Supporting Information

Kinetic resolution of secondary alcohols with *Burkholderia cepacia* lipase immobilized on biodegradable ternary blend polymer matrix; as a highly efficient and heterogeneous recyclable biocatalyst

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General Methods: All chemicals and solvents were purchased from M/S Sigma Aldrich, S. D. Fine Chemicals, and commercial suppliers. *Burkholderia cepacia* activity ≥30,000 U/g, white colour powder purchased from Sigma Aldrich, India All solvents were distilled before use. The progress of the reaction was monitored by thin layer chromatography using Merck silica gel 60 F254 plates. Products were purified by column chromatography on silica gel (60–120 mesh). The $^1$H and $^{13}$C NMR spectroscopic data were analysed with a Varian Inova 400 MHz spectrometer in either CDCl$_3$. Chemical shifts are reported in parts per million (δ) relative to tetramethylsilane as the internal standard. The coupling constants (J) are reported in Hz, and the splitting patterns of the proton signals are described as s (singlet), d (doublet), t (triplet), and m (multiplet). Mass is confirmed by GC-MS analysis by Shimadzu QP 2010 instrument (Rtx-17, 30 m × 25mmID, film thickness 0.25 μm df) column flow- 2 mL/min, 80 °C to 240 °C at 10°/min rise.. The IR spectra were recorded with an FTIR (Perkin-Elmer). Optical rotations were measured by using a Rudolph IV automatic Polarimeter. The enantiomeric excess values (ee) of the products were determined by HPLC analysis with an Agilent- HPLC on Daicel Chiralcel-OJ-H and Chiralcel OD-H chiral columns using propan-2-ol/hexane as the eluent.
General procedure for the kinetic resolution of secondary alcohols

In general procedure, a dry 10 ml glass stoppered tube was charged with 0.5 mmol (1 eq.) of secondary alcohol and 3 mL MTBE. After gentle stirring, 2 mmol (4 eq.) of vinyl acetate was added and to this 20 mg immobilized enzyme was added to initiate the reaction. The reaction mixture was placed at 40 °C in orbital shaker at 150 rpm speed given time span. Reaction progress was monitored by TLC, after completion of reaction the reaction mixture was filtered and biocatalyst was thoroughly washed 2-3 times with MTBE to remove any traces of reactant or product sticked to biocatalyst. The solvent was then evaporated under vacuum at very low pressure. The product residue obtained was then subjected for column chromatography (silica gel, mesh size 60–120) using pet ether: ethyl acetate (99:1) as eluent to afford pure products. The enantiomeric excess values (ee) of the product were determined by HPLC analysis with an Agilent- HPLC on Chiralcel OD-H chiral columns using propan-2-ol/hexane as the eluent.

(R)-1-Phenethyl acetate (2a); (Figure 2)

The title compound was purified by silica gel chromatography (petroleum ether/ethyl acetate, 90:10); The ee was determined by HPLC using a Daicel Chiralcel OD-H column, n-hexane/i-PrOH = 95/5, flow rate = 0.4 mL/min, 254nm; tR = 15.6 min (one enantiomer); 99% ee. [α]D22 108.2 (Conc. 0.11 in CHCl3); 1H NMR (400 MHz, CDCl3): δ 7.40-7.28 (m, 5H), 5.91 (q, J=8 Hz, 1H), 2.10(s, 3H), 1.55 (d, J= 8Hz, 3H); 13C NMR (100 MHz, CDCl3): δ 170.31, 141.66, 128.46, 127.84, 126.07, 72.29, 22.17, 21, 32 ; Mass: GC-MS (EI, 70 eV): m/z: 164 [M]+, 164, 149, 122 (100), 104, 91,77,63,43.
Signal 1: VWD1 A, Wavelength=254 nm

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Totals: 913.29526 47.72153
Racemic 1-phenylethanol: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n hexane/IPA), flow rate: 0.4ml/ min, 254nm
(S)-1-phenylethanol (1a); (Figure 2): The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.4ml/min, 254nm.
(R)-1-(p-tolyl) ethyl acetate (2b); Figure 2

The title compound was purified by silica gel chromatography (petroleum ether/ethyl acetate, 90:10); The ee was determined by HPLC using a Daicel Chiralcel OJ-H column, n-hexane/ i-PrOH = 99/1, flow rate = 0.5 mL/min, 254 nm; $t_R$ = 16.2 min (major), $t_R$=30.8 min (minor), 99% ee; $^1$H NMR (400 MHz, CDCl$_3$): 7.28-7.26 (d, $J$= 8Hz, 2H), 7.19-7.17 (d, $J$=8Hz, 2H), 5.88 (q, $J$= 8Hz, 1H), 2.36 (s, 3H), 2.08 (s, 3H), 1.55 (d, $J$=8Hz, 3H), Mass: GC-MS (EI, 70 eV): $m/z$: 178 [M]$^+$, 178, 163,136,117(100), 103,91,77,65,43,41,40.
**Racemic 1-(p-tolyl) ethanol:** The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.3 ml/min, 220nm.

![Graph](image1)

(S)-1-(p-tolyl) ethanol (1b); **Figure 2:** The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.3 ml/min, 220nm.

![Graph](image2)
The title compound was purified by silica gel chromatography (petroleum ether/ethyl acetate, 90:10); The ee was determined by HPLC using a Daicel Chiralcel OD-H column, n-hexane/i-PrOH = 95/5, flow rate = 0.3 mL/min, 254 nm; $t_R = 18.4$ min (major), $t_R = 19.3$ min (minor). 97% ee; $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.31-7.26 (m, 2H), 6.89-6.87 (m, 2H), 5.85 (q, $J=8$Hz, 1H), 3.80 (s, 3H), 2.05 (s, 3H), 1.52 (d, $J=8$Hz, 3H); $^{13}$C NMR (100 MHz, CDCl$_3$): 170.38, 159.24, 133.71, 127.56, 113.80, 71.98, 55.22, 21.90, 21.35; Mass: GC-MS (EI, 70 eV): $m/z$: 196 [M]$^+$, 196, 179,152, 134 (100), 119, 105, 91,77,65,43,40.
Signal 1: VWD1 A, Wavelength=254 nm

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Totals: 3783.48164 178.83514
Racemic 1-(4-methoxyphenyl) ethanol: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.3 ml/min, 254nm.

(S)-1-(4-methoxyphenyl) ethanol (1c); Figure 2: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.3 ml/min, 254nm.
The title compound was purified by silica gel chromatography (petroleum ether/ethyl acetate, 90:10); The ee was determined by HPLC using a Daicel Chiralcel OJ-H column, n-hexane/ i-PrOH = 99/1, flow rate = 0.3 mL/min, 254nm; $t_R = 27.4$ min (major), $t_R = 32.0$ min (minor),
99% ee; $^1$H NMR (400 MHz, CDCl$_3$): δ 7.34-7.26 (m, 2 H), 7.05-7.01 (m, 2 H), 5.85 (q, $J$=8 Hz, 1 H), 2.06 (s, 3 H), 1.52 (d, $J$=8 Hz, 3 H); $^{13}$C NMR (100 MHz, CDCl$_3$): 170.13, 163.52, 161.08, 137.49, 137.45, 127.85, 115.43, 115.21, 71.62, 22.15, 21.28; Mass: GC-MS (EI, 70 eV): $m/z$: 182 [M]$^+$, 167, 140, 139, 122 (100), 103, 96, 77, 57, 43, 41.
**Racemic 1-(4-fluorophenyl) ethanol**: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 98:2 (n-hexane/IPA), flow rate: 0.4ml/min, 254nm

(S)-1-(4-fluorophenyl) ethanol (1d); Figure 2: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 98:2 (n-hexane/IPA), flow rate: 0.4ml/min, 254nm.
(R)-1-(4-chlorophenyl) ethyl acetate (2e); Figure 2:

The title compound was purified by silica gel chromatography (petroleum ether/ethyl acetate, 90:10); The ee was determined by HPLC using a Daicel Chiralcel OJ-H column, n-hexane/ i-
PrOH = 99/1, flow rate = 0.5 mL/min, 254 nm; $t_R = 14.8$ min (major). $t_R = 19.6$ min (minor), 98 % ee; $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.35-7.28 (m, 4H), 5.86 (q, $J = 8$ Hz, 1H), 2.09 (s, 3H), 1.54 (d, $J = 8$ Hz, 3H); Mass: GC-MS (EI, 70 eV): $m/z$: 198 [M]$^+$, 198, 183, 156, 140, 138, 121, 103, 91, 77, 63, 43, 41.
Racemic 1-(4-chlorophenyl) ethanol: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.4 ml/ min, 254nm
(S)-1-(4-chlorophenyl) ethanol (1e): **Figure 2:** The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.4 ml/min, 254nm.
(R)-1-(4-bromophenyl) ethyl acetate (2f); Figure 2

The title compound was purified by silica gel chromatography (petroleum ether/ethyl acetate, 90:10); The ee was determined by HPLC using a Daicel Chiralcel OJ-H column, n-hexane/PrOH = 99/1, flow rate = 0.5 mL/min, 254 nm; tR = 16.0 min (major), 99% ee; 1H NMR (400 MHz, CDCl3): δ 7.51-7.48 (q, J=8Hz, 1H), 7.28-7.24(m, 2H), 5.84(q, J= 8 Hz, 1H), 1.53 (d, J=8Hz, 3H), 13C NMR (100 MHz, CDCl3): δ 170.17, 140.71, 131.60, 1227.82, 121.72, 71.60, 22.80, 21.25; Mass: GC-MS (EI, 70 eV): m/z: 242 [M]+, 242, 227, 200, 182, 157, 121, 104, 91,77,63,43(100), 41.
Racemic 1-(4-bromophenyl) ethanol: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.4 ml/ min, 254nm

(S)-1-(4-bromophenyl) ethanol (1f); Figure 2: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.4 ml/ min, 254nm
Signal 1: VWD1 A, Wavelength=254 nm

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Totals: 1279.11217 53.26831
(R)-1-(naphthalen-2-yl) ethyl acetate (2g); Figure 2

The title compound was purified by silica gel chromatography (petroleum ether/ethyl acetate, 90:10); The ee was determined by HPLC using a Daicel Chiralcel OD-H column, n-hexane/i-PrOH = 95/5, flow rate = 0.4 mL/min, 254 nm; $t_R = 11.1$ min (major), $t_R = 12.7$ min (minor), 98% ee; $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.85-7.80 (m, 4H), 7.50-7.48 (m, 3H), 6.05 (q, $J$= 8Hz, 1H), 2.11(s, 3H), 1.63 (d, $J$=8Hz, 3H); $^{13}$C NMR (100 MHz, CDCl$_3$): 170.3, 139, 133.1, 133.0, 128.3, 128.0, 127.6, 126.2, 126.0, 125.0, 124.0, 77.2, 77.0, 76.7, 72.4, 22.1, 21.3; Mass: GC-MS (EI, 70 eV): $m/z$: 214 [M]$^+$, 214,199,1172(100),158,154,129,115,101,89,76,63,43,
**Racemic 1-(naphthalen-2-yl) ethanol:** The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 98:2 (n-hexane/IPA), flow rate: 0.9 ml/ min, 254 nm
(S)-1-(naphthalen-2-yl) ethanol (1g); Figure 2: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 98:2(n-hexane/IPA), flow rate: 0.9ml/ min, 254nm
The title compound was purified by silica gel chromatography (petroleum ether/ethyl acetate, 80:20); The ee was determined by HPLC using a Daicel Chiralcel OD-H column, n-hexane/i-PrOH = 99/1, flow rate = 0.7 mL/min, 254 nm; $t_R = 38.7$ min (major), $t_R = 48.2$ min (minor), 96% ee; Mass: GC-MS (EI, 70 eV): $m/z$: 165 [M]$^+$, 165, 150, 123 (100), 106, 94, 78, 65, 43, 40.
**Racemic 1-(pyridin-4-yl) ethanol:** The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.5 ml/ min, 254nm
Signal 1: VWD1 A, Wavelength=220 nm

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Totals : 4778.57617 67.11730

(S)-1-(pyridin-4-yl) ethanol (1h); Figure 2: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.5 mL/min, 254nm

(R)-1, 2, 3, 4-tetrahydronaphthalen-1-yl acetate (2i); Figure 2

The title compound was purified by silica gel chromatography (petroleum ether/ethyl acetate, 90:10); The ee was determined by HPLC using a Daicel Chiralcel OJ-H column, n-hexane/ i-PrOH = 99/1, flow rate = 0.5 mL/min, 254 nm; $t_R = 12.7$ min (minor), $t_R = 16.4$ min (major), 89% ee; $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.31-7.16 (m, 4H), 6.03(t, $J=8$ Hz, 1H), 2.92-2.80(m, 2H), 2.13 (s, 3H), 2.11-1.86 (m, 4H), 13C NMR (100 MHz, CDCl$_3$): 170.78, 137.92, 134.55, 129.41, 129.06, 128.07, 126.06, 69.99, 29.07, 28.95, 21.47, 18.79; Mass: GC-MS (EI, 70 eV): $m/z$: 190 [M]$^+$, 165, 148, 130 (100), 115,105, 91,77,65,43,40.
Racemic 1,2,3,4-tetrahydronaphthalen-1-ol: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.3 ml/ min, 254nm
(S)-1,2,3,4-tetrahydronaphthalen-1-ol (1i); Figure 2: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.3 ml/min, 254nm.
(R)-2,3-dihydro-1H-inden-1-yl acetate (2j); Figure 2

The title compound was purified by silica gel chromatography (petroleum ether/ethyl acetate, 90:10); The ee was determined by HPLC using a Daicel Chiralcel OJ-H column, n-hexane/i-PrOH = 99/1, flow rate = 0.5 mL/min, 254 nm; $t_R = 13.3$ min (minor), $t_R = 18.7$ min (major), 91% ee; Mass: GC-MS (EI, 70 eV): $m/z$: 176 [M]^+, 176, 154, 133, 116 (100), 105, 91, 77, 65, 43.
Racemic 2,3-dihydro-1H-inden-1-ol: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.3 ml/min, 254nm
(S)-2,3-dihydro-1H-inden-1-ol (1j); Figure 2: The ee was determined by HPLC using a Daicel Chiralcel OD-H column; 95:5 (n-hexane/IPA), flow rate: 0.3 ml/min, 254 nm

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