

Isolation and characterization of a 2,4-dinitrophenol-degrading bacterium

ABSTRACT

2,4-dinitrophenol (2,4-DNP) is utilized in the production of wood preservatives, dyes, and also as a pesticide. Human acute (short-term) exposure to 2,4-DNP in humans by means of oral exposure are nausea or vomiting, sweating, headaches, dizziness, and weight reduction. Thus, the removal of this compound is highly sought. A 2,4-DNP-degrading bacterium (isolate 1) was isolated from a sample soil from Terengganu. This bacterium (isolate 1) was characterized as a rod Gram positive, non-sporulated, and non-motile bacterium. The bacterium is oxidase negative and had catalase positive activity and was able to grow aerobically on 2,4-dinitrophenol as the sole carbon source. This bacterium showed maximal growth on 2,4-DNP at the temperature optimum of 30 °C, pH 5.0 and was tolerant to 2,4-DNP concentration of up to 0.5 mM (0.092 g/L). This bacterium prefers to use urea as the nitrogen source in addition to yeast extract for mineral source and vitamin precursors.

Keyword: 2,4-dinitrophenol; 2,4-dinitrophenol-degrading bacterium; Bioremediation