

Isolation and characterization of a molybdenum-reducing and Orange G-decolorizing *Enterobacter* sp. strain Zeid-6 in soils from Sudan

ABSTRACT

Chemical toxins and organic contaminants such as hydrocarbons and dyes are major global contaminants with countless tones of those chemicals are created yearly with a significant amount release to the environment. In this work we screen the ability of a molybdenum-reducing bacterium isolated from contaminated soil to decolorize various azo and triphenyl methane dyes independent of molybdenum reduction. Biochemical analysis resulted in a tentative identification of the bacterium as *Enterobacter* sp. strain Zeid-6. The bacterium was able to decolorize the azo dye Orange G. The bacterium reduces molybdate to Mo-blue optimally at pH between 5.5 and 8.0 and temperatures of between 30 and 37 °C. Other requirements include a phosphate concentration of 5 mM and a molybdate concentration of 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 copper, lead, mercury and silver which showed 36.8, 16.9, 64.9 and 67.6% inhibition to Mo-reducing activity of *Enterobacter* sp. strain Zeid-6, respectively. The resultant molybdenum blue spectrum closely resembles the spectrum of molybdenum blue from the phosphate determination method. The ability of this bacterium to detoxify molybdenum and decolorize azo dye makes this bacterium an important tool for bioremediation.

Keyword: Bioremediation; Molybdenum-reducing bacterium; Molybdenum blue; Dye-decolorizing bacterium; *Enterobacter* sp.