

Isolation and characterisation of a molybdenum-reducing and Metanil Yellow dye-decolourising *Bacillus* sp. strain neni-10 in soils from West Sumatera, Indonesia

ABSTRACT

A molybdenum reducing bacterium with the novel ability to decolorise the azo dye Metanil Yellow is reported. Optimal conditions for molybdenum reduction were pH 6.3 and at 34°C. Glucose was the best electron donor. Another requirement includes a narrow phosphate concentration between 2.5 and 7.5 mM. A time profile of Mo-blue production shows a lag period of approximately 12 hours, a maximum amount of Mo-blue produced at a molybdate concentration of 20 mM, and a peak production at 52 h of incubation. The heavy metals mercury, silver, copper and chromium inhibited reduction by 91.9, 82.7, 45.5 and 17.4%, respectively. A complete decolourisation of the dye Metanil Yellow at 100 and 150 mg/L occurred at day three and day six of incubations, respectively. Higher concentrations show partial degradation, with an approximately 20% decolourisation observed at 400 mg/L. The bacterium is partially identified based on biochemical analysis as *Bacillus* sp. strain Neni-10. The absorption spectrum of the Mo-blue suggested the compound is a reduced phosphomolybdate. The isolation of this bacterium, which shows heavy metal reduction and dye-decolorising ability, is sought after, particularly for bioremediation.

Keyword: Molybdenum-reducing; Molybdenum blue; *Bacillus* sp.; Azo dye; Metanil Yellow