Electronic Supplementary Information

Model based temperature control for improving lactic acid production from glycerol

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The *E.* AC-52 cells were harvested by centrifugation (11, 000xg, 2 min), washed with 9 g L^{-1} NaCl, and resuspended with an equilibration buffer (0.05 M potassium phosphate buffer, pH 6.5) at 4 °C. Then, the cells were cracked by an ultrasonic generator. The lysate was centrifuged at 11,000 ×g for 2 min, and the supernatant was used as a crude enzyme solution. The lactate dehydrogenase was purified by His-Tagged Purification Miniprep Kit (TaKaRa (Dalian), China).

One unit of the overall lactate dehydrogenase activity was defined as the amount of enzyme required to oxide 1μmol of NADH per minute. The protein concentration was determined by the Bradford method using bovine serum albumin as the standard. The reaction mixture was 500 μL, consisted of 25 μL NADH (10 mM), 25 μL pyruvate (20 mM) and 25 μL the purified enzyme in 425 μL potassium phosphate buffer (pH 6.5, 0.05 M). Relative activities were defined relative to the maximum activity (100%). The thermal stability of lactate dehydrogenase was assessed by incubating

the enzyme at 35 to 60 °C for 4 h and the initial enzymatic activity at 45 °C was used as the control (100%). All determinations were carried out in triplicates.

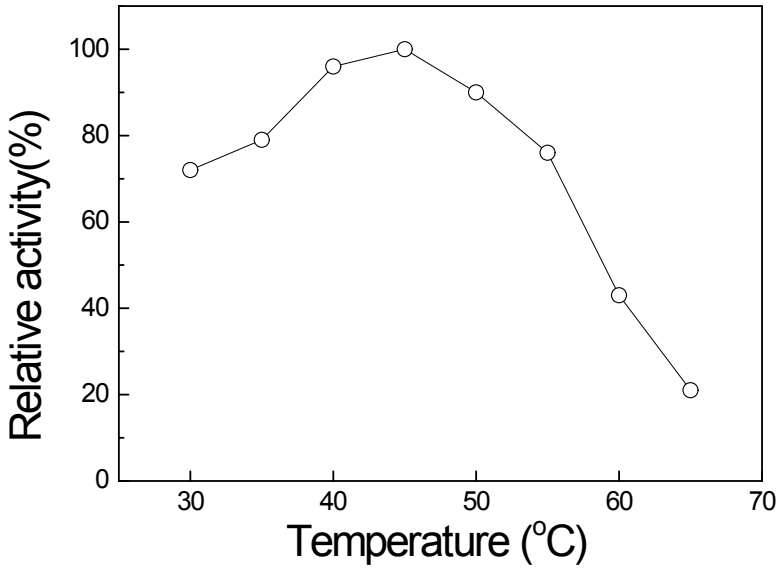

Fig S1. Effect on temperature on lactate dehydrogenase activity

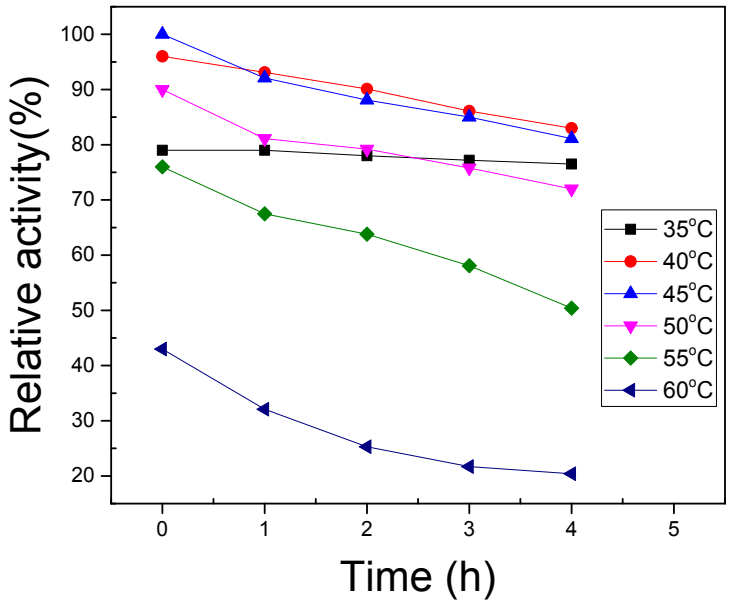

Fig S2. The thermal stability of lactate dehydrogenase