

## Development and culture optimization of mutants of *Thiobacillus* sp. IW for elimination of hydrogen sulfide

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### Abstract

UIW-10 mutant obtained by UV treatment using sulfur-oxidizing bacteria, *Thiobacillus* sp. IW was studied. The colony size of UIW-10 was found 2 ~ 3 times bigger in diameter than the parent colony on TAM medium. UIW-10 mutant growth was two times higher than parent strain at 6 h culture in liquid medium containing sulfides such as sulfur and sodium thiosulfate. Initial pH and temperature for the optimum growth of UIW-10 were 6.0 and 35-40°C, respectively. It was found that addition of 0.5% yeast extract and 0.5 to 2.0% tryptone as nitrogen sources and the constant agitation at 150 to 200 rpm had a positive effect and the growth of UIW-10 was increased.

### Introduction

Hydrogen sulfide (H<sub>2</sub>S) is irritating and smelly compound with very low odor thresholds at 1 ppb. It is usually liberated in industrial processes. Biotreatments, especially biofiltration, has drawn great attention because of low cost and high removal efficiency. This study reported that mutant of thiosulfate oxidizing bacteria was tested for utilization of sulfur compound.

### Materials & methods

Sulfur oxidizing bacterium, *Thiobacillus* sp. IW used in this work was provided by Dr. Sung Hoon Park at Dept. of Chemical Engineering, Pusan University. The bacterium was cultured and maintained on TAM agar medium containing 50 mM thiosulfate, 30 mM ammonium phosphate buffer (pH 6 ~ 6.5) and 12 kinds of

mineral salts (2 mM, total) at 30°C.

### Results & discussion

The colony size of UIW-10 was found 2 ~ 3 times bigger in diameter than the parent strain on TAM medium (Table 1). Growth of UIW-10 in liquid medium supplemented with sulfides such as sulfur and sodium thiosulfate was also found 2-fold higher than the parent strain during 6 h culture (Fig. 1).

Table 1. The size of colonies on Thiosulfate-Agar Medium.

Strains	Average size of colonies (mm)
<i>Thiobacillus</i> sp. IW	3.0 ± 0.3
the mutant strain UIW-10	6.8 ± 0.4
the mutant strain UIW-15	6.5 ± 0.9

\*. The bacteria were cultured on TAM at 30°C for 6 days.

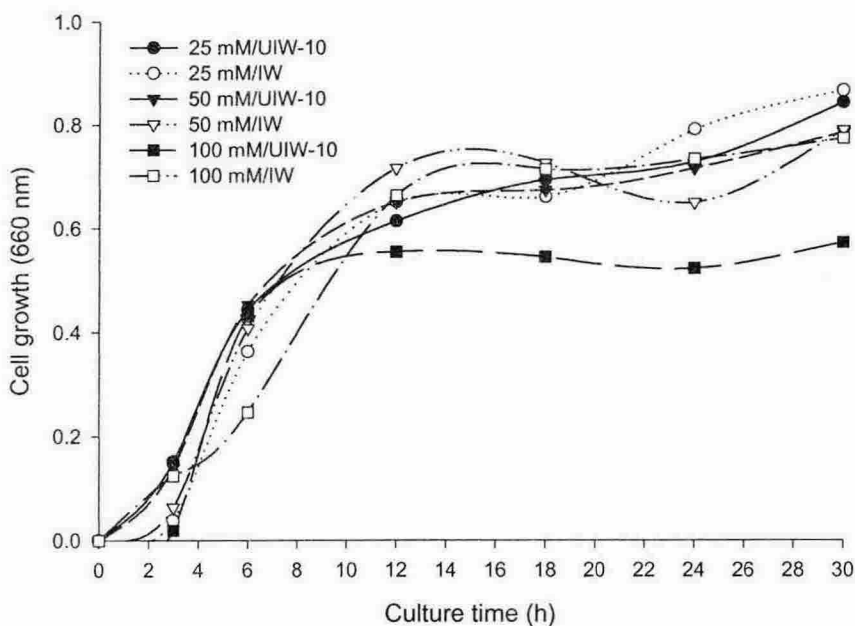


Fig. 1. Effect of sodium thiosulfate Cells were cultured at 30°C with 150 rpm on TAM medium.

### Conclusions

These results suggested that UIW-10 has the potential to be used as a H<sub>2</sub>S removal agent in biofiltration.

### References

1. Ying-Chien Chung et. al., Biological elimination of H<sub>2</sub>S and NH<sub>3</sub> from waste gases by biofilter packed with immobilized heterotrophic bacteria (2001). *Chemosphere* 43, 1043-1050.
2. Biological deodorization of hydrogen sulfide using porous lava as a carrier of *Thiobacillus thiooxidans* (2000), *J. Biosci. Bioeng.* 90, 25-31.