Supporting Information

Highly Enantioselective Decarboxylative Protonation of α -Aminomalonates Mediated by Thiourea *Cinchona*-Alkaloid Derivatives: Access to both Enantiomers of Cyclic and Acyclic α -Aminoacids

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General Information

Acetonitrile (MeCN) was dried, purified from Pure-Solv™ 400 Solvent Purification System. Triethylamine (Et₃N) was distilled from CaH₂. All commercially available compounds were used as received. Thin layer chromatographies were performed on silica gel 60 F-254 plates (0.1 mm, Merck) with phosphomolybdic acid and/or UV detection. Chromatographic separations were achieved on silica gel columns (Kieselgel 60, 40-63 μ m, Merck). Analytical high performance liquid chromatographies (HPLC) were carried out with a Waters instrument [detector M996 (200-400 nm) and pump 600]. A Daicel Chiralpack AD-H (250mm x 4.6 mm, 5 μ m) was used for the determination of the enantiomeric excesses. The configuration of each enantiomer was assigned by comparison of the retention times of the reaction products with those of authentic samples independently synthesized. All NMR spectra were recorded on a Bruker Avance DPX 250 instrument. Chemical shifts (δ) are given in ppm and coupling constants (*J*) in Hz. Mass and high resolution mass spectra (HRMS) were obtained on a Waters-Micromass Q-ToF micro instrument. IR spectra were recorded on a Perkin-Elmer 16 PC FT-IR spectrometer. Optical rotations were measured on a Perkin-Elmer 241 LC polarimeter in a 1 dm cell.

Cinchona alkaloid derivatives **2**,¹ **3**,² **5**,³ **6**,² and starting materials or reference compounds

¹ Li, B.-J. ; Jiang, L. ; Liu, M. ; Chen, Y.-C.; Ding L.-S.; Wu, Y. *Synlett* **2005**, 603-606.

² Vakulya, B.; Varga, S.; Csampai A.; Soos, T. *Org. Lett.* **2005**, 7, 1967-1969.

³ Marcelli, Y.; van der Haas, R. N. S.; van Maarseveen, J. H.; Hiemstra, H. *Angew. Chem., Int. Ed.* **2006**, 45, 929-931.

7a,⁴ **7b**,⁴ **10a**,⁴ **10b**,⁴ **13a**,⁵ **13b**,⁵ **15a**,⁵ **15b**⁶ were prepared according to literature procedures. Compounds **12b**,⁷ **14b**,⁸ are known compounds but only partially characterized. Therefore, the full set of data is given here.

9-amino(9-deoxy)epicinchonin-9-yl [3,5-bis(trifluoromethyl)phenyl]thiocarbamate 1:

To a solution of 9-amino(9-deoxy)epicinchonine (0.6 g 2 mmol) in 5 mL of dry CH₂Cl₂ under nitrogen was added 3,5-bis(trifluoromethyl)phenyl isocyanate (0.34 mL, 2 mmol) at 0 °C. After 30 min, the mixture was stirred for 10 h at room temperature, and then concentrated

⁴ Seitz, T.; Baudoux, J.; Bekolo, H.; Cahard, D.; Plaquevent, J.-C.; Lasne, M.-C.; Rouden, J. *Tetrahedron* **2006**, 62, 6155-6165.

⁵ Brunner, H.; Baur, M. A. *Eur. J. Org. Chem.* **2003**, 2854-2862.

⁶ Dobashi, A.; Saito, N.; Motoyama, Y.; Hara, S. *J. Am. Chem. Soc.* **1986**, 108, 307-308.

⁷ Yamada, S.; Takeuchi, Y. *Chem. Pharm. Bull.* **1974**, 22, 634-637.

⁸ Duczec, W.; Deutsch, J.; Vieth, S.; Niclas, H.-J. *Synthesis* **1996**, 37-38.

under reduced pressure. The residue was purified by flash column chromatography (silicagel, CH₂Cl₂/MeOH/Et₃N: 97/3/ 0 to 89/10/1) to afford the title compound **1** (1.01 g, 92%). [α]_D²⁰ = +130.0 (c 0.97, CHCl₃); ¹H NMR (CDCl₃) δ 8.90 (d, *J* = 4.8 Hz, 1H), 8.39 (d, *J* = 8.4 Hz, 1H), 8.17 (d, *J* = 8.4 Hz, 1H), 7.78-7.65 (m, 2H), 7.63 (t, *J* = 7.6 Hz, 1H), 7.48 (d, *J* = 4.8 Hz, 1H), 7.39 (s, 1H), 6.56 (bs, 1H), 5.84 (ddd, *J* = 17.1, 10.4, 6.2 Hz, 1H), 5.31 (bs, 1H), 5.12 (dd, *J* = 17.1, 10.4 Hz, 2H), 2.93 (bs, 1H), 2.84 (d, *J* = 8.8 Hz, 2H), 2.71 (t, *J* = 8.0 Hz, 2H), 2.24 (q, *J* = 6.8 Hz, 1H), 1.60 (s, 1H), 1.48-1.35 (m, 2H), 1.27 (t, *J* = 8.4 Hz, 1H), 0.91-0.86 (m, 1H); ¹³C NMR (CD₃OD) δ 156.7, 151.0, 150.0, 149.0, 143.2, 141.4, 133.0 (q, ²*J*_{CF} = 33.3 Hz), 130.0, 128.8, 128.2, 125.0, 124.7 (q, ¹*J*_{CF} = 272.3 Hz), 120.6, 118.9, 115.5, 115.3, 61.2, 51.8, 50.2, 48.0, 40.4, 28.8, 27.3, 26.3; ¹⁹F (235 MHz, CDCl₃) δ 62.95; IR 3301, 3082, 2939, 2873, 1696, 1675, 1568, 1472, 1385, 1276, 1125, 681 cm⁻¹; MS (EI) *m/z* (%) 549 (M+H, 45), 320 (2), 294 (100), 277 (16); HRMS (ESI) calcd for C₂₈H₂₇F₆N₄O (M+H) 549.2089, found 549.2070.

9-amino(9-deoxy)epiquinidin-9-yl phenylthiocarbamate **4**:

Prepared from 9-amino(9-deoxy)epiquinidine (0.65 g, 2 mmol) and phenyl isocyanate (0.36 mL, 3 mmol) according to a procedure similar to that one described for compound **1**. Flash column chromatography purification (silicagel, CH₂Cl₂ / MeOH: 97 / 3 to 90 / 10) afforded the desired product **4** (0.89 g, 98%). [α]_D²⁰ = +217.0 (c 0.93, CHCl₃); ¹H NMR (CDCl₃) δ 8.48 (d, *J* = 4.4 Hz, 1H), 8.20 (bs, 1H), 7.94 (d, *J* = 9.2 Hz, 1H), 7.74 (bs, 1H), 7.35-7.31 (m, 3H), 7.24-7.19 (m, 4H), 6.1 (bs, 1H), 5.87 (ddd, *J* = 17.0, 10.4, 6.4 Hz, 1H), 5.19 (d, *J* = 17.0 Hz, 1H), 5.14 (dd, *J* = 10.8, 1.2 Hz, 1H), 3.93 (s, 3H), 3.13 (m, 2H), 2.96-2.81 (m, 3H), 2.28 (d, *J* = 8.0 Hz, 1H), 1.60 (s, 1H), 1.51-1.45 (m, 2H), 1.31-1.25 (m, 1H), 0.94-0.89 (m, 1H); ¹³C NMR (CDCl₃) δ 180.8, 158.1, 147.8, 145.8, 144.9, 140.4, 138.2, 131.7, 129.7, 129.7, 128.6, 126.7, 125.6, 125.5, 122.6, 119.7, 115.4, 102.3, 61.2, 55.9, 55.9, 48.9, 47.6, 39.2, 27.5, 26.5, 25.5; IR 3195, 2938, 2871, 1621, 1589, 1506, 1313, 1262, 1225, 1028, 850, 732 cm⁻¹; MS (EI) *m/z* (%) 459 (M+H, 32), 366 (12), 324 (100), 307 (61), 264 (8); HRMS (ESI) calcd for C₂₇H₃₁N₄OS (M+H) 459.2195, found 459.2196.

1-Benzyloxycarbonyl, 2-carboethoxy-piperidine-2-carboxylic acid **8a**

To a stirred solution of 1,4-dibromobutane (2.5 mL, 21 mmol, 1.05 equiv.) and Cs_2CO_3 (15.0 g, 46 mmol, 2.3 equiv.) in MeCN (425 mL) was added acylaminomalonic acid diethyl ester (20 mmol, 1.0 equiv) in MeCN (20 mL) over 15 h at 50 °C. After 24 h stirring at 70 °C, the reaction mixture was cooled to room temperature and concentrated under reduced pressure. Water (200 mL) was added and the mixture was extracted with CH_2Cl_2 (5 x 100 mL). The combined organic layers were dried (MgSO_4) and concentrated under reduced pressure. The crude was purified by flash column chromatography (silicagel, CH_2Cl_2 / MeOH: 97 / 3) to afford the diester **8'a** (5.15 g, 71%). ^1H NMR (CDCl_3 , 2 rotamers a/b: 65/35) δ 7.35-7.23 (m, 5H a+b), 5.06 (s, 2H b), 5.03 (s, 2H a), 4.3-4.07 (m, 4H, a+b), 3.87 (d, J = 5.6 Hz, 1H, a+b), 3.38-3.34 (m, 1H a+b), 2.17-2.13 (m, 1H a+b), 1.5-1.4 (m, 1H a+b), 1.39-1.15 (m, 9H a+b), 1.2-1.0 (m, 1H a+b); ^{13}C NMR (CDCl_3 , 2 rotamers) δ 170.0 (b), 168.7 (a), 157.3 (a), 156.3 (b), 136.2 (a+b), 128.5 (a+b), 128.2 (a+b), 127.5 (a+b), 69.6 (b), 67.6 (a), 67.0 (a+b), 61.9 (a+b), 61.4 (a+b), 43.4 (b), 42.7 (a), 32.5 (a+b), 23.7 (a+b), 20.4 (a+b), 14.1 (a), 13.9 (b).

To a solution of diester **8'a** (1.09 g, 3 mmol, 1 equiv.) in ethanol (10 mL) was added KOH (0.84 g, 15 mmol, 5 equiv.). The mixture was stirred for 15 h at room temperature. Ethanol was removed under vacuum while maintaining the temperature below 20 °C. The residue was dissolved in 100 mL of 10% NaHCO_3 and washed with diethyl ether (3 x 50 mL). The aqueous phase was acidified with HCl (6N) at 0 °C. The product was extracted with ether (3 x 75 mL). The combined ether fractions were dried over MgSO_4 . Evaporation of organic solvent under reduced pressure gave the monoester **8a** (0.84 g, 83%). ^1H NMR (CDCl_3 + one drop of CD_3OD) δ 7.5-7.4 (m, 3H), 6.9 (m, 2H), 4.3-4.2 (m, 3H), 3.85 (s, 2H), 3.5-3.2 (m, 2H), 2.45-2.2 (m, 2H), 1.6-1.3 (m, 4H), 1.3 (t, J = 7.1 Hz, 3H); ^{13}C NMR (CDCl_3 + one drop of CD_3OD) δ 174.2, 169.8, 161.3, 129.2, 127.0, 113.8, 68.7, 62.2, 55.2, 47.1, 32.1, 23.8, 20.4, 13.7; IR 2960, 2874, 1739, 1724, 1602, 1569, 1424, 1264, 1021, 847 cm^{-1} ; MS (EI) m/z (%) 336 ($\text{M}+\text{H}$, 36), 156 (43), 135(100); HRMS (ESI) calcd. for $\text{C}_{15}\text{H}_{23}\text{NO}_6$ ($\text{M}+\text{H}$) 336.1435, found 336.1423.

1-(Thiophene-2-carbonyl)-2-carboethoxypiperidine-2-carboxylic acid **9a**

Compound **9'a** was prepared according to the same procedure as the one used for **8'a**. ^1H NMR (CDCl_3) δ 7.47 (d, J = 2.0 Hz, 1H), 7.39 (d, J = 1.9 Hz, 1H), 7.01-6.97 (m, 1H), 4.31-4.1 (m, 4H), 3.6-3.5 (m, 2H), 2.3-1.9 (m, 2H), 1.64-1.54 (m, 4H), 1.27-1.1 (m, 6H); ^{13}C NMR (CDCl_3) δ 168.4, 166.9, 137.1, 129.8, 129.4, 127.1, 69.8, 62.3, 47.7, 32.8, 24.5, 21.4, 14.4.

To a solution of **9'a** (0.34 g, 1 mmol, 1 equiv.) in ethanol (10 mL) was added KOH (0.45 g, 8 mmol, 8 equiv.). The contents were stirred for 20 h at room temperature.⁹ Ethanol was removed under vacuum while maintaining the temperature below 20 °C. The residue was dissolved in 100 mL of 10% NaHCO_3 and washed with ether (3 x 50 mL). The aqueous phase was acidified with HCl (6N) at 0 °C. The product was extracted with diethyl ether (3 x 75 mL). The combined ether fractions were dried over MgSO_4 . Evaporation of the volatile compounds under reduced pressure gave monoester **9a** (0.28 g, 90%). ^1H NMR (CDCl_3) δ 8.8 (bs, COOH), 7.58-7.53 (m, 2H), 7.13-7.05 (m, 1H), 4.33-4.20 (q, J = 7.1 Hz, 2H), 4.07-4.00 (m, 1H), 3.66-3.58 (m, 1H), 2.1-2.03 (m, 1H), 1.85-1.73 (m, 4H), 1.27 (t, J = 7.1 Hz, 3H); ^{13}C NMR (CDCl_3) δ 171.1, 169.4, 168.6, 135.5, 131.3, 131.1, 127.3, 67.9, 63.0, 46.6, 30.9, 23.0, 18.4, 15.2, 13.8; IR 3104, 2936, 1738, 1606, 1518, 1428, 1223, 735 cm^{-1} ; MS (EI) m/z (%) 312 ($\text{M}+\text{H}$, 24), 294 (20), 266 (100), 238 (11), 222 (12), 156 (76), 111 (23); HRMS (ESI) calcd. for $\text{C}_{14}\text{H}_{18}\text{NO}_5\text{S}$ ($\text{M}+\text{H}$) 312.0906, found 312.0901.

(*N*-Benzoylamino)-2-benzylmalonic acid monoethyl ester **11a**

⁹ A small amount of diacid was also formed, but only product **9a** was obtained after work up as diacid is sparingly water soluble

To a solution of NaOEt [from Na (10 mmol, 0.23 g) and absolute ethanol (40 mL)] under N₂, was added diethyl *N*-benzoyl-aminomalonate (10 mmol, 2.79 g). The mixture was stirred for 5 min at room temperature. Benzyl chloride (13 mmol, 1.48 mL) was then added and the reaction mixture was refluxed for 1 h 30. The hot reaction mixture was filtered and washed with hot ethanol (100 mL). The combined ethanol filtrates were evaporated to dryness. The crude product was purified through a short pad of silicagel (CH₂Cl₂) yielding diester **11'a** (2.9 g, 80%). ¹H NMR (CDCl₃) δ 7.80-7.71 (m, 2H), 7.39-7.2 (m, 3H), 7.18-7.16 (m, 3H and NH), 7.05-7.01 (m, 2H), 4.35-4.21 (m, 4H), 3.78 (s, 2H), 1.30 (t, *J* = 7 Hz, 6H). ¹³C NMR (CDCl₃) δ 167.6, 166.1, 135.2, 133.6, 131.9, 129.9, 128.6, 128.3, 127.5, 127.1, 67.4, 62.7, 37.8, 14.0.

To a solution of diester **11'a** (2.5 g, 6.7 mmol), in ethanol (10 mL) and water (1 mL) cooled to 0 °C, was added KOH (0.728 g, 13 mmol). The mixture was then stirred for 15 h at room temperature. Ethanol was removed under vacuum while maintaining the temperature below 20 °C. The residue was dissolved in 100 mL of 10% NaHCO₃ and washed with diethyl ether (3 x 50 mL). The aqueous phase was acidified with HCl (6N) at 0 °C. The product was extracted with diethyl ether (3 x 75 mL). The combined ether fractions were dried over MgSO₄. Evaporation of volatile compounds under reduced pressure and chromatography (silicagel, CH₂Cl₂/MeOH: 93/7) of the residue afforded monoester **11a** (2.1 g, 92%). ¹H NMR (CDCl₃) δ 7.99 (bs COOH), 7.75-7.71 (m, 2H), 7.51-6.72 (m, 8H and NH), 7.05-7.01 (m, 2H), 4.22 (q, *J* = 6.9 Hz, 2H), 3.75 (s, 2H), 1.27 (t, *J* = 6.9 Hz, 3H); ¹³C NMR (CDCl₃) δ 170.6, 168.6, 167.1, 135.2, 133.2, 132.0, 130.0, 129.4, 128.6, 128.2, 127.2, 67.9, 62.9, 37.9, 13.9; IR 3406, 3031, 2959, 1758, 1730, 1625, 1519, 1483, 1277, 1199, 1056, 700 cm⁻¹; MS (EI) *m/z* (%) 342 (M+H, 35), 324 (7), 296 (51), 224 (28), 192 (100), 105 (19); HRMS (ESI) calcd. for C₁₉H₂₀NO₅ (M+H) 342.1341, found 342.1354.

(*N*-Methoxycarbonylamino)-2-benzyl malonic acid monoethyl ester 12a

To a solution of NaOEt [from Na (16 mmol, 0.36 g) and absolute ethanol (50 mL)] under N₂, was added diethyl *N*-methoxycarbonyl-aminomalonate (15 mmol, 3.5 g). Benzyl chloride (15

mmol, 1.74 mL) was added and the reaction mixture was refluxed for 4 h. After removal of the solvent, the residue was dissolved in 100 mL of hot water, cooled and the aqueous layer was extracted with CH₂Cl₂ (2 x 75 mL) to afford **12'a** as a colourless liquid (4.12 g, 85%). ¹H NMR (CDCl₃) δ 7.32-7.18 (m, 3 H), 7.07-7.01 (m, 2H), 5.92 (bs, 1H), 4.30-4.10 (m, 4H), 3.71 (s, 3H), 3.64 (s, 2H), 1.27 (t, *J* = 7.1 Hz, 6H); ¹³C NMR (CDCl₃) δ 167.4, 155.0, 135.0, 129.9, 127.6, 127.2, 67.3, 62.6, 52.4, 38.2, 14.0.

To a solution of **12'a** (4 g, 12.3 mmol) in ethanol (25 mL) and H₂O (1 mL) cooled to 0 °C, KOH (1.05 g, 18 mmol) was added. The mixture was stirred for 15 h at room temperature. Ethanol was removed under vacuum while maintaining the temperature below 20 °C. The residue was dissolved in 75 mL of a saturated aqueous solution of NaHCO₃ and washed with CH₂Cl₂ (3 x 50 mL). The aqueous phase was acidified with HCl (6N) at 0 °C. The product was extracted with CH₂Cl₂ (3 x 75 mL). The combined organic layers were dried over MgSO₄ and evaporated under reduced pressure to give monoester **12a**. ¹H NMR (CDCl₃) δ 8.10 (bs, 1H), 7.29-7.15 (m, 3H), 7.1-7.04 (m, 2H), 5.99 (bs, 1H), 4.31 (q, *J* = 7.2 Hz, 2H), 3.73 (s, 3H), 3.56 (s, 2H), 1.28 (t, *J* = 7.2 Hz, 3H); ¹³C NMR (CDCl₃) δ 170.2, 167.5, 155.6, 134.7, 129.9, 128.4, 127.3, 67.3, 63.1, 52.7, 38.3, 14.0; IR 3419, 3030, 2970, 1736, 1714, 1496, 1371, 1269, 1194, 1076, 1039, 700 cm⁻¹; MS (EI) *m/z* (%) 296 (M+H, 15), 250 (100), 222 (52), 204 (14), 178 (7); HRMS (ESI) calcd. for C₁₄H₁₈NO₆ (M+H) 296.1134, found 296.1130.

(*N*-Formylamino)-2-benzyl malonic acid monoethyl ester **14a**

To a solution of NaOEt [from Na (15 mmol, 0.345 g) and absolute ethanol (40 mL)] under N₂, was added diethyl *N*-formyl-aminomalonate (15 mmol, 3.04 g). The mixture was stirred for 5 min at room temperature before adding benzyl chloride (20 mmol, 2.2 mL). After refluxing for 2 h, the reaction mixture was filtered and washed with 100 mL of hot ethanol. The solvent was removed, and the solid was dissolved in a minimum amount of hot ether and the solution cooled to 0 °C. The precipitate formed was collected and washed with pentane to afford diester **14'a** (3.2 g, 73%). ¹H NMR (CDCl₃) δ 8.09 (bs, 1H), 7.22-7.16 (m, 3H), 6.98-6.94 (m, 2H), 6.67 (bs, 1H), 4.29-4.11 (m, 4H), 3.58 (s, 2H), 1.22 (t, *J* = 7.2 Hz, 6H); ¹³C NMR (CDCl₃) δ 167.1, 159.9, 134.7, 129.9, 128.3, 127.3, 66.6, 62.8, 37.8, 13.9.

A solution of diester **14'a** (1.46 g, 5 mmol) in ethanol (10 mL) and water (1 mL) was cooled to 0 °C before adding KOH (0.28 g, 5 mmol). The mixture was stirred for 15 h at room temperature. Ethanol was removed under vacuum while maintaining the temperature below 20 °C. The residue was dissolved in 75 mL of a saturated aqueous solution of NaHCO₃ and washed with CH₂Cl₂ (3 x 50 mL). The aqueous phase was acidified with HCl (6N) at 0 °C. The product was extracted with CH₂Cl₂ (3 x 75 mL). The combined organic layers were dried over MgSO₄ and evaporated under reduced pressure to give monoester **14a** (1.1 g, 83%). ¹H NMR (DMSO) δ 13.50 (bs, COOH), 8.33 (s, 1H), 7.98 (s, 1H), 7.25-7.20 (m, 3H), 7.02-6.98 (m, 2H), 4.15 (q, *J* = 7.1 Hz, 2H), 3.41 (s, 2H), 1.22 (t, *J* = 7.1 Hz, 6H). ¹³C NMR (DMSO, two rotamers a, b) δ 171.0 (a+b), 167.9 (a+b), 160.9 (b), 160.7 (a), 136.8 (a), 135.4 (b), 129.8, 129.0, 128.2 (a), 128.0 (b), 126.7 (b), 126.5 (a), 66.1, 61.4 (a), 60.6 (b), 37.2 (b), 36.7 (a), 13.9 (b), 13.8 (a); IR 3360, 2982, 1724, 1621, 1495, 1194, 1055, 695 cm⁻¹; MS (EI) *m/z* (%) 266 (M+H, 25), 238 (100), 220 (5), 194 (20); HRMS (ESI) calcd. for C₁₃H₁₆NO₅ (M+H) 266.1028, found 266.1039.

***N*-Acetyl-3-carboethoxy 1,2,3,4-tetrahydroisoquinoline-3- carboxylic acid 16a**

To a solution of 1,2-bis(chloromethyl)benzene (0.345 g, 1.97 mmol) in MeCN (10 mL) was added diethylacetamidomalonate (0.427g, 1.97 mmol), sodium iodide (0.716g, 4.72 mmol) and cesium carbonate (1.53g, 4.72 mmol). The mixture was heated at 85 °C for 68 h. An aqueous solution of sodium thiosulfate was then added. The mixture was extracted with CH₂Cl₂. The combined organic layers were dried over MgSO₄ and concentrated under reduced pressure. The crude product was purified by flash column chromatography (silicagel, CH₂Cl₂/MeOH: 97/3) to afford diester **16'a** (0.74 g, 78%). ¹H NMR (CDCl₃) δ 7.15-7.06 (m, 4H), 4.60 (s, 2H), 4.15-3.96 (m, 4H), 3.35 (s, 2H), 2.21 (s, 3H), 1.12 (t, *J* = 7.2 Hz, 6H); ¹³C NMR (CDCl₃) δ 170.9, 167.8, 132.6, 132.2, 127.7, 127.6, 127.4, 126.0, 67.9, 61.8, 47.8, 37.4, 22.4, 13.8.

A solution of diester **16'a** (0.95 g, 3 mmol, 1 equiv.) in ethanol (15 mL) was added KOH (0.5 g, 9 mmol, 3 equiv.). The mixture was stirred for 15 h at room temperature. Ethanol was removed under vacuum while maintaining the temperature below 20 °C. The residue was

dissolved in 100 mL of 10% NaHCO₃ and washed with CH₂Cl₂ (3 x 50 mL). The aqueous phase was acidified with HCl (6N) at 0 °C. The product was extracted with CH₂Cl₂ (3 x 75 mL). The combined organic layers were dried over MgSO₄ and evaporated under reduced pressure. to give monoester **16a** (0.63 g, 72%). ¹H NMR (CHCl₃) δ 8.90 (bs, COOH), 7.27-7.09 (m, 4H), 4.65 (d, *J* = 2.4 Hz, 2H), 4.2-3.99 (m, 2H), 3.52 (d, *J* = 15.0 Hz, 1H), 3.17 (d, *J* = 15.0 Hz, 1H), 2.30 (s, 3H), 0.99 (t, *J* = 7.2 Hz, 3H); ¹³C NMR (CHCl₃) δ 173.3, 172.6, 169.2, 133.6, 132.6, 128.8, 128.0, 127.9, 126.0, 67.8, 63.5, 48.5, 37.3, 22.4, 14.0; IR 3026, 2906, 1734, 1614, 1446, 1417, 1210, 1053, 700 cm⁻¹; MS (EI) *m/z* (%) 314 (M+Na, 73), 270 (100), 224(4); HRMS (ESI) calcd. for C₁₆H₂₂NO₄Na (M+Na) 314.1004, found 314.1000.

General procedure for asymmetric decarboxylation of hemimalonic esters using bifunctional urea or thiourea chiral bases. All reactions were carried out either on 0.35 mmol scale or on 0.175 mmol scale (see Tables 2 and 3). A solution of hemimalonic ester (1 equiv.) and chiral base (1 equiv.) in 1 or 2 mL of solvent was stirred at 0 °C. The reaction was monitored by TLC (CH₂Cl₂/MeOH: 96/4). After completion of the reaction, the solvent was removed under reduced pressure and the crude product was purified by flash chromatography (silicagel, CH₂Cl₂/MeOH: 99/1).

1-Benzyloxycarbonyl piperidine-2-carboxylic acid monoethyl ester **8b**.

Product **8b** was obtained (45 mg, 88% yield) from **8a** (58 mg, 0.175mmol) in 83% ee (configuration *S* of the major enantiomer). HPLC retention times: (*R*) 31.3 min, (*S*) 36.1 min (T: 20 °C, λ: 210 nm); [α]_D²⁰ = -42.6 (c 1.20, CHCl₃) for the optically pure (*S*) enantiomer (synthesized independently); ¹H NMR (CDCl₃, 2 rotamers a/b : 55/45) δ 7.40-7.30 (m, 5H, a+b), 5.15 (s, 2H a+b), 4.92 (d, *J* = 4.2 Hz, 1H, a), 4.82 (d, *J* = 3.4 Hz, 1H, b), 4.17 (m, 3H, a+b), 4.07-4.01 (m, 1H, a+b), 3.10-2.90 (m, 1H, a+b), 2.24 (b s, 1H, a+b), 1.71-1.27 (m, 5H, a+b), 1.23 (m, 5H, 3H, a+b); ¹³C NMR (CDCl₃, 2 rotamers a, b) δ 171.6 (a+b), 156.5 (a), 156.0 (b), 136.7 (a+b) 128.4 (a+b), 128.1 (a+b), 127.9 (b), 127.7 (a), 67.2 (b), 67.1 (a), 61.1

(a+b), 54.6 (b), 54.3 (a), 41.8 (a+b), 26.7 (a+b), 24.7 (a), 24.5 (b), 20.6 (a), 20.5 (b), 14.2 (a+b); IR 3033, 2941, 2861, 1736, 1698, 1412, 1253, 1161, 1024, 696 cm^{-1} ; MS (EI) m/z (%) 292 (M+H, 37), 248 (100), 156 (5), 91 (8); HRMS (ESI) calcd. for $\text{C}_{16}\text{H}_{22}\text{NO}_4$ (M+H) 292.1549, found 292.1535.

1-(2-Thiophenecarbonyl)-piperidine-2-carboxylic acid ethyl ester **9b.**

Product **9b** was obtained (43 mg, 92% yield) from **9a** (54 mg, 0.175 mmol) in 88% ee (configuration *S* of the major enantiomer). HPLC retention times: (*R*) 15.8 min, (*S*) 16.9 min (T: 20 °C, λ : 210 nm); $[\alpha]_{\text{D}}^{20} = -59.0$ (c 0.85, CHCl_3) for the optically pure (*S*) enantiomer (independently synthesized); ^1H NMR (CDCl_3) δ 7.40 (m, 1H), 7.29 (bs, 1H), 7.03 (m, 1H), 5.30 (bs, 1H), 4.20 (q, $J = 7.2$ Hz, 2H), 3.30 (b s, 2H), 2.30 (d, $J = 13.0$ Hz, 1H), 1.80-1.68 (m, 3H), 1.60-1.40 (m, 2H), (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (CDCl_3) δ 170.9, 164.8, 136.8, 128.5, 126.9, 126.6, 61.3, 53.0, 45.8, 26.9, 25.2, 21.0, 14.2; IR 3097, 2939, 2861, 1731, 1614, 1428, 1197, 1020, 710 cm^{-1} ; MS (EI) m/z (%) 268 (M+H, 29), 222 (100), 194 (98), 111 (18); HRMS (ESI) calcd. for $\text{C}_{13}\text{H}_{18}\text{NO}_3\text{S}$ (M+H) 268.1007, found 268.1018.

2-(*N*-benzoylamino)-3-phenylpropanoic acid ethyl ester **11b**

Product **11b** was obtained (46 mg, 89% yield) from **11a** (60 mg, 0.175 mmol) in 73% ee (configuration *S* of the major enantiomer). HPLC retention times: (*S*) 24.4 min, (*R*) 35.8 min (T: 20 °C, λ : 210 nm); $[\alpha]_{\text{D}}^{20} = +108.6$ (c 0.76, CHCl_3) for the optically pure (*S*) enantiomer (independently synthesized); ^1H NMR (CDCl_3) δ 7.70 (dd, $J = 7.9, 1.1$ Hz, 2H), 7.5-7.25 (m, 6H), 7.10 (dd, $J = 7.1, 1.4$ Hz, 2H), 6.60 (d, $J = 7.2$ Hz, 1H, NH), 5.06 (ddd, $J = 7.2, 5.5, 1.4$ Hz, 1H), 4.21 (q, $J = 7.1$ Hz, 2H), 3.26 (dd, $J = 4.2, 5.5$ Hz, 2H), 1.22 (t, $J = 7.1$ Hz, 3H). ^{13}C

NMR (CDCl₃) δ 171.6, 166.8, 135.9, 133.9, 131.7, 129.4, 129.3, 128.6, 128.5, 127.1, 127.0, 126.9, 61.6, 53.5, 37.9, 14.1; IR 3362, 3070, 2929, 1748, 1639, 1519, 1209, 1095, 716 cm⁻¹; MS (EI) *m/z* (%) 298 (M+H, 83), 252 (92), 224 (100), 105 (8); HRMS (ESI) calcd. for C₁₈H₂₀NO₃ (M+H) 298.1443, found 298.1457.

2-(*N*-Methoxycarbonylamino)-3-phenylpropanoic acid ethyl ester **12b**.⁷

Product **12b** was obtained (39 mg, 84% yield) from **12a** (52 mg, 0.175 mmol) in 83% ee (configuration *S* of the major enantiomer). HPLC retention times: (*R*) 16.1 min, (*S*) 17.4 min (T: 20 °C, λ : 205 nm); $[\alpha]_D^{20} = +67.6$ (c 0.70, CHCl₃) for the optically pure (*S*) enantiomer (independently synthesized); ¹H NMR (CDCl₃) δ 7.33-7.11 (m, 5H), 5.10 (d, *J* = 7.2 Hz, 1H, NH), 4.60 (dd, *J* = 7.2, 6.0 Hz, 1H), 4.18 (q *J* = 7.1 Hz, 2H), 3.66 (s, 3H), 3.10 (d *J* = 6.0 Hz, 2H), 1.23 (t, *J* = 7.1 Hz, 3 H); ¹³C NMR (CDCl₃) δ 171.6, 156.2, 135.8, 129.3, 128.5, 127.1, 61.5, 54.7, 52.3, 38.3, 14.1; IR 3335, 3030, 2983, 1716, 1709, 1515, 1555, 1189, 1056, 689 cm⁻¹; MS (EI) *m/z* (%) 252 (M+H, 36), 220 (6), 206 (17), 178 (100), 146 (4); HRMS (ESI) calcd. for C₁₃H₁₈NO₄ (M+H) 252.1236, found 252.1242.

2-(*N*-formylamino)-3-phenylpropanoic acid ethyl ester **14b**.⁸

Product **14b** was obtained (29 mg, 74% yield) from **14a** (46 mg, 0.175 mmol) in 61% ee (configuration *S* of the major enantiomer). HPLC retention times: (*S*) 7.3 min, (*R*) 28.5 min (T: 20 °C, λ : 205 nm); $[\alpha]_D^{20} = +76.0$ (c 0.55, CHCl₃) [Lit.⁸ +81.7 (c 1.78, CHCl₃)] for the optically pure (*S*) enantiomer (independently synthesized); ¹H NMR (CDCl₃) δ 8.10 (s, 1H), 7.25-6.93 (m, 5H), 6.90 (d, *J* = 5.8 Hz, 1H, NH), 4.85 (dd, *J* = 7.8, 5.8 Hz, 1H), 4.10 (q, *J* = 7.1 Hz, 2H), 3.06 (dd, *J* = 5.8, 2.0 Hz, 2H), 1.28 (t, *J* = 7.1 Hz, 3H); ¹³C NMR (CDCl₃, rotamers a, b) δ 174.1 (a), 170.6 (b), 163.4 (b), 160.5 (a), 135.5 (a), 135.1 (b), 129.4 (a), 128.5

(b), 128.2 (a), 127.4 (b), 127.1 (a), 61.9 (b), 61.7 (a), 56.3 (b), 51.8 (a), 40.1 (b), 37.8 (a), 14.0 (a+b); IR 3285, 3030, 2982, 1736, 1660, 1496, 1374, 1196, 1028, 698 cm^{-1} ; MS (EI) m/z (%) 222 (M+H, 14), 194(62), 176(35), 148(100), 120 (42); HRMS (ESI) calcd. for $\text{C}_{12}\text{H}_{16}\text{NO}_3$ (M+H) 222.1130, found 222.1140.

2-Acetyl-1,2,3,4-tetrahydroisoquinoline-3-carboxylic acid ethyl ester **16b.**

Product **16b** was obtained (78 mg, 90% yield) from **16a** (110 mg, 0.35 mmol). HPLC retention times: (*R*) 30.4 min, (*S*) 34.3 min (T: 20 °C, λ : 210 nm); $[\alpha]_{\text{D}}^{20} = +284.1$ (c 0.24, CHCl_3) for the 88% ee (*R*) enantiomer; ^1H NMR (CDCl_3 , 2 rotamers a/b: 71/29) δ 7.28-7.02 (m, 4H, a+b), 5.49 (dd, $J = 3.6, 3.1$ Hz, 1H, a), 4.78 (dd, $J = 3.6, 3.1$ Hz, 1H, b), 4.90 (d, $J = 17.6$ Hz, 1H, b) 4.71 (dd, $J = 15.6, 11.2$ Hz, 2H, a), 4.55 (d, $J = 17.6$ Hz, 1H, b), 4.10-3.90 (m, 2H, a+b), 3.38-3.09 (m, 2H, a+b) 2.27 (s, 3H, a), 2.17 (s, 3H, b), 1.13 (t, $J = 7.2$ Hz, 3H, a), 1.09 (t, $J = 7.2$ Hz, 3H, b); ^{13}C NMR (CDCl_3 , 2 rotamers a/b) δ 171.3 (a), 171.1 (b), 171.0 (b), 170.9 (a), 133.2, 132.6, 132.5, 131.8, 128.9, 128.4, 127.56, 127.52, 127.3, 127.1, 127.0, 126.4, 62.0 (b), 61.6 (a), 56.2 (b), 51.6 (a), 46.8 (a), 44 (b), 32.5 (b), 31.4 (a), 22.4 (a), 22.3 (b), 14.0; IR 3019, 2982, 1738, 1698, 1604, 1367, 1197, 733 (cm^{-1}); MS (EI) m/z (%) 248 (M+H, 12), 206 (31), 202 (40), 174 (100), 132 (28); HRMS (ESI) calcd. for $\text{C}_{14}\text{H}_{18}\text{NO}_3$ (M+H) 248.1287, found 248.1294.

9-Amino(9-deoxy)epicinchonin-9-yl [3,5-bis(trifluoromethyl)phenyl]thiocarbamate 1:

9-Amino(9-deoxy)epiquinidin-9-yl phenylthiocarbamate 4:

1-Benzyloxycarbonyl, 2-carboethoxy-piperidine-2-carboxylic acid **8a**

1-(Thiophene-2-carbonyl)-2-carboethoxypiperidine-2-carboxylic acid 9a

(N-Benzoylamino)-2-benzylmalonic acid monoethyl ester 11a

(N-Methoxycarbonylamino)-2-benzyl malonic acid monoethyl ester 12a

2-(*N*-formylamino)-3-phenylpropanoic acid ethyl ester 14a

***N*-Acetyl-3-carboethoxy 1,2,3,4-tetrahydroisoquinoline-3- carboxylic acid 16a**

N-Benzoyl -piperidine-2-carboxylic acid ethyl ester 7b

Comments Col. Daicel AD-H 250mmx0,46mm 1mL/mn 95%*n*-heptane 5%(70%MeOH+30%EtOH)
 Modified User System
 Locked No
 Method Id 1024
 Method Version 1

SampleName am470THF 2inj
 Vial 1
 Injection 1
 Injection Volume 1,00 μ l
 Channel 996
 Run Time 20,0 Minutes

Sample Type Unknown
 Date Acquired 15/02/06 15:25:17
 Acq Method Set MS 1mL 95 5
 Processing Method PM 1mL 95 5
 Date Processed 15/02/06 16:10:48

Peak Results					
Name	RT	% Area	Start Time	End Time	Int Type
1 a	15,012	91,70	14,395	15,620	BB
2 b	17,382	8,30	16,845	17,953	BB

SampleName am92Ph
 Vial 4
 Injection 1
 Injection Volume 10,00 μ l
 Channel 996
 Run Time 25,0 Minutes

Sample Type Unknown
 Date Acquired 30/06/06 12:40:39
 Acq Method Set MS 1mL95%*n*hept5%MeEt
 Processing Method PM1mL 95 5
 Date Processed 30/06/06 14:05:19

Instrument Method: IM 1mL95%*n*hept5%MeEt Stored: 29/06/06 16:26:45

Comments Col. Daicel AD-H 250mmx4,6mm 5 μ m 1mL/mn 95%*n*-heptane 5%(50%MeOH+50%EtOH) col. λ 20°C
 Modified User System
 Locked No
 Method Id 1022
 Method Version 1

Peak Results					
Name	RT	Start Time	End Time	% Area	
1 Peak1	18,065	17,292	18,458	5,52	
2 Peak2	18,766	18,458	21,517	94,48	

1-Benzyloxycarbonyl piperidine-2-carboxylic acid ethyl ester 8b:

SampleName	am77racinj1	Sample Type	Unknown
Vial	2	Date Acquired	06/04/06 18:21:23
Injection	1	Acq Method Set	MS 1mL95%nhpt5%_MeOH
Injection Volume	5,00 uL	Processing Method	PM1mL 95 5
Channel	996	Date Processed	06/04/06 19:22:10
Run Time	45,0 Minutes		

Instrument Method: IM 1mL 95%nhpt5%_MeOHEtOH

Stored: 06/04/06 17:20:25

Comments Col.Daiceil Chiralpak AD-H 250mmx4,6mm 5µm 1mL/mn 95%*n*-heptane 5%(70%MeOH+30%EtOH)
 Modified User System
 Locked No
 Method Id 1240
 Method Version 3

Auto-Scaled Chromatogram

SampleName am77racinj1 Vial 2 Injection 1 Date Acquired 06/04/06 18:21:23 Processed Channel Descr. PDA 210,0 nm
 température colonne : 20°C

Peak Results

Name	Retention Time	% Area	Area	Start Time	End Time
1 Peak a	30.667	49.80	15393313	29.848	33.473
2 Peak b	36.958	50.20	15517661	35.715	38.807

SampleName	am77racinj2	Sample Type	Unknown
Vial	8	Date Acquired	05/04/06 19:40:39
Injection	1	Acq Method Set	MS 1mL95%nhpt5%_MeOH
Injection Volume	10,00 uL	Processing Method	PM1mL 95 5
Channel	996	Date Processed	05/04/06 20:32:23
Run Time	45,0 Minutes		

Instrument Method: IM 1mL 95%nhpt5%_MeOHEtOH

Stored: 23/03/06 12:35:01

Comments Col.Daiceil Chiralpak AD-H 250mmx4,6mm 5µm 1mL/mn 95%*n*-heptane 5%(70%MeOH+30%EtOH)
 Modified User System
 Locked No
 Method Id 1023
 Method Version 2

Auto-Scaled Chromatogram

SampleName am77racinj2 Vial 8 Injection 1 Date Acquired 05/04/06 19:40:39 Processed Channel Descr. PDA 205,0 nm

température colonne : 20°C

Peak Results

Name	Retention Time	% Area	Area	Start Time	End Time
1 Peak a	31.306	8.60	9539541	30.492	33.208
2 Peak b	36.183	91.40	101414497	35.092	39.067

(2-Thiophenecarbonyl)-2-piperidinecarboxylic acid ethyl ester 9b:

Comments Col. Daicel AD-H 250mmx0,46mm 1mL/mn 95%*n*-heptane 5%(70%MeOH+30%EtOH)
 Modified User System
 Locked No
 Method Id 1024
 Method Version 1

SampleName am64racenj1
 Vial 6
 Injection 1
 Injection Volume 1,00 ul
 Channel 996
 Run Time 20,0 Minutes

Sample Type Unknown
 Date Acquired 28/02/06 17:10:16
 Acq Method Set MS 1mL 95 5
 Processing Method PM 1mL 95 5
 Date Processed 28/02/06 17:38:46

Auto-Scaled Chromatogram

Peak Results

	Name	RT	% Area	Start Time	End Time	Int Type
1	a	15,751	50,01	15,260	16,452	BV
2	b	17,046	49,99	16,452	17,668	VB

Comments Col. Daicel AD-H 250mmx0,46mm 1mL/mn 95%*n*-heptane 5%(70%MeOH+30%EtOH)
 Modified User System
 Locked No
 Method Id 1024
 Method Version 1

SampleName am64Sinj1
 Vial 3
 Injection 1
 Injection Volume 5,00 ul
 Channel 996
 Run Time 30,0 Minutes

Sample Type Unknown
 Date Acquired 28/02/06 13:25:26
 Acq Method Set MS 1mL 95 5
 Processing Method PM 1mL 95 5
 Date Processed 28/02/06 15:29:13

Auto-Scaled Chromatogram

Peak Results

	Name	RT	% Area	Start Time	End Time	Int Type
1	a	15,840	6,13	15,392	16,375	BB
2	b	16,982	93,87	16,400	17,717	BB

N-acetyl-piperidine-2-carboxylic acid ethyl ester 10b

SampleName am76racinj2
 Vial 1
 Injection 1
 Injection Volume 10,00 ul
 Channel 996
 Run Time 20,0 Minutes

Sample Type Unknown
 Date Acquired 05/04/06 14:06:05
 Acq Method Set MS 1mL95%nhpt5%_MeOH
 Processing Method 1mLPM 95 5
 Date Processed 05/04/06 14:31:27

Instrument Method: IM 1mL 95%nhpt5%_MeOHEtOH

Stored: 23/03/06 12:35:01

Comments Col.Daiceil Chiralpak AD-H 250mmx4,6mm 5µm 1mL/mn 95%-heptane 5%(70%MeOH+30%EtOH)
 Modified User System
 Locked No
 Method Id 1023
 Method Version 2

SampleName am76racinj2 Vial 1 Injection 1 Date Acquired 05/04/06 14:06:05 Processed Channel Descr. PDA 210,0 nm
 température colonne : 20°C

Peak Results						
Name	Retention Time	% Area	Area	Start Time	End Time	
1 Peaka	10.983	49,84	4591345	10,428	11,753	
2 Peakb	15.205	50,16	4621025	14,370	16,070	

SampleName am84acetone1
 Vial 2
 Injection 1
 Injection Volume 10,00 ul
 Channel 996
 Run Time 20,0 Minutes

Sample Type Unknown
 Date Acquired 28/04/06 01:02:29
 Acq Method Set MS 1mL95%nhpt5%_MeOH
 Processing Method PM1mL 95 5
 Date Processed 28/04/06 01:54:34

Instrument Method: IM 1mL 95%nhpt5%_MeOHEtOH

Stored: 06/04/06 17:20:25

Comments Col.Daiceil Chiralpak AD-H 250mmx4,6mm 5µm 1mL/mn 95%-heptane 5%(70%MeOH+30%EtOH)
 Modified User System
 Locked No
 Method Id 1240
 Method Version 3

SampleName am84acetone1 Vial 2 Injection 1 Date Acquired 28/04/06 01:02:29 Processed Channel Descr. PDA 205,0 nm

température colonne : 20°C

Peak Results						
Name	Retention Time	% Area	Area	Start Time	End Time	
1 Peaka	10.827	3,61	505732	10,397	11,272	
2 Peakb	15.795	96,39	13487881	14,747	17,230	

2-(*N*-benzoylamino)-3-phenylpropanoic acid ethyl ester **11b:**

SampleName	am86racemic	Sample Type	Unknown
Vial	4	Date Acquired	13/07/06 03:35:50
Injection	1	Acq Method Set	MS 1mL95%nhpt5%_MeOH
Injection Volume	5,00 ul	Processing Method	PM 1mL 95 5
Channel	996	Date Processed	13/07/06 04:38:48
Run Time	45,0 Minutes		

Instrument Method: IM 1mL 95%nhpt5%_MeOHEtOH

Stored: 06/04/06 17:20:25

Comments Col.DaiceI Chiralpak AD-H 250mmx4,6mm 5µm 1mL/mn 95%*n*-heptane 5%(70%MeOH+30%EtOH)
 Modified User System
 Locked No
 Method Id 1240
 Method Version 3

Auto-Scaled Chromatogram

SampleName am86racemic Vial 4 Injection 1 Date Acquired 13/07/06 03:35:50 Processed Channel Descr. PDA 210,0 nm

température colonne : 20°C

Peak Results

Name	Retention Time	% Area	Area	Start Time	End Time
1 Peak a	24.739	48,96	2913185	23,890	25,782
2 Peak b	36.290	51,04	3036893	34,940	38,223

SampleName	am86Ph1inj	Sample Type	Unknown
Vial	2	Date Acquired	11/07/06 22:28:40
Injection	1	Acq Method Set	MS 1mL95%nhpt5%_MeOH
Injection Volume	10,00 ul	Processing Method	PM 1mL 95 5
Channel	996	Date Processed	11/07/06 23:17:07
Run Time	40,0 Minutes		

Instrument Method: IM 1mL 95%nhpt5%_MeOHEtOH

Stored: 06/04/06 17:20:25

Comments Col.DaiceI Chiralpak AD-H 250mmx4,6mm 5µm 1mL/mn 95%*n*-heptane 5%(70%MeOH+30%EtOH)
 Modified User System
 Locked No
 Method Id 1240
 Method Version 3

Auto-Scaled Chromatogram

SampleName am86Ph1inj Vial 2 Injection 1 Date Acquired 11/07/06 22:28:40 Processed Channel Descr. PDA 210,0 nm

température colonne : 20°C

Peak Results

Name	Retention Time	% Area	Area	Start Time	End Time
1 Peak a	24.470	85,49	6366282	23,517	25,958
2 Peak b	35,844	13,51	994589	34,625	36,983

2-(*N*-Methoxycarbonylamino)-3-phenylpropanoic acid ethyl ester 12b.

SampleName	am85raceOMe	Sample Type	Unknown
Vial	1	Date Acquired	12/07/06 23:03:25
Injection	1	Acq Method Set	MS 1mL95% <i>n</i> hept5%_MeOH
Injection Volume	10,00 ul	Processing Method	PM1mL 95 5
Channel	996	Date Processed	12/07/06 23:44:08
Run Time	30,0 Minutes		

Instrument Method: IM 1mL 95%*n*hept5%_MeOHEtOH

Stored: 06/04/06 17:20:25

Comments	Col.DaiceI Chiralpak AD-H 250mmx4,6mm 5µm 1mL/mn 95% <i>n</i> -heptane 5%(70%MeOH+30%EtOH)
Modified User	System
Locked	No
Method Id	1240
Method Version	3

SampleName am85raceOMe Vial 1 Injection 1 Date Acquired 12/07/06 23:03:25 Processed Channel Descr. PDA 210,0 nm

température colonne : 20°C

Peak Results					
Name	Retention Time	% Area	Area	Start Time	End Time
1 Peak a	14.966	49,91	38173681	14,190	15,615
2 Peak b	16.071	50,09	38318703	15,615	17,282

SampleName	am85acet2Fr	Sample Type	Unknown
Vial	3	Date Acquired	11/07/06 23:26:59
Injection	1	Acq Method Set	MS 1mL95% <i>n</i> hept5%_MeOH
Injection Volume	10,00 ul	Processing Method	PM 1mL 95 5
Channel	996	Date Processed	11/07/06 23:50:07
Run Time	20,0 Minutes		

Instrument Method: IM 1mL 95%*n*hept5%_MeOHEtOH

Stored: 06/04/06 17:20:25

Comments	Col.DaiceI Chiralpak AD-H 250mmx4,6mm 5µm 1mL/mn 95% <i>n</i> -heptane 5%(70%MeOH+30%EtOH)
Modified User	System
Locked	No
Method Id	1240
Method Version	3

SampleName am85acet2Fr Vial 3 Injection 1 Date Acquired 11/07/06 23:26:59 Processed Channel Descr. PDA 205,0 nm

température colonne : 20°C

Peak Results					
Name	Retention Time	% Area	Area	Start Time	End Time
1 Peak a	16.182	9,36	176134	15,732	16,715
2 Peak b	17.480	90,64	1706637	16,857	18,073

2-(N-acetylamino)-3-phenylpropanoic acid ethyl ester 13b.

SampleName am80.1rac1inj
 Vial 3
 Injection 1
 Injection Volume 5,00 µl
 Channel 996
 Run Time 45,0 Minutes

Sample Type Unknown
 Date Acquired 13/04/06 23:59:19
 Acq Method Set MS 1ml 95%nhpt5%_MeOH
 Processing Method PM 1mL 95 5
 Date Processed 14/04/06 02:20:27

Instrument Method: IM 1mL 95%nhpt5%_MeOHEtOH

Stored: 14/03/06 10:36:03

Comments Col.DaiceI Chiralpak AD-H 250mmx4,6mm 5µm 1mL/mn 95%-heptane 5%(50%MeOH+50%EtOH)
 Modified User System
 Locked No
 Method Id 1200
 Method Version 1
 Edit User

température colonne : 20°C

Peak Results					
Name	Retention Time	% Area	Area	Start Time	End Time
1	18,118	50,02	8425618	17,455	18,713
2	19,382	49,98	8420314	18,713	20,913

SampleName am80.1product1inj
 Vial 4
 Injection 1
 Injection Volume 5,00 µl
 Channel 996
 Run Time 45,0 Minutes

Sample Type Unknown
 Date Acquired 14/04/06 00:45:19
 Acq Method Set MS 1ml 95%nhpt5%_MeOH
 Processing Method PM1mL 95 5
 Date Processed 14/04/06 02:34:16

Instrument Method: IM 1mL 95%nhpt5%_MeOHEtOH

Comments Col.DaiceI Chiralpak AD-H 250mmx4,6mm 5µm 1mL/mn 95%-heptane 5%(50%MeOH+50%EtOH)
 Modified User System
 Locked No
 Method Id 1200
 Method Version 1

température colonne : 20°C

Peak Results					
Name	Retention Time	% Area	Area	Start Time	End Time
1 Peaka	18,144	8,95	1236255	17,703	18,612
2 Peakb	19,326	91,05	12580712	18,620	20,378

2-(*N*-formylamino)-3-phenylpropanoic acid ethyl ester **14b:**

SampleName	lincoln75Rrac.20°C	Sample Type	Unknown
Vial	1	Date Acquired	13/04/06 19:07:37
Injection	1	Acq Method Set	MS 1ml 95%nhpt5%_MeOH
Injection Volume	10,00 ul	Processing Method	PM 1mL 95 5
Channel	996	Date Processed	13/04/06 23:05:02
Run Time	60,0 Minutes		

Instrument Method: IM 1mL 95%nhpt5%_MeOHEtOH

Stored: 14/03/06 10:36:03

Comments Col.Daiceil Chiralpak AD-H 250mmx4,6mm 5µm 1mL/mn 95%*n*-heptane 5%(50%MeOH+50%EtOH)
 Modified User System
 Locked No
 Method Id 1200
 Method Version 1

SampleName lincoln75Rrac.20°C Vial 1 Injection 1 Date Acquired 13/04/06 19:07:37 Processed Channel Descr. PDA
 210,0 nm

température colonne : 20°C

Peak Results					
Name	Retention Time	% Area	Area	Start Time	End Time
1 Peak a	10,357	50,13	21400369	5,650	15,558
2 Peak b	29,419	49,87	21287394	27,933	38,158

SampleName	lincoln75Product.20°C	Sample Type	Unknown
Vial	2	Date Acquired	13/04/06 20:36:09
Injection	1	Acq Method Set	MS 1ml 95%nhpt5%_MeOH
Injection Volume	10,00 ul	Processing Method	PM1mL 95 5
Channel	996	Date Processed	13/04/06 23:42:27
Run Time	60,0 Minutes		

Instrument Method: IM 1mL 95%nhpt5%_MeOHEtOH

Stored: 14/03/06 10:36:03

Comments Col.Daiceil Chiralpak AD-H 250mmx4,6mm 5µm 1mL/mn 95%*n*-heptane 5%(50%MeOH+50%EtOH)
 Modified User System
 Locked No
 Method Id 1200
 Method Version 1

SampleName lincoln75Product.20°C Vial 2 Injection 1 Date Acquired 13/04/06 20:36:09 Processed Channel Descr. PDA
 208,0 nm

température colonne : 20°C

Peak Results					
Name	Retention Time	% Area	Area	Start Time	End Time
1 Peak a	7,368	80,71	25636559	4,032	16,615
2 Peak b	28,573	19,29	6128502	27,265	35,590

2-(*N*-acetylamino)-3-methylpropanoic acid ethyl ester 15b:

SampleName	am80.2rac1inj	Sample Type	Unknown
Vial	3	Date Acquired	14/04/06 02:15:54
Injection	1	Acq Method Set	MS 1ml 95% <i>n</i> hept5%_MeOH
Injection Volume	2,00 μ l	Processing Method	PM1ml.95.5
Channel	996	Date Processed	14/04/06 02:54:44
Run Time	35,0 Minutes		

Instrument Method: IM 1mL 95%*n*hept5%_MeOHEtOH

Stored: 14/03/06 10:36:03

Comments	Col.DaiceI Chiralpak AD-H 250mmx4,6mm 5 μ m 1mL/mn 95% <i>n</i> -heptane 5%(50%MeOH+50%EtOH)
Modified User	System
Locked	No
Method Id	1200
Method Version	1

Auto-Scaled Chromatogram

SampleName am80.2rac1inj Vial 3 Injection 1 Date Acquired 14/04/06 02:15:54 Processed Channel Descr. PDA 210,0 nm

température colonne : 20°C

Peak Results						
Name	Retention Time	% Area	Area	Start Time	End Time	
1 Peak a	7.914	50,71	1120331	7,387	8,903	
2 Peak b	10,476	49,29	1089003	10,087	11,045	

SampleName	am80.2product1inj	Sample Type	Unknown
Vial	4	Date Acquired	14/04/06 02:51:54
Injection	1	Acq Method Set	MS 1ml 95% <i>n</i> hept5%_MeOH
Injection Volume	5,00 μ l	Processing Method	PM1ml.95.5
Channel	996	Date Processed	14/04/06 04:45:21
Run Time	35,0 Minutes		

Instrument Method: IM 1mL 95%*n*hept5%_MeOHEtOH

Stored: 14/03/06 10:36:03

Comments	Col.DaiceI Chiralpak AD-H 250mmx4,6mm 5 μ m 1mL/mn 95% <i>n</i> -heptane 5%(50%MeOH+50%EtOH)
Modified User	System
Locked	No
Method Id	1200
Method Version	1

Auto-Scaled Chromatogram

SampleName am80.2product1inj Vial 4 Injection 1 Date Acquired 14/04/06 02:51:54 Processed Channel Descr. PDA 205,0 nm

température colonne : 20°C

Peak Results						
Name	Retention Time	% Area	Area	Start Time	End Time	
1 Peak a	7,924	5,44	154154	7,693	8,272	
2 Peak b	10,479	94,56	2680708	10,038	11,113	

SampleName am92Prop.2
 Vial 6
 Injection 1
 Injection Volume 10,00 ul
 Channel 996
 Run Time 25,0 Minutes

Sample Type Unknown
 Date Acquired 30/06/06 13:37:48
 Acq Method Set MS 1mL95%nhpt5%MeEt
 Processing Method PM1mL 95 5
 Date Processed 30/06/06 14:12:38

Peak Results

	Name	RT	Area	Height	Amount	Units
1	Peaka	7,791	1307335	117129		
2	Peakb	10,569	97389	7317		

2-Acetyl-1,2,3,4-tetrahydroisoquinoline-3-carboxylic acid ethyl ester 16b:

SampleName	ambicycle2	Sample Type	Unknown
Vial	3	Date Acquired	30/06/06 16:21:44
Injection	1	Acq Method Set	MS 1mL95%nhpt5%MeEt
Injection Volume	10,00 ul	Processing Method	PM1 mL 95 5
Channel	996	Date Processed	30/06/06 17:30:58
Run Time	45,0 Minutes		

Instrument Method: IM 1mL95%nhpt5% MeEt

Stored: 29/06/06 16:26:45

Comments Col. Daicel AD-H 250mmx4,6mm 5µm 1mL/mn 95% n-heptane 5% (50%MeOH+50%EtOH) col. & 20°C
 Modified User System
 Locked No
 Method Id 1022
 Method Version 1
 Edit User

Peak Results					
Name	RT	Start Time	End Time	% Area	
1 Peak1	30,488	27,627	31,943	7,84	
2 Peak2	34,332	31,943	37,085	92,86	

Current Date 03/10/08

SampleName	am101bicycle	Sample Type	Unknown
Vial	2	Date Acquired	29/07/06 11:31:57
Injection	1	Acq Method Set	MS 1mL95%nhpt5%MeEt
Injection Volume	10,00 ul	Processing Method	PM 1mL 95 5
Channel	996	Date Processed	29/07/06 18:00:29
Run Time	45,0 Minutes		

Instrument Method: IM 1mL95%nhpt5% MeEt

Stored: 29/06/06 16:26:45

Comments Col. Daicel AD-H 250mmx4,6mm 5µm 1mL/mn 95% n-heptane 5% (50%MeOH+50%EtOH) col. & 20°C
 Modified User System
 Locked No
 Method Id 1022
 Method Version 1
 Edit User

Peak Results					
Name	RT	Start Time	End Time	% Area	
1 Peak1	27,183	23,690	30,205	93,81	
2 Peak2	31,031	30,205	32,830	6,39	