Concurrent Biocatalytic Oxidation of 5-Hydroxymethylfurfural into 2,5-Furandicarboxylic Acid by Merging Galactose Oxidase with Whole Cells

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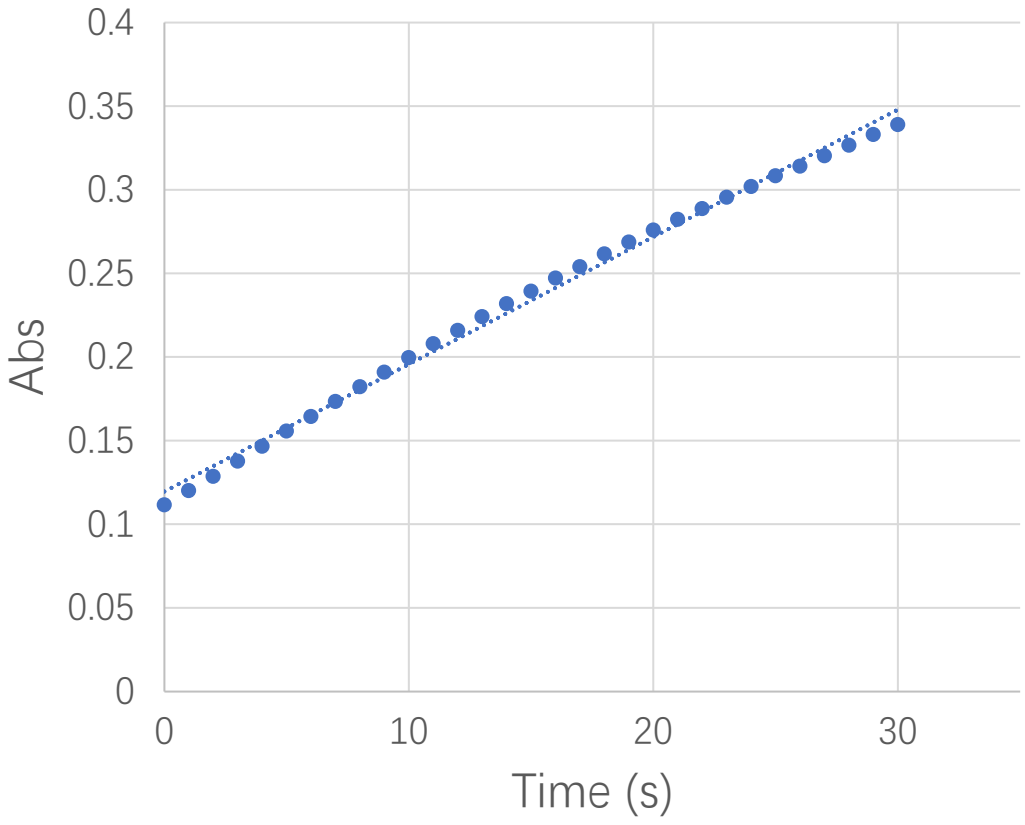

Figure S1. GO assay curve.

Figure S2. The picture of the experimental set-up.

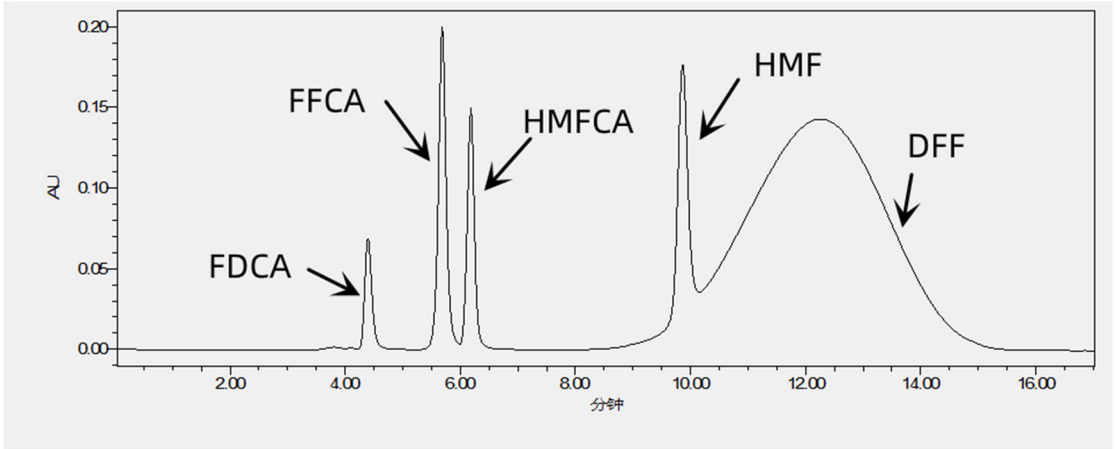

Figure S3. HPLC chromatogram of the reaction mixture.

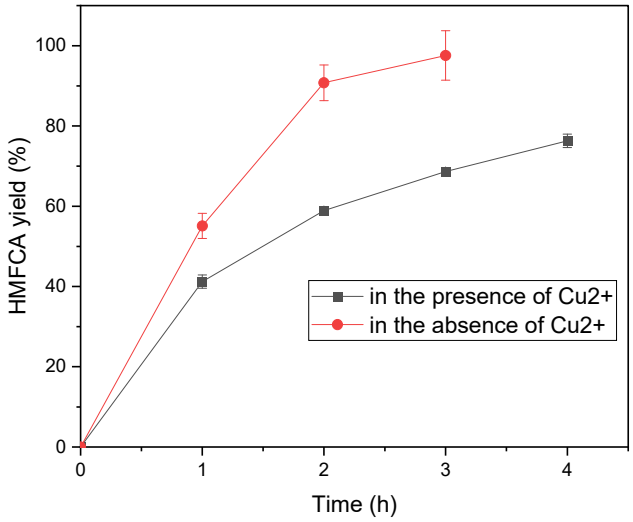

Figure S4. Effect of 1 mM Cu^{2+} on the HMFCA synthesis by *E. coli*_VDH1_NOX cells. Reaction conditions: 20 mM HMF, 30 mg/mL *E. coli*_VDH1_NOX, 1 mM $CuCl_2$, 2 mL phosphate buffer (200 mM, pH 7), 30 °C, 150 r/min.

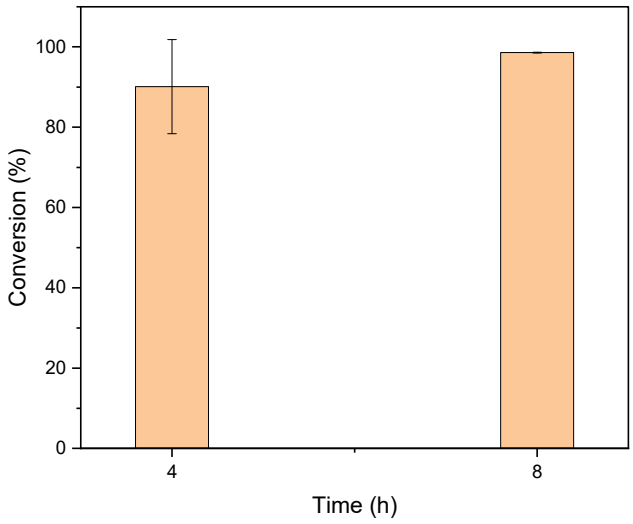

Figure S5. Enzymatic oxidation of HMFCA by GO M_{3-5} CFE. Reaction conditions: 50 mM HMFCA, 0.25 U/mL GO M_{3-5} CFE, 0.05 mg/mL HRP, 0.1 mg/mL catalase, 0.5 mM $CuCl_2$, 2 mL phosphate buffer (200 mM , pH 7), 150 r/min, 30 °C.

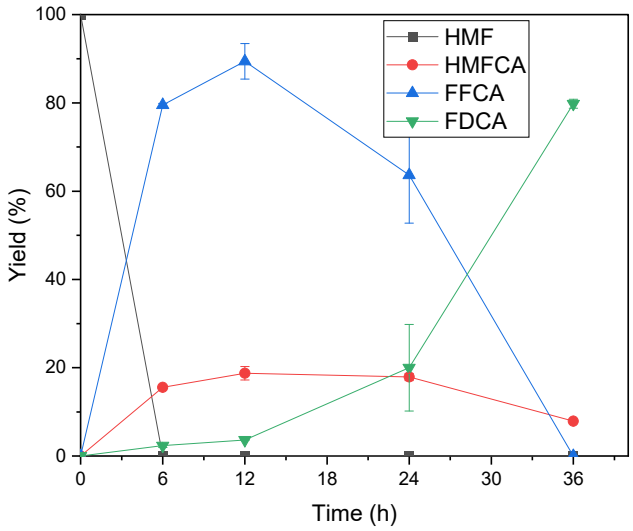

Figure S6. Oxidation of HMF into FDCA by GO $M_{3\text{-}5}$ and a high loading of *E. coli*_VDH1-NOX cells. Reaction conditions: 20 mM HMF, 0.5 U/mL GO $M_{3\text{-}5}$ CFE, 0.05 mg/mL HRP, 0.1 mg/mL catalase, 0.5 mM $CuCl_2$, 20 mg/mL *E. coli*_VDH1_NOX (cell wet weight), 2 mL phosphate buffer (200 mM, pH 7), 30 °C, 150 r/min.

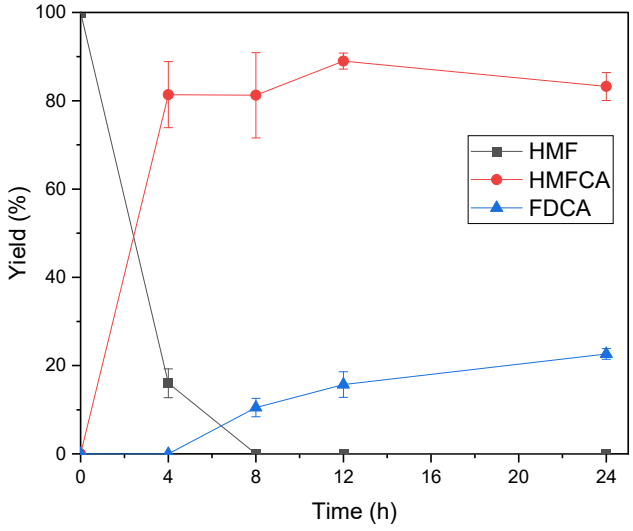

Figure S7. Oxidation of HMF into FDCA by GO $M_{3\text{-}5}$ and *E. coli*_VDH1-NOX cells in the presence of 0.1 mM $CuCl_2$. Reaction conditions: 20 mM HMF, 0.5 U/mL GO $M_{3\text{-}5}$ CFE, 0.05 mg/mL HRP, 0.1 mg/mL catalase, 0.1 mM $CuCl_2$, 20 mg/mL *E. coli*_VDH1_NOX (cell wet weight), 2 mL phosphate buffer (200 mM, pH 7), 30 °C, 150 r/min.

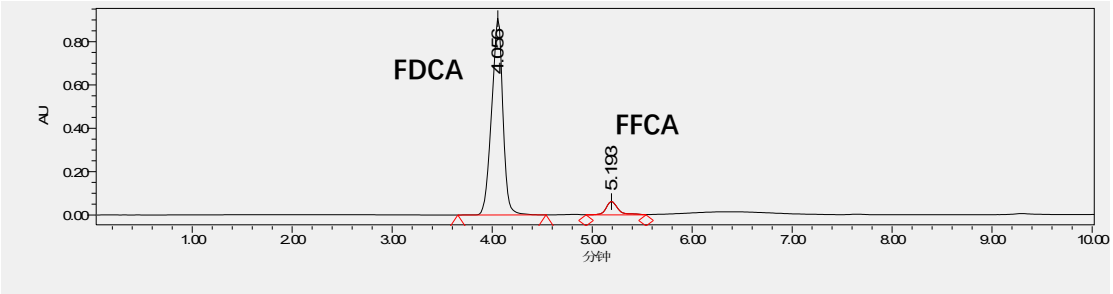

Figure S8. HPLC analysis of the crude product.