

## **Isolation and characterization of a molybdenum-reducing and azo-dye decolorizing *Serratia marcescens* strain Neni-1 from Indonesian soil**

### **ABSTRACT**

Heavy metals and organic xenobiotics including dyes are important industrial components with their usage amounting to the millions of tonnes yearly. Their presence in the environment is a serious pollution issue globally. Bioremediation of these pollutants using microbes with multiple detoxification capacity is constantly being sought. In this work we screen the ability of a molybdenum-reducing bacterium isolated from contaminated soil to decolorize various azo and triphenyl methane dyes. The bacterium reduces molybdate to molybdenum blue (Mo-blue) optimally at pH 6.0, and temperatures of between 25 and 40°C. Glucose was the best electron donor for supporting molybdate reduction followed by sucrose, trehalose, maltose, d-sorbitol, d-mannitol, d-mannose, myo-inositol, glycerol and salicin in descending order. Other requirements include a phosphate concentration of between 5.0 and 7.5 mM and a molybdate concentration between 10 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 copper, silver and mercury at 2 ppm by 43.8%, 42.3% and 41.7%, respectively. We screen for the ability of the bacterium to decolorize various dyes. The bacterium was able to decolorize the dye Congo Red. Biochemical analysis resulted in a tentative identification of the bacterium as *Serratia marcescens* strain Neni-1. The ability of this bacterium to detoxify molybdenum and decolorize azo dye makes this bacterium an important tool for bioremediation.

**Keyword:** Molybdenum; Bioremediation; Azo dye; Congo Red; Decolorization