

Reduction of Mo (VI) by the bacterium *Serratia* sp. strain DRY5.

ABSTRACT

The need to isolate efficient heavy metal reducers for cost effective bioremediation strategy have resulted in the isolation of a potent molybdenum-reducing bacterium. The isolate was tentatively identified as *Serratia* sp. strain DRY5 based on the Biolog GN carbon utilization profiles and partial 16S rDNA molecular phylogeny. Strain DRY5 produced 2.3 times the amount of Mo-blue than *S. marcescens* strain Dr.Y6, 23 times more than *E. coli* K12 and 7 times more than *E. cloacae* strain 48. Strain DRY5 required 37 degrees C and pH 7.0 for optimum molybdenum reduction. Carbon sources such as sucrose, maltose, glucose and glycerol, supported cellular growth and molybdate reduction after 24 hr of static incubation. The most optimum carbon source that supported reduction was sucrose at 1.0% (w/v). Ammonium sulphate, ammonium chloride, glutamic acid, cysteine, and valine supported growth and molybdate reduction with ammonium sulphate as the optimum nitrogen source at 0.2% (w/v). Molybdate reduction was optimally supported by 30 mM molybdate. The optimum concentration of phosphate for molybdate reduction was 5 mM when molybdate concentration was fixed at 30 mM and molybdate reduction was totally inhibited at 100 mM phosphate. Mo-blue produced by this strain shows a unique characteristic absorption profile with a maximum peak at 865 nm and a shoulder at 700 nm, Dialysis tubing experiment showed that 95.42% of Mo-blue was found in the dialysis tubing suggesting that the molybdate reduction seen in this bacterium was catalyzed by enzyme(s). The characteristics of isolate DRY5 suggest that it would be useful in the bioremediation of molybdenum-containing waste.

Keyword: *Serratia* sp.; Molybdate-reduction; Molybdenum blue.