IIOAB Journal, vol. 7 (1), 2016, pages 28-40

Isolation and characterization of a molybdenum-reducing and amide-degrading burkholderia SP. Strain neni-11 in soils from west sumatera, Indonesia

Abstract

A molybdenum-reducing bacterium isolated from contaminated soil was able to utilize acrylamide as the electron donor source, and was able utilize acrylamide, acetamide and propionamide for growth. Reduction was optimal at pH between 6.0 to 6.3, at temperatures of between 30 and 37 oC, glucose as the electron donor, phosphate at 5.0 mM, and sodium molybdate at 15 mM. The absorption spectrum of the Mo-blue indicates it is a reduced phosphomolybdate. Molybdenum reduction was inhibited by mercury (ii), silver (i) and chromium (vi) at 2 p.p.m. by 91.9, 82.7 and 17.4 %, respectively. Biochemical analysis resulted in a tentative identification of the bacterium as Burkholderia cepacia strain Neni-11. The growth of this bacterium modelled according to the modified Gompertz model. The growth parameters obtained were maximum specific growth rates of 1.241 d-1, 0.971 d-1, 0.85 d-1 for acrylamide, propionamide and acetamide, respectively, while the lag periods of 1.372 d, 1.562 and 1.639 d were observed for acrylamide, propionamide and acetamide, respectively. The ability of this bacterium to detoxify molybdenum and grown on toxic amides makes this bacterium an important tool for bioremediation.

Keywords

Acetamide; Acrylamide; Burkholderia sp; Molybdenum blue; Molybdenum reduction; Propionamide