**Pd-Catalyzed Asymmetric Allylic Alkylation of Glycine Iminoester Using a
Chiral Phase-Transfer Catalyst**

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Supporting information

Synthesis of the chiral PTC 3d: *N*-(9-anthracenylmethyl)-*O*-(9)-methyl-cinchonidinium iodide

(3d). To a suspension of *N*-(9-anthracenylmethyl)cinchonidinium chloride (1.10 g, 2.11 mmol) in CH₂Cl₂ (30 mL) were added methyl iodide (0.946 g, 6.33 mmol) and aqueous 50% NaOH (0.844 g, 10.6 mmol). The resulting mixture was stirred vigorously at 20 °C for 4 h, during which time all of the solids were dissolved. The mixture was diluted with CHCl₃ (150 mL), washed with water (3 × 20 mL) and brine (20 mL), dried over MgSO₄, filtrated and concentrated *in vacuo*. The residue was poured onto Et₂O (30 mL) and the mixture was stirred vigorously at 20 °C for 1 h. The suspension was filtered and the orange solids were collected. The crystallization of the solids from CH₂Cl₂/Et₂O afforded 0.982 g (74%) of the desired product. $[\alpha]_D^{19} = -288^\circ$ (*c* 1.0, CH₂Cl₂); R_f = 0.21 (CHCl₃:MeOH = 10:1); ¹H NMR (500 MHz, CDCl₃): δ 1.38-1.55 (m, 2H), 1.95-2.03 (m, 1H), 2.12-2.21 (m, 1H), 2.35-2.43 (m, 1H), 2.64-2.72 (m, 1H), 3.09 (dd, 1H, *J* = 5.6, 5.6 Hz), 3.83 (s, 3H), 4.42-4.51 (m, 1H), 4.84 (d, *J* = 4.8 Hz, 1H), 5.07 (d, *J* = 5.2 Hz, 1H), 5.19 (d, *J* = 8.5 Hz, 1H), 5.25 (brs, 1H), 5.87-6.02 (m, 2H), 6.52 (brs, 1H), 6.97 (d, *J* = 6.9 Hz, 1H), 7.54-7.60 (m, 3H), 7.69-7.73 (m, 2H), 7.82-7.89 (m, 2H), 7.97 (brs, 1H), 8.05 (d, *J* = 4.3 Hz, 1H), 8.14 (d, *J* = 4.1 Hz, 1H), 8.20 (d, *J* = 4.3 Hz, 1H), 8.32 (d, *J* = 4.6 Hz, 1H), 8.65 (s, 1H), 9.06 (d, *J* = 2.3 Hz, 2H), 9.65 (d, *J* = 4.4 Hz, 1H); ¹³C NMR (126 MHz, CD₃OD): δ 23.2, 26.2, 27.2, 39.4, 53.7, 57.5, 57.7, 63.3, 70.0, 79.5, 117.8, 118.9, 121.8, 124.7, 124.8, 125.7, 126.57, 126.61, 127.2, 129.4, 129.4, 129.6, 130.4, 131.1, 131.2, 131.5, 132.9, 133.0, 133.8, 134.6, 134.7, 138.5, 143.0, 149.1, 150.9; IR (CHCl₃): ν 3686, 3014, 2952, 1598, 1515, 1456, 1075, 986 cm⁻¹; MS (*m/z*): (FAB) 499 (M-I, 42), 309 (12), 191 (100), 154 (44), 136 (18); HRMS: (FAB) Calculated for C₃₅H₃₅N₂O (M-I): 499.2749. Found: 499.2759.

***N*-(9-anthracenylmethyl)-*O*-(9)-methyl-cinchonidium hexafluorophosphate.** *N*-(9-anthracenylmethyl)-*O*-methyl-cinchonidium iodide (100 mg, 0.160 mmol) was dissolved to CH₂Cl₂ and aqueous ammonium hexafluorophosphate (240 mg/water 1ml, 1.60 mmol) were added. The suspension was stirred at room temperature for 1 h and diluted with CH₂Cl₂ (15 ml), washed with water (5ml X 3), dried over MgSO₄. The solvent was evaporated under reduced pressure. Recrystallization of the residue from CH₂Cl₂/CHCl₃ gave a desired product as yellow crystals. Mp. 163-164°C (CH₂Cl₂/CHCl₃); elemental analysis: calcd for C₃₅H₃₅F₆N₂P₆: C, 65.21; H, 5.49; N, 4.35. Found: C, 64.92; H, 5.49; N, 4.13. $[\alpha]_D^{23} = -314^\circ$ (*c* 1.1, CH₂Cl₂); ¹H NMR (500 MHz, CD₃OD): δ 1.38-1.51 (m, 2H), 1.80-1.85 (m, 1H), 1.98-2.08 (m, 1H), 2.25-2.34 (m, 2H), 2.74-2.82 (m, 1H), 3.09 (dd, *J* = 11.9, 11.9 Hz, 1H), 3.56-3.65 (m, 1H), 3.73 (s, 3H), 4.22-4.30 (m, 1H), 4.34-4.43 (m, 1H), 4.83-4.90 (m, 2H), 5.55 (ddd, *J* = 7.0, 10.4, 17.4 Hz, 1H), 5.71 (d, *J* = 14.0 Hz, 1H), 6.24 (d, *J* = 14.0 Hz, 1H) 6.64 (s, 1H), 7.48-8.95 (m, 15H); ¹³C NMR (126 MHz, CD₃OD): δ 23.2, 26.1, 27.2, 39.4, 53.8, 57.3, 57.5, 63.5, 70.2, 79.4, 117.7, 118.9, 121.7, 124.2, 124.7, 125.2, 126.6, 126.6, 127.2, 129.4, 129.4, 129.5, 130.5, 131.1, 131.2, 131.5, 133.0, 133.0, 133.9, 134.6, 134.7, 138.5, 142.8, 149.3, 151.0; IR (CHCl₃): ν 3674, 3070, 3040, 3006, 2958, 1590, 1509, 1455, 1072, 993 cm⁻¹; MS (*m/z*): (FAB) 499 (M-PF₆, 63), 309 (18), 290 (38), 191 (100), 154 (25), 136 (31), 57 (43).

***tert*-Butyl (2*S*)-2-[(diphenylmethylene)amino]-4-pentenate (4a)** (Table 1, Entry 1). To a suspension of the *tert*-butylglycinate benzophenone imine **1a** (100 mg, 0.339 mmol), *N*-(9-anthracenylmethyl)cinchonidinium chloride **3a** (17.6 mg, 0.0339 mmol), [PdCl(π-C₃H₅)]₂ (4.3 mg, 0.012 mmol), 1,2-bisdiphenylphosphinoethane (10.8 mg, 0.0271 mmol), allyl acetate (67.8 mg, 0.677 mmol), KOH (33.5 mg, 0.508 mmol) in toluene (3.4 ml) was stirred vigorously at room temperature for 5 h. The mixture was diluted with ethyl acetate (15 ml), the organic phase was washed with water (3 × 5 ml), brine (5 ml) and dried over MgSO₄. After evaporation of the solvent, the crude product was purified by column chromatography to give 94.2 mg (83 %) of **4a**. (Entry 2) By a procedure similar to that described above, **1a** (30.0 mg, 0.102 mmol) was converted into 24.2 mg (71%) of **4a** using **3b** (10.2 mg, 0.0169 mmol) as PTC. (Entry 3) By a procedure similar to that described above, **1a** (100 mg, 0.339 mmol) was converted into 103.5 mg (91%) of **4a** using **3c** (22.2 mg, 0.0339 mmol) as PTC.

(Entry 4) By a procedure similar to that described above, **1a** (30.0 mg, 0.102 mmol) was converted into 83.7 mg (74%) of **4a** using **3d** (21.2 mg, 0.339 mmol) as PTC. (Entry 5) By a procedure similar to that described for Entry 4, **1a** (100 mg, 0.339 mmol) was converted into 78.8 mg (69%) of **4a** using tributylphosphine (11.0 mg, 0.0542 mmol) as ligand. (Entry 6) By a procedure similar to that described for Entry 4, **1a** (100 mg, 0.339 mmol) was converted into 36.1 mg (32%) of **4a** using triphenylphosphine (14.2 mg, 0.0542 mmol) as ligand. (Entry 7) By a procedure similar to that described for Entry 5, **1a** (100 mg, 0.339 mmol) was converted into 28.5 mg (25%) of **4a** using triethyl phosphite (9.0 mg, 0.054 mmol) as ligand. (Entry 8) By a procedure similar to that described for Entry 4, **1a** (100 mg, 0.339 mmol) was converted into 21.2 mg (19%) of **4a** using triphenyl phosphite (16.8 mg, 0.0542 mmol) as ligand. (Entry 9) To a suspension of **1a** (50.0 mg, 0.17 mmol), **3d** (10.6 mg, 0.0169 mmol), [PdCl(π -C₃H₅)]₂ (5.4 mg, 0.015 mmol), triphenyl phosphite (21.0 mg, 0.0677 mmol), allyl acetate (33.9 mg, 0.339 mmol) in toluene (0.56 ml) was added aqueous 50% KOH (66.4 mg, 0.591 mmol) at 0 °C under an argon atmosphere and the resulting mixture was stirred vigorously at 0 °C for 5h. The mixture was diluted with ether (15 ml) and the organic phase was washed with aqueous saturated NaHCO₃ (3 × 5 ml), brine (5 ml). The extract was dried over Na₂SO₄. After evaporation of the solvent, the crude product was purified by column chromatography [basic silica gel, Hexane/AcOEt (300/1)] to give 46.5 mg (82%) of **4a**. (Entry 10) By a procedure similar to that described for Entry 9, **1a** (50 mg, 0.169 mmol) was converted into 47.3 mg (83%) of **4a** using [PdCl(π -C₃H₅)]₂ (3.1 mg, 0.0085 mmol), **3d** (10.6 mg, 0.0169 mmol), and DPPE(O) (7.0 mg, 0.0169 mmol). **4a**: The enantioselectivity was determined by chiral HPLC (Chiralcel OD column, 0.5% 2-propanol hexane, 0.6 mL/min, λ = 254 nm, retention times: *S* (major) 10.3 min, *R* (minor) 12.4 min). A colorless oil. $[\alpha]_D^{25} = -105^\circ$ (*c* 1.2, CH₂Cl₂); elemental analysis: calcd for C₂₂H₂₅NO₂: C, 78.77; H, 7.51; N, 4.18. Found: C, 78.95; H, 7.65; N, 4.12. ¹H NMR (500 MHz, CDCl₃): δ 1.51 (s, 9H), 2.64-2.78 (m, 2H), 4.08 (dd, 1H, *J* = 5.2 Hz, 7.7 Hz), 5.08 (dd, 1H, *J* = 1.0 Hz, 10.0 Hz), 5.14 (dd, 1H, *J* = 1.0 Hz, 17.1 Hz), 5.75-5.85 (m, 1H), 7.21-7.74 (m, 10H); ¹³C NMR (126 MHz, CDCl₃): δ 28.0, 38.1, 65.8, 81.0, 117.2, 127.9, 127.9, 128.3, 128.5, 128.7, 130.1, 134.7, 136.6, 139.7, 170.1, 170.8; IR (CHCl₃): ν 1726, 1622, 1447, 1157, 992 cm⁻¹; MS (*m/z*): (FAB) 336 (MH⁺, 100), 280 (79), 234 (53).

***tert*-Butyl (2*S*)-2-[(diphenylmethylene)amino]-5-(4-fluorophenyl)-4-pentenate (4b)** (Table 2, entry 1) To a suspension of **1a** (50.0 mg, 0.169 mmol), **3d** (10.6 mg, 0.0169 mmol), [PdCl(π -C₃H₅)]₂ (3.1 mg, 0.0085 mmol), and triphenyl phosphite (10.5 mg, 0.0336 mmol) in toluene (0.28 ml), were successively added a solution of cinnamyl acetate (59.6 mg, 0.34 mmol) in toluene (0.28 ml) and an aqueous 50% KOH solution (66.4 mg, 0.591 mmol) at 0 °C under an argon atmosphere. The mixture was stirred vigorously at 0 °C for 2.5 h. The mixture was diluted with ether (15 ml), washed with aqueous saturated NaHCO₃ (3 $\times$ 5 ml) and brine (5 ml). The extract was dried over Na₂SO₄, filtered and concentrated *in vacuo*. The crude product was purified by column chromatography [basic silica gel, Hexane/AcOEt (300/1)] to give 61.8 mg (89%) of **4b** as a colorless oil. The enantioselectivity was determined by chiral HPLC (Chiralcel OD-H column, 0.6% 2-propanol/hexane, 0.6 mL/min, λ = 254 nm, retention times: *S* (major) 15.2 min, *R* (minor) 22.1 min). $[\alpha]_D^{20}$ = -53° (*c* 1.30, CHCl₃); elemental analysis: calcd for C₂₈H₂₉NO₂: C, 81.72; H, 7.10; N, 3.40. Found: C, 81.46; H, 7.08; N, 3.32. ¹H NMR (500 MHz, CDCl₃): δ 1.55 (s, 9H), 2.82-2.98 (m, 2H), 4.20 (dd, 1H, *J* = 4.9 Hz, 7.3 Hz), 6.20 (ddd, 1H, *J* = 7.3 Hz, 7.3 Hz, 15.0 Hz), 6.51 (d, 1H, *J* = 15.6 Hz), 7.22-7.53 (m, 15H); ¹³C NMR (126 MHz, CDCl₃): δ 28.0, 37.3, 66.1, 81.0, 126.0, 126.4, 127.0, 127.9, 127.9, 128.3, 128.4, 128.5, 128.8, 130.2, 132.4, 136.6, 137.4, 139.6, 170.2, 170.8; IR (CHCl₃): ν 1726, 1618, 1487, 1155, 969 cm⁻¹; MS (*m/z*): (FAB) 412 (MH⁺, 100), 356 (93), 238 (25).

***tert*-Butyl (2*S*)-2-[(diphenylmethylene)amino]-5-(4-fluorophenyl)-4-pentenate (4d)** (Entry 3). The enantioselectivity was determined by chiral HPLC (Chiralcel OD-H column, 0.6% 2-propanol/hexane, 0.75 mL/min, λ = 254 nm, retention times: *S* (major) 16.8 min, *R* (minor) 28.2 min). A colorless oil. $[\alpha]_D^{23}$ = -105° (*c* 1.20, CH₂Cl₂); elemental analysis: calcd for C₂₈H₂₈FNO₂: C, 78.30; H, 6.57; F, 4.42; N, 3.26. Found: C, 78.22; H, 6.71; F 4.29; N 3.26. ¹H NMR (500 MHz, CDCl₃): δ 1.44 (s, 9H), 2.70-2.83 (m, 2H), 4.07 (dd, 1H, *J* = 5.2, 7.6 Hz), 6.01 (td, 1H, *J* = 7.6, 15.9 Hz), 6.35 (d, 1H, *J* = 15.9 Hz), 6.94-7.65 (m, 14H); ¹³C NMR (126 MHz, CDCl₃): δ 28.1, 37.2, 66.1, 81.1, 115.2, 115.4, 126.2, 127.4, 127.9, 128.3, 128.5, 128.8, 130.2, 131.2, 133.6, 136.6, 139.6, 162.0 (C-F coupling, d, *J* = 246 Hz), 170.2, 170.8; IR (CHCl₃): ν 2980, 1725, 1621, 1509 cm⁻¹; MS (*m/z*): (FAB) 430 (MH⁺, 83), 374 (100), 328 (27), 238 (61).

***tert*-Butyl (2*S*)-2-[(diphenylmethylene)amino]-5-(4-methylphenyl)-4-pentenate (4f)** (Entry 5). The enantioselectivity was determined by chiral HPLC (Chiralcel OD-H column, 0.5% 2-propanol/hexane, 0.6 mL/min, λ = 254 nm, retention times: *S* (major) 10.3 min, *R* (minor) 12.4 min). A colorless oil. $[\alpha]_D^{23} = -57^\circ$ (*c* 0.7, CHCl₃); elemental analysis: calcd for C₂₉H₃₁NO₂: C, 81.85; H, 7.34; N, 3.29. Found: C, 81.85; H, 7.34; N, 3.29. ¹H NMR (500 MHz, CDCl₃): δ 1.44 (s, 9H), 2.31 (s, 3H), 2.70-2.83 (m, 2H), 4.07 (dd, 1H, *J* = 5.0, 7.8 Hz), 6.02 (td, 1H, *J* = 7.7, 15.9 Hz), 6.37 (d, 1H, *J* = 15.9 Hz), 7.00-7.65 (m, 14H); ¹³C NMR (126 MHz, CDCl₃): δ 21.1, 28.1, 37.3, 66.2, 81.0, 125.3, 125.9, 127.9, 128.0, 128.3, 128.5, 128.8, 129.1, 130.1, 132.2, 132.4, 134.7, 136.7, 139.7, 170.2, 170.9; IR (CHCl₃): ν 3009, 1726, 1656, 1622 cm⁻¹; MS (*m/z*): (FAB) 426 (MH⁺, 82), 370 (100), 324 (26), 238 (63).

***tert*-Butyl (2*S*)-2-benzoylamino-2-methyl-4-pentenate (5)**. To a suspension of **1b** (50.0 mg, 0.197 mmol), **3d** (12.4 mg, 0.0197 mmol), [PdCl(π -C₃H₅)₂] (3.6 mg, 0.0099 mmol), triphenyl phosphite (6.1 mg, 0.020 mmol) in toluene (0.66 ml) were successively added allyl acetate (39.5mg, 0.394 mmol) and aqueous 50% KOH (66.4 mg, 0.591 mmol) at 0 °C and the resulting mixture was stirred vigorously at 0 °C for 17 h under an argon atmosphere. The mixture was diluted with ether (15 ml) and filtered through a pad of Celite. The combined filtrates were dried over Na₂SO₄. After evaporation of the solvent, THF (1.2 ml) and an aqueous 15% citric acid was added to the residue and the mixture was stirred at room temperature for 3 h. The solution was diluted with Et₂O (15ml) and then extracted with water (3 $\times$ 15 ml). The combined aqueous layers were neutralized with solid K₂CO₃, then extracted with Et₂O (3 $\times$ 30 ml). The combined organic layers were dried over Na₂SO₄. After evaporation of solvent, the residue was dissolved to dry CH₂Cl₂ (1 ml), and to this triethylamine (0.043 mg, 0.30 mmol) and Benzoyl chloride (41.6 mg, 0.30 mmol) were added at 0 °C and the solution was stirred at room temperature for 14 h. The mixture was quenched with water (2 ml) and extracted with ethyl acetate (15 ml $\times$ 3). The combined organic layers were washed with water (5ml) and aqueous saturated NaHCO₃ (2 $\times$ 5 ml), brine (5 ml) and dried over MgSO₄. After evaporation of the solvent, the crude product was purified by column chromatography (AcOEt/hexane=1/10) to give 13.1 mg (24%) of **5** as a colorless oil. The enantioselectivity was determined by chiral HPLC (Chiralcel OD-H column, 2% 2-

propanol/hexane, 0.7 mL/min, $\lambda = 254$ nm, retention times: (minor) 8.5 min, (major) 10.6 min) to 83% ee. $[\alpha]_D^{34} = +34^\circ$ (c 0.80, CHCl_3); ^1H NMR (500 MHz, CDCl_3): δ 1.47 (s, 9H), 1.69 (s, 3H), 2.57 (dd, $J = 7.6, 14.0$ Hz, 1H), 3.23 (dd, $J = 7.6, 14.0$ Hz, 1H), 5.05 (d, $J = 10.1$ Hz, 1H), 5.09 (d, $J = 17.1$ Hz, 1H), 5.59-5.70 (m, 1H), 7.12 (bs, 1H), 7.36-7.80 (m, 5H); ^{13}C NMR (126 MHz, CDCl_3): δ 23.1, 27.9, 40.2, 60.6, 82.4, 119.0, 126.8, 128.5, 131.3, 132.7, 135.2, 166.2, 173.4; IR (CHCl_3): ν 3409, 3007, 1721, 1661, 1515 cm^{-1} ; MS (m/z): (FAB) 290 (MH^+ , 9), 234 (71), 105 (100); HRMS: (FAB) Calculated for $\text{C}_{17}\text{H}_{24}\text{NO}_3$ (MH^+): 290.1756. Found: 290.1761.

***tert*-Butyl (2*S*,3*R*)-3,5-diphenyl-2-[(diphenylmethylene)amino]pent-4-enate (9) and *tert*-Butyl (2*R*,3*R*)-3,5-diphenyl-2-[(diphenylmethylene)amino]pent-4-enate (10)** Table 3: (Entry 2). To a suspension of **1a** (50.0 mg, 0.169 mmol), **3d** (10.6 mg, 0.0169 mmol), $[\text{PdCl}(\pi\text{-C}_3\text{H}_5)]_2$ (3.1 mg, 0.0085 mmol), DPPE (6.7 mg, 0.017 mmol), 1,3-diphenylpropenyl acetate (64.1 mg, 0.254 mmol) in toluene (0.56 ml) was added an aqueous 50% KOH solution (57.0 mg, 0.508 mmol) at 0 under an argon atmosphere and the resulting mixture was stirred vigorously at 0 for 3 h. The suspension was diluted with ether (15 ml) and the organic phase was washed with aqueous saturated NaHCO_3 (3×5 ml), brine (5 ml) and dried over Na_2SO_4 . After evaporation of the solvent, the crude product was purified by column chromatography [basic silica gel, Hexane/ AcOEt (300/1)] to give 48.7 mg of **9** and 18.0 mg of **10** (total yield 97 %). (Entry 3) By the same procedure as described above, **1a** (50.0 mg, 0.169 mmol) was converted into 27.2 mg of **9** and 4.8 mg of **10** using DPPE(O) (7.0 mg, 0.017 mmol) as ligand (total yield 39%). (Entry 4) By the same procedure as described above, **1a** (50.0 mg, 0.169 mmol) was converted into 33.2 mg of **9** and 17.0 mg of **10** using (*R*)-BINAP(O) (21.6 mg, 0.0339 mmol) as a ligand (total yield 61%). (Entry 5) By the same procedure as described above, **1a** (50.0 mg, 0.169 mmol) was converted into 23.6 mg of **9** and 14.7 mg of **10** using (*S*)-BINAP(O) (21.6 mg, 0.0339 mmol) as a ligand (total yield 33%). (Entry 6) By the same procedure as described above, **1a** (50.0 mg, 0.169 mmol) was converted into 18.2 mg of **9** and 9.1 mg of **10** using (*R*)-BINAP(O) (21.6 mg, 0.0339 mmol) as a ligand and without PTC **3d** (total yield 33%). **9**: a viscous liquid. The enantioselectivity was determined by chiral HPLC (Chiralcel AD column, 1% 2-propanol/hexane, 0.8 mL/min, $\lambda = 254$ nm, retention times: (*S*, *R*) (major) 12.5 min, (*R*, *S*) (minor) 17.9 min). $[\alpha]_D^{31} = -77^\circ$

(*c* 1.00, CHCl₃); ¹H NMR (500 MHz, CDCl₃): δ 1.34 (s, 9H), 4.29 (dd, *J* = 7.3, 7.3 Hz, 1H), 4.38 (d, *J* = 6.4 Hz, 1H), 6.57 (d, *J* = 15.9 Hz, 1H), 6.65 (dd, *J* = 8.2, 15.9 Hz, 1H), 6.81-7.75 (m, 20H); ¹³C NMR (126 MHz, CDCl₃): δ 27.9, 53.0, 71.1, 81.0, 126.3, 126.5, 127.1, 127.8, 127.9, 128.2, 128.4, 128.7, 128.9, 129.7, 130.1, 132.1, 136.6, 137.5, 139.6, 141.4, 169.9, 170.8; IR (CHCl₃): ν 3010, 1731, 1151, 966 cm⁻¹; MS (*m/z*): (FAB) 488 (MH⁺, 84), 432 (77), 386 (35), 238 (99), 193 (100), 165 (33), 115 (30); HRMS: (FAB) Calculated for C₃₄H₃₄NO₂ (MH⁺): 488.2589. Found: 488.2602. **10**: a viscous liquid. The enantioselectivity was determined by chiral HPLC (Chiralcel AD column, 2% 2-propanol hexane, 0.6 mL/min, λ = 254 nm, retention times: (*R, R*) (major) 12.0 min, (*S, S*) (minor) 14.5 min). [α]_D³³ = -129° (*c* 0.80, CHCl₃); ¹H NMR (500 MHz, CDCl₃): δ 1.38 (s, 9H), 4.26-4.35 (m, 2H), 6.36 (ddd, *J* = 1.0, 7.3, 15.9 Hz, 1H), 6.50 (d, *J* = 15.9 Hz, 1H), 6.70-7.52 (m, 20H); ¹³C NMR (126 MHz, CDCl₃): δ 28.0, 53.4, 71.6, 81.2, 126.2, 126.5, 127.2, 127.8, 128.2, 128.2, 128.4, 128.5, 128.9, 129.0, 129.7, 130.0, 131.6, 136.3, 137.3, 139.7, 140.9, 170.1, 170.5; IR (CHCl₃): ν 3008, 1727, 1150, 967 cm⁻¹; MS (*m/z*): (FAB) 488 (MH⁺, 63), 432 (68), 386 (26), 238 (95), 193 (100), 165 (38), 115 (34); HRMS: (FAB) Calculated for C₃₄H₃₄NO₂ (MH⁺): 488.2589. Found: 488.2585.

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 OBFRQ : 500.00 MHz
 OBSET : 162160.00 Hz
 RGAIN : 22

SCANS : 8 times
 SLVNT : CDCL₃
 SPINNING : 13 Hz
 TEMP : 24.8 °C