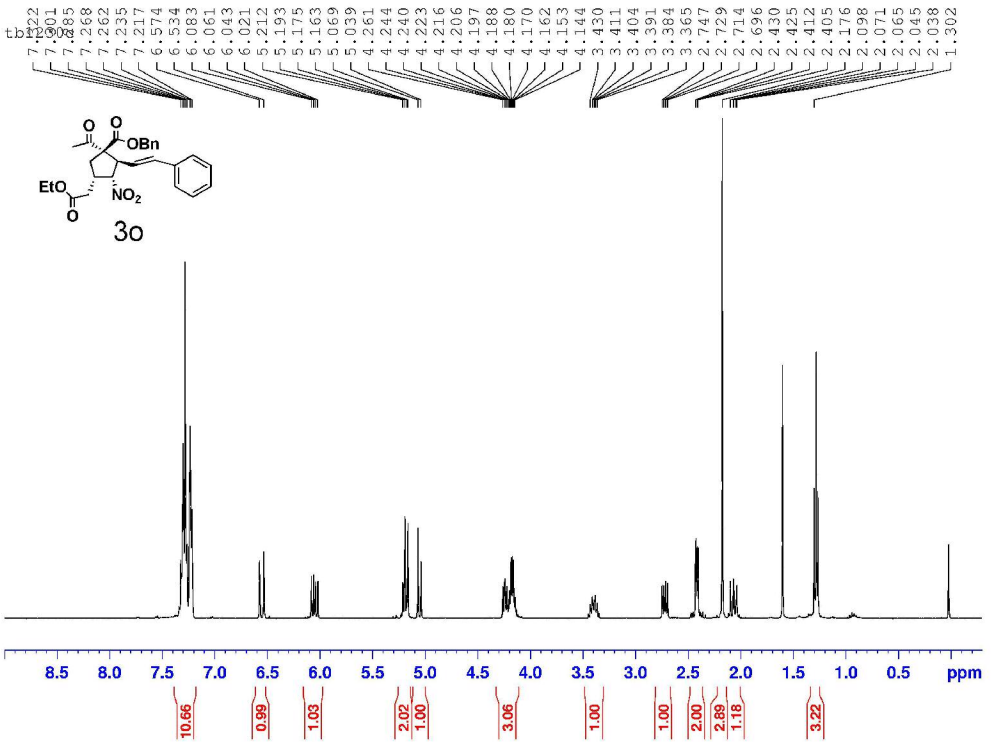
40
20
ppm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6.043
6.021
5.212
5.193
5.175
5.163
5.069
5.039
4.261
4.244
4.240
4.223
4.216
4.206
4.197
4.188
4.180
4.170
4.162
4.153
4.144
3.430
3.411
3.404
3.391
3.384
3.365
2.747
2.729
2.714
2.696
2.430
2.425
2.412
2.405
2.176
2.098
2.071
2.065
2.045
2.038
1.302
OBn
EtO
NO2
3o
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm
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2.02
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3.06
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1.00
2.00
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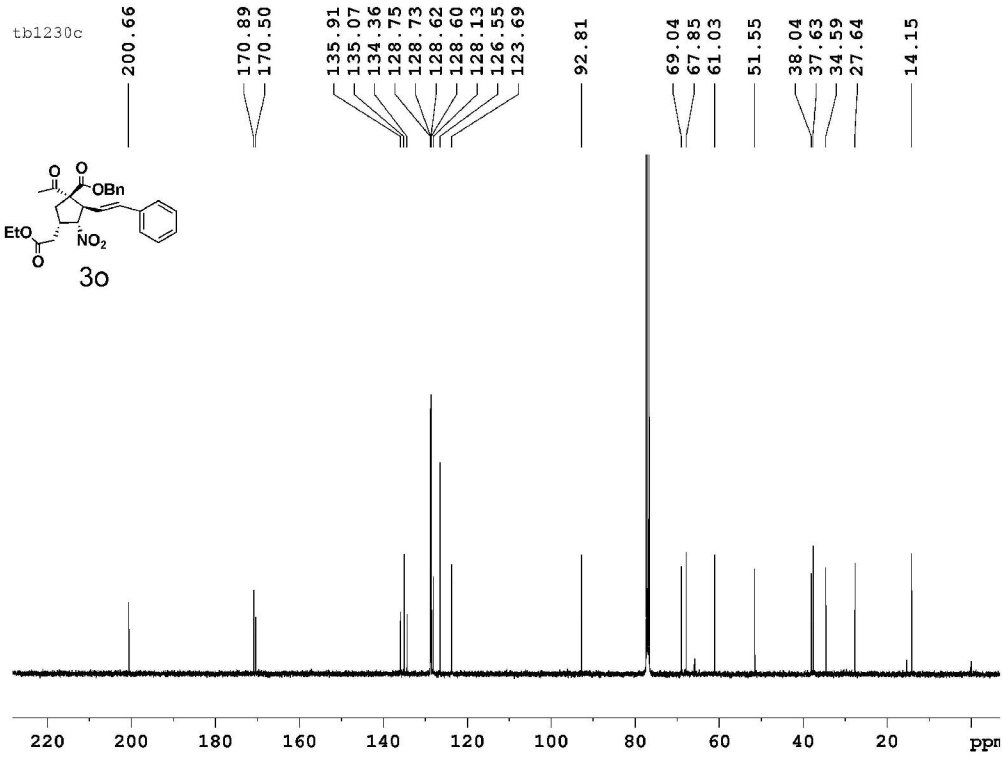
1.18
3.22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128.75
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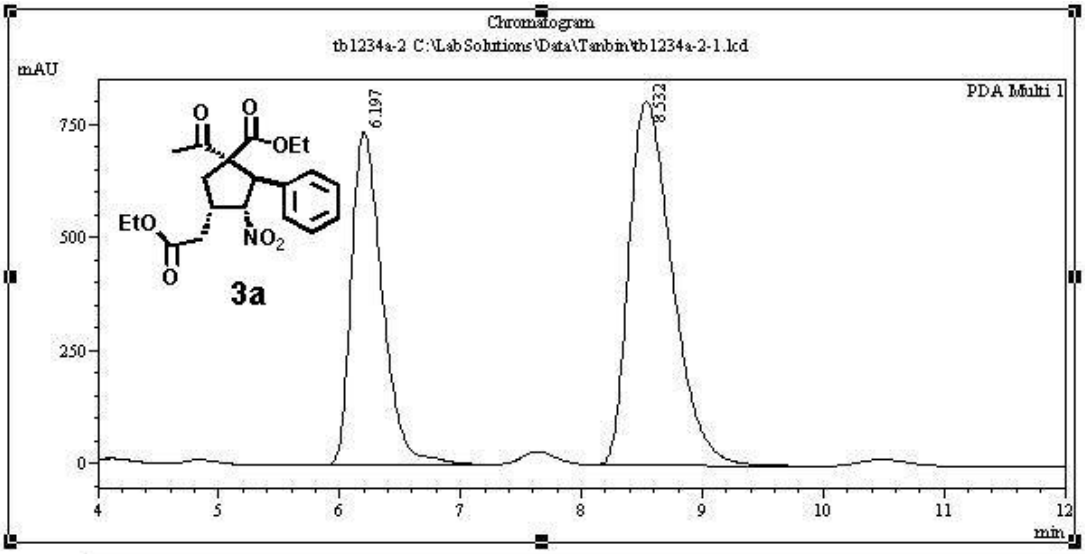
128.62
128.60
128.13
126.55
123.69
92.81
69.04
67.85
61.03
51.55
38.04
37.63
34.59
27.64
14.15
OBn
EtO
NO2
3o
220
200
180
160
140
120
100
80
60
40
20
ppm

HPLC Spectra



PeakTable

PDA Ch1 220nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
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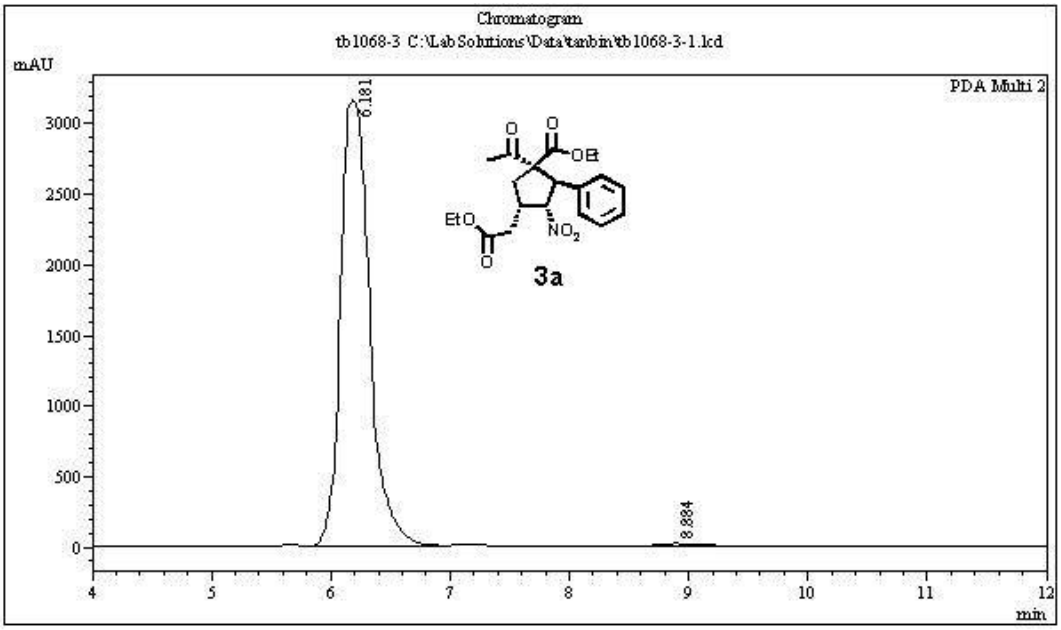
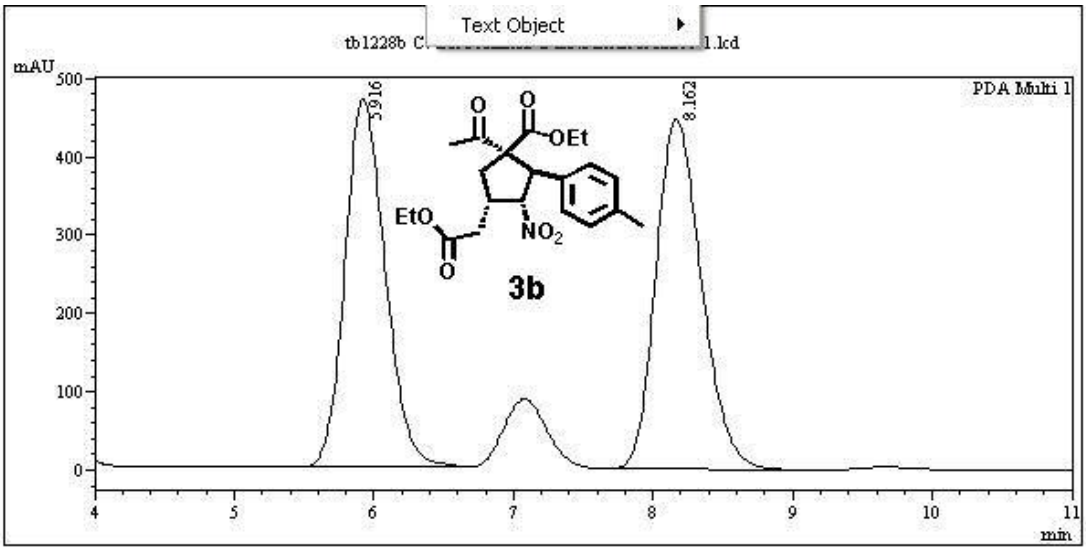
2	8.532	20134209	807569	60.652	52.334
Total		33196012	1543118	100.000	100.000



PeakTable

PDA Ch2 230nm 4nm

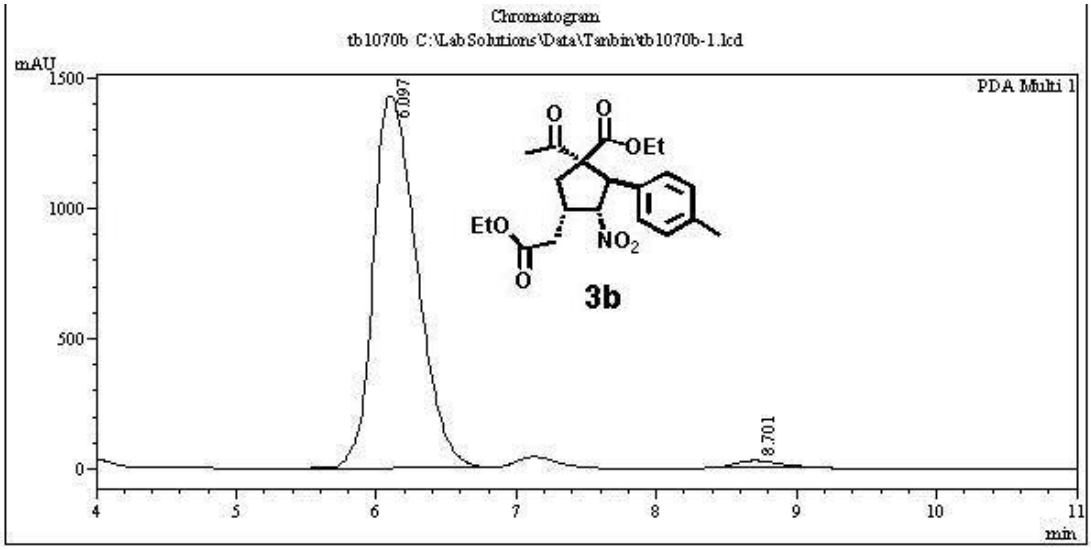
Peak#	Ret. Time	Area	Height	Area %	Height %
1	6.181	53665704	3153678	98.957	99.353
2	8.884	565881	20552	1.043	0.647
Total		54231586	3174230	100.000	100.000



PeakTable

PDA Ch1 220nm 4nm

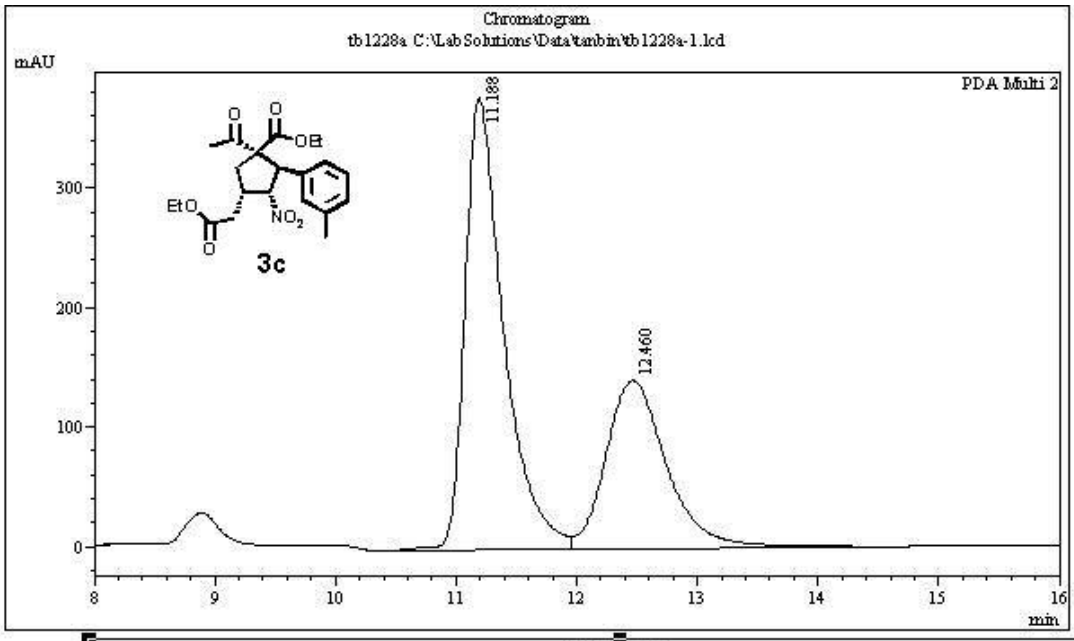
Peak#	Ret. Time	Area	Height	Area %	Height %
1	5.916	9429191	470267	48.127	51.263
2	8.162	10163065	447097	51.873	48.737
Total		19592256	917364	100.000	100.000



PeakTable

PDA Ch1 220nm 4nm

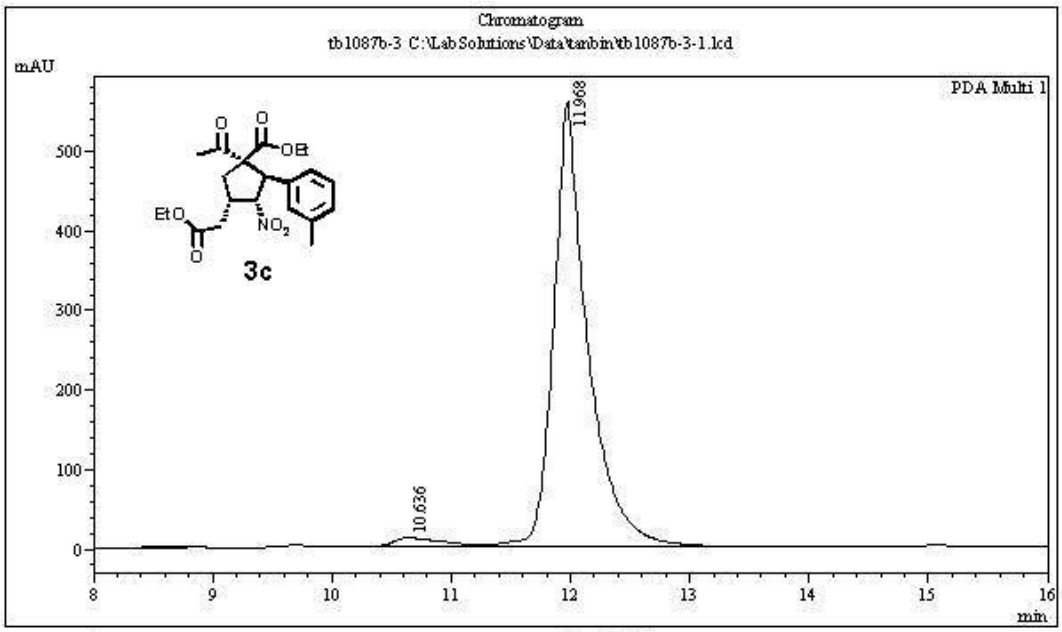
Peak#	Ret. Time	Area	Height	Area %	Height %
1	6.097	30844320	1425898	97.983	98.105
2	8.701	635084	27547	2.017	1.895
Total		31479404	1453445	100.000	100.000



PeakTable

PDA Ch2 230nm 4nm

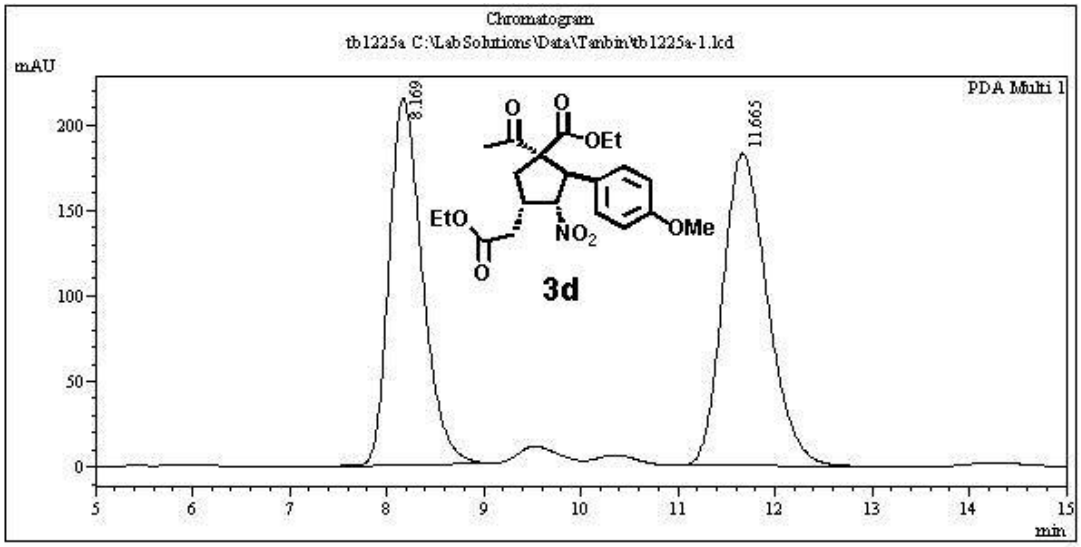
Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.188	8517342	378370	63.245	72.861
2	12.460	4949876	140937	36.755	27.139
Total		13467218	519307	100.000	100.000



PeakTable

PDA Ch1 210nm 4nm

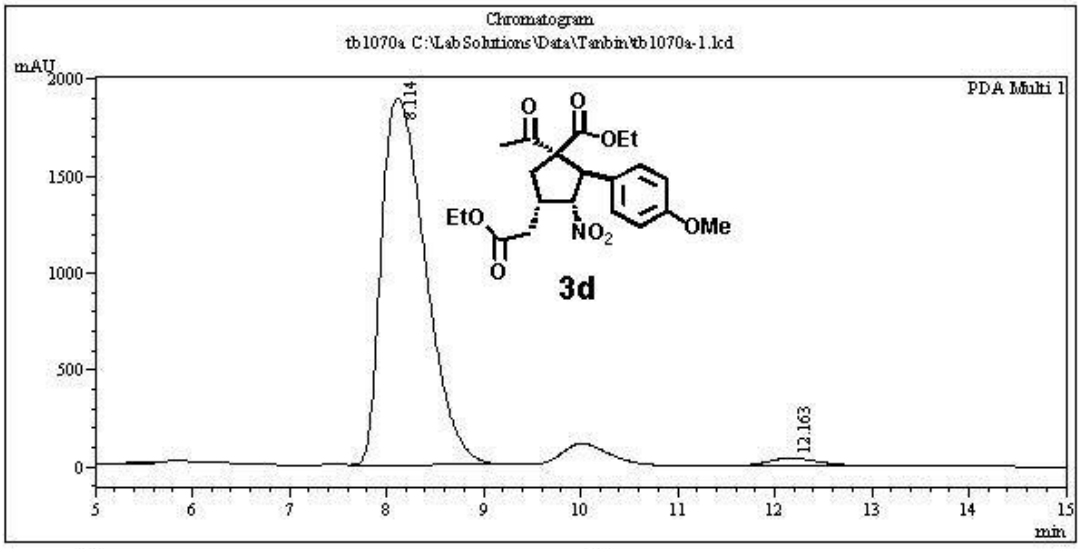
Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.636	336804	11347	2.929	1.991
2	11.968	11162791	558668	97.071	98.009
Total		11499595	570015	100.000	100.000



PeakTable

PDA Ch1 220nm 4nm

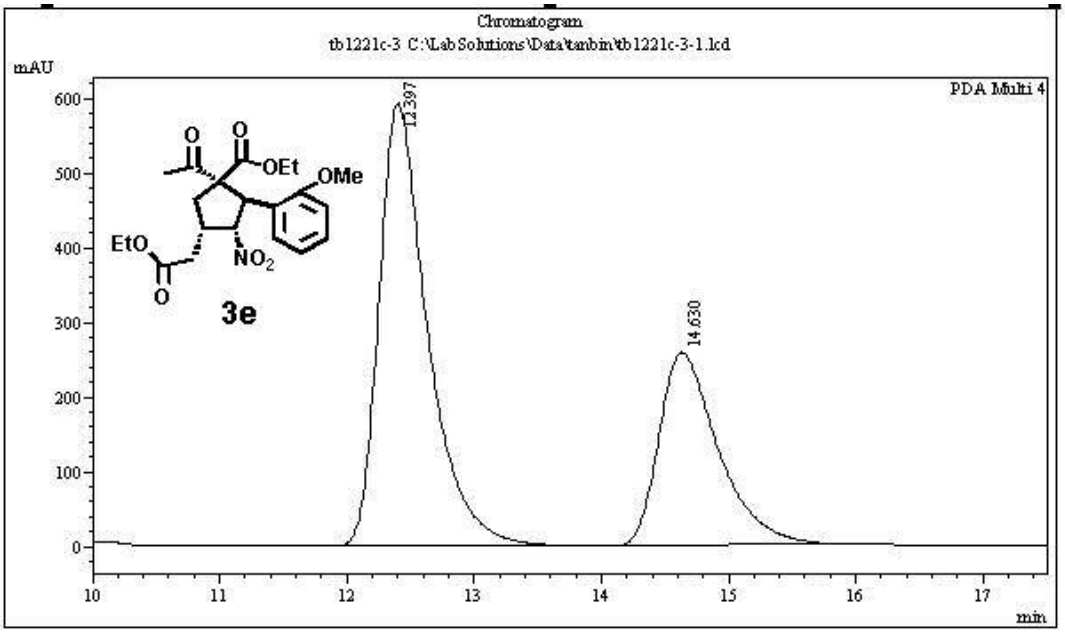
Peak#	Ret. Time	Area	Height	Area %	Height %
1	8.169	5094138	214474	46.608	54.025
2	11.665	5835561	182518	53.392	45.975
Total		10929699	396993	100.000	100.000



PeakTable

PDA Ch1 220nm 4nm

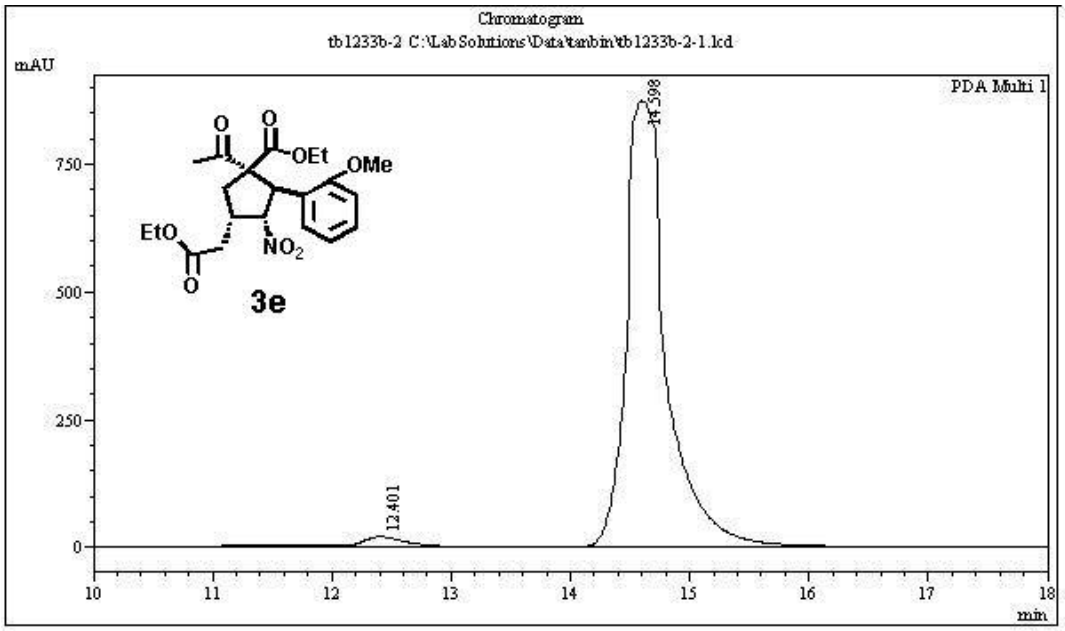
Peak#	Ret. Time	Area	Height	Area %	Height %
1	8.114	59769180	1892428	98.030	98.105
2	12.163	1201292	36552	1.970	1.895
Total		60970471	1928981	100.000	100.000



PeakTable

PDA Ch4 220nm 4nm

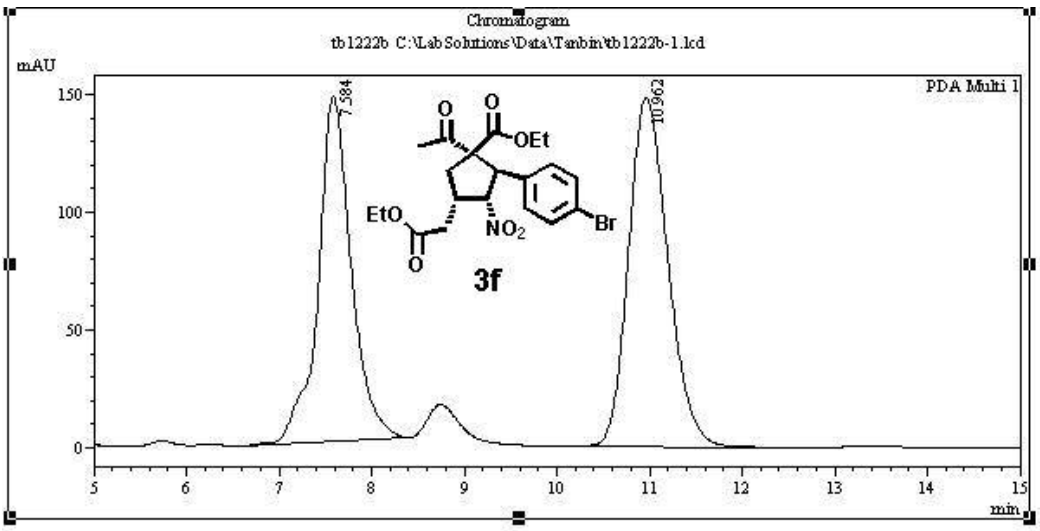
Peak#	Ret. Time	Area	Height	Area %	Height %
1	12.397	15754103	592810	65.165	69.611
2	14.630	8421506	258789	34.835	30.389
Total		24175609	851599	100.000	100.000



PeakTable

PDA Ch1 210nm 4nm

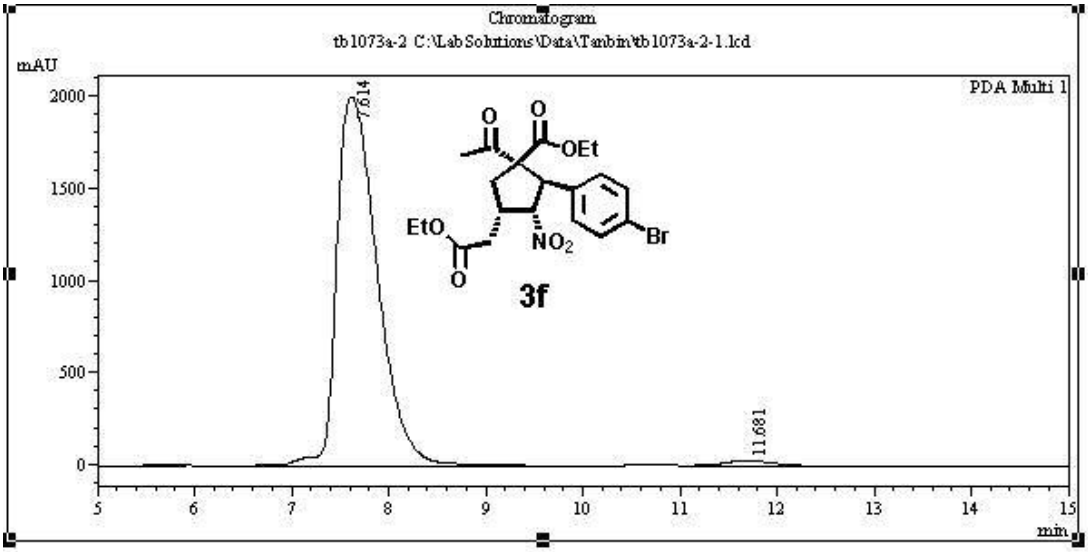
Peak#	Ret. Time	Area	Height	Area %	Height %
1	12.401	513863	20153	2.431	2.257
2	14.598	20623530	872686	97.569	97.743
Total		21137393	892838	100.000	100.000



PeakTable

PDA Ch1 220nm 4nm

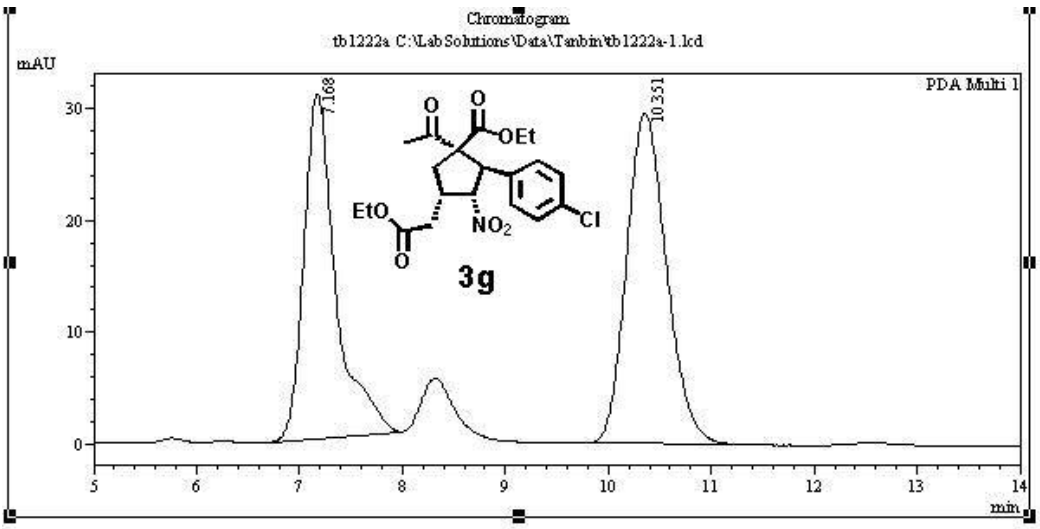
Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.584	3655715	146829	45.469	49.756
2	10.962	4384243	148266	54.531	50.244
Total		8039958	295095	100.000	100.000



PeakTable

PDA Ch1 220nm 4nm

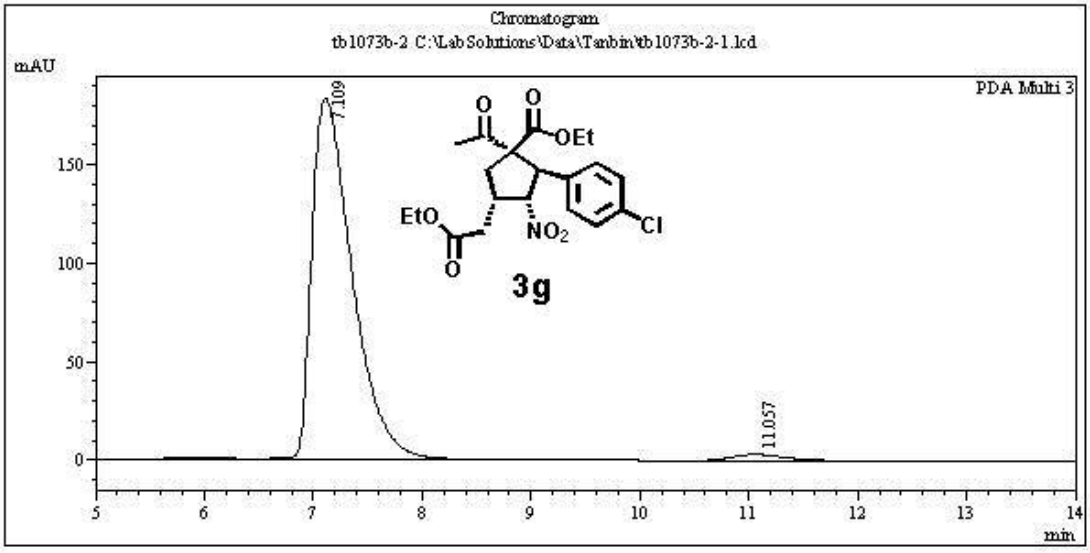
Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.614	58155024	2001801	98.383	98.620
2	11.681	955999	28010	1.617	1.380
Total		59111022	2029811	100.000	100.000



PeakTable

PDA Ch1 220nm 4nm

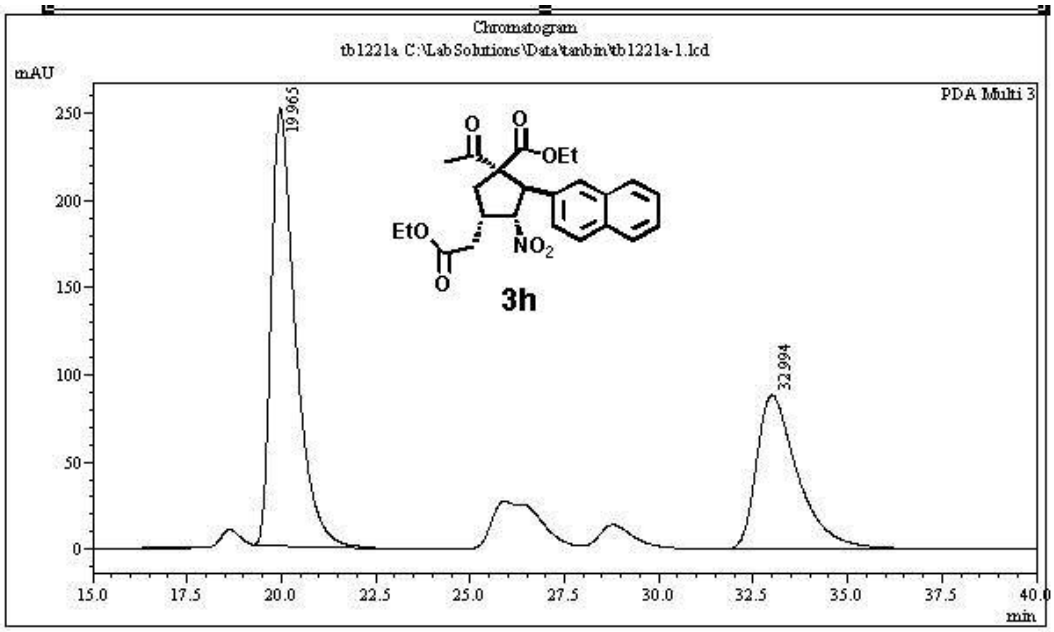
Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.168	662374	30710	45.380	51.037
2	10.351	797250	29463	54.620	48.963
Total		1459625	60173	100.000	100.000



PeakTable

PDA Ch3 254nm 4nm

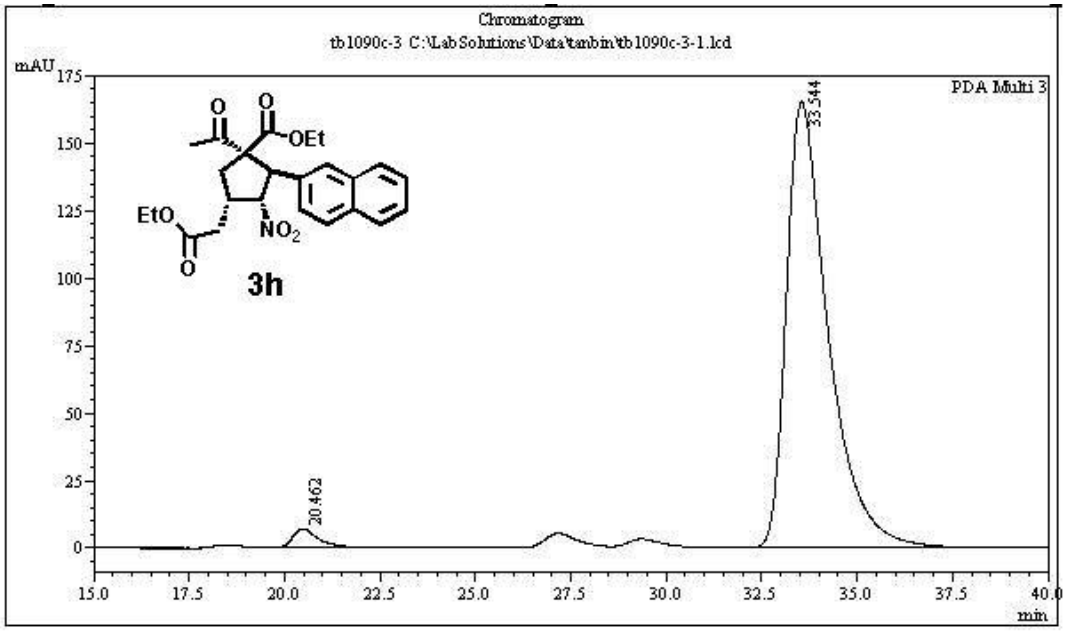
Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.109	4725021	183370	97.860	98.327
2	11.057	103310	3119	2.140	1.673
Total		4828331	186489	100.000	100.000



PeakTable

PDA Ch3 254nm 4nm

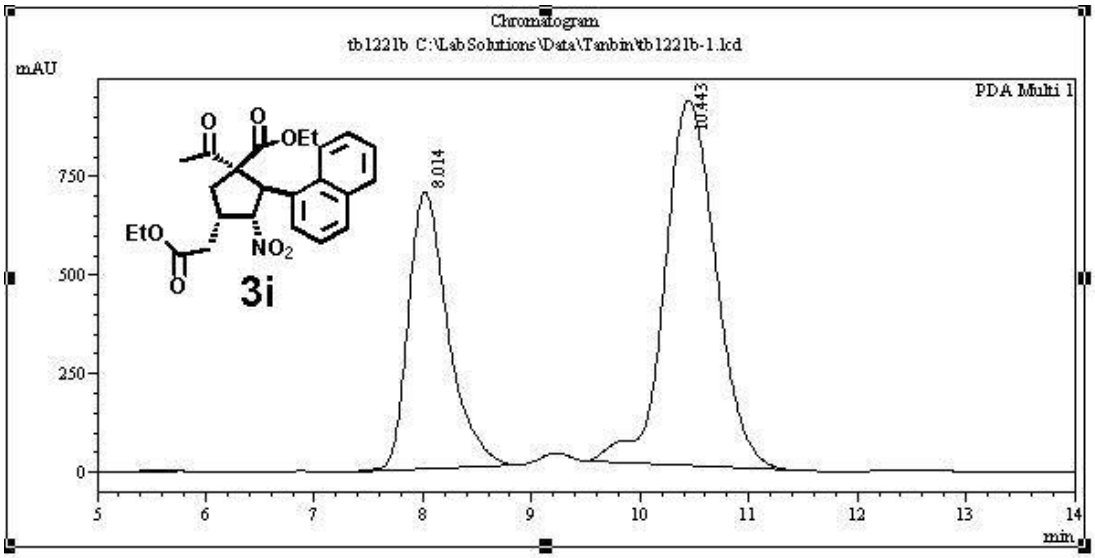
Peak#	Ret. Time	Area	Height	Area %	Height %
1	19.965	11170366	250515	62.705	73.954
2	32.994	6643774	88230	37.295	26.046
Total		17814140	338745	100.000	100.000



PeakTable

PDA Ch3 254nm 4nm

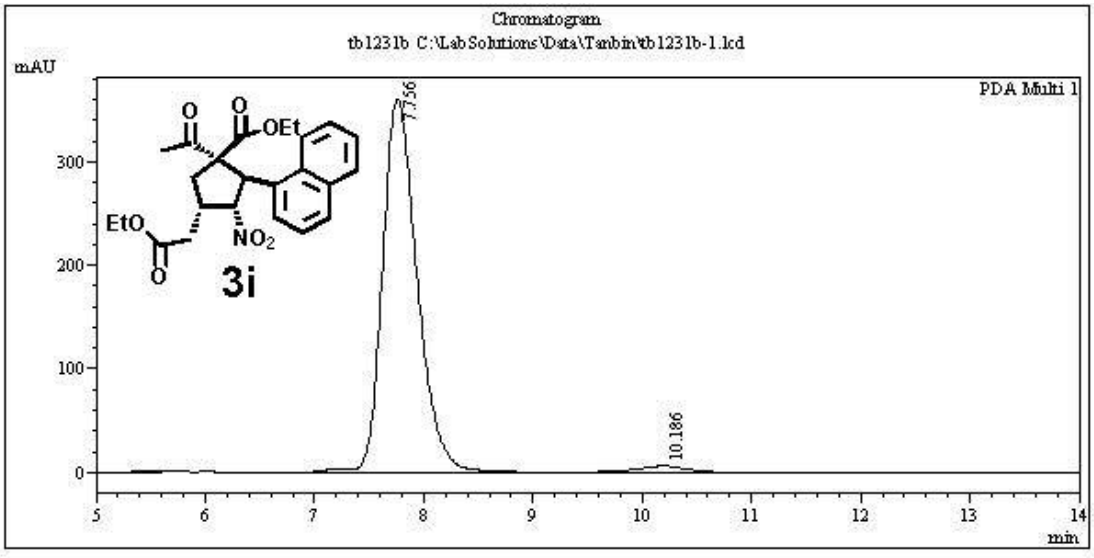
Peak#	Ret. Time	Area	Height	Area %	Height %
1	20.462	324277	7015	2.513	4.072
2	33.544	12578996	165249	97.487	95.928
Total		12903273	172263	100.000	100.000



PeakTable

PDA Ch1 220nm 4nm

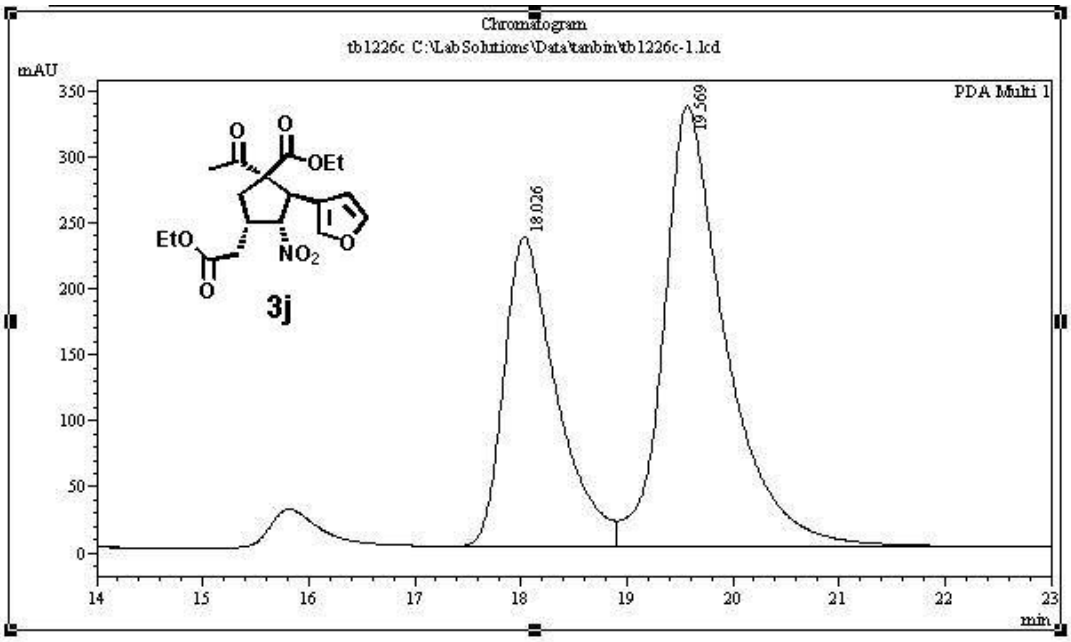
Peak#	Ret. Time	Area	Height	Area %	Height %
1	8.014	17761993	702468	36.908	43.166
2	10.443	30363232	924894	63.092	56.834
Total		48125225	1627362	100.000	100.000



PeakTable

PDA Ch1 220nm 4nm

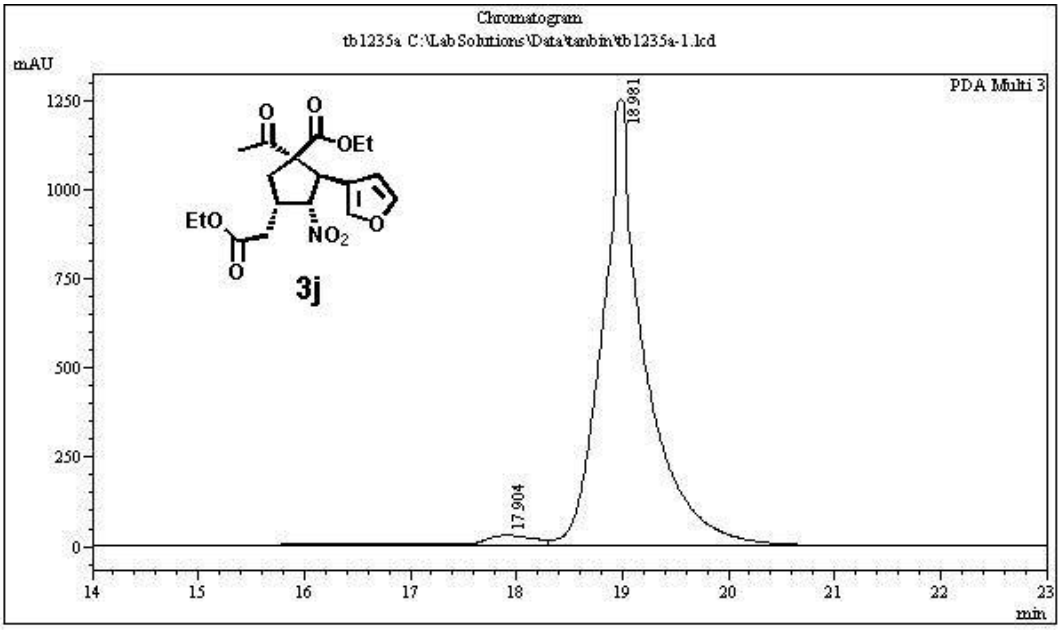
Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.756	7956596	360466	97.511	98.307
2	10.186	203069	6206	2.489	1.693
Total		8159664	366672	100.000	100.000



PeakTable

PDA Ch1 210nm 4nm

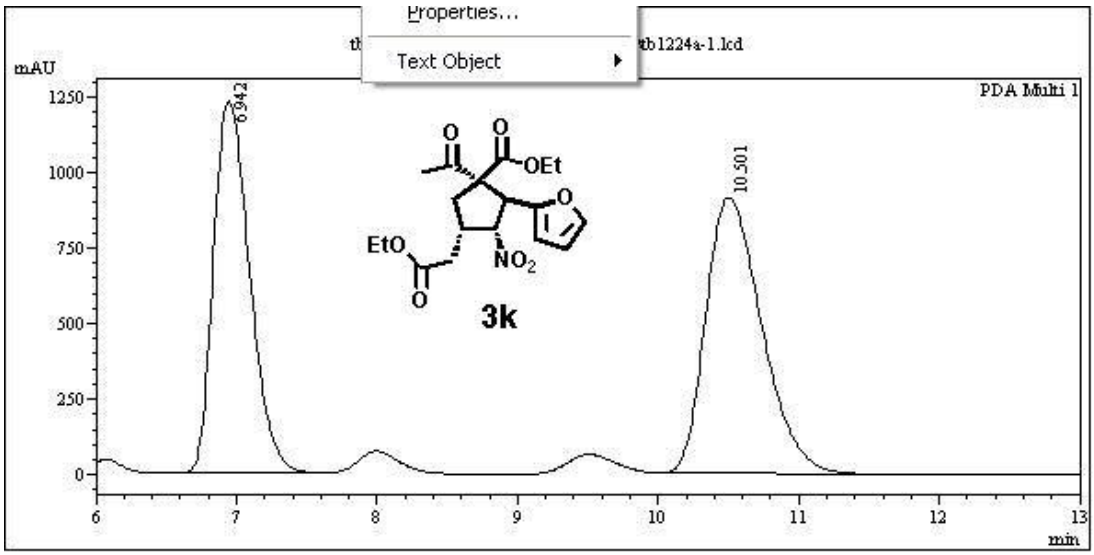
Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.026	8059622	234060	37.515	41.281
2	19.569	13423997	332932	62.485	58.719
Total		21483619	566992	100.000	100.000



PeakTable

PDA Ch3 254nm 4nm

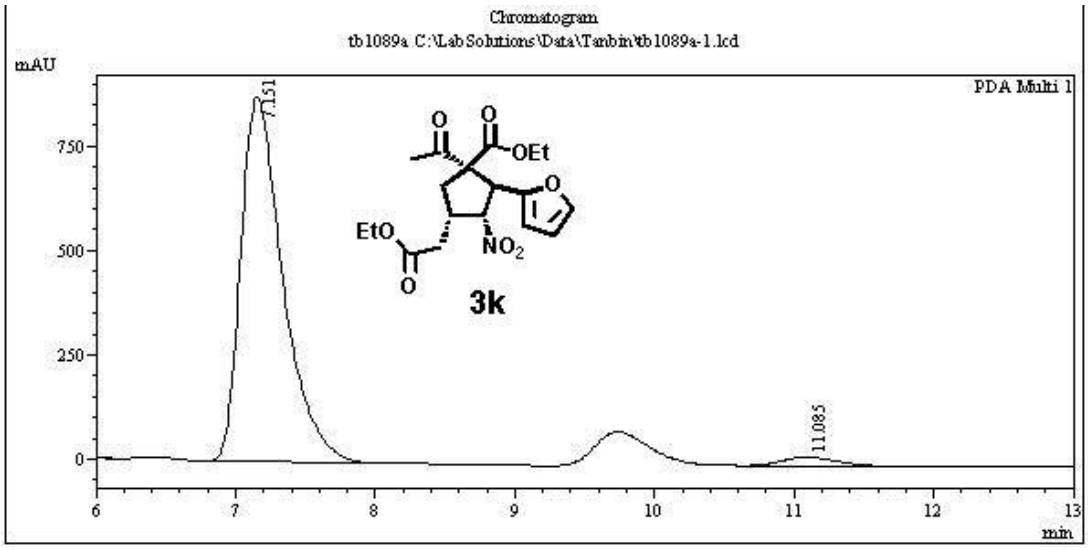
Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.904	1014914	30886	2.813	2.406
2	18.981	35069428	1252908	97.187	97.594
Total		36084342	1283795	100.000	100.000



PeakTable

PDA Ch1 220nm 4nm

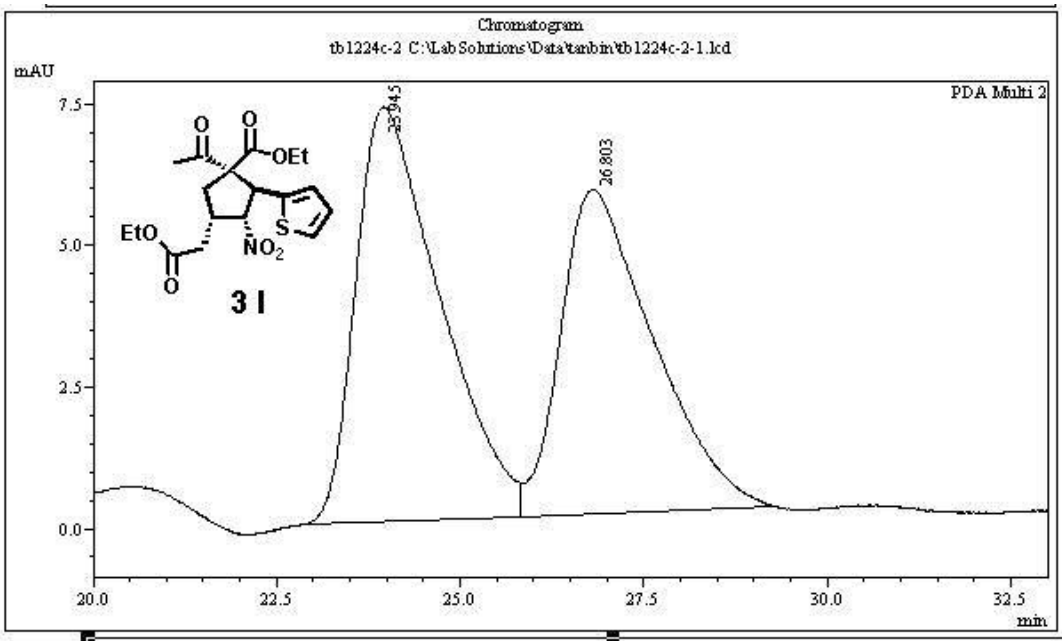
Peak#	Ret. Time	Area	Height	Area %	Height %
1	6.942	21921833	1232172	46.441	57.436
2	10.501	25282244	913126	53.559	42.564
Total		47204077	2145298	100.000	100.000



PeakTable

PDA Ch1 220nm 4nm

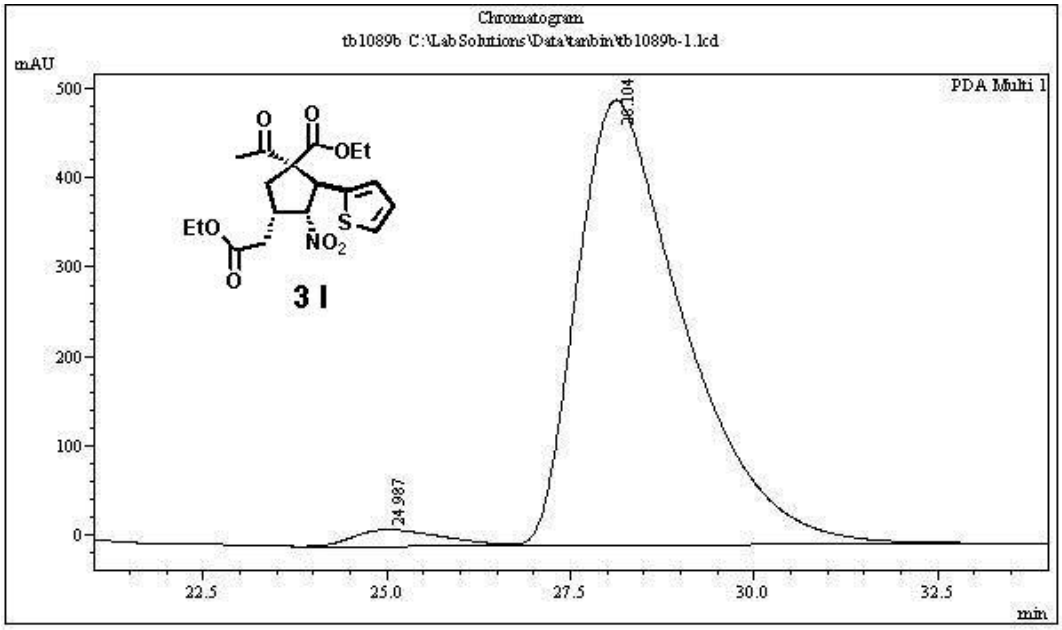
Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.151	18297596	873762	96.908	97.638
2	11.085	583760	21140	3.092	2.362
Total		18881356	894903	100.000	100.000



PeakTable

PDA Ch2 230nm 4nm

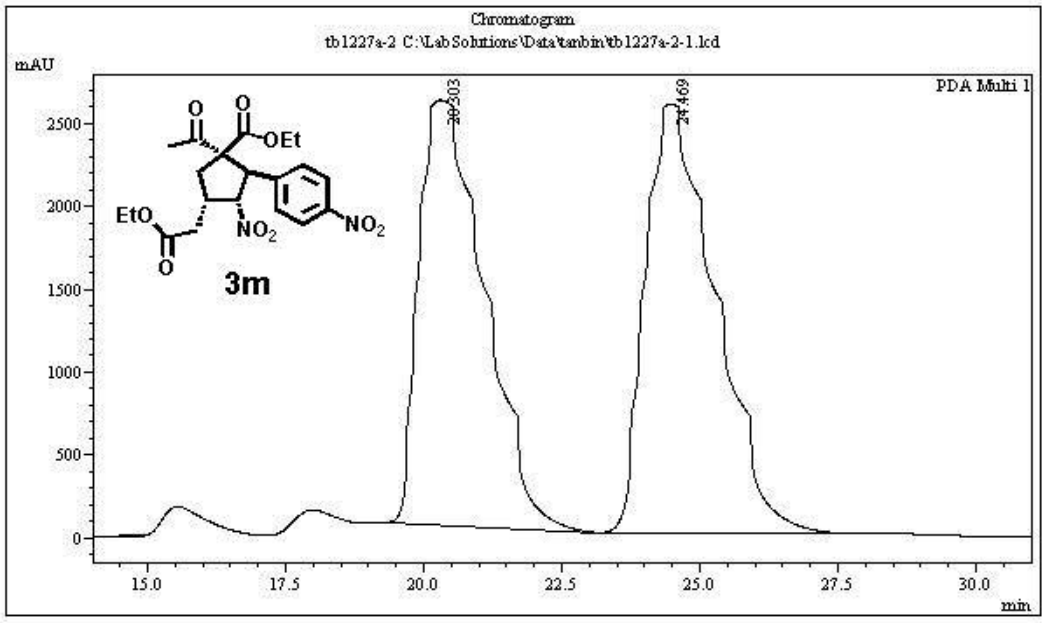
Peak#	Ret. Time	Area	Height	Area %	Height %
1	23.945	584190	7327	53.736	56.139
2	26.803	502960	5724	46.264	43.861
Total		1087151	13051	100.000	100.000



PeakTable

PDA Ch1 210nm 4nm

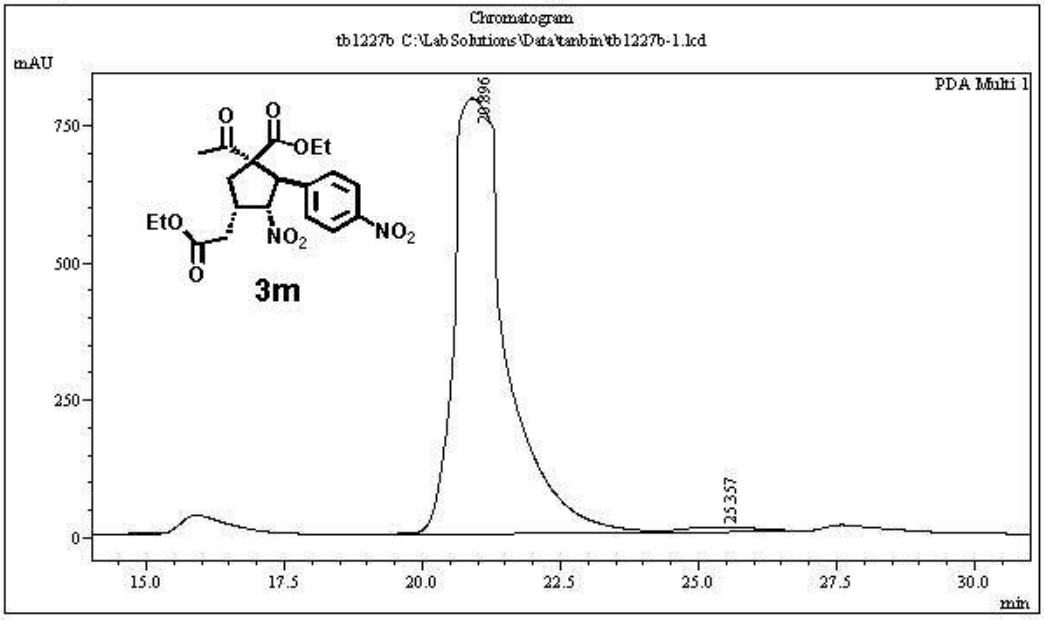
Peak#	Ret. Time	Area	Height	Area %	Height %
1	24.987	1517978	18395	2.917	3.562
2	28.104	50517843	498038	97.083	96.438
Total		52035822	516432	100.000	100.000



PeakTable

PDA Ch1 210nm 4nm

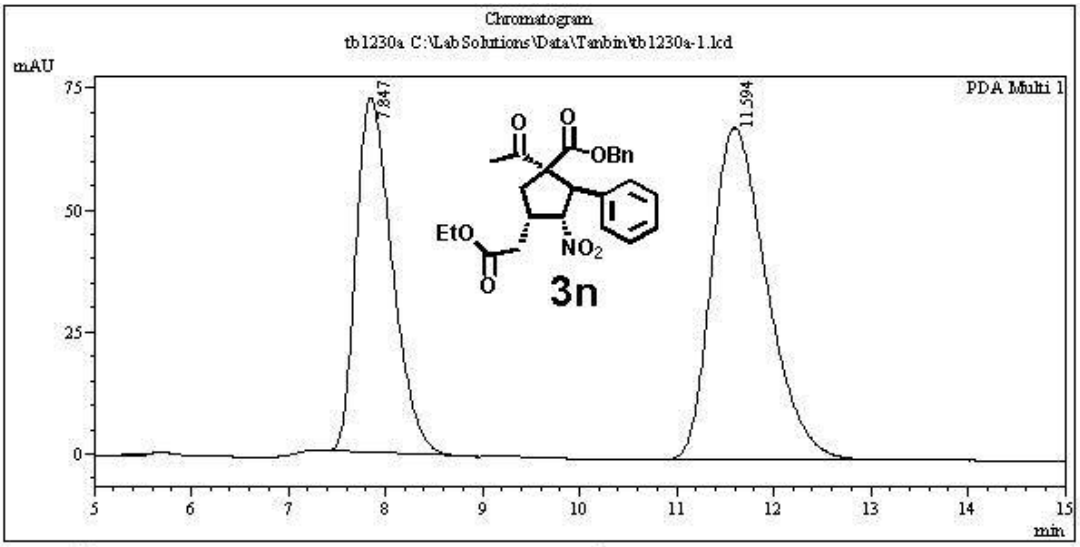
Peak#	Ret. Time	Area	Height	Area %	Height %
1	20.303	211574144	2563444	48.119	49.774
2	24.469	228118982	2586764	51.881	50.226
Total		439693126	5150209	100.000	100.000



PeakTable

PDA Ch1 210nm 4nm

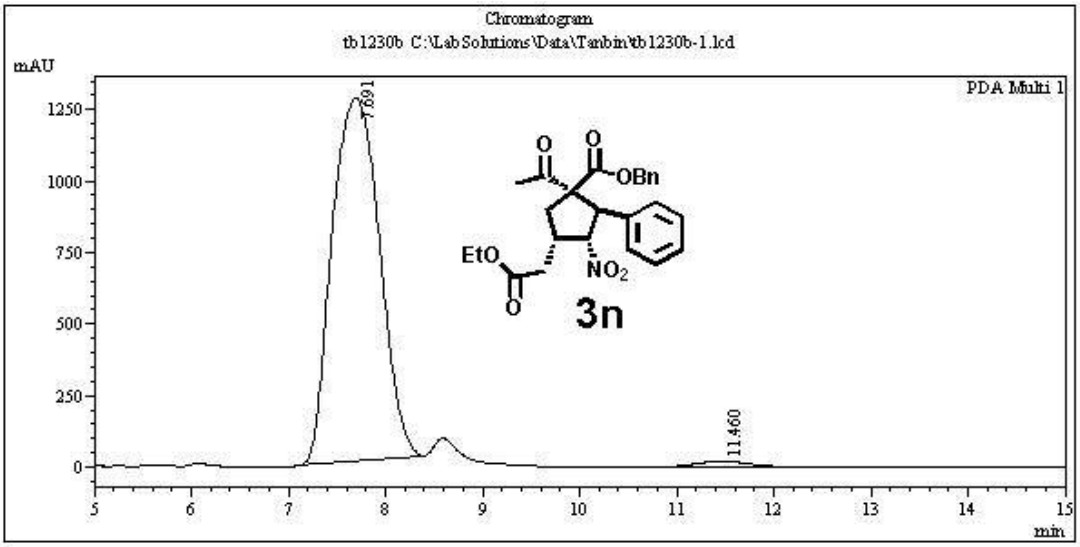
Peak#	Ret. Time	Area	Height	Area %	Height %
1	20.896	53116048	793869	98.525	98.937
2	25.357	795452	8526	1.475	1.063
Total		53911500	802395	100.000	100.000



PeakTable

PDA Ch1 220nm 4nm

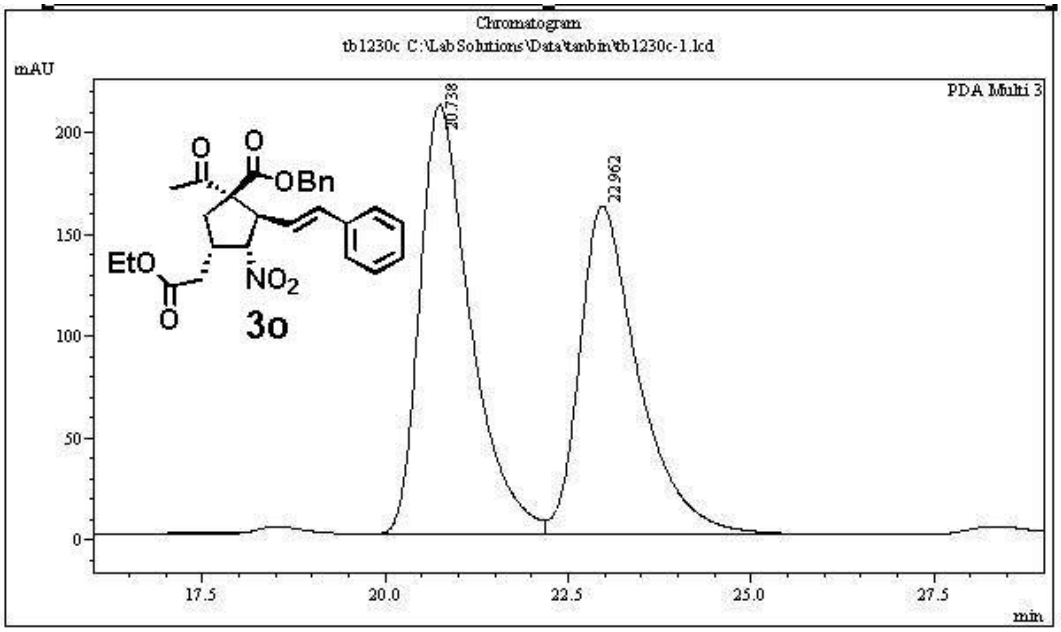
Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.847	1881105	72600	41.190	51.635
2	11.594	2685778	68002	58.810	48.365
Total		4566883	140602	100.000	100.000



PeakTable

PDA Ch1 220nm 4nm

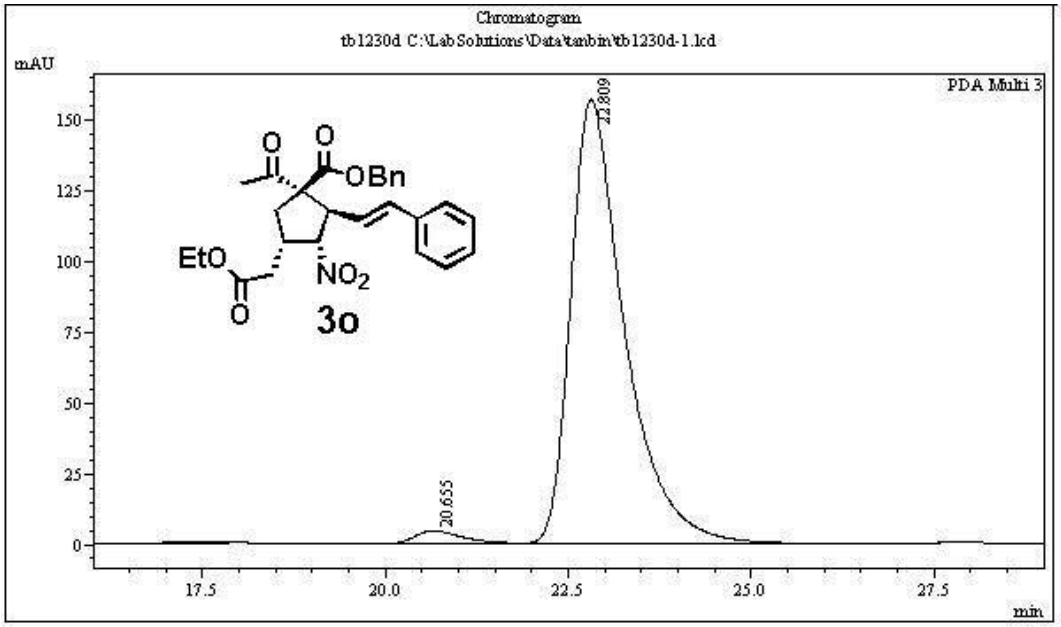
Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.691	43264341	1271194	98.282	98.446
2	11.460	756084	20068	1.718	1.554
Total		44020425	1291262	100.000	100.000



PeakTable

PDA Ch3 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	20.738	10170695	210859	52.952	56.656
2	22.962	9036698	161313	47.048	43.344
Total		19207393	372172	100.000	100.000



PeakTable

PDA Ch3 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	20.655	196569	4549	2.386	2.819
2	22.809	8040203	156827	97.614	97.181
Total		8236772	161376	100.000	100.000