

Photocatalytic Disinfection of pathogenic *Escherichia coli*

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Abstract

Polyoxometalates (POMs) as a homogeneous photocatalyst and semiconductor oxide TiO₂ as a heterogeneous photocatalyst share many aspects of similarity in their operating mechanisms¹⁻³. In this study, we compared photocatalytic inactivation of pathogenic *E. coli* using POM and TiO₂ in aqueous solution. Almost all the initial *E. coli* (5 X 10⁷ cell/ml) were inactivated with 40 min in the presence of both POM and TiO₂, but the POM-mediated inactivation was faster than that with TiO₂ under the experimental conditions employed in this study. Kinetic studies using *tert*-butyl alcohol or methanol as an OH radical scavenger suggested that OH radicals are dominant photooxidant in photocatalyst inactivation³⁻⁴. In particular, the biocidal action of the photocatalyst has been accepted that reactive oxygen species (ROS) and OH radicals play the role⁴.

References

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