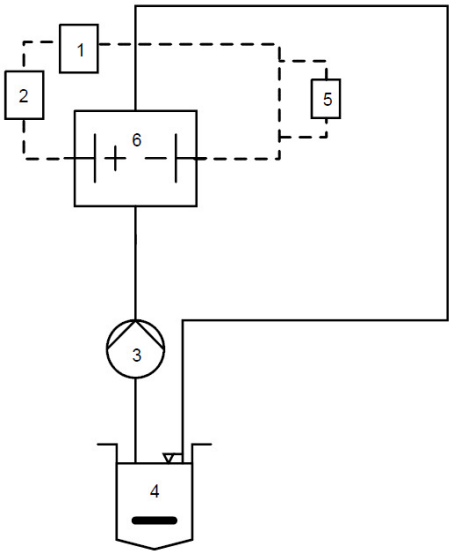
Supplementary Information

Electrochemical setup

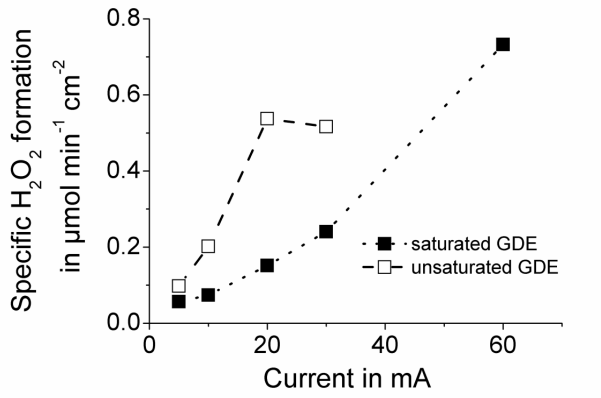


The electrochemical setup consisted of a storage vessel (4) from which the reaction solution was pumped with a peristaltic pump (3) through the electrochemical reaction cell (6) in a circular flow. A current was applied using a current generator (2) to enable hydrogen peroxide production catalyzed by a gas diffusion electrode (GDE). Current and voltage were measured with a series-connected digital ampere meter (1) and a parallel-connected voltmeter (5), respectively.

1: Digital ampere meter, 2: Current source, 3: Peristaltic pump, 4: Storage vessel, 5: Digital voltmeter, 6: Electrochemical reaction cell

Electrochemical hydrogen peroxide formation

Specific electrochemical H_2O_2 formation using our electrochemical setup with a GDE (A = 5.5 cm²). The untreated GDE produced H_2O_2 in linear fashion in a range from 5 to 20 mA ($y = 0.025 \cdot x$, $R^2 = 0.96$) up to 0.53 µmol min^{-1} cm^{-2}. The saturated GDE produced H_2O_2 in linear fashion in a range of 5 mA to 60 mA ($y = 0.011 \cdot x$, $R^2 = 0.94$) up to 0.7 µmol min^{-1} cm^{-2}.



Kinetics of electroenzymatic thymol conversion

Kinetics of electroenzymatic chlorothymol formation in our electrochemical reactor system varying the applied current. The experiments were performed with a thymol-saturated electrode in 0.1 M citrate buffer (pH 3.5) with 10 nM CPO, a substrate concentration of 2.5 mM thymol, 50 mM NaCl and a continuous electrochemical H_2O_2 production at a temperature of 30 °C. Highest productivities were observed at an applied current of 45 mA.