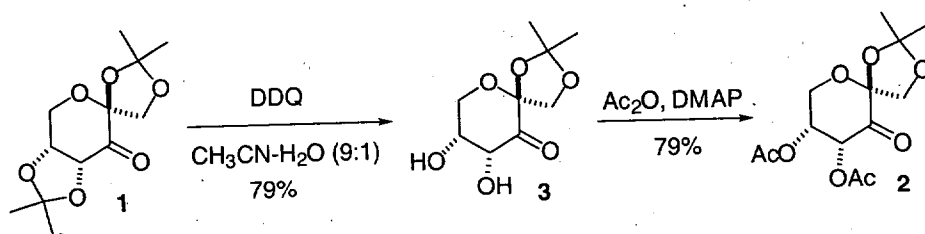


**General Methods:** Oxone was purchased from Aldrich. All glassware used for the epoxidation was carefully washed to be free from any trace metals which catalyze the decomposition of Oxone. Column chromatography was carried out with 60Å 230-400 mesh Whatman silica gel. The 300 MHz  $^1\text{H}$  NMR and 75.5 MHz  $^{13}\text{C}$  NMR spectra were measured on a Varian Inova-300 spectrometer in  $\text{CDCl}_3$ . Proton chemical shifts are given relative to internal  $\text{CDCl}_3$  (7.27 ppm), and carbon chemical shifts are given relative to  $\text{CDCl}_3$  (77.23 ppm). Infrared spectra were recorded on a Nicolet Avatar 320 FT-IR spectrometer. High resolution mass spectra were performed at the mass spectrometry facility of Colorado State University. Elemental analyses were performed by M-H-W Laboratories (Phoenix, AZ). Optical rotations were measured on an Autopol III automatic polarimeter in a 10 cm cell.

### Preparation of Ketone 2



To a solution of ketone **1** (6.9 g, 26.7 mmol) in  $\text{CH}_3\text{CN-H}_2\text{O}$  (9/1) (90 mL) was added DDQ (0.6 g, 2.6 mmol) at rt. Upon stirring at rt for 7 h, the reaction mixture was concentrated, dissolved in EtOAc (80 mL), dried ( $\text{Na}_2\text{SO}_4$ ), filtered, concentrated, and purified by flash chromatography (1/0 to 1/1 hexane / EtOAc) to give diol **3** as a white solid (4.00 g, 79%).<sup>1</sup> mp 107-110 °C (lit.<sup>1a</sup> mp 96-101 °C);  $[\alpha]_{\text{D}}^{25} = -140$  (c 0.8, MeOH) [lit.<sup>1b</sup>  $[\alpha]_{\text{D}}^{20} = -119$  (c 0.8, MeOH)]; IR (film) 3469, 3402, 1747  $\text{cm}^{-1}$ ;  $^1\text{H}$  NMR  $\delta$  4.74 (d,  $J = 4.2$  Hz, 1H), 4.68 (d,  $J = 9.6$  Hz, 1H), 4.39 (m, 1H), 4.32 (d,  $J = 12.9$  Hz, 1H), 4.00

(d,  $J = 9.6$  Hz, 1H), 3.98 (dd,  $J = 12.9, 2.4$  Hz, 1H), 3.29 (m, 2H), 1.54 (s, 3H), 1.39 (s, 3H);  $^{13}\text{C}$  NMR  $\delta$  199.0, 113.6, 104.5, 74.4, 73.8, 69.7, 63.6, 26.6, 26.4.

To a solution of diol **3** (3.514 g, 16.1 mmol) and DMAP (0.40 g, 0.32 mmol) in dry  $\text{CH}_2\text{Cl}_2$  (150 mL) was added dropwise  $\text{Ac}_2\text{O}$  (4.60 mL, 48.7 mmol) at  $0^\circ\text{C}$  over 20 min. Upon stirring at room temperature for 16 h (monitored by TLC), the reaction mixture was filtered through a short silica gel column. The filtrate was concentrated and the residue was purified by flash chromatography (hexane / EtOAc 1/0 to 3:1) to give ketone **2** as a colorless syrup (3.84 g, 79%).  $[\alpha]_D^{25} = -103$  ( $c$  0.98,  $\text{CHCl}_3$ ); IR (film)  $1750\text{ cm}^{-1}$ ;  $^1\text{H}$  NMR  $\delta$  5.89 (d,  $J = 3.9$  Hz, 1H), 5.62-5.60 (m, 1H), 4.70 (d,  $J = 9.6$  Hz, 1H), 4.44 (d,  $J = 13.2$  Hz, 1H), 3.99 (d,  $J = 9.6$  Hz, 1H), 3.96 (dd,  $J = 13.2, 2.1$  Hz, 1H), 2.18 (s, 3H), 2.13 (s, 3H), 1.55 (s, 3H), 1.41 (s, 3H);  $^{13}\text{C}$  NMR  $\delta$  191.8, 170.2, 169.4, 114.0, 105.2, 74.2, 72.4, 69.6, 62.8, 26.7, 26.3, 21.1, 20.7; HRMS calcd for  $\text{C}_{13}\text{H}_{19}\text{O}_8$  ( $M+1$ ) 303.1080, Found 303.1087.

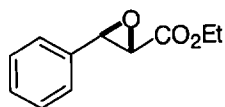
**Representative Asymmetric Epoxidation Procedure (Table 1, Entry 3):** Aqueous  $\text{Na}_2(\text{EDTA})$  ( $1 \times 10^{-4}\text{ M}$ , 2.5 mL) and a catalytic amount of tetrabutylammonium hydrogen sulfate (10 mg, 0.03 mmol) were added to a solution of ethyl *trans*-4-methylcinnamate (0.095 g, 0.5 mmol) in  $\text{CH}_3\text{CN}$  (2.5 mL) with vigorous stirring at  $0^\circ\text{C}$ . A mixture of Oxone (1.537 g, 2.5 mmol) and  $\text{NaHCO}_3$  (0.651 g, 7.75 mmol) was pulverized, and a small portion of this mixture was added to the reaction mixture to bring pH to  $>7$ . Then a solution of ketone **2** (0.038 g, 0.125 mmol) in  $\text{CH}_3\text{CN}$  (1.25 mL) was added. The rest of the Oxone and  $\text{NaHCO}_3$  was added to the reaction mixture portionwise over a period of 4.5 h. Upon stirring for additional 7.5 h at  $0^\circ\text{C}$  and 12 h at room temperature, the resulting mixture was diluted with water, and extracted with ethyl acetate. The combined extracts were washed with brine, dried ( $\text{Na}_2\text{SO}_4$ ), filtered, concentrated, and purified by

flash chromatography (hexane/EtOAc 1/0 to 95/5) to give the epoxide as a colorless liquid (0.094 g, 91% yield, 97% ee).

[For entry 4, 7.5 mL of CH<sub>3</sub>CN and 5.0 mL of Na<sub>2</sub>(EDTA) were used due to the poorer solubility of the substrate. For entries 4 and 15, the silica gel was buffered with 1% Et<sub>3</sub>N in hexane.]

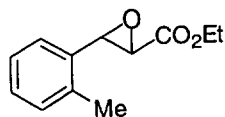
### Characterization data of epoxides in Table 1

#### Entry 1



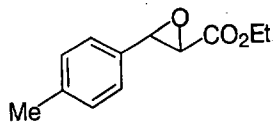
**(+)-(2*S*, 3*R*)-Ethyl 3-phenyloxiranecarboxylate:**<sup>2</sup> Colorless oil;  $[\alpha]_D^{25} = +160.1$  (*c* 1.15, CHCl<sub>3</sub>) (96% ee) [lit<sup>2</sup>  $[\alpha]_D^{20} = +152.0$  (*c* 1.3, CHCl<sub>3</sub>) (95% ee)]; IR (film) 1747 cm<sup>-1</sup>; <sup>1</sup>H NMR  $\delta$  7.39-7.35 (m, 3H), 7.32-7.29 (m, 2H), 4.35-4.25 (m, 2H), 4.10 (d, *J* = 1.8 Hz, 1H), 3.52 (d, *J* = 1.8 Hz, 1H), 1.34 (t, *J* = 6.9 Hz, 3H); <sup>13</sup>C NMR  $\delta$  168.3, 135.1, 129.1, 128.8, 126.0, 62.0, 58.2, 57.0, 14.5.

#### Entry 2



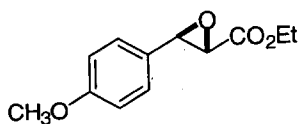
**(+)-Ethyl *trans*-3-(2-methylphenyl)oxiranecarboxylate:**<sup>3</sup> Colorless oil;  $[\alpha]_D^{25} = +58.5$  (*c* 0.83, CHCl<sub>3</sub>) (93% ee); IR (film) 1750 cm<sup>-1</sup>; <sup>1</sup>H NMR  $\delta$  7.27-7.16 (m, 4H), 4.36-4.26 (m, 2H), 4.22 (d, *J* = 1.8 Hz, 1H), 3.41 (d, *J* = 1.8 Hz, 1H), 2.40 (s, 3H), 1.34 (t, *J* = 7.5 Hz, 3H); <sup>13</sup>C NMR  $\delta$  168.5, 136.5, 133.5, 130.1, 128.6, 126.3, 124.5, 62.0, 56.4, 56.1, 19.1, 14.5.

## Entry 3



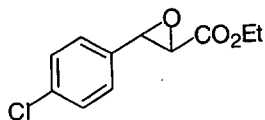
**(+)-Ethyl *trans*-3-(4-methylphenyl)oxiranecarboxylate:**<sup>4</sup> Colorless oil;  $[\alpha]_D^{25} = +159.4$  (*c* 1.09,  $\text{CHCl}_3$ ) (97% ee); IR (film)  $1749 \text{ cm}^{-1}$ ;  $^1\text{H NMR}$   $\delta$  7.19 (s, 4H), 4.35-4.24 (m, 2H), 4.07 (d, *J* = 1.8 Hz, 1H), 3.51 (d, *J* = 1.8 Hz, 1H), 2.37 (s, 3H), 1.34 (t, *J* = 6.9 Hz, 3H);  $^{13}\text{C NMR}$   $\delta$  168.5, 139.1, 132.1, 129.5, 126.0, 61.9, 58.2, 57.0, 21.44, 14.33.

## Entry 4



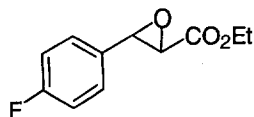
**(+)-(2*S*, 3*R*)-Ethyl 3-(4-methoxyphenyl)oxiranecarboxylate:**<sup>5</sup> Colorless syrup;  $[\alpha]_D^{25} = +143.2$  (*c* 1.03,  $\text{CHCl}_3$ ) (90% ee) [lit<sup>5</sup>  $[\alpha]_D^{25} = -152$  (*c* 1.10,  $\text{CHCl}_3$ ) for (2*R*, 3*S*)-form (97.7% ee)]; IR (film)  $1747 \text{ cm}^{-1}$ ;  $^1\text{H NMR}$   $\delta$  7.25-7.20 (m, 2H), 6.93-6.88 (m, 2H), 4.34-4.24 (m, 2H), 4.05 (d, *J* = 2.1 Hz, 1H), 3.82 (s, 3H), 3.51 (d, *J* = 2.1 Hz, 1H), 1.34 (t, *J* = 6.9 Hz, 3H);  $^{13}\text{C NMR}$   $\delta$  168.6, 160.5, 127.4, 127.1, 114.3, 61.9, 58.1, 56.9, 55.6, 14.4.

## Entry 5



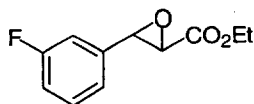
**(+)-Ethyl *trans*-3-(4-chlorophenyl)oxiranecarboxylate:**<sup>4</sup> Colorless oil;  $[\alpha]_D^{25} = +156.4$  (*c* 0.5,  $\text{CHCl}_3$ ) (97% ee); IR (film)  $1748 \text{ cm}^{-1}$ ;  $^1\text{H NMR}$   $\delta$  7.37-7.33 (m, 2H), 7.26-7.22 (m, 2H), 4.35-4.24 (m, 2H), 4.08 (d, *J* = 1.8 Hz, 1H), 3.47 (d, *J* = 1.8 Hz, 1H), 1.34 (t, *J* = 6.9 Hz, 3H);  $^{13}\text{C NMR}$   $\delta$  167.9, 134.9, 133.6, 129.0, 127.2, 62.1, 57.5, 57.0, 14.4.

## Entry 6



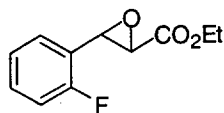
**(+)-Ethyl *trans*-3-(4-fluorophenyl)oxiranecarboxylate:**<sup>4</sup> Colorless oil;  $[\alpha]_D^{25} = +144.9$  (*c* 1.05, CHCl<sub>3</sub>) (96% ee); IR (film) 1748 cm<sup>-1</sup>; <sup>1</sup>H NMR  $\delta$  7.31-7.26 (m, 2H), 7.10-7.04 (m, 2H), 4.34-4.26 (m, 2H), 4.09 (d, *J* = 1.8 Hz, 1H), 3.48 (d, *J* = 1.8 Hz, 1H), 1.34 (t, *J* = 6.9 Hz, 3H); <sup>13</sup>C NMR  $\delta$  168.1, 127.8, 127.7, 116.0, 115.7, 62.1, 57.6, 57.0, 14.5.

## Entry 7



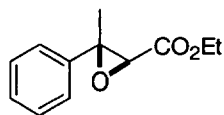
**(+)-Ethyl *trans*-3-(3-fluorophenyl)oxiranecarboxylate:** Colorless oil;  $[\alpha]_D^{25} = +148.0$  (*c* 0.4, CHCl<sub>3</sub>) (97% ee); IR (film) 1748 cm<sup>-1</sup>; <sup>1</sup>H NMR  $\delta$  7.32-7.39 (m, 1H), 6.98-7.14 (m, 3H), 4.25-4.36 (m, 2H), 4.10 (d, *J* = 1.8 Hz, 1H), 3.48 (d, *J* = 1.8 Hz, 1H), 1.35 (t, *J* = 6.9 Hz, 3H); <sup>13</sup>C NMR  $\delta$  167.9, 130.5, 121.9, 116.3, 116.0, 113, 112.7, 62.2, 57.5, 57.1, 14.5; Anal Calcd for C<sub>11</sub>H<sub>11</sub>O<sub>3</sub>F: C, 62.85; H, 5.27. Found: C, 63.02; H, 5.20.

## Entry 8



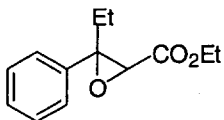
**(+)-Ethyl *trans*-3-(2-fluorophenyl)oxiranecarboxylate:** Colorless oil;  $[\alpha]_D^{25} = +110.9$  (*c* 0.34, CHCl<sub>3</sub>) (95% ee); IR (film) 1750 cm<sup>-1</sup>; <sup>1</sup>H NMR  $\delta$  7.36-7.06 (m, 4H), 4.38 (d, *J* = 1.8 Hz, 1H), 4.36-4.27 (m, 2H), 3.53 (d, *J* = 1.8 Hz, 1H), 1.35 (t, *J* = 7.2 Hz, 3H); <sup>13</sup>C NMR  $\delta$  168.0, 130.5, 130.4, 126.3, 124.6, 115.8, 115.5, 62.2, 56.3, 52.8, 14.4; Anal Calcd for C<sub>11</sub>H<sub>11</sub>O<sub>3</sub>F: C, 62.85; H, 5.27. Found: C, 62.72; H, 5.32.

## Entry 9



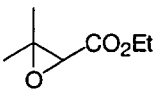
**(+)-(2*S*, 3*R*)-Ethyl 3-methyl-3-phenyloxiranecarboxylate:**<sup>6</sup> Colorless oil;  $[\alpha]_D^{25} = +121.3$  (*c* 1.0, CHCl<sub>3</sub>) (96% ee) [lit<sup>6b</sup>  $[\alpha]_D^{25} = +113.8$  (*c* 1.7, CHCl<sub>3</sub>)]; IR (film) 1750 cm<sup>-1</sup>; <sup>1</sup>H NMR  $\delta$  7.39-7.32 (m, 5H), 4.36-4.26 (m, 2H), 3.47 (s, 1H), 1.79 (s, 3H), 1.34 (t, *J* = 6.9 Hz, 3H); <sup>13</sup>C NMR  $\delta$  167.7, 140.3, 128.6, 128.2, 125.4, 62.2, 61.8, 17.3, 14.6.

## Entry 10



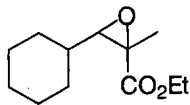
**(+)-Ethyl (*E*)-3-ethyl-3-phenyloxiranecarboxylate:**<sup>7</sup> Colorless oil;  $[\alpha]_D^{25} = +65.0$  (*c* 1.03, CHCl<sub>3</sub>) (93% ee); IR (film) 1751 cm<sup>-1</sup>; <sup>1</sup>H NMR  $\delta$  7.40-7.32 (m, 5H), 4.35-4.28 (m, 2H), 3.48 (s, 1H), 2.24-2.13 (m, 1H), 1.96-1.87 (m, 1H), 1.35 (t, *J* = 7.1 Hz, 3H), 0.96 (t, *J* = 7.3 Hz, 3H); <sup>13</sup>C NMR  $\delta$  167.8, 138.5, 128.6, 128.1, 126.3, 66.8, 61.8, 61.6, 24.2, 14.6, 9.8.

## Entry 11



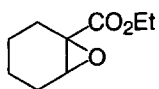
**(+)-Ethyl 3,3-dimethyloxiranecarboxylate:**<sup>8</sup> Colorless oil;  $[\alpha]_D^{25} = +20.5$  (*c* 1.09, CHCl<sub>3</sub>) (82% ee) [lit<sup>8</sup>  $[\alpha]_D = +27.3$  (*c* 0.44, CHCl<sub>3</sub>)]; IR (film) 1752 cm<sup>-1</sup>; <sup>1</sup>H NMR  $\delta$  4.32-4.21 (m, 2H), 3.34 (s, 1H), 1.44 (s, 3H), 1.39 (s, 3H), 1.32 (t; *J* = 6.9 Hz, 3H); <sup>13</sup>C NMR  $\delta$  168.6, 61.6, 60.4, 59.7, 24.6, 18.5, 14.6.

## Entry 12



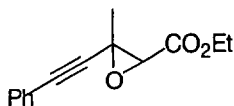
(+)-Ethyl (Z)-3-cyclohexyl-2-methyloxiranecarboxylate:<sup>9</sup> Colorless oil;  $[\alpha]_D^{25} = +23.9$  (*c* 1.02, CHCl<sub>3</sub>) (89% ee); IR (film) 1750 cm<sup>-1</sup>; <sup>1</sup>H NMR  $\delta$  4.25 (q, *J* = 7.2 Hz, 2H), 2.64 (d, *J* = 8.4 Hz, 1H), 2.03-1.55 (m, 5H), 1.55 (s, 3H), 1.31-1.10 (m, 6H), 1.29 (t, *J* = 7.2 Hz, 3H); <sup>13</sup>C NMR  $\delta$  170.3, 68.6, 61.5, 59.8, 37.4, 30.7, 28.9, 26.4, 25.6, 25.4, 19.9, 14.6; Anal Calcd for C<sub>12</sub>H<sub>20</sub>O<sub>3</sub>: C, 67.89; H, 9.50. Found: C, 68.04; H, 9.61.

## Entry 13



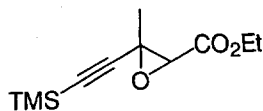
(+)-Ethyl 7-oxabicyclo[4.1.0]heptane-1-carboxylate:<sup>10</sup> Colorless oil;  $[\alpha]_D^{25} = +40.7$  (*c* 1.11, CHCl<sub>3</sub>) (93% ee); IR (film) 1730 cm<sup>-1</sup>; <sup>1</sup>H NMR  $\delta$  4.26-4.15 (m, 2H), 3.39 (m, 1H), 2.48-2.38 (m, 1H), 2.05-1.85 (m, 3H), 1.51-1.25 (m, 4H), 1.29 (t, *J* = 6.9 Hz, 3H); <sup>13</sup>C NMR  $\delta$  171.4, 61.6, 58.1, 57.1, 24.4, 24.2, 19.6, 19.3, 14.5; Anal Calcd for C<sub>9</sub>H<sub>14</sub>O<sub>3</sub>: C, 63.51; H, 8.29. Found: C, 63.71; H, 8.40.

## Entry 14



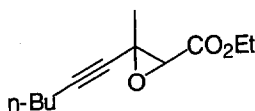
(+)-Ethyl (E)-3-methyl-3-(phenylethynyl)oxiranecarboxylate: Colorless oil;  $[\alpha]_D^{25} = +152.0$  (*c* 1.05, CHCl<sub>3</sub>) (94% ee); IR (film) 1751 cm<sup>-1</sup>; <sup>1</sup>H NMR  $\delta$  7.47-7.43 (m, 2H), 7.36-7.32 (m, 3H), 4.36-4.27 (m, 2H), 3.83 (s, 1H), 1.71 (s, 3H), 1.35 (t, *J* = 6.9 Hz, 3H); <sup>13</sup>C NMR  $\delta$  166.9, 132.0, 129.1, 128.5, 121.6, 87.4, 83.0, 62.1, 60.1, 52.7, 18.6, 14.5; Anal Calcd for C<sub>14</sub>H<sub>14</sub>O<sub>3</sub>: C, 73.02; H, 6.13. Found: C, 73.07; H, 5.99.

## Entry 15



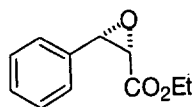
**(+)-Ethyl (*E*)-3-methyl-3-(trimethylsilylethynyl)oxiranecarboxylate:** Colorless oil;  $[\alpha]_D^{25} = +107.4$  (*c* 1.04,  $\text{CHCl}_3$ ) (94% ee); IR (film)  $1755 \text{ cm}^{-1}$ ;  $^1\text{H NMR } \delta$  4.32-4.24 (m, 2H), 3.72 (s, 1H), 1.60 (s, 3H), 1.33 (t,  $J = 7.2 \text{ Hz}$ , 3H), 0.18 (s, 9H);  $^{13}\text{C NMR } \delta$  166.8, 103.2, 88.5, 62.1, 59.9, 52.2, 18.4, 14.5, 0.0; Anal Calcd for  $\text{C}_{11}\text{H}_{18}\text{O}_3$ : C, 58.37; H, 8.02. Found: C, 58.50; H, 7.88.

## Entry 16



**(+)-Ethyl (*E*)-3-methyl-3-(1-hexynyl)oxiranecarboxylate:** Colorless oil;  $[\alpha]_D^{25} = +92.5$  (*c* 1.10,  $\text{CHCl}_3$ ) (98% ee); IR (film)  $1754 \text{ cm}^{-1}$ ;  $^1\text{H NMR } \delta$  4.28-4.21 (m, 2H), 3.64 (s, 1H), 2.18 (t,  $J = 6.9 \text{ Hz}$ , 2H), 1.56 (s, 3H), 1.50-1.33 (m, 4H), 1.30 (t,  $J = 7.2 \text{ Hz}$ , 3H), 0.89 (t,  $J = 7.2 \text{ Hz}$ , 3H);  $^{13}\text{C NMR } \delta$  167.1, 84.3, 78.7, 61.9, 60.0, 52.5, 30.5, 22.2, 18.9, 18.5, 14.5, 13.8; Anal Calcd for  $\text{C}_{12}\text{H}_{18}\text{O}_3$ : C, 68.54; H, 8.63. Found: C, 68.25; H, 8.74.

## Entry 17



**(-)-(2*S*, 3*S*)-Ethyl 3-phenyloxiranecarboxylate:**<sup>2</sup> Colorless oil;  $[\alpha]_D^{25} = -7.6$  (*c* 2.17,  $\text{CHCl}_3$ ) (44% ee) [lit<sup>2</sup>  $[\alpha]_D^{20} = +25.0$  (*c* 1.1,  $\text{CHCl}_3$ ) for (2*R*, 3*R*)-form (95.0% ee)]; IR (film)  $1752, 1732 \text{ cm}^{-1}$ ;  $^1\text{H NMR } \delta$  7.44-7.40 (m, 2H), 7.37-7.30 (m, 3H), 4.28 (d,  $J =$

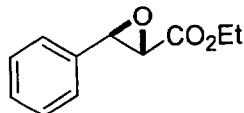
4.8 Hz, 1H), 4.07-3.96 (m, 2H), 3.83 (d,  $J = 4.8$  Hz, 1H), 1.03 (t,  $J = 7.2$  Hz, 3H);  $^{13}\text{C}$  NMR  $\delta$  166.8, 133.0, 128.5, 128.1, 126.8, 61.4, 57.6, 56.0, 14.2.

## References

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- (10) Van der Baan, J.L.; Barnick, J.W.F.K.; Bickelhaupt, F. *Synthesis*, **1990**, 897.

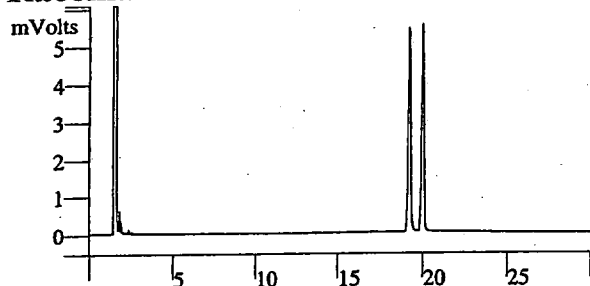
## The spectral data for the determination of enantiomeric excess of the epoxides

(+)-(2*S*, 3*R*)- Ethyl 3-Phenyloxiranecarboxylate (Table 1, entry 1)



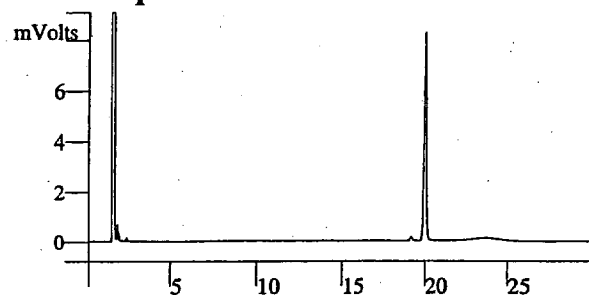
**GC Conditions:** Column: Chiraldex G-TA (Cat. No. 73033), Advanced Separation Technologies Inc.  
Oven: 125°C; Carrier: Helium, head pressure: 25psi; Detection: FID 250°C

**Racemate**



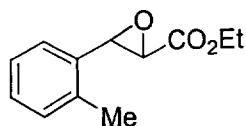
Peak No	Result ()	Ret. Time (min)	Minutes Area (counts)
1	49.8519	19.196	51995
2	50.1481	19.984	52304
		100.0000	104299

**Chiral epoxide**



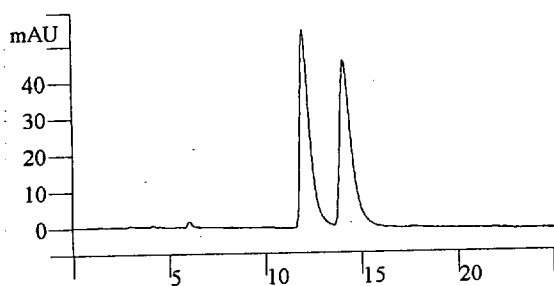
Peak No	Result ()	Ret. Time (min)	Minutes Area (counts)
1	1.8805	19.177	1542
2	98.1195	19.979	80480
		100.0000	82022

(+)-Ethyl *trans*-3-(4-methylphenyl)oxiranecarboxylate (Table 1, entry 2)



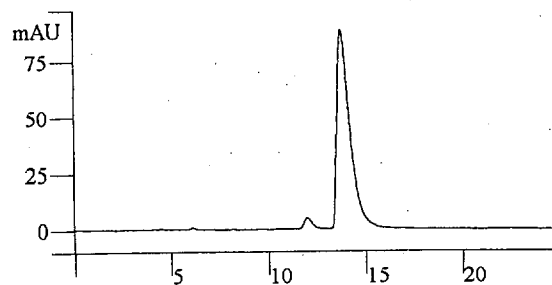
**HPLC Conditions:** Column: Chiralcel OD ((Column No. OD00CE-IC041), Chiral Technologies Inc.  
Eluent: Hexane/IPA (98/2); Flow rate: 1.0ml/min; Detection: UV254

**Racemate**



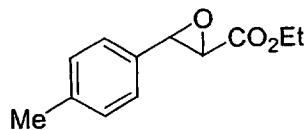
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	12.011	50.0893	979022
2	14.102	49.9107	975533
		100.0000	1954555

**Chiral epoxide**



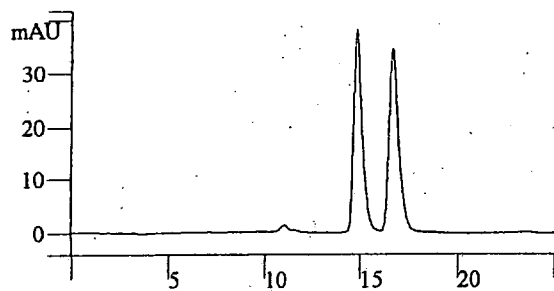
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	11.976	3.2739	72278
2	13.727	96.7261	2135411
		100.0000	2207689

**(+)-Ethyl *trans*-3-(4-methylphenyl)oxiranecarboxylate (Table 1, entry 3)**



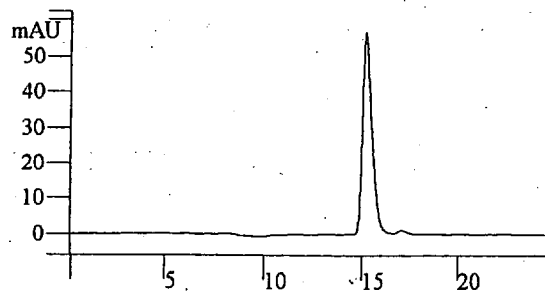
**HPLC Conditions:** Column: Chiralcel AD (Column No. AD00CE-IC048), Chiral Technologies Inc.  
 Eluent: Hexane/IPA (98/2); Flow rate: 0.5ml/min; Detection: UV254

**Racemate**



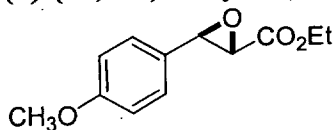
Peak No	Ret Time (min)	Result 0	Peak Area (counts)
1	14.804	49.8927	616236
2	16.624	50.1073	618886
		100.0000	1235122

**Chiral epoxide**



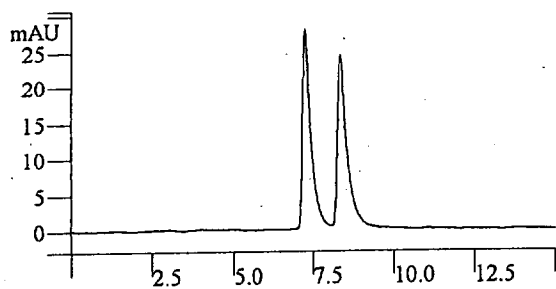
Peak No	Ret Time (min)	Result 0	Peak Area (counts)
1	15.164	98.2607	988342
2	17.079	1.7393	17494
		100.0000	1005836

**(+)-(2*S*, 3*R*)-Ethyl 3-(4-methoxyphenyl)oxiranecarboxylate (Table 1, entry 4)**



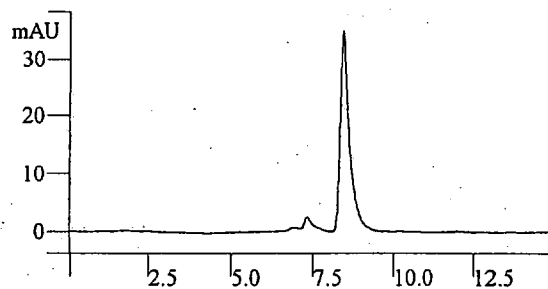
**HPLC Conditions:** Column: Chiralcel OD (Column No. OD00CE-IC041), Chiral Technologies Inc.  
 Eluent: Hexane/IPA (95/5); Flow rate: 1.0ml/min; Detection: UV254

**Racemate**

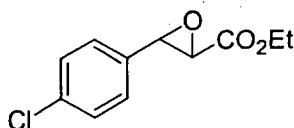


Peak No	Ret Time (min)	Result 0	Peak Area (counts)
1	7.242	49.8740	257366
2	8.329	50.1260	258667
		100.0000	516033

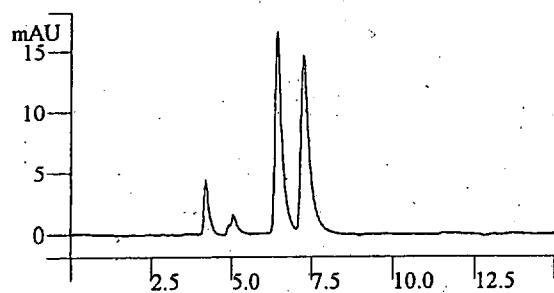
**Chiral epoxide**



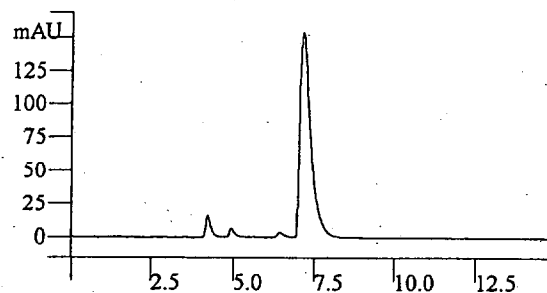
Peak No	Ret Time (min)	Result 0	Peak Area (counts)
1	7.318	4.9657	19086
2	8.392	95.0343	365276
		100.0000	384362

**(+)-Ethyl *trans*-3-(4-chlorophenyl)oxiranecarboxylate (Table 1, entry 5)**

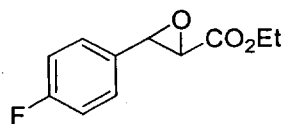
**HPLC Conditions:** Column: Chiralcel OD (Column No. OD00CE-IC041), Chiral Technologies Inc.  
 Eluent: Hexane/IPA (95/5); Flow rate: 1.0ml/min; Detection: UV254

**Racemate**

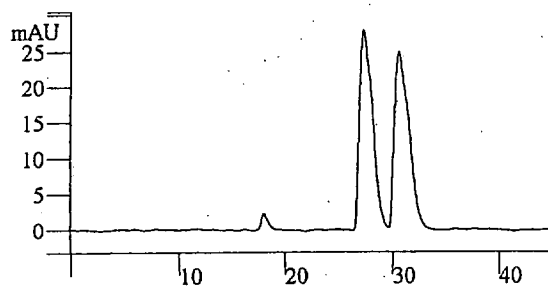
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	6.424	49.5398	134095
2	7.234	50.4602	136586
		100.0000	270681

**Chiral epoxide**

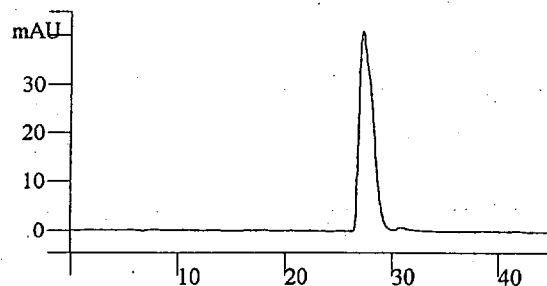
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	6.424	1.3683	25543
2	7.109	98.6317	1841258
		100.0000	1866801

**(+)-Ethyl *trans*-3-(4-fluorophenyl)oxiranecarboxylate (Table 1, entry 6)**

**HPLC Conditions:** Column: Chiralcel OJ (Column No. OJ00CE-HC029), Chiral Technologies Inc.  
 Eluent: Hexane/IPA (98/2); Flow rate: 0.5ml/min; Detection: UV254

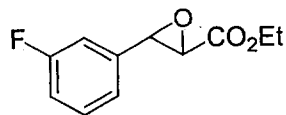
**Racemate**

Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	27.144	49.8048	1232499
2	30.392	50.1952	1242162
		100.0000	2474661

**Chiral epoxide**

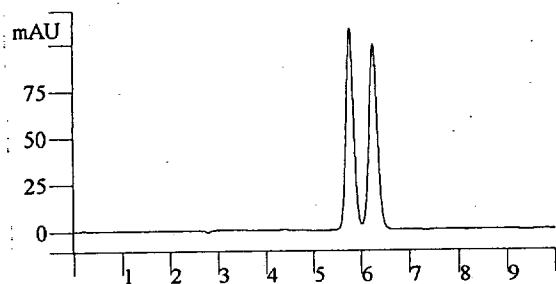
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	27.156	98.2232	1892882
2	30.868	1.7768	34242
		100.0000	1927124

**(+)-Ethyl *trans*-3-(3-fluorophenyl)oxiranecarboxylate (Table 1, entry 7)**



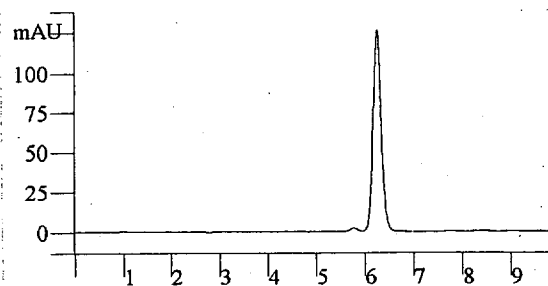
**HPLC Conditions:** Column: Chiralcel AD (Column No. AD00CE-IC048), Chiral Technologies Inc.  
 Eluent: Hexane/IPA (90/10); Flow rate: 1.0 ml/min; Detection: UV254

**Racemate**



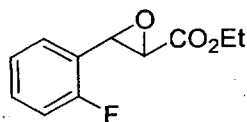
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	5.756	49.8509	621827
2	6.236	50.1491	625547
		100.0000	1247374

**Chiral epoxide**



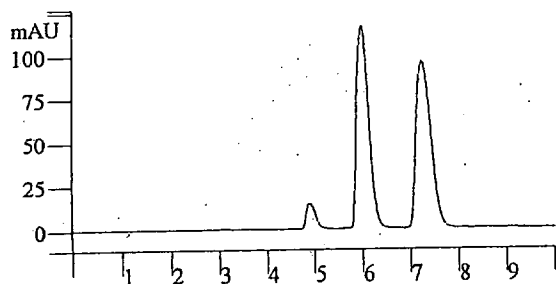
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	5.761	1.4579	11631
2	6.242	98.5421	786145
		100.0000	797776

**(+)-Ethyl *trans*-3-(2-fluorophenyl)oxiranecarboxylate (Table 1, entry 8)**



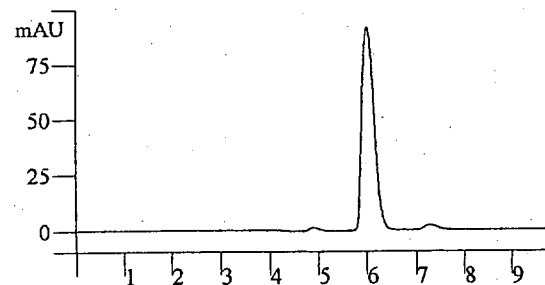
**HPLC Conditions:** Column: Chiralcel OJ (Column No. OJ00CE-HC029), Chiral Technologies Inc.  
 Eluent: Hexane/IPA (90/10); Flow rate: 1.0ml/min; Detection: UV254

**Racemate**



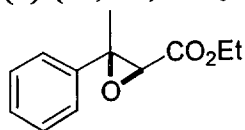
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	5.977	50.0223	1046016
2	7.229	49.9777	1045084
		100.0000	2091100

**Chiral epoxide**



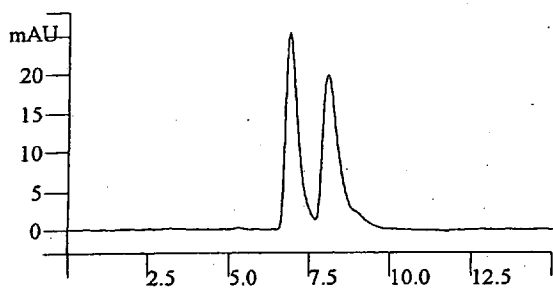
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	5.983	97.5653	827905
2	7.266	2.4347	20660
		100.0000	848565

**(+)-(2*S*, 3*R*)-Ethyl 3-methyl-3-phenyloxiranecarboxylate (Table 1, entry 9)**



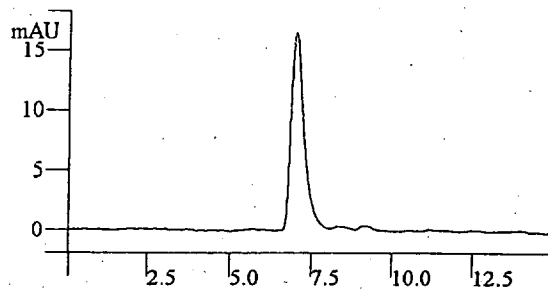
**HPLC Conditions:** Column: Chiralcel OB (Column No. OB00CE-GJ019), Chiral Technologies Inc.  
 Eluent: Hexane/IPA (95/5); Flow rate: 1.0ml/min; Detection: UV254

**Racemate**



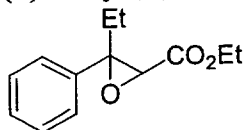
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	6.867	49.8178	364642
2	8.052	50.1822	367309
		100.0000	731951

**Chiral epoxide**



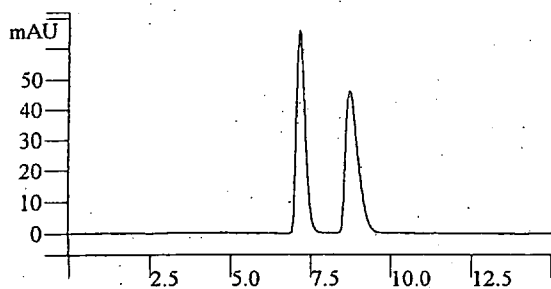
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	6.966	97.9537	240632
2	8.276	2.0463	5027
		100.0000	245659

**(+)-Ethyl (*E*)-3-Ethyl-3-phenyloxiranecarboxylate (Table 1, entry 10)**



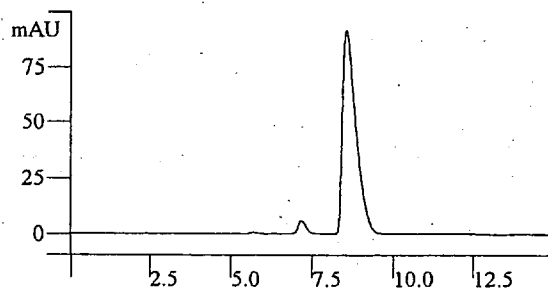
**HPLC Conditions:** Column: Chiralcel OJ (Column No. OJ00CE-HC029), Chiral Technologies Inc.  
 Eluent: Hexane/IPA (90/10); Flow rate: 1.0ml/min; Detection: UV254

**Racemate**



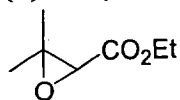
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	7.126	49.8615	644440
2	8.693	50.1385	648020
		100.0000	1292460

**Chiral epoxide**



Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	7.161	3.6257	51544
2	8.509	96.3743	1370090
		100.0000	1421634

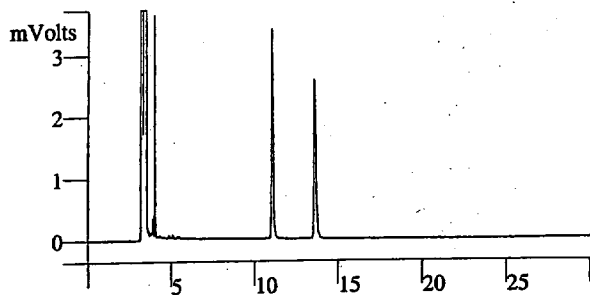
**(+)-Ethyl 3,3-dimethyloxiranecarboxylate (Table 1, entry 11)**



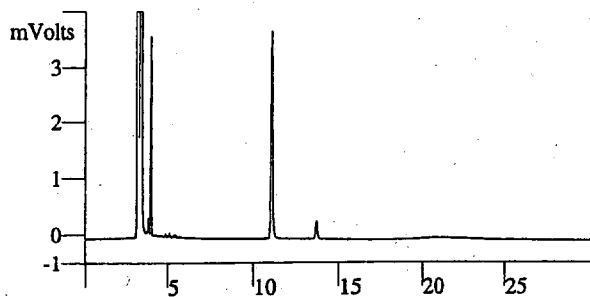
**GC Conditions:** Column: Chiraldex G-TA (Cat. No. 73033), Advanced Separation Technologies Inc.  
 Oven: 100°C; Carrier: Helium, head pressure: 10psi; Detection: FID 250°C

**Racemate**

**Chiral epoxide**

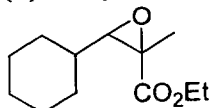


Peak No	Result ()	Ret. Time (min)	Minutes Area (counts)
1	50.0249	11.051	22235
2	49.9751	13.611	22213
			44448
			100.0000



Peak No	Result ()	Ret. Time (min)	Minutes Area (counts)
1	91.0805	11.051	24775
2	8.9195	13.667	2426
			27201
			100.0000

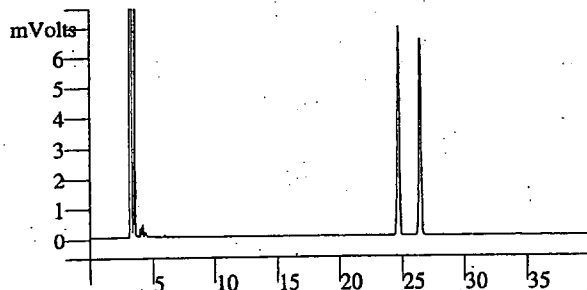
**(+)-Ethyl (Z)-3-cyclohexyl-2-methyloxiranecarboxylate (Table 1, entry 12)**



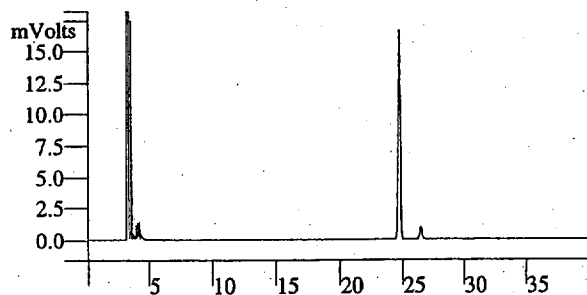
**GC Conditions:** Column: Chiraldex G-TA (Cat. No. 73033), Advanced Separation Technologies Inc.  
 Oven: 120°C; Carrier: Helium, head pressure: 10psi; Detection: FID 250°C

**Racemate**

**Chiral epoxide**

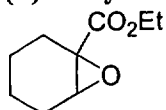


Peak No	Result ()	Ret. Time (min)	Minutes Area (counts)
1	49.9661	24.681	83380
2	50.0339	26.411	83493
			166873
			100.0000



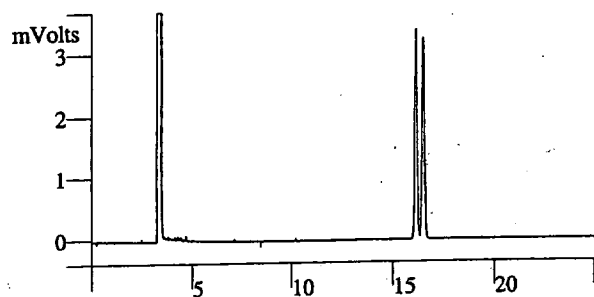
Peak No	Result ()	Ret. Time (min)	Minutes Area (counts)
1	94.5125	24.733	203297
2	5.4875	26.421	11804
			215101
			100.0000

**(+)-Ethyl 7-oxabicyclo[4.1.0]heptane-1-carboxylate** (Table 1, entry 13)



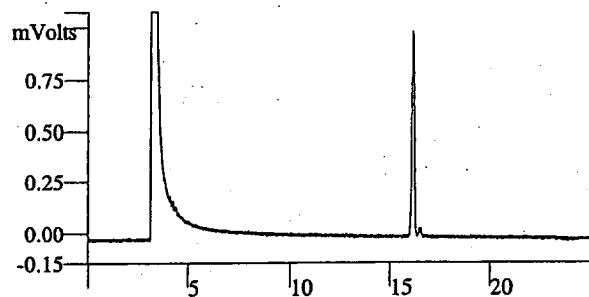
**GC Conditions:** Column: Chiraldex G-TA (Cat. No. 73033), Advanced Separation Technologies Inc.  
Oven: 120°C; Carrier: Helium, head pressure: 10psi; Detection: FID 250°C

**Racemate**



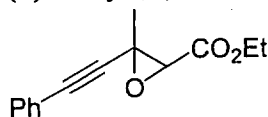
Peak No	Result ()	Ret. Time (min)	Minutes Area (counts)
1	50.0284	16.124	27761
2	49.9716	16.479	27730
		100.0000	55491

**Chiral epoxide**



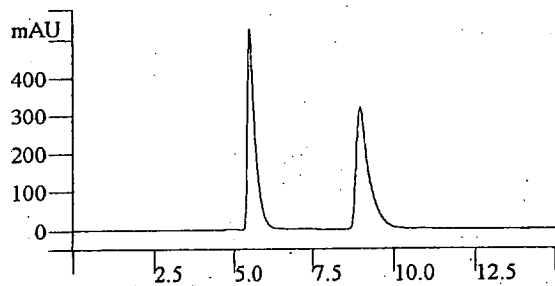
Peak No	Result ()	Ret. Time (min)	Minutes Area (counts)
1	96.7537	16.129	8476
2	3.2463	16.504	284
		100.0000	8760

**(+)-Ethyl (E)-3-Methyl-3-(phenylethynyl)oxirane-carboxylate** (Table 1, entry 14)



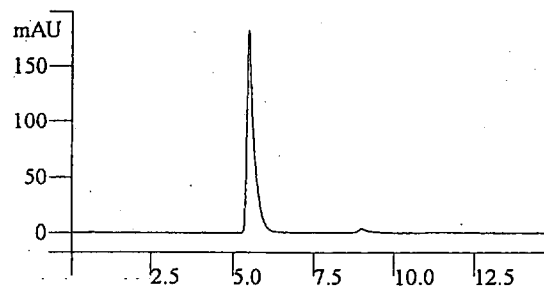
**HPLC Conditions:** Column: Chiralcel OD (Column No. OD00CE-IC041), Chiral Technologies Inc.  
Eluent: Hexane/IPA (95/5); Flow rate: 1.0ml/min; Detection: UV254

**Racemate**



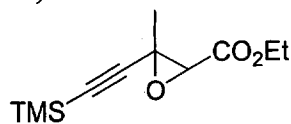
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	5.479	50.5157	4581680
2	8.941	49.4843	4488128
		100.0000	9069808

**Chiral epoxide**



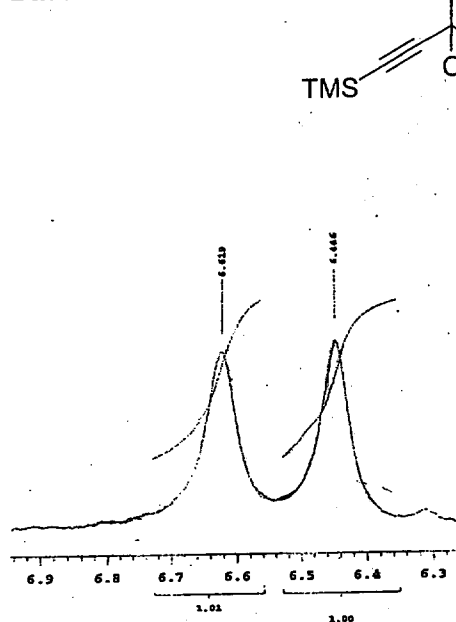
Peak No	Ret Time (min)	Result ()	Peak Area (counts)
1	5.479	97.0756	1442011
2	8.983	2.9244	43441
		100.0000	1485452

**(+)-Ethyl (*E*)-3-methyl-3-(trimethylsilylethynyl)oxiranecarboxylate** (Table 1, entry 15)

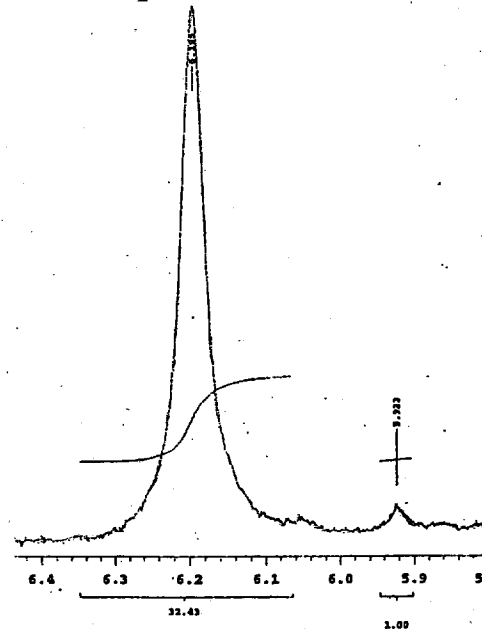
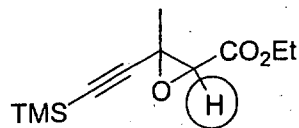


<sup>1</sup>H NMR spectra in the presence of chiral shift reagent, (+)-Eu(hfc)<sub>3</sub>.

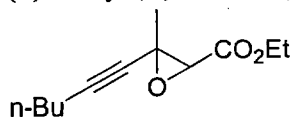
**Racemate**



**Chiral epoxide**

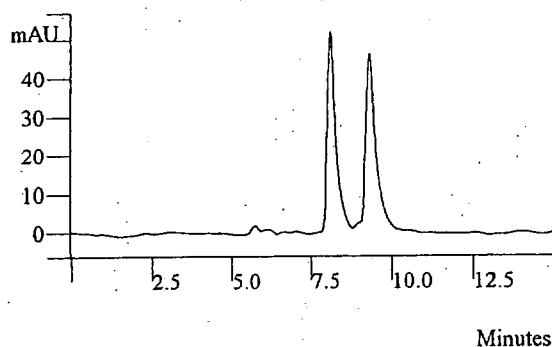


**(+)-Ethyl (*E*)-3-methyl-3-(hexynyl)oxiranecarboxylate** (Table 1, entry 16)



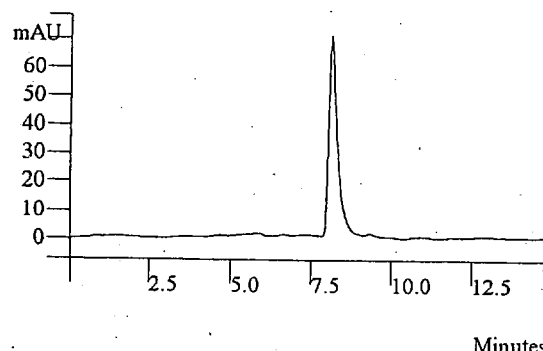
**HPLC Conditions:** Column: Chiralcel OD (Column No. OD00CE-IC041), Chiral Technologies Inc.  
Eluent: Heptane/IPA (98/2); Flow rate: 0.5ml/min; Detection: UV210

**Racemate**



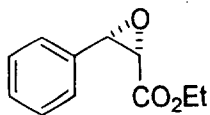
Peak No	Ret Time (min)	Result (%)	Peak Area (counts)
1	8.083	49.9164	517567
2	9.284	50.0836	519301
		100.0000	1036868

**Chiral epoxide**



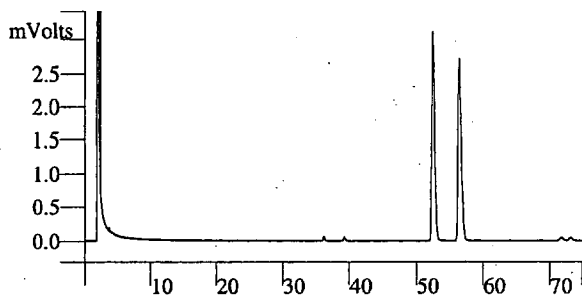
Peak No	Ret Time (min)	Result (%)	Peak Area (counts)
1	8.096	98.7951	712921
2	9.299	1.2049	8694
		100.0000	721615

**(-)-(2*S*, 3*S*)- Ethyl 3-Phenylloxiranecarboxylate (Table 1, entry 17)**



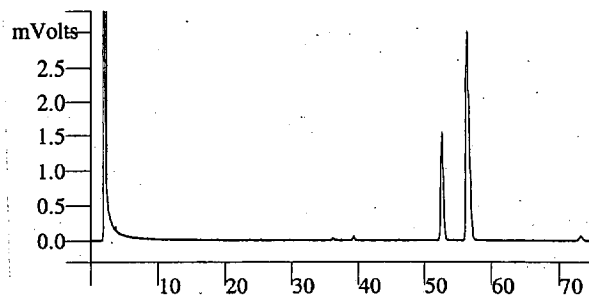
**GC Conditions:** Column: Chiraldex B-DM (Cat. No. 77023), Advanced Separation Technologies Inc.  
 Oven: 110°C; Carrier: Helium, head pressure: 20psi; Detection: FID 250°C

**Racemate**



Peak No	Result ()	Ret. Time (min)	Minutes Area (counts)
1	50.0062	52.347	91789
2	49.9938	56.256	91766
	100.0000		183555

**Chiral epoxide**



Peak No	Result ()	Ret. Time (min)	Minutes Area (counts)
1	27.9957	52.518	40535
2	72.0043	56.211	104254
	100.0000		144789