# Selective Oxidation of Crude Glycerol to Dihydroxyacetone in a Biphasic Photoreactor

Alexander Luis Imbault and Ramin Farnood

## Supplementary Data

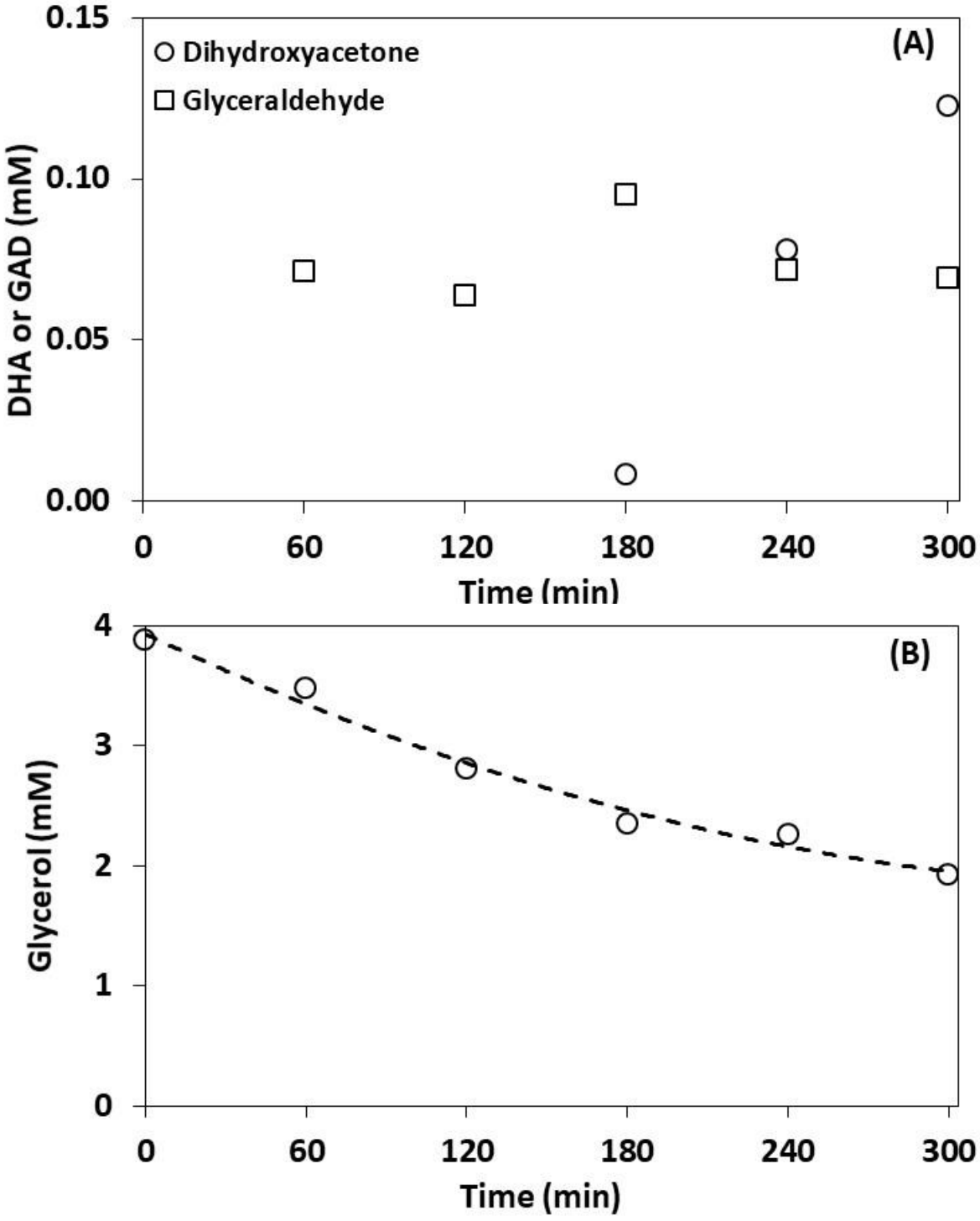


**Fig. S1.** Photocatalytic reaction of glycerol in water under simulated solar light. (A) The concentration of DHA and GAD, and (B) concentration of glycerol over time. Water: 100 mL, glycerol: 0.4 mmol, Degussa P25 $TiO_2$: 0.1 g.

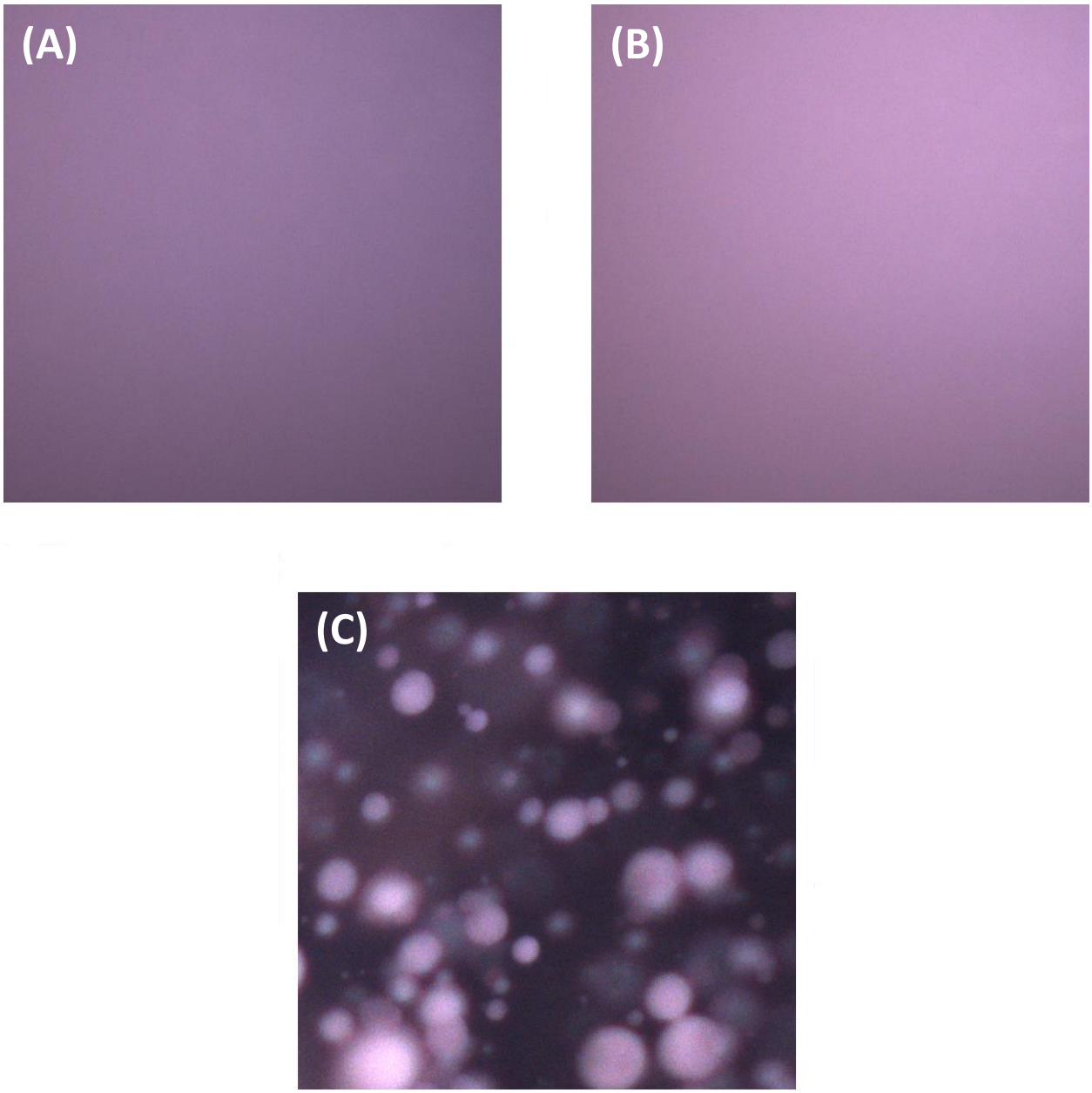


**Fig. S2.** Photographs of three mixtures of 0.1 g of Degussa P25 $TiO_2$ : (A) 100 mL of ethyl acetate, (B) 100 mL of water, and (C) 90 mL ethyl acetate with 10 mL water. Image size (approx.): 12mm x12 mm.

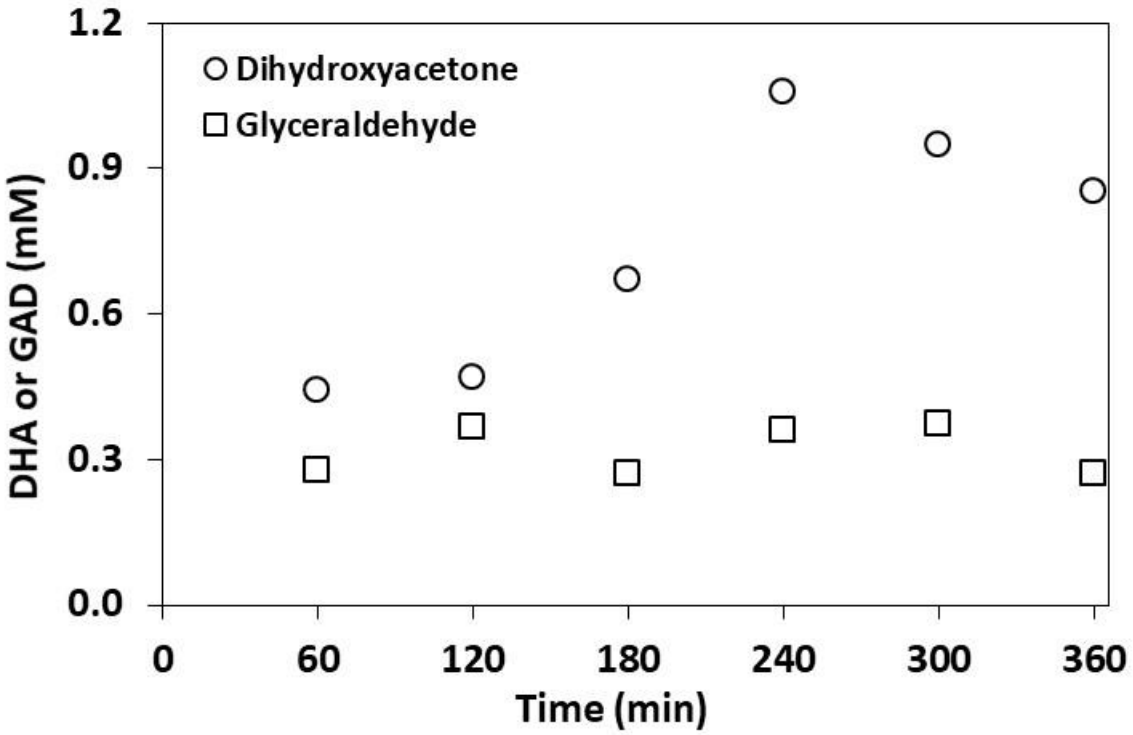


**Fig. S3.** Photocatalytic reaction of glycerol in a mixture of ethyl acetate and water under simulated solar light. The concentration of DHA and GAD over time. Water: 10 mL, ethyl acetate: 90 mL, glycerol: 0.4 mmol, Degussa P25 $TiO_2$: 0.1 g.

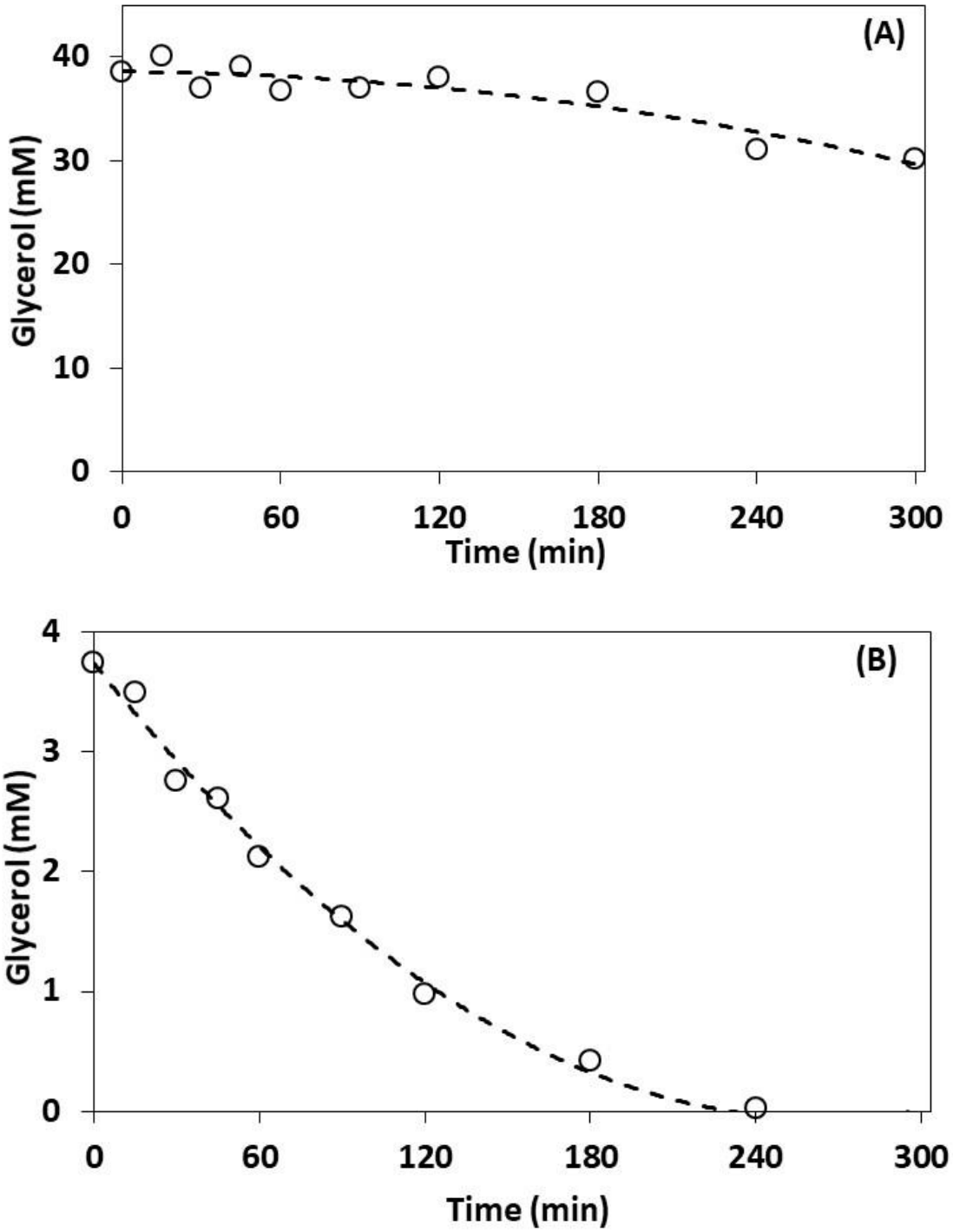


**Fig. S4.** Effect of reduced photocatalyst loading on the concentration of glycerol in the water phase: A) glycerol loading of 0.4 mmol, and B) glycerol loading of 0.04 mmol. DHA and GAD concentration over time is shown in Fig. 7. Water: 10 mL, ethyl acetate: 90 mL, Degussa P25 $TiO_2$: 0.01 g.

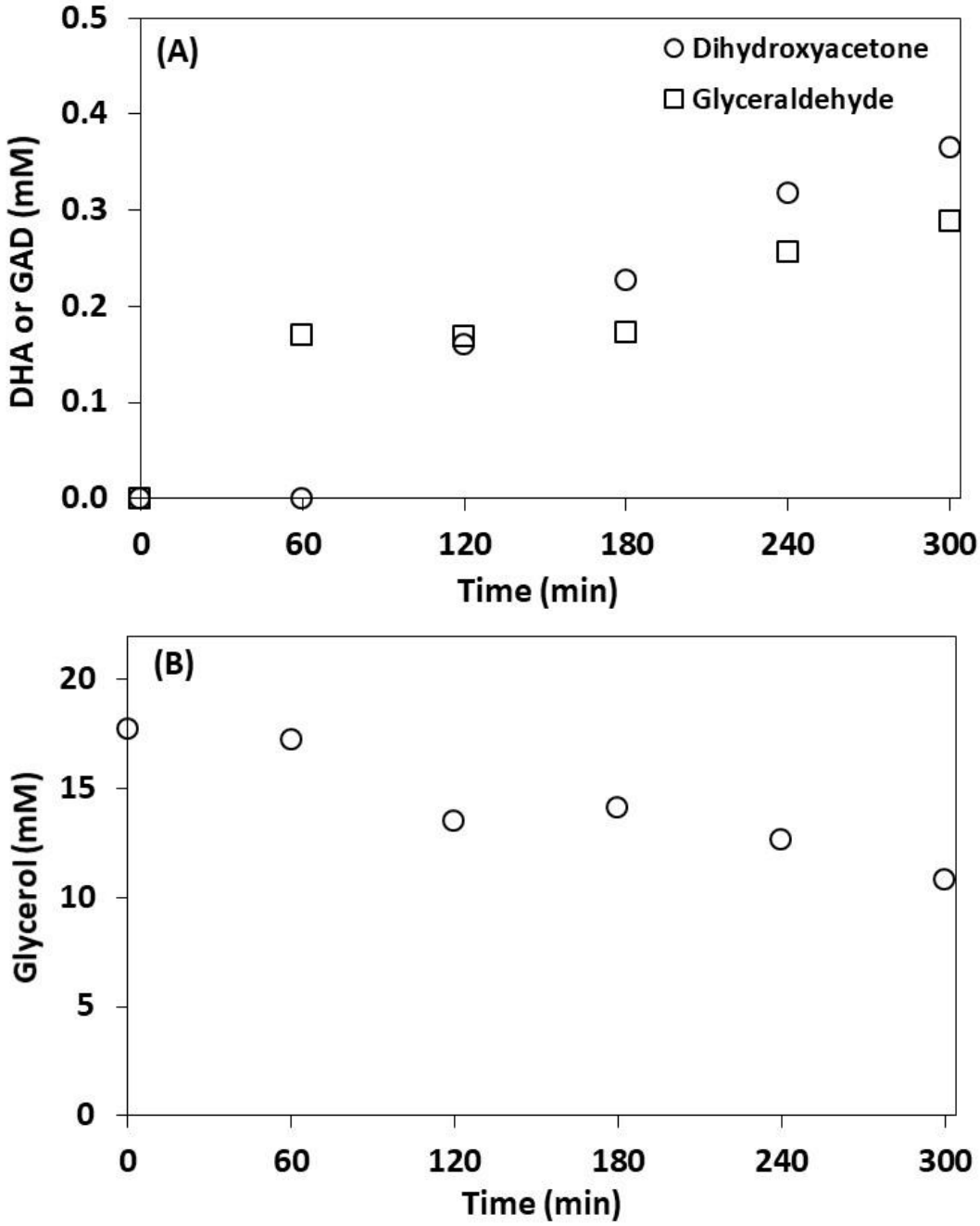


**Fig. S5.** Photocatalytic reaction of glycerol in a mixture of ethyl acetate and water under simulated solar light. (A) The concentration of DHA, GAD and (B) concentration of glycerol over time. Water: 20 mL, ethyl acetate: 80 mL, glycerol: 0.4 mmol, Degussa P25 $TiO_2$: 0.1 g.

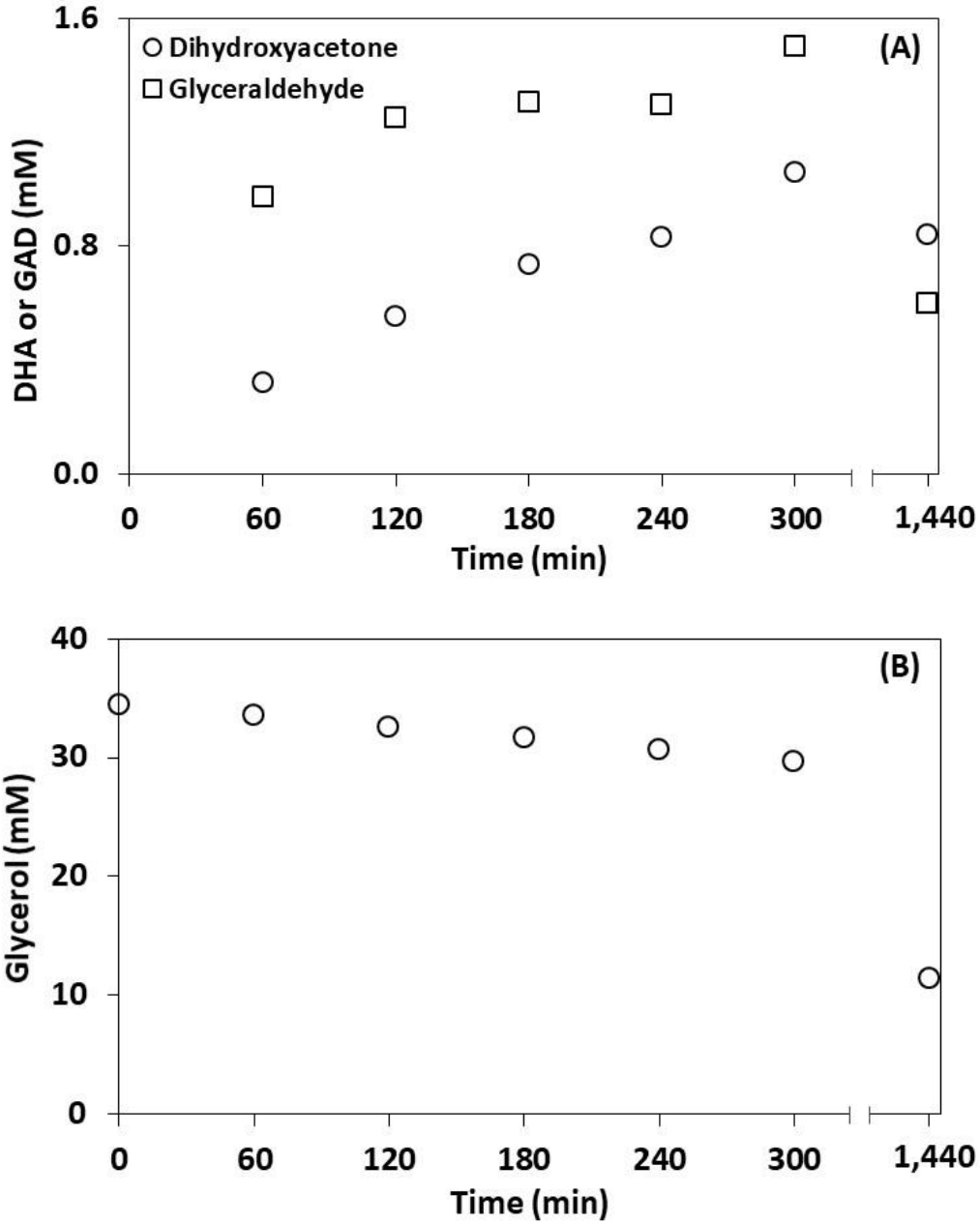


**Fig. S6.** Photocatalytic reaction of crude glycerol in a mixture of ethyl acetate and water under simulated solar light. (A) The concentration of DHA, GAD and (B) concentration of glycerol over time. The xenon bulb used elsewhere in this paper came to the end of its life and had to be replaced, the new xenon bulb displays approximately 30 % more intensity according to methyl orange degradation tests performed before and after replacement, see Fig. S.6. Water: 10 mL, ethyl acetate: 90 mL, crude glycerol amount: 0.0622 g (approximately 0.36 mmol of glycerol), Degussa P25 $TiO_2$: 0.1 g.

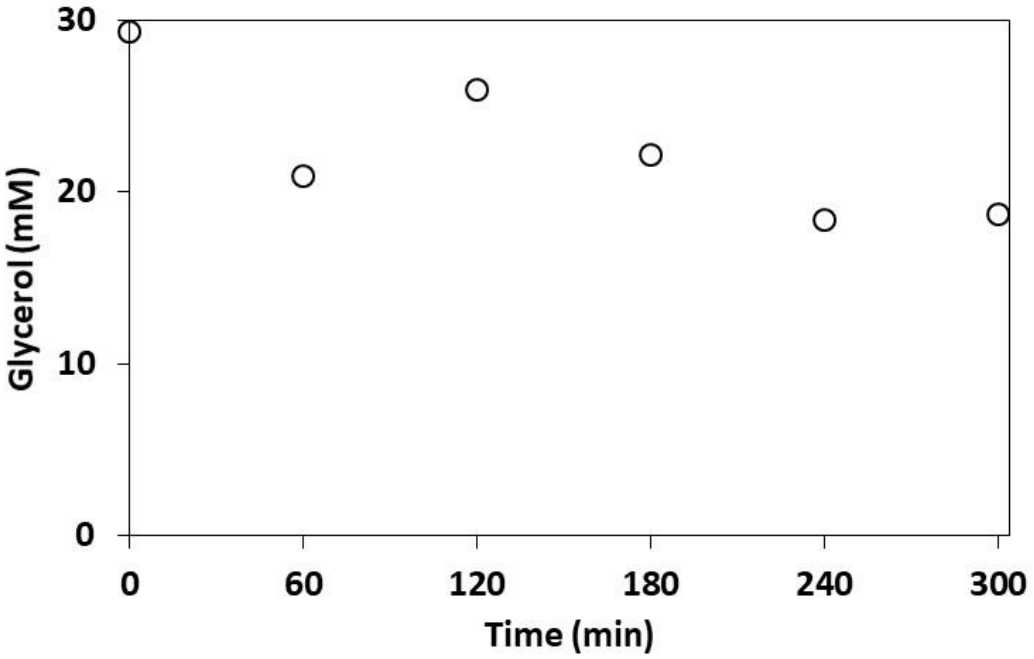


**Fig. S7.** Photocatalytic reaction of glycerol in a mixture of hexane and water under simulated solar light. The concentration of glycerol in the water phase over time. Water: 10 mL, hexane: 90 mL, glycerol: 0.4 mmol, Degussa P25 $TiO_2$: 0.1 g.

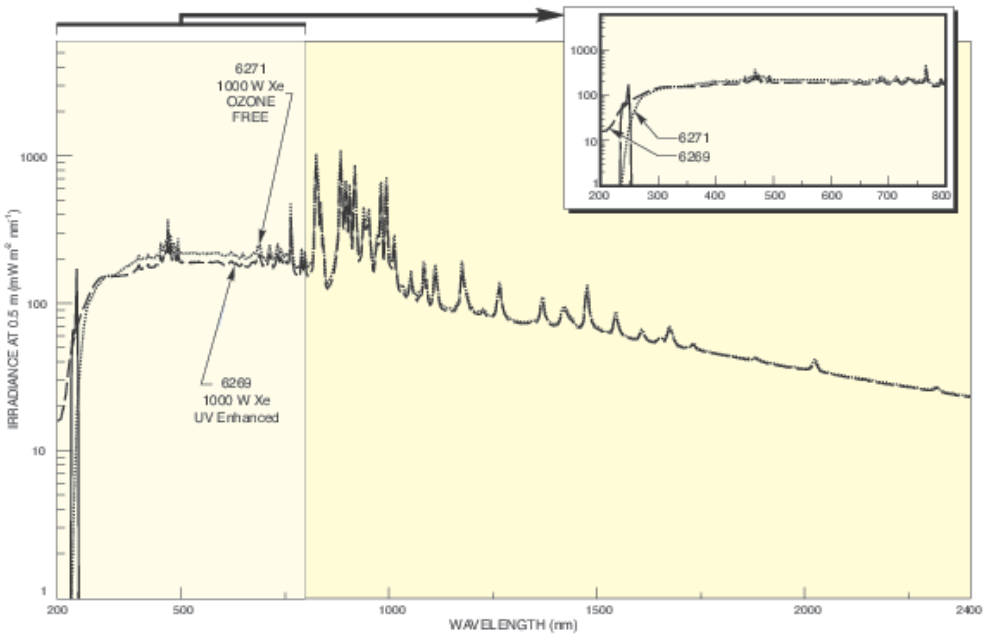


**Fig. S8.** Spectrum of the 1000W Xe UV enhanced bulb (6269). Reproduced with permission from Newport from https://www.newport.com/f/xenon-arc-lamps.