Mo (VI) reduction to molybdenum blue by Serratia marcescens strain Dr. Y9.

ABSTRACT

In this work we report on the isolation of a local molybdenum-reducing bacterium. The bacterium reduced molybdate or Mo(6+) to molybdenum blue (oxidation states between 5+ to 6+). Electron donors that supported cellular growth were sucrose, maltose, mannitol,fructose, glucose and starch (in decreasing order) with sucrose supporting formation of the highest amount of molybdenum blue at 10 g/l after 24 hours of static incubation. The optimum molybdate and phosphate concentrations that supported molybdate reduction were 20 and 5 mM, respectively. Molybdate reduction was optimal at 37∞C. The molybdenum blue produced from cellular reduction exhibited a unique absorption spectrum with a maximum peak at 865 nm and a shoulder at 700 nm. The isolate was tentatively identified as S. marcescens strain Dr.Y9 based on carbon utilization profiles using Biolog GN plates and partial 16S rDNA molecular phylogeny. No inhibition of molybdenum-reducing activity was seen using electron transport system (ETS) inhibitors such as antimycin A,1 HQNO (Hydro-xyquinoline-N-Oxide), sodium azide and cyanide suggesting that the ETS of this bacterium is not the site of molybdate reduction.

Keyword: Serratia marcescens; Molybdate-reduction; Molybdenum blue.