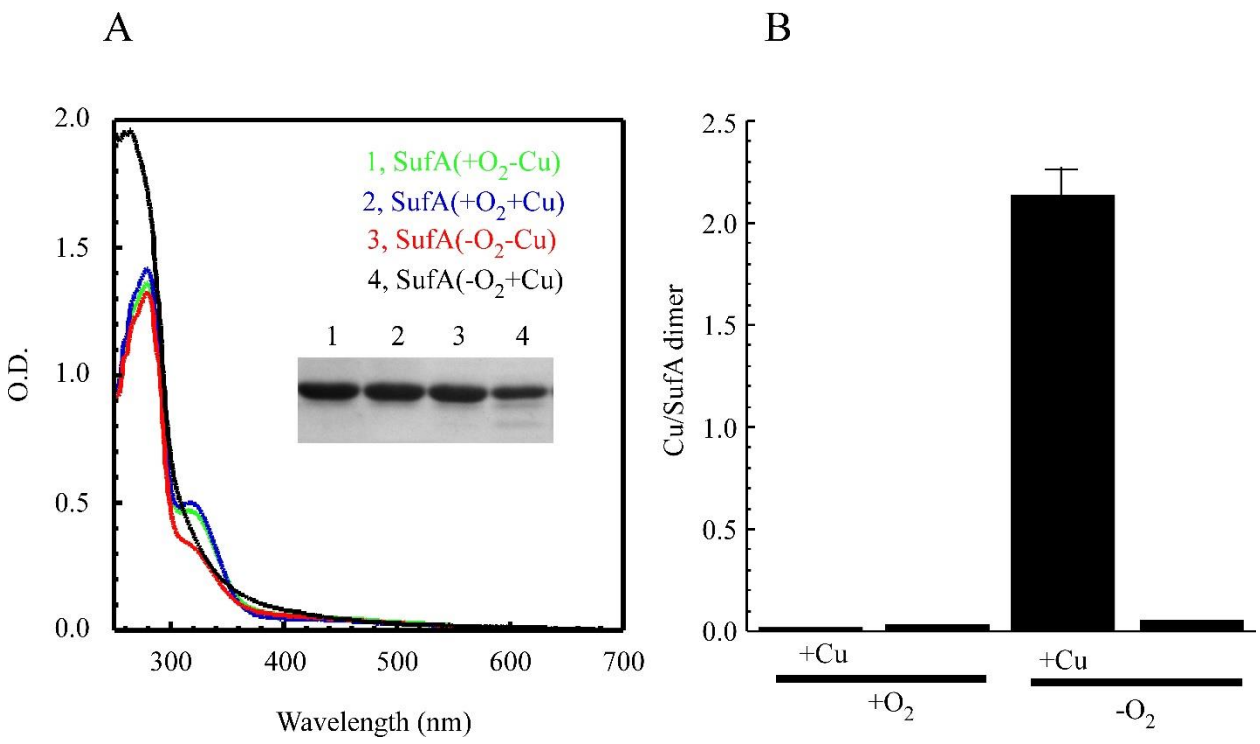
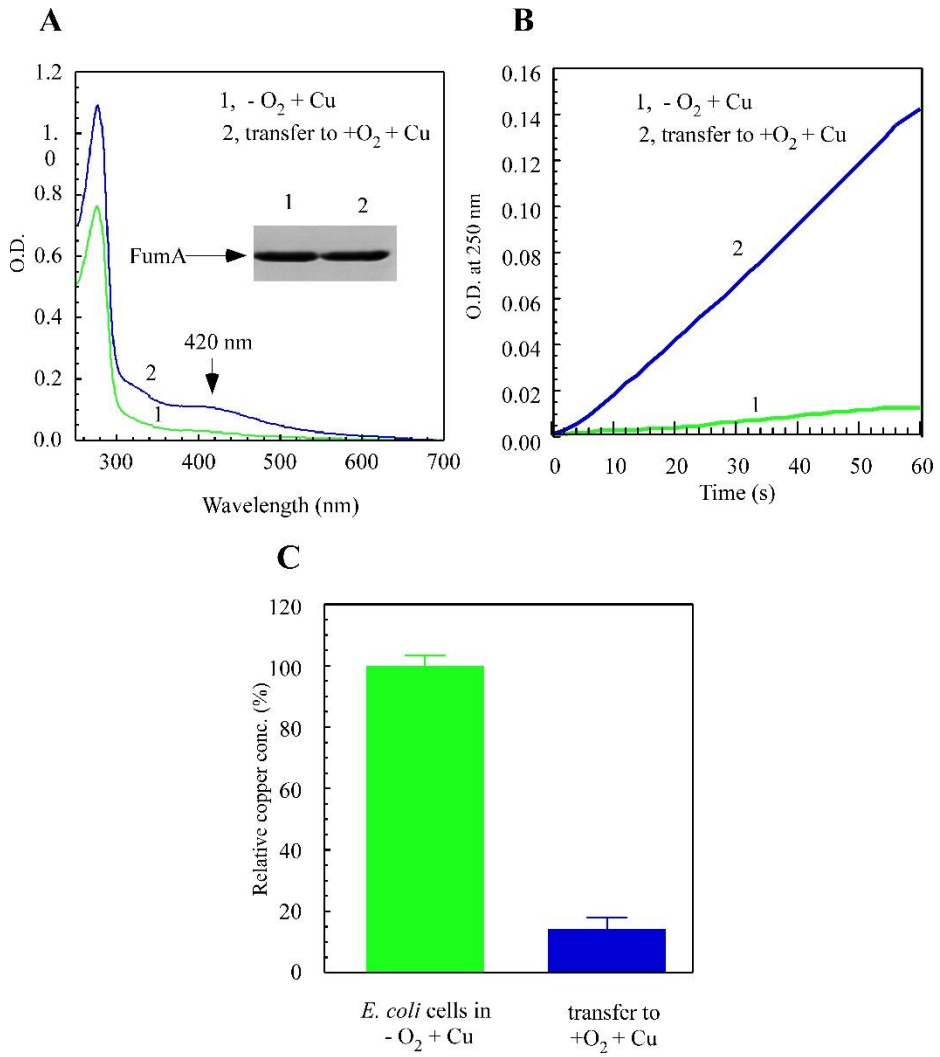


Supplemental Figure 1. Copper binding in SufA in *E. coli* cells under anaerobic growth conditions. SufA was expressed in *E. coli* cells grown in LB medium supplemented with 0 or 0.2 mM $CuCl_2$ under aerobic or anaerobic conditions. **A)**, UV-visible absorption spectra of purified SufA. Spectrum 1, with no $CuCl_2$ under aerobic growth conditions; spectrum 2, with 0.2 mM $CuCl_2$ under aerobic growth conditions; spectrum 3, with no $CuCl_2$ under anaerobic growth conditions; spectrum 4, with 0.2 mM $CuCl_2$ under anaerobic growth conditions. The absorption peak at 260 nm indicates the copper binding in the protein. Insert in the panel is a photograph of the SDS-PAGE gel of purified proteins. **B)**, copper contents of purified SufA proteins. The protein samples were the same as in panel A. The results are the average ± standard deviation from three independent experiments.



Supplemental Figure 2. Reversibility of copper toxicity in *E. coli* cells. Recombinant FumA was expressed in *E. coli* cells grown in LB medium supplemented with 0.2 mM $CuCl_2$ under anaerobic conditions. One-half of the cell culture was transferred to fresh LB medium supplemented with 0.2 mM $CuCl_2$ under aerobic growth conditions for additional two hours. FumA was then purified from the cells. **A)**, UV-visible absorption spectra of FumA. Spectrum 1, FumA purified from the *E. coli* cells grown in LB medium supplemented with 0.2 mM $CuCl_2$ under anaerobic growth conditions. Spectrum 2, FumA purified from the same *E. coli* cells in A), except with additional two hour growth in fresh LB medium supplemented with 0.2 mM $CuCl_2$ under aerobic growth conditions. Insert is a photograph of the SDS-PAGE gel of purified FumA proteins. **B)**, the enzyme activity of purified FumA. FumA proteins were the same as in A). FumA (10 nM) was incubated with 50 mM sodium phosphate (pH 7.4), and 50 mM malic acid. The enzyme activity was measured at the absorption peak at 250 nm of the product fumaric acid. **C)**, total copper content of the *E. coli* cells grown in LB medium supplemented with 0.2 mM $CuCl_2$ under anaerobic conditions and after the cells were transferred to fresh LB medium supplemented with 0.2 mM $CuCl_2$ under aerobic growth conditions for additional two hours. The copper content of *E. coli* cells was determined using the ICP- MS/MS (Agilent 8800).