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Isolation and characterization of mercury-resistant bacteria from industrial wastewater

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ABSTRACT

Mercury (Hg) is present in the environment due to the natural processes and from anthropogenic sources. The amount of Hg mobilized and released into biosphere has increased with the increase of industrial age. The aim of this study was to isolate and characterize the Hg-resistant strains from industrial wastewater of Penang, Malaysia, in terms of Hg processing and uptake ability. These bacterial isolates were designated as CZ1 and CZ2 after isolation. These were identified as *Acinetobacter junii* and *Pseudomonas stutzeri* on the basis of morphological, biochemical and 16S rDNA characterization. The optimum pH for *Acinetobacter junii* and *Pseudomonas stutzeri* was 7.0 and 8.0, respectively. The optimum temperature for both bacterial strains was 35°C. The growth patterns of both isolates were similar with control (without Hg stress) but greatly affected by Hg. Both strains were mostly resistant against antibiotics but sensitive against penicillin. The *Acinetobacter junii* and *Pseudomonas stutzeri* could remove the Hg up to 70% and 90%, respectively. The Hg bioaccumulation ability of *Acinetobacter junii* and *Pseudomonas stutzeri* was 76% and 90%. The Hg induced bands were observed with molecular weight of 28 kDa (*Pseudomonas stutzeri*) and 98 kDa (*Acinetobacter junii*). This study shows that these bacterial strains can be employed as an efficient bioremediation tool to recover and remove the Hg from industrial wastewater.

Keywords: Antibiotics; Bioaccumulation; Mercury; Resistance

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