

Visible light mediated synergistic catalyst for effective inactivation of *E. coli* and degradation of azo dye Direct Red-22 with mechanism investigation

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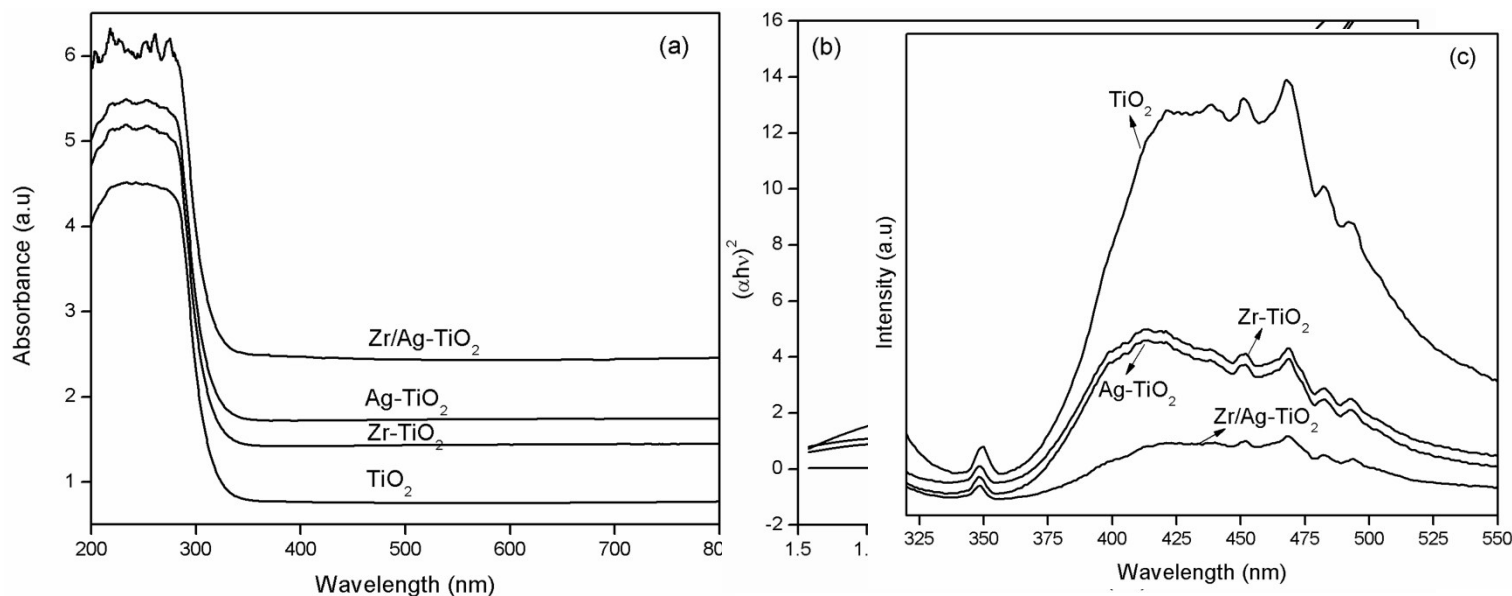


Fig. S1: (a) UV-Vis absorption spectra of nanoparticles and (b) optical energy gap (E_g) and photoluminescence spectra (c) of the prepared nanoparticles

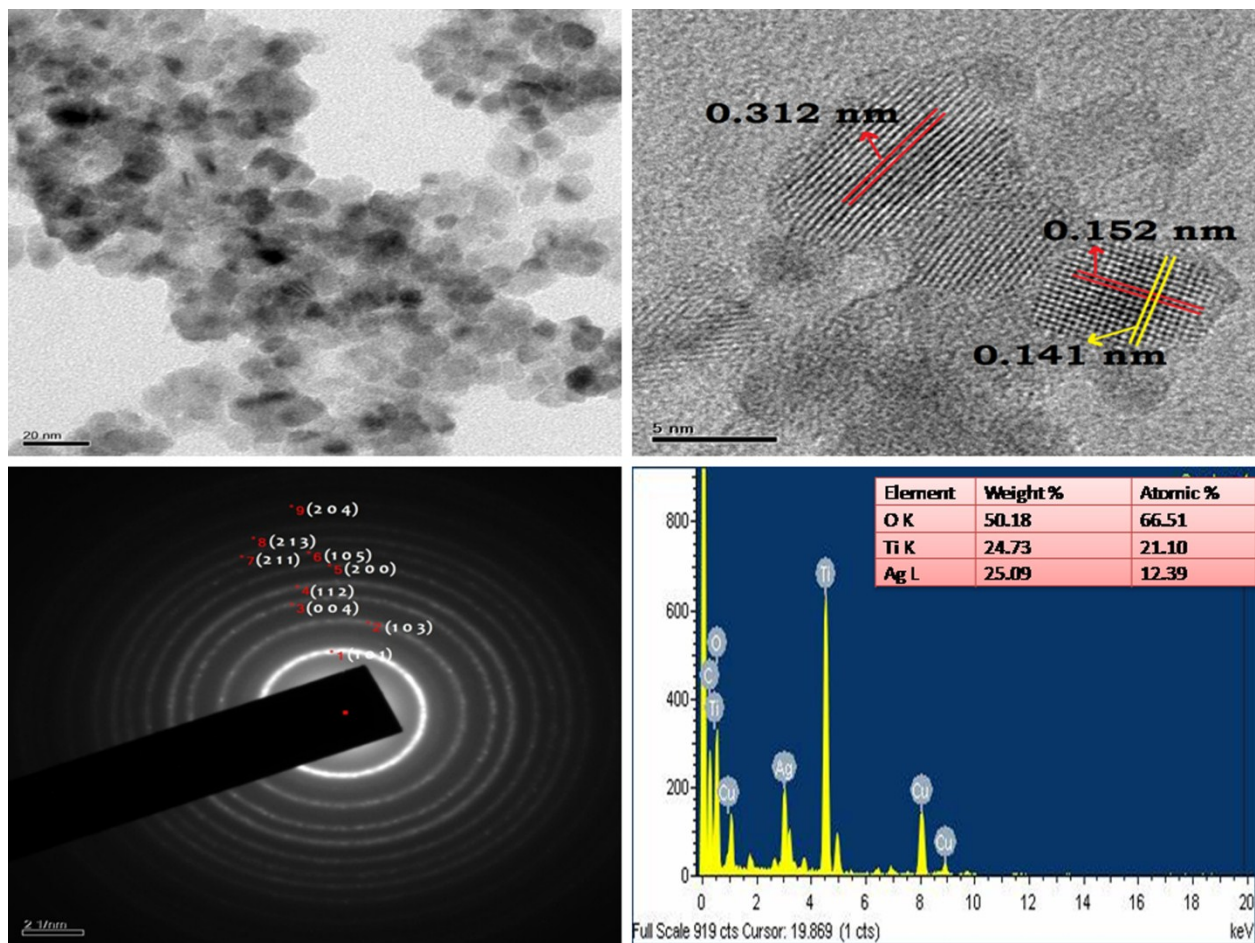


Fig. S2: TEM images of Ag-TiO₂ nanoparticles (a) and (b), selected area electron diffraction pattern of the doped nanoparticles (c), EDAX profile (d) showing the elements present in the doped nanoparticles

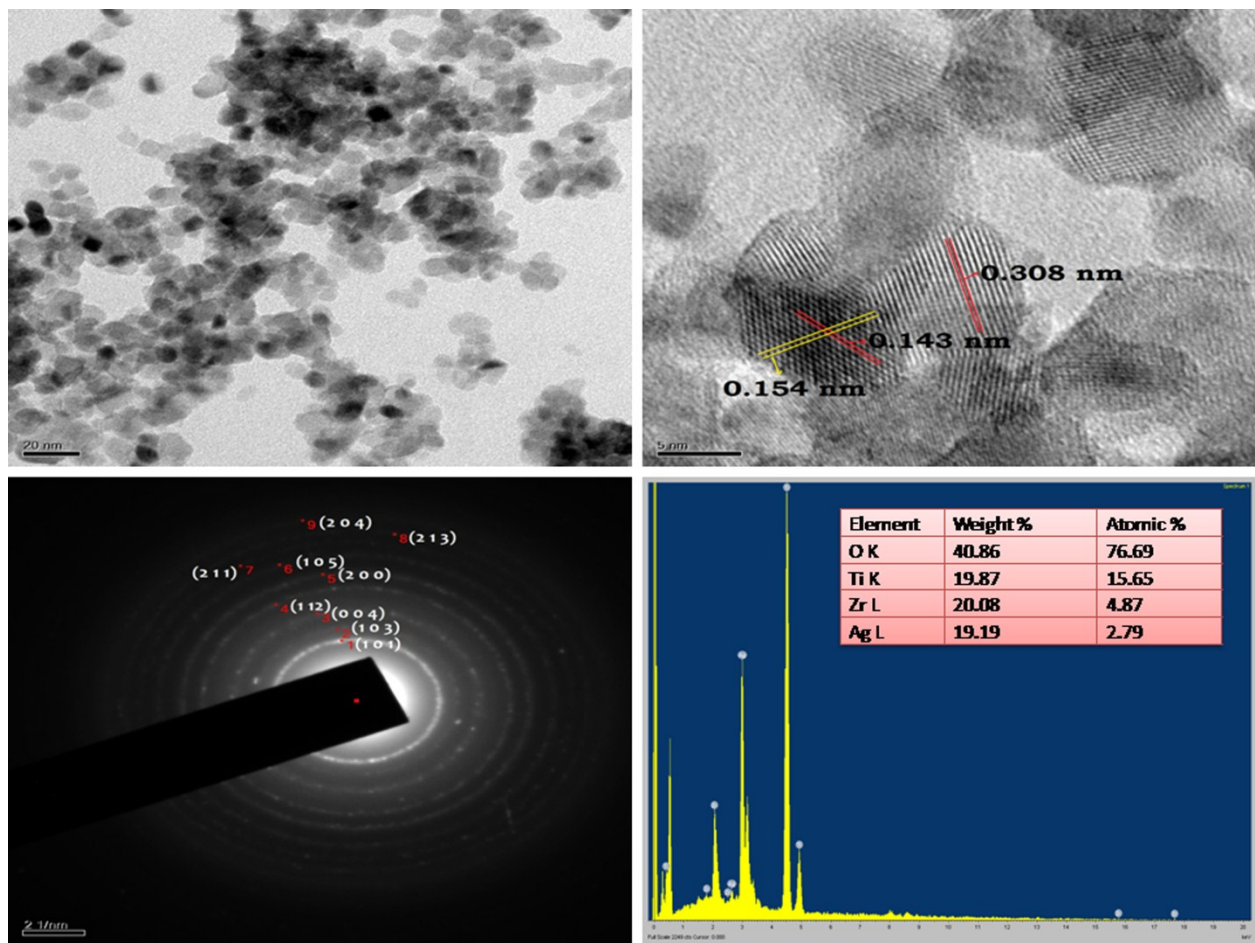


Fig. S3: TEM images of Zr/Ag co-doped TiO₂ nanoparticles (a) and (b), selected area electron diffraction pattern of the doped nanoparticles (c), EDAX profile (d) showing the elements present in the doped nanoparticles

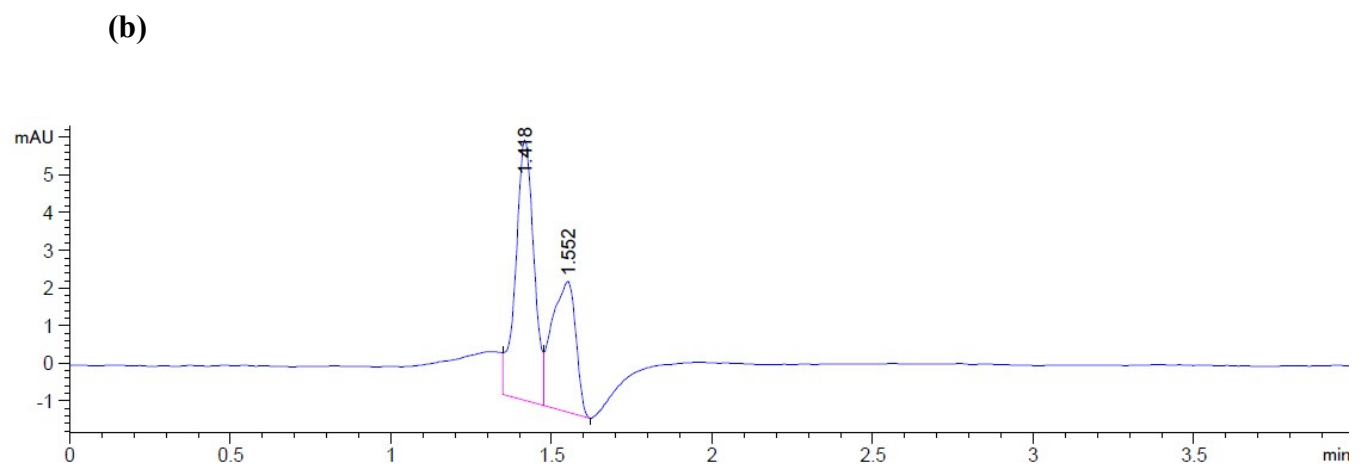
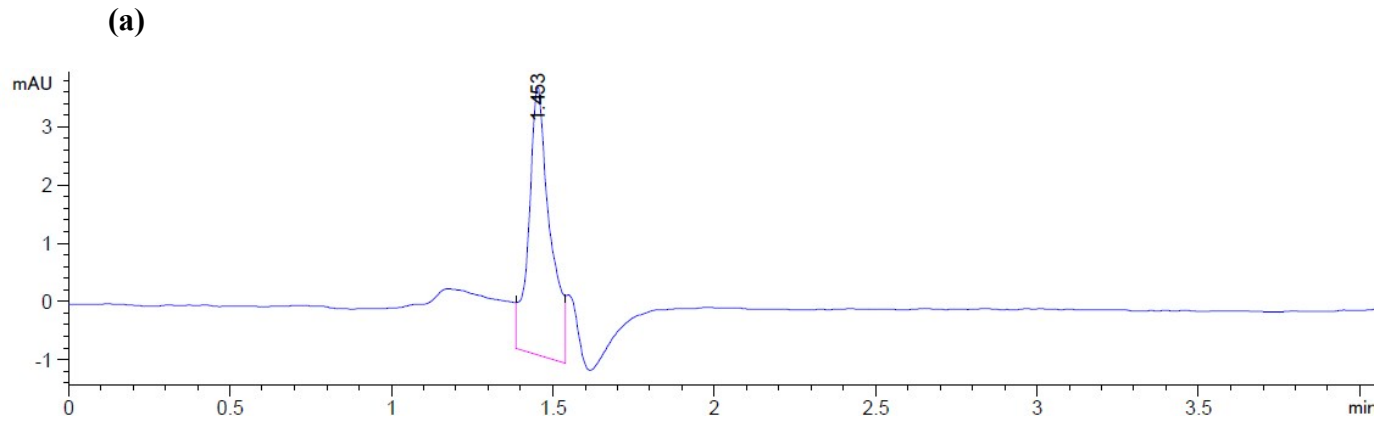
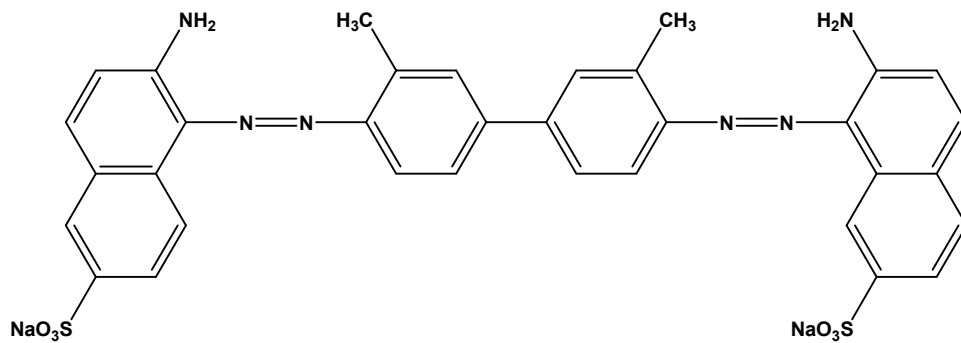


Fig. S4: HPLC chromatogram of DR-22 extracted at 0 h (a) and degraded metabolites extracted at 5 h (b).

(a)



(b)

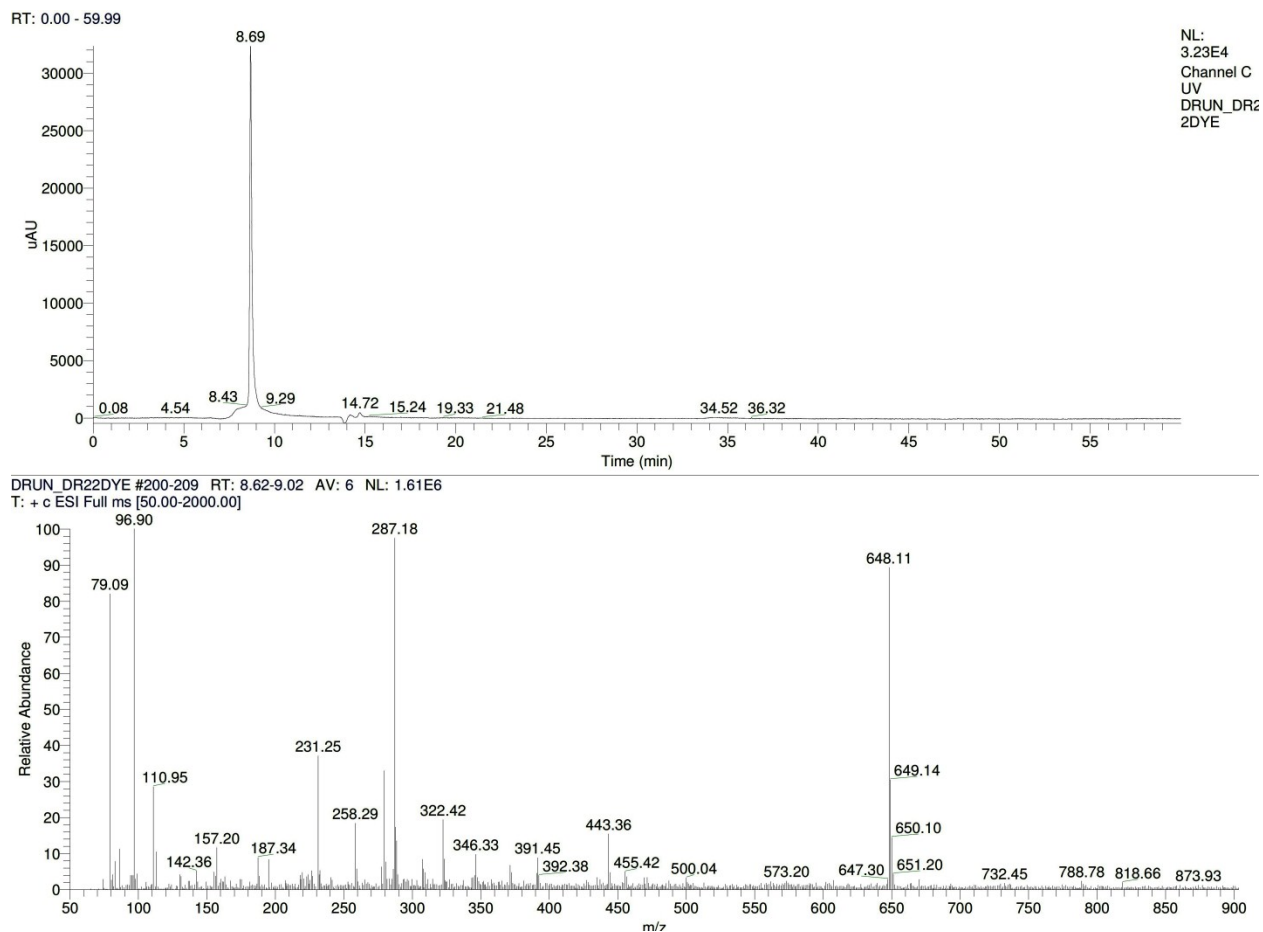


Fig. S5: Chemical structure of DR-22 (a) and LC-MS pattern (b) of the dye

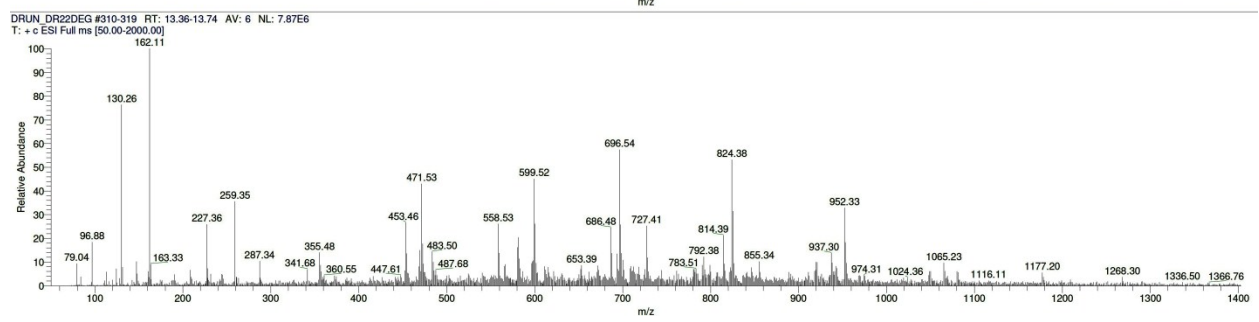
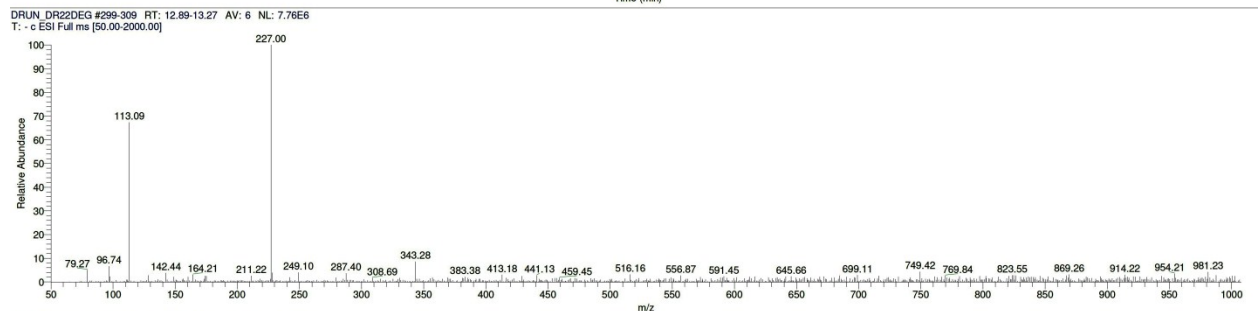
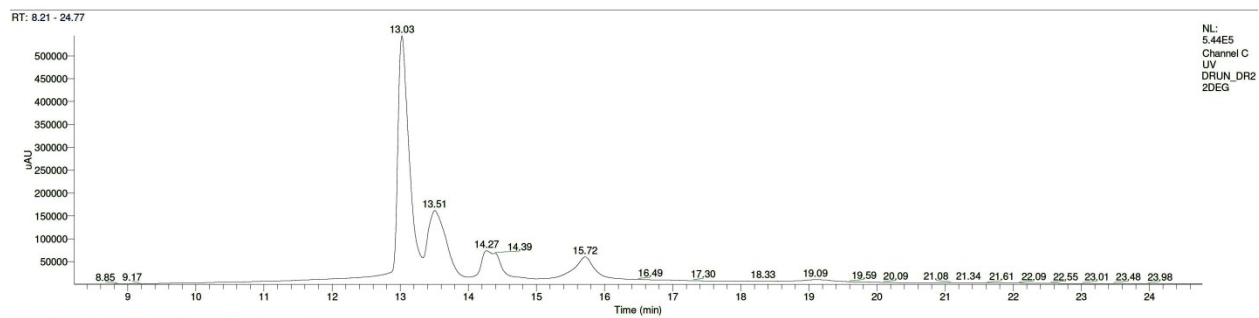


Fig. S6: LC-MS chromatogram and mass fragmentation pattern of degraded sample

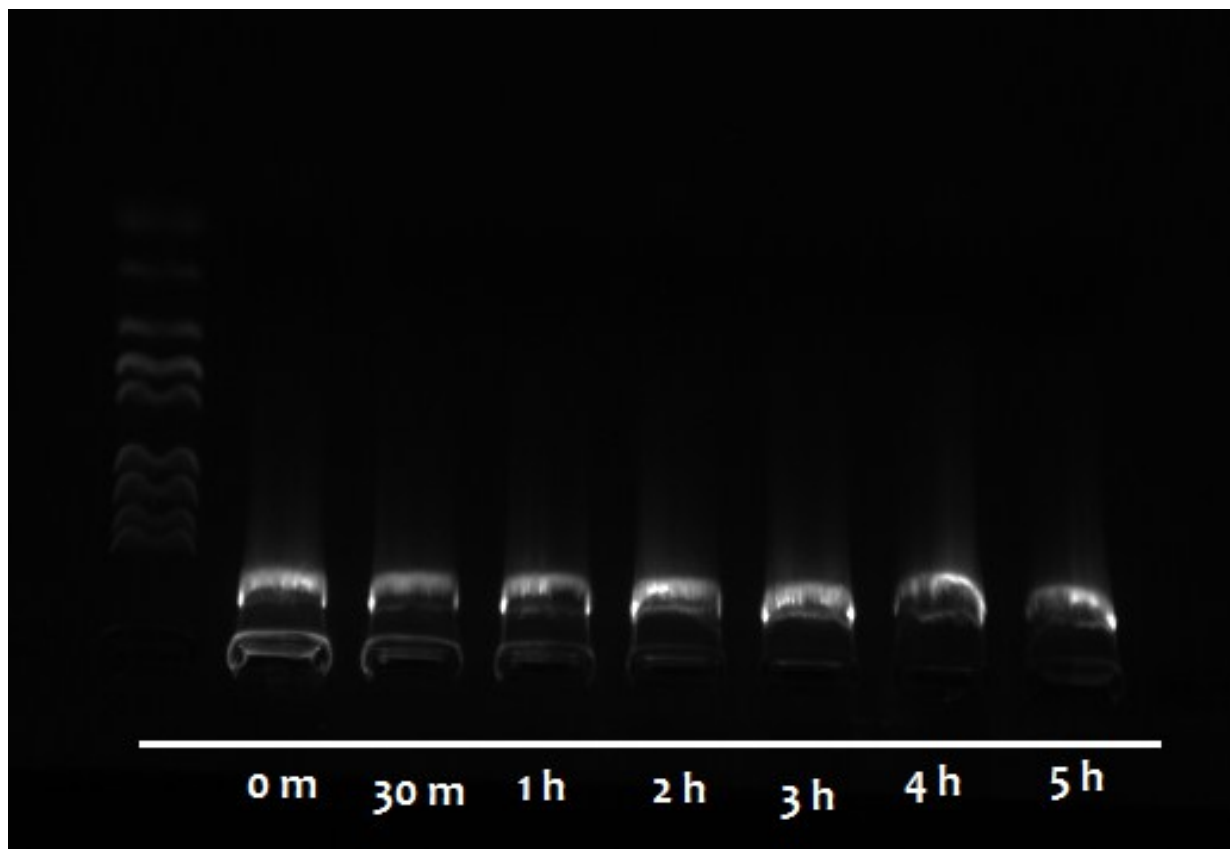


Fig. S7: Gel electrophoresis map of genomic DNA extracted from *E. coli* during visible light irradiation using Zr/Ag-TiO₂ nanoparticles