

Isolation and characterization of a molybdenum-reducing and SDS-degrading *Klebsiella oxytoca* strain Aft-7 and its bioremediation application in the environment

ABSTRACT

Pollution as a result of anthropogenic activities is a severe global issue. These activities including inappropriate disposal, industrial and prospecting activities and unnecessary use of agricultural chemicals have triggered international initiatives to eliminate these contaminants. In this work we screen the ability of a molybdenum-reducing bacterium isolated from contaminated soil to grow and reduce molybdenum on various detergents. The bacterium was able to grow on SDS as a carbon source although the compound did not support molybdenum reduction. The bacterium reduces molybdate to Mo-blue optimally between pH 5.8 and 6.3 and between 25 and 34°C. Glucose was the best electron donor for supporting molybdate reduction followed by sucrose, D-mannitol, D-sorbitol, lactose, salicin, trehalose, maltose and myo-Inositol in descending order. Other requirements include a phosphate concentration between 5.0 and 7.5 mM and a molybdate concentration between 5 and 20 mM. The absorption spectrum of the Mo-blue produced was similar to previous Mo-reducing bacterium, and closely resembles a reduced phosphomolybdate. Molybdenum reduction was inhibited by mercury (ii), silver (i) and copper (ii) at 2 ppm by 62.1, 33.9 and 33.6%, respectively. Biochemical analysis resulted in a tentative identification of the bacterium as *Klebsiella oxytoca* strain Aft-7. The ability of this bacterium to detoxify molybdenum and degrade detergent makes this bacterium an important tool for bioremediation.

Keyword: Bioremediation; Isolation; *Klebsiella oxytoca*; Molybdenum; SDS