

## Inactivation and degradation of antibiotic-resistant bacteria and its gene by Cu (II)/H<sub>2</sub>O<sub>2</sub> system

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This study deals with the degradation and/or removal of antibiotic resistant bacteria (ARB) and antibiotic resistant gene (ARG) using Cu(II)/H<sub>2</sub>O<sub>2</sub>. The removal of ARB using Cu(II) was achieved, however, the inactivation capability was considerably improved when supplement with H<sub>2</sub>O<sub>2</sub>. The improved ARB inactivation was confirmed by: (1) Addition of copper chelating agents, EDTA (for Cu(II)) and DMP (for Cu(I)) to block Cu(II)/Cu(I) redox cycle, (2) Addition of radical scavenger t-BuOH proving that ARB is mainly inactivated by Cu(III), and (3) Addition of H<sub>2</sub>O<sub>2</sub> to produce Cu(I) and Cu(III). To investigate the cell destruction, PI staining was applied to check cell membrane integrity, and cell-permeability test to identify intra- and extra-cellular oxidative damage. In case of ARG inactivation, the efficiency was up to 5.5% when Cu(II) was treated alone, then it was improved up to 85% within 20 min when supplement with H<sub>2</sub>O<sub>2</sub> in the reaction. Therefore, it is concluding that Cu (II)/H<sub>2</sub>O<sub>2</sub> system is not only potential for inactivation of ARB but also inactivation of ARG under neutral pH condition.

### Biography

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