**Enzymatic synthesis of tyrosol esters in organic solvents and ionic liquids: Correlation between enzyme activity and solvent properties**

Kang-Hong Wang1, Shuangfei Li1, Ying-Fen Meng2, Yong Zou2, Guo-Bin Liang1, Cheng Yang1, Zhen Yang1\*

1College of Life Sciences and Oceanography, Shenzhen University, Shenzhen, Guangdong 518055, China.

2School of Pharmaceutical Sciences, Sun Yat-Sen University, Guangzhou, Guangdong 510006, China

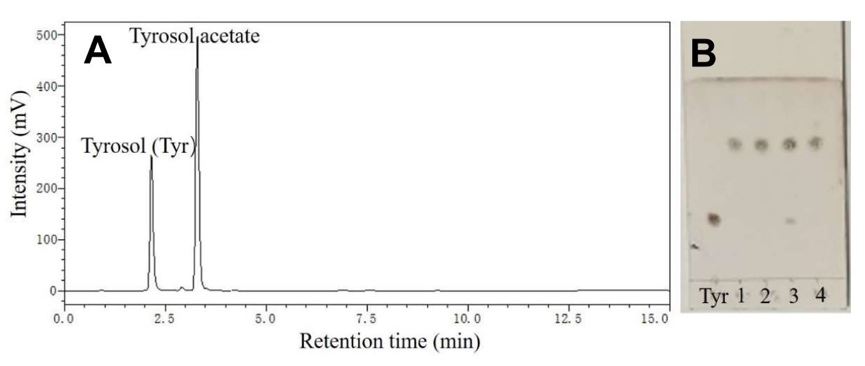
\*Corresponding author: Zhen Yang, Ph.D., Professor

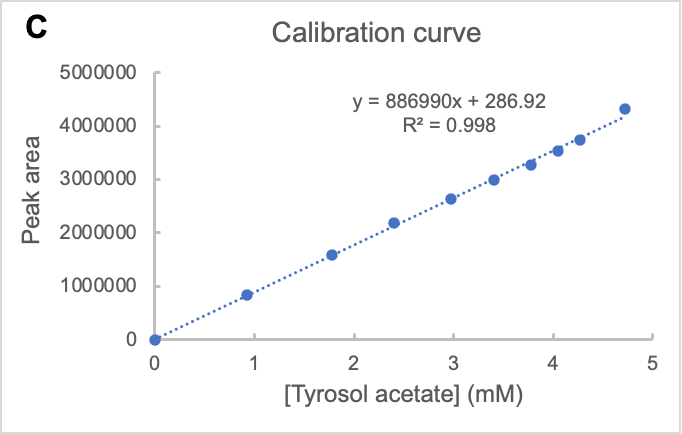
Address: College of Life Sciences and Oceanography, Shenzhen University, 1066 Xue Yuan Avenue, Shenzhen, Guangdong 518055, China.

Tel.: +86 755 2641 2791

Fax: +86 755 2653 4277

E-mail: zyang@szu.edu.cn

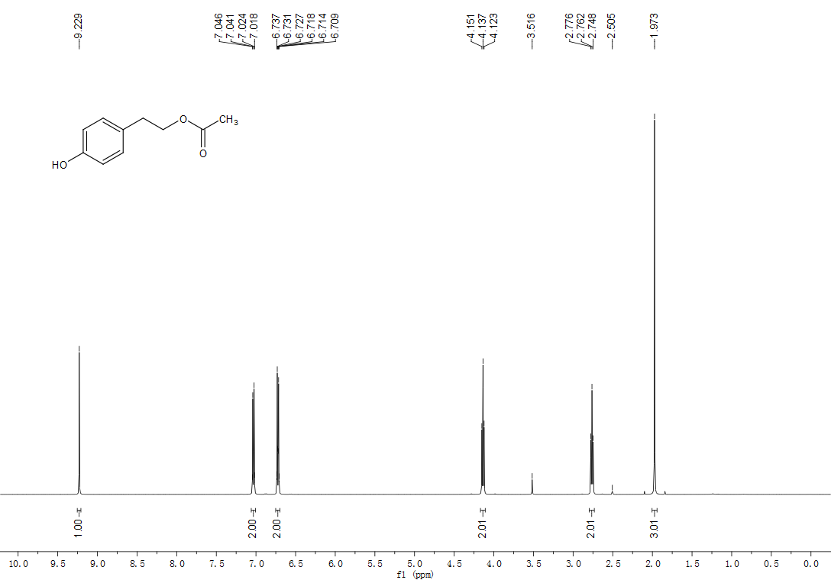




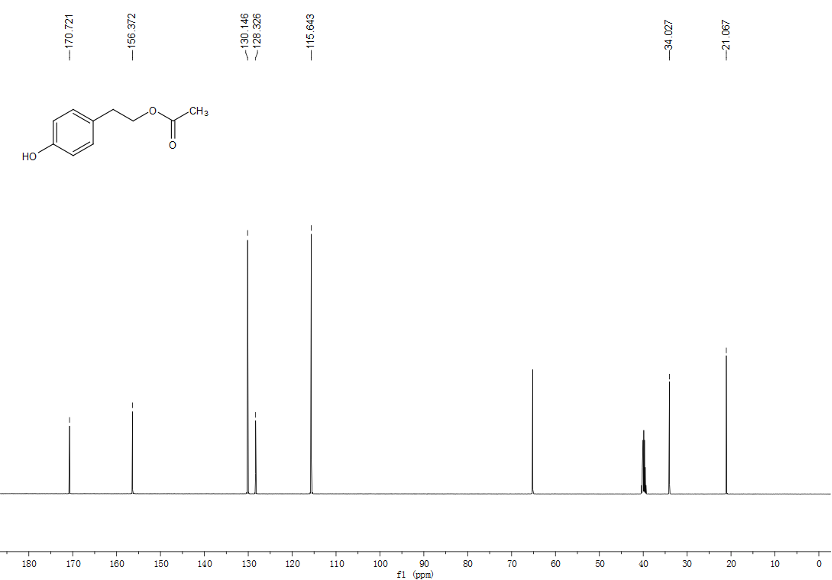
**Figure S1.** HPLC (A) and TLC (B) of the samples obtained from the enzymatic reaction in MTBE. (C) is the HPLC calibration curve used for determination of the tyrosol acetate concentration.

In the TLC plate (B), the label “Tyr” refers to the standard sample tyrosol, whereas “1, 2, 3, 4” refer to the samples obtained from the above 4 reactions, respectively. The reactions were performed in a 5 mL solution containing tyrosol (5 mM) and vinyl acetate (25 mM) in MTBE, with agitation of 250 rpm at 40 oC for 2 h, by adding:

1. Novozym 435 (10 mg)
2. Novozym 435 (10 mg) + 4Å molecular sieves (250 mg)
3. Lipozyme TLIM (10 mg)
4. Lipozyme TLIM (10 mg) + 4Å molecular sieves (250 mg)
5. **1H NMR** **(500 MHz, DMSO-*d6*) spectrum**



1. **1H NMR** **(500 MHz, DMSO-*d6*) spectrum**



**Figure S2.** Characterization of the product, tyrosol acetate, via 1H-NMR (A) and 13C-NMR (B).

1H NMR (500 MHz, DMSO-*d6*) *δ* 9.23 (s, 1H), 7.06-7.01 (d, *J* = 8.5 Hz, 2H), 6.75-6.70 (d, *J* = 8.5 Hz, 2H), 4.14 (t, *J* = 7.0 Hz, 2H), 2.76 (t, *J* = 7.0 Hz, 2H), 1.97 (s, 3H).

13C NMR (125 MHz, DMSO-*d6*) *δ* 170.72, 156.37, 130.15, 128.33, 115.64, 65.19, 34.03, 21.07.

**Table S1**. Organic solvents used in this study and their corresponding log P values.

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Solvent** | **Abbreviation** | **\*log P** |
| 1 | Dimethyl sulfoxide | DMSO | -1.3 |
| 2 | N,N-Dimethylformamide | DMF | -1 |
| 3 | Acetonitrile |  | -0.33 |
| 4 | Acetone |  | -0.23 |
| 5 | tert-Butanol | *tert*-BuOH | 0.35 |
| 6 | Tetrahydrofuran | THF | 0.46 |
| 7 | 2-Methyl-2-butanol | 2M2B | 0.89 |
| 8 | Methyl tert-butyl ether | MTBE | 0.94 |
| 9 | Heptanone |  | 1.8 |
| 10 | Benzene |  | 2.0 |
| 11 | Octanone |  | 2.4 |
| 12 | Toluene |  | 2.5 |
| 13 | Chlorobenzene |  | 2.8 |
| 14 | Nonanone |  | 2.9 |
| 15 | Cyclohexane |  | 3.2 |
| 16 | n-Hexane |  | 3.5 |
| 17 | n-Heptane |  | 4.0 |
| 18 | Isooctane |  | 4.5 |

\*log P values were obtained from (Laane et al., 1987).