Catalytic Asymmetric Direct-type 1,4-Addition Reactions of Simple Esters

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Supporting Information

Contents

I. Experimental Section

General

^{1}H and ^{13}C NMR spectra were recorded on JEOL JNM-ECA500 and JNM-ECX600 spectrometers in $CDCl_3$ unless otherwise noted. Tetramethylsilane (TMS) served as internal standard (δ= 0) for ^{1}H NMR, and $CDCl_3$ served as internal standard (δ= 77.0) for ^{13}C NMR. IR spectra were measured using JASCO FT/IR **-** 4200 spectrometer. High-performance liquid chromatography was carried out using followed apparatuses; SHIMADZU LC-20AB (liquid chromatograph), SHIMADZU SPD-M20A (Photo diode array detector). Optical rotations were recorded on JASCO P-2100. Column chromatography was conducted on Silica gel 60N (spherical, neutral, Kanto Chem. Co., Inc.) and preparative thin-layer chromatography (PTLC) was carried out using Wakogel B-5F. Potassium bis(trimethylsilyl)amide (KHMDS), sodium bis(trimethylsilyl)amide (NaHMDS), lithium bis(trimethylsilyl)amide (LiHMDS) were purchased from Aldrich Co., Ltd.. Potassium *tert*-butoxide were purchased from Kanto Chemical Co., Ltd..

18-crown-6, amide (**2f**) and ketone (**2g**) were purchased from Tokyo Chemical Industry Co., Ltd.. Toluene, THF and diethyl ether were distilled just before using in the presence of benzophenone and sodium. **L1**[1], **L2**[2], **S1**[1] and **S2**[3] were synthesized by following literatures. Esters (**2a-2e**) were prepared from corresponding acid anhydrides and alcohols. α,β-Unsaturated amides (**1a-1l**), ester (**1m**) and were prepared from corresponding α,β-unsaturated acid chlorides, amines and alcohols. α,β-Unsaturated ketone (**1n**) was prepared by Aldol condensation from pinacolin and benzaldehyde. The yields of **3af**[1], **3ma**[4], **3na**[4], and **3ng**[4] were determined by ^{1}H HMR analyses of the crude mixture without isolation.

Typical procedure of KHMDS/18-crown-6 catalyzed 1,4-addition reaction of ^{t}Bu propionate (Table 1, entry 4)

KHMDS (6.0 mg, 3.0 x 10^{-2} mmol) and 18-crown-6 (8.9 mg, 3.4 x 10^{-2} mmol) were placed in a dried 5 mL reaction tube with septa inside a glove box filled with argon. The tube was cooled to –40 ˚C, then toluene (0.6 mL) was added. The reaction mixture was stirred for 1 h at the same temperature for catalyst preparation. After that, ^{t}Bu propionate (**2a**, 47.2 mg, 0.363 mmol) was added to the reaction mixture by syringe, then *N,N*-dimethylcinnamamide (**1a**, 52.6 mg, 0.300 mmol), which was put in another dried tube inside a glove box, was added to the tube through cannula with extra toluene (0.9 mL). The whole mixture was stirred for 18 h at –40 ºC. The reaction was quenched with H_2O (1.0 mL) and extracted with DCM (10 mL) for three times. The combined organic layers were dried over anhydrous Na_2SO_4. After filtration and concentration under reduced pressure, the crude product was obtained. The crude product was purified by silica-gel PTLC (Hexane-Ethyl acetate) to afford the desired 1,4-adduct **3aa** in quantitative yield (*syn*-form, 52.2 mg, 0.171 mmol; *anti*-form, 40.0 mg, 0.131 mmol).

Typical procedure of catalytic asymmetric 1,4-addition reaction of ^{t}Bu propionate (Table 2, entry 2)

KHMDS (7.9 mg, 4.0 x 10^{-2} mmol) and **L1** (19.8 mg, 2.23 x 10^{-2} mmol) were placed in a dried 10 mL flask inside a glove box filled with argon. The flask was cooled to –78

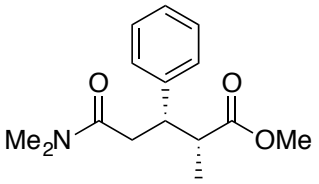
˚C, then toluene (0.7 mL) was added. The reaction mixture was stirred for 1 h at the same temperature for catalyst preparation. After that, ^{t}Bu propionate (**2a**, 64.1 mg, 0.492 mmol) was added to the reaction mixture by syringe, then *N,N*-dimethylcinnamamide (**1a**, 70.0 mg, 0.400 mmol), which was put in another dried tube inside a glove box, was added to the reaction mixture through cannula with extra toluene (1.5 mL). The whole mixture was stirred for 24 h at –78 ºC. The reaction was quenched with H_2O (1.0 mL) and extracted with DCM (10 mL) for three times. The combined organic layers were dried over anhydrous Na_2SO_4. After filtration and concentration under reduced pressure, the crude product was obtained. The crude product was purified by silica-gel PTLC (Hexane-Ethyl acetate) to afford the desired 1,4-adduct **3aa** in 92 % yield (*syn*-form, 73.7 mg, 0.241 mmol; *anti*-form, 39.3 mg, 0.129 mmol).

tert-butyl (2*R*,3*S*)-5-(dimethylamino)-2-methyl-5-oxo-3-phenylpentanoate (3aa-*syn*); colorless oil; IR (neat, cm^{-1}); 2976, 2932, 2361, 1723, 1649, 1495, 1455, 1395, 1367, 1259, 1149, 849, 763, 701, 665; HRMS (DART) calcd for $C_{18}H_{28}NO_3$ $[M + H]^+$ 306.2069, found 306.2054; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 95/5, 1.0 mL/min, 210 nm, t_R = 22.1 min (major), 16.4 min (minor)); $[\alpha]_D$ = –13.77 (c 0.23, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.29-7.18 (m, 5H), 3.38 (td, 1H, J = 10.1, 4.4 Hz), 2.85 (s, 3H), 2.78 (s, 3H), 2.74 (dd, 1H, J = 14.8, 10.0 MHz), 2.67-2.61 (m, 2H), 1.46 (s, 9H), 0.93 (d, 3H, J = 6.9 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 175.1, 170.8, 141.8, 128.2, 128.1, 126.6, 80.4, 46.1, 45.2, 37.9, 37.2, 35.2, 28.0, 16.0.

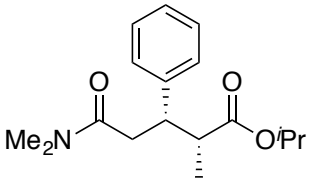
tert-butyl (2*S*,3*S*)-5-(dimethylamino)-2-methyl-5-oxo-3-phenylpentanoate (3aa-*anti*); colorless oil; IR (neat, cm^{-1}); 2976, 2933, 1724, 1648, 1494, 1455, 1395, 1367, 1253, 1150, 849, 761, 701, 664; HRMS (DART) calcd for $C_{18}H_{28}NO_3$ $[M + H]^+$ 306.2069, found 306.2061; HPLC analysis using Daicel Chiralpak OD-3 column (Hex/^{i}PrOH = 95/5, 0.7 mL/min, 210 nm, t_R = 18.7 min (Major), 16.3 min (minor)); $[\alpha]_D$ = –17.03 (c 0.19, $CHCl_3$); ^{1}H

NMR (600 MHz, $CDCl_3$) δ: 7.26-7.16 (m, 5H), 3.41 (td, 1H, J = 9.1, 5.4 Hz), 2.81 (s, 3H), 2.79 (s, 3H), 2.77-2.73 (m, 2H), 2.66 (dd, 1H, J = 15.1, 8.9 MHz), 1.23 (d, 3H, J = 6.9 Hz), 1.18 (s, 9H); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.3, 171.3, 142.4, 128.3, 128.0, 126.5, 79.9, 45.7, 45.4, 37.2, 36.6, 35.4, 27.6, 15.7.

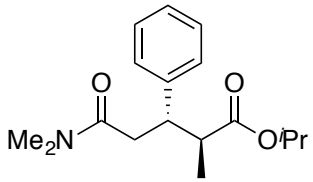
methyl (2*R*,3*S*)-5-(dimethylamino)-2-methyl-5-oxo-3-phenylpentanoate (3ab, *syn*/*anti* = 55:45); colorless oil; HRMS (DART) calcd for $C_{15}H_{22}NO_3$ $[M + H]^+$ 264.1600, found 264.1604; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 100/1, 1.0 mL/min, 210 nm, t_R = 111.7 min (*anti*, minor), 126.8 min (*syn*, minor), 140.2 min (*syn*, major), 149.7 min (*syn*, major)); *syn*-form ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.30-7.17 (m, 5H), 3.70 (s, 3H), 3.48-3.45 (m, 1H), 2.85 (s, 3H), 2.80 (s, 3H), 2.75-2.67 (m, 2H), 2.62 (dd, 1H, J = 15.12, 5.50 Hz). 0.96 (d, 3H, J = 6.87 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 176.2, 170.7, 141.7, 128.397, 128.0, 126.7, 51.6, 44.9, 44.5, 37.2, 37.1, 35.3, 15.7; *Anti*-form: ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.30-7.17 (m, 5H), 3.57-3.52 (m, 1H), 3.49 (s, 3H), 2.90 (s, 3H), 2.89-2.75 (m, 3H), 2.85 (s, 3H), 1.20 (d, 3H, J = 6.87 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 175.3, 171.1, 141.9, 128.1, 128.0, 126.6, 51.3, 44.9, 44.8, 37.9, 35.6, 35.4, 14.8.



isopropyl (2*R*,3*S*)-5-(dimethylamino)-2-methyl-5-oxo-3-phenylpentanoate (3ac-*syn*); colorless oil; IR (neat, cm^{-1}); 2918, 1722, 1649, 1540, 1456, 1397, 1149, 664; HRMS (DART) calcd for $C_{17}H_{26}NO_3$ $[M + H]^+$ 292.1913, found 292.1907; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 95/5, 1.0 mL/min, 210 nm, t_R = 29.8 min (minor), 33.3 min (major)); $[\alpha]_D$ = –19.65 (c 0.23, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.28-7.27 (m, 2H), 7.21-7.20 (m, 3H), 5.06-5.01 (m, 1H), 3.43 (td, 1H, J = 9.78, 4.35 Hz), 2.86 (s, 3H), 2.78 (s, 3H), 2.75-2.70 (m, 2H), 2.61 (dd, 1H, J = 15.02, 4.25 Hz), 1.25 (d, 6H, J = 6.24 Hz), 0.95 (d, 3H, J = 6.80 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 175.3, 170.7, 141.7, 128.3, 128.1, 126.6, 67.7, 45.2, 45.0, 37.8, 37.1, 35.2, 21.7, 21.6, 15.9.

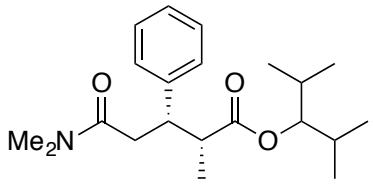


isopropyl (2*S*,3*S*)-5-(dimethylamino)-2-methyl-5-oxo-3-phenylpentanoate



(3ac-*anti*); colorless oil; IR (neat, cm^{-1}); 2918, 1724, 1649, 1540, 1456, 1397, 1147, 1110, 632; HRMS (DART) calcd for $C_{17}H_{26}NO_3$ $[M + H]^+$ 292.1913, found 292.1910; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 95/5, 1.0 mL/min, 210 nm, t_R = 29.6 min (minor), 34.4 min (major)); $[\alpha]_D$ = –16.58 (c 0.21, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.23-7.19 (m, 5H), 4.79-4.76 (m, 1H), 3.48-3.47 (m, 1H), 2.82 (s, 6H), 2.80-2.78 (m, 2H), 2.67 (dd, 1H, J = 15.02, 8.79 Hz), 1.23 (d, 3H, J = 7.37 Hz), 1.00 (q, 6H, J = 6.42 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.4, 171.1, 142.1, 128.1, 128.0, 126.6, 67.2, 45.1, 44.8, 37.1, 36.2, 35.3, 21.4, 21.4, 15.4.

2,4-dimethylpentan-3-yl (2*R*,3*S*)-5- (dimethylamino)-2-methyl-5-oxo-3-phenylpentanoate (3ad-*syn*); colorless oil; IR (neat, cm^{-1}); 2967, 2934, 1726, 1651, 1456, 1396, 1258, 1172, 1129, 701, 665, 642; HRMS (DART) calcd for $C_{21}H_{34}NO_3$ $[M + H]^+$ 348.2539, found 348.2548; HPLC analysis using Daicel Chiralpak AD-3 and AD-H column (Hex/^{i}PrOH = 95/5, 0.4 mL/min, 210 nm, t_R = 90.0 min (minor), 93.7 min (major)); $[\alpha]_D$ = –4.73 (c 0.43, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.22-7.20 (2H, m), 7.15-7.12 (3H, m), 4.58 (1H, t, J = 6.19 Hz), 3.36 (1H, td, J = 10.31, 4.12 Hz), 2.77 (3H, s), 2.76-2.73 (1H, m), 2.69 (3H, s), 2.65-2.62 (2H, m), 1.89-1.83 (2H, m), 0.93 (3H, d, J = 6.87 Hz), 0.82-0.81 (12H, m); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 176.0, 170.6, 141.6 128.3, 128.2, 126.6, 82.7, 45.6, 44.8, 38.3, 37.1, 35.2, 29.4, 29.3, 19.6, 17.3, 17.1, 16.9.



2,4-dimethylpentan-3-yl (2*S*,3*S*)-5- (dimethylamino)-2-methyl-5-oxo-3-phenylpentanoate (3ad-*anti*); colorless oil; IR (neat, cm^{-1}); 2966, 2933, 1729, 1649, 1457, 1396, 1257, 1169, 1130, 700, 664; HRMS (DART) calcd for $C_{21}H_{34}NO_3$ $[M + H]^+$ 348.2539, found 348.2551; HPLC analysis using Daicel Chiralpak AD-3 and AD-H column (Hex/^{i}PrOH = 95/5, 0.4 mL/min, 210 nm, t_R = 99.7 min (minor), 116.9 min (major)); $[\alpha]_D$ = 5.48 (c 0.19, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.18-7.16 (4H, m), 7.09-7.06 (1H, m), 4.34 (1H, t, J = 5.84 Hz),

3.47-3.46 (1H, m), 2.93 (1H, dt, J = 16.27, 7.05 Hz), 2.73 (3H, s), 2.72-2.70 (1H, m), 2.68 (3H, s), 2.60 (1H, dd, J = 14.78, 9.28 Hz), 1.71-1.64 (2H, m), 1.25 (3H, d, J = 6.87 Hz), 0.62 (6H, dd, J = 16.50, 6.87 Hz), 0.55 (6H, t, J = 6.19 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 175.2, 171.2142.5, 128.2, 128.1, 126.6, 82.4, 44.9, 44.6, 37.1, 36.2, 35.3, 29.3, 29.1,19.3,19.2, 17.1, 16.8, 16.2.

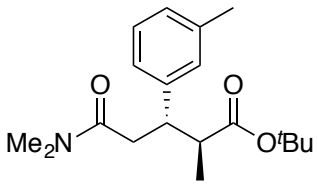
***tert*-butyl (2*R*,3*S*)-5-(dimethylamino)-2-methyl-5-oxo-3-(*o*-tolyl)pentanoate (3ba-*syn*)**; colorless oil; IR (neat, cm^{-1}); 1723, 1651, 1395, 1367, 1259, 1146, 849, 763, 729, 664; HRMS (DART) calcd for $C_{19}H_{30}NO_3$ $[M + H]^+$ 320.2226, found 320.2221; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 95/5, 1.0 mL/min, 210 nm, t_R = 10.2 min (major), 12.0 min (minor)); $[\alpha]_D$ = 3.68 (c 0.20, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ : 7.15-7.07 (m, 4H), 3.72-3.68 (m, 1H), 2.87 (s, 3H), 2.792.76 (m, 4H), 2.63-2.57 (m, 2H), 2.43 (s, 3H), 1.48 (s, 9H), 0.91 (d, 3H, J = 6.80 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 175.5, 171.0, 140.7, 137.4, 130.3, 126.0, 125.9, 125.6, 80.4, 47.0, 47.0, 38.1, 37.2, 35.3, 28.0, 20.1, 15.9.

***tert*-butyl (2*S*,3*S*)-5-(dimethylamino)-2-methyl-5-oxo-3-(*o*-tolyl)pentanoate (3ba-*anti*)**; colorless oil; IR (neat, cm^{-1}); 2931, 1722, 1649, 1491, 1458, 1395, 1366, 1258, 1150, 1047, 849, 728, 665; HRMS (DART) calcd for $C_{19}H_{30}NO_3$ $[M + H]^+$ 320.2226, found 320.2230; HPLC analysis using Daicel Chiralpak OD-3 column (Hex/^{i}PrOH = 95/5, 0.7 mL/min, 210 nm, t_R = 15.4 min (minor), 18.9 min (major)); $[\alpha]_D$ = 8.74 (c 0.22, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ : 7.13-7.08 (m, 4H), 3.75-3.71 (m, 1H), 2.81 (s, 3H), 2.76 (s, 3H), 2.70-2.66 (m, 3H), 2.42 (s, 3H), 1.24 (d, 3H, J = 6.80 Hz), 1.16 (s, 9H); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.5, 171.3, 141.2, 136.8, 130.3, 126.4, 126.1, 125.5, 79.8, 45.7, 40.0, 37.2, 36.1, 35.4, 27.5, 19.7, 15.2.

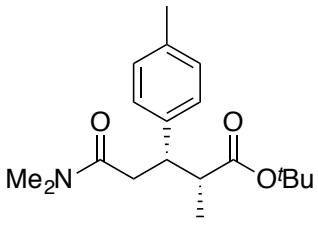
***tert*-butyl (2*R*,3*S*)-5-(dimethylamino)-2-methyl-5-oxo-3-(*m*-tolyl)pentanoate (3ca-*syn*)**; colorless oil; IR (neat, cm^{-1}); 1723, 1650, 1490, 1457, 1395, 1367, 1259, 1149, 105,0, 848, 788, 707, 665;

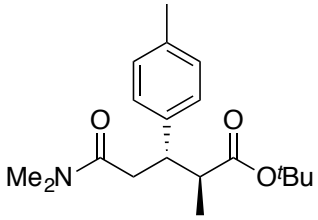
HRMS (DART) calcd for $C_{19}H_{30}NO_3$ $[M + H]^+$ 320.2226, found 320.2237; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 95/5, 1.0 mL/min, 210 nm, t_R = 12.7 min (minor), 22.9 min (major)); $[\alpha]_D$ = –9.35 (c 0.38, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.16 (1H, t, J = 7.90 Hz), 7.00-6.99 (3H, m), 3.35 (1H, td, J = 9.97, 4.35 Hz), 2.85 (3H, s), 2.79 (3H, s), 2.73 (1H, dd, J = 14.78, 9.97 Hz), 2.66-2.59 (2H, m), 2.31 (3H, s), 1.46 (9H, s), 0.93 (3H, d, J = 6.87 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 175.2, 170.9, 141.7, 137.6, 129.0, 128.1, 127.3, 125.0, 80.3, 46.1, 45.1, 37.9, 37.2, 35.3, 28.0, 21.4, 16.0.

***tert*-butyl (2*S*,3*S*)-5-(dimethylamino)-2-methyl-5-oxo-3-(*m*-tolyl)pentanoate (3ca-*anti*)**; colorless oil; IR (neat, cm^{-1}); 2920, 1720, 1650, 1558, 1457, 1396, 1366, 1150, 752, 664; HRMS (DART) calcd for $C_{19}H_{30}NO_3$ $[M + H]^+$ 320.2226, found 320.2233; HPLC analysis using Daicel Chiralpak OD-3 column (Hex/^{i}PrOH = 95/5, 0.7 mL/min, 210 nm, t_R = 13.2 min (minor), 16.4 min (major)); $[\alpha]_D$ = 1.37 (c 1.10, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.14-7.09 (1H, m), 7.03-6.97 (3H, m), 3.38 (1H, td, J = 8.76, 5.27 Hz), 2.82 (3H, s), 2.81 (3H, s), 2.75-2.72 (2H, m), 2.65 (1H, dd, J = 15.12, 8.94 Hz), 2.30 (3H, s), 1.21-1.20 (12H, m); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.3, 171.3, 142.3, 137.3, 129.1, 127.8, 127.2, 125.1, 79.8, 45.7, 45.3, 37.2, 36.4, 35.4, 27.6, 21.3, 15.6.

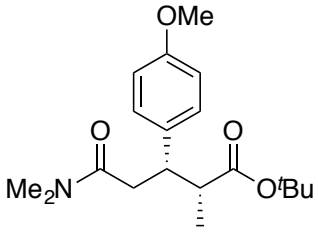


***tert*-butyl (2*R*,3*S*)-5-(dimethylamino)-2-methyl-5-oxo-3-(*p*-tolyl)pentanoate (3da-*syn*)**; colorless oil; IR (neat, cm^{-1}); 2931, 1723, 1650, 1512, 1456, 1395, 1367, 1260, 1148, 849, 818, 666; HRMS (DART) calcd for $C_{19}H_{30}NO_3$ $[M + H]^+$ 320.2226, found 320.2235; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 95/5, 1.0 mL/min, 210 nm, t_R = 17.7 min (minor), 22.3 min (major)); $[\alpha]_D$ = –15.18 (c 0.55, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.05 (br s, 4H), 3.31 (td, 1H, J = 9.92, 4.35 Hz), 2.84 (s, 3H), 2.76 (s, 3H), 2.70-2.67 (m, 1H), 2.62-2.57 (m, 2H), 2.27 (s, 3H), 1.44 (s, 9H), 0.90 (d, 3H, J = 6.80 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 175.3, 170.9, 138.6, 136.0, 128.9, 128.0, 80.3, 46.1, 44.8, 38.1, 37.2, 35.2, 28.0, 21.0, 16.0.

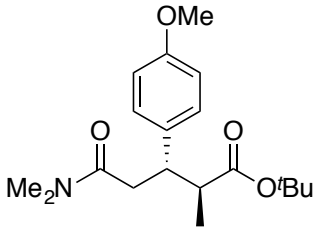


***tert*-butyl (2*S*,3*S*)-5-(dimethylamino)-2-methyl-5-oxo-3-(*p*-tolyl)pentanoate (3da-a*nti*)**; 

colorless oil; IR (neat, cm^{-1}); 2921, 1723, 1650, 1510, 1457, 1396, 1366, 1258, 1150, 850, 816, 644; HRMS (DART) calcd for $C_{19}H_{30}NO_3$ $[M + H]^+$ 320.2226, found 320.2214; HPLC analysis using Daicel Chiralpak OD-3 column (Hex/^{i}PrOH = 95/5, 0.7 mL/min, 210 nm, t_R = 15.0 min (minor), 19.3 min (major)); $[\alpha]_D$ = 3.20 (c 0.34, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.10 (d, 2H, J = 7.56 Hz), 7.05 (d, 2H, J = 7.56 Hz), 3.38 (td, 1H, J = 8.76, 5.04 Hz), 2.82 (s, 3H), 2.82 (s, 3H), 2.75-2.70 (m, 2H), 2.64 (dd, 1H, J = 14.78, 9.28 Hz), 2.28 (s, 3H), 1.21 (s, 9H), 1.20 (d, 3H, J = 6.87 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.3, 171.3, 139.2, 135.9, 128.6, 128.1, 79.9, 45.7, 44.9, 37.2, 36.5, 35.3, 27.7, 21.0, 15.5.

***tert*-butyl (2*R*,3*S*)-5-(dimethylamino)-3-(4-methoxyphenyl)-2-methyl-5-oxopentanoate (3ea-*syn*)**; 

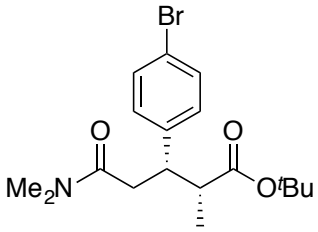
colorless oil; IR (neat, cm^{-1}); 2933, 1722, 1649, 1513, 1458, 1395, 1367, 1251, 1148, 1036, 832, 647; HRMS (DART) calcd for $C_{19}H_{30}NO_4$ $[M + H]^+$ 336.2175, found 336.2184; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 95/5, 1.0 mL/min, 210 nm, t_R = 32.2 min (minor), 42.6 min (major)); $[\alpha]_D$ = –14.23 (c 0.54, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.11 (d, 2H, J = 8.94 Hz), 6.82 (d, 2H, J = 8.94 Hz), 3.78 (s, 3H), 3.32 (td, 1H, J = 9.97, 4.12 Hz), 2.87 (s, 3H), 2.79 (s, 3H), 2.70 (dd, 1H, J = 14.78, 9.97 Hz), 2.61-2.58 (m, 2H), 1.47 (s, 9H), 0.92 (d, 3H, J = 6.87 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 175.3, 171.0, 158.1, 133.7, 129.0, 113.6, 80.4, 55.1, 46.3, 44.4, 38.1, 37.2, 35.3, 28.0, 16.0.

***tert*-butyl (2*S*,3*S*)-5-(dimethylamino)-3-(4-methoxyphenyl)-2-methyl-5-oxopentanoate (3ea-*anti*)**; 

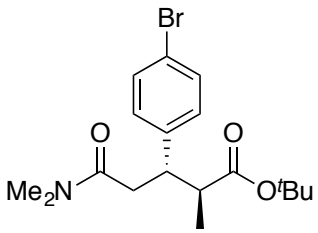
IR (neat, cm^{-1}); 2934, 1723, 1648, 1513, 1459, 1359, 1366, 1249, 1150, 1036, 830, 627; HRMS (DART) calcd for $C_{19}H_{30}NO_4$ $[M + H]^+$ 336.2175, found 336.2178; HPLC analysis using Daicel Chiralpak OD-3

column (Hex/^{i}PrOH = 95/5, 0.7 mL/min, 210 nm, t_R = 23.6 min (minor), 31.7 min (major)); $[\alpha]_D$ = –1.75 (c 0.26, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.07 (d, 2H, J = 8.25 Hz), 6.72 (d, 2H, J = 8.25 Hz), 3.69 (s, 3H), 3.29 (td, 1H, J = 9.28, 4.81 Hz), 2.75 (s, 3H), 2.74 (s, 3H), 2.67-2.63 (m, 2H), 2.55 (dd, 1H, J = 15.12, 8.94 Hz), 1.14-1.13 (m, 12H); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.3, 171.3, 158.1, 134.4, 129.2, 113.3, 79.9, 55.1, 45.8, 44.6, 37.2, 36.9, 35.4, 27.7, 15.6.

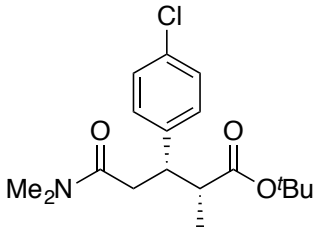
***tert*-butyl (2*R*,3*S*)-3-(4-bromophenyl)-5-(dimethylamino)-2-methyl-5-oxopentanoate (3fa-syn)**; white solid; Mp 86-87 ˚C; IR (neat, cm^{-1}); 2933, 1723, 1649, 1488, 1396, 1367, 1259, 1149, 1072, 1010, 962, 848, 825, 753, 640, 612; HRMS (DART) calcd for $C_{18}H_{27}BrNO_3$ $[M + H]^+$ 384.1174, found 384.1173; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 95/5, 1.0 mL/min, 210 nm, t_R = 26.2 min (minor), 36.9 min (major)); $[\alpha]_D$ = –1.68 (c 0.31, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.40 (2H, d, J = 8.25 Hz), 7.09 (2H, d, J = 8.25 Hz), 3.37 (1H, td, J = 9.97, 4.12 Hz), 2.90 (3H, s), 2.80 (3H, s), 2.70 (1H, dd, J = 15.12, 10.31 Hz), 2.64-2.56 (2H, m), 1.46 (9H, s), 0.92 (3H, d, J = 6.87 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.8, 170.5, 141.0, 131.3, 129.9, 120.3, 80.6, 46.0, 44.5, 37.7, 37.1, 35.3, 27.9, 16.0.



***tert*-butyl (2*S*,3*S*)-3-(4-bromophenyl)-5-(dimethylamino)-2-methyl-5-oxopentanoate (3fa-anti)**; white solid; Mp 96-98 ˚C; IR (neat, cm^{-1}); 2977, 2934, 1724, 1648, 1488, 1396, 1367, 1258, 1149, 1011, 962, 823, 751, 717, 652; HRMS (DART) calcd for $C_{18}H_{27}BrNO_3$ $[M + H]^+$ 384.1174, found 384.1187; HPLC analysis using Daicel Chiralpak OD-3 column (Hex/^{i}PrOH = 95/5, 0.7 mL/min, 210 nm, t_R = 16.9 min (minor), 21.0 min (major)); $[\alpha]_D$ = 6.15 (c 0.20, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ : 7.35 (d, 2H, J = 7.94 Hz), 7.10 (d, 2H, J = 7.94 Hz), 3.38 (td, 1H, J = 8.79, 4.35 Hz), 2.83 (s, 3H), 2.80 (s, 3H), 2.73-2.65 (m, 2H), 2.59 (dd, 1H, J = 15.30, 9.64 Hz), 1.19-1.17 (m, 12H); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.0, 170.8, 141.5, 131.0, 131.0, 130.1, 80.2, 45.5, 44.6, 37.2, 36.2, 35.4, 27.6, 15.6.

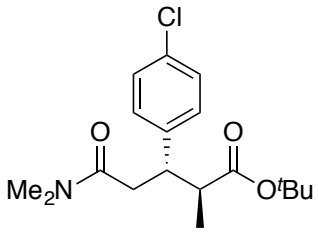


***tert*-butyl (2*R*,3*S*)-3-(4-chlorophenyl)-5-(dimethylamino)-2-methyl-5-oxopentanoate**



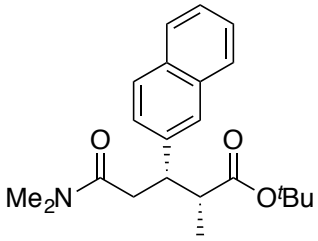
(3ga-*syn*); white solid; Mp 78-79 ˚C; IR (neat, cm^{-1}); 2977, 2933, 1723, 1648, 1491, 1457, 1397, 1368, 1260, 1149, 1092, 1052, 1014, 961, 931, 830, 753, 720, 609; HRMS (DART) calcd for $C_{18}H_{27}ClNO_3$ $[M + H]^+$ 340.1674, found 340.1674; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 95/5, 1.0 mL/min, 210 nm, t_R = 24.9 min (minor), 33.6 min (major)); $[\alpha]_D$ = –5.35 (c 0.37, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.25 (2H, d, J = 8.25 Hz), 7.15 (2H, d, J = 8.94 Hz), 3.38 (1H, td, J = 9.97, 4.12 Hz), 2.90 (3H, s), 2.80 (3H, s), 2.71 (1H, dd, J = 15.12, 10.31 Hz), 2.64-2.58 (2H, m), 1.46 (9H, s), 0.92 (3H, d, J = 6.87 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.8, 170.5, 140.5, 132.2, 129.5, 128.4, 80.6, 46.0, 44.5, 37.7, 37.1, 35.3, 28.0, 16.0.

***tert*-butyl (2*S*,3*S*)-3-(4-chlorophenyl)-5-(dimethylamino)-2-methyl-5-oxopentanoate**



(3ga-*anti*); white solid; Mp 91-93 ˚C; IR (neat, cm^{-1}); 2976, 2934, 1724, 1645, 1490, 1458, 1397, 1366, 1149, 1047, 1017 921, 828, 751, 723, 679; HRMS (DART) calcd for $C_{18}H_{27}ClNO_3$ $[M + H]^+$ 340.1674, found 340.1672; HPLC analysis using Daicel Chiralpak OD-3 column (Hex/^{i}PrOH = 95/5, 0.7 mL/min, 210 nm, t_R = 14.6 min (minor), 17.7 min (major)); $[\alpha]_D$ = 7.90 (c 0.85, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.23 (2H, d, J = 8.25 Hz), 7.18 (2H, d, J = 8.25 Hz), 3.41 (1H, td, J = 9.11, 4.58 Hz), 2.85 (3H, s), 2.83 (3H, s), 2.73-2.71 (2H, m), 2.62 (1H, dd, J = 15.12, 9.68 Hz), 1.22-1.20 (12H, m); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.0, 170.8, 141.0, 132.2, 129.7, 128.1, 80.2, 45.6, 44.6, 37.2, 36.3, 35.4, 27.7, 15.6.

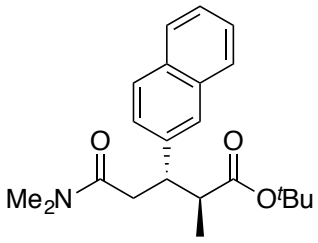
***tert*-butyl (2*R*,3*S*)-5-(dimethylamino)-2-methyl-3-(naphthalen-2-yl)-5-oxopentanoate (3ha-*syn*)**



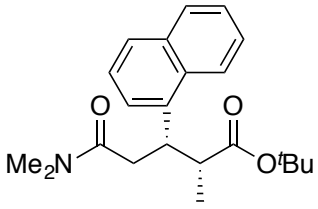
; white solid; Mp 111-114 ˚C; IR (neat, cm^{-1}); 2977, 2934, 1722, 1648, 1456, 1395, 1367, 1258, 1148, 1052, 851, 821, 751, 665; HRMS (DART) calcd for $C_{22}H_{30}NO_3$ $[M + H]^+$ 356.2226, found 356.2221; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 95/5, 1.0 mL/min, 210 nm, t_R = 25.7 min (minor), 42.7 min (major)); $[\alpha]_D$ = –3.99 (c

0.48, $CHCl_3$); ^1H NMR (600 MHz, $CDCl_3$) δ: 7.79-7.77 (3H, m), 7.65 (1H, s), 7.44-7.42 (2H, m), 7.36 (1H, dd, J = 8.25, 1.37 Hz), 3.57 (1H, td, J = 10.31, 4.12 Hz), 2.88-2.84 (1H, m), 2.85 (3H, s), 2.76-2.75 (1H, m), 2.75 (3H, s), 2.70 (1H, dd, J = 15.12, 4.12 Hz), 1.48 (9H, s), 0.95 (3H, d, J = 6.87 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 175.1, 170.8, 139.4, 133.3, 132.4, 127.9, 127.6, 127.5, 127.1, 126.2, 125.8, 125.3, 80.5, 46.1, 45.3, 37.9, 37.2, 35.3, 28.0, 16.2.

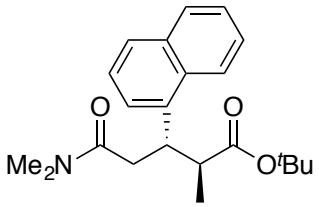
***tert*-butyl** **(2*S*,3*S*)-5-(dimethylamino)-2-methyl-3-(naphthalen-2-yl)-5-oxopentanoate (3ha-*anti*)**; white solid; Mp 79-82 ˚C; IR (neat, cm^{-1}); 2975, 2933, 1723, 1647, 1395, 1366, 1257, 1148, 1055, 853, 819, 749; HRMS (DART) calcd for $C_{22}H_{30}NO_3$ $[M + H]^+$ 356.2226, found 356.2235; HPLC analysis using Daicel Chiralpak OD-3 column (Hex/^{i}PrOH = 95/5, 0.7 mL/min, 210 nm, t_R = 19.0 min (minor), 23.8 min (major)); $[\alpha]_D$ = 4.51 (c 0.18, $CHCl_3$); ^1H NMR (600 MHz, $CDCl_3$) δ: 7.77-7.75 (3H, m), 7.66 (1H, s), 7.42-7.41 (3H, m), 3.61 (1H, td, J = 8.59, 5.04 Hz), 2.87-2.83 (2H, m), 2.80 (3H, s), 2.79 (3H, s), 2.77-2.76 (1H, m), 1.26 (3H, d, J = 6.87 Hz), 1.13 (9H, s); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.2, 171.2, 140.4, 133.2, 132.3, 127.7, 127.5, 127.4, 126.8, 126.8, 125.7, 125.3, 80.0, 45.7, 45.4, 37.2, 36.4, 35.4, 27.6, 15.6.



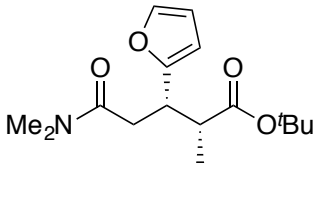
***tert*-butyl** **(2*R*,3*S*)-5-(dimethylamino)-2-methyl-3-(naphthalen-1-yl)-5-oxopentanoate (3ia-*syn*)**; colorless oil; IR (neat, cm^{-1}); 2976, 2933, 1722, 1649, 1456, 1395, 1367, 1259, 1150, 950, 848, 799, 781; HRMS (DART) calcd for $C_{22}H_{30}NO_3$ $[M + H]^+$ 356.2226, found 356.2230; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 95/5, 1.0 mL/min, 210 nm, t_R = 16.6 min (minor), 20.2 min (major)); $[\alpha]_D$ = 47.06 (c 0.20, $CHCl_3$); ^1H NMR (600 MHz, $CDCl_3$) δ: 8.31 (1H, d, J = 10.00 Hz), 7.82 (1H, d, J = 8.25 Hz), 7.71 (1H, d, J = 8.25 Hz), 7.53 (1H, t, J = 7.56 Hz), 7.46-7.42 (2H, m), 7.36 (1H, d, J = 6.87 Hz), 4.39 (1H, br s), 2.92 (1H, br s), 2.84-2.82 (2H, m), 2.81 (3H, s), 2.67 (3H, s), 1.46 (9H, s), 0.92 (3H, d, J = 6.87 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 175.3, 170.9, 139.1, 133.8, 132.8, 128.6, 127.0, 125.9, 125.4, 125.1, 123.6, 123.2, 80.5, 46.9, 45.3, 38.0, 37.2, 35.3, 28.0, 16.3.



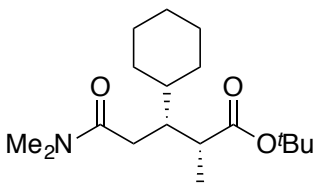
***tert*-butyl (2*S*,3*S*)-5-(dimethylamino)-2-methyl-3-(naphthalen-1-yl)-5-oxopentanoate (3ia-*anti*)**; colorless oil; IR (neat, cm^{-1}); 2976, 2932, 1723, 1646, 1458, 1396, 1367, 1258, 1152, 1057, 849, 798, 780; HRMS (DART) calcd for $C_{22}H_{30}NO_3$ $[M + H]^+$ 356.2226, found 356.2226; HPLC analysis using Daicel Chiralpak OD-3 column (Hex/^{i}PrOH = 95/5, 0.7 mL/min, 210 nm, t_R = 19.3 min (minor), 24.6 min (major)); $[\alpha]_D$ = 15.65 (c 0.23, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 8.26 (1H, d, J = 8.94 Hz), 7.73 (1H, d, J = 8.25 Hz), 7.62 (1H, d, J = 8.25 Hz), 7.47-7.44 (1H, m), 7.38 (1H, t, J = 7.22 Hz), 7.34-7.30 (2H, m), 4.41 (1H, br s), 2.90-2.88 (1H, m), 2.75-2.73 (2H, m), 2.65 (3H, s), 2.64 (3H, s), 1.18 (3H, d, J = 6.87 Hz), 1.01 (9H, s); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.4, 171.2, 139.5, 133.9, 131.9, 128.5, 127.0, 126.0, 125.4, 124.9, 123.9, 123.6, 80.0, 45.8, 38.5, 37.2, 35.8, 35.4, 27.5, 14.9.



***tert*-butyl (2*R*,3*S*)-5-(dimethylamino)-3-(furan-2-yl)-2-methyl-5-oxopentanoate (3ja, *syn*/*anti* = 58:42)**; colorless oil; HRMS (DART) calcd for $C_{16}H_{26}NO_4$ $[M + H]^+$ 296.1862, found 296.1858; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 95/5, 0.7 mL/min, 210 nm, t_R = 20.8 min (*syn*, minor), 21.9 min (*anti*, minor), 23.0 min (*anti*, major), 28.4 min (*syn*, major)); *Syn*-form: ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.29-7.29 (1H, m), 6.26-6.26 (1H, m), 6.08-6.07 (1H, m), 3.65-3.62 (1H, m), 2.92 (3H, s), 2.87 (3H, s), 2.84-2.70 (2H, m), 2.53 (1H, dd, J = 15.12, 4.12 Hz), 1.44 (9H, s), 1.00 (3H, d, J = 6.87 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.3, 170.7, 154.9, 141.0, 110.0, 106.8, 80.3, 44.1, 38.5, 37.1, 35.4, 35.0, 27.9, 14.7; *Anti*-form: ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.29-7.29 (1H, m), 6.26-6.26 (1H, m), 6.08-6.07 (1H, m), 3.65-3.62 (1H, m), 2.95 (3H, s), 2.90 (3H, s), 2.84-2.70 (3H, m), 1.37 (9H, s), 1.15 (3H, d, J = 6.87 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 173.8, 170.7, 154.9, 140.9, 110.0, 106.3, 80.1, 43.6, 38.5, 37.1, 35.3, 33.9, 27.8, 14.7.

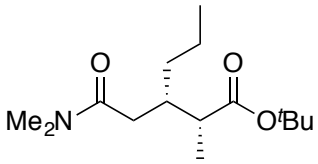


***tert*-butyl (2*R*,3*R*)-3-cyclohexyl-5-(dimethylamino)-2-methyl-5-oxopentanoate (3ka, *syn*/*anti* = 87:13)**; colorless oil; HRMS (DART) calcd for

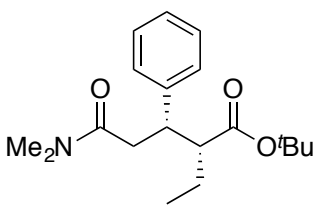


$C_{18}H_{34}NO_3$ $[M + H]^+$ 312.2539, found 312.2537; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 100/1, 0.7 mL/min, 210 nm, t_R = 30.6 min (*anti*, minor), 35.5 min (*anti*, major), 38.4 min (*syn*, minor), 43.2 min (*syn*, major)); *Syn*-form: ^{1}H NMR (600 MHz, $CDCl_3$) δ: 2.96 (s, 3H), 2.87 (s, 3H), 2.57-2.53 (m, 1H), 2.47 (m, 1H), 2.20-2.14 (m, 2H), 1.67-1.54 (m, 6H), 1.36 (s, 9H), 1.26-1.25 (m, 2H), 1.13-1.07 (m, 2H), 0.96 (d, 2H, J = 7.56 Hz), 0.94-0.92 (m, 2H); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 175.9, 172.4, 79.8, 41.7, 41.6, 40.3, 37.1, 35.6, 31.2, 28.0, 27.9, 26.7, 26.6, 26.4, 13.4; *Anti*-form: ^{1}H NMR (600 MHz, $CDCl_3$) δ: 2.97 (s, 3H), 2.87 (s, 3H), 2.57-2.53 (m, 1H), 2.47 (m, 1H), 2.20-2.14 (m, 2H), 1.67-1.54 (m, 6H), 1.37 (s, 9H), 1.26-1.25 (m, 2H), 1.13-1.07 (m, 2H), 1.03 (d, 2H, J = 7.56 Hz), 0.94-0.92 (m, 2H); ^{13}C NMR (150 MHz, $CDCl_3$, detectable peaks) δ: 175.7, 170.2, 79.8, 32.0, 29.5, 13.4.

***tert*-butyl (2*R*,3*S*)-3-(2-(dimethylamino)-2-oxoethyl)-2-methylhexanoate (3la, *syn*/*anti* = 52:48)**; colorless oil; HRMS (DART) calcd for $C_{15}H_{30}NO_3$ $[M + H]^+$ 272.2226, found 272.2232; HPLC analysis using Daicel Chiralpak AS-3 column (Hex/^{i}PrOH = 99/1, 0.3 mL/min, 210 nm, t_R = 20.7 min (*syn*, minor), 27.0 min (*anti*, minor), 29.0 min (*syn*, major) , 30.6 min (*anti*, major)); *Syn*-form: ^{1}H NMR (600 MHz, $CDCl_3$) δ: 2.95 (6H, s), 2.58-2.52 (1H, m), 2.46 (1H, dd, J = 15.81, 5.50 Hz), 2.28-2.25 (1H, m), 2.18 (1H, m), 1.45 (9H, s), 1.36-1.28 (4H, m), 1.05 (3H, d, J = 6.87 Hz), 0.91-0.88 (3H, m); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 175.2, 172.2, 79.9, 42.0, 37.3, 37.2, 35.4, 34.7, 34.3, 28.0, 19.9, 14.1, 12.8; *Anti*-form: ^{1}H NMR (600 MHz, $CDCl_3$) δ: 3.02 (6H, s), 2.58-2.52 (1H, m), 2.36 (1H, dd, J = 14.43, 4.81 Hz), 2.28-2.25 (2H, m), 1.45 (9H, s), 1.36-1.28 (4H, m), 1.07 (3H, d, J = 6.87 Hz), 0.91-0.88 (3H, m); ^{13}C NMR (150 MHz, $CDCl_3$, detectable peaks) δ: 175.2, 172.2, 79.9, 41.9, 37.2, 35.4, 34.7, 33.8, 28.0, 20.3, 14.2, 13.4.

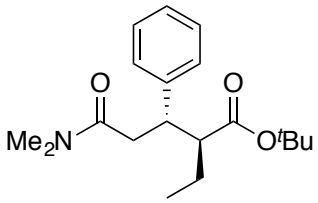


***tert*-butyl (2*R*,3*S*)-5-(dimethylamino)-2-ethyl-5-oxo-3-phenylpentanoate (3ae-*syn*)**; colorless solid; Mp 75-77 °C; IR (neat, cm^{-1}); 2966, 2934, 1722, 1650, 1456, 1395, 1367, 1267, 1151, 763, 703; HRMS (DART) calcd for $C_{19}H_{30}NO_3$ $[M + H]^+$ 320.2226, found 320.2231; HPLC analysis using Daicel Chiralpak AS-3



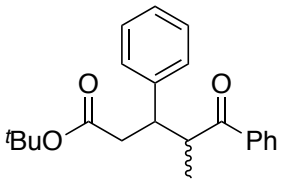
column (Hex/^{i}PrOH = 99/1, 1.0 mL/min, 210 nm, t_R = 27.3 min (minor), 54.9 min (major)); $[\alpha]_D$ = –9.96 (c 0.31, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.28-7.26 (2H, m), 7.19-7.18 (3H, m), 3.37 (1H, td, J = 10.65, 3.67 Hz), 2.82 (3H, s), 2.77-2.74 (1H, m), 2.76 (3H, s), 2.57 (1H, dd, J = 14.78, 3.78 Hz), 2.47 (1H, td, J = 10.48, 3.90 Hz), 1.48 (9H, s), 1.42-1.39 (1H, m), 1.26-1.20 (1H, m), 0.80 (3H, t, J = 7.56 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 174.5, 170.8, 142.1, 128.2, 128.0, 126.5, 80.5, 54.0, 44.6, 37.8, 37.1, 35.2, 28.0, 24.1, 11.6.

***tert*-butyl (2*R*,3*S*)-5-(dimethylamino)-2-ethyl-5-oxo-3-phenylpentanoate (3ae-*anti*)**;



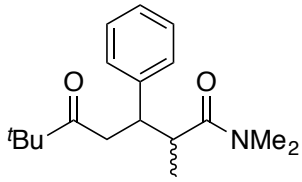
colorless solid; Mp 61-64 ˚C; IR (neat, cm^{-1}); 2968, 2934, 1723, 1646, 1456, 1395, 1365, 1268, 1152, 755, 701; HRMS (DART) calcd for $C_{19}H_{30}NO_3$ $[M + H]^+$ 320.2226, found 320.2220; HPLC analysis using Daicel Chiralpak AD-3 column (Hex/^{i}PrOH = 95/5, 1.0 mL/min, 210 nm, t_R = 18.7 min (major), 19.8 min (minor)); $[\alpha]_D$ = –9.01 (c 0.28, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.27-7.15 (5H, m), 3.40 (1H, td, J = 9.28, 4.81 Hz), 2.80 (3H, s), 2.76 (3H, s), 2.74 (1H, dd, J = 15.12, 4.81 Hz), 2.63 (1H, dd, J = 15.12, 8.94 Hz), 2.58 (1H, td, J = 10.14, 3.89 Hz), 1.71-1.63 (2H, m), 1.15 (9H, s), 0.94 (3H, t, J = 7.22 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 173.4, 171.2, 142.4, 128.4, 127.9, 126.5, 79.9, 53.4, 44.6, 37.1, 37.1, 35.3, 26.6, 23.8, 11.9.

***tert*-butyl (3*R*,4*S*)-4-methyl-5-oxo-3,5-diphenylpentanoate (3mg, dr = 68:32)**;



colorless oil; HRMS (DART) calcd for $C_{22}H_{27}O_3$ $[M + H]^+$ 339.1960, found 339.1965; major isomer: ^{1}H NMR (600 MHz, $CDCl_3$) 8.01-8.00 (m, 2H), 7.59-7.18 (m, 8H), 3.77-3.75 (m, 1H), 3.55-3.53 (m, 1H), 2.64-2.60 (m, 1H), 2.48 (dd, 1H, J = 14.74, 10.77 Hz), 1.19 (s, 9H), 0.98 (d, 3H, J = 6.80 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 203.6, 170.7, 141.2, 136.8, 133.1, 128.7, 128.2, 128.1, 127.9, 126.7, 80.1, 45.5, 45.0, 40.4, 27.7, 16.6; minor isomer: ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.79-7.78 (m, 2H), 7.59-7.18 (m, 8H), 3.83-3.82 (m, 1H), 3.62-3.59 (m, 1H), 2.77 (dd, 1H, J = 14.74, 5.10 Hz), 2.64-2.60 (m, 1H), 1.24 (d, 3H, J = 6.80 Hz), 1.21 (s, 9H); ^{13}C NMR (150 MHz, $CDCl_3$, detectable peaks) δ: 203.2, 171.2, 136.7, 132.7, 128.4, 128.2, 128.0, 128.0, 126.5, 80.1, 46.0, 44.1, 38.1, 28.1, 14.7.

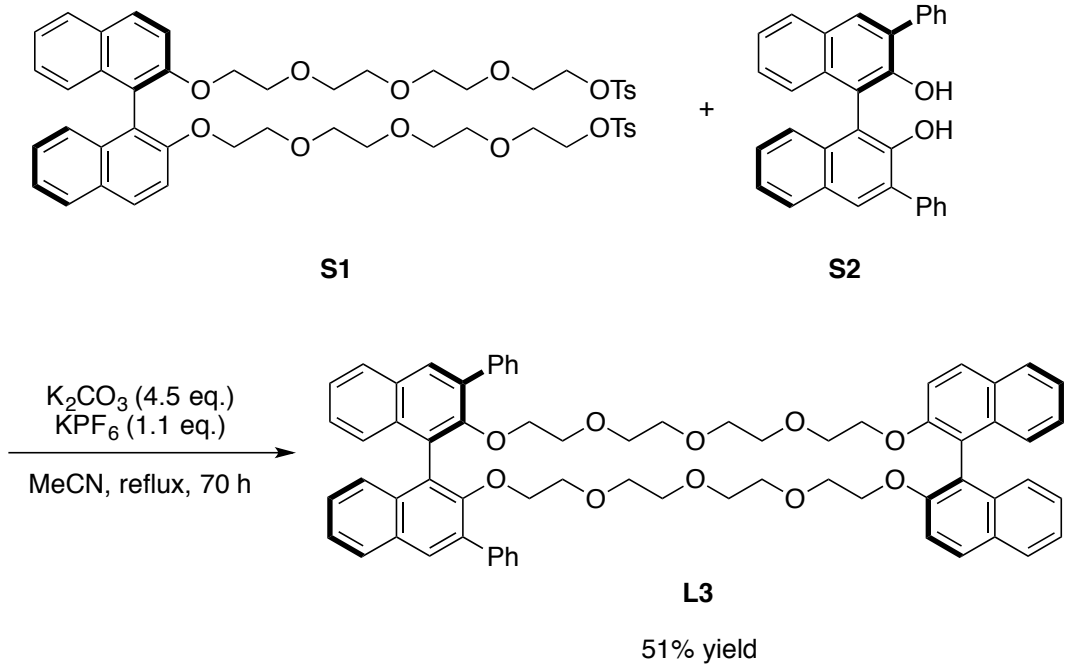
***N*,*N*,2,6,6-pentamethyl-5-oxo-3-phenylheptanamide (3nf, dr = 55:45)**; colorless oil;



HRMS (DART) calcd for $C_{18}H_{28}NO_2$ $[M + H]^+$ 290.2120, found 290.2121; major isomer: ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.28-7.13 (5H, m), 3.60 (1H, td, J = 8.59, 3.89 Hz), 3.09-2.97 (2H, m), 2.91 (3H, s), 2.81 (1H, dd, J = 17.18, 4.12 Hz), 2.76 (3H, s), 1.13 (3H, d, J = 6.87 Hz), 1.02 (9H, s); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 213.8, 175.0, 143.3, 128.2, 128.1, 126.3, 44.3, 42.5, 39.8, 37.2, 37.1, 35.5, 26.0, 16.5; minor isomer: ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.28-7.13 (5H, m), 3.50 (1H, td, J = 9.11, 3.89 Hz), 3.17-3.16 (1H, m), 3.09-2.97 (2H, m), 2.95 (3H, s), 2.94 (3H, s), 0.95-0.94 (3H, m), 0.95 (9H, s); ^{13}C NMR (150 MHz, $CDCl_3$) δ: 213.9, 175.3, 142.7, 128.2, 127.8, 126.4, 44.1, 44.1, 40.4, 40.0, 37.7, 35.6, 26.2, 14.3.

Synthesis of L3

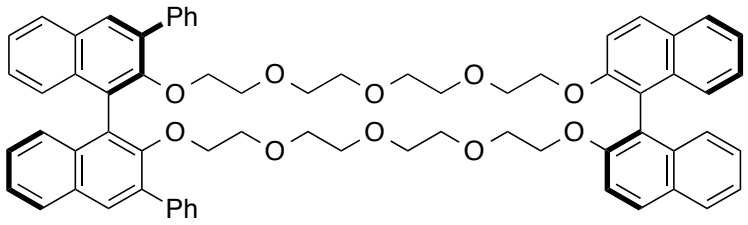
Scheme S1



(*R*)-**S1**[1] (1.19 g, 1.26 mmol), (*R*)-**S2**[3] (0.55 g, 1.26 mmol), K_2CO_3 (0.78 g, 5.65 mmol) and KPF_6 (0.25 g, 1.38 mmol) were placed in a flame-dried flask that was

fulfilled with argon, and MeCN (80 mL) was added. The reaction mixture was stirred for 70 h under reflux condition. After that, the reaction mixture was cooled to room temperature followed by filtered through Celite. The filtrate was evaporated under reduced pressure, and DCM (100 mL) was then added. The DCM solution was washed with 1 M HCl aq. (30 mL x 3), 1 M NaOH aq. (30 mL x 2) and brine (30 mL). The organic layer was dried over anhydrous Na_2SO_4. After filtration and concentration under reduced pressure, the crude product obtained was purified by silica-gel column chromatography (hexane-ethyl acetate) to afford the desired product **L3** (0.67 g, 51 % yield). The product was dried for 10 h at 100 ºC under reduced pressure to remove a trace amount of water.

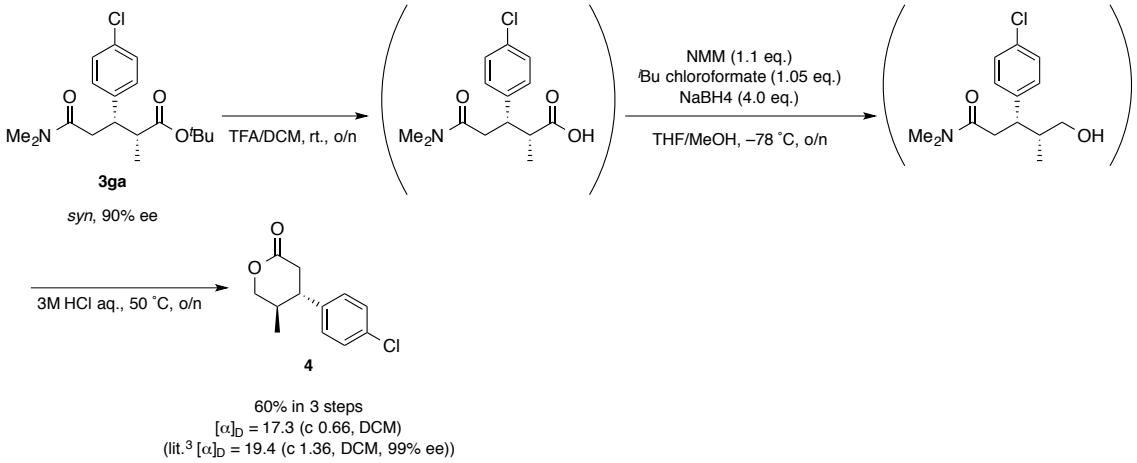
6,45-diphenyl-8,9,11,12,14,15,17,18,33,34,36,37,39,40,42,43-hexadecahydrotetranaphtho[2,1-*e*$_1$:1',2'-*g*$_1$:2'',1''-*n*:1''',2'''-*p*][1,4,7,10,13,18,21,24,27,30]decaoxacyclotetratriacontine (L3); white solid; Mp 79-82 ºC; IR (neat, cm^{-1}); 3055, 2871, 2361, 2340, 1592, 1507, 1421, 1352, 1128, 892, 807, 751, 700; HRMS (ESI) calcd for $C_{68}H_{64}NaO_{10}$ $[M + Na]^+$ 1063.4397, found 1063.4374; $[\alpha]_D$ = 30.14 (c 0.58, $CHCl_3$); ^1H NMR (600 MHz, $CDCl_3$) δ: 7.88 (2H, s), 7.82 (4H, d, J = 8.25 Hz), 7.76 (2H, d, J = 8.25 Hz), 7.68 (4H, d, J = 6.87 Hz), 7.37 (4H, t, J = 7.90 Hz), 7.32-7.31 (4H, m), 7.28 (2H, t, J = 7.56 Hz), 7.24-7.22 (2H, m), 7.19-7.16 (2H, m), 7.14-7.12 (4H, m), 7.06 (2H, d, J = 8.25 Hz), 4.03-3.99 (2H, m), 3.93-3.90 (2H, m), 3.58-3.56 (2H, m), 3.41-3.37 (2H, m), 3.31-3.29 (4H, m), 3.23-3.15 (8H, m), 3.13-3.06 (4H, m), 3.03-2.96 (6H, m), 2.88-2.84 (2H, m); ^{13}C NMR (150 MHz, $CDCl_3$, detectable peaks) δ: 154.4, 153.3, 138.8, 135.2, 134.1, 133.6, 130.7, 130.4, 129.4, 129.4, 129.2, 128.3, 128.0, 127.8, 127.4, 126.3, 126.2, 126.0, 125.8, 125.5, 125.0, 123.6, 120.5, 115.9, 72.0, 70.6, 70.4, 70.3, 70.1, 69.7, 69.6.



Determination of absolute configuration of 3ga

Syn-isomer of **3ga** was transformed into the lactone **4** (Scheme S1). **3ga** was converted into corresponding carboxylic acid by acid treatment; then it was reduced to the alcohol. Finally, it was cyclized under acidic condition to afford the lactone **4**. Through these transformations, the products were obtained as single diastereomers. The absolute configuration of the lactone **4** was determined by comparison of their optical rotations.[5]

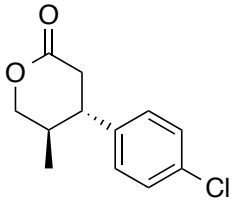
Scheme S2



To a solution of **3ga** (83.8 mg, 2.47 x10^{-1} mmol, *syn:anti* = >99:1, 90% ee) in DCM (2 mL) was added TFA (2 mL) at 0 ˚C, then the reaction mixture was warmed to room temperature and stirred for overnight. After stirring, TFA and DCM were removed by evaporator to obtain crude oil. It was dissolved in 1M NaOH aq., and washed with Et_2O for three times. Water layer was acidified with conc. HCl to pH 2, then precipitations appeared was extracted with DCM for five times. The organic layer was evaporated to obtain carboxylic acid as white solid. It was used to next reaction without further purification. To a solution of the carboxylic acid in THF (2.0 mL) were added *N*-methylmorpholine (29.2 μ L, 2.66 x10^{-1} mmol, 1.1 eq.) and ^{n}Bu chloroformate (33.4 μ L, 2.54 x 10^{-1} mmol, 1.05 eq.) at 0 ˚C. After stirring for 1h, the reaction mixture was added to a solution of $NaBH_4$ (36.6 mg, 9.67 x10^{-1} mmol, 4.0 eq.) in THF/MeOH = 7/3 (2.0 mL) at –78 ˚C through cannula with extra THF (1.5 mL). The reaction mixture was stirred for overnight, then the reaction was quenched by 10% AcOH aq. (1.25 mL) and diluted with H_2O (6 mL). The organic layer was extracted with DCM for three times

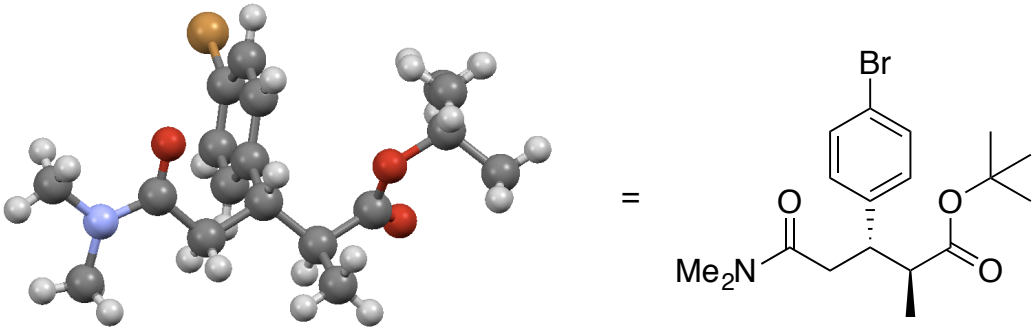
and washed with brine, then dried over anhydrous Na_2SO_4. After filtration and concentration under reduced pressure, crude product of the alcohol was obtained. This crude was used for next reaction without purification. To this crude product was added 3M HCl aq. (10 mL), then the reaction mixture was stirred at 50 ˚C for overnight. After that, the reaction mixture was cooled to room temperature then extracted with DCM for five times. The combined organic layer was washed with brine, then dried over anhydrous Na_2SO_4. After filtration and concentration under reduced pressure, the crude product was obtained. The crude product was purified by silica-gel PTLC (Hexane-Acetone) to afford the desired lactone **4** (33.1 mg, 1.47 x10^{-1} mmol, 60% in 3 steps) as an white solid. The physical data was corresponded with the literature compound reported.[5]

(4*S*,5*R*)-4-(4-chlorophenyl)-5-methyltetrahydro-2*H*-pyran-2-one (4);[5]



White solid; $[\alpha]_D$ = 17.3 (c 0.66, DCM) (lit.[3] $[\alpha]_D$ = 19.4 (99% ee, c 1.36, DCM)); ^{1}H NMR (600 MHz, $CDCl_3$) δ: 7.33 (d, 2H, *J* = 8.25 Hz), 7.12 (d, 2H, *J* = 8.94 Hz), 4.42-4.41 (m, 1H), 4.01 (t, 1H, *J* = 11.00), 2.89 (dd, 1H, *J* = 17.87, 6.19 Hz), 2.75-2.74 (m, 1H), 2.60 (dd, 1H, *J* = 17.87, 11.00 Hz), 2.17-2.15 (m, 1H), 0.82 (d, 3H, *J* = 6.87 Hz); ^{13}C NMR (150 MHz, $CDCl_3$) δ:170.5, 140.4, 133.0, 129.1, 128.5, 74.1, 44.8, 37.4, 34.6, 14.5.

Absolute configuration of **3fa-*anti*** was determined by by X-ray single crystal structure analysis. The data have been deposited with the Cambridge Crystallographic Data Centre as CCDC 1482367. Copies of the data can be obtained, free of charge, on application to the Director, CCDC, 12 Union Road, Cambridge CB2 1EZ, UK (fax: +448(0)12238336033 or deposit@ccdc.cam.ac.uk).



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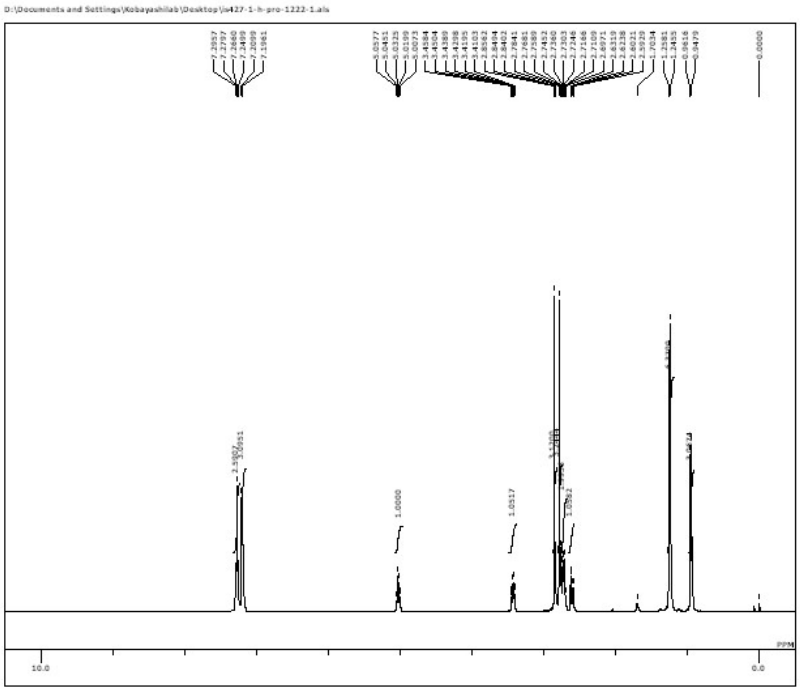
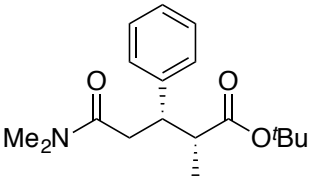
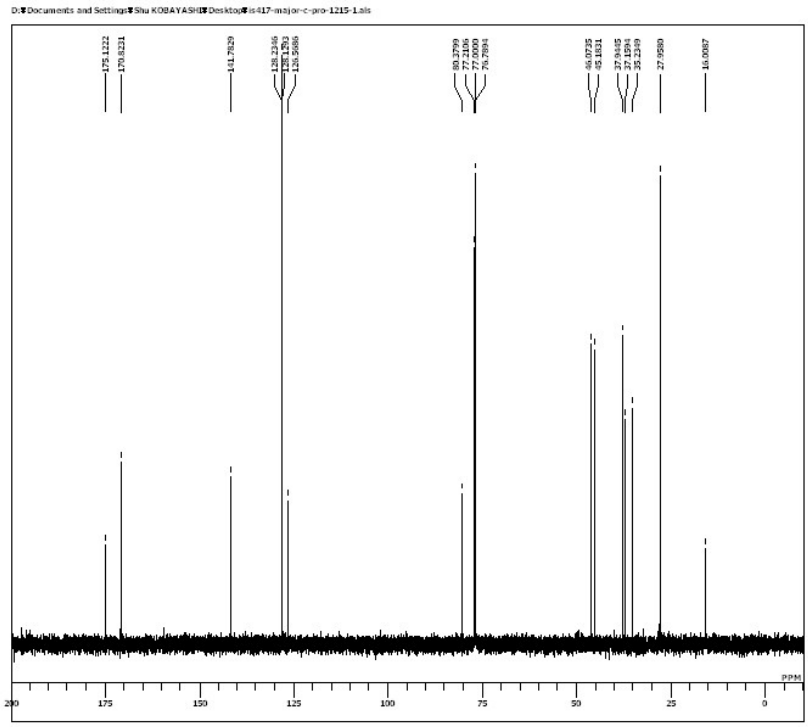
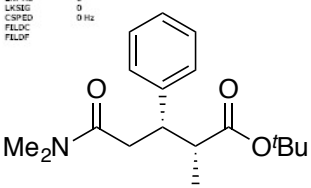
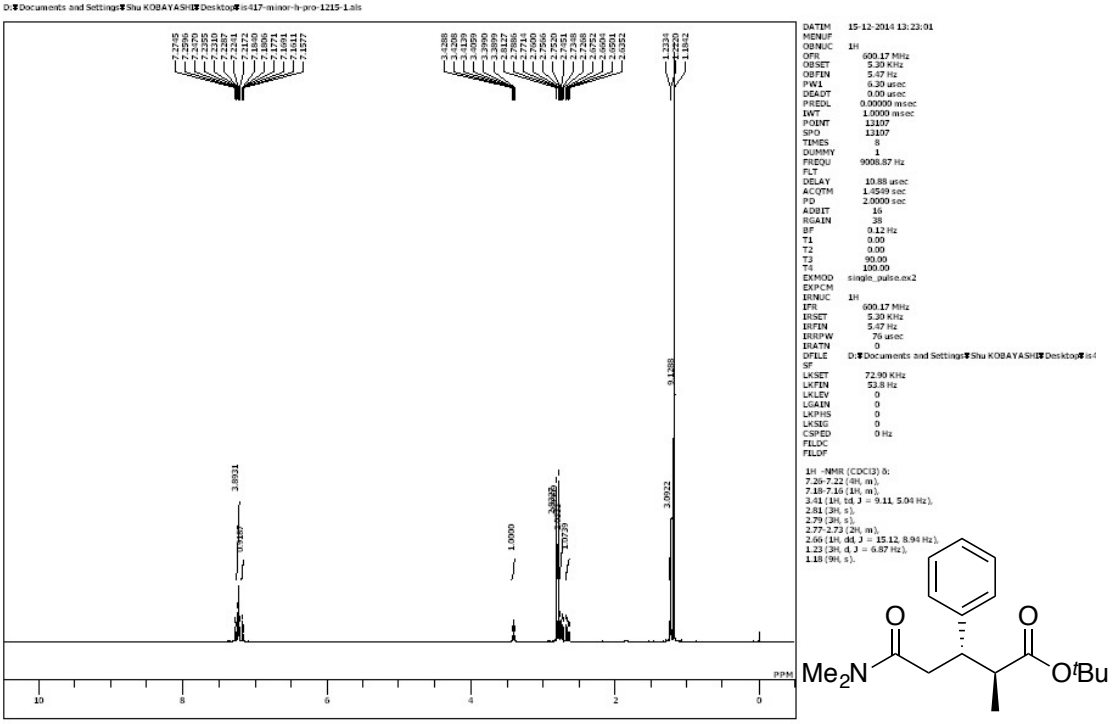
II. NMR and HPLC charts of the products







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FILDC
FILDF
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7.18-7.16 (1H, m),
3.41 (1H, td, J = 9.11, 5.04 Hz),
2.81 (3H, s),
2.79 (3H, s),
2.77-2.73 (2H, m),
2.66 (1H, dd, J = 15.12, 8.94 Hz),
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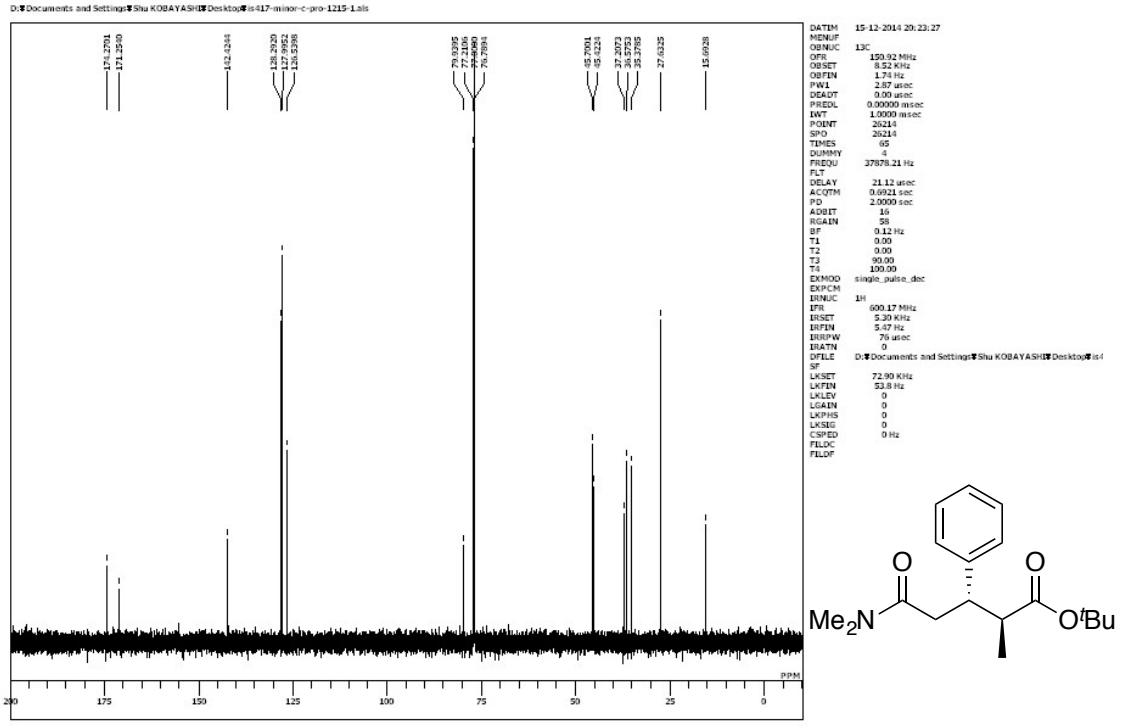
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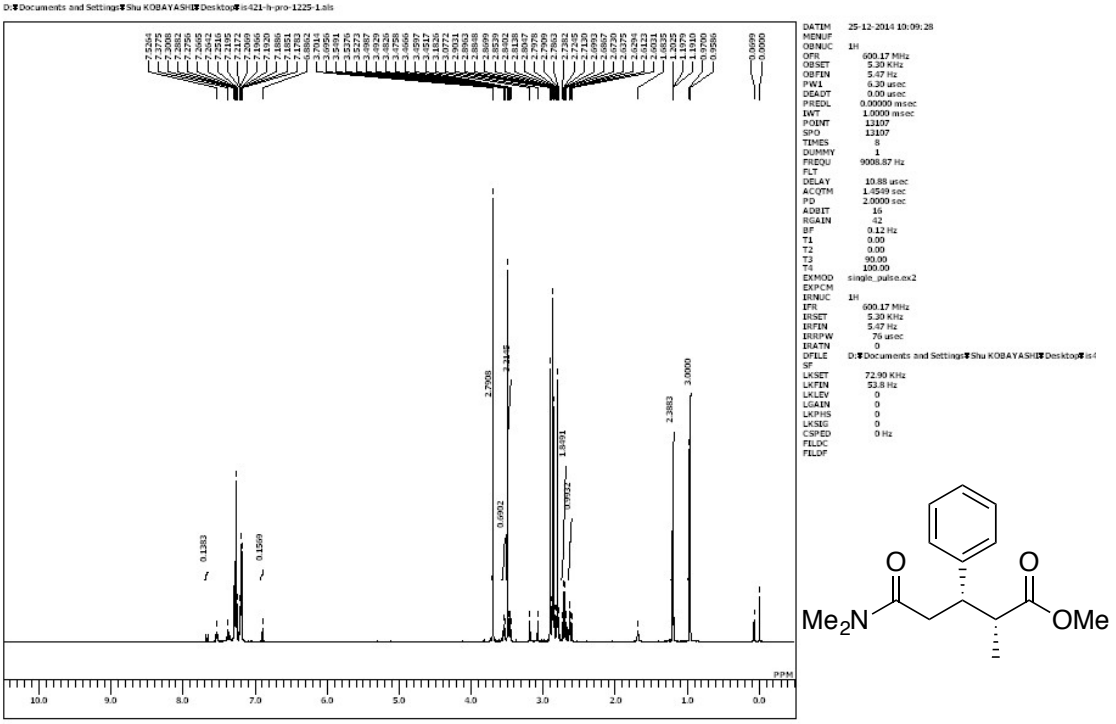
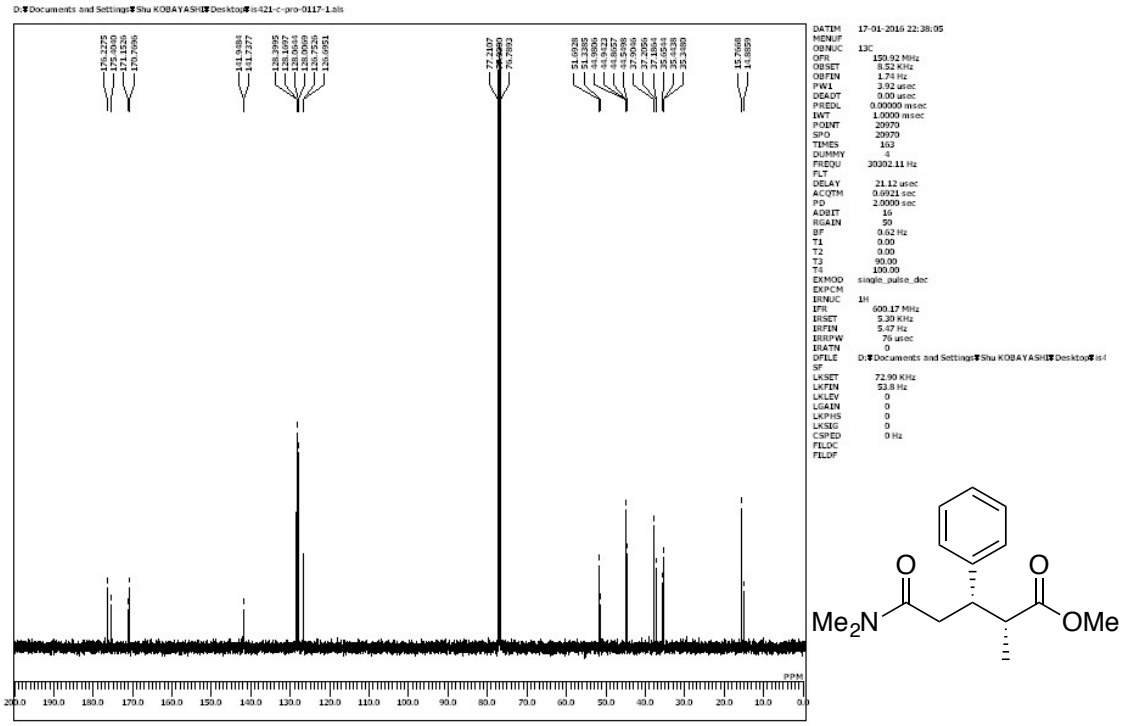
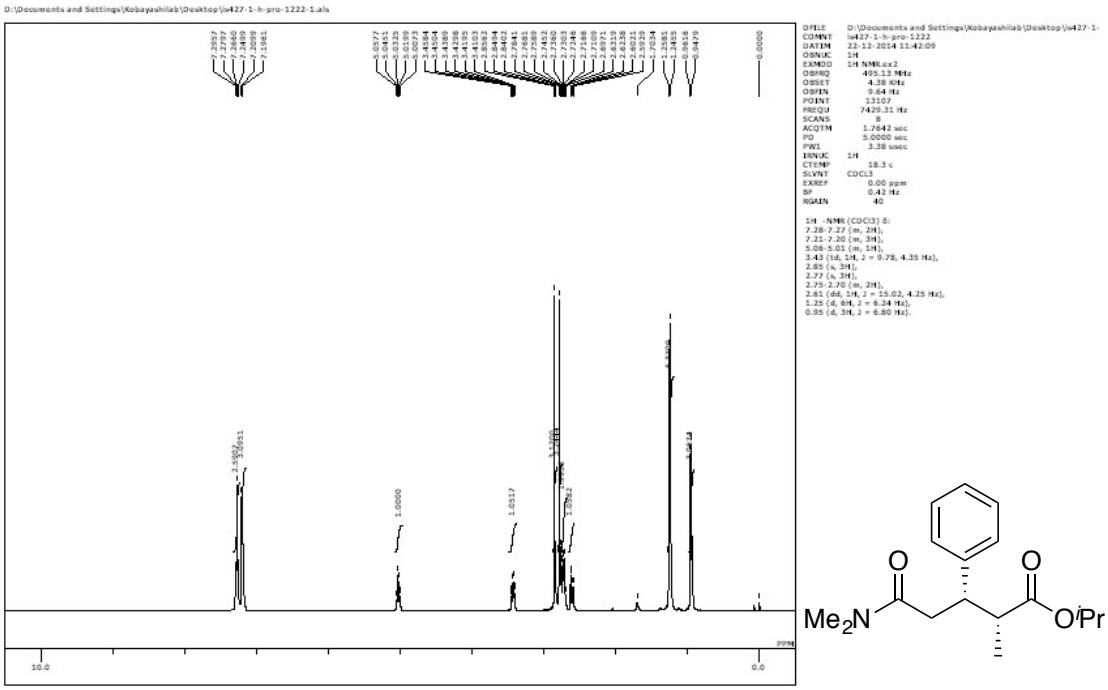
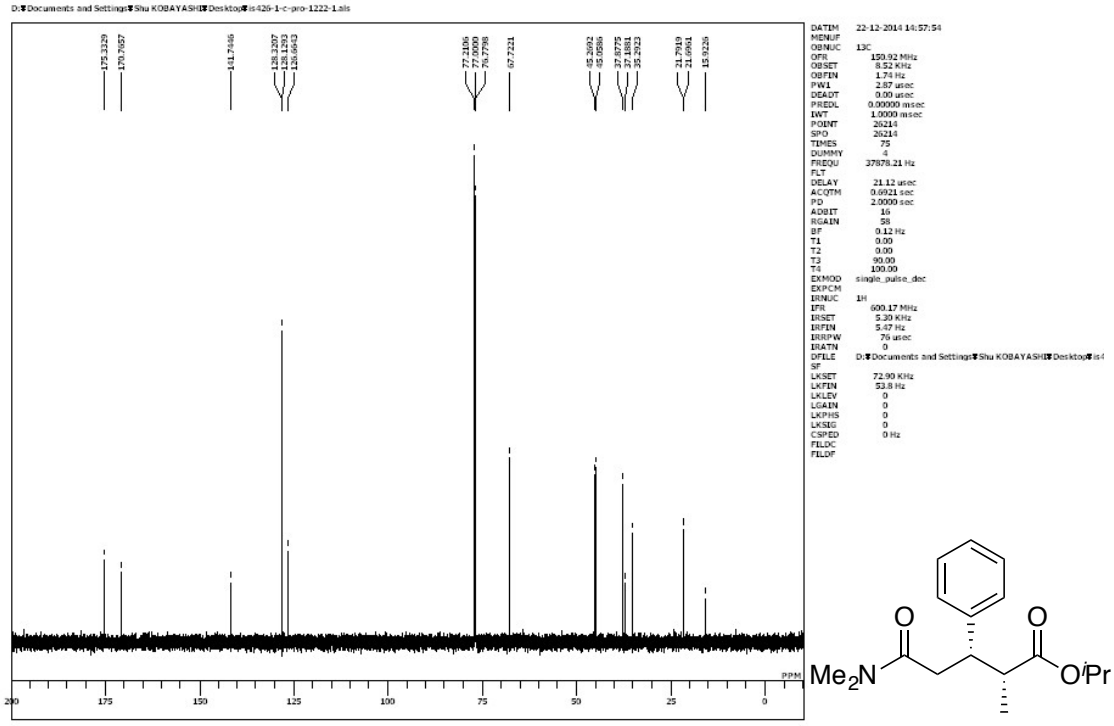
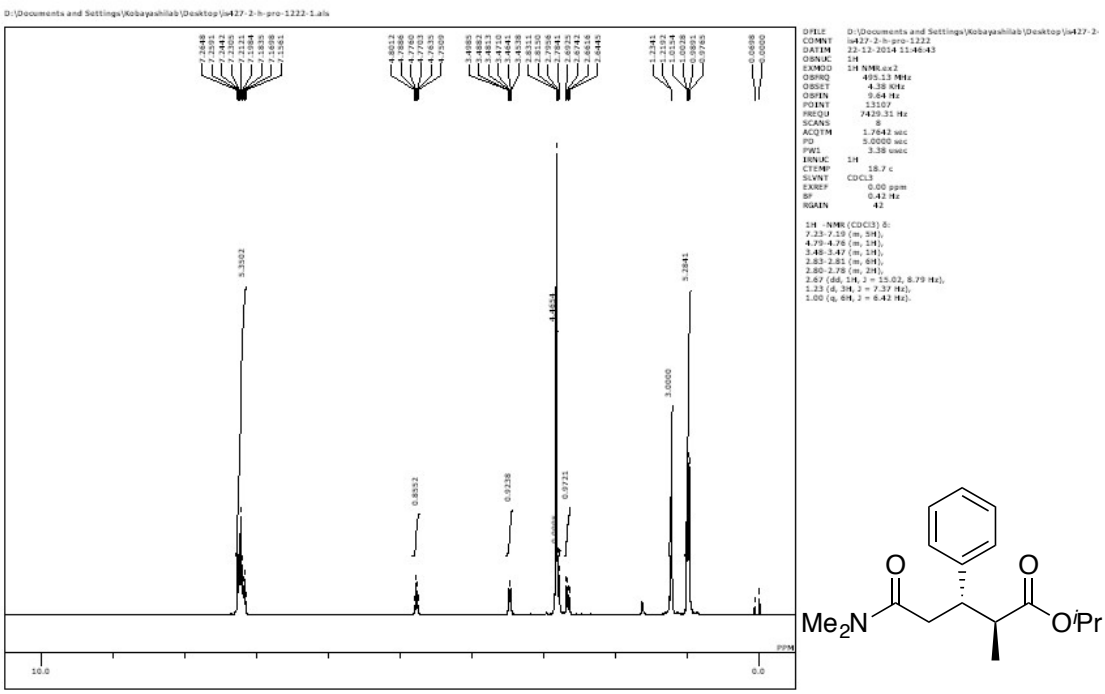
DUMMY 4
FREQU 37878.21 Hz
DELAY 21.12 usec
ACQTM 0.6921 sec
PD 2.0000 sec
ADBIT 16
RGAIN 58
BF 0.12 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRPW 76 usec
IRATN 0
SF
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
PPM
Me2N
O
O
OtBu

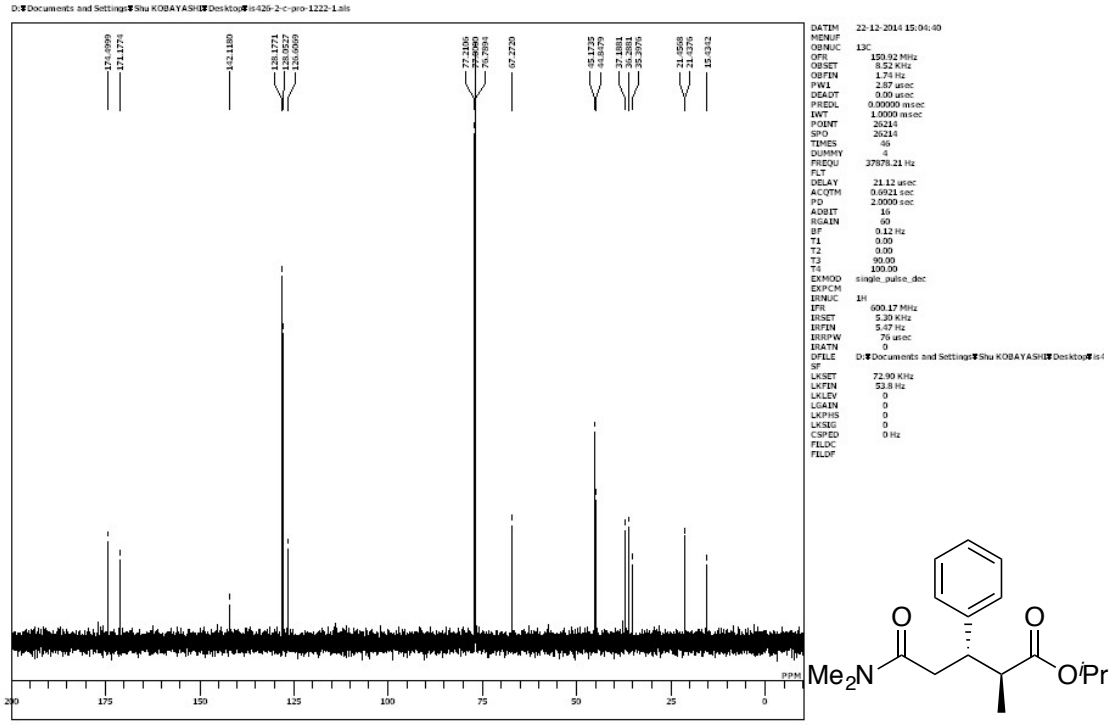

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is421-h-pro-1225-1.als
DATIM 25-12-2014 10:09:28
OBNUC 1H
OFR 600.17 MHz
OBSET 5.30 KHz
OBFIN 5.47 Hz
PW1 6.30 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 13107
SPO 13107
TIMES 8
DUMMY 1
FREQU 9008.87 Hz
DELAY 10.88 usec
ACQTM 1.4549 sec
PD 2.0000 sec
ADBIT 16
RGAIN 42
BF 0.12 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
DFILE D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is4
SF
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
0.1383
0.1569
0.6902
2.7908
3.1348
1.8991
0.9922
2.3883
3.0000
PPM
O
O
Me2N
OMe

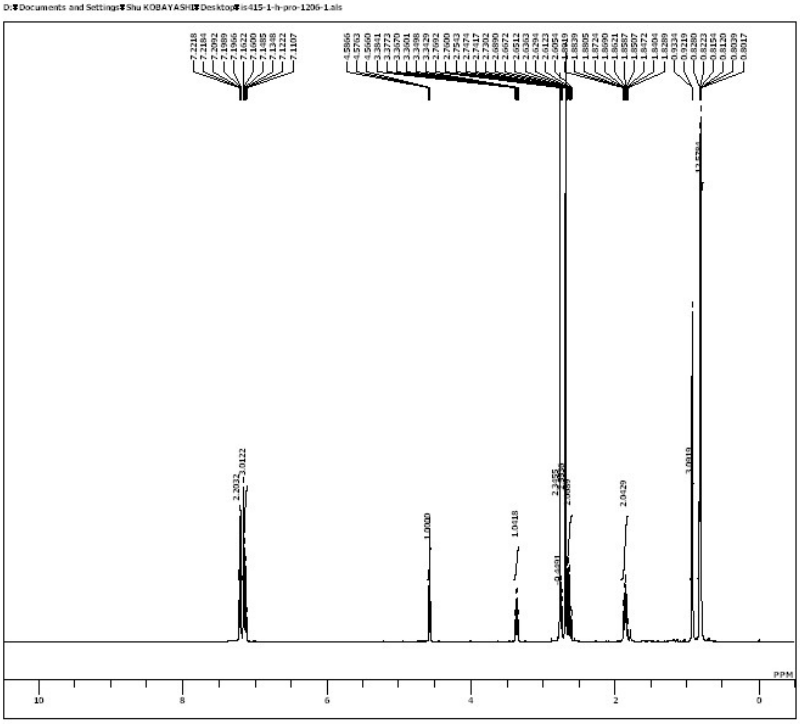

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is421-c-pro-0117-1.als
DATIM 17-01-2016 22:38:05
OBNUC 13C
OFR 150.92 MHz
OBSET 8.52 KHz
OBFIN 1.74 Hz
PW1 3.92 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 20970
SPO 20970
TIMES 163
DUMMY 4
FREQU 30302.11 Hz
DELAY 21.12 usec
ACQTM 0.6921 sec
PD 2.0000 sec
ADBIT 16
RGAIN 59
BF 0.62 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
DFILE D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is4
SF
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
PPM
O
O
Me2N
OMe

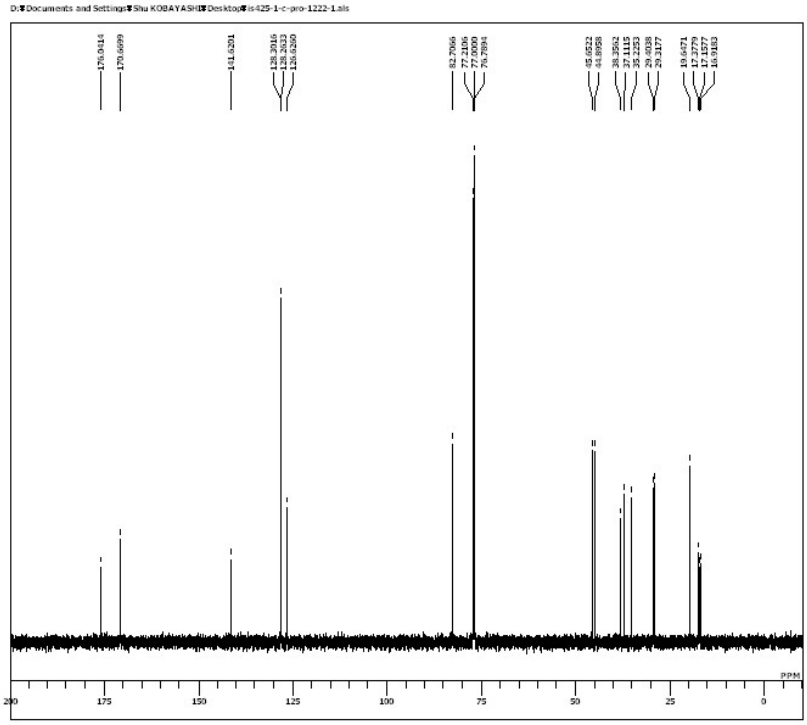

Me2N
O
O
O
iPr

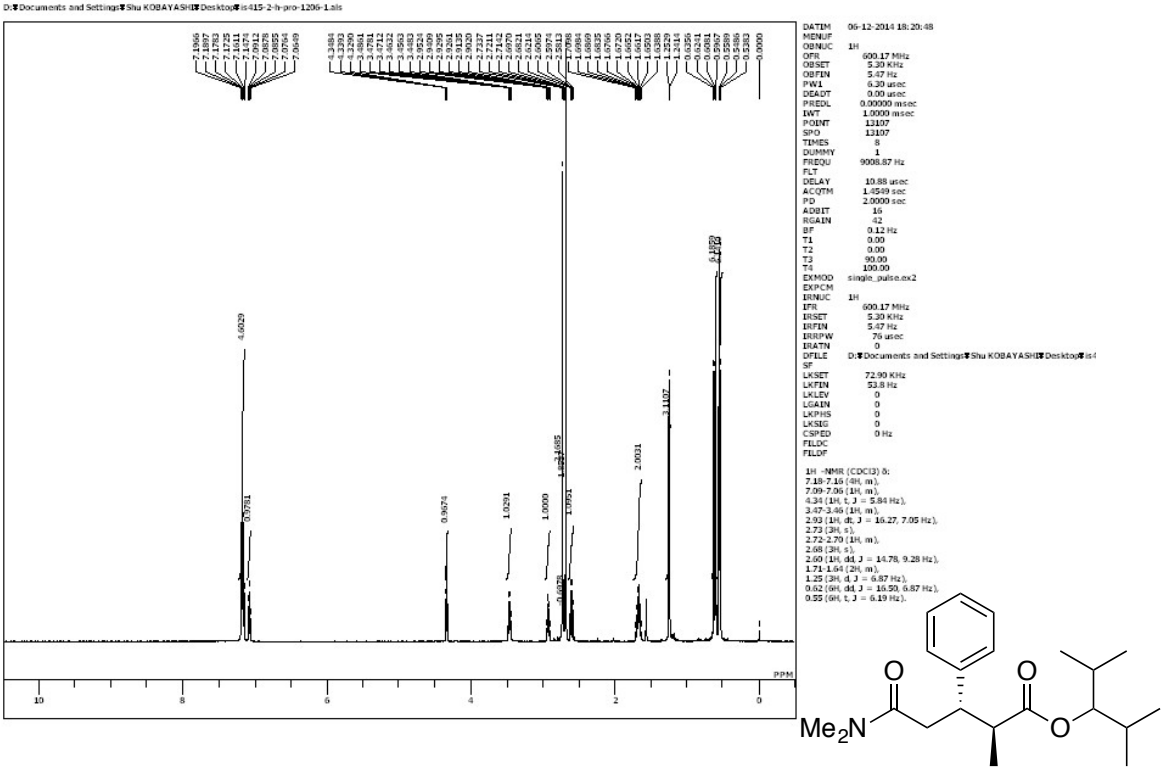

Me2N
O
O
O
iPr

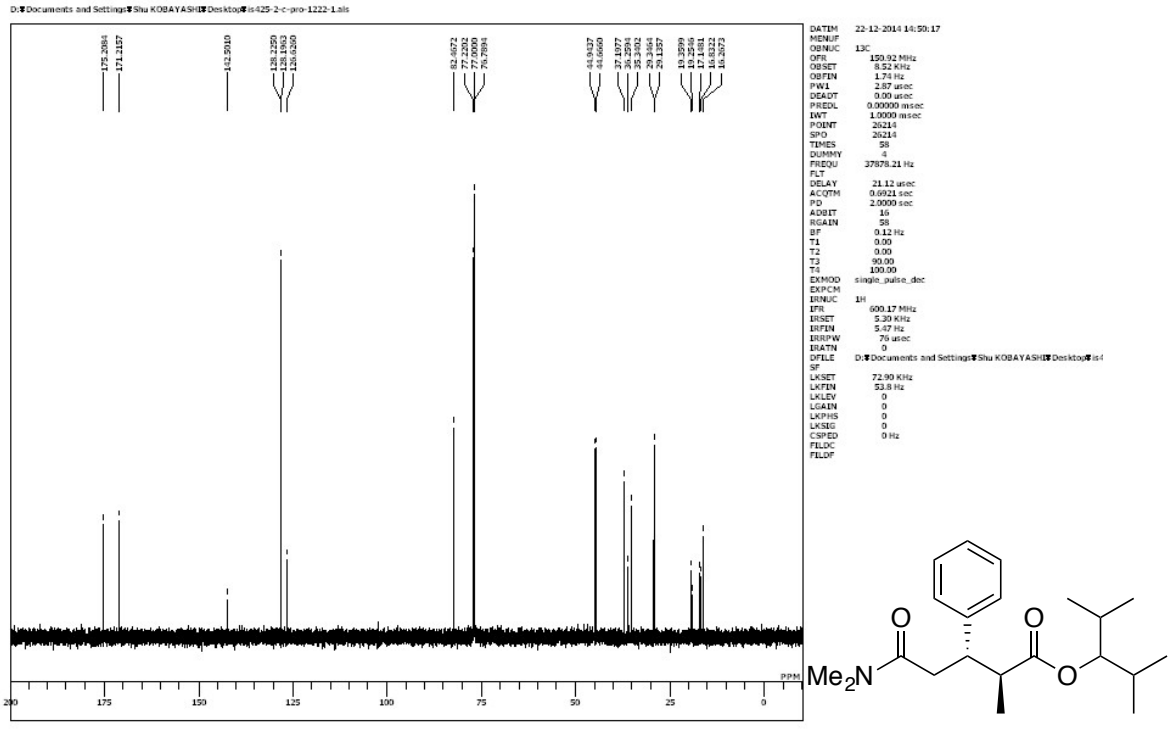

Me2N
O
O
OiPr

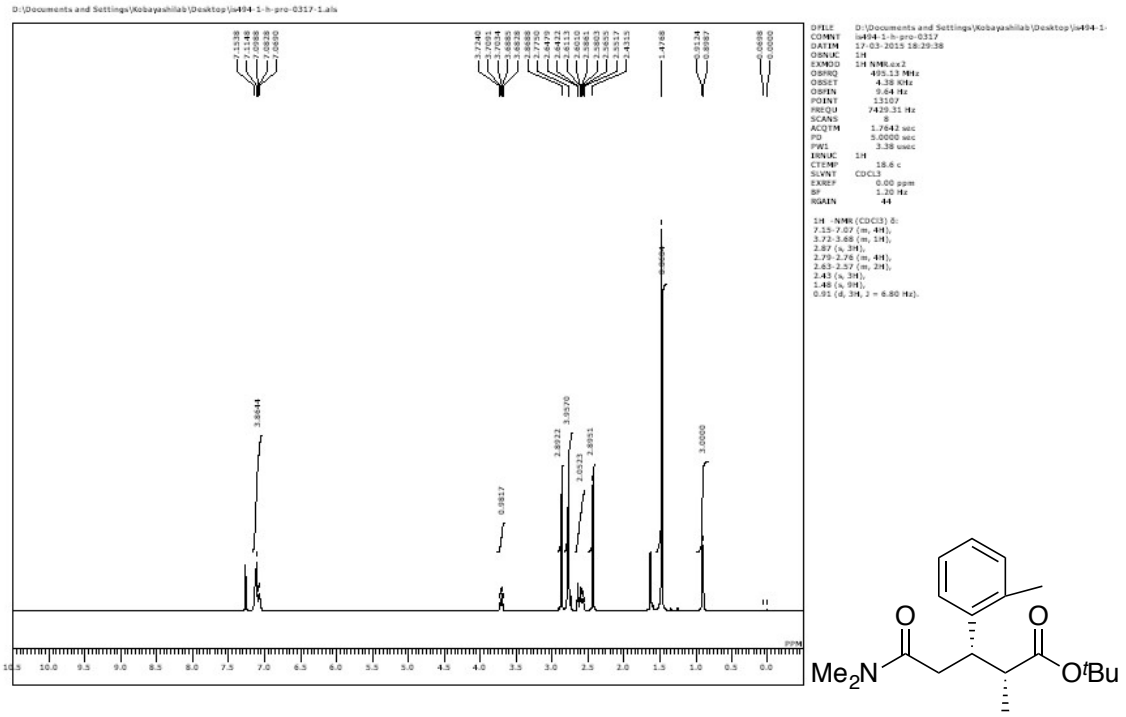

Me2N
O
O
OiPr

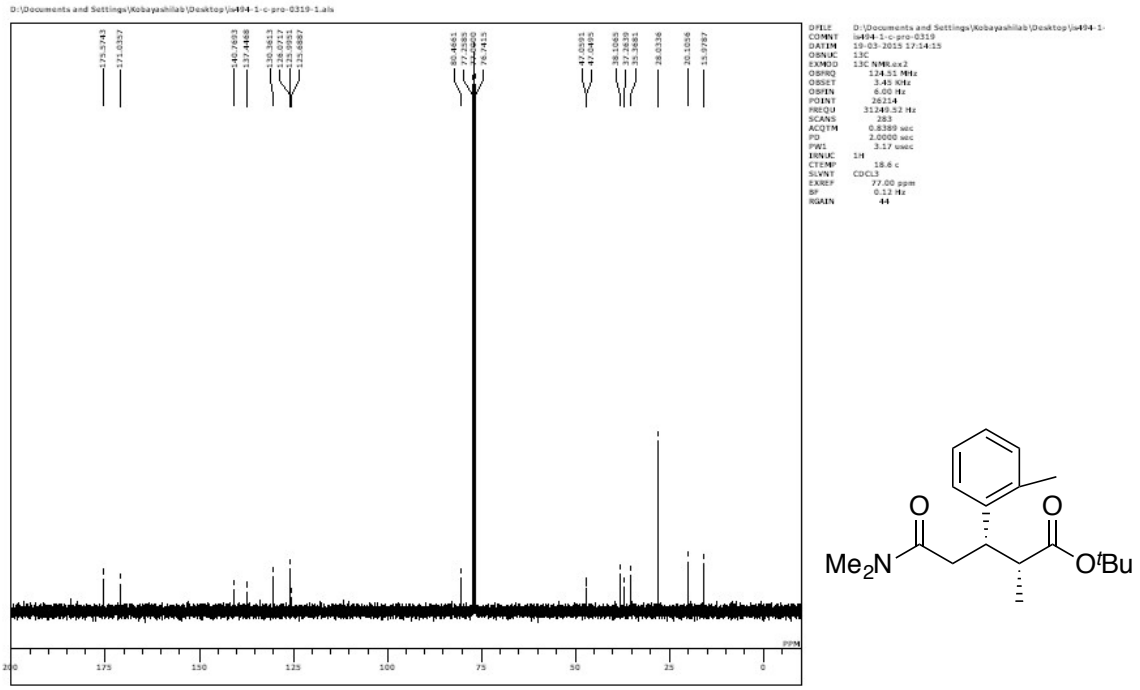

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is415-1-h-pro-1206-1.als
DATIM 06-12-2014 18:17:11
MENUF
OBNUC 1H
OFR 600.17 MHz
OBSET 5.30 KHz
OBFIN 5.47 Hz
PW1 6.30 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 13107
SPO 13107
TIMES 8
DUMMY 1
FREQU 9008.87 Hz
FLT
DELAY 10.88 usec
ACQTM 1.4549 sec
PD 2.0000 sec
ADBIT 16
RGAIN 36
BF 0.12 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
DFILE D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is4
SF
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
1H -NMR (CDCl3) δ:
7.22-7.29 (2H, m),
7.15-7.12 (3H, m),
4.58 (1H, t, J = 6.19 Hz),
3.36 (1H, td, J = 10.31, 4.12 Hz),
2.77 (3H, s),
2.75-2.73 (1H, m),
2.69 (3H, s),
2.65-2.62 (2H, m),
1.89-1.83 (2H, m),
0.93 (3H, d, J = 6.87 Hz),
0.82-0.81 (13H, m).
PPM
Me2N
O
O
O

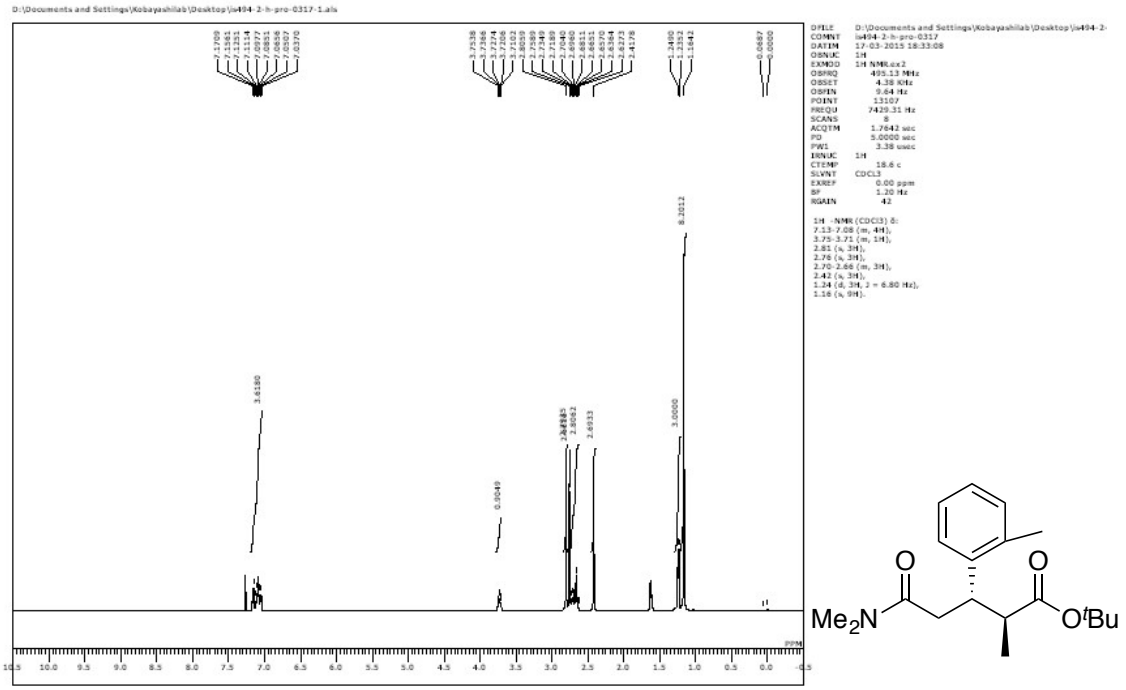

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is425-1-c-pro-1222-1.als
DATIM 22-12-2014 14:30:05
MENUF
OBNUC 13C
OFR 150.92 MHz
OBSET 8.52 KHz
OBFIN 1.74 Hz
PW1 2.87 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 26214
SPO 26214
TIMES 48
DUMMY 4
FREQU 37878.21 Hz
FLT
DELAY 21.12 usec
ACQTM 0.6921 sec
PD 2.0000 sec
ADBIT 16
RGAIN 60
BF 1.20 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
DFILE D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is4
SF
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
PPM
Me2N
O
O
O

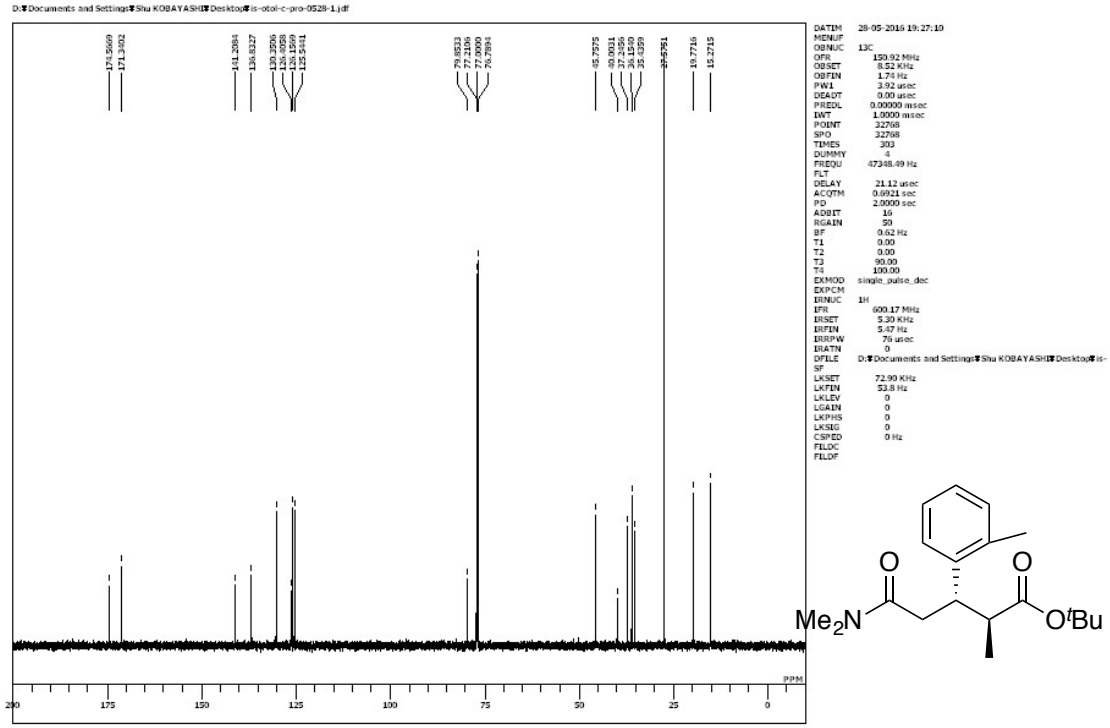

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is415-2-h-pro-1206-1.als
DATIM 06-12-2014 18:20:48
OBNUC 1H
OFR 600.17 MHz
OBSET 5.30 KHz
OBFIN 5.47 Hz
PW1 6.30 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 13107
SPO 13107
TIMES 8
DUMMY 1
FREQU 9008.87 Hz
DELAY 10.88 usec
ACQTM 1.4549 sec
PD 2.0000 sec
ADBIT 16
RGAIN 42
BF 0.12 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
1H -NMR (CDCl3) δ:
7.18-7.16 (4H, m),
7.09-7.06 (1H, m),
4.34 (1H, t, J = 5.84 Hz),
3.47-3.46 (1H, m),
2.93 (1H, dt, J = 16.27, 7.05 Hz),
2.73 (3H, s),
2.72-2.70 (1H, m),
2.68 (3H, s),
2.60 (1H, dd, J = 14.78, 9.28 Hz),
1.71-1.64 (2H, m),
1.25 (3H, d, J = 6.87 Hz),
0.62 (6H, dd, J = 16.50, 6.87 Hz),
0.55 (6H, t, J = 6.19 Hz).
PPM
Me2N
O
O
O

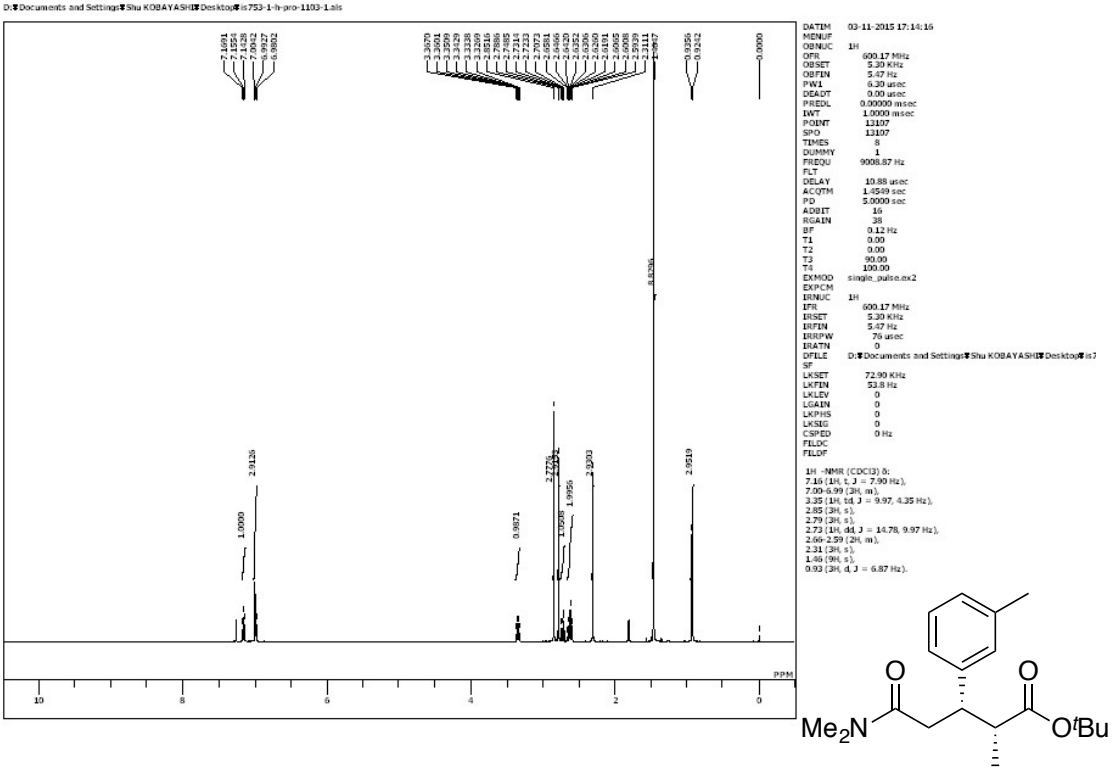

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is425-2-c-pro-1222-1.als
DATIM 22-12-2014 14:50:17
OBNUC 13C
OFR 150.92 MHz
OBSET 8.52 KHz
OBFIN 1.74 Hz
PW1 2.87 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 26214
SPO 26214
TIMES 58
DUMMY 4
FREQU 37878.21 Hz
DELAY 21.12 usec
ACQTM 0.6921 sec
PD 2.0000 sec
ADBIT 16
RGAIN 58
BF 0.12 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
PPM
Me2N
O
O
O

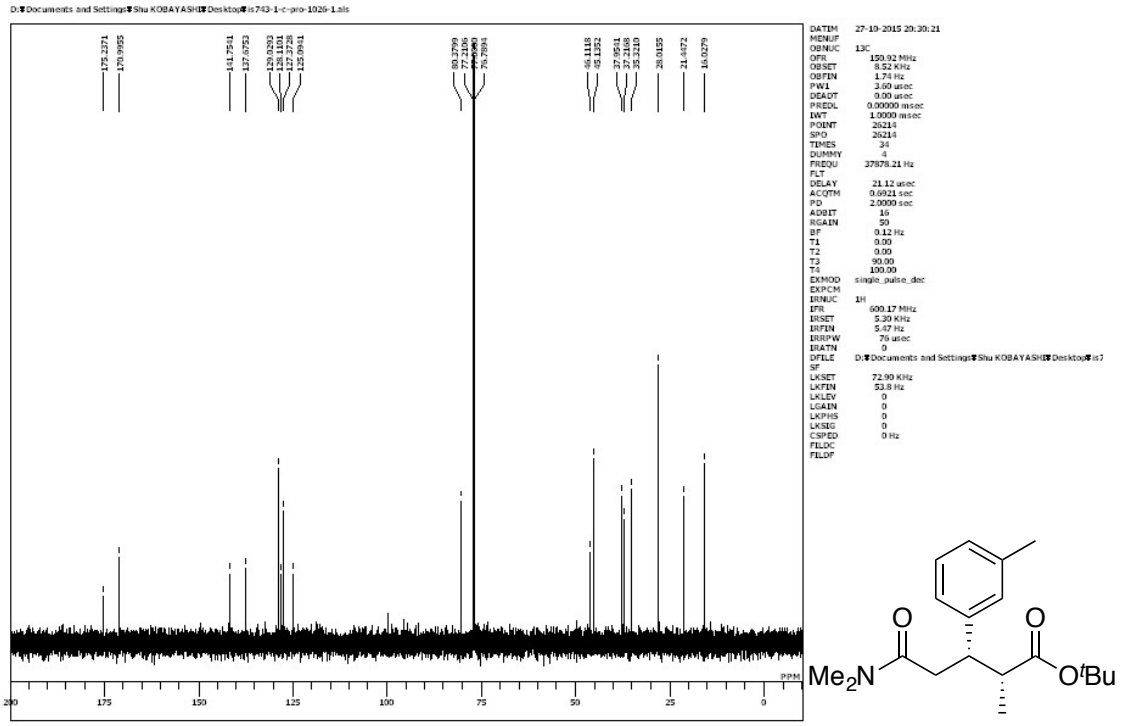

Me2N
O
O
OtBu

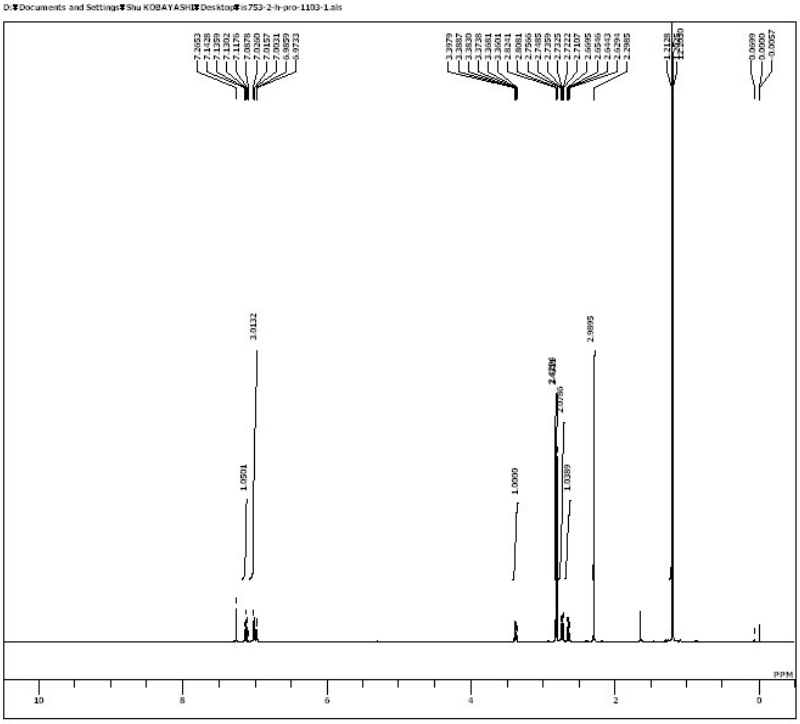

Me2N
O
O
OtBu

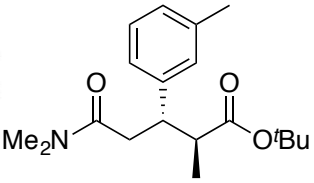

Me2N
O
O
OtBu

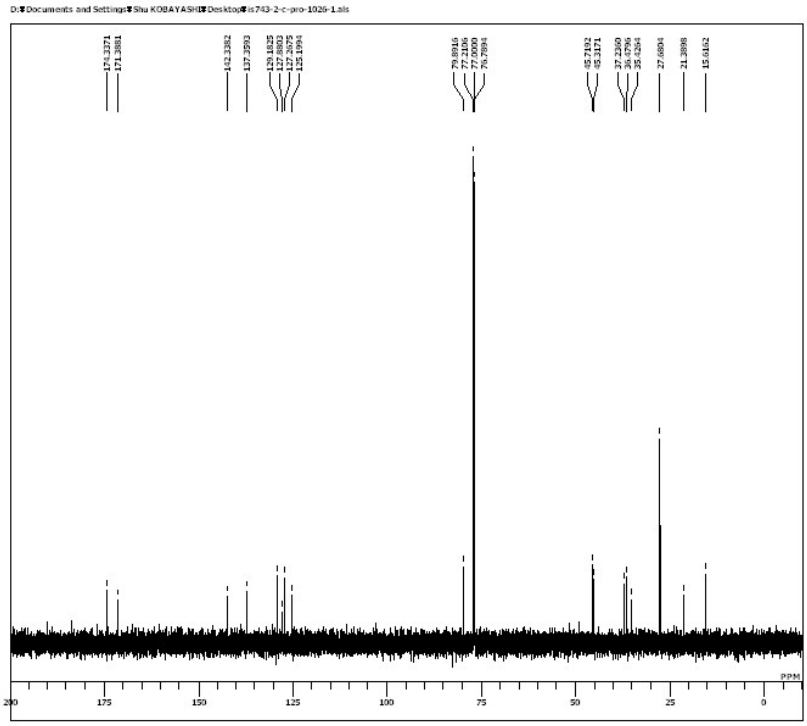

Me2N
O
O
OtBu

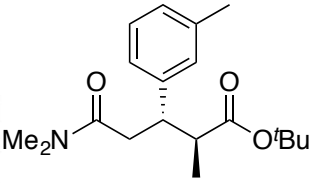

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is753-1-h-pro-1103-1.als
DATIM 03-11-2015 17:14:16
OBNUC 1H
OFR 600.17 MHz
OBSET 5.30 KHz
OBFIN 5.47 Hz
PW1 6.30 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 13107
SPO 13107
TIMES 8
DUMMY 1
FREQU 9008.87 Hz
DELAY 10.88 usec
ACQTM 1.4549 sec
PD 5.0000 sec
AD8IT 16
RGAIN 38
BF 0.12 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
DFILE D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is7
SF
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
1H -NMR (CDCl3) δ:
7.16 (1H, t, J = 7.90 Hz),
7.00-6.99 (3H, m),
3.35 (1H, td, J = 9.97, 4.35 Hz),
2.85 (3H, s),
2.79 (3H, s),
2.73 (1H, dd, J = 14.78, 9.97 Hz),
2.66-2.59 (2H, m),
2.31 (3H, s),
1.46 (9H, s),
0.93 (3H, d, J = 6.87 Hz).
PPM
Me2N
O
O
OtBu

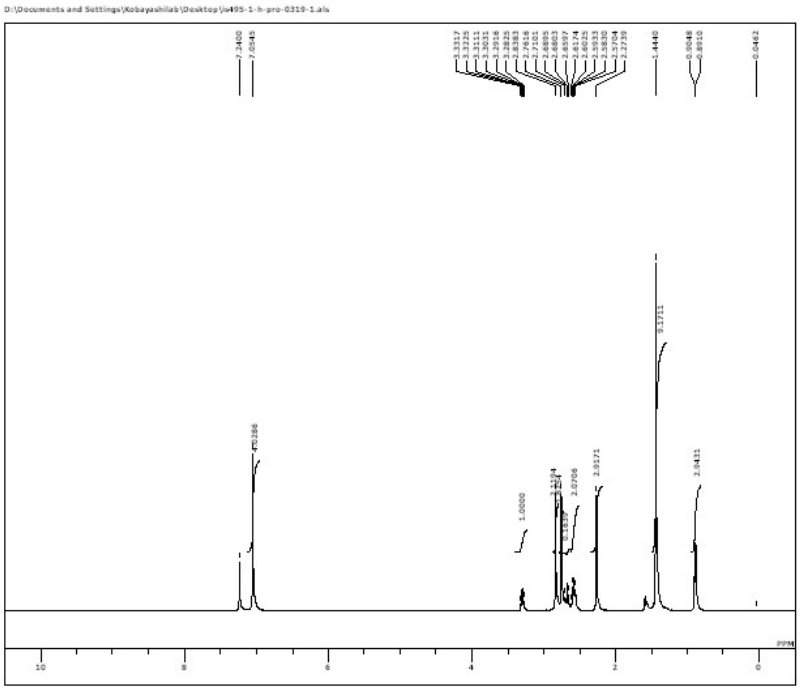

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is743-1-c-pro-1026-1.als
DATIM 27-10-2015 20:30:21
OBNUC 13C
OFR 150.92 MHz
OBSET 8.52 KHz
OBFIN 1.74 Hz
PW1 3.60 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 26214
SPO 26214
TIMES 34
DUMMY 4
FREQU 37878.21 Hz
DELAY 21.12 usec
ACQTM 0.6921 sec
PD 2.0000 sec
AD8IT 16
RGAIN 50
BF 0.12 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
DFILE D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is7
SF
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
PPM
Me2N
O
O
OtBu

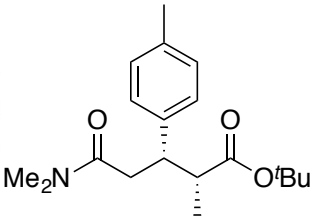


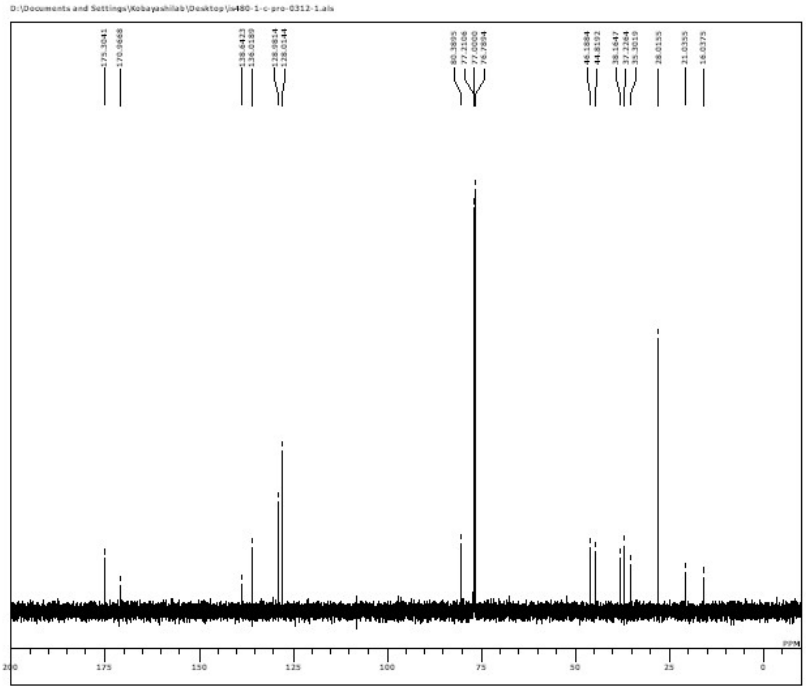


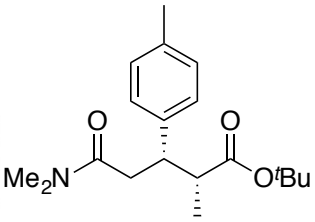


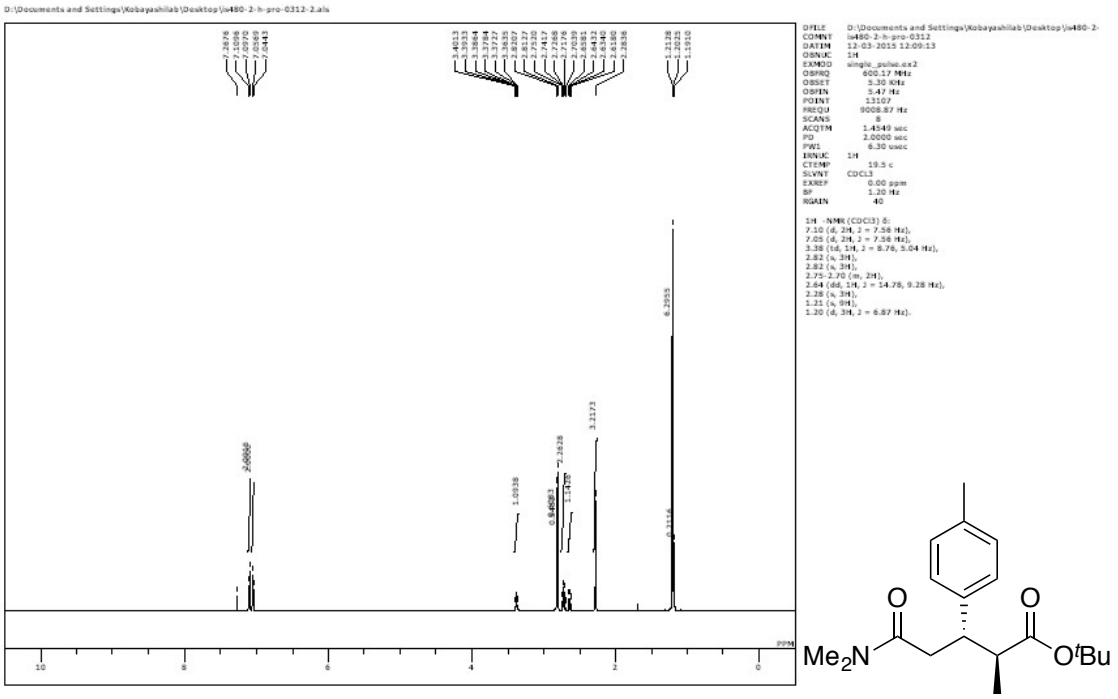


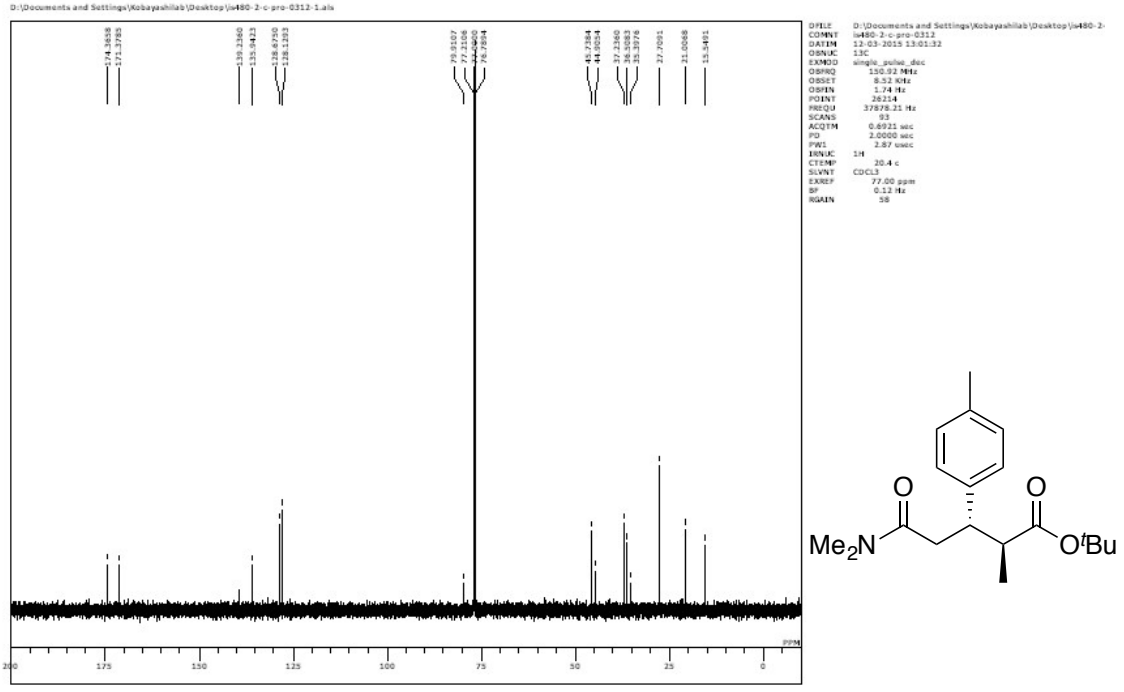


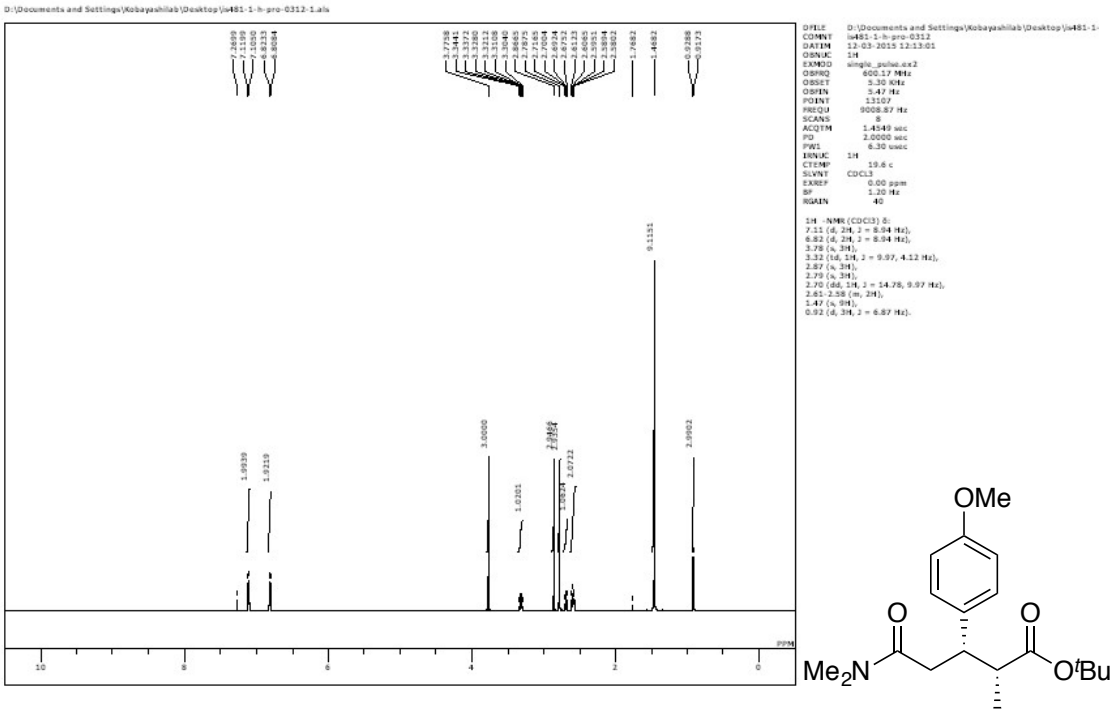

O
O
Me2N
OtBu

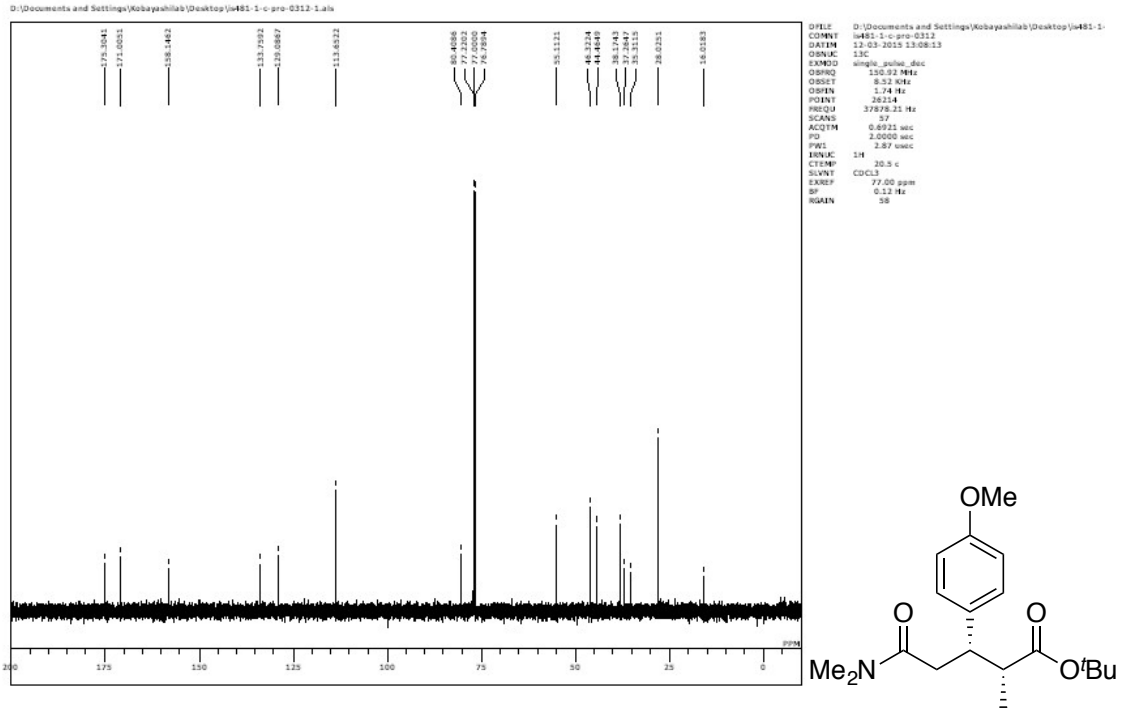


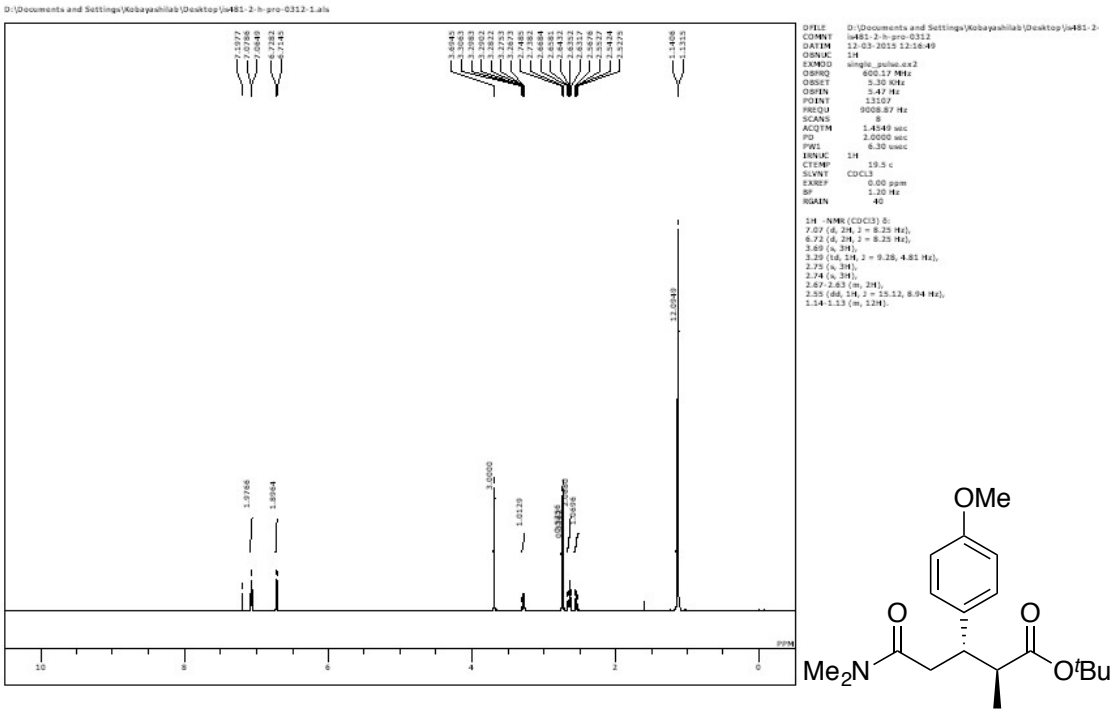

O
O
Me2N
OtBu

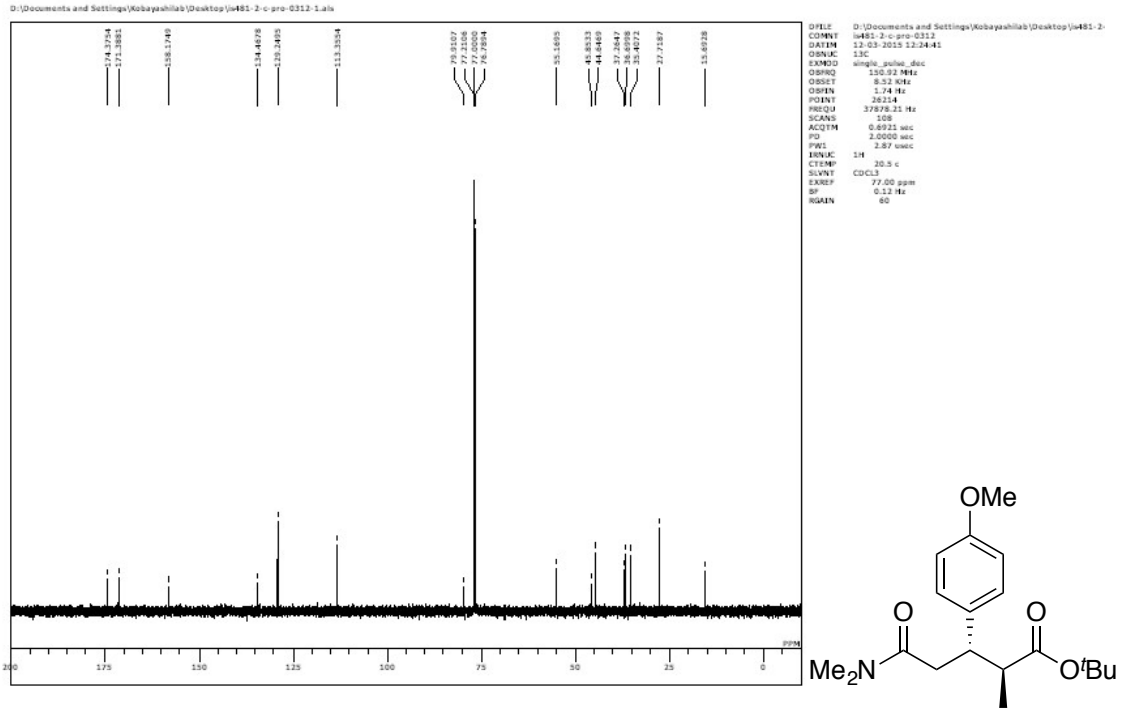

Me2N
O
O
OtBu

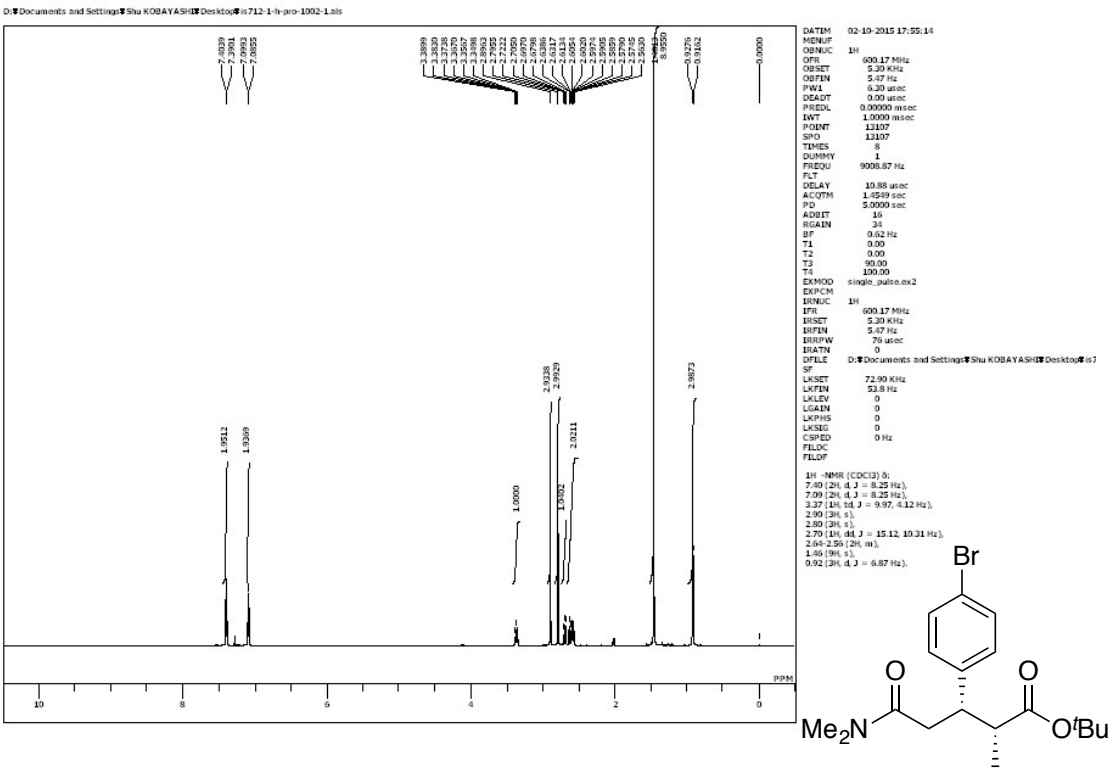

Me2N
O
O
OtBu

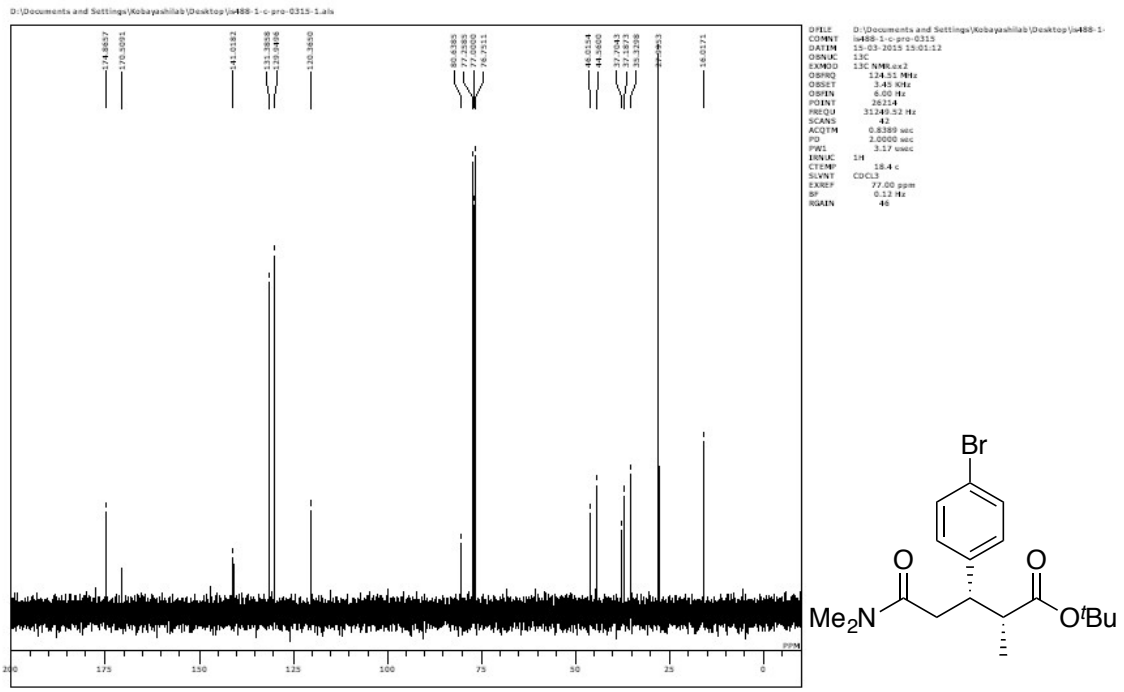

OMe
O
O
Me2N
OtBu

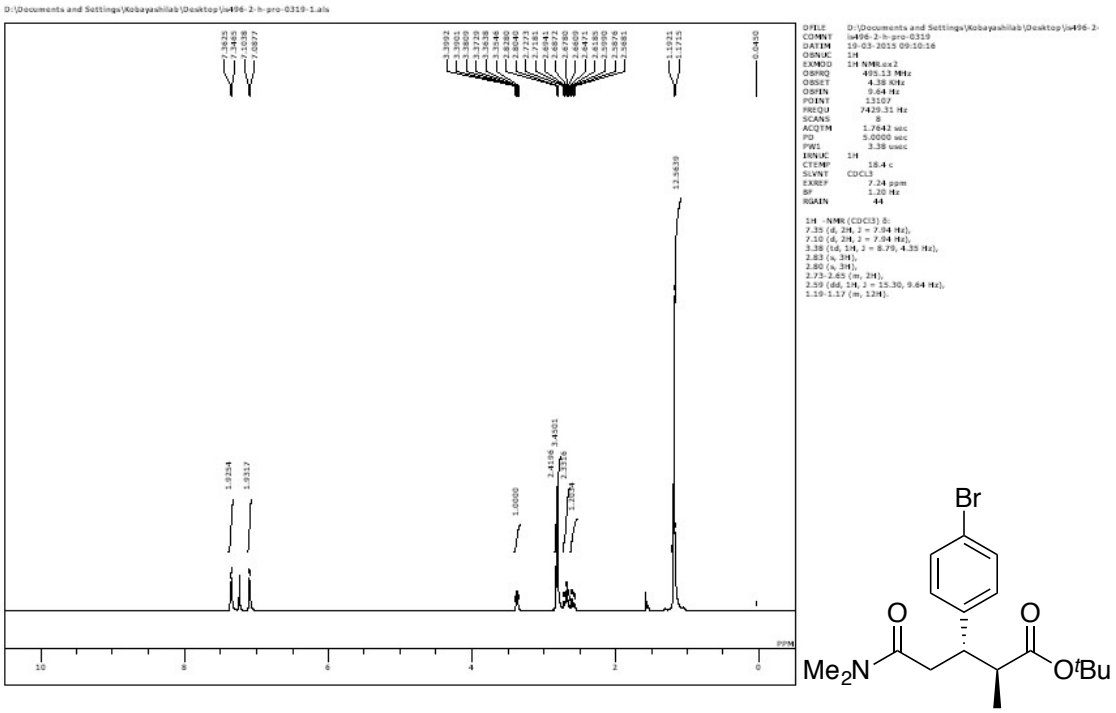

OMe
O
O
Me2N
OtBu

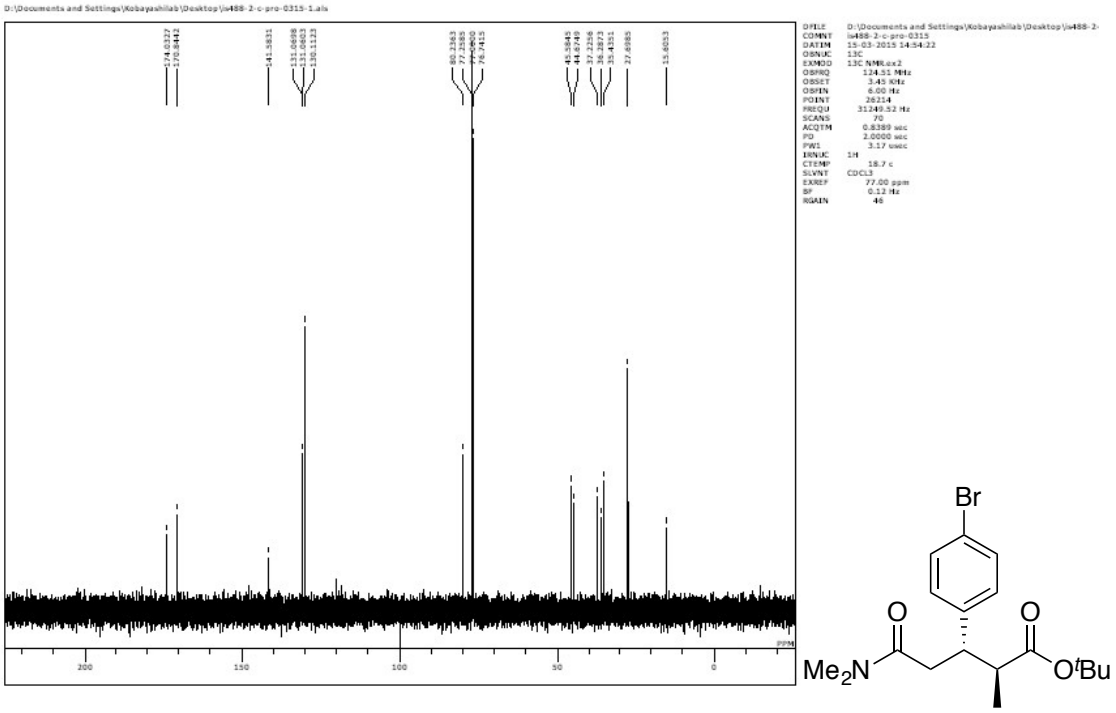

OMe
O
O
Me2N
OtBu

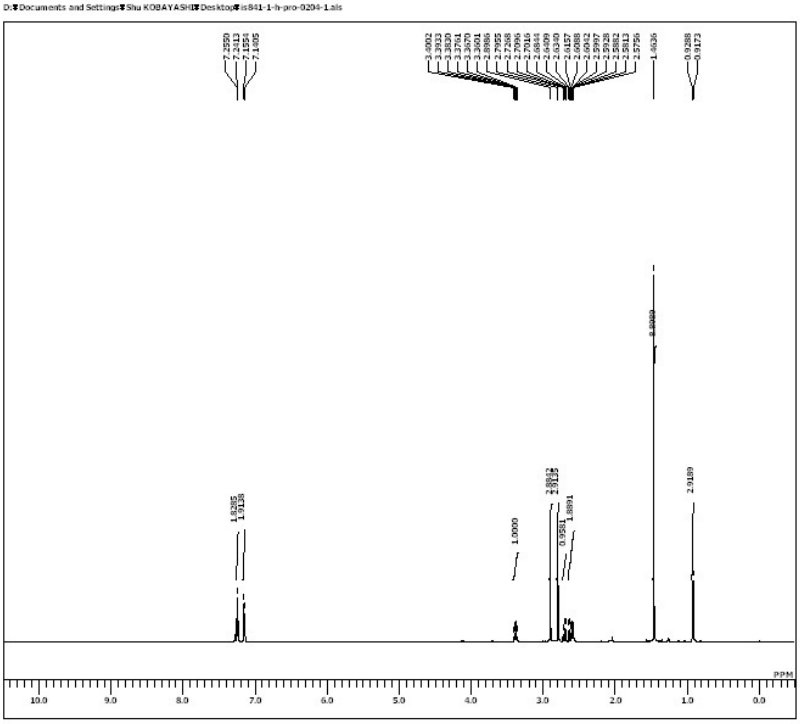

OMe
O
O
Me2N
OtBu

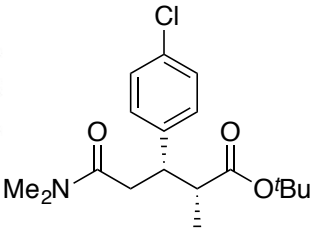

Br
O
O
Me2N
OtBu

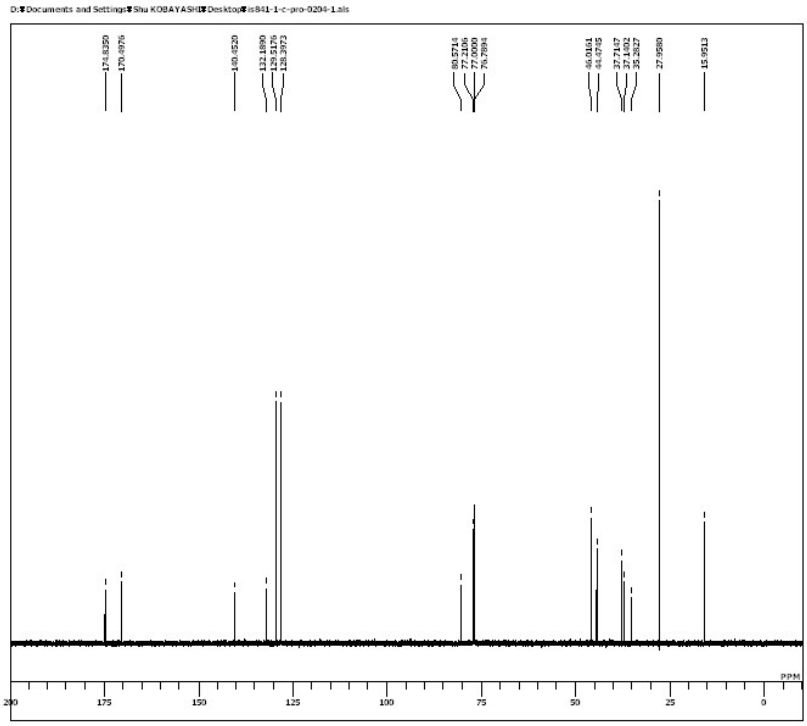

Br
O
O
Me2N
OtBu

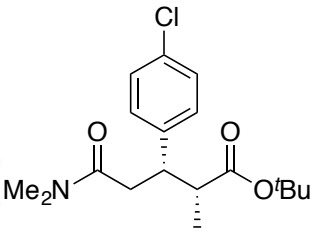

Br
O
O
Me2N
OtBu

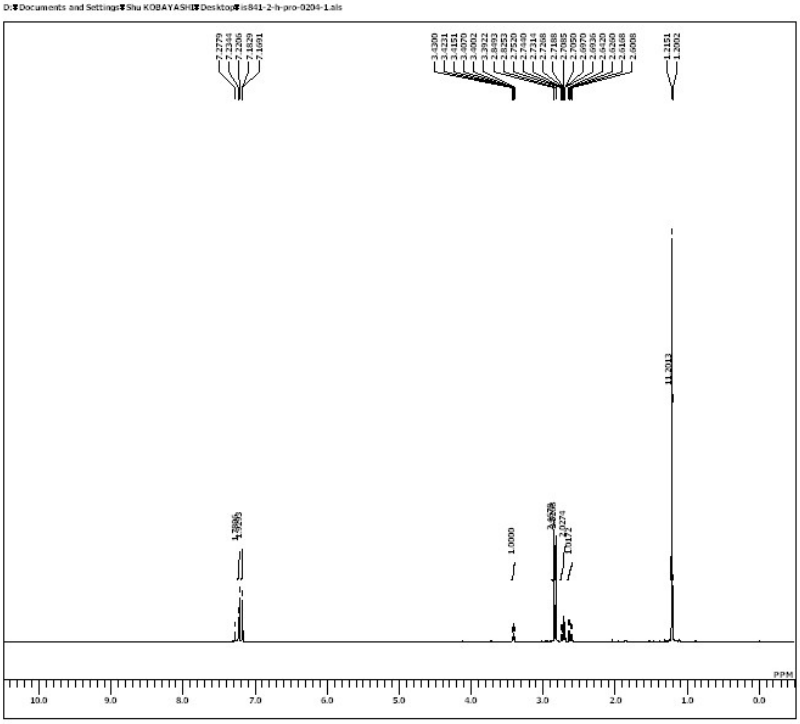

Br
O
O
Me2N
OtBu




Cl
O
O
Me2N
OtBu

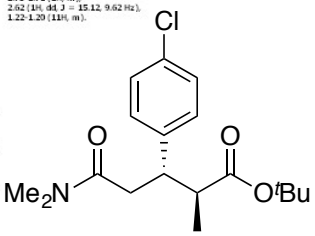


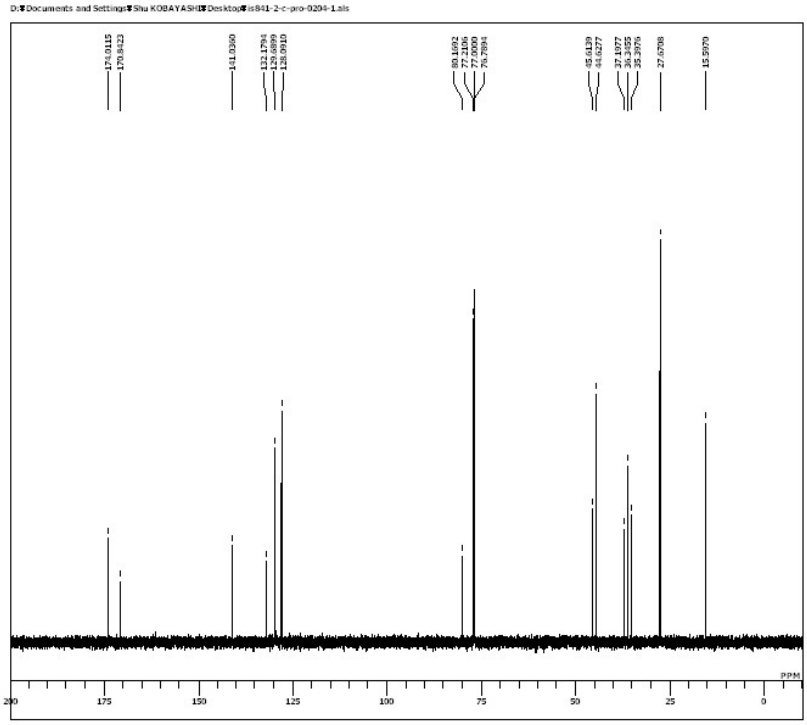

Cl
O
O
Me2N
OtBu



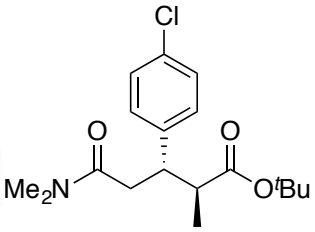

```
DATIM    04-02-2016 17:06:56
MENUF
OBNUC    1H
OFR        600.17 MHz
OBSET        5.30 KHz
OBFIN        5.47 Hz
PW1          6.73 usec
DEADT        0.00 usec
PREDL     0.00000 msec
IWT       1.0000 msec
POINT       13107
SPO         13107
TIMES           8
DUMMY           1
FREQU     9008.87 Hz
FLT
DELAY       10.88 usec
ACQTM     1.4549 sec
PD        5.0000 sec
ADBIT           16
RGAIN           36
BF           0.12 Hz
T1           0.00
T2           0.00
T3          90.00
T4         100.00
EXMOD    single_pulse.ex2
EXPCM
IRNUC    1H
IFR        600.17 MHz
IRSET        5.30 KHz
IRFIN        5.47 Hz
IRRPW         76 usec
IRATN            0
DFILE    D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is8
SF
LKSET       72.90 KHz
LKFIN       53.8 Hz
LKLEV            0
LGAIN            0
LKPHS            0
LKSIG            0
CSPED        0 Hz
FILDC
FILDF
```

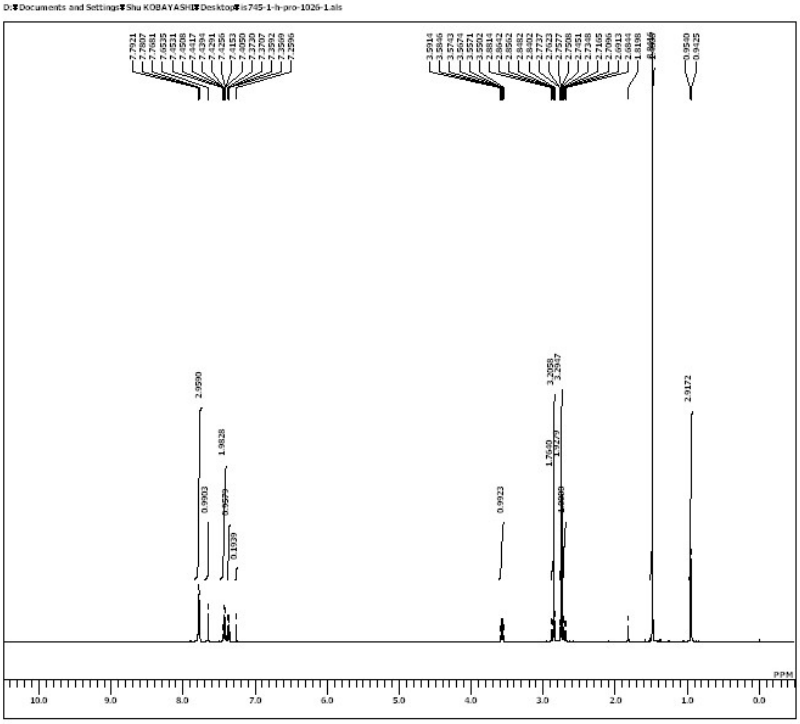
1H -NMR (CDCl3) δ:
7.23 (2H, d, J = 8.25 Hz),
7.18 (2H, d, J = 8.25 Hz),
3.41 (1H, td, J = 9.11, 4.58 Hz),
2.85 (3H, s),
2.83 (3H, s),
2.73-2.71 (2H, m),
2.62 (1H, dd, J = 15.12, 9.62 Hz),
1.22-1.29 (11H, m).





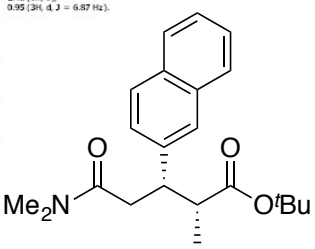

```
DATIM    04-02-2016 17:10:49
MENUF
OBNUC    13C
OFR        150.92 MHz
OBSET        8.52 KHz
OBFIN        1.74 Hz
PW1          2.92 usec
DEADT        0.00 usec
PREDL     0.00000 msec
IWT       1.0000 msec
POINT       26214
SPO         26214
TIMES          72
DUMMY           4
FREQU     37878.21 Hz
FLT
DELAY       21.12 usec
ACQTM     0.6921 sec
PD        2.0000 sec
ADBIT           16
RGAIN           50
BF           0.12 Hz
T1           0.00
T2           0.00
T3          90.00
T4         100.00
EXMOD    single_pulse_dec
EXPCM
IRNUC    1H
IFR        600.17 MHz
IRSET        5.30 KHz
IRFIN        5.47 Hz
IRRPW         76 usec
IRATN            0
DFILE    D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is8
SF
LKSET       72.90 KHz
LKFIN       53.8 Hz
LKLEV            0
LGAIN            0
LKPHS            0
LKSIG            0
CSPED        0 Hz
FILDC
FILDF
```

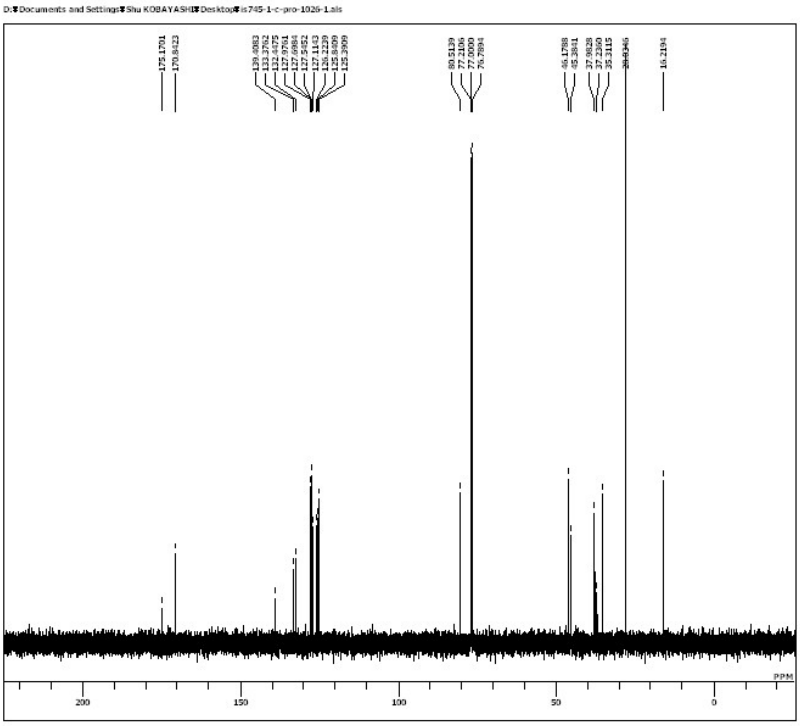




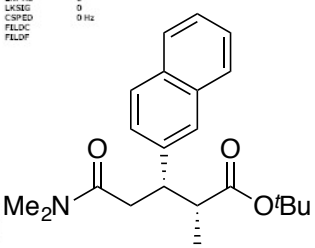

```
DATIM    27-10-2015 14:30:39
MENUF
OBNUC    1H
OFR        600.17 MHz
OBSET        5.30 KHz
OBFIN        5.47 Hz
PW1          6.30 usec
DEADT        0.00 usec
PREDL     0.00000 msec
IWT       1.0000 msec
POINT       13107
SPO         13107
TIMES           8
DUMMY           1
FREQU     9008.87 Hz
FLT
DELAY       10.88 usec
ACQTM     1.4549 sec
PD          5.0000 sec
AD0IT           16
RGAIN           38
BF           0.12 Hz
T1           0.00
T2           0.00
T3          90.00
T4         100.00
EXMOD    single_pulse.ex2
EXPCM
IRNUC    1H
IFR        600.17 MHz
IRSET        5.30 KHz
IRFIN        5.47 Hz
IRRPW       76 usec
IRATN           0
DFILE    D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is7
SF
LKSET       72.90 KHz
LKFIN       53.8 Hz
LKLEV           0
LGAIN           0
LKPHS           0
LKSIG           0
CSPED       0 Hz
FILDC
FILDF
```

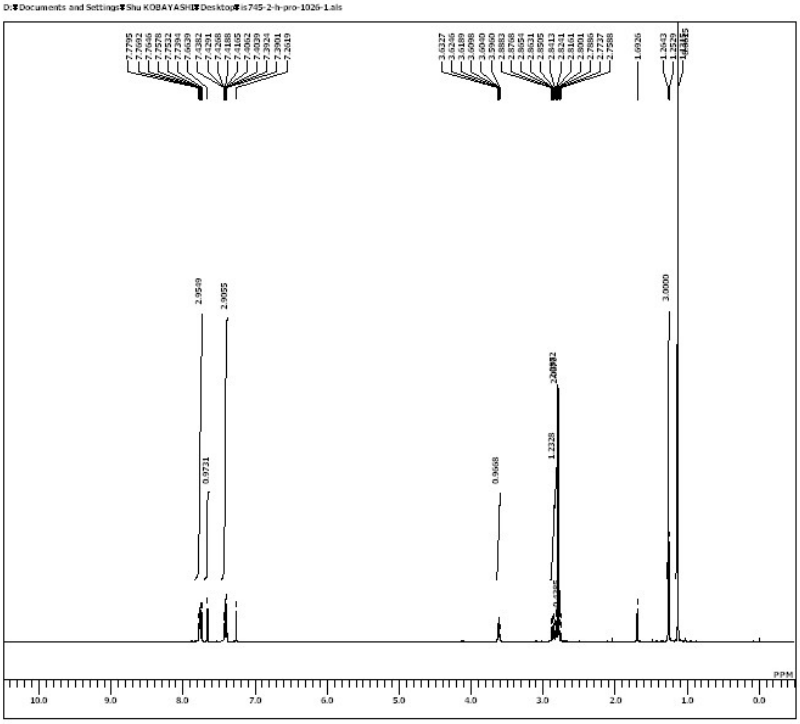
1H -NMR (CDCl3) δ:
7.79-7.77 (3H, m),
7.65 (1H, s),
7.44-7.42 (2H, m),
7.36 (1H, dd, J = 8.25, 1.37 Hz),
3.57 (1H, td, J = 10.31, 4.12 Hz),
2.88-2.84 (1H, m),
2.85 (3H, s),
2.76-2.75 (1H, m),
2.75 (3H, s),
2.70 (1H, dd, J = 15.12, 4.12 Hz),
1.48 (9H, s),
0.95 (3H, d, J = 6.87 Hz).

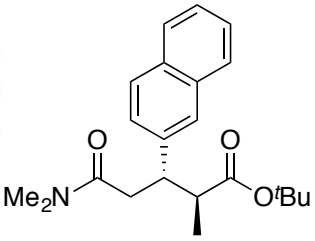


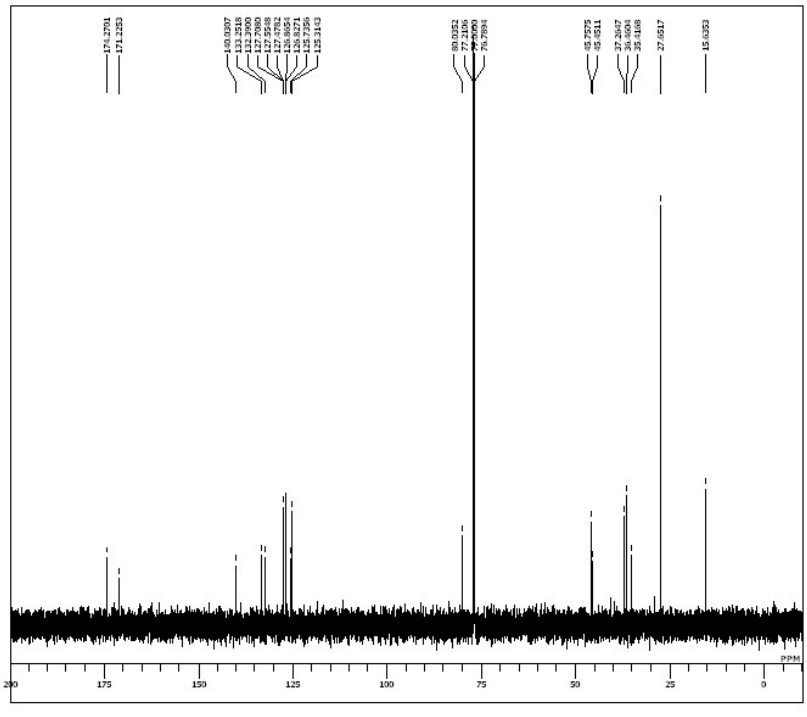


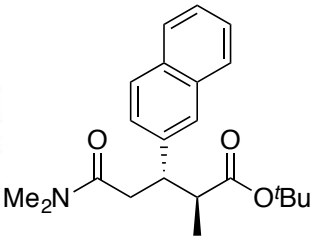

```
DATIM    27-10-2015 21:01:49
MENUF
OBNUC    13C
OFR        150.92 MHz
OBSET        8.52 KHz
OBFIN        1.74 Hz
PW1          3.60 usec
DEADT        0.00 usec
PREDL     0.00000 msec
IWT       1.0000 msec
POINT       26214
SPO         26214
TIMES          32
DUMMY           4
FREQU     37878.21 Hz
FLT
DELAY       21.12 usec
ACQTM     0.6921 sec
PD          2.0000 sec
AD0IT           16
RGAIN           59
BF           0.12 Hz
T1           0.00
T2           0.00
T3          90.00
T4         100.00
EXMOD    single_pulse_dec
EXPCM
IRNUC    1H
IFR        600.17 MHz
IRSET        5.30 KHz
IRFIN        5.47 Hz
IRRPW       76 usec
IRATN           0
DFILE    D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is7
SF
LKSET       72.90 KHz
LKFIN       53.8 Hz
LKLEV           0
LGAIN           0
LKPHS           0
LKSIG           0
CSPED       0 Hz
FILDC
FILDF
```

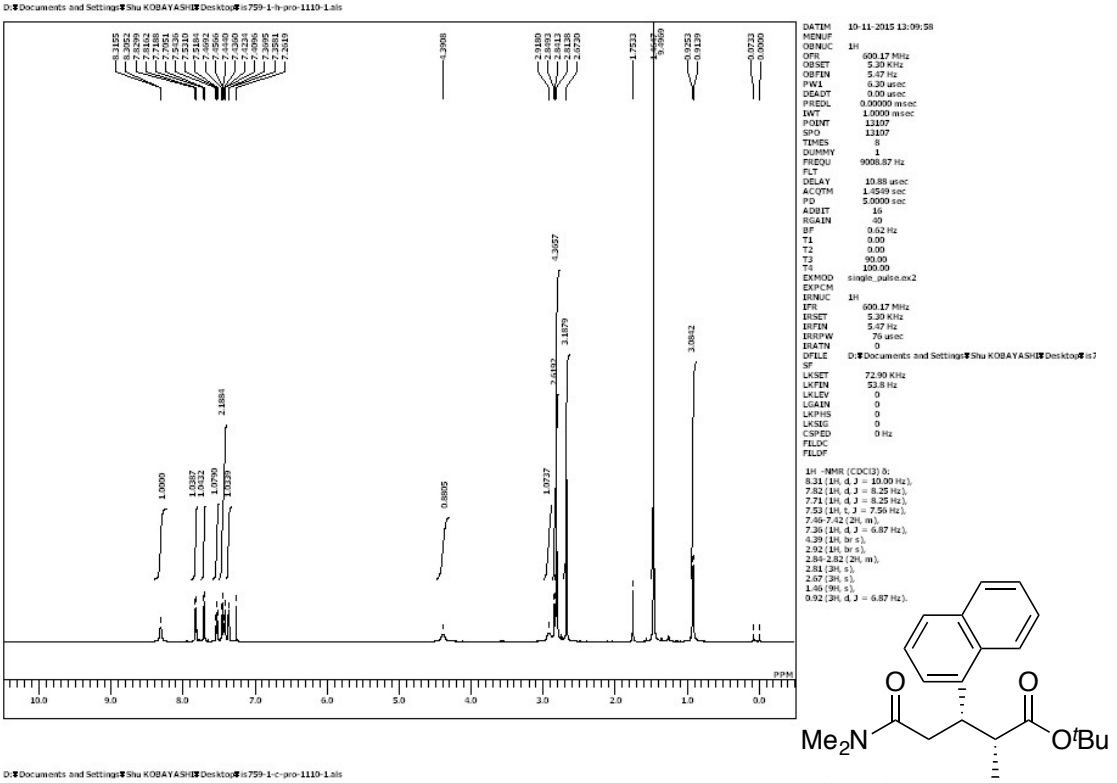


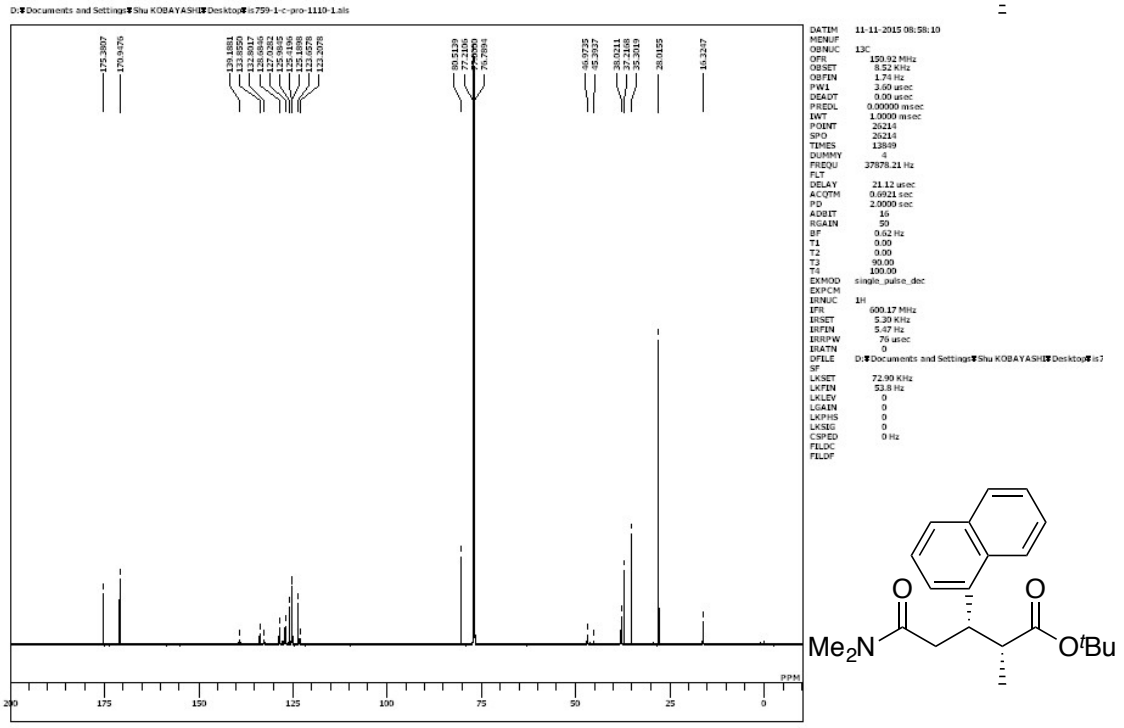


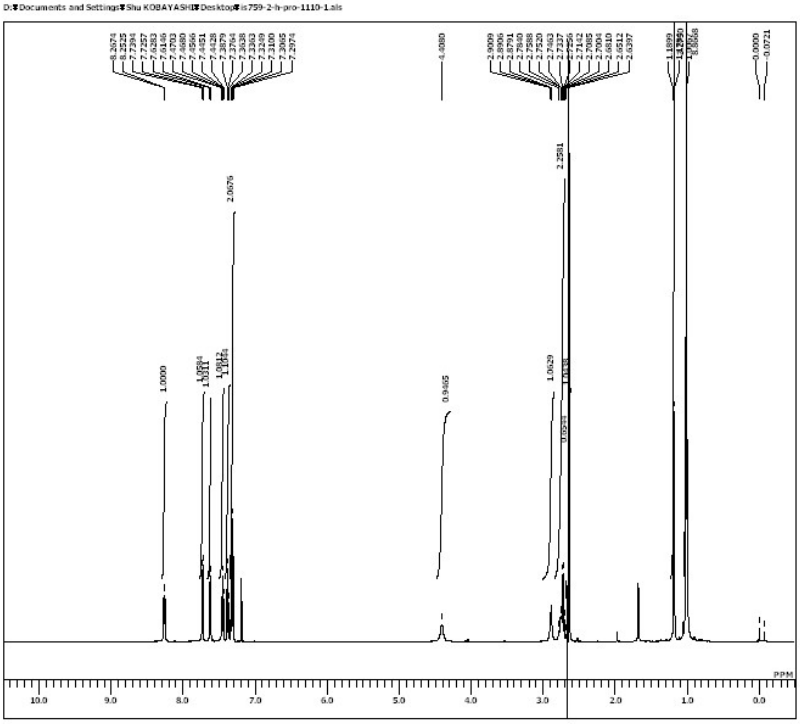

O
O
Me2N
OtBu

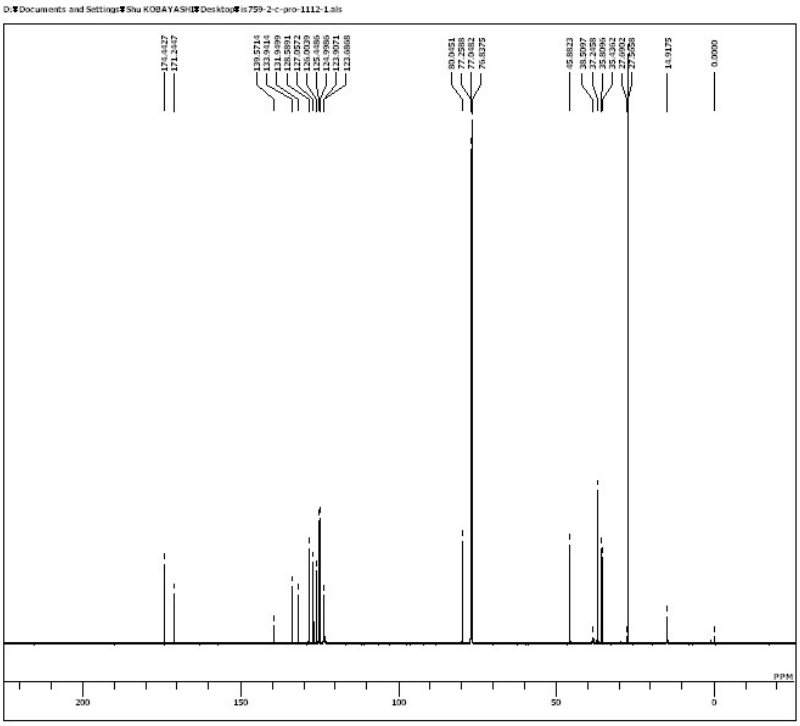


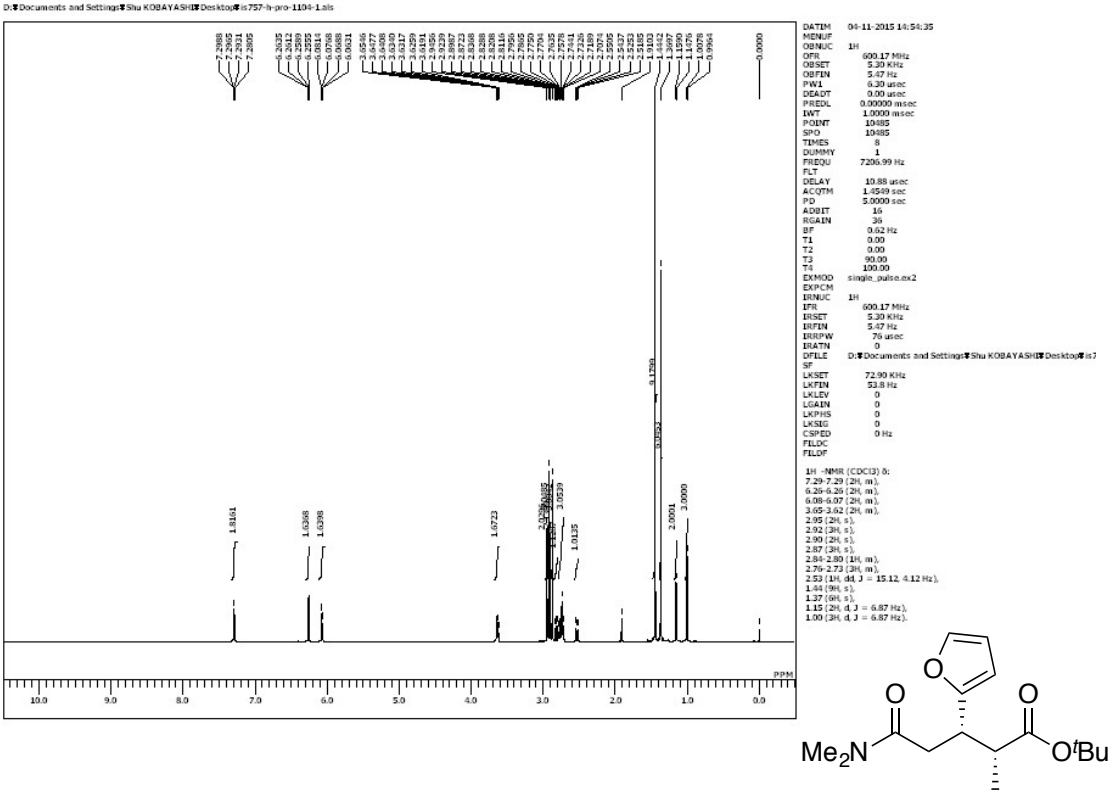

O
O
Me2N
OtBu

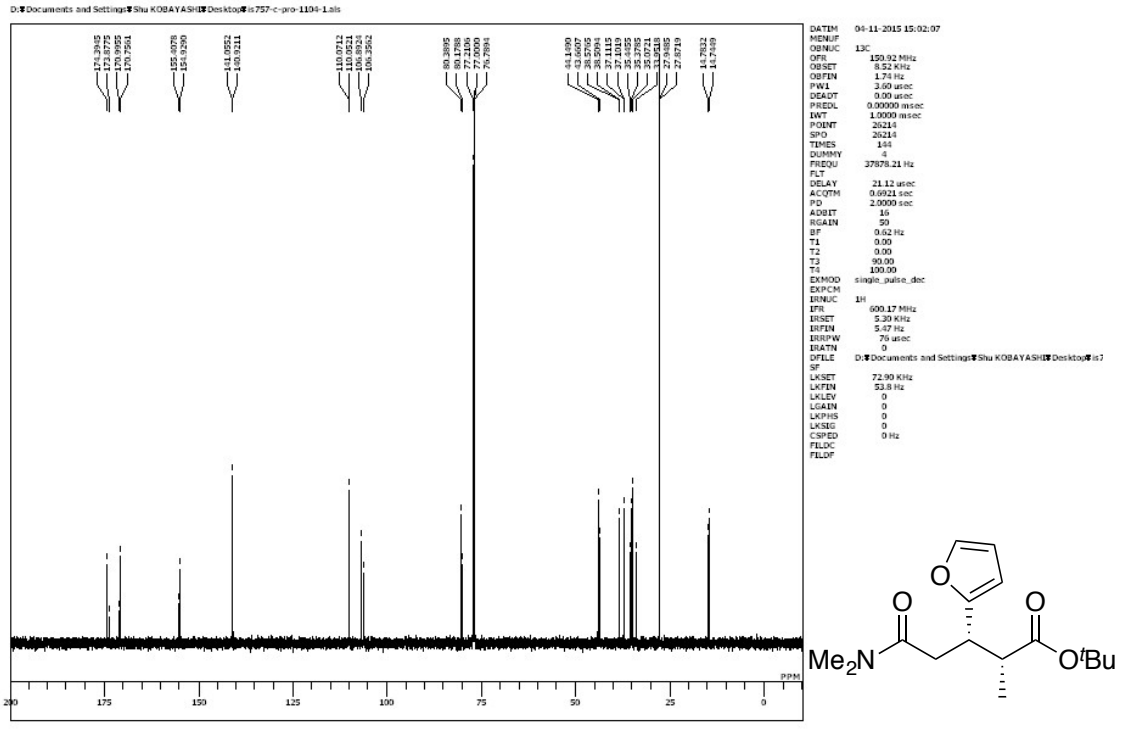

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is759-1-h-pro-1110-1.als
DATIM 10-11-2015 13:09:58
OBNUC 1H
OFR 600.17 MHz
OBSET 5.30 KHz
OBFIN 5.47 Hz
PW1 6.30 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 13107
SPO 13107
TIMES 8
DUMMY 1
FREQU 9008.87 Hz
FLT
DELAY 10.88 usec
ACQTM 1.4549 sec
PD 5.0000 sec
ADBIT 16
RGAIN 40
BF 0.62 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRPW 76 usec
IRATN 0
DFILE D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is7
SF
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
1H -NMR (CDCl3) δ:
8.31 (1H, d, J = 10.00 Hz),
7.82 (1H, d, J = 8.25 Hz),
7.71 (1H, d, J = 8.25 Hz),
7.53 (1H, t, J = 7.56 Hz),
7.46-7.42 (2H, m),
7.36 (1H, d, J = 6.87 Hz),
4.39 (1H, br s),
2.92 (1H, br s),
2.89-2.82 (2H, m),
2.81 (3H, s),
2.67 (3H, s),
1.46 (9H, s),
0.92 (3H, d, J = 6.87 Hz).
PPM
Me2N
O
O
OtBu

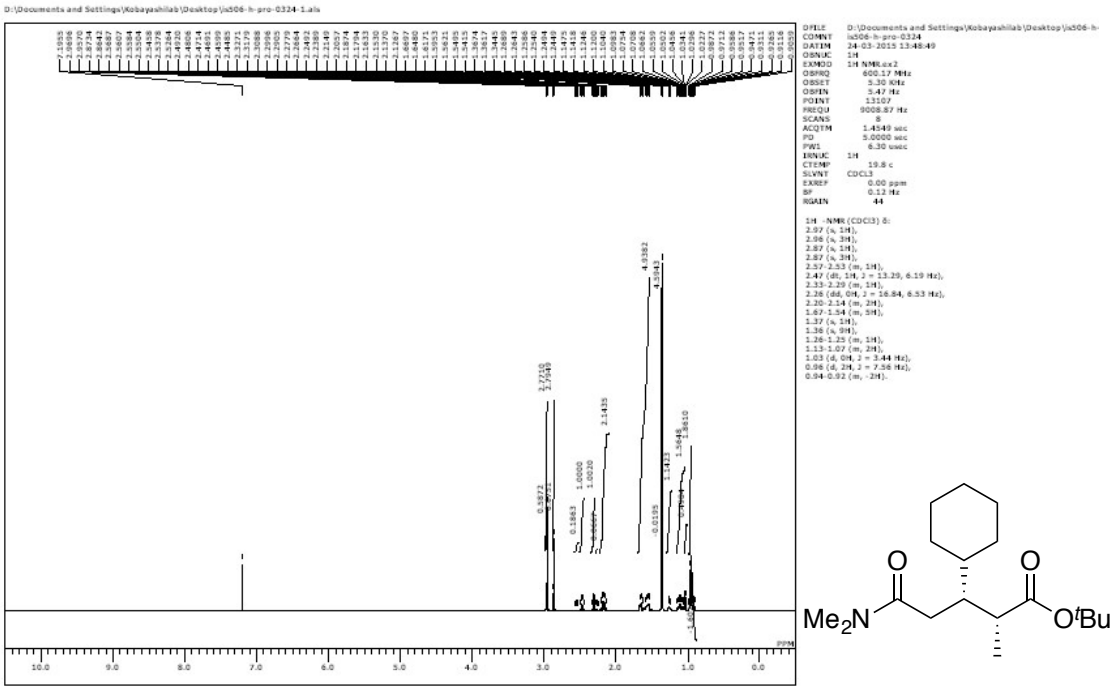

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is759-1-c-pro-1110-1.als
DATIM 11-11-2015 08:58:10
OBNUC 13C
OFR 150.92 MHz
OBSET 8.52 KHz
OBFIN 1.74 Hz
PW1 3.60 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 26214
SPO 26214
TIMES 13849
DUMMY 4
FREQU 37878.21 Hz
FLT
DELAY 21.12 usec
ACQTM 0.6921 sec
PD 2.0000 sec
ADBIT 16
RGAIN 50
BF 0.62 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRPW 76 usec
IRATN 0
DFILE D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is7
SF
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
PPM
Me2N
O
O
OtBu

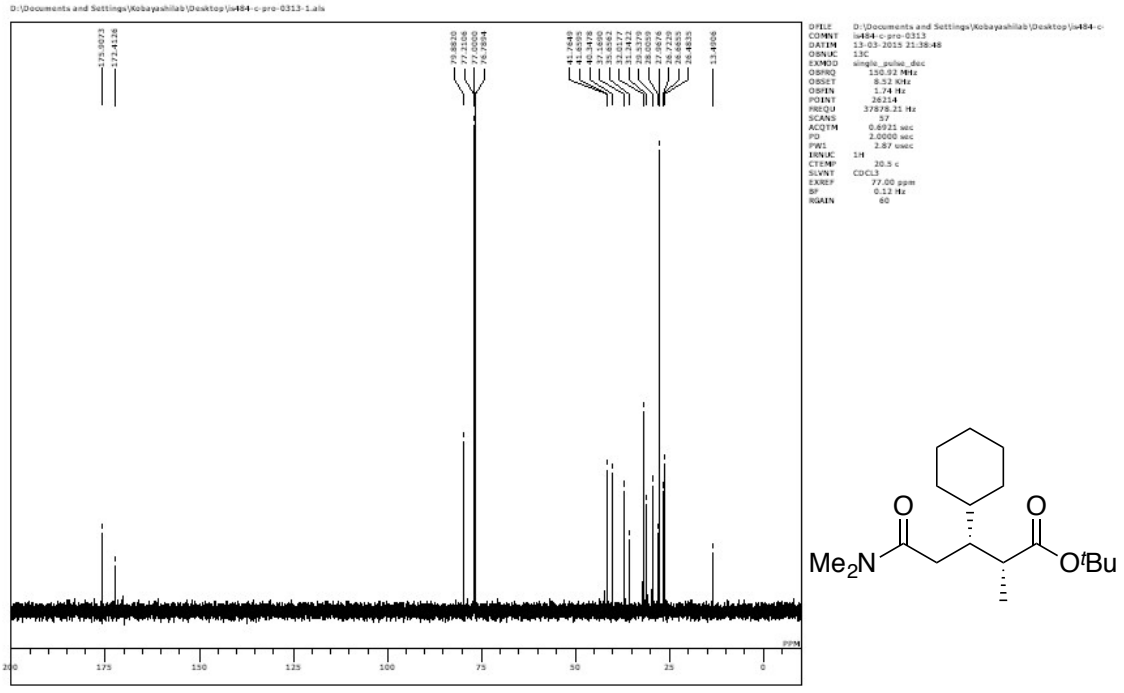


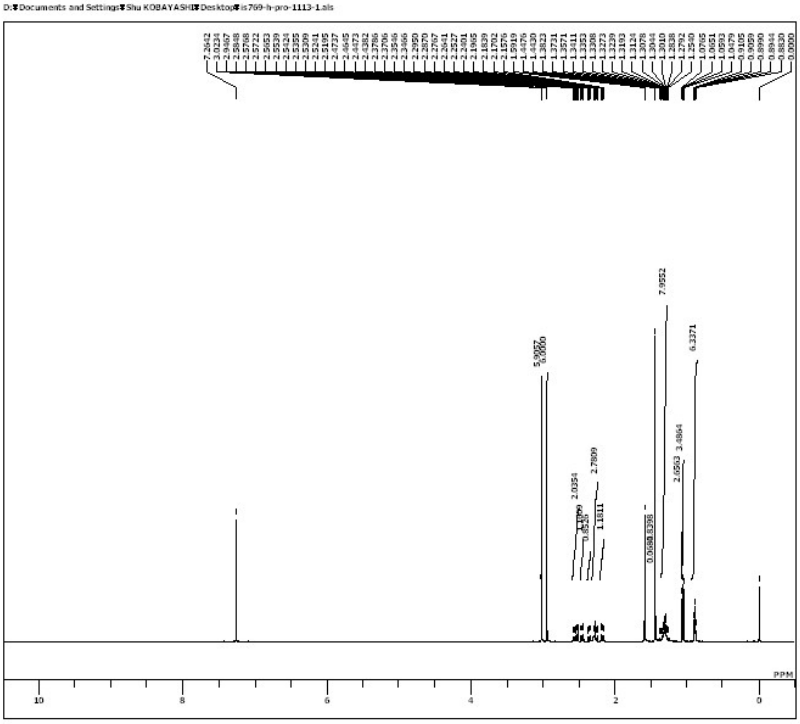


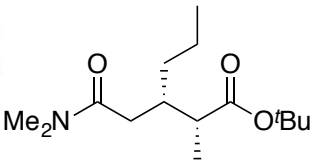

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is757-h-pro-1104-1.als
DATIM 04-11-2015 14:54:35
MENUF
OBNUC 1H
OFR 600.17 MHz
OBSET 5.30 KHz
OBFIN 5.47 Hz
PW1 6.30 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 19485
SPO 19485
TIMES 8
DUMMY 1
FREQU 7206.99 Hz
FLT
DELAY 10.88 usec
ACQTM 1.4549 sec
PD 5.0000 sec
AD8IT 16
RGAIN 36
BF 0.62 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
DFILE D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is7
SF
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
1H -NMR (CDCl3) δ:
7.29-7.29 (2H, m),
6.26-6.26 (2H, m),
6.08-6.07 (2H, m),
3.65-3.62 (2H, m),
2.95 (2H, s),
2.92 (3H, s),
2.90 (2H, s),
2.87 (3H, s),
2.84-2.80 (1H, m),
2.76-2.73 (3H, m),
2.53 (1H, dd, J = 15.12, 4.12 Hz),
1.44 (9H, s),
1.37 (9H, s),
1.15 (2H, d, J = 6.87 Hz),
1.00 (3H, d, J = 6.87 Hz).
PPM
Me2N
O
O
O
OtBu

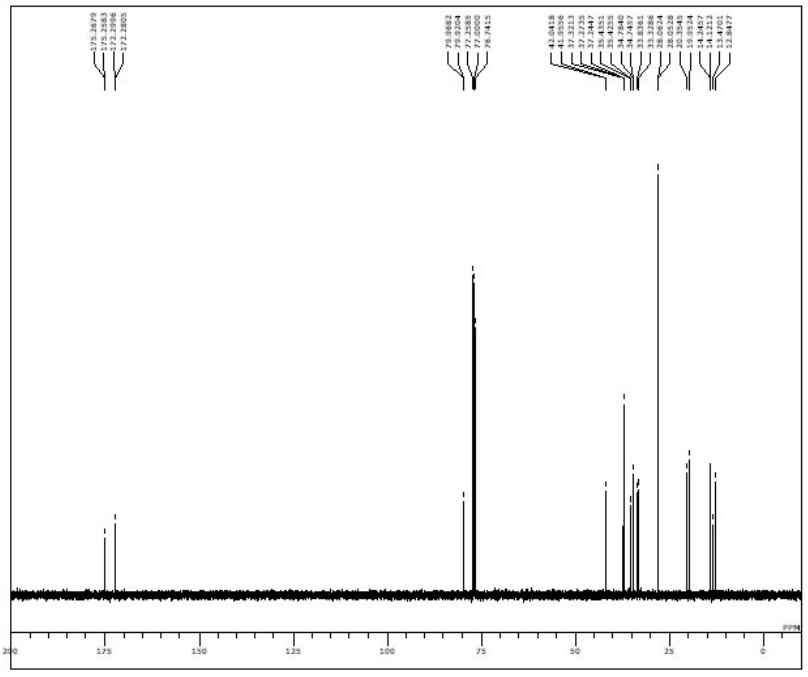

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is757-c-pro-1104-1.als
DATIM 04-11-2015 15:02:07
MENUF
OBNUC 13C
OFR 150.92 MHz
OBSET 8.52 KHz
OBFIN 1.74 Hz
PW1 3.60 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 26214
SPO 26214
TIMES 144
DUMMY 4
FREQU 37878.21 Hz
FLT
DELAY 21.12 usec
ACQTM 0.6921 sec
PD 2.0000 sec
AD8IT 16
RGAIN 50
BF 0.62 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
DFILE D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is7
SF
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
PPM
Me2N
O
O
O
OtBu

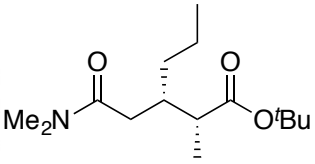


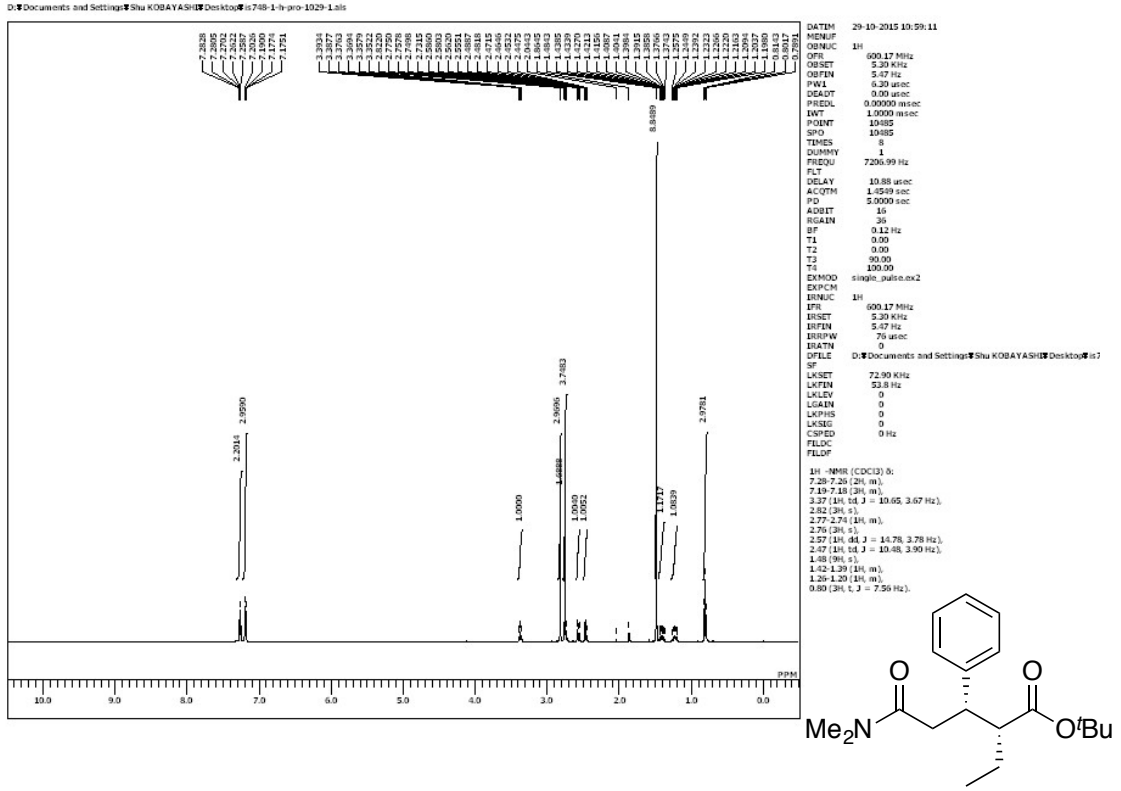


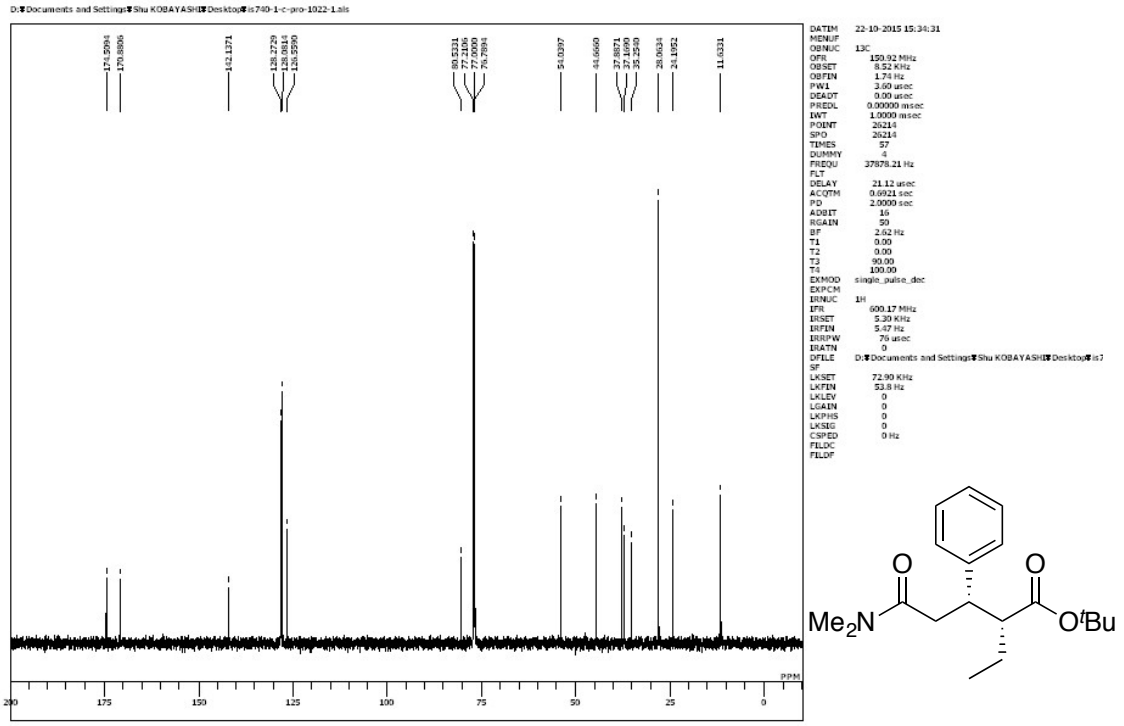


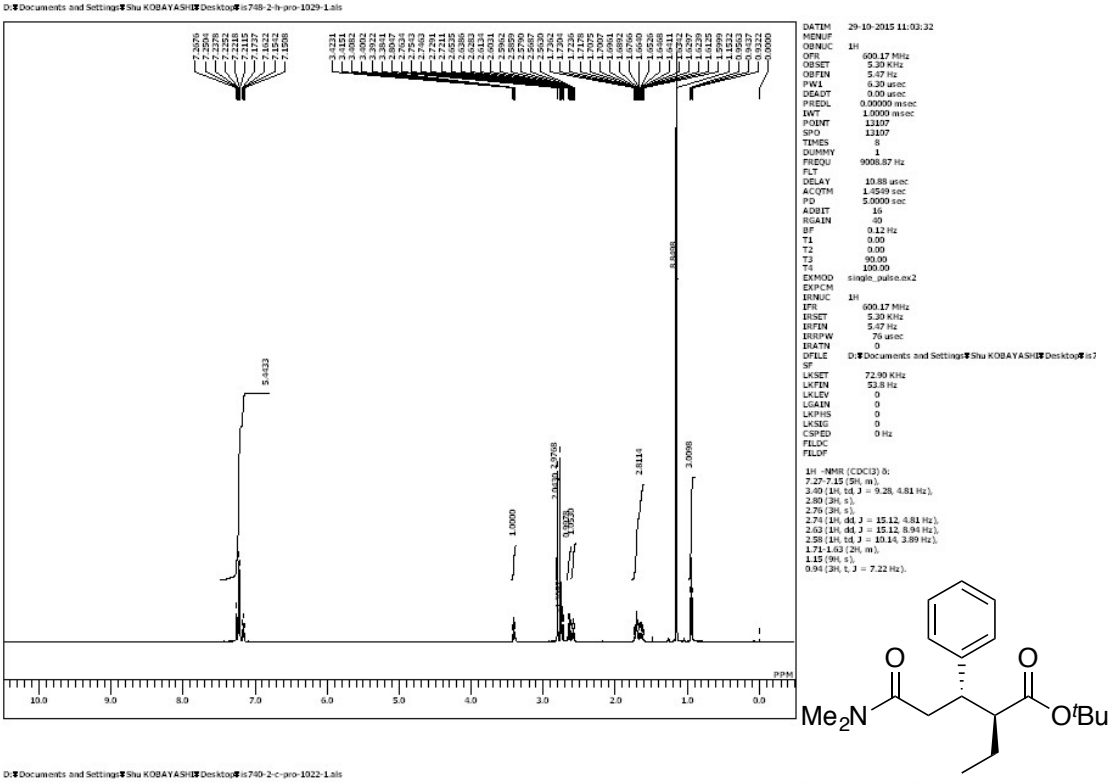

O
O
Me2N
OtBu

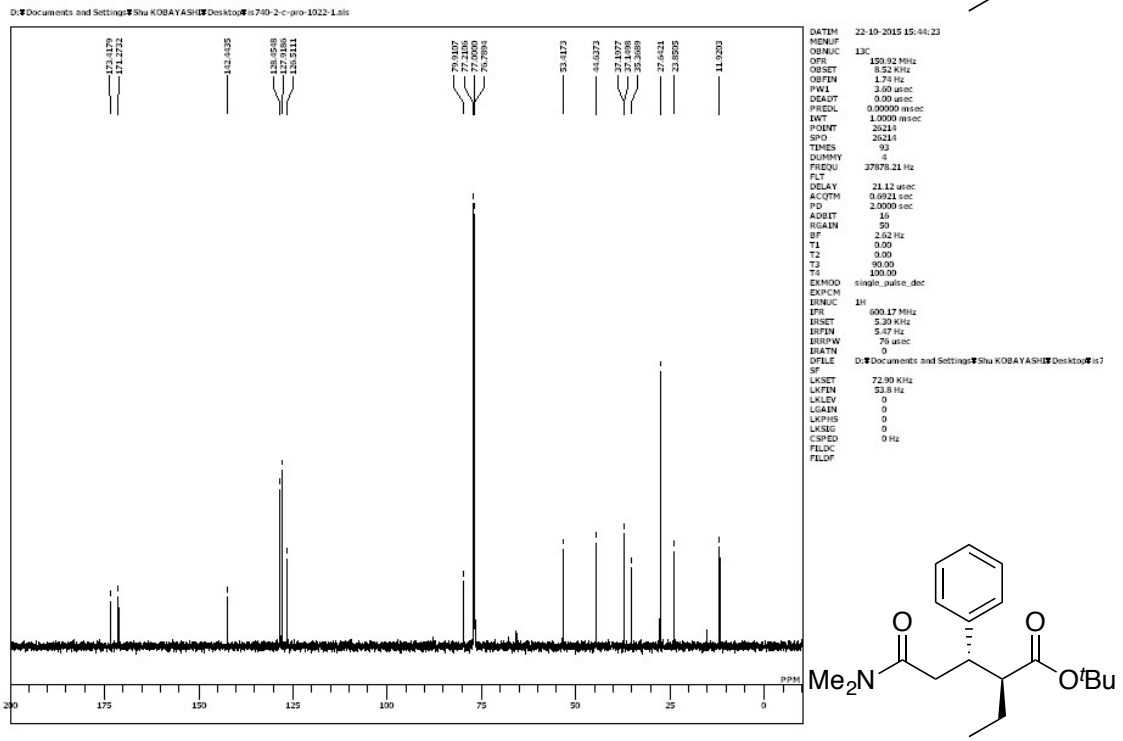


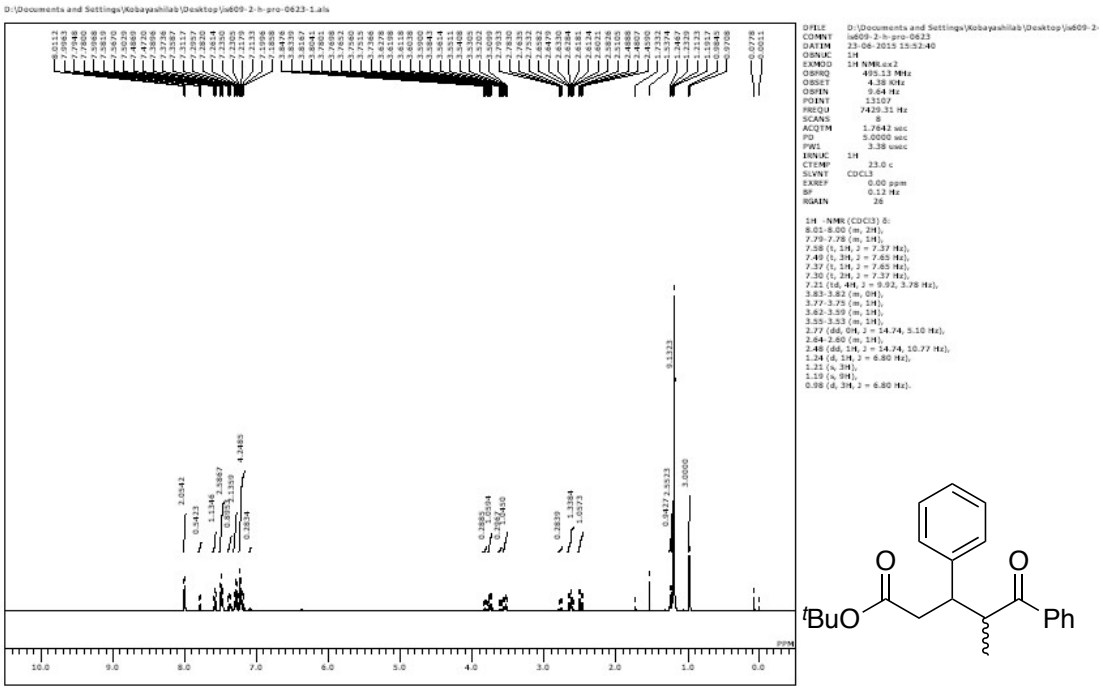

O
O
Me2N
OtBu

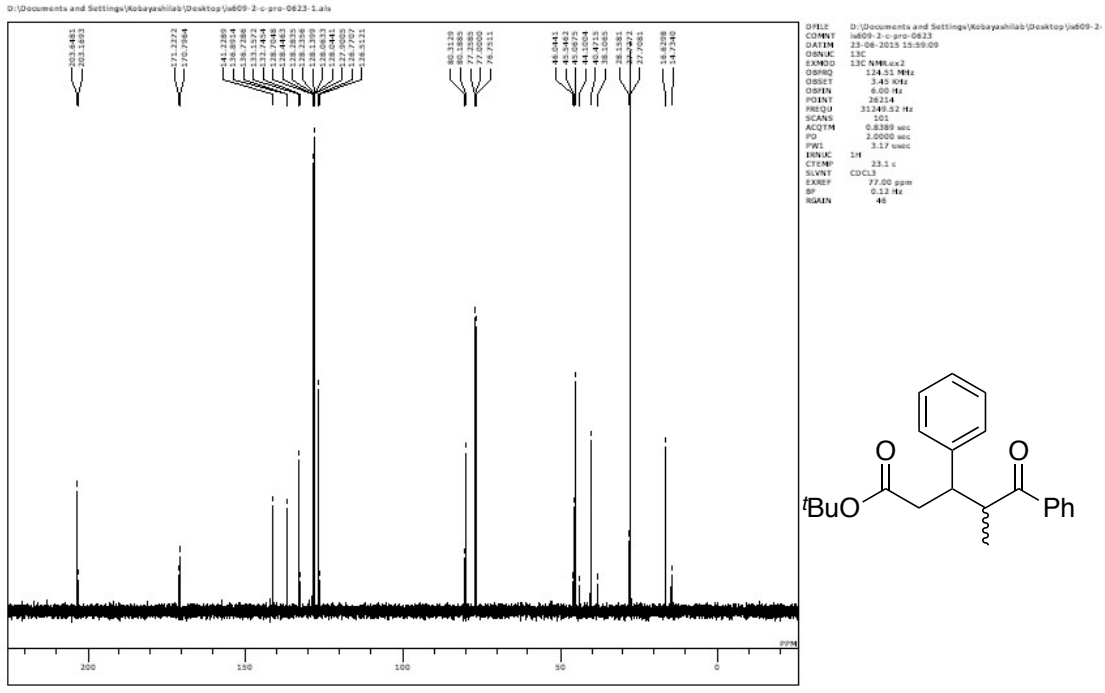

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is748-1-h-pro-1029-1.als
DATIM 29-10-2015 10:59:11
OBNUC 1H
OFR 600.17 MHz
OBSET 5.30 KHz
OBFIN 5.47 Hz
PW1 6.30 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 19485
SPO 19485
TIMES 8
DUMMY 1
FREQU 7206.99 Hz
DELAY 10.88 usec
ACQTM 1.4549 sec
PD 5.0000 sec
ADBIT 16
RGAIN 36
BF 0.12 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKPHS 0
LKSIG 0
CSPED 0 Hz
1H -NMR (CDCl3) δ:
7.28-7.26 (2H, m),
7.19-7.18 (3H, m),
3.37 (1H, td, J = 10.65, 3.67 Hz),
2.82 (3H, s),
2.77-2.74 (1H, m),
2.75 (3H, s),
2.57 (1H, dd, J = 14.78, 3.78 Hz),
2.47 (1H, td, J = 10.48, 3.90 Hz),
1.48 (9H, s),
1.42-1.39 (1H, m),
1.26-1.20 (1H, m),
0.80 (3H, t, J = 7.56 Hz).
PPM
Me2N
O
O
OtBu

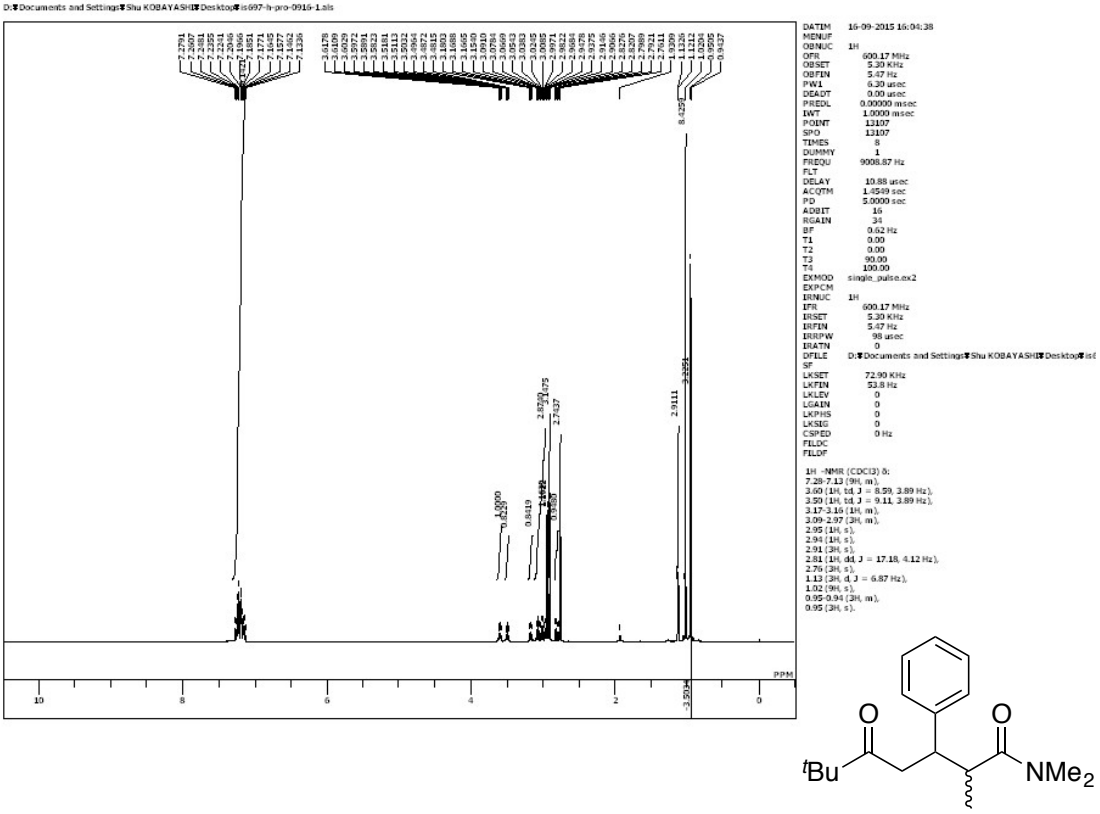

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is740-1-c-pro-1022-1.als
DATIM 22-10-2015 15:34:31
OBNUC 13C
OFR 150.92 MHz
OBSET 8.52 KHz
OBFIN 1.74 Hz
PW1 3.60 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 26214
SPO 26214
TIMES 57
DUMMY 4
FREQU 37878.21 Hz
DELAY 21.12 usec
ACQTM 0.6921 sec
PD 2.0000 sec
ADBIT 16
RGAIN 59
BF 2.62 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
IRFIN 5.47 Hz
IRRPW 79 usec
IRATN 0
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKPHS 0
LKSIG 0
CSPED 0 Hz
PPM
Me2N
O
O
OtBu

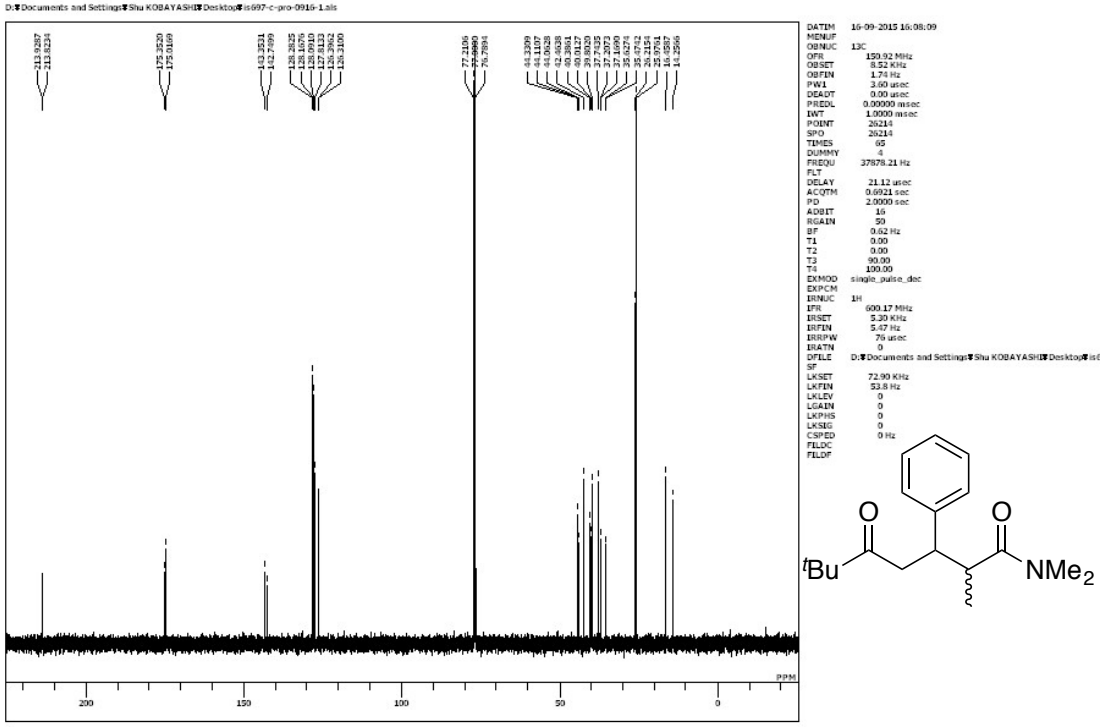

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is748-2-h-pro-1029-1.als
DATIM 29-10-2015 11:03:32
OBNUC 1H
OFR 600.17 MHz
OBSET 5.30 KHz
OBFIN 5.47 Hz
PW1 6.30 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 13107
SPO 13107
TIMES 8
DUMMY 1
FREQU 9008.87 Hz
DELAY 10.88 usec
ACQTM 1.4549 sec
PD 5.0000 sec
ADBIT 16
RGAIN 40
BF 0.12 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
EXPCM
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
DFILE D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is7
SF
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
1H -NMR (CDCl3) δ:
7.27-7.15 (5H, m),
3.40 (1H, td, J = 9.28, 4.81 Hz),
2.80 (3H, s),
2.76 (3H, s),
2.74 (1H, dd, J = 15.12, 4.81 Hz),
2.63 (1H, dd, J = 15.12, 8.94 Hz),
2.58 (1H, td, J = 10.14, 3.89 Hz),
1.71-1.63 (2H, m),
1.15 (9H, s),
0.94 (3H, t, J = 7.22 Hz).
PPM
Me2N
O
O
OtBu

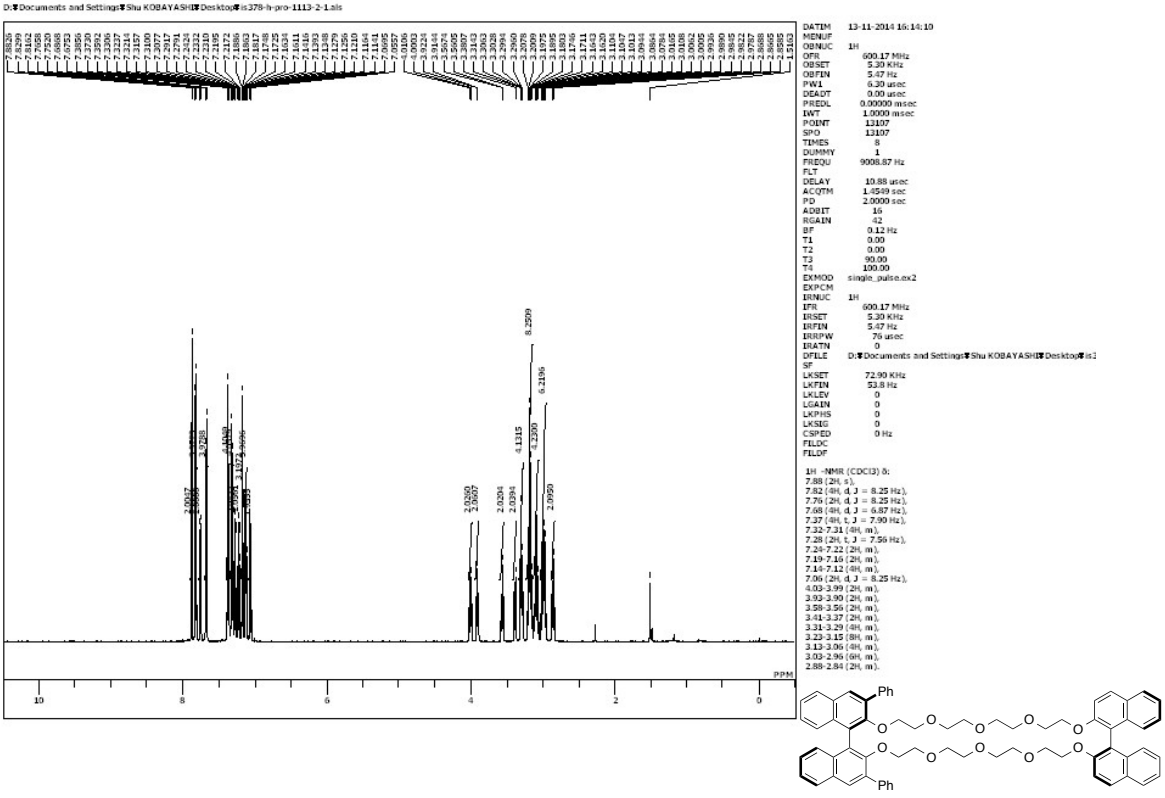

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is740-2-c-pro-1022-1.als
DATIM 22-10-2015 15:44:23
OBNUC 13C
OFR 150.92 MHz
OBSET 8.52 KHz
OBFIN 1.74 Hz
PW1 3.60 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 26214
SPO 26214
TIMES 93
DUMMY 4
FREQU 37878.21 Hz
DELAY 21.12 usec
ACQTM 0.6921 sec
PD 2.0000 sec
ADBIT 16
RGAIN 50
BF 2.62 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
DFILE D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is7
SF
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
PPM
Me2N
O
O
OtBu

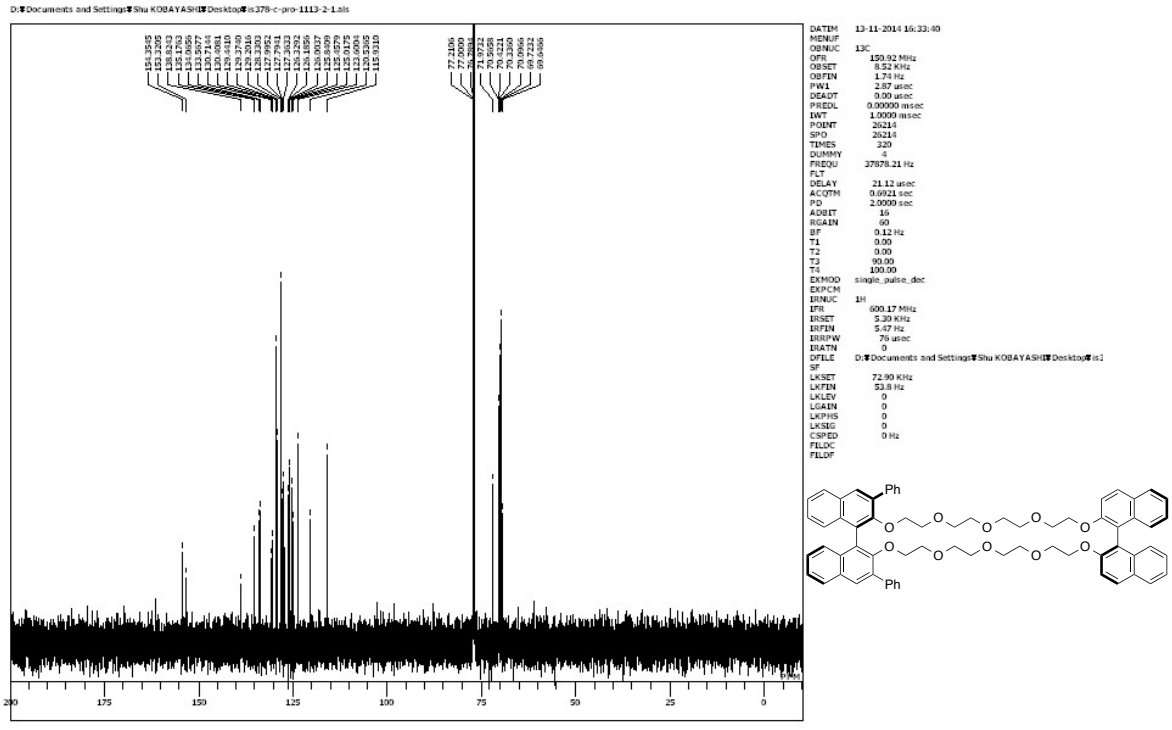

D:\Documents and Settings\Kobayashilab\Desktop\ja609-2-h-pro-0623-1.als
DFILE D:\Documents and Settings\Kobayashilab\Desktop\ja609-2-
COMNT ja609-2-h-pro-0623
DATIM 23-06-2015 15:52:40
OBNUC 1H
EXMOD 1H NMR.ex2
OBFRQ 495.13 MHz
OBSET 4.38 KHz
OBSPN 9.64 Hz
POINT 13107
FREQU 7429.31 Hz
SCANS 8
ACQTM 1.7642 sec
PD 5.0000 sec
PW1 3.38 usec
IRNUC 1H
CTEMP 23.0 c
SLVNT CDCL3
EXREF 0.00 ppm
BF 0.12 Hz
RGAIN 26
1H -NMR (CDCl3) δ:
8.01-8.00 (m, 2H),
7.79-7.78 (m, 1H),
7.58 (t, 1H, J = 7.37 Hz),
7.49 (t, 3H, J = 7.65 Hz),
7.37 (t, 1H, J = 7.65 Hz),
7.30 (t, 2H, J = 7.37 Hz),
7.21 (td, 4H, J = 9.02, 3.78 Hz),
3.83-3.82 (m, 0H),
3.77-3.75 (m, 1H),
3.62-3.59 (m, 1H),
3.55-3.53 (m, 1H),
2.77 (dd, 0H, J = 14.74, 5.10 Hz),
2.64-2.60 (m, 1H),
2.49 (dd, 1H, J = 14.74, 10.77 Hz),
1.24 (d, 1H, J = 6.80 Hz),
1.21 (s, 3H),
1.19 (s, 9H),
0.98 (d, 3H, J = 6.80 Hz).
O
O
tBuO
Ph

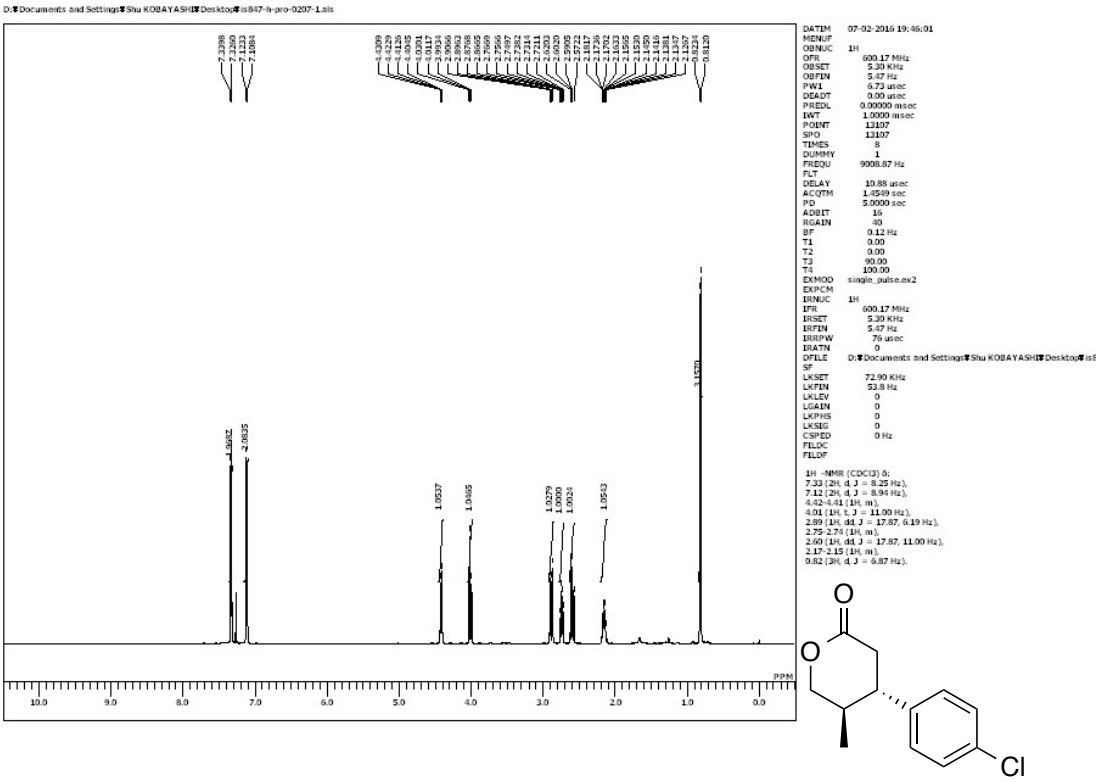

D:\Documents and Settings\Kobayashilab\Desktop\ja609-2-c-pro-0623-1.als
DFILE D:\Documents and Settings\Kobayashilab\Desktop\ja609-2-
COMNT ja609-2-c-pro-0623
DATIM 23-06-2015 15:59:09
OBNUC 13C
EXMOD 13C NMR.ex2
OBFRQ 124.51 MHz
OBSET 3.45 KHz
OBSPN 6.00 Hz
POINT 26214
FREQU 31249.52 Hz
SCANS 101
ACQTM 0.8389 sec
PD 2.0000 sec
PW1 3.17 usec
IRNUC 1H
CTEMP 23.1 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 0.12 Hz
RGAIN 46
O
O
tBuO
Ph

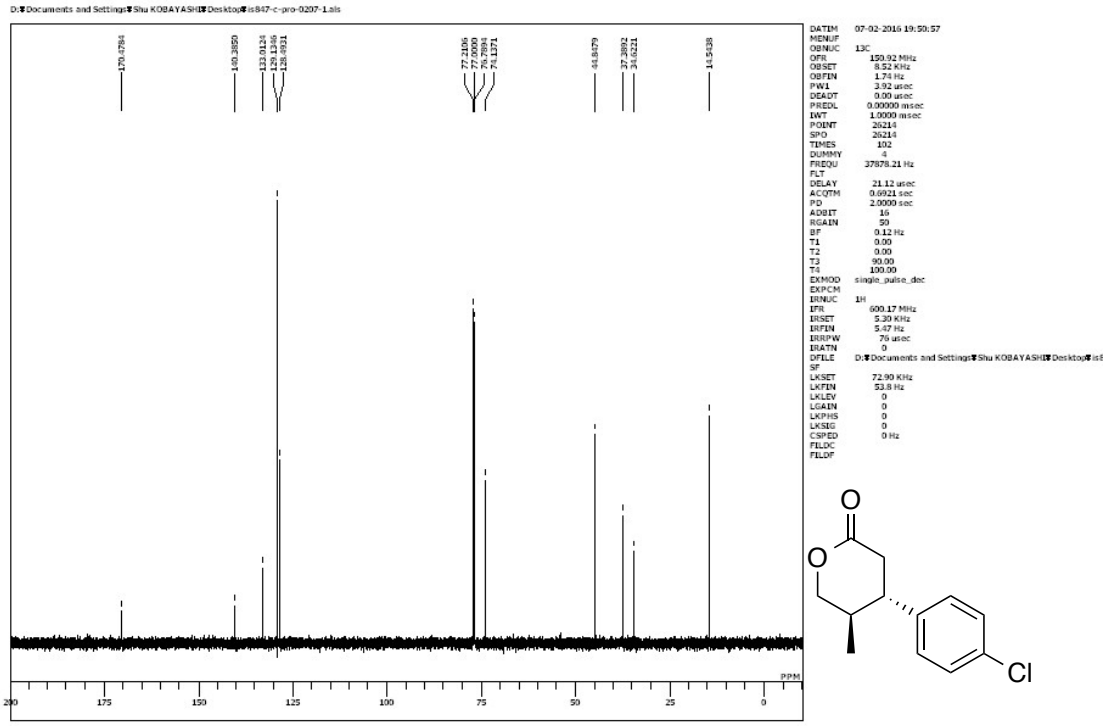

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is697-h-pro-0916-1.als
DATIM 16-09-2015 16:04:38
OBNUC 1H
OFR 600.17 MHz
OBSET 5.30 KHz
OBFIN 5.47 Hz
PW1 6.30 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 13107
SPO 13107
TIMES 8
DUMMY 1
FREQU 9008.87 Hz
DELAY 10.88 usec
ACQTM 1.4549 sec
PD 5.0000 sec
ADBIT 16
RGAIN 34
BF 0.62 Hz
1H -NMR (CDCl3) δ:
7.28-7.13 (9H, m),
3.60 (1H, td, J = 8.59, 3.89 Hz),
3.59 (1H, td, J = 9.11, 3.89 Hz),
3.17-3.16 (1H, m),
3.09-2.97 (3H, m),
2.95 (1H, s),
2.94 (1H, s),
2.91 (3H, s),
2.81 (1H, dd, J = 17.18, 4.12 Hz),
2.76 (3H, s),
1.13 (3H, d, J = 6.87 Hz),
1.02 (9H, s),
0.95-0.94 (3H, m),
0.95 (3H, s).
PPM
10
8
6
4
2
0
tBu
NMe2


D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is697-c-pro-0916-1.als
DATIM 16-09-2015 16:08:09
OBNUC 13C
OFR 150.92 MHz
OBSET 8.52 KHz
OBFIN 1.74 Hz
PW1 3.60 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 26214
SPO 26214
TIMES 65
DUMMY 4
FREQU 37878.21 Hz
DELAY 21.12 usec
ACQTM 0.6921 sec
PD 2.0000 sec
ADBIT 16
RGAIN 50
BF 0.62 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
EXPCM
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
PPM
200
150
100
50
0
tBu
NMe2

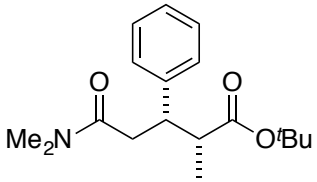

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is378-h-pro-1113-2-1.als
DATIM 13-11-2014 16:14:10
OBNUC 1H
OFR 600.17 MHz
OBSET 5.30 KHz
OBFIN 5.47 Hz
PW1 6.30 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 13107
SPO 13107
TIMES 8
DUMMY 1
FREQU 9008.87 Hz
DELAY 10.88 usec
ACQTM 1.4549 sec
PD 2.0000 sec
ADBIT 16
RGAIN 42
BF 0.12 Hz
1H -NMR (CDCl3) δ:
7.88 (2H, s),
7.82 (4H, d, J = 8.25 Hz),
7.79 (2H, d, J = 8.25 Hz),
7.68 (4H, d, J = 6.87 Hz),
7.37 (4H, t, J = 7.90 Hz),
7.32-7.31 (4H, m),
7.28 (2H, t, J = 7.56 Hz),
7.24-7.22 (2H, m),
7.19-7.16 (2H, m),
7.14-7.12 (4H, m),
7.06 (2H, d, J = 8.25 Hz),
4.03-3.99 (2H, m),
3.93-3.90 (2H, m),
3.58-3.56 (2H, m),
3.41-3.37 (2H, m),
3.31-3.29 (4H, m),
3.23-3.15 (8H, m),
3.13-3.06 (4H, m),
3.03-2.96 (6H, m),
2.88-2.84 (2H, m).
Ph
Ph


D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is378-c-pro-1113-2-1.als
DATIM 13-11-2014 16:33:40
OBNUC 13C
OFR 150.92 MHz
OBSET 8.52 KHz
OBFIN 1.74 Hz
PW1 2.87 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 26214
SPO 26214
TIMES 320
DUMMY 4
FREQU 37878.21 Hz
DELAY 21.12 usec
ACQTM 0.6921 sec
PD 2.0000 sec
ADBIT 16
RGAIN 60
BF 0.12 Hz
1H
EXMOD single_pulse_dec
OBNUC 1H
OFR 600.17 MHz
OBSET 5.30 KHz
OBFIN 5.47 Hz
PW1 6.30 usec
Ph
Ph

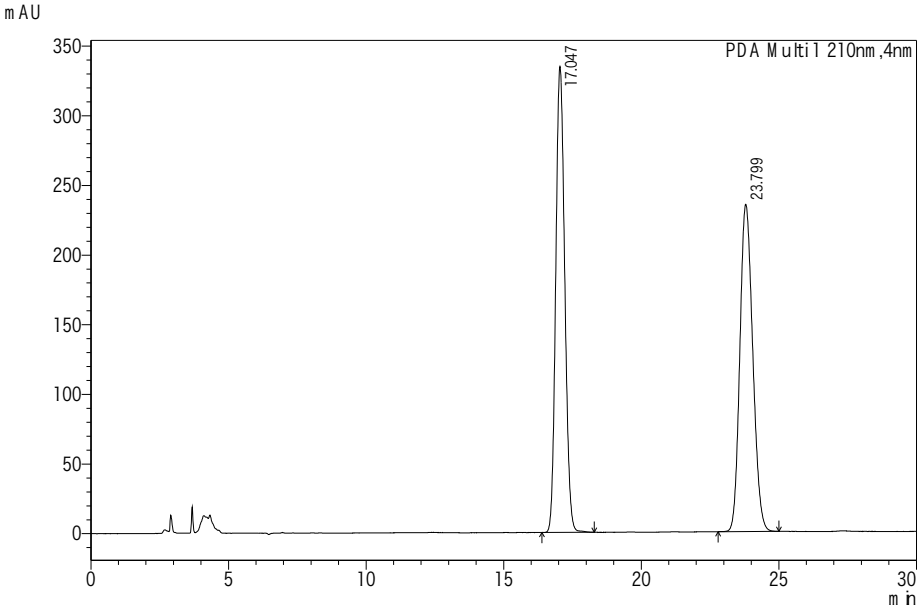

D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is847-h-pro-0207-1.als
DATIM 07-02-2016 19:46:01
OBNUC 1H
OFR 600.17 MHz
OBSET 5.30 KHz
OBFIN 5.47 Hz
PW1 6.73 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 13107
SPO 13107
TIMES 8
DUMMY 1
FREQU 9008.87 Hz
DELAY 10.88 usec
ACQTM 1.4549 sec
PD 5.0000 sec
ADBIT 16
RGAIN 40
BF 0.12 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse.ex2
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
1H -NMR (CDCl3) δ:
7.33 (2H, d, J = 8.25 Hz),
7.12 (2H, d, J = 8.94 Hz),
4.42-4.41 (1H, m),
4.01 (1H, t, J = 11.00 Hz),
2.89 (1H, dd, J = 17.87, 6.19 Hz),
2.75-2.71 (1H, m),
2.60 (1H, dd, J = 17.87, 11.00 Hz),
2.17-2.15 (1H, m),
0.82 (3H, d, J = 6.87 Hz).
PPM
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
O
O
Cl


D:¥Documents and Settings¥Shu KOBAYASHI¥Desktop¥is847-c-pro-0207-1.als
DATIM 07-02-2016 19:50:57
OBNUC 13C
OFR 150.92 MHz
OBSET 8.52 KHz
OBFIN 1.74 Hz
PW1 3.92 usec
DEADT 0.00 usec
PREDL 0.00000 msec
IWT 1.0000 msec
POINT 26214
SPO 26214
TIMES 102
DUMMY 4
FREQU 37878.21 Hz
DELAY 21.12 usec
ACQTM 0.6921 sec
PD 2.0000 sec
ADBIT 16
RGAIN 50
BF 0.12 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD single_pulse_dec
IRNUC 1H
IFR 600.17 MHz
IRSET 5.30 KHz
IRFIN 5.47 Hz
IRRPW 76 usec
IRATN 0
LKSET 72.90 KHz
LKFIN 53.8 Hz
LKLEV 0
LGAIN 0
LKPHS 0
LKSIG 0
CSPED 0 Hz
FILDC
FILDF
PPM
200
175
150
125
100
75
50
25
0
O
O
Cl

Acquired by	: System Administrator
Sample Name	: is353-1-rac-0224
Sample ID	: is353-1-rac-0224
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is353-1-rac-0224.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/02/24 10:31:20
Date Processed	: 2015/02/24 11:44:13



racemic



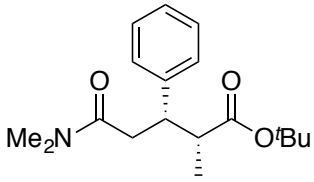
Peak Table

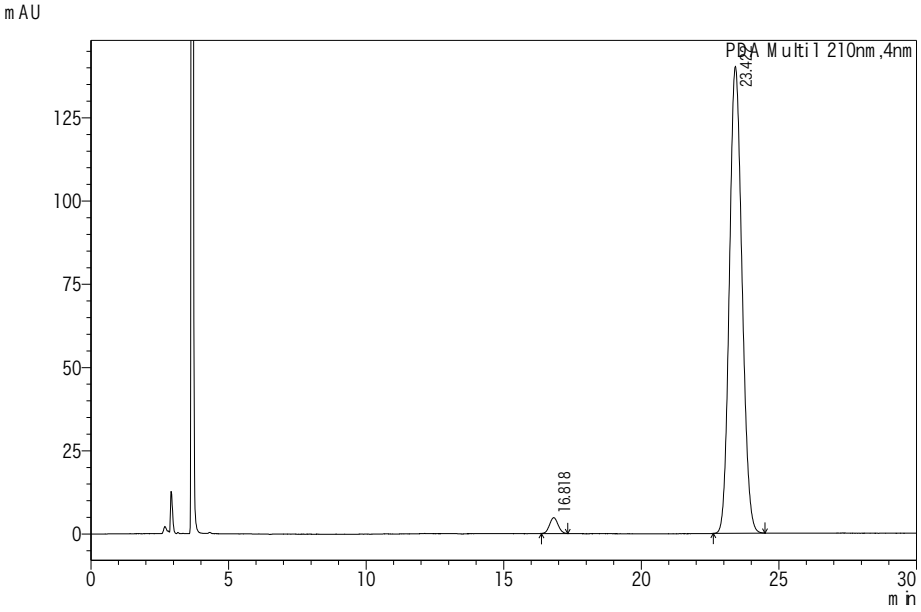
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	17.047	7602692	334523	49.879
2	23.799	7639636	234981	50.121
Total		15242328	569504	100.000

D:¥Personal Files¥Sato¥is353-1-rac-0224.lcd

Acquired by	: System Administrator
Sample Name	: is456-1-0224
Sample ID	: is456-1-0224
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is456-1-0224.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/02/24 11:45:40
Date Processed	: 2015/02/24 19:03:46





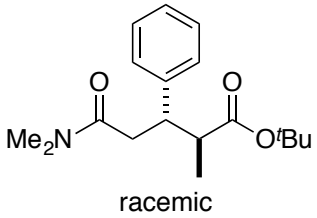
Peak Table

SPD-M20A Ch1 210nm

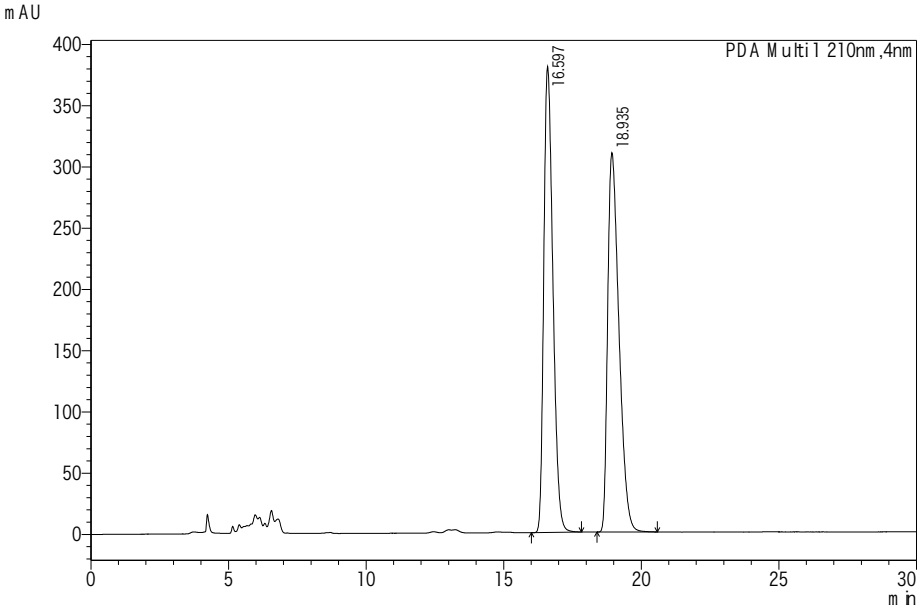
Peak#	Ret. Time	Area	Height	Area%
1	16.818	103555	4777	2.269
2	23.422	4460859	140195	97.731
Total		4564414	144972	100.000

D:¥PersonalFiles¥Sato¥is456-1-0224.lcd

Acquired by	: System Administrator
Sample Name	: is353-2-racemic-0228
Sample ID	: is353-2-racemic-0228
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is353-2-racemic-0228.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/02/28 10:52:39
Date Processed	: 2015/02/28 11:52:01



racemic



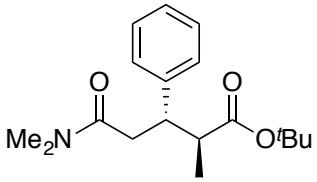
Peak Table

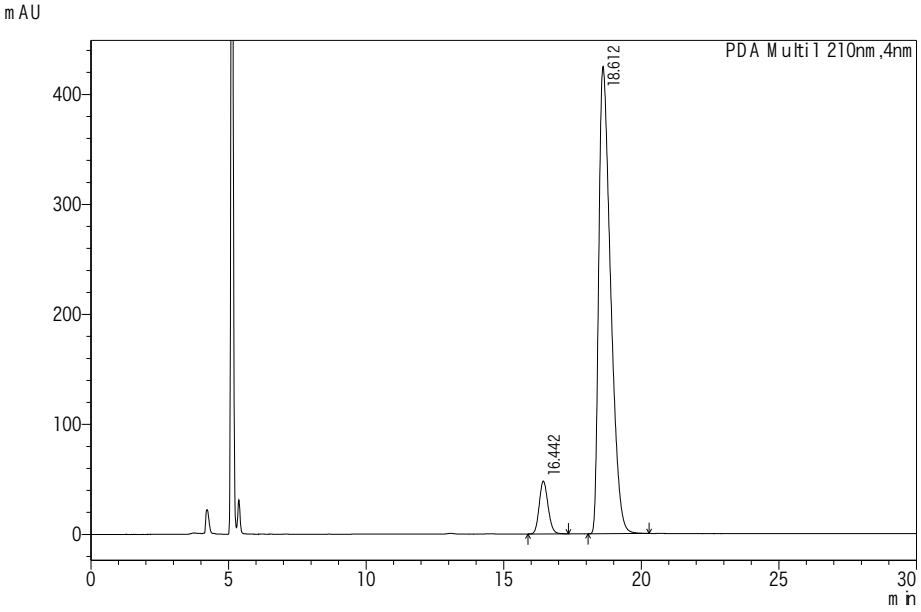
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	16.597	8788829	380429	49.830
2	18.935	8848635	309768	50.170
Total		17637464	690197	100.000

D:¥PersonalFiles¥Sato¥is353-2-racemic-0228.lcd

Acquired by	: System Administrator
Sample Name	: is456-2-2nd-0228
Sample ID	: is456-2-2nd-0228
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is456-2-2nd-0228.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/02/28 12:57:25
Date Processed	: 2015/02/28 17:06:16





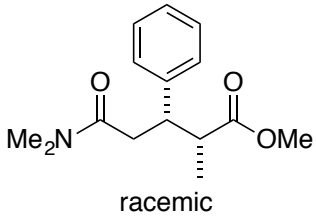
Peak Table

SPD-M20A Ch1 210nm

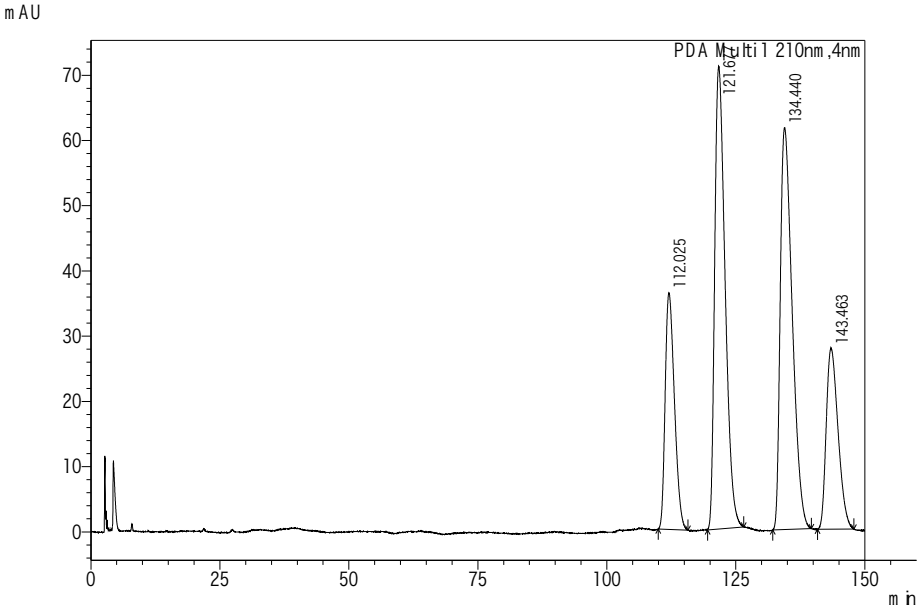
Peak#	Ret. Time	Area	Height	Area%
1	16.442	1067869	48057	7.738
2	18.612	12732459	424841	92.262
Total		13800328	472898	100.000

D:¥Persona Files¥Sato¥is456-2-2nd-0228.lcd

Acquired by	: System Administrator
Sample Name	: is419-1rac-ad3-0316
Sample ID	: is419-1rac-ad3-0316
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is419-1rac-ad3-0316.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/16 16:21:07
Date Processed	: 2015/03/16 20:38:49



racemic



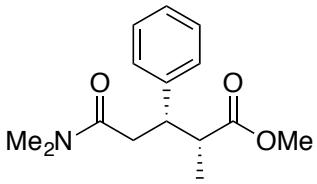
Peak Table

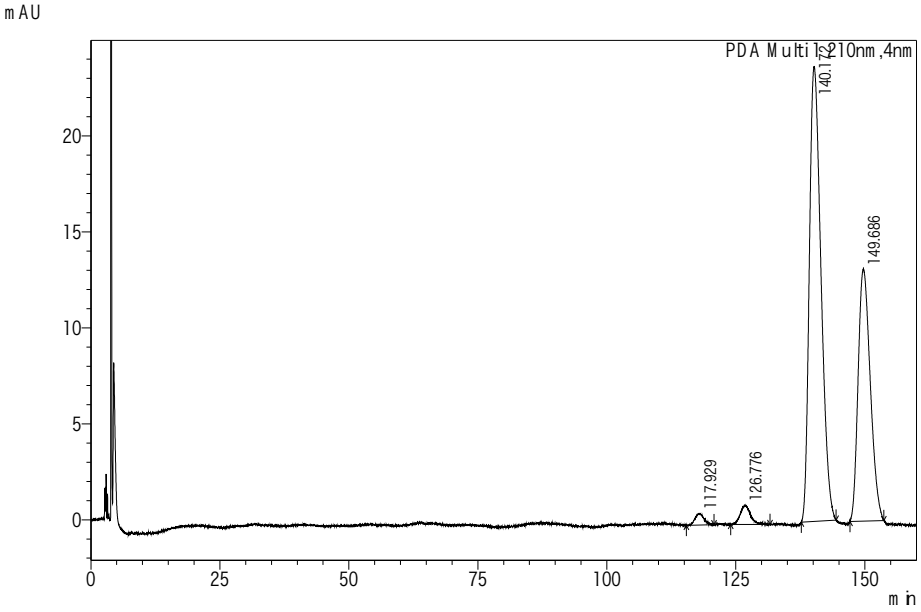
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	112.025	4531372	36284	15.714
2	121.677	9953003	70893	34.515
3	134.440	9922616	61613	34.410
4	143.463	4429471	27722	15.361
Total		28836461	196512	100.000

D:¥PersonalFiles¥Sato¥is419-1rac-ad3-0316.lcd

Acquired by	: System Administrator
Sample Name	: is421-rac-ad3-0316
Sample ID	: is421-rac-ad3-0316
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is421-ad3-0316.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/16 18:55:42
Date Processed	: 2015/03/16 22:18:51





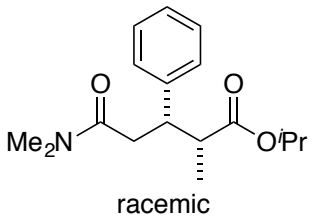
Peak Table

SPD-M20A Ch1 210nm

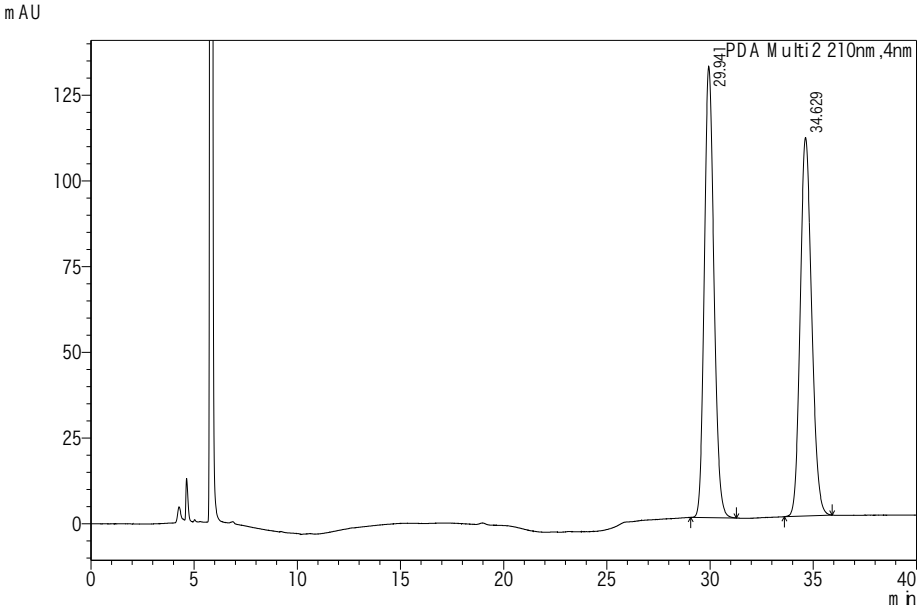
Peak#	Ret. Time	Area	Height	Area%
1	117.929	71288	599	1.173
2	126.776	138398	996	2.277
3	140.172	3714934	23706	61.118
4	149.686	2153700	13143	35.432
Total		6078319	38444	100.000

D:¥PersonalFiles¥Sato¥is421-ad3-0316.lcd

Acquired by	: System Administrator
Sample Name	: is427-1-2nd-ad3-1223
Sample ID	: is427-1-2nd-ad3-1223
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is427-1-2nd-ad3-1223.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2014/12/23 11:50:53
Date Processed	: 2014/12/23 13:45:40



racemic



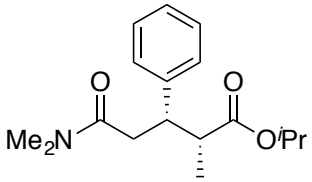
Peak Table

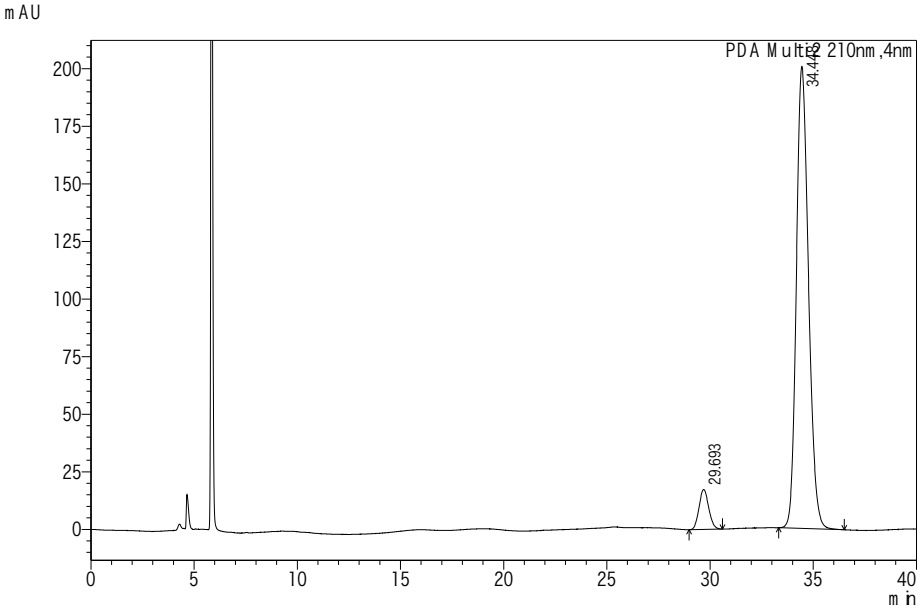
SPD-M20A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area%
1	29.941	4277123	131619	50.091
2	34.629	4261544	110377	49.909
Total		8538666	241997	100.000

D:¥PersonalFiles¥Sato¥is427-1-2nd-ad3-1223.lcd

Acquired by	: System Administrator
Sample Name	: is426-1-ad3-1223
Sample ID	: is426-1-ad3-1223
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is426-1-ad3-1223.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2014/12/23 12:47:16
Date Processed	: 2014/12/23 13:56:30





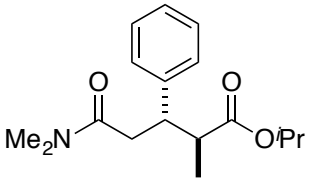
Peak Table

SPD-M20A Ch2 210nm

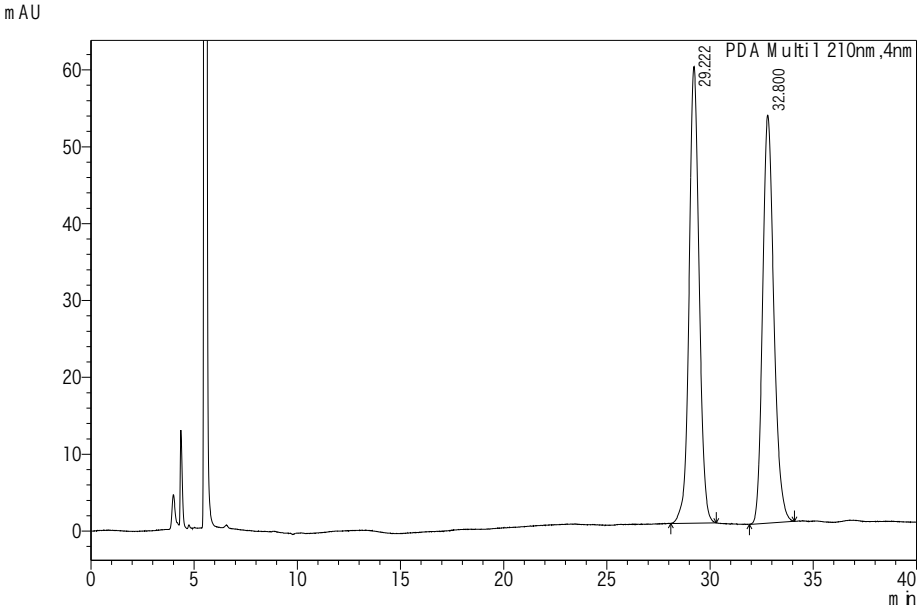
Peak#	Ret. Time	Area	Height	Area%
1	29.693	567263	17362	6.473
2	34.448	8196292	200560	93.527
Total		8763555	217923	100.000

D:¥PersonaFiles¥Sato¥is426-1-ad3-1223.lcd

Acquired by	: System Administrator
Sample Name	: is427-2-ad3-1223
Sample ID	: is427-2-ad3-1223
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is427-2-ad3-1223.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2014/12/23 13:29:30
Date Processed	: 2014/12/23 17:14:54



racemic



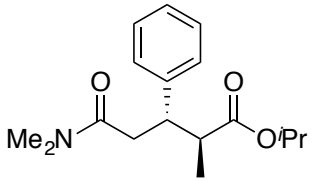
Peak Table

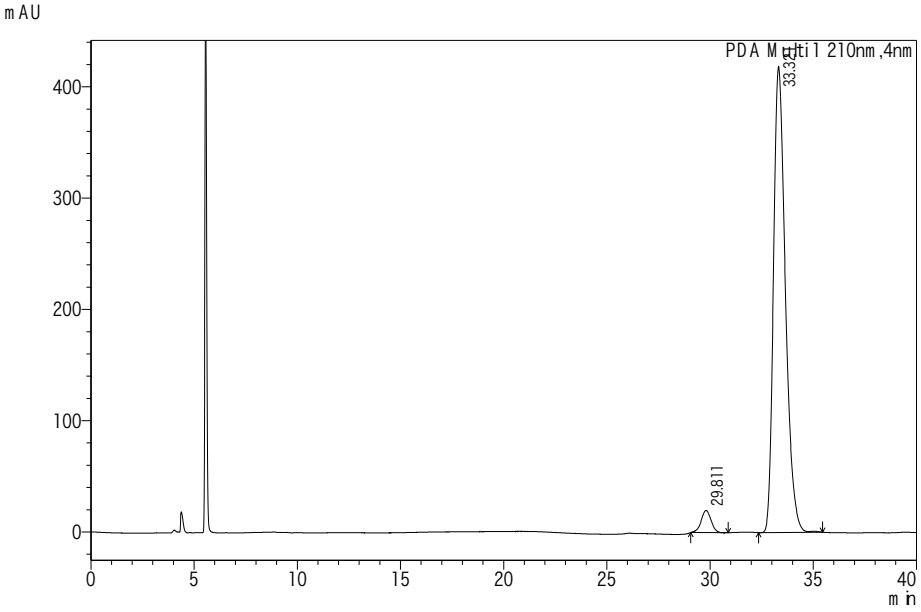
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	29.222	2010129	59413	50.032
2	32.800	2007527	53086	49.968
Total		4017656	112499	100.000

D:¥PersonaFiles¥Sato¥is427-2-ad3-1223.lcd

Acquired by	: System Administrator
Sample Name	: is426-2-ad3-1223
Sample ID	: is426-2-ad3-1223
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is426-2-ad3-1223.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2014/12/23 14:24:51
Date Processed	: 2014/12/23 17:14:47





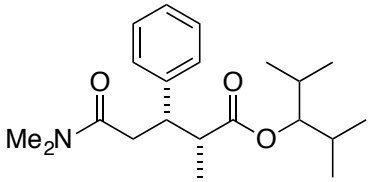
Peak Table

SPD-M20A Ch1 210nm

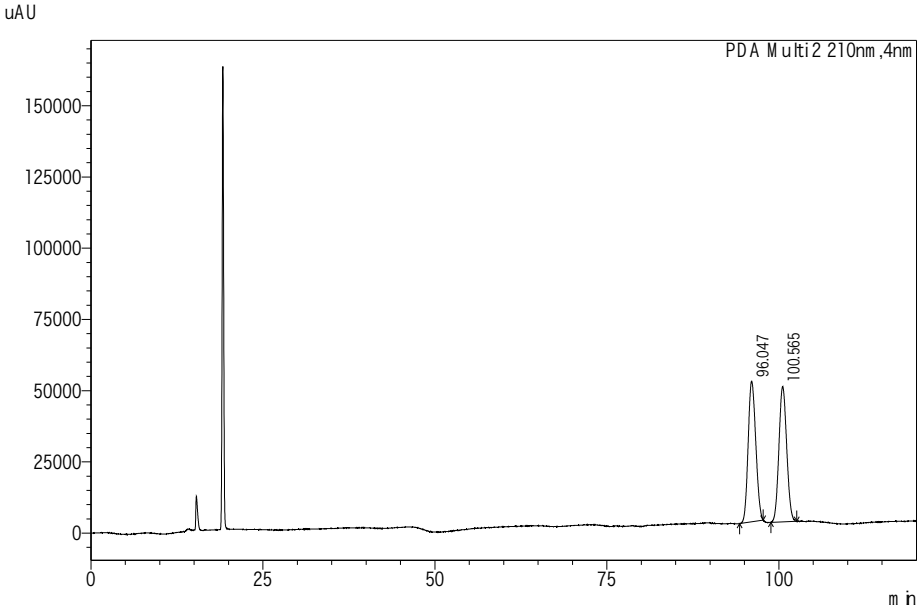
Peak#	Ret. Time	Area	Height	Area%
1	29.811	664196	19940	3.803
2	33.321	16802612	418652	96.197
Total		17466808	438592	100.000

D:¥PersonaFiles¥Sato¥is426-2-ad3-1223.lcd

Acquired by	: System Administrator
Sample Name	: is415-1-ad3adh-0107
Sample ID	: is415-1-ad3adh-0107
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is415-1-ad3adh-0107-1.lcd
Method File	: 0-0.4-120.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/01/07 11:24:13
Date Processed	: 2015/01/07 13:43:10



racemic



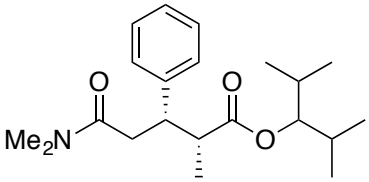
Peak Table

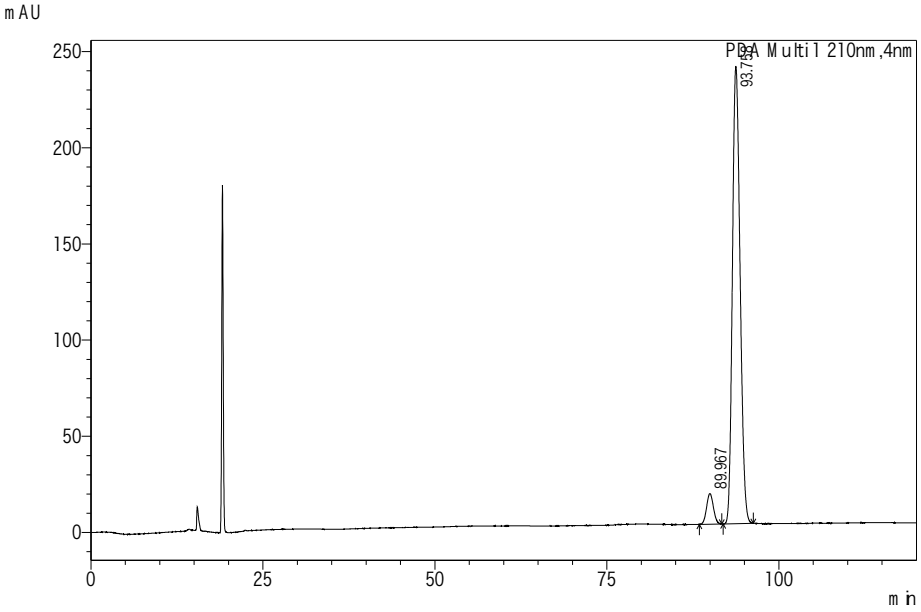
SPD-M20A Ch2 210nm

Peak#	Ret. Time	Area	Height	Area%
1	96.047	3805725	49370	50.467
2	100.565	3735302	47538	49.533
Total		7541027	96908	100.000

D:¥PersonalFiles¥Sato¥is415-1-ad3adh-0107-1.lcd

Acquired by	: System Administrator
Sample Name	: is425-1-ad3adh-0107
Sample ID	: is425-1-ad3adh-0107
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is425-1-ad3adh-0107.lcd
Method File	: 0-0.4-120.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/01/07 13:31:05
Date Processed	: 2015/01/07 15:34:24





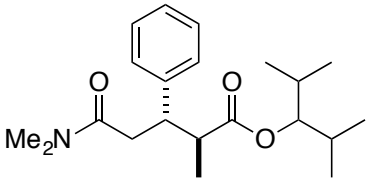
Peak Table

SPD-M20A Ch1 210nm

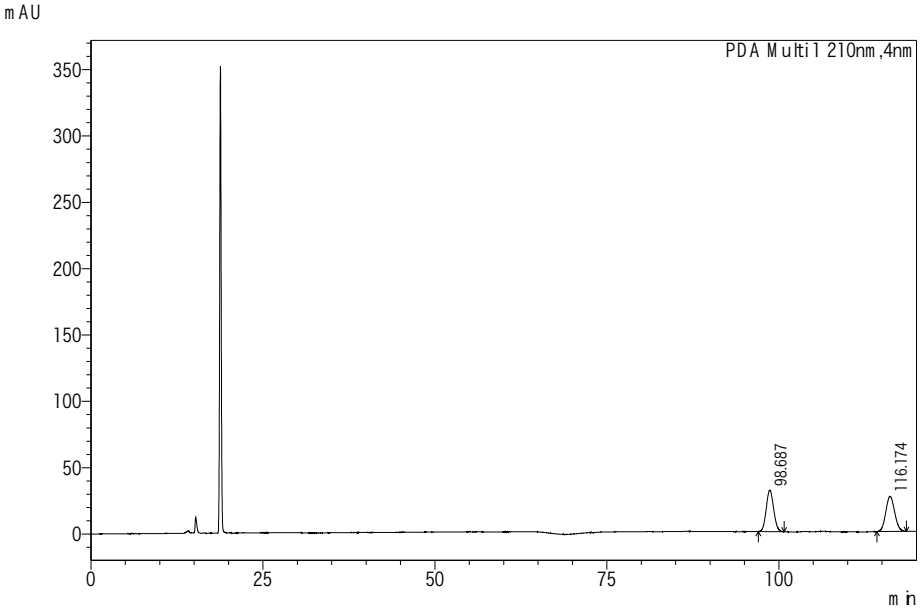
Peak#	Ret. Time	Area	Height	Area%
1	89.967	1099317	15951	5.623
2	93.758	18452444	237677	94.377
Total		19551761	253629	100.000

D:¥PersonaFiles¥Sato¥is425-1-ad3adh-0107.lcd

Acquired by	: System Administrator
Sample Name	: is415-2-ad3adh-0107
Sample ID	: is415-2-ad3adh-0107
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is415-2-ad3adh-0107.lcd
Method File	: 0-0.4-120.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/01/07 15:36:19
Date Processed	: 2015/01/07 21:55:52



racemic



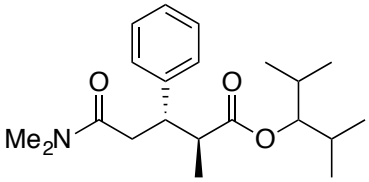
Peak Table

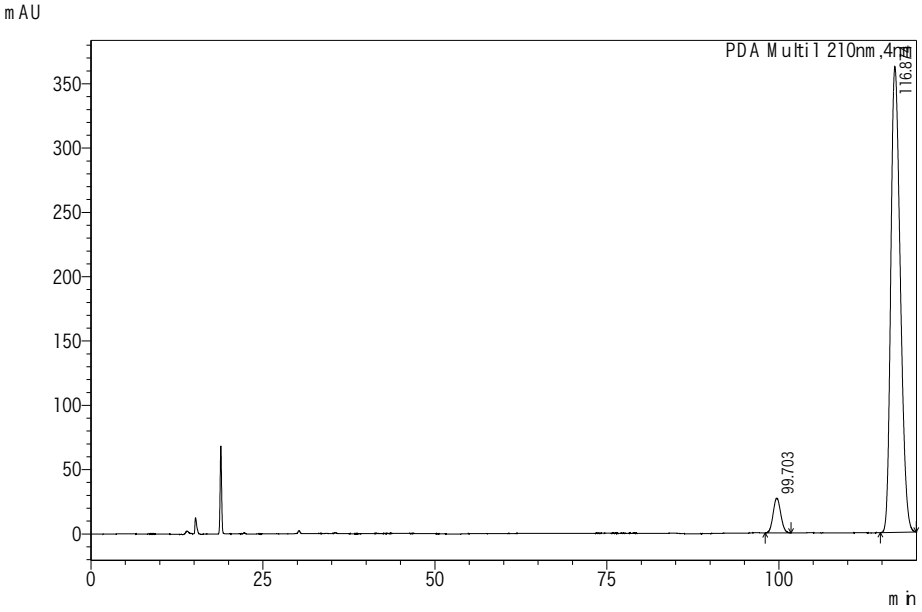
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	98.687	2341465	31238	49.737
2	116.174	2366261	26432	50.263
Total		4707725	57671	100.000

D:¥PersonaFiles¥Sato¥is415-2-ad3adh-0107.lcd

Acquired by	: System Administrator
Sample Name	: is425-2-ad3adh-0107
Sample ID	: is425-2-ad3adh-0107
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is425-2-ad3adh-0107.lcd
Method File	: 0-0.4-120.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/01/07 18:52:31
Date Processed	: 2015/01/07 21:55:19





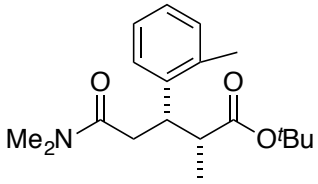
Peak Table

SPD-M20A Ch1 210nm

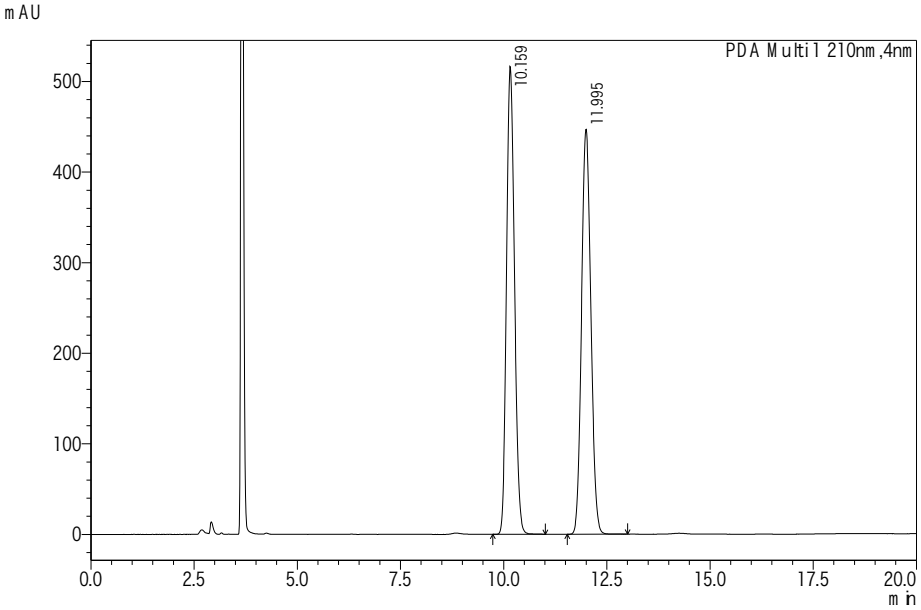
Peak#	Ret. Time	Area	Height	Area%
1	99.703	2079896	27088	5.639
2	116.874	34803882	362231	94.361
Total		36883778	389319	100.000

D:¥Persona Files¥Sato¥is425-2-ad3adh-0107.lcd

Acquired by	: System Administrator
Sample Name	: is479-1-o-tol-rac-0317
Sample ID	: is479-1-o-tol-rac-0317
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is479-1-o-tol-rac-0317.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/17 19:46:52
Date Processed	: 2015/03/17 20:10:01



racemic



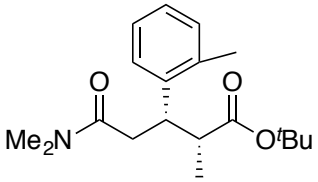
Peak Table

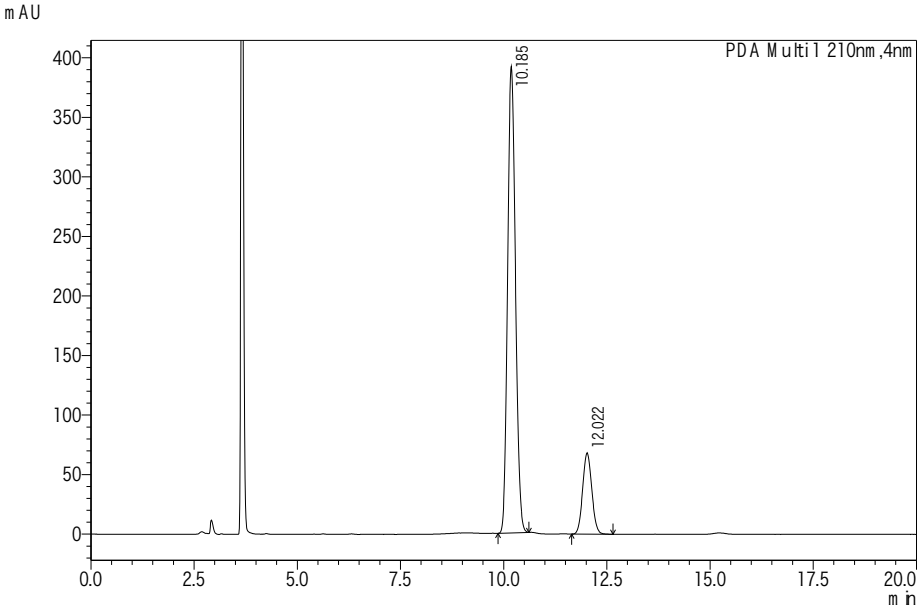
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	10.159	6961211	516468	49.760
2	11.995	7028363	447023	50.240
Total		13989574	963491	100.000

D:¥PersonalFiles¥Sato¥is479-1-o-tol-rac-0317.lcd

Acquired by	: System Administrator
Sample Name	: is494-1-o-tol-0317
Sample ID	: is494-1-o-tol-0317
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is494-1-o-tol-0317.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/17 20:11:24
Date Processed	: 2015/03/17 21:48:08





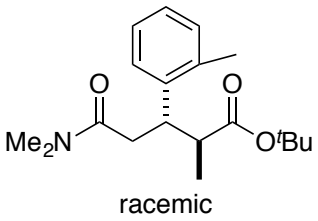
Peak Table

SPD-M20A Ch1 210nm

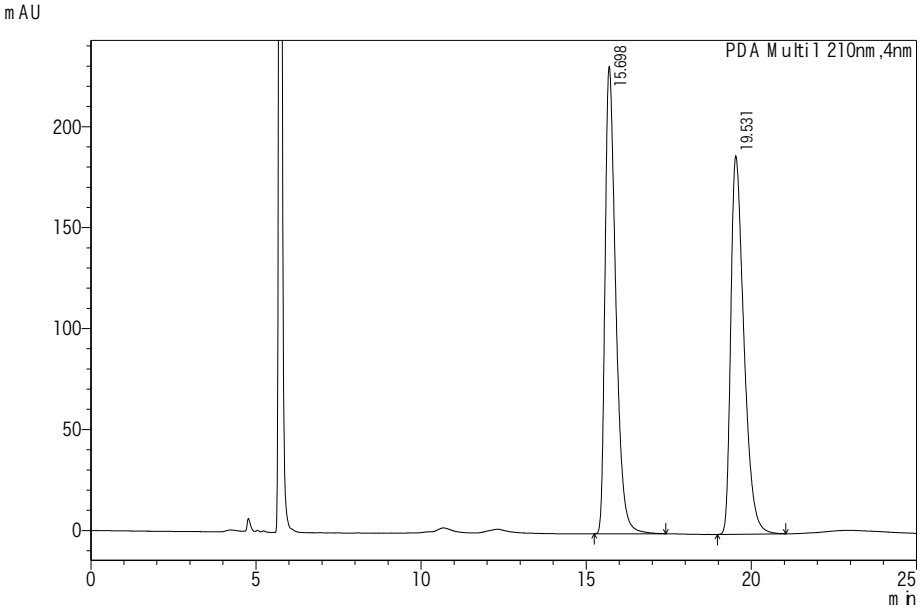
Peak#	Ret. Time	Area	Height	Area%
1	10.185	5190985	391729	83.140
2	12.022	1052716	68318	16.860
Total		6243701	460047	100.000

D:¥PersonalFiles¥Sato¥is494-1-o-tol-0317.lcd

Acquired by	: System Administrator
Sample Name	: is479-2-o-tol-rac-0319
Sample ID	: is479-2-o-tol-rac-0319
Tray#	: 1
Vial#	: 1
Injection Volume	: 1
Data File	: is479-2-o-tol-rac-0319.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/19 14:24:53
Date Processed	: 2015/03/19 17:17:39



racemic



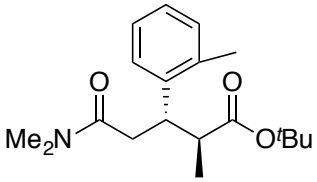
Peak Table

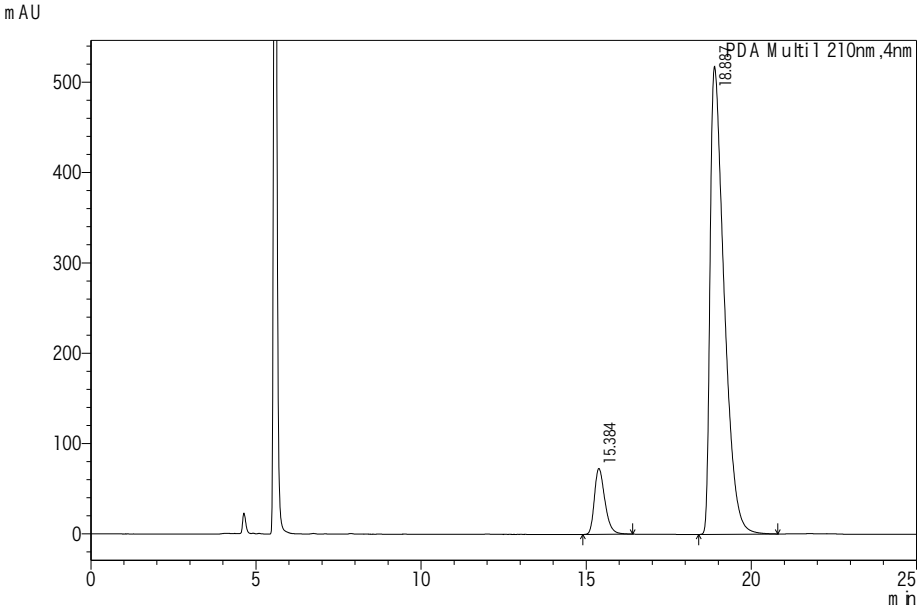
PDA Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	15.698	5234050	231435	50.260
2	19.531	5179855	187428	49.740
Total		10413906	418862	100.000

D:¥PersonalFiles¥Sato¥is479-2-o-tol-rac-0319.lcd

Acquired by	: System Administrator
Sample Name	: is494-2-o-tol-0319
Sample ID	: is494-2-o-tol-0319
Tray#	: 1
Vial#	: 1
Injection Volume	: 1
Data File	: is494-2-o-tol-0319.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/19 14:54:27
Date Processed	: 2015/03/19 17:17:28





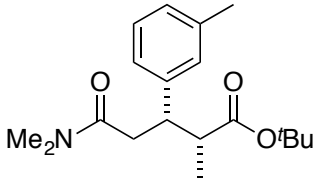
Peak Table

PDA Ch1 210nm

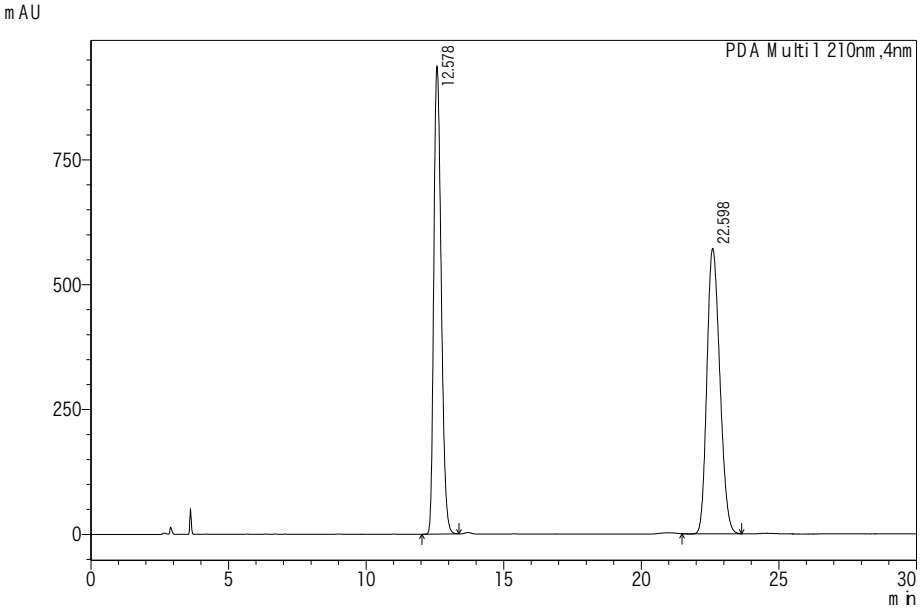
Peak#	Ret. Time	Area	Height	Area%
1	15.384	1608787	72982	9.507
2	18.887	15314115	518027	90.493
Total		16922902	591010	100.000

D:¥PersonalFiles¥Sato¥is494-2-o-tol-0319.lcd

Acquired by	: System Administrator
Sample Name	: is743-1-rac-1103
Sample ID	: is743-1-rac-1103
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is743-1-rac-1103.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/03 16:30:44
Date Processed	: 2015/11/03 17:59:13



racemic



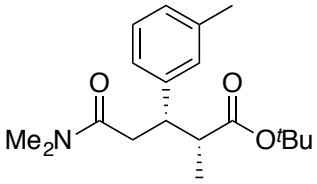
Peak Table

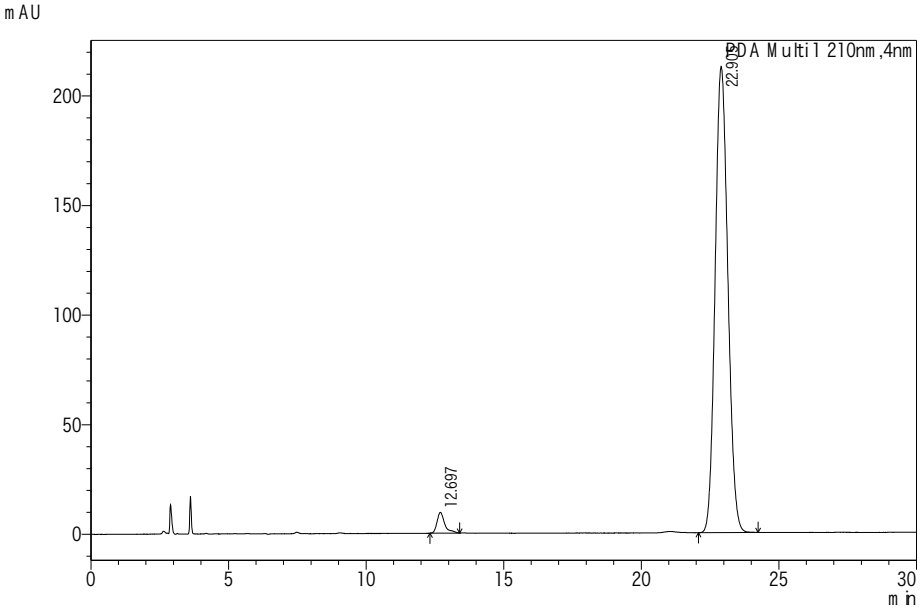
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	12.578	17598912	936321	48.627
2	22.598	18592509	571437	51.373
Total		36191420	1507759	100.000

D:¥PersonalFiles¥Sato¥is743-1-rac-1103.lcd

Acquired by	: System Administrator
Sample Name	: is753-1-1103
Sample ID	: is753-1-1103
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is753-1-1103.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/03 17:11:34
Date Processed	: 2015/11/03 17:59:08





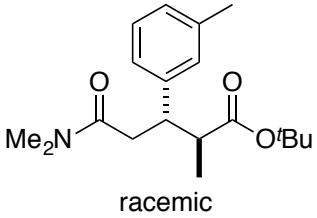
Peak Table

SPD-M20A Ch1 210nm

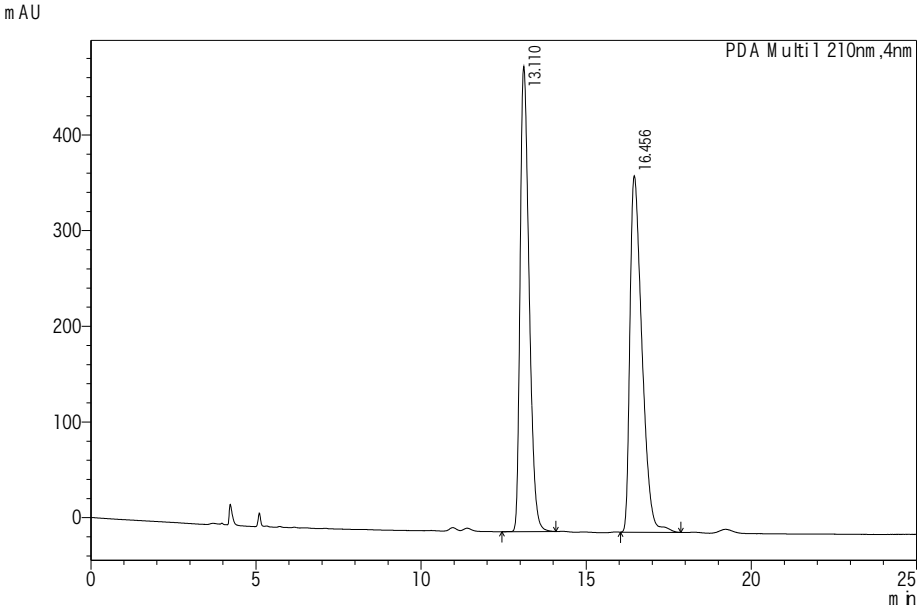
Peak#	Ret. Time	Area	Height	Area%
1	12.697	186136	9466	2.653
2	22.905	6828982	212687	97.347
Total		7015117	222153	100.000

D:¥PersonalFiles¥Sato¥is753-1-1103.lcd

Acquired by	: System Administrator
Sample Name	: is743-2-rac-1103
Sample ID	: is743-2-rac-1103
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is743-2-rac-1103.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/03 19:16:41
Date Processed	: 2015/11/03 19:56:59



racemic



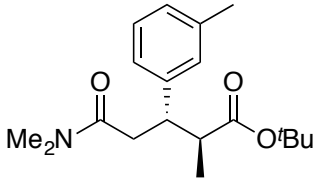
Peak Table

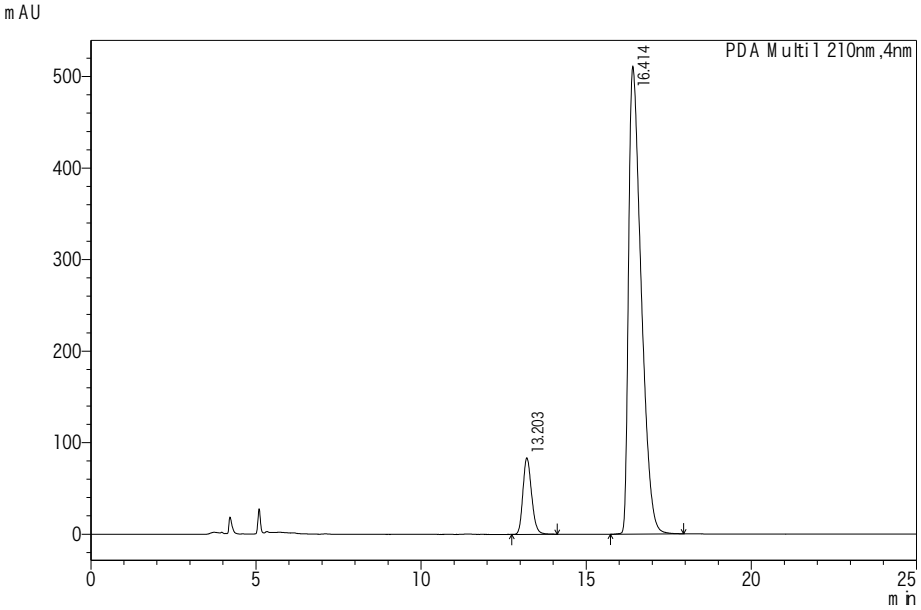
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	13.110	9215330	486156	49.475
2	16.456	9410923	372626	50.525
Total		18626253	858782	100.000

D¥Personal Files¥Sato¥is743-2-rac-1103.lcd

Acquired by	: System Administrator
Sample Name	: is753-2-1103
Sample ID	: is753-2-1103
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is753-2-1103.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/03 19:57:49
Date Processed	: 2015/11/03 20:59:37



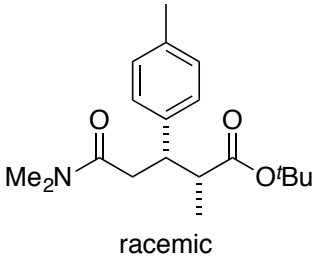


Peak Table

SPD-M20A Ch1 210nm

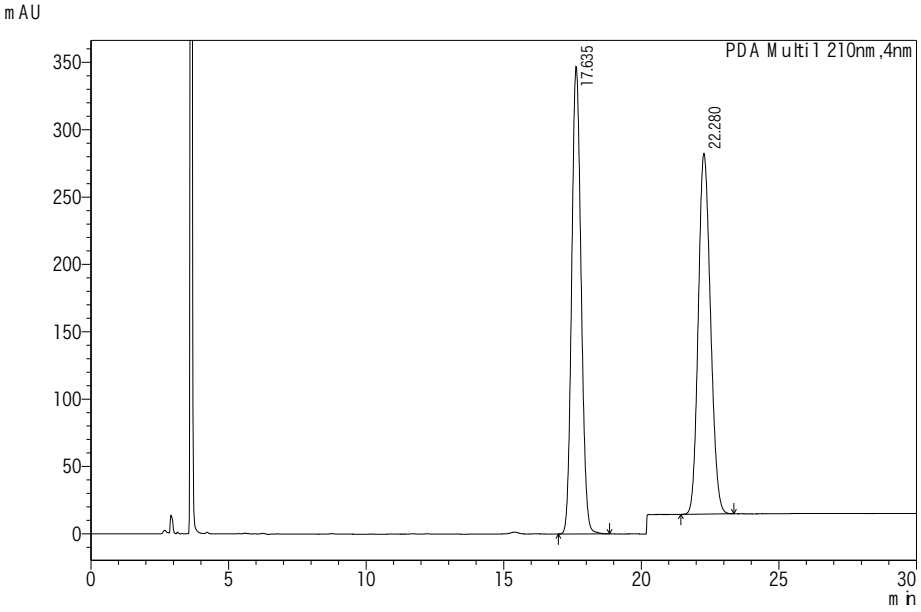
Peak#	Ret. Time	Area	Height	Area%
1	13.203	1525379	83603	10.134
2	16.414	13527442	510997	89.866
Total		15052821	594601	100.000

D:¥PersonalFiles¥Sato¥is753-2-1103.lcd



racemic

Acquired by	: System Administrator
Sample Name	: is480-1-p-tol-rac-0319
Sample ID	: is480-1-p-tol-rac-0319
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is480-1-p-tol-rac-0319.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/19 13:17:37
Date Processed	: 2015/03/19 14:30:50



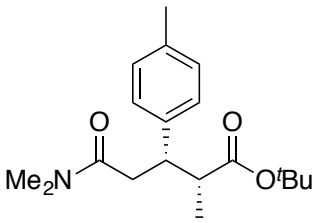
Peak Table

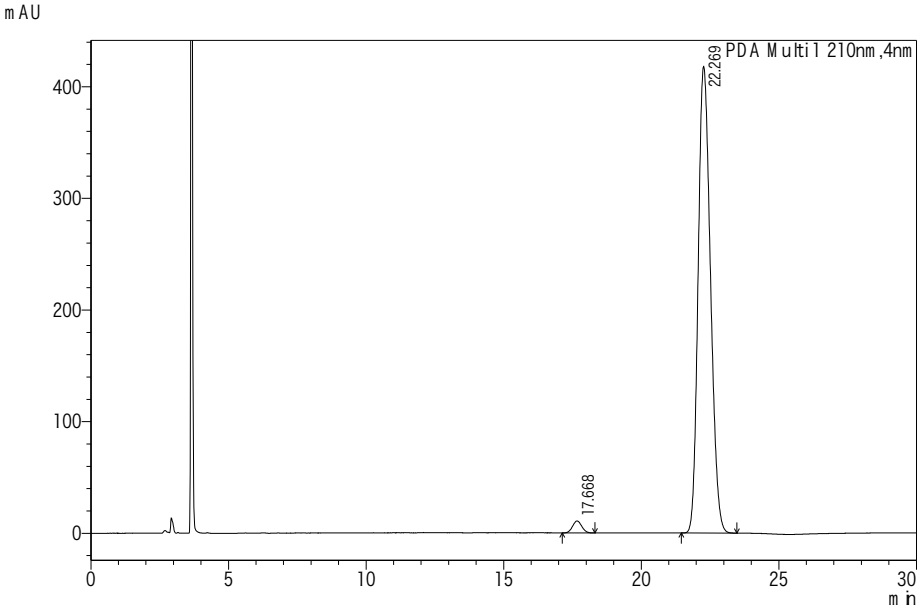
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	17.635	8256380	347080	49.957
2	22.280	8270539	267861	50.043
Total		16526920	614942	100.000

D:¥PersonalFiles¥Sato¥is480-1-p-tol-rac-0319.lcd

Acquired by	: System Administrator
Sample Name	: is495-1-p-tol-0319
Sample ID	: is495-1-p-tol-0319
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is495-1-p-tol-0319.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/19 13:56:08
Date Processed	: 2015/03/19 14:30:42





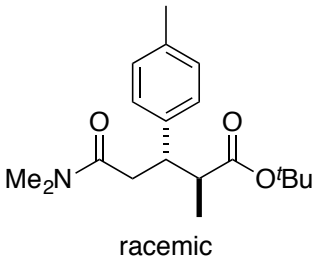
Peak Table

SPD-M20A Ch1 210nm

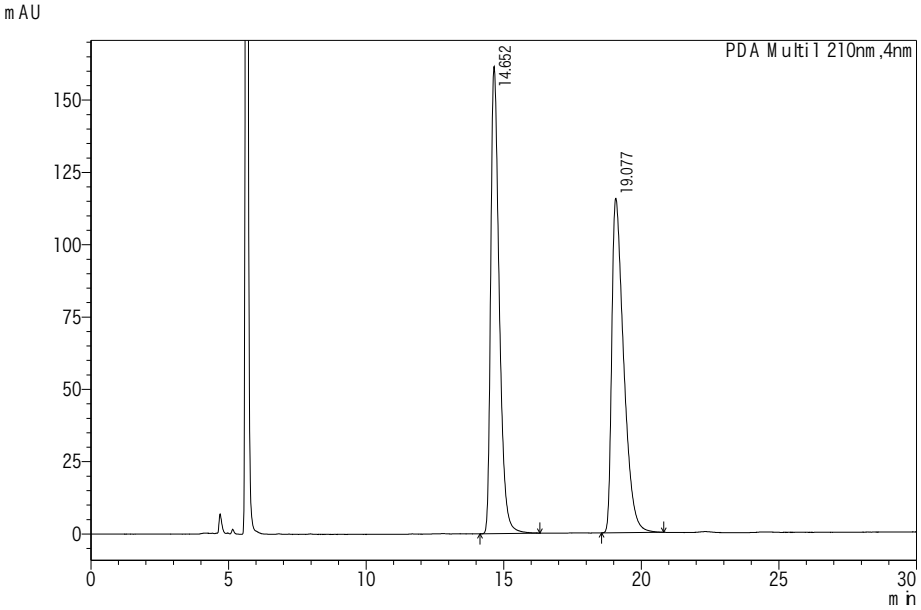
Peak#	Ret. Time	Area	Height	Area%
1	17.668	251874	10775	1.896
2	22.269	13029761	417999	98.104
Total		13281635	428774	100.000

D:¥PersonalFiles¥Sato¥is495-1-p-tol-0319.lcd

Acquired by	: System Administrator
Sample Name	: is480-2-p-tol-rac-0319
Sample ID	: is480-2-p-tol-rac-0319
Tray#	: 1
Vial#	: 1
Injection Volume	: 1
Data File	: is480-2-p-tol-rac-0319.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/19 17:09:39
Date Processed	: 2015/03/19 18:50:42



racemic



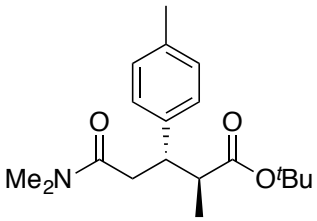
Peak Table

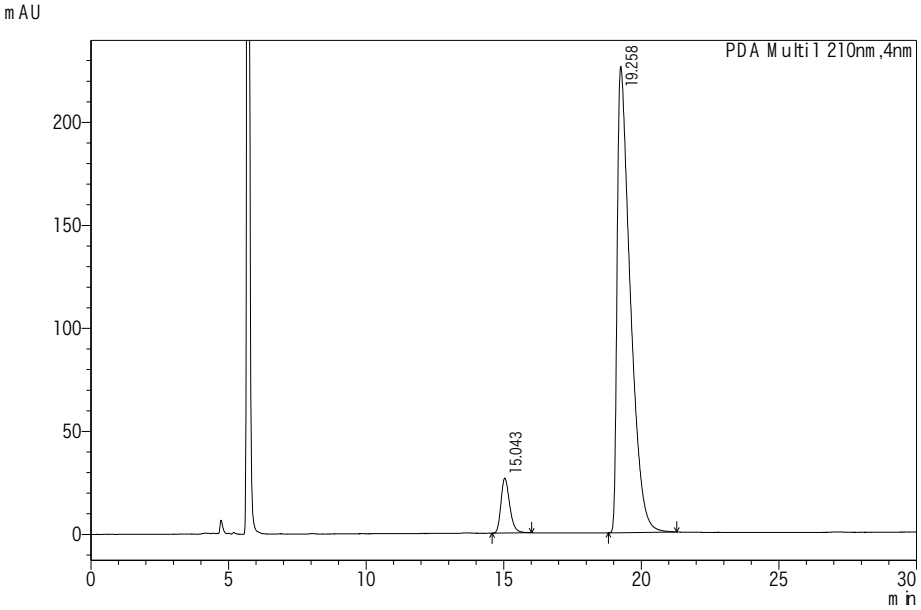
PDA Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	14.652	3490876	161518	50.043
2	19.077	3484811	115636	49.957
Total		6975688	277154	100.000

D:¥PersonalFiles¥Sato¥is480-2-p-tol-rac-0319.lcd

Acquired by	: System Administrator
Sample Name	: is495-2-p-tol-0319
Sample ID	: is495-2-p-tol-0319
Tray#	: 1
Vial#	: 1
Injection Volume	: 1
Data File	: is495-2-p-tol-0319.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/19 17:43:04
Date Processed	: 2015/03/19 18:50:37





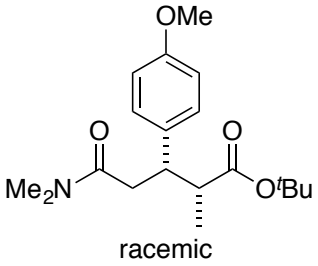
Peak Table

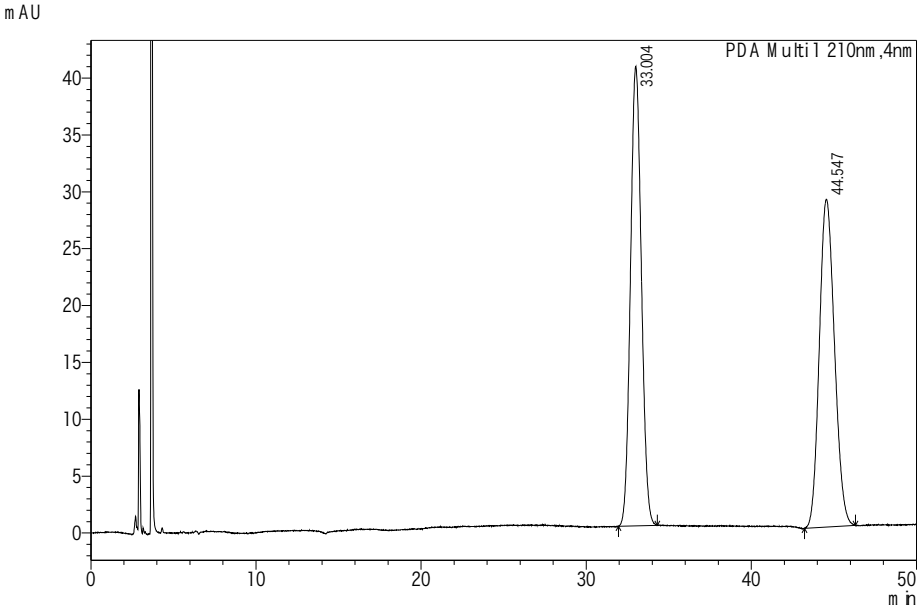
PDA Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	15.043	586970	26671	7.261
2	19.258	7497213	226299	92.739
Total		8084184	252970	100.000

D:¥Personal Files¥Sato¥is495-2-p-tol-0319.lcd

Acquired by	: System Administrator
Sample Name	: is481-1-p-OMe-rac-0324
Sample ID	: is481-1-p-OMe-rac-0324
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is481-1-p-OMe-rac-0324.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/24 10:54:06
Date Processed	: 2015/03/24 11:54:11





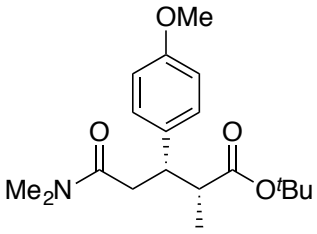
Peak Table

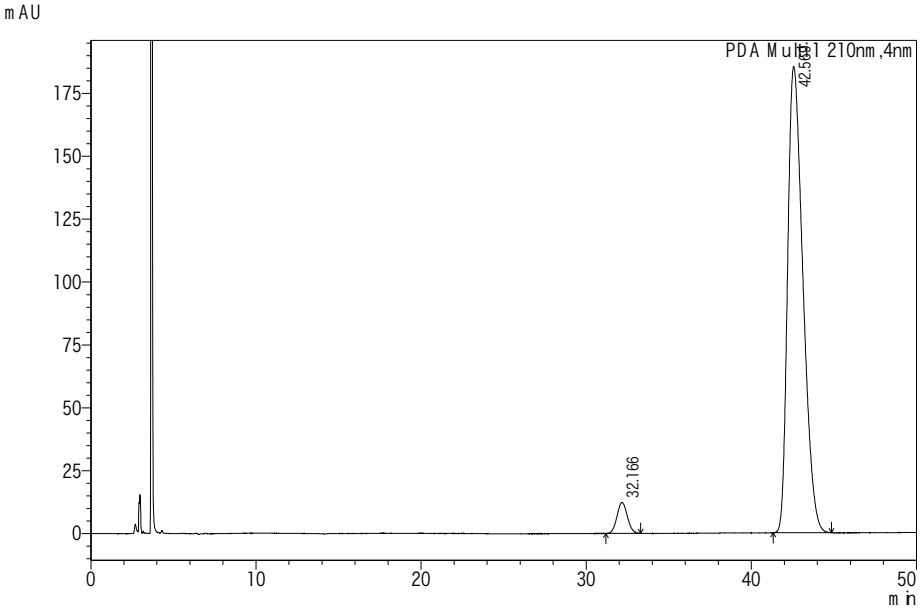
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	33.004	1851287	40388	50.150
2	44.547	1840204	28822	49.850
Total		3691491	69210	100.000

D:¥PersonaFiles¥Sato¥is481-1-p-OMe-rac-0324.lcd

Acquired by	: System Administrator
Sample Name	: is503-1-p-OMe-0324
Sample ID	: is503-1-p-OMe-0324
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is503-1-p-OMe-0324.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/24 12:03:00
Date Processed	: 2015/03/24 13:19:56





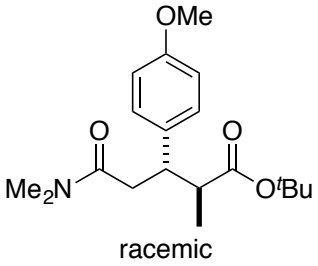
Peak Table

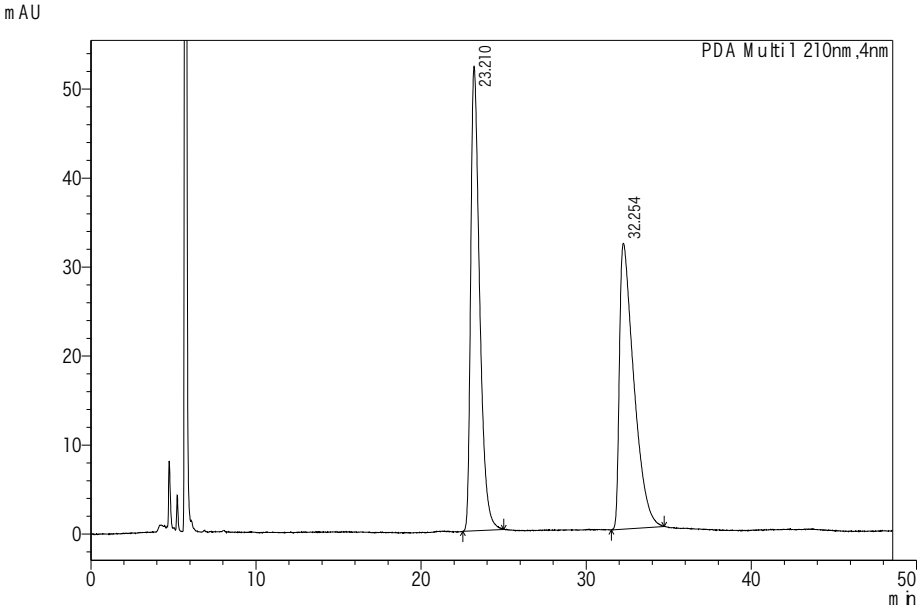
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	32.166	535096	12284	4.289
2	42.569	11941379	185392	95.711
Total		12476475	197676	100.000

D:¥PersonalFiles¥Sato¥is503-1-p-OMe-0324.lcd

Acquired by	: System Administrator
Sample Name	: is481-2-p-OMe-rac-0324
Sample ID	: is481-2-p-OMe-rac-0324
Tray#	: 1
Vial#	: 1
Injection Volume	: 1
Data File	: is481-2-p-OMe-rac-0324.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/24 15:00:49
Date Processed	: 2015/03/24 15:49:27





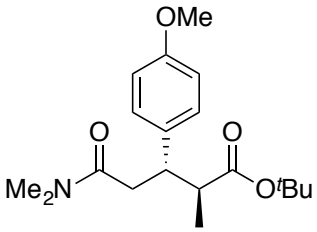
Peak Table

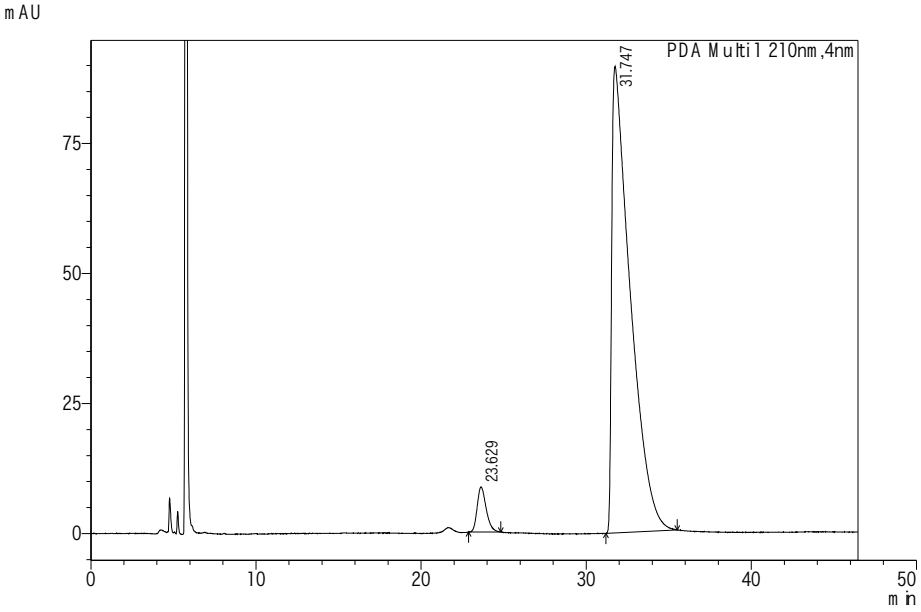
PDA Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	23.210	1968334	52175	50.228
2	32.254	1950498	32123	49.772
Total		3918832	84299	100.000

D:¥PersonaFiles¥Sato¥is481-2-p-OMe-rac-0324.lcd

Acquired by	: System Administrator
Sample Name	: is503-2-p-OMe-0324
Sample ID	: is503-2-p-OMe-0324
Tray#	: 1
Vial#	: 1
Injection Volume	: 1
Data File	: is503-2-p-OMe-0324.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/24 15:51:14
Date Processed	: 2015/03/24 16:45:09





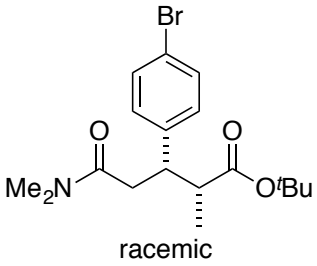
Peak Table

PDA Ch1 210nm

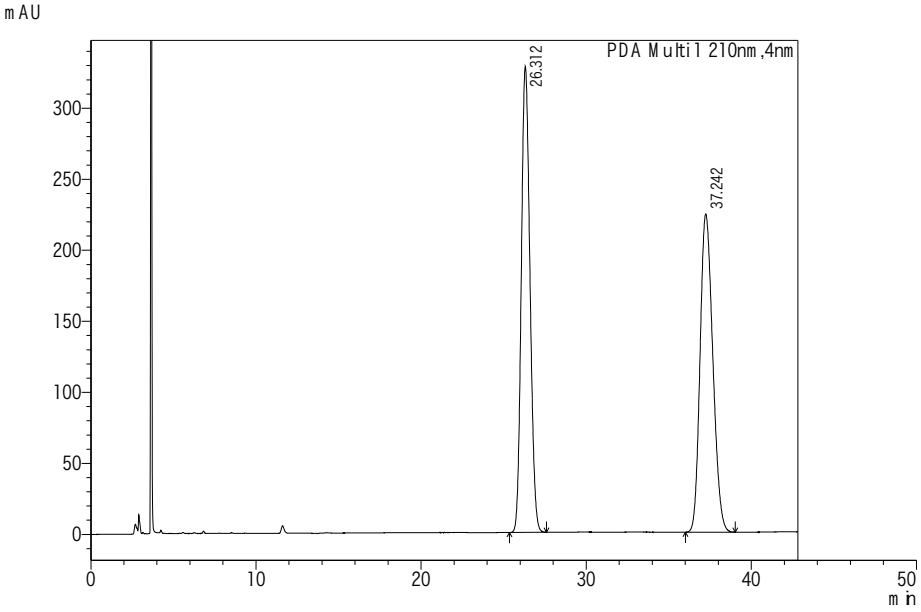
Peak#	Ret. Time	Area	Height	Area%
1	23.629	329520	8676	4.498
2	31.747	6995777	89671	95.502
Total		7325298	98347	100.000

D:¥PersonalFiles¥Sato¥is503-2-p-OMe-0324.lcd

Acquired by	: System Administrator
Sample Name	: is488-1-p-br-rac-0319
Sample ID	: is488-1-p-br-rac-0319
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is488-1-p-br-rac-0319.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/19 11:43:53
Date Processed	: 2015/03/19 12:26:46



racemic



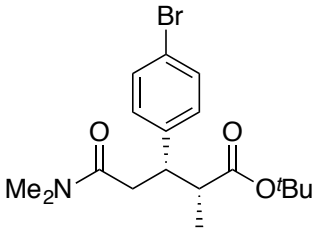
Peak Table

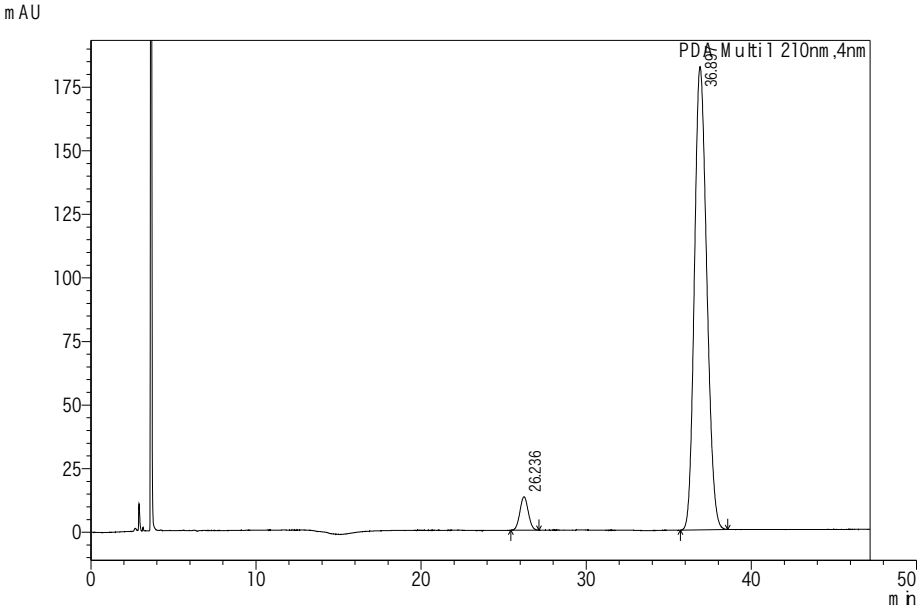
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	26.312	11967587	327915	49.909
2	37.242	12011105	224055	50.091
Total		23978691	551970	100.000

D:¥PersonalFiles¥Sato¥is488-1-p-br-rac-0319.lcd

Acquired by	: System Administrator
Sample Name	: is496-1-p-br-0319
Sample ID	: is496-1-p-br-0319
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is496-1-p-br-0319.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/19 12:28:31
Date Processed	: 2015/03/19 14:30:57





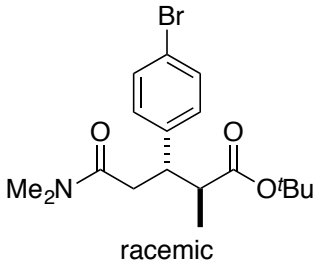
Peak Table

SPD-M20A Ch1 210nm

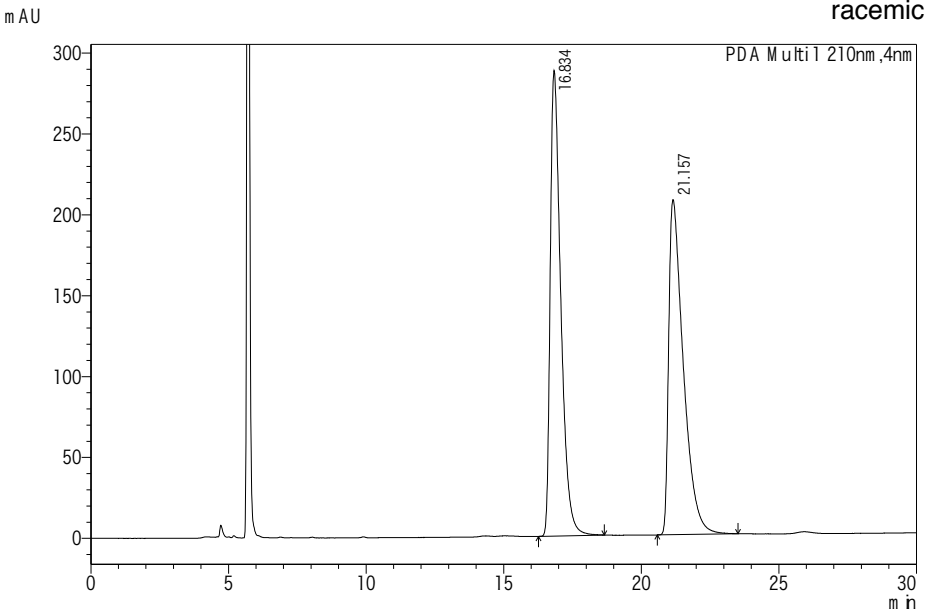
Peak#	Ret. Time	Area	Height	Area%
1	26.236	461614	13144	4.652
2	36.897	9460977	182186	95.348
Total		9922592	195330	100.000

D:¥PersonalFiles¥Sato¥is496-1-p-br-0319.lcd

Acquired by	: System Administrator
Sample Name	: is488-2-p-br-0319
Sample ID	: is488-2-p-br-0319
Tray#	: 1
Vial#	: 1
Injection Volume	: 1
Data File	: is488-2-p-br-0319.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/19 18:46:04
Date Processed	: 2015/03/19 19:31:41



racemic



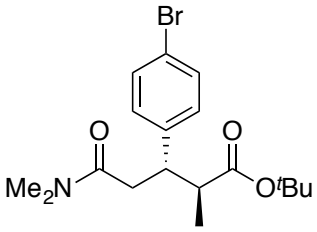
Peak Table

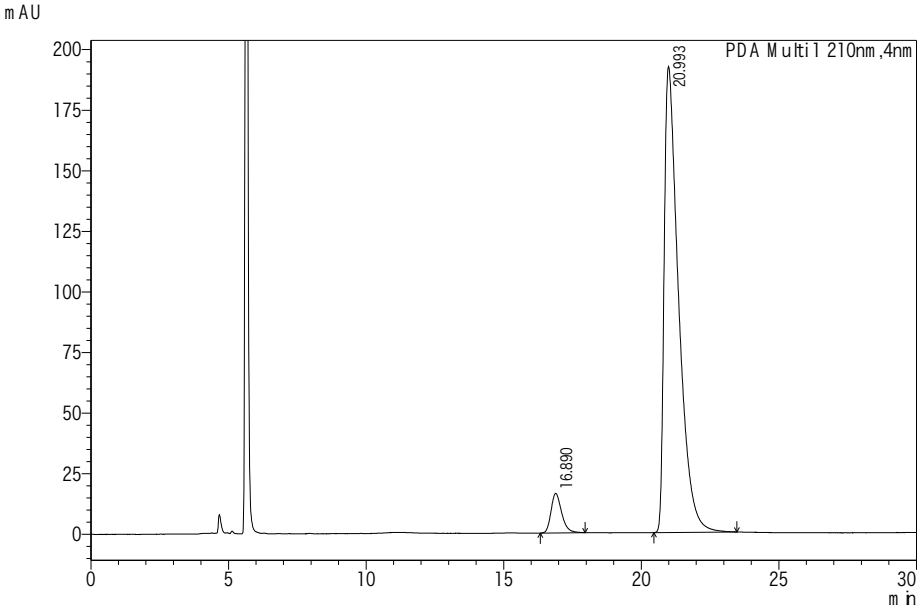
PDA Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	16.834	7696098	287852	50.140
2	21.157	7653097	207162	49.860
Total		15349195	495014	100.000

D:¥PersonalFiles¥Sato¥is488-2-p-br-0319.lcd

Acquired by	: System Administrator
Sample Name	: is496-2-p-br-0319
Sample ID	: is496-2-p-br-0319
Tray#	: 1
Vial#	: 1
Injection Volume	: 1
Data File	: is496-2-p-br-0319.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/19 19:33:31
Date Processed	: 2015/03/19 20:33:47





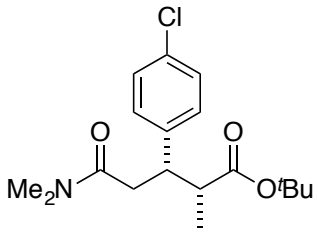
Peak Table

PDA Ch1 210nm

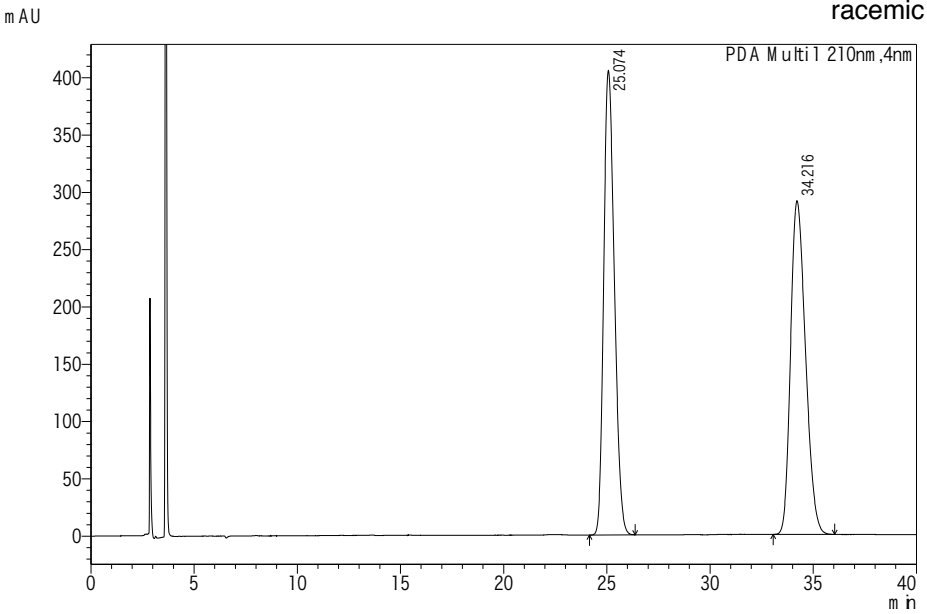
Peak#	Ret. Time	Area	Height	Area%
1	16.890	439691	16325	5.892
2	20.993	7022397	192287	94.108
Total		7462088	208612	100.000

D:¥PersonalFiles¥Sato¥is496-2-p-br-0319.lcd

Acquired by	: System Administrator
Sample Name	: is841-1-rac-0205
Sample ID	: is841-1-rac-0205
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is841-1-rac-0205.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2016/02/05 11:48:03
Date Processed	: 2016/02/05 16:19:03



racemic



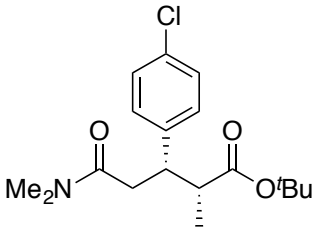
Peak Table

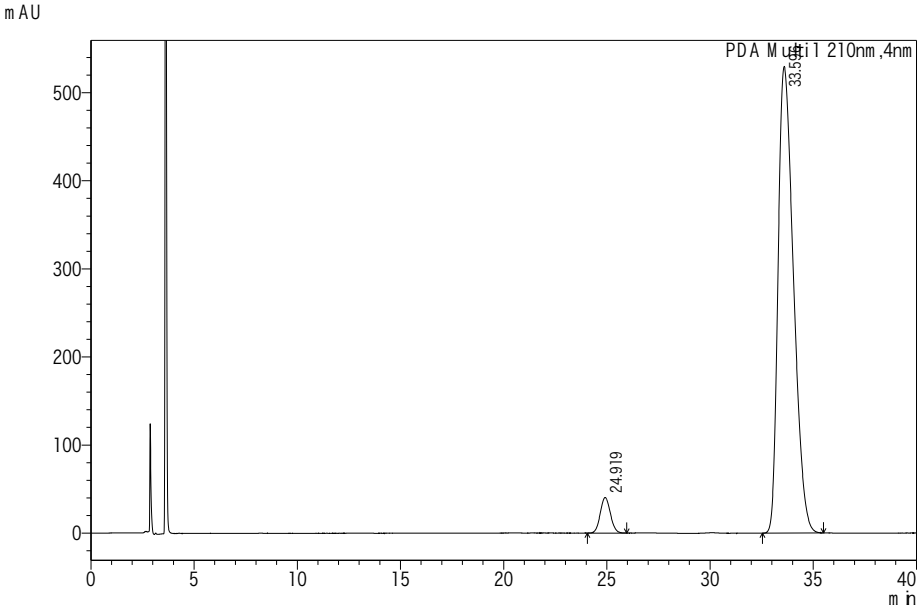
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	25.074	14574607	405318	49.878
2	34.216	14645640	291264	50.122
Total		29220247	696581	100.000

D:¥Personal Files¥Sato¥is841-1-rac-0205.lcd

Acquired by	: System Administrator
Sample Name	: is842-1-0205
Sample ID	: is842-1-0205
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is842-1-0205.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2016/02/05 12:45:35
Date Processed	: 2016/02/05 17:35:46





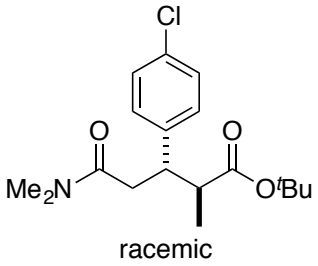
Peak Table

SPD-M20A Ch1 210nm

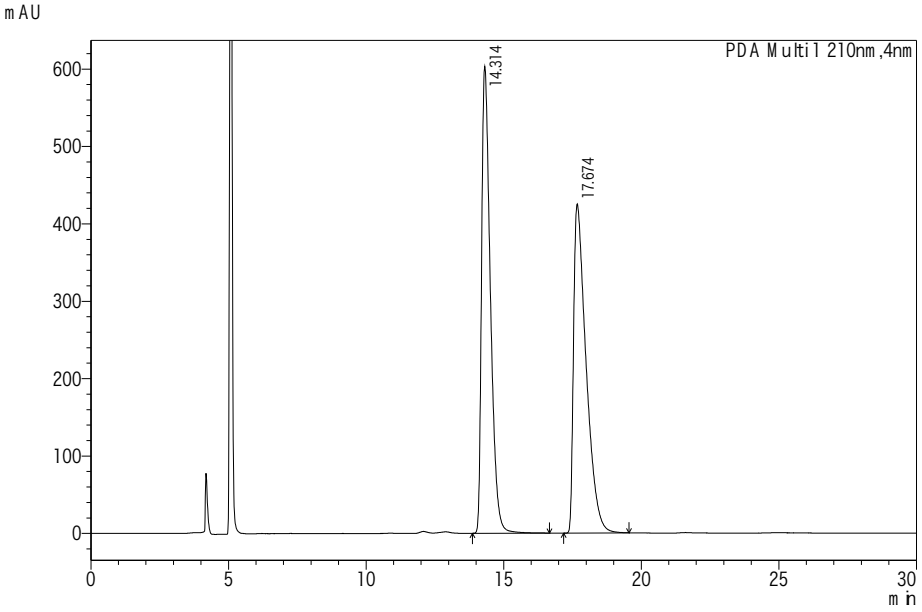
Peak#	Ret. Time	Area	Height	Area%
1	24.919	1375680	40465	4.764
2	33.596	27501495	529735	95.236
Total		28877175	570200	100.000

D:¥PersonalFiles¥Sato¥is842-1-0205.lcd

Acquired by	: System Administrator
Sample Name	: is841-2-rac-0205
Sample ID	: is841-2-rac-0205
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is841-2-rac-0205.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2016/02/05 16:15:57
Date Processed	: 2016/02/05 17:36:18



racemic



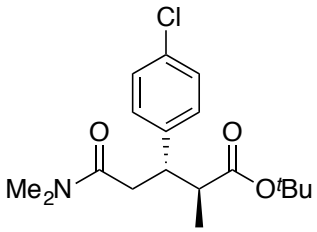
Peak Table

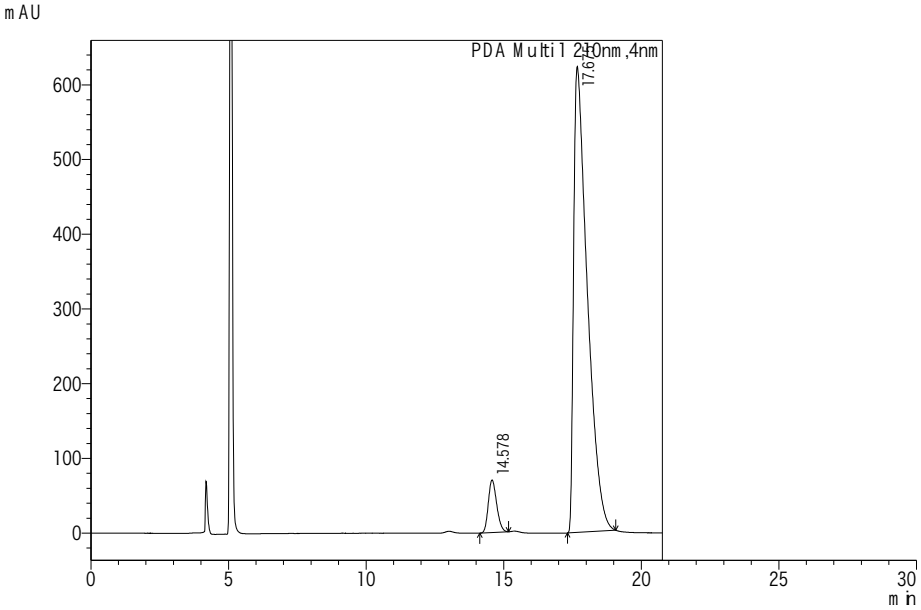
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	14.314	13444427	603207	49.936
2	17.674	13479076	425387	50.064
Total		26923503	1028594	100.000

D:¥Personal Files¥Sato¥is841-2-rac-0205.lcd

Acquired by	: System Administrator
Sample Name	: is842-2-0205
Sample ID	: is842-2-0205
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is842-2-0205.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2016/02/05 17:14:54
Date Processed	: 2016/02/05 17:38:17





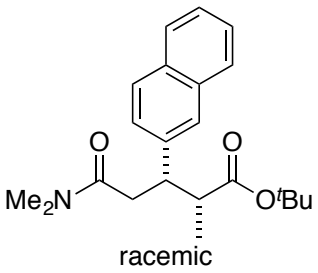
Peak Table

SPD-M20A Ch1 210nm

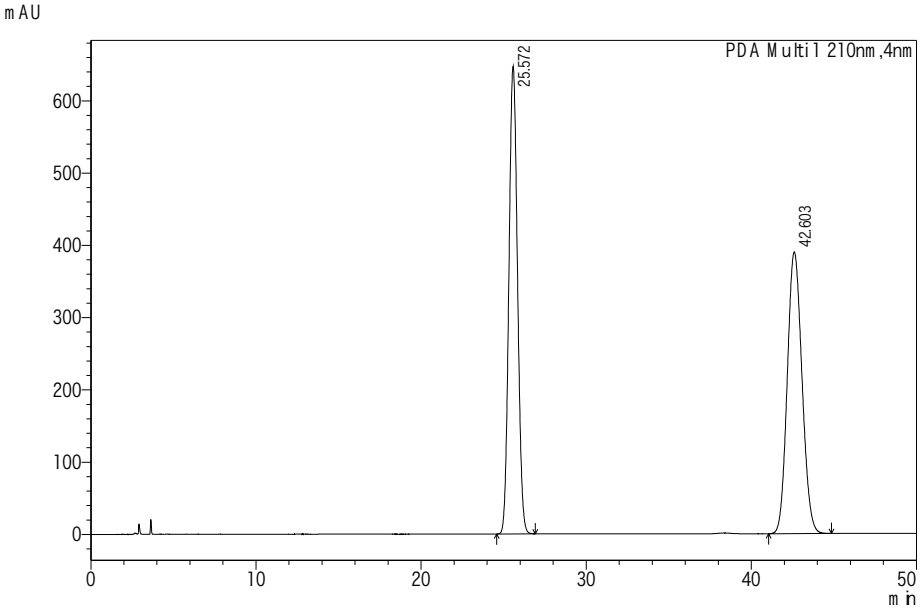
Peak#	Ret. Time	Area	Height	Area%
1	14.578	1491782	70391	6.466
2	17.675	21578804	623657	93.534
Total		23070586	694048	100.000

D:¥PersonalFiles¥Sato¥is842-2-0205.lcd

Acquired by	: System Administrator
Sample Name	: is745-1-rac-1105
Sample ID	: is745-1-rac-1105
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is745-1-rac-1105.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/05 14:03:04
Date Processed	: 2015/11/05 16:18:55



racemic



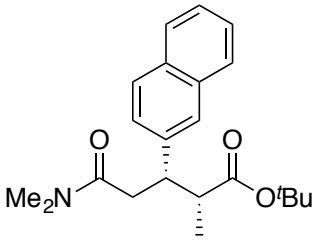
Peak Table

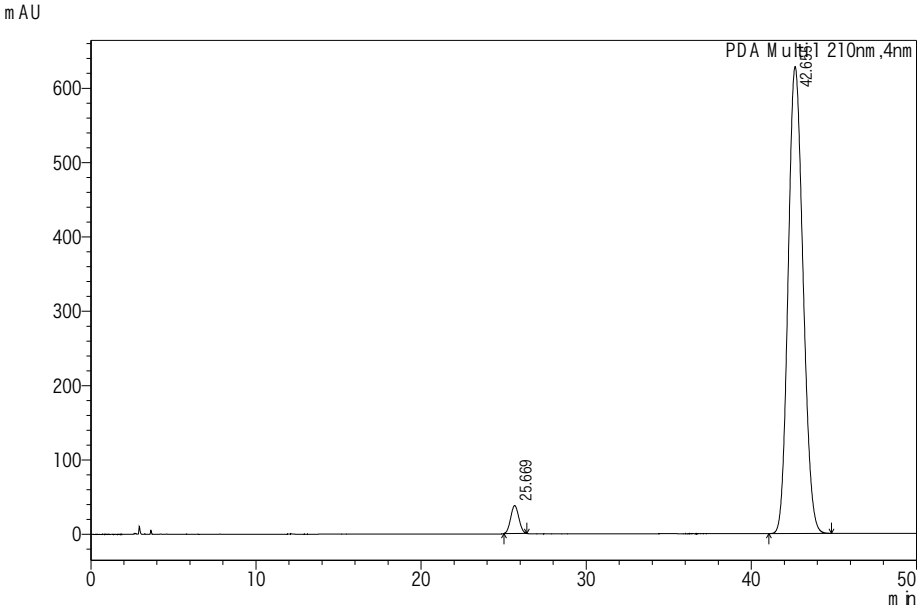
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	25.572	23429824	646811	49.253
2	42.603	24140121	389830	50.747
Total		47569945	1036642	100.000

D:¥Personal Files¥Sato¥is745-1-rac-1105.lcd

Acquired by	: System Administrator
Sample Name	: is758-1-1105
Sample ID	: is758-1-1105
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is758-1-1105.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: for paper.lsr
Date Acquired	: 2015/11/05 15:11:21
Date Processed	: 2016/05/10 13:17:02





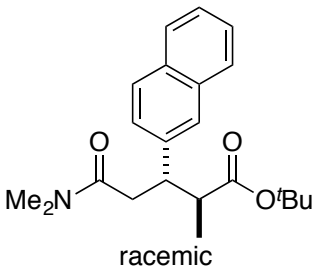
Peak Table

SPD-M20A Ch1 210nm

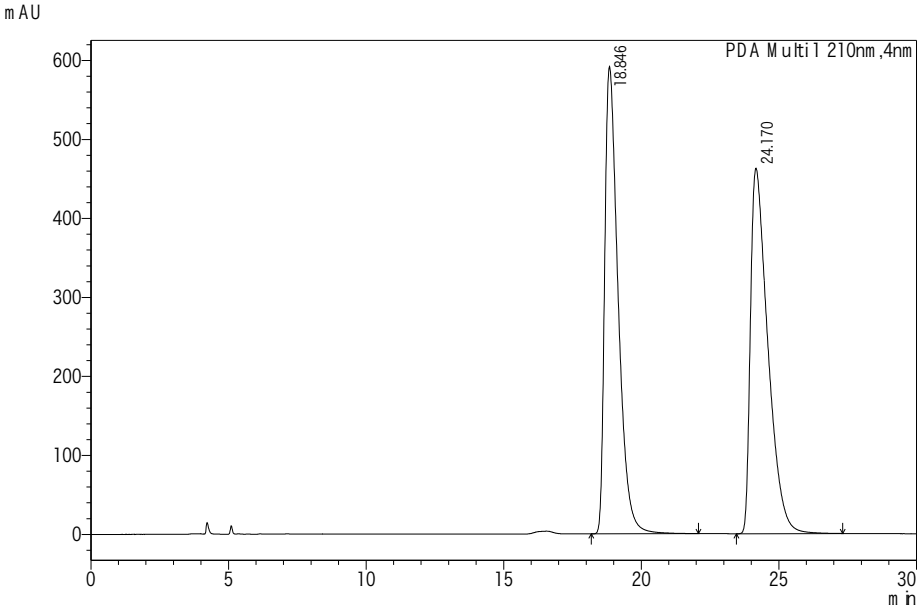
Peak#	Ret. Time	Area	Height	Area%
1	25.669	1289677	37589	3.171
2	42.655	39380625	628100	96.829
Total		40670302	665688	100.000

D:¥PersonalFiles¥Sato¥is758-1-1105.lcd

Acquired by	: System Administrator
Sample Name	: is745-2-rac-1110
Sample ID	: is745-2-rac-1110
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is745-2-rac-1110.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/10 10:37:38
Date Processed	: 2015/11/10 12:37:35



racemic



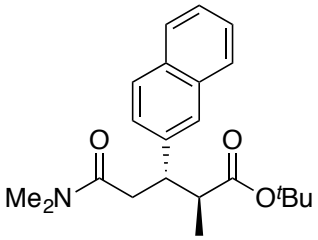
Peak Table

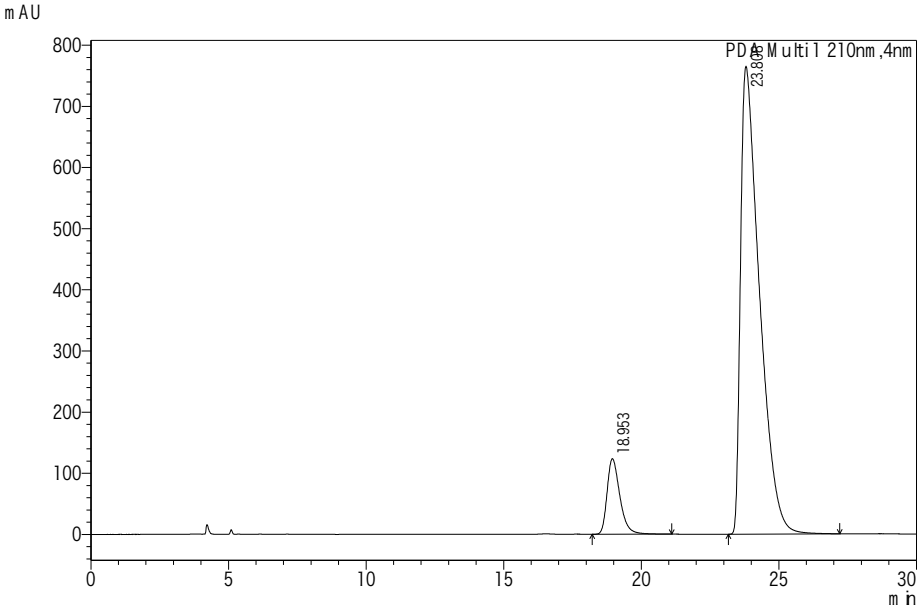
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	18.846	20095247	591682	49.666
2	24.170	20365560	462799	50.334
Total		40460808	1054481	100.000

D:¥Personal Files¥Sato¥is745-2-rac-1110.lcd

Acquired by	: System Administrator
Sample Name	: is758-2-1110
Sample ID	: is758-2-1110
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is758-2-1110.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/10 11:37:15
Date Processed	: 2015/11/10 12:37:28



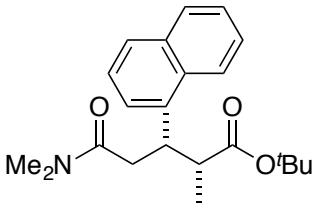


Peak Table

SPD-M20A Ch1 210nm

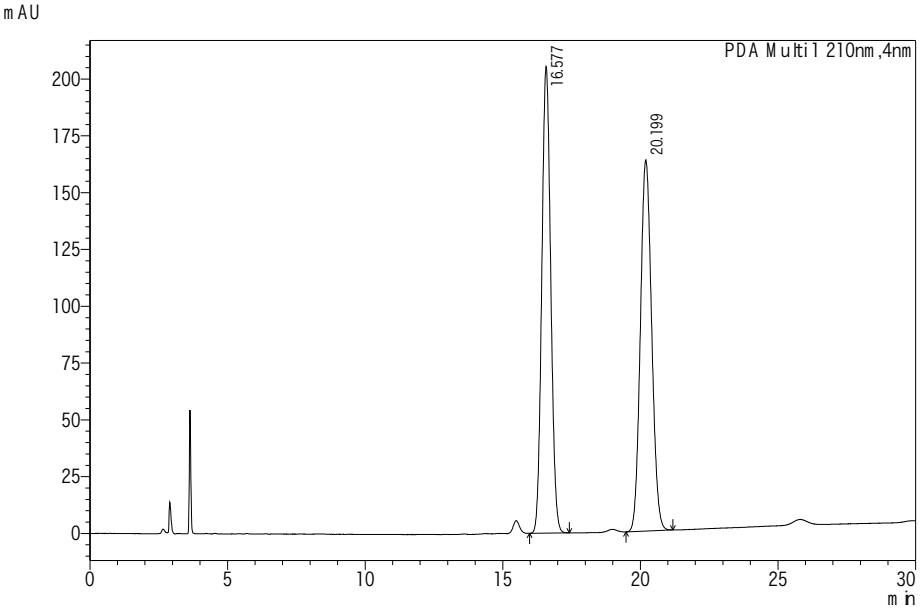
Peak#	Ret. Time	Area	Height	Area%
1	18.953	3991333	123623	9.848
2	23.808	36538922	764744	90.152
Total		40530254	888368	100.000

D:¥PersonalFiles¥Sato¥is758-2-1110.lcd



racemic

Acquired by	: System Administrator
Sample Name	: is744-1-rac-1110
Sample ID	: is744-1-rac-1110
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is744-1-rac-1110.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/10 17:05:22
Date Processed	: 2015/11/10 17:37:57



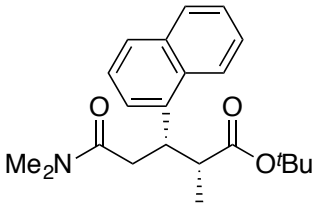
Peak Table

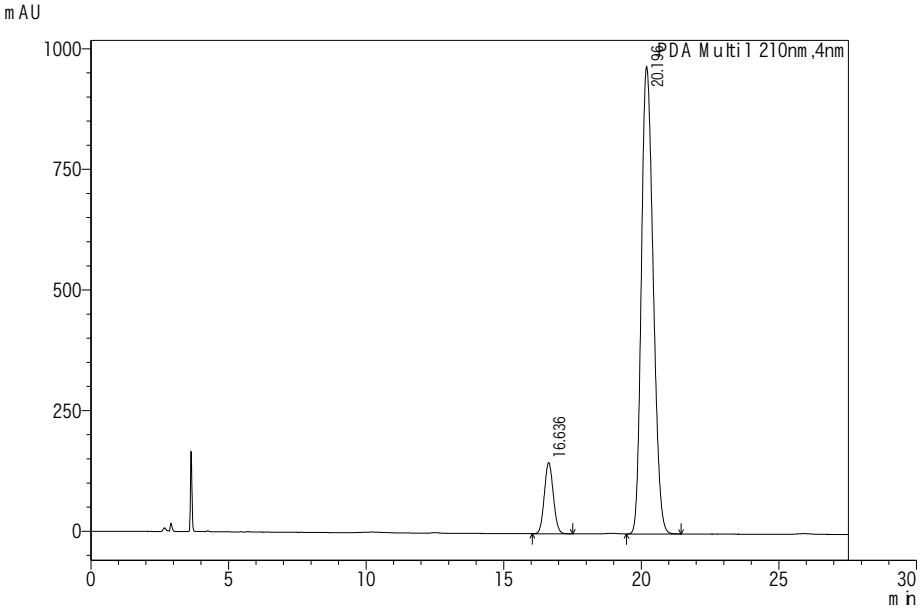
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	16.577	4644521	205384	49.933
2	20.199	4657017	163427	50.067
Total		9301538	368811	100.000

D:¥Personal Files¥Sato¥is744-1-rac-1110.lcd

Acquired by	: System Administrator
Sample Name	: is759-1-1110
Sample ID	: is759-1-1110
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is759-1-1110.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/10 17:38:58
Date Processed	: 2015/11/10 18:07:57





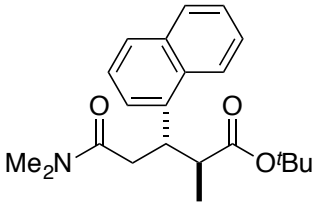
Peak Table

SPD-M20A Ch1 210nm

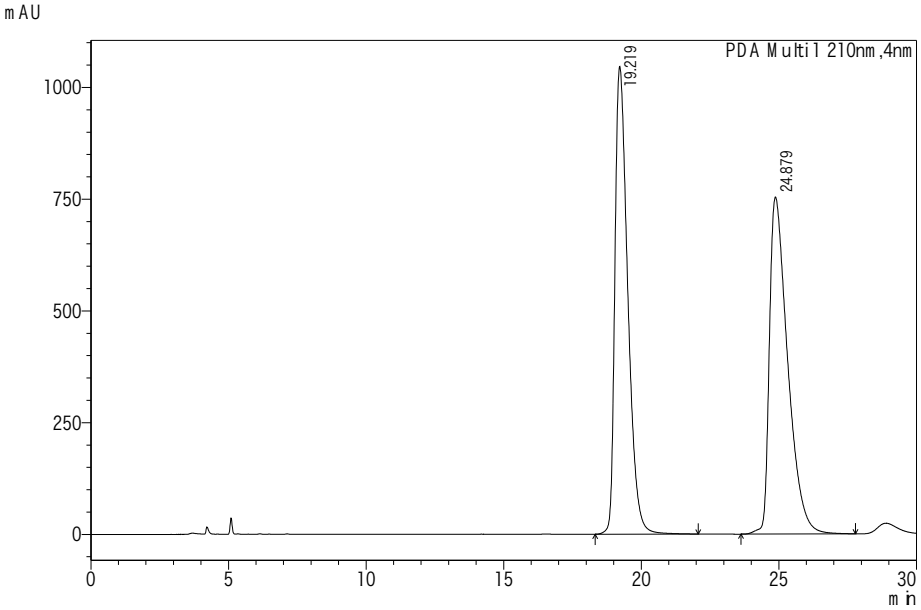
Peak#	Ret. Time	Area	Height	Area%
1	16.636	3341796	147516	10.358
2	20.196	28919642	968818	89.642
Total		32261438	1116334	100.000

D:¥PersonalFiles¥Sato¥is759-1-1110.lcd

Acquired by	: System Administrator
Sample Name	: is744-2-rac-1110
Sample ID	: is744-2-rac-1110
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is744-2-rac-1110.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/10 12:34:06
Date Processed	: 2015/11/10 16:23:02



racemic



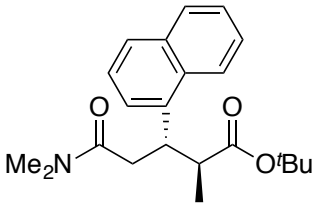
Peak Table

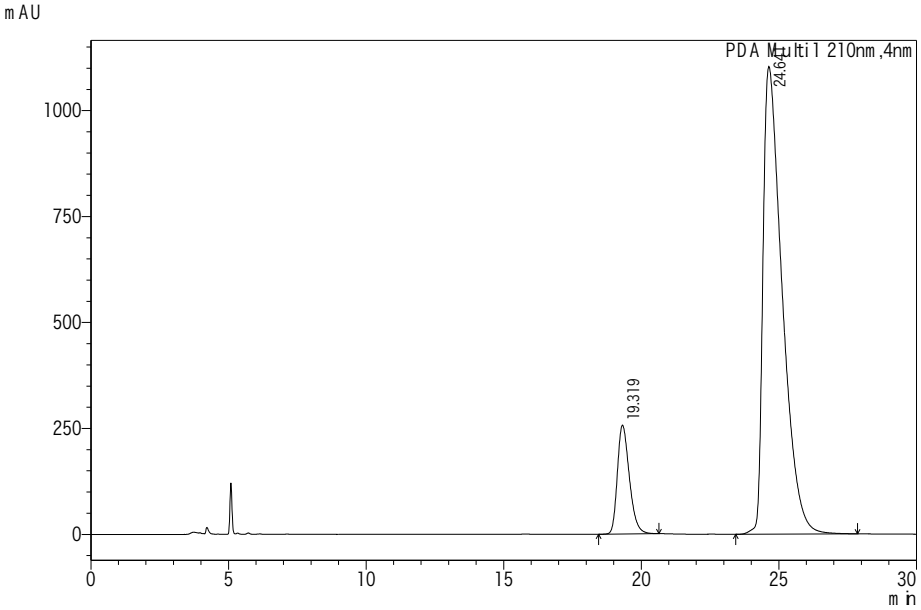
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	19.219	33967574	1046168	49.366
2	24.879	34840528	754023	50.634
Total		68808102	1800190	100.000

D:¥Personal Files¥Sato¥is744-2-rac-1110.lcd

Acquired by	: System Administrator
Sample Name	: is759-2-1110
Sample ID	: is759-2-1110
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is759-2-1110.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/10 13:45:37
Date Processed	: 2015/11/10 16:22:56





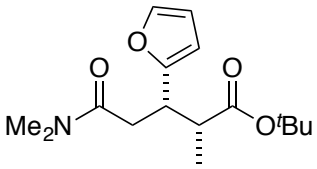
Peak Table

SPD-M20A Ch1 210nm

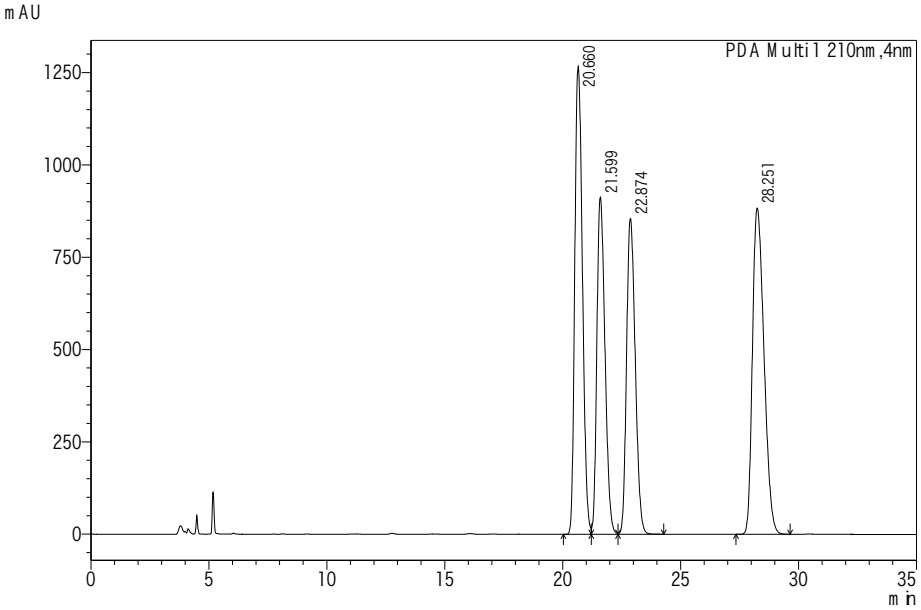
Peak#	Ret. Time	Area	Height	Area%
1	19.319	7786704	257140	12.684
2	24.641	53602432	1103604	87.316
Total		61389137	1360744	100.000

D:¥PersonalFiles¥Sato¥is759-2-1110.lcd

Acquired by	: System Administrator
Sample Name	: is756-rac-1110
Sample ID	: is756-rac-1110
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is756-rac-1110.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/10 18:59:17
Date Processed	: 2015/11/10 21:49:41



racemic



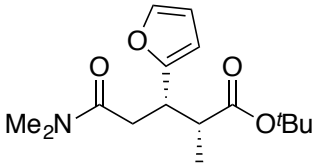
Peak Table

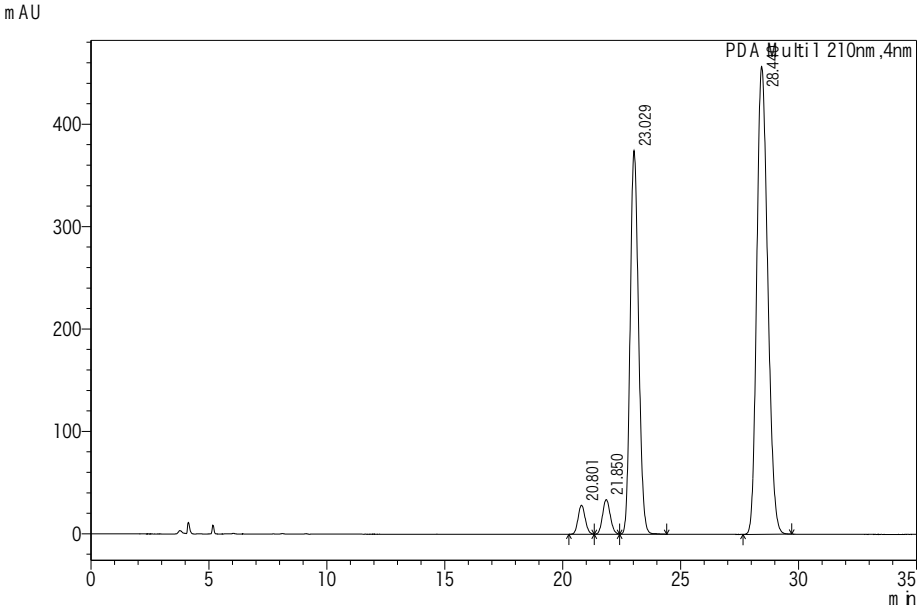
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	20.660	28646121	1266982	27.952
2	21.599	21832231	913289	21.303
3	22.874	21929751	855555	21.398
4	28.251	30074598	883420	29.346
Total		102482701	3919245	100.000

D:¥PersonaFiles¥Sato¥is756-rac-1110.lcd

Acquired by	: System Administrator
Sample Name	: is757-1110
Sample ID	: is757-1110
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is757-1110.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/10 20:11:05
Date Processed	: 2015/11/10 21:49:38





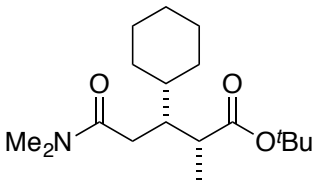
Peak Table

SPD-M20A Ch1 210nm

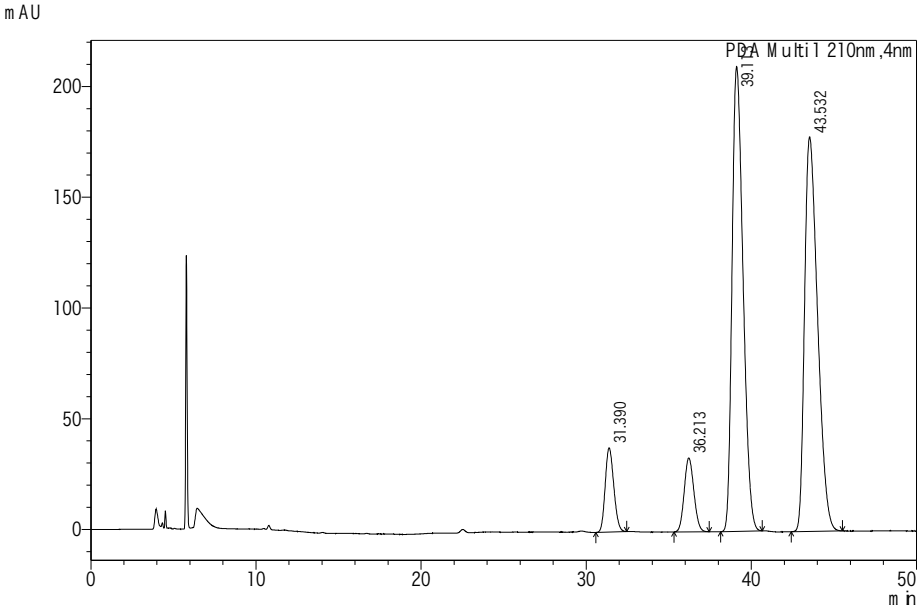
Peak#	Ret. Time	Area	Height	Area%
1	20.801	599649	28384	2.356
2	21.850	773311	33940	3.039
3	23.029	9276552	374718	36.454
4	28.440	14797540	456886	58.150
Total		25447052	893927	100.000

D:¥PersonalFiles¥Sato¥is757-1110.lcd

Acquired by	: System Administrator
Sample Name	: is482-cyHex-rac-0324-2nd
Sample ID	: is482-cyHex-rac-0324-2nd
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is482-cyHex-rac-0324-2nd.lcd
Method File	: 0-0.7-180.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/24 16:35:39
Date Processed	: 2015/03/24 20:16:12



racemic



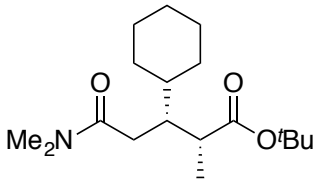
Peak Table

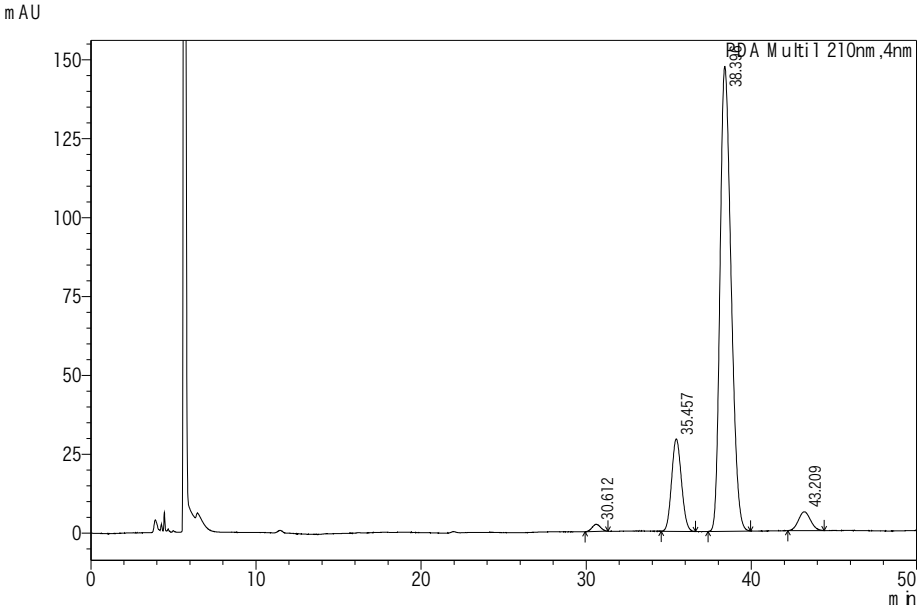
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	31.390	1372156	38027	6.180
2	36.213	1353519	33382	6.096
3	39.113	9708716	209878	43.724
4	43.532	9769960	178175	44.000
Total		22204351	459462	100.000

D:¥PersonalFiles¥Sato¥is482-cyHex-rac-0324-2nd.lcd

Acquired by	: System Administrator
Sample Name	: is506-cyHex-0324
Sample ID	: is506-cyHex-0324
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is506-cyHex-0324.lcd
Method File	: 0-0.7-180.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/03/24 19:12:01
Date Processed	: 2015/03/24 20:16:07





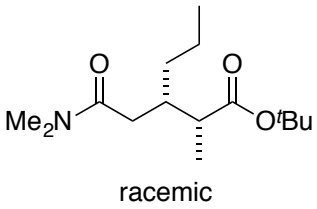
Peak Table

SPD-M20A Ch1 210nm

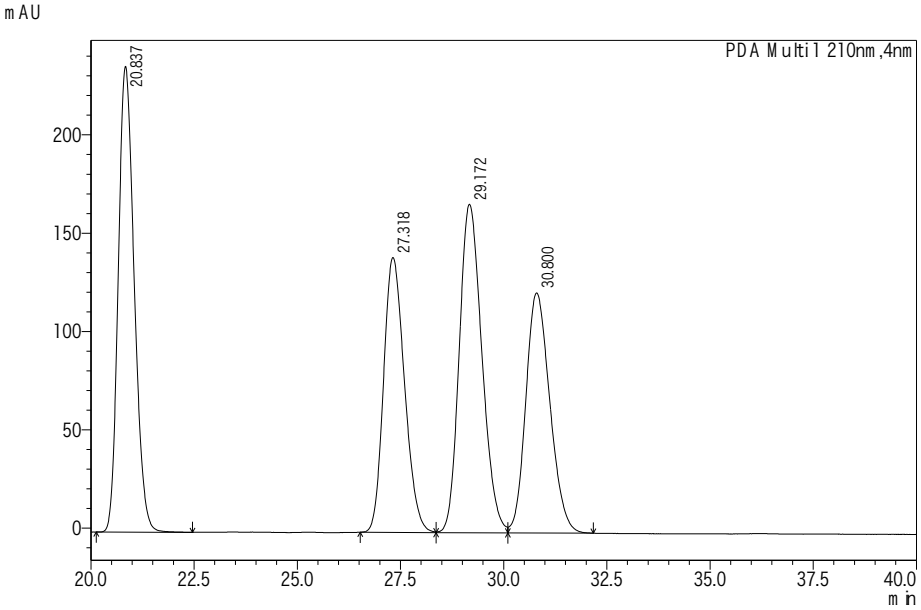
Peak#	Ret. Time	Area	Height	Area%
1	30.612	80739	2280	0.956
2	35.457	1213014	29309	14.368
3	38.396	6844429	147282	81.070
4	43.209	304458	5964	3.606
Total		8442639	184835	100.000

D:¥PersonalFiles¥Sato¥is506-cyHex-0324.lcd

Acquired by	: System Administrator
Sample Name	: is769-rac-1218
Sample ID	: is769-rac-1218
Tray#	: 1
Vial#	: 1
Injection Volume	: 1
Data File	: is769-rac-1218.lcd
Method File	: 0.25-200.lcm
Batch File	:
Report Format File	: for paper.lsr
Date Acquired	: 2015/12/18 11:40:20
Date Processed	: 2016/05/10 13:38:22



racemic



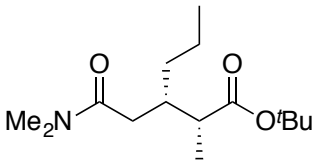
Peak Table

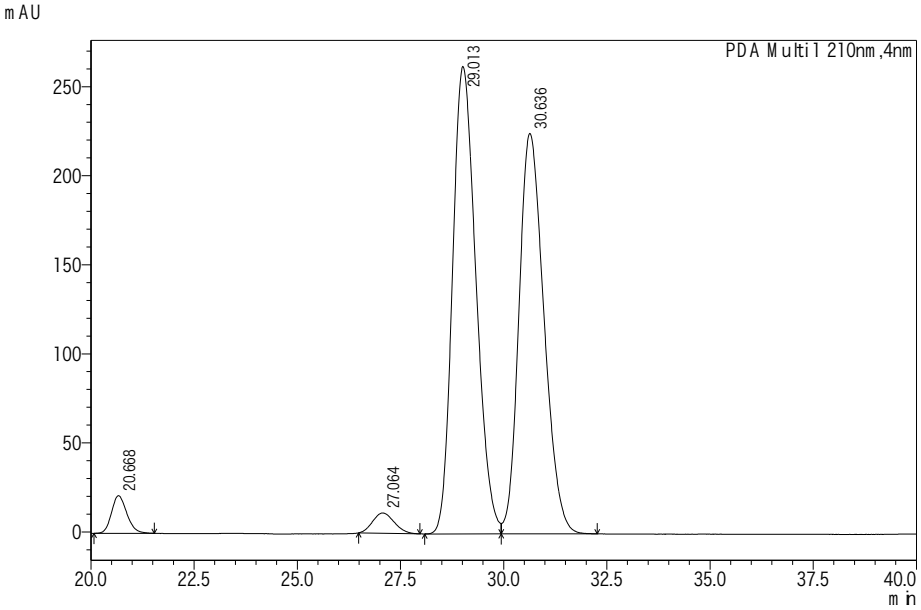
PDA Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	20.837	6366401	236842	28.133
2	27.318	4931572	139806	21.792
3	29.172	6381981	167070	28.202
4	30.800	4949730	122035	21.873
Total		22629683	665753	100.000

D:¥PersonalFiles¥Sato¥is769-rac-1218.lcd

Acquired by	: System Administrator
Sample Name	: is773-1218
Sample ID	: is773-1218
Tray#	: 1
Vial#	: 1
Injection Volume	: 1
Data File	: is773-1218.lcd
Method File	: 0.25-200.lcm
Batch File	:
Report Format File	: for paper.lsr
Date Acquired	: 2015/12/18 12:36:30
Date Processed	: 2016/05/28 18:51:23





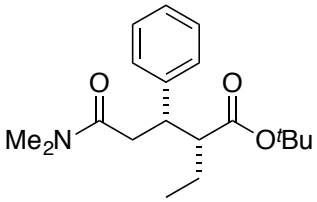
Peak Table

PDA Ch1 210nm

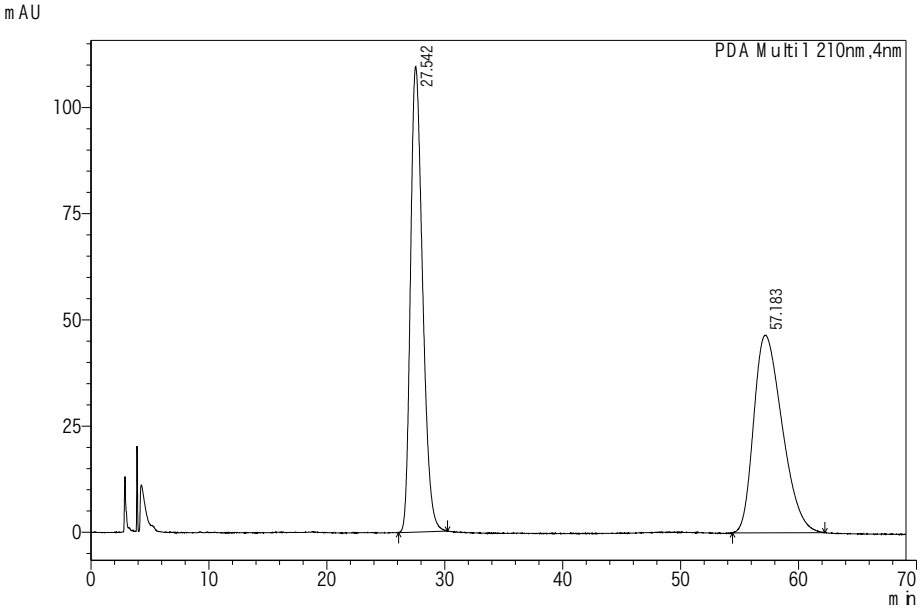
Peak#	Ret. Time	Area	Height	Area%
1	20.668	547374	21134	2.632
2	27.064	412632	11397	1.984
3	29.013	10367422	262464	49.855
4	30.636	9467709	224896	45.528
Total		20795136	519891	100.000

D:¥PersonalFiles¥Sato¥is773-1218.lcd

Acquired by	: System Administrator
Sample Name	: is740-1-rac-1104
Sample ID	: is740-1-rac-1104
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is740-1-rac-1104.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/04 12:08:59
Date Processed	: 2015/11/04 19:59:34



racemic



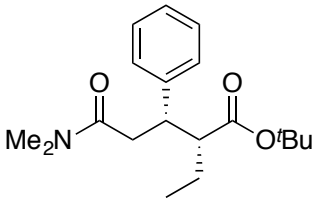
Peak Table

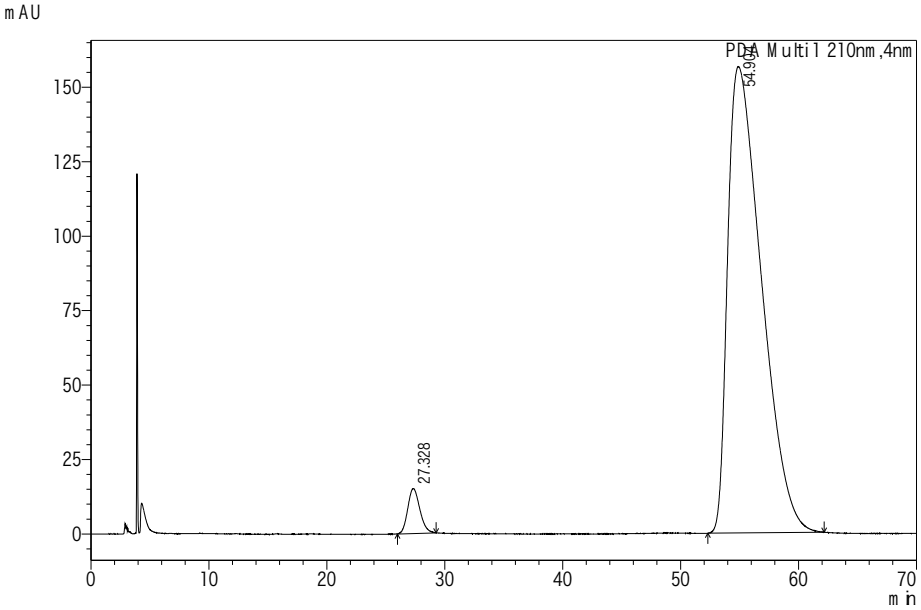
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	27.542	7826868	109616	50.085
2	57.183	7800292	46517	49.915
Total		15627160	156133	100.000

D:¥Personal Files¥Sato¥is740-1-rac-1104.lcd

Acquired by	: System Administrator
Sample Name	: is748-1-1104
Sample ID	: is748-1-1104
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is748-1-1104.lcd
Method File	: 0-1.0-60.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/11/04 13:20:47
Date Processed	: 2015/11/04 14:33:11





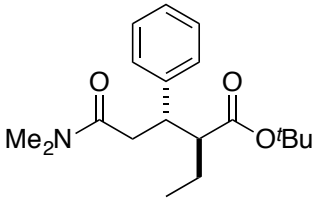
Peak Table

SPD-M20A Ch1 210nm

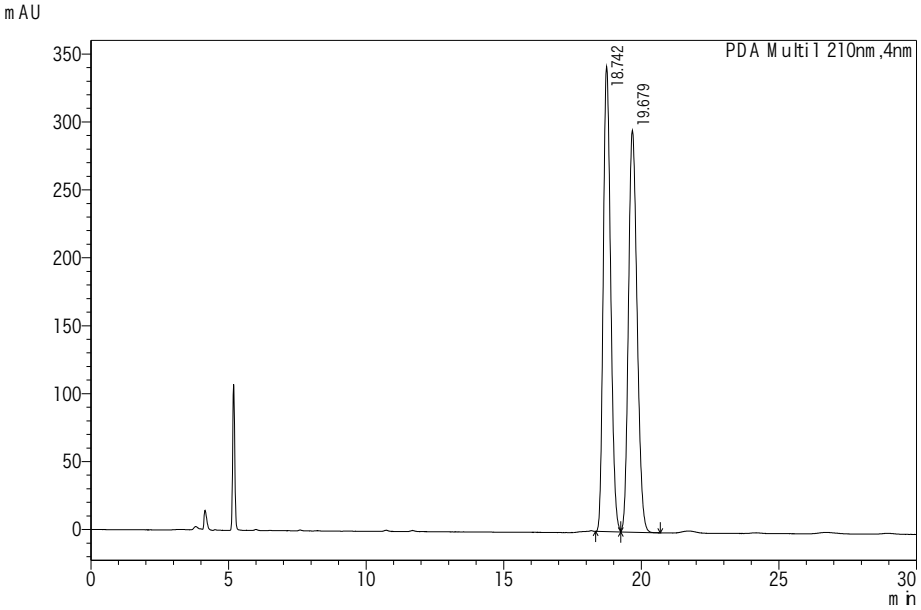
Peak#	Ret. Time	Area	Height	Area%
1	27.328	1077864	15136	3.344
2	54.904	31150825	156626	96.656
Total		32228690	171763	100.000

D:¥PersonalFiles¥Sato¥is748-1-1104.lcd

Acquired by	: System Administrator
Sample Name	: is740-2-1030-2nd
Sample ID	: is740-2-1030-2nd
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is740-2-1030-2nd.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/10/30 12:31:07
Date Processed	: 2015/10/30 14:20:04



racemic



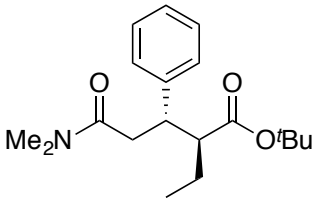
Peak Table

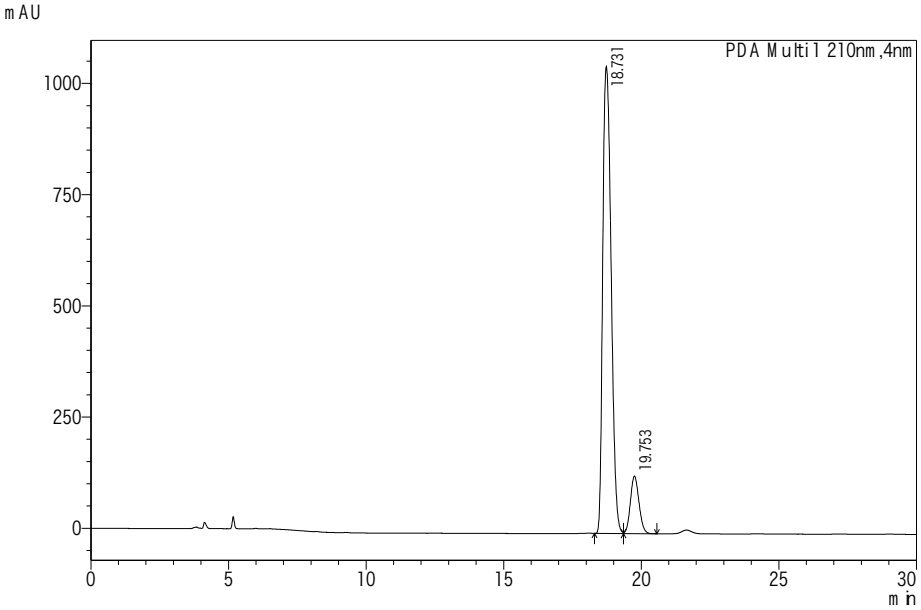
SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	18.742	6414550	342397	49.803
2	19.679	6465169	295938	50.197
Total		12879719	638335	100.000

D:¥Persona Files¥Sato¥is740-2-1030-2nd.lcd

Acquired by	: System Administrator
Sample Name	: is748-2-1030-2nd
Sample ID	: is748-2-1030-2nd
Tray#	: 1
Vial#	: -1
Injection Volume	: 1
Data File	: is748-2-1030-2nd.lcd
Method File	: 0-0.7-90.lcm
Batch File	:
Report Format File	: DEFAULT.lsr
Date Acquired	: 2015/10/30 11:57:22
Date Processed	: 2015/10/30 14:19:58





Peak Table

SPD-M20A Ch1 210nm

Peak#	Ret. Time	Area	Height	Area%
1	18.731	22260022	1049920	88.805
2	19.753	2806174	129373	11.195
Total		25066196	1179293	100.000

D:¥PersonaFiles¥Sato¥is748-2-1030-2nd.lcd