Supplementary Information

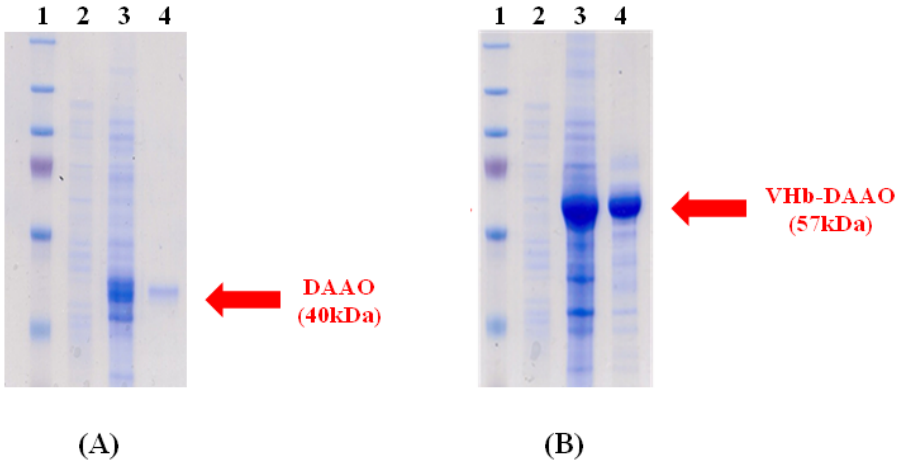

Figure S1. Expression and purification of (A) DAAO and (B) VHb-DAAO (A) Lane 1, Molecular weight marker; lane 2, Crude extract of control-BL21; lane 3, Crude extract of recombinant *E. coli* BL21 over expressing DAAO; lane 4, Purified DAAO (40 kDa). (B) Lane 1, Molecular weight marker; lane 2, Crude extract of control-BL21; lane 3, Crude extract of recombinant *E. coli* BL21 over expressing VHb-DAAO; lane 4, Purified VHb-DAAO (57 kDa).

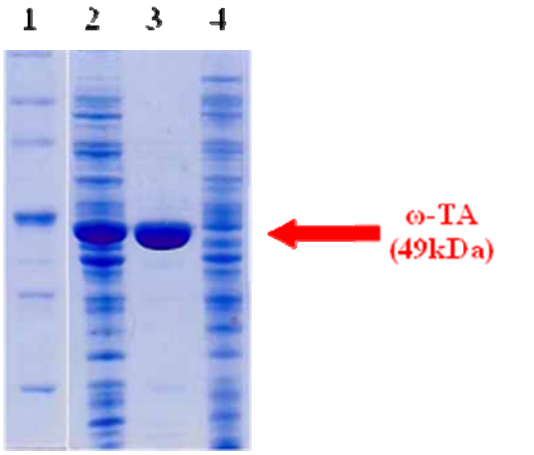

Figure S2. Expression and purification of ω-TA: Lane 1, Molecular weight marker; lane 2, Crude extract of *E. coli* BL21 over expressing *ω*-TA; lane 3, Purified *ω*-TA (49 kDa); lane 4, Crude extract of control-BL21.

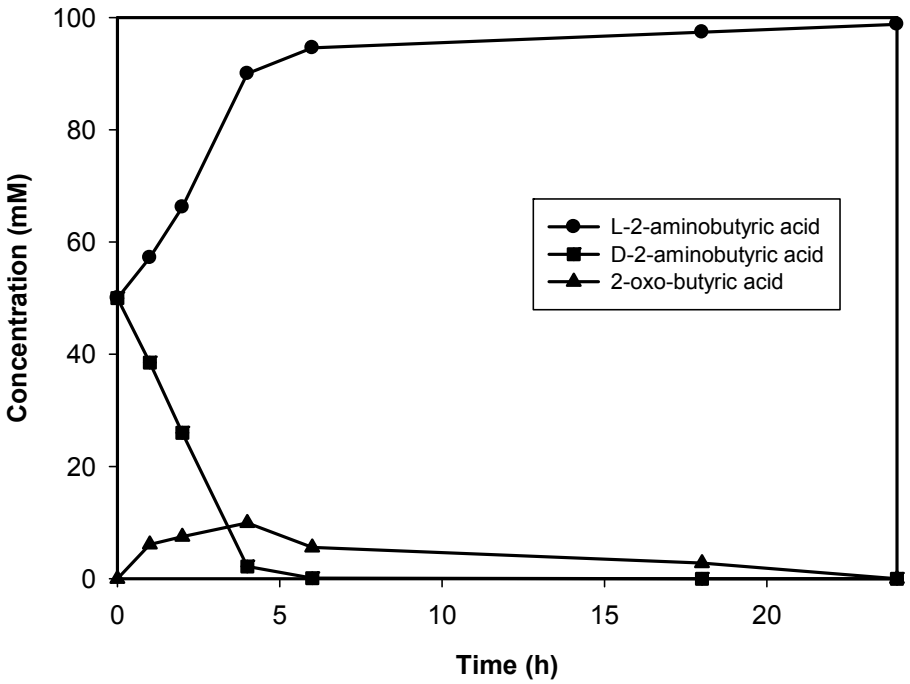

Figure S3. Deracemization of *rac*-**1** in biphasic system. *Reaction conditions:* 1 mL of *iso*-octane was carefully added into 1 mL of 100 mM phosphate buffer (pH 8.0) containing 100 mM *rac*-**1,** 200 mM benzylamine, 0.04 mg/L VHb-DAAO enzyme, 0.36 mg/L ω-TA, 1 μM FAD and 0.05 mg/L of catalase, and was incubated at 37 °C.

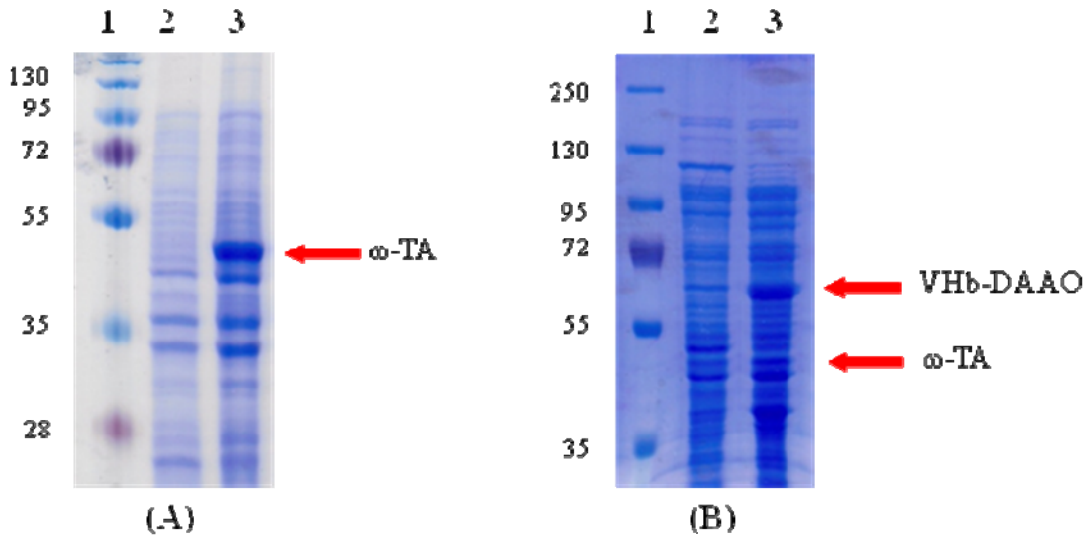

Figure S4. Single expression of ω-TA and co-expression of *ω*-TA and VHb-DAAO. **(A)** Single cell expression of *ω*-TA: Lane 1, Molecular weight marker; Lane 2, Crude extract of control- *E. coli* BL21; Lane 3, Crude extract of *E. coli* BL21 over expressing *ω*-TA. **(B)** Co-expression: Lane 1, Molecular weight marker; Lane 2, Crude extract of control- *E. coli* BL21; Lane 3, Crude extract of *E. coli* BL21 co-expressing VHb-DAAO and *ω*-TA.

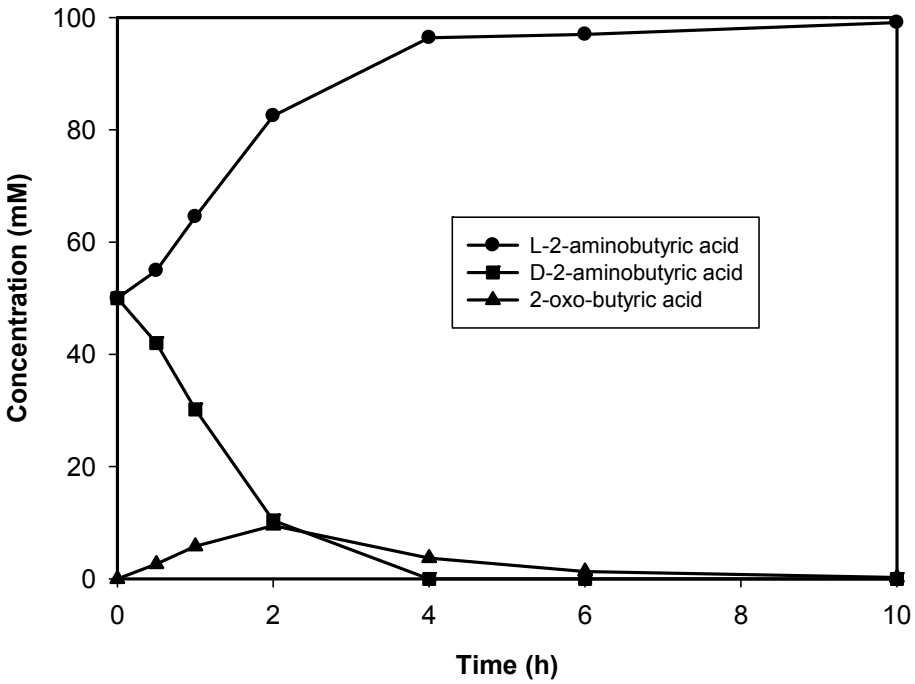

Figure S5. Deracemization of *rac*-**1** using whole cell system. *Reaction conditions*: 1 mL of *iso*-octane was carefully added into 1 mL of 100 mM phosphate buffer (pH 8.0) containing 100 mM *rac*-**1,** 200 mM benzylamine, 0.82 mg/L VHb-DAAO whole cell and 0.36 mg/L ω-TA whole cell, and was incubated at 37 °C.

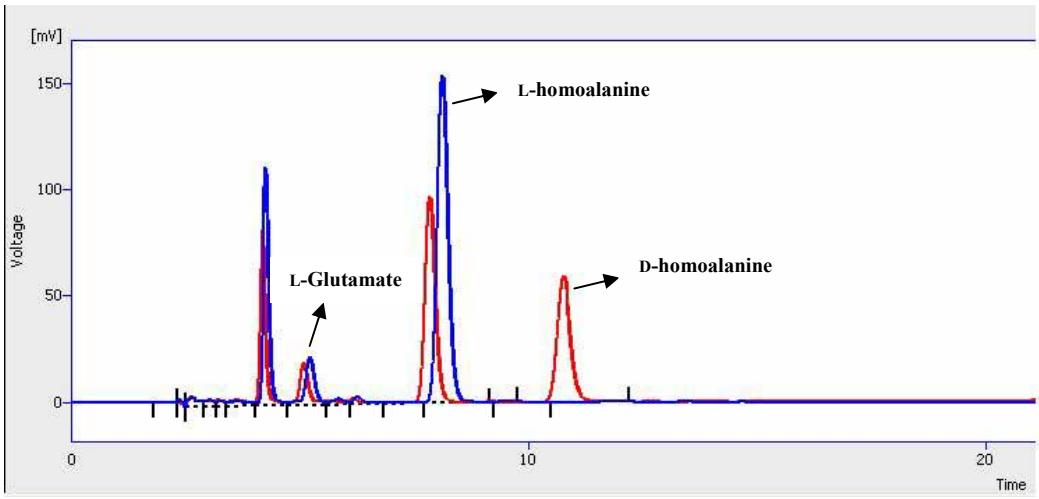

Figure S6. Representative HPLC chromatogram of GITC derivatized L-glutamate, L-**1** and D-**1**. Separation of each enantiomer was achieved through an isocratic elution with a mixture of 50% methanol and 50% water (0.1% TFA) at a flow rate of 1.0 mL/min. The red and blue peak represents the initial and final reaction samples of 500 mM deracemization reaction in whole-cell (reaction conditions were described in the main manuscript, Fig. 4).

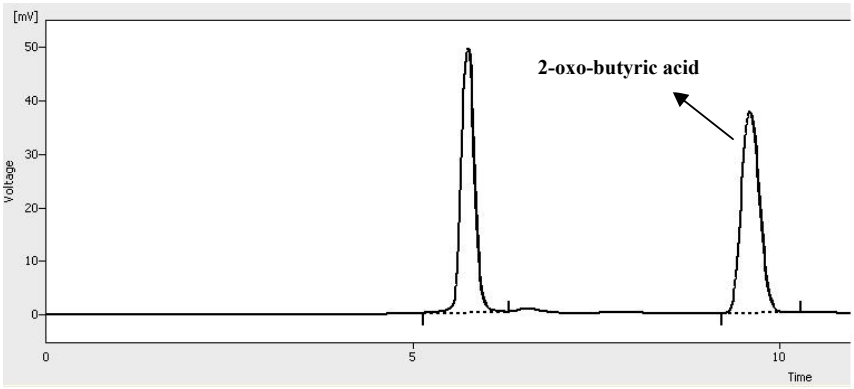

Figure S7. HPLC chromatogram of 2-oxo-butyric acid. 2-oxo-butyric acid was analyzed using Aminex HPX-87H HPLC column (Bio-Rad, CA) with an elution of 5 mM sulfuric acid solution at UV 210 nm was used. Its retention time was 9.61 min.