## Electronic Supplementary Information:

# Activity Adaptability of DhHP-6 Peroxidase-Mimic at Wide pH, Temperature and Solvent Medium

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# Content

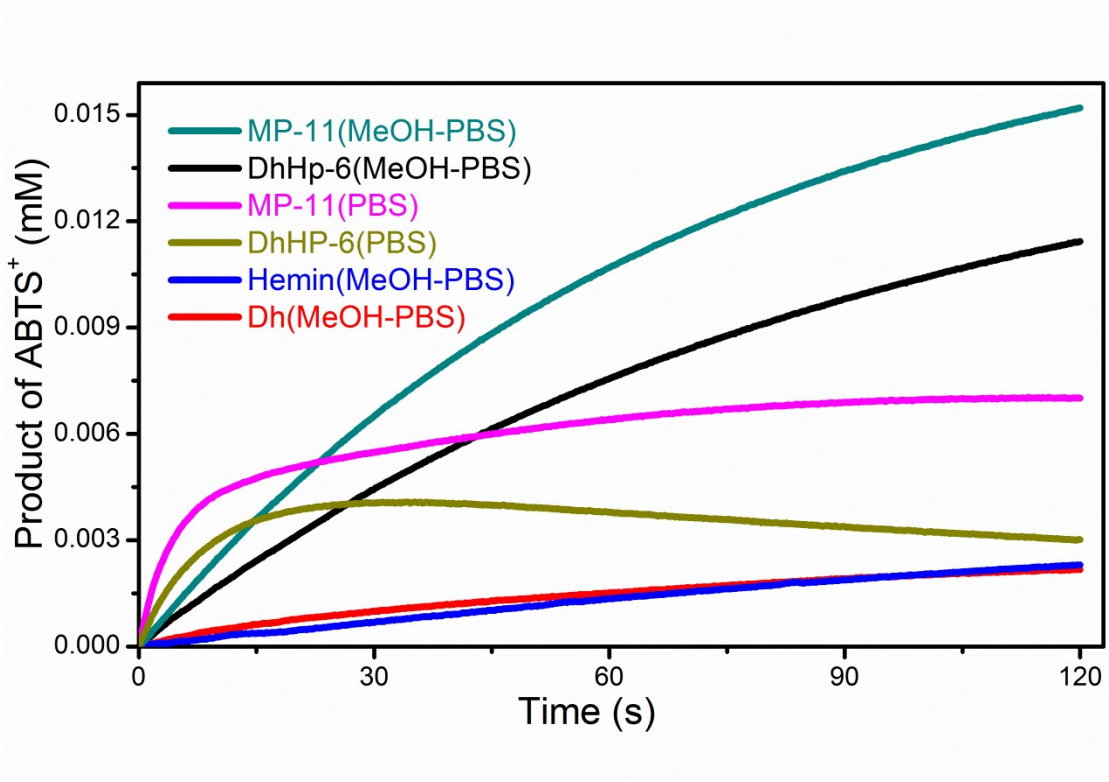


Figure S1. Time-dependent product concentration of $ABTS^{+}$ with various enzyme mimic as catalysts. All of the curves that marked MeOH-PBS are the methanol-PBS mixed solvent with a volume ratio of methanol equal 15%.

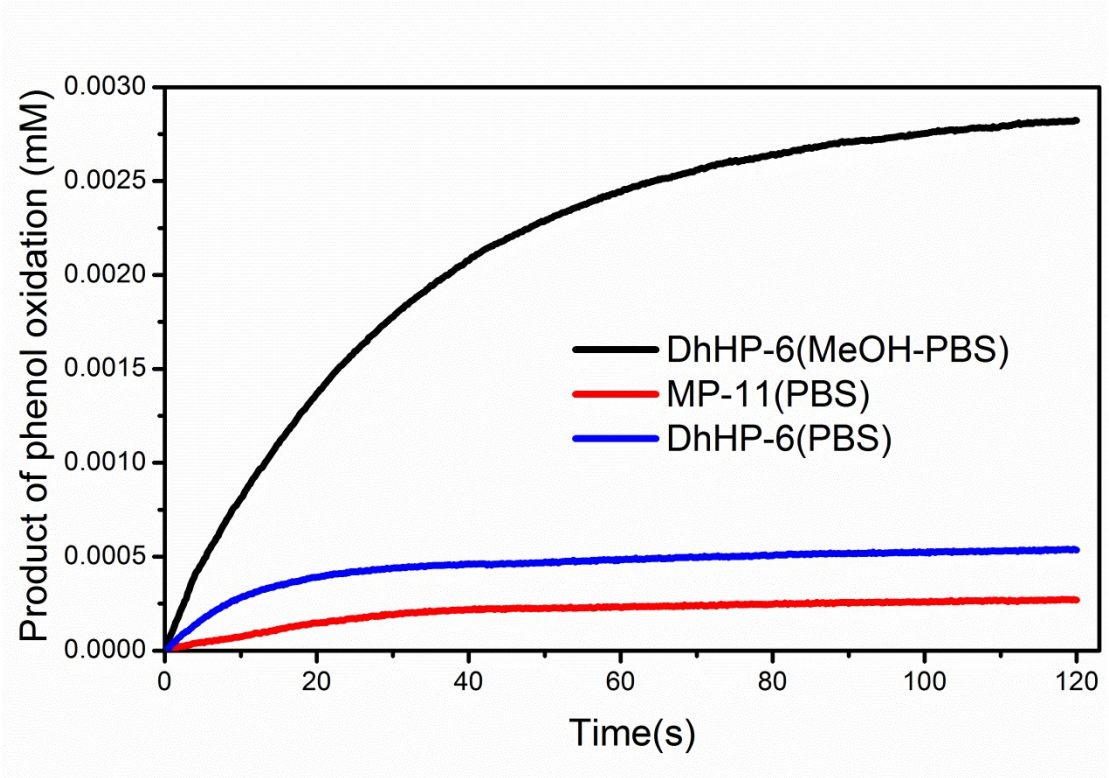


Figure S2. Time-dependent product concentration of phenol oxidation with various enzyme mimic as catalysts. The concentration of enzymes was set to be 0.01 μM for all of the three catalytic reactions at a temperature of 30 °C.

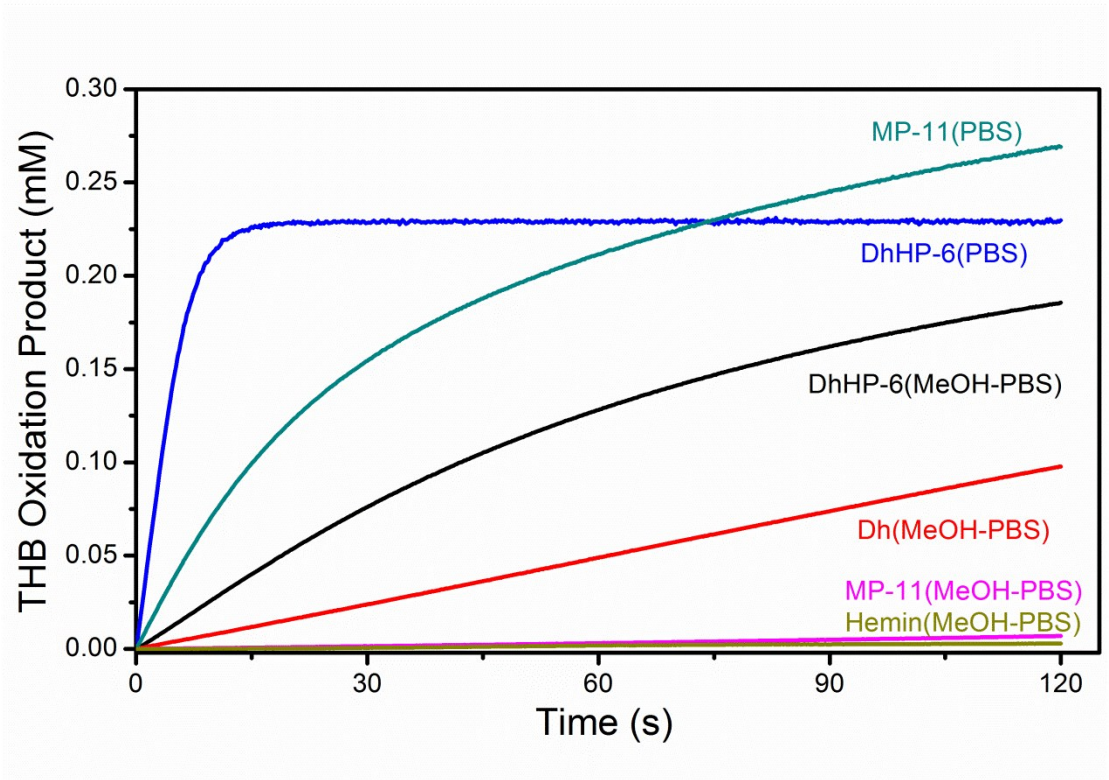


Figure S3 Time-dependent product concentration of THB oxidation with various enzyme mimics as catalysts.

Table S1 Kinetic parameters of DhHP-6 as measured using 0.02-15 μM phenol concentrations in differing concentrations (% v/v) of organic solvents. The reaction media were set in phosphate buffer, pH 7.0. The enzyme activity was measured under standard assay conditions.

| Organic Solvent (% v/v) | Kinetic parameters | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Acetone | | | 1,4-Dioxane | | | Ethanol | | | Methanol | | |
| | $K_m$ | $V_m$ | $V_m/K_m$ | $K_m$ | $V_m$ | $V_m/K_m$ | $K_m$ | $V_m$ | $V_m/K_m$ | $K_m$ | $V_m$ | $V_m/K_m$ |
| 20 | 0.9 | 5.18 | 5.76 | 0.37 | 1.28 | 3.46 | 0.32 | 6.8 | 21.25 | 0.098 | 3.16 | 32.24 |
| 40 | 0.56 | 2.15 | 3.84 | 1.83 | 4.7 | 2.57 | 0.2 | 1.49 | 7.45 | 0.1 | 2.2 | 22 |
| 60 | -- | -- | -- | -- | -- | -- | 0.077 | 0.5 | 6.49 | 0.067 | 0.95 | 14.18 |
| 80 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.19 | 0.282 | 1.48 |

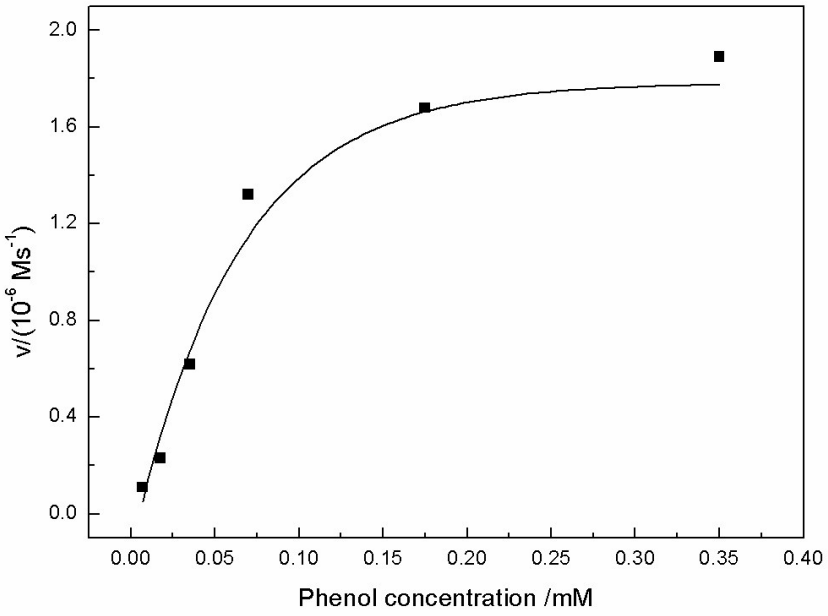


Figure S4 Steady-state kinetic assay and catalytic mechanism of DhHP-6: The concentration of $H_2O_2$ is 1 mM and the phenol concentration is varied.

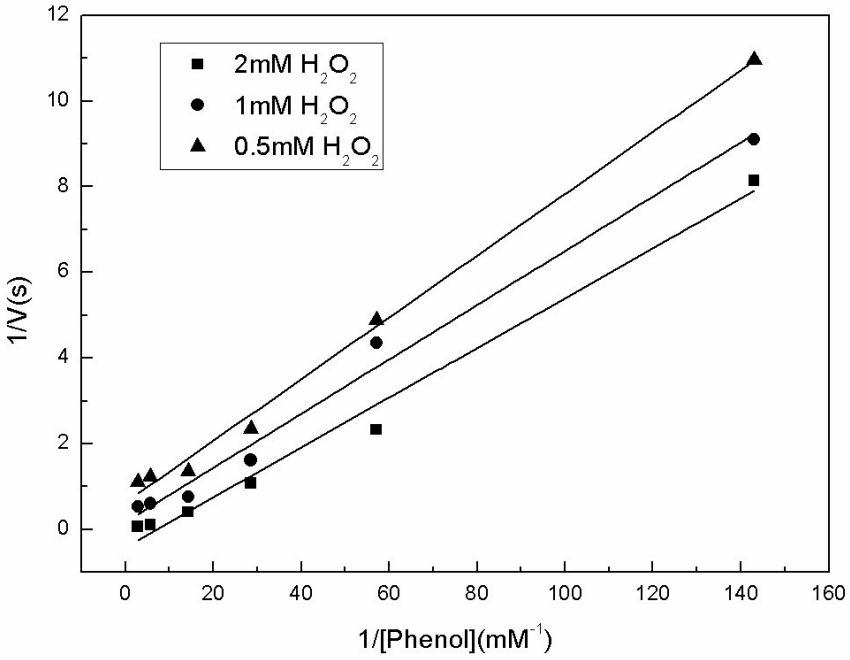


Figure S5 Double reciprocal plots of peroxidase activity of DhHP-6: initial velocity against the concentration of the substrate phenol is obtained over a range of concentrations of the second substrate $H_2O_2$. All test conditions was at 25 °C in a pH 7.0 PBS (0.05 M) buffer.

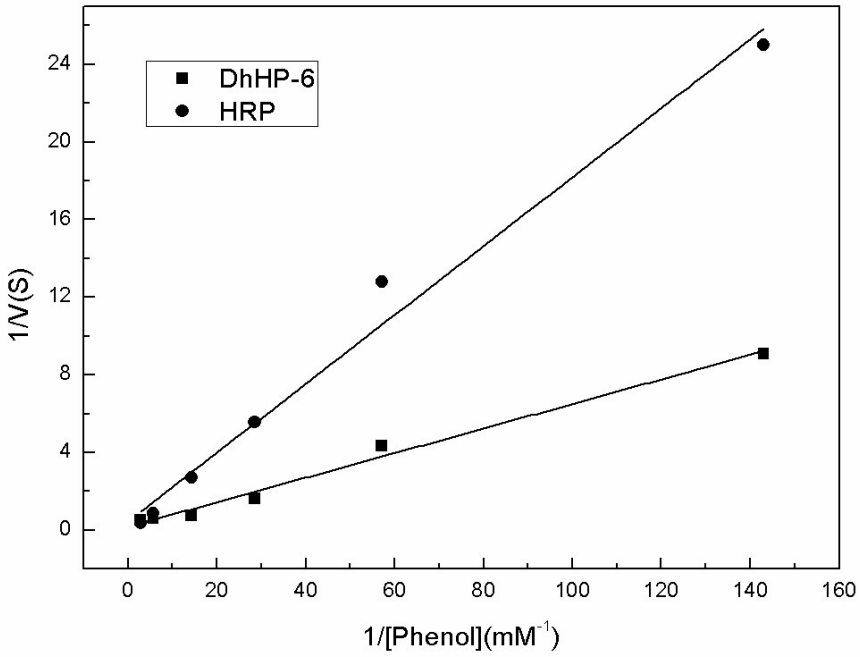


Figure S6 Double-reciprocal plots of activity of DhHP-6 and HRP at a fixed concentration of $H_2O_2$ versus varying concentration of phenol. The test conditions of DhHP-6 was at 25 °C in a pH 7.0 PBS (0.05 M) buffer and the test conditions of HRP was at 25 °C in a pH 6.0 PBS (0.05 M).