Fabrication and Characterization of $BiVO_4$ Decorated Hydrogen Peroxide Modified Titanium Dioxide ($BiVO_4$@HMT) and Enhanced Visible Photocatalytic Growth Inhibition of Harmful Cyanobacteria in Water

1.0. Supplementary Information

1.1. BG-11 Recipe:

The cultivation media consists of the following chemical ingredients: $NaNO_3$ (25g/L); $MgSO_4.7H_2O$ (7.5g/L); Na_2CO_3 (1g/L); K_2HPO_4 (7.5g/L); $CaCl_2.2H_2O$ (2.5g/L); Citric Acid (1g/L); ferric ammonium citrate (0.6g/L); $Na_2EDTA.2H_2O$ (0.1g/L); H_3BO_3 (0.61g/L); and 1ml/L of micronutrient solution (0.169g/L of $MnSO_4$. H_2O + 0.287g/L of $ZnSO_4.7H_2O$ + 0.0025g/L of $CuSO_4.5H_2O$ and 0.0125 g/L of $(NH_4)_6$ $Mo_7O_{24}.4H_2O$).

1.2. Bio-protocol for chlorophyll '*a*' measurement

For the process, the sample aliquots taken at each hour were added in small falcon tubes (15ml) and centrifuged at 3000 rpm to harvest the algal debris and cells followed by decanting the supernatant. The obtained pellet in tube was added with 10 ml of 90% acetone and falcon tube was vortexed (Digital vortex mixer VWR) at 2000-2500 rpm for 4-8s for homogenized mixing of the pellet in solvent. The obtained mixture was left in the refrigerator overnight to dissolve all the pigment in the solvent. Then falcon tubes were centrifuged at 3300 rpm for 300s to collect the green-colored supernatant contained dissolved chlorophyll '*a*', while the obtained pellet was discarded. The supernatant was filtered through a 0.22 μm syringe filter to avoid any catalytic impurity. The filtered supernatant was analysed by measuring absorbance at 680 nm using UV-visible spectrophotometer T80+ pg. instruments, against 90% acetone as blank.

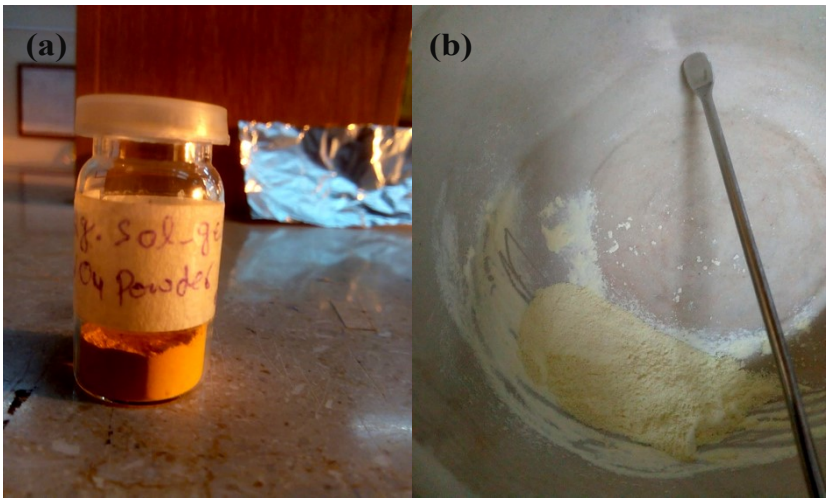

Figure S1: (a) As synthesized pristine $BiVO_4$ caclined at 600°C; **(b)** Pristine HMT powder

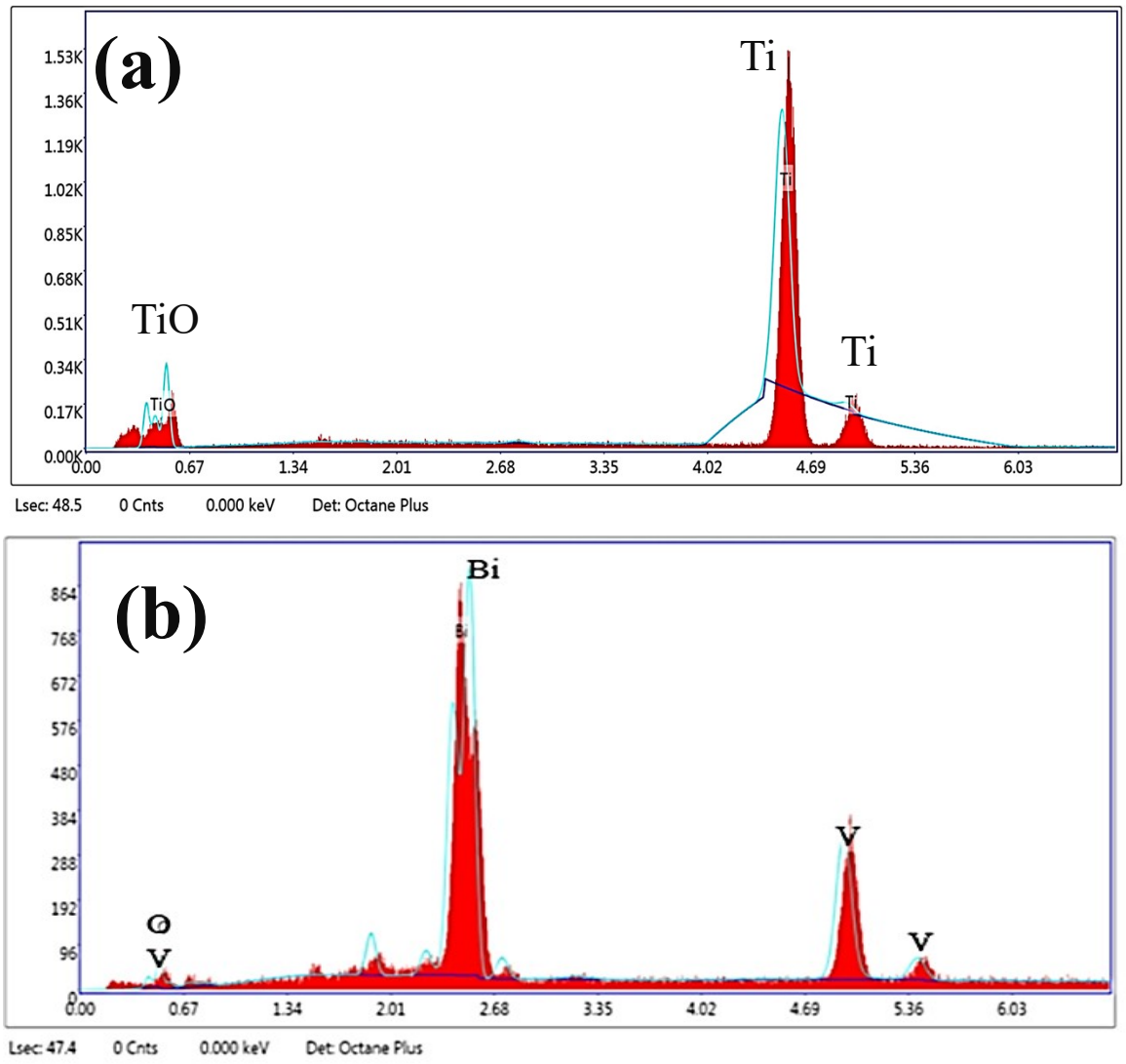

Figure S2: EDAX analysis of pristine nanomaterials: **(a)** titanium peroxide and **(b)** $BiVO_4$ at 600°C

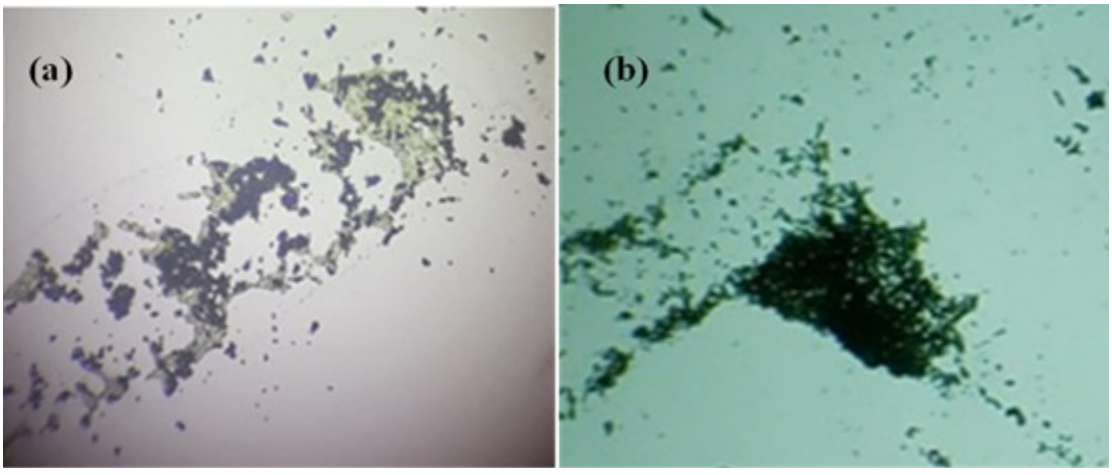

Figure S3: Microscopic images taken for the sample at 6th h with 40X magnification **(a)** Adsorptive interaction of cells with photocatalyst; **(b)** Cyanobacterial injured cell's agglomeration at the catalyst

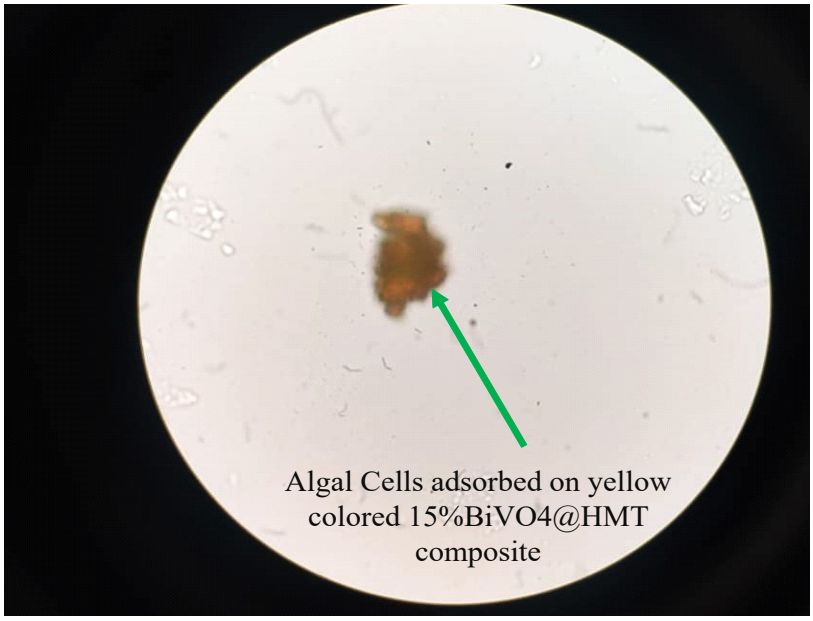

Figure S4: Light Microscopic graph taken at 6th hour revealing the adsorptive interaction of cyanobacterial cell with catalyst.

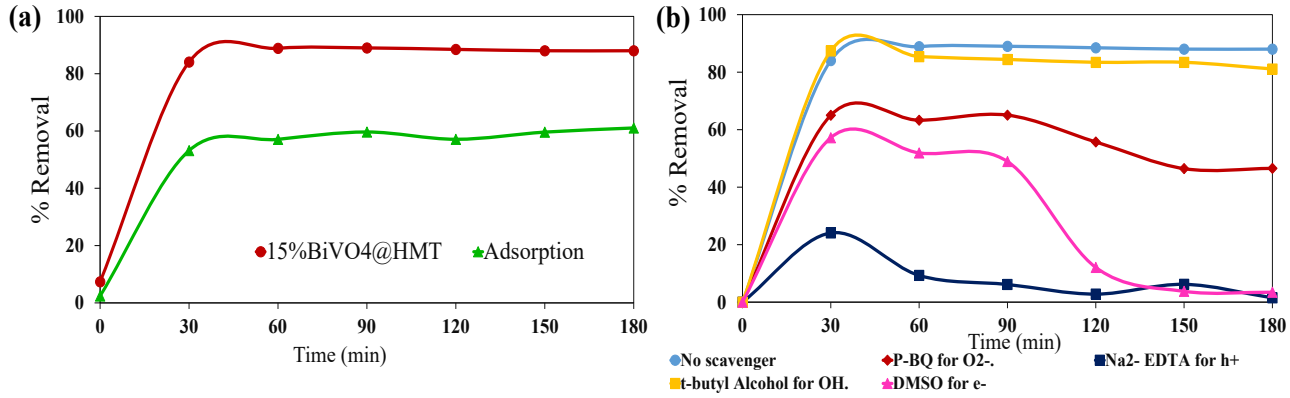

Figure S5: a) Percentage removal of 15%$BiVO_4$@HMT by adsorption and Photocatalysis (Congo red dye Conc. = 75ppm, Catalyst Dose = 1g/L; **b)** Effect of different scavengers on degradation efficiency of 15%$BiVO_4$@HMT.