Supporting Information

Covalent Immobilization of *Pseudomonas stutzeri* lipase on a porous polymer: an efficient biocatalyst for a scalable production of enantiopure benzoin esters under sustainable conditions.

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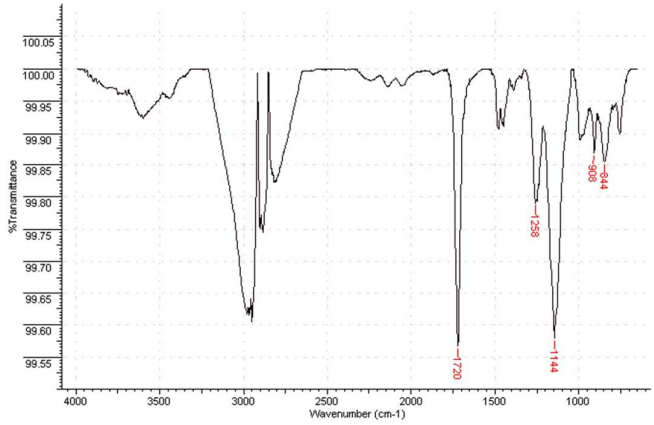
Table S1. Pore volume distribution in poly(GMA-co-HDDMA).

Radius (nm)	**< 5**	**5-10**	**10-15**	**15-20**	**20-30**	**30-50**	**50-100**	**>100**
Pore Volume Distribution (vol. %)	2	2	3	4	11	24	33	21

a)



b)

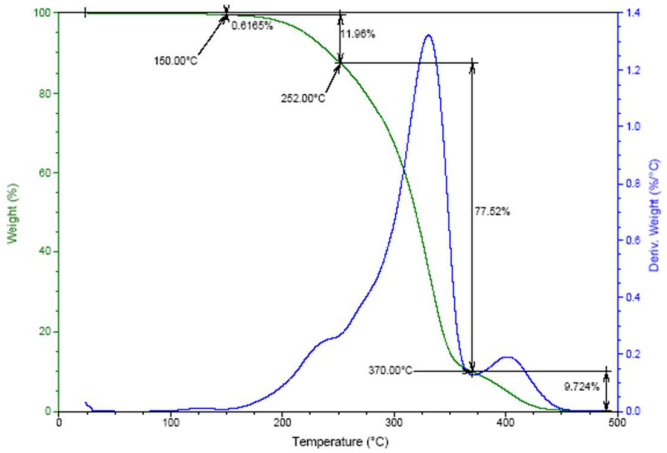


Figure S1. a) FT-IR spectrum of the poly(GMA-co-HDDMA); b) Termogravimetric analysis of the poly(GMA-co-HDDMA).

Table S2. Results of the immobilization of Lipase from P. stutzeri at different ratios of support/lipase.

Entry	Support	Derivative Code	Support (mg)	Lipase (mg)	Bound protein (%)	Loading (mg enzyme mg support^{-1})	stationary effectiveness factor η^a
1	Poly(GMA-*co*-HDDMA)	TL-PGcH-1	100	1	100	0.010	0.76
2		TL-PGcH-2	100	2	78	0.016	0.80
3		TL-PGcH-3	100	3	60	0.018	0.65
4	Eupergit C	TL-EuC	100	1	72	0.007	0.45

[a]Ratio of hydrolysis rate of *p*-nitrophenyl-palmitate by the immobilized enzyme compared to the same amount of native enzyme, as described.[12] Enzymatic activity of native lipase from *P. stutzeri* was 105 U/mg crude enzyme, equivalent to η=1.

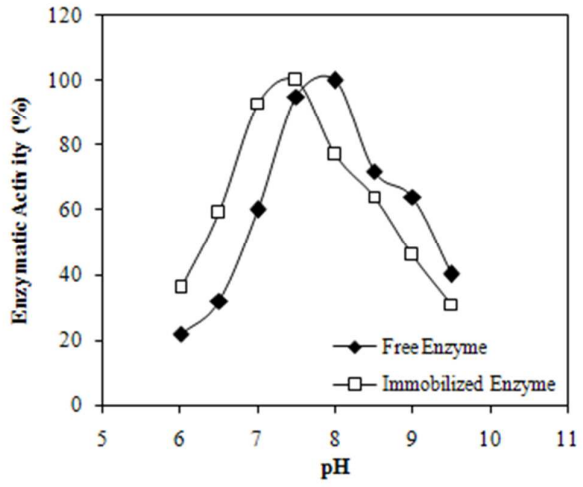


Figure S2. Effect of pH on the activity of free and immobilized lipase from *P. stutzeri*.

Table S3. Green chemistry calculations

KR scaled TL-PGc-2H							
Raw Materials Footprint							
Parameter	**Complete Reclaiming**	**Partial Reclaiming**	**No Reclaiming**	**Ideal**	**Parameter**	**Actual**	**Ideal**
AE	0.865	0.865	0.865	1	**Input BI**	0.77	1
Rxn Yield	0.49	0.49	0.49	1	**Output BI**	0.83	1
1/SF	0.830	0.838	0.838	1	**Waste BI**	0.70	1
MRP	1	0.031	0.031	1	**E_{MW}**	0.16	0
RME	0.352	0.011	0.011	1			
BI (Waste)	1	1	0.70	1			
E	1.8	90.3	90.3	0			
MI=(E+1)	2.8	91.3	91.3	1			

DKR TL-PGc-2H/Shvo's catalyst							
Raw Materials Footprint							
Parameter	**Complete Reclaiming**	**Partial Reclaiming**	**No Reclaiming**	**Ideal**	**Parameter**	**Actual**	**Ideal**
AE	0.738	0.738	0.738	1	**Input BI**	0.92	1
Rxn Yield	0.950	0.950	0.950	1	**Output BI**	0.77	1
1/SF	0.502	0.502	0.502	1	**Waste BI**	0.71	1
MRP	1	0.032	0.032	1	**E_{MW}**	0.35	0
RME	0.352	0.011	0.011	1			
BI (Waste)	1	1	0.71	1			
E	1.8	86.9	86.9	0			
MI=(E+1)	2.8	87.9	87.9	1			

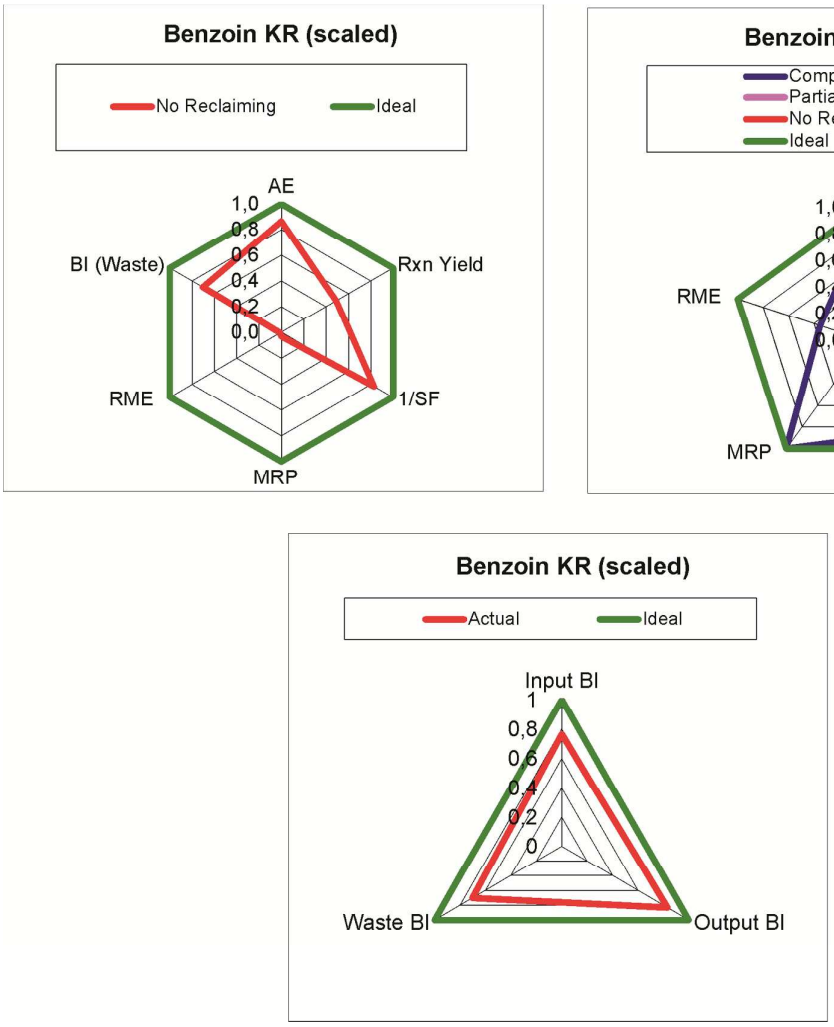


Figure S3. Plots for KR of **1a** at higher scale with TL-PGc-2H

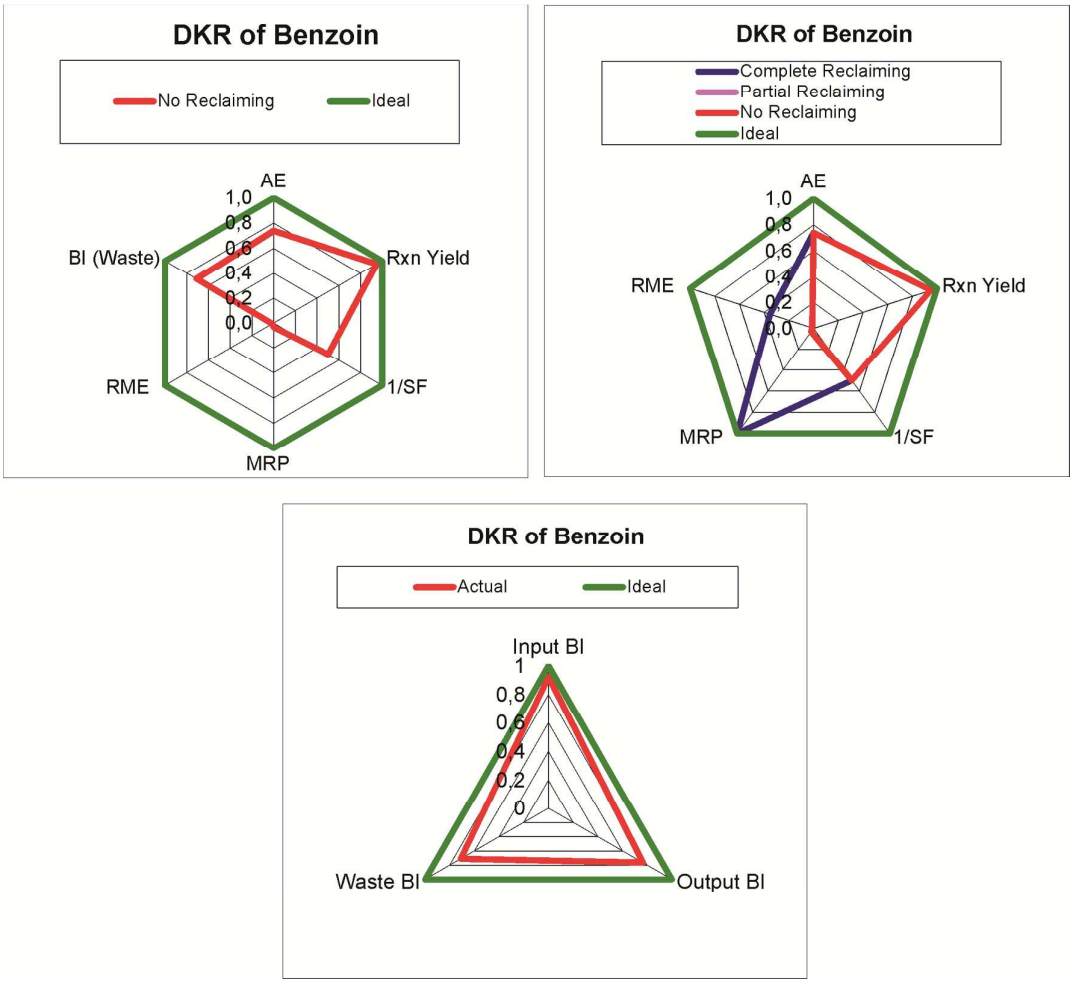


Figure S4. Plots for DKR of **1a** with TL-PGc-2H

NMR of reaction products:

***1. (1S)-2-oxo-1,2-diphenylethyl butyrate* (2a).**

Colorless oil (12 mg, 90% isolated yield), $[\alpha]^{20}_{D}$: + 118.7 (c 2 $CHCl_3$). ^{1}H-RMN (300 MHz, $CDCl_3$) δ (ppm): 0.97 (t, 3H, J= 7.38 Hz), 1.71 (m, 2H, J= 7.40 Hz), 2.44 (m, 2H), 6.86 (s, 1H), 7.33 (m, 1H), 7.35 (m, 2H), 7.40 (m, 2H), 7.46 (m, 2H), 7.51 (m, 2H). ^{13}C-RMN (75.5 MHz, $CDCl_3$) δ (ppm): 13.56, 18.35, 35.85, 77.36, 128.57, 128.74, 129.04, 133.36, 133.70, 173.10, 193.92.

***2.2.7.2. (1S)-1,2-bis(4-methoxyphenyl)-2-oxoethyl butyrate* (2b).**

Colorless oil (19 mg, 86% isolated yield), $[\alpha]^{20}_{D}$: + 104.1 (c 2 $CHCl_3$). ^{1}H-RMN (300 MHz, $CDCl_3$) δ (ppm): 0.96 (t, 3H, J= 7.34 Hz), 1.70 (m, 2H, J= 7.40 Hz), 2.42 (m, 2H), 3.75 (s, 3H), 3.80 (s, 3H), 6.80 (s, 1H), 6.85 (m, 4H), 7.37 (m, 2H), 7.91 (m, 2H). ^{13}C-RMN (75.5 MHz, $CDCl_3$) δ (ppm): 13.59, 18.36, 35.85, 55.21, 55.38, 76.68, 113.78, 114.46, 126.18, 127.55, 130.02, 131.07, 160.18, 163.60, 173.19, 192.25.

***2.2.7.3. (1S)-1,2-bis(4-isopropylphenyl)-2-oxoethyl butyrate* (2c).**

Colorless oil (15 mg, 87% isolated yield), $[\alpha]^{20}_{D}$: + 101.3 (c 2 $CHCl_3$). ^{1}H-RMN (300 MHz, $CDCl_3$) δ (ppm): 0.96 (t, 3H, J= 7.38 Hz), 1.20 (d, 6H, J= 7.00 Hz), 1.21 (d, 6H, J= 7.00 Hz), 1.70 (m, 2H, J= 7.40 Hz), 2.42 (m, 2H), 2.88 (m, 2H), 6.82 (s, 1H), 7.22 (m, 4H), 7.38 (m, 2H), 7.89 (m, 2H). ^{13}C-RMN (75.5 MHz, $CDCl_3$) δ (ppm): 13.63, 18.36, 23.58, 23.81, 33.87, 34.26, 35.91, 77.14, 126.76, 127.19, 128.66, 129.10, 131.20, 132.57, 150.00, 154.95, 173.22, 193.50.

***2.2.7.4. (1S)-1-(4-methoxyphenyl)-2-oxo-2-phenylethyl butyrate* (2d).**

Colorless oil (12 mg, 80% isolated yield), $[\alpha]^{20}_{D}$: + 138.1 (c 2 $CHCl_3$). **^{1}H-RMN** (300 MHz, $CDCl_3$) δ (ppm): 0.97 (t, 3H, J= 7.34 Hz), 1.37 (t, 3H, J= 7.06 Hz), 1.70 (m, 2H, J= 7.40 Hz), 2.43 (m, 2H), 3.98 (q, 2H, J= 6.99 Hz), 6.81 (s, 1H), 6.85 (m, 2H), 7.36 (m, 2H), 7.37 (m, 2H), 7.49 (m, 1H), 7.91 (m, 2H). **^{13}C-RMN** (75.5 MHz, $CDCl_3$) δ (ppm): 13.60, 14.71, 18.38, 35.88, 63.46, 77.02, 115.02, 125.44, 128.55, 128.73, 130.12, 133.26, 134.79, 159.70, 173.23, 193.96.

***2.2.7.5. (1S)-2-(4-methoxyphenyl)-2-oxo-1-phenylethyl butyrate* (2e).**

Colorless oil (12.5 mg, 85% isolated yield), $[\alpha]^{20}_{D}$: + 124.9 (c 2 $CHCl_3$). ^{1}H-RMN (300 MHz, $CDCl_3$) δ (ppm): 0.96 (t, 3H, J= 7.44 Hz), 1.39 (t, 3H, J= 7.06 Hz), 1.70 (m, 2H, J= 7.44 Hz), 2.44 (m, 2H), 4.04 (q, 2H, J= 6.93 Hz), 6.83 (s, 1H), 6.84 (m, 2H), 7.33 (m, 2H), 7.34 (m, 1H), 7.45 (m, 2H), 7.91 (m, 2H). ^{13}C-RMN (75.5 MHz, $CDCl_3$) δ (ppm): 13.60, 14.58, 18.38, 35.90, 63.73, 77.05, 114.25, 125.44, 127.35, 128.52, 128.99, 129.06, 131.13, 134.27, 163.14, 173.11, 193.96.

***2.2.7.6. (1S)-1-(3,4-dichlorophenyl)-2-oxo-2-phenylethyl butyrate* (2f).**

Colorless oil (14.5 mg, 88% isolated yield), $[\alpha]^{20}_{D}$: + 102.4 (c 2 $CHCl_3$). ^{1}H-RMN (300 MHz, $CDCl_3$) δ (ppm): 0.96 (t, 3H, J= 7.34 Hz), 1.70 (m, 2H, J= 7.44 Hz), 2.43 (m, 2H), 6.79 (s, 1H), 7.27 (dd, 1H, J= 2.10, 8.20 Hz), 7.40 (m, 1H), 7.44 (m, 2H), 7.53 (m, 1H), 7.56 (m, 1H), 7.90 (m, 2H). ^{13}C-RMN (75.5 MHz, $CDCl_3$) δ (ppm): 13.57, 18.32, 35.76, 75.70, 127.65, 128.72, 128.82, 130.32, 131.00, 133.30, 133.64, 133.83, 133.87, 134.36, 172.83, 193.31.

***2.2.7.7. (1S)-2-(3,4-dichlorophenyl)-2-oxo-1-phenylethyl butyrate* (2g).**

Colorless oil (14 mg, 83% isolated yield), $[\alpha]^{20}_{D}$: + 96.0 (c 2 $CHCl_3$). ^{1}H-RMN (300 MHz, $CDCl_3$) δ (ppm): 0.97 (t, 3H, J= 7.44 Hz), 1.70 (m, 2H, J= 7.44 Hz), 2.45 (m, 2H), 6.72 (s, 1H), 7.36 (m, 1H), 7.38 (m, 2H), 7.40 (m, 1H), 7.42 (m, 2H), 7.46 (m, 1H, J= 8.39), 7.73 (dd, 1H, J= 2.10, 8.39 Hz), 8.00 (d, 1H, J= 2.10). ^{13}C-RMN (75.5 MHz, $CDCl_3$) δ (ppm): 13.57, 18.35, 35.78, 77.29, 127.67, 128.51, 129.28, 129.57, 130.73, 132.90, 133.44, 134.24, 138.07, 173.16, 191.98.

***2.2.7.8. (1S)-1,2-di-2-furyl-2-oxoethyl butyrate* (2h).**

Colorless oil (11 mg, 91% isolated yield), $[\alpha]^{20}_{D}$: + 103.8 (c 2 $CHCl_3$). **^{1}H-RMN** (300 MHz, $CDCl_3$) δ (ppm): 0.96 (t, 3H, J= 7.44 Hz), 1.70 (m, 2H, J= 7.40 Hz), 2.43 (m, 2H) 6.36 (dd, 1H, J= 1.91, 3.24 Hz), 6.48 (d, 1H, J= 3.05 Hz), 6.50 (dd, 1H, J= 1.72, 3.62 Hz), 6.76 (s, 1H), 7.24 (dd, 1H, J= 0.57, 3.62 Hz), 7.43 (dd, 1H, J= 0.57, 3.62 Hz), 7.56 (dd, 1H, J= 0.76, 1.72 Hz). **^{13}C-RMN** (75.5 MHz, $CDCl_3$) δ (ppm): 13.48, 18.25, 35.55, 70.13, 110.95, 111.53, 112.40, 119.05, 144.07, 146.58, 147.08, 150.19, 172.70, 179.73.

***2.2.7.9. (1S)-2-oxo-1,2-di-3-thienylethyl butyrate* (2i).**

Colorless oil (13 mg, 82% isolated yield), $[\alpha]^{20}_{D}$: + 92.1 (c 2 $CHCl_3$). **^{1}H-RMN** (300 MHz, $CDCl_3$) δ (ppm): 0.96 (t, 3H, J= 7.44 Hz), 1.70 (m, 2H, J= 7.40 Hz), 2.44 (m, 2H), 6.74 (s, 1H), 7.13 (dd, 1H, J= 1.24, 5.05 Hz), 7.26 (dd, 1H, J= 2.86, 5.15 Hz), 7.31 (dd, 1H, J= 2.96, 5.05 Hz), 7.41 (dd, 1H, J= 0.86, 2.96 Hz), 7.52 (dd, 1H, J= 1.14, 5.15 Hz), 8.09 (dd, 1H, J= 1.34, 2.86 Hz). **^{13}C-RMN** (75.5 MHz, $CDCl_3$) δ (ppm): 13.54, 18.31, 35.78, 73.85, 125.50, 126.32, 126.88, 126.92, 127.23, 133.24, 134.28, 138.81, 172.94, 187.62.