A Fundamental Study on Microbial Removal of Hydrogen Sulfide from Anoxic Sea Water on Sediments by Using Phototrophic Green Sulfur Bacterium
- Selection of Light Source for a Night Operation -

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Summary

Because the presence of hydrogen sulfide in sea water on sediments poses serious problem of blue tide (blue colored anoxic sea water, so called Aoshio phenomenone), the removal of dissolved hydrogen sulfide is of importance in control of environmental pollution. Although physical and chemical processes have been extensively developed, another possible process is the removal of microbial means. One of microorganisms responsible for the sulfide removal is the phototrophic green sulfur bacterium *Chlorobium limicola*, which is associated with the sulfur cycle of aqueous environments.

In this report, the anaerobic oxidation of dissolved H_2S into elemental sulfur was studied at 23°C and pH 6.5±0.3 in a continuous culture of the phototrophic bacterium *C. limicola* at different light sources. The maximum H_2S oxidation rate measured using a near infrared LED (light-emitting diode with a peak emission at 735 ± 25 nm) at 10 lx was comparable to that for the white fluorescent lamps (wave length range of 300-800 nm) at 5000 lx. This suggests that both the light sources achieve nearly identical light energies in the long wavelength region of 735 ± 25 nm. Moreover, the combined use of the infrared LED and the white fluorescent lamps provided a 30% increase in the maximum oxidation rate per unit reactor volume.