ABSTRACT

Bioremediation strategy using bacteria isolated from Hg-contaminated environment has long been proposed as an alternative way to remove mercury pollutant in the environment because this is less expensive, effective and efficient to remove mercury. Hg-resistant bacteria have been isolated from water and tailing soil of a traditional gold mining sites called "Blue Lake" in Singkawang, West Borneo Province, Indonesia.The purposes of this study was to provide the first information of the diversity and Hg-bioremoval ability of mercury-resistant bacteria in the Hg-polluted sites of Singkawang that might be useful for developing bioremediation technology. This present studies revealed that eleven mercury-resistant bacteria were isolated from mercury-contaminated gold mining site in Singkawang. These bacteria were able to grow well at 10-70 ppm of $HgCl_2$, except strain BSDBi4, BSDBii1, and BSDBii2, which were able to grow at 500 ppm of $HgCl_2$. Three selected strains were identified based on the 16S rRNA gene sequence. Hg^{2+} bioremoval ability of three strains was also conducted in Nutrient Broth medium with addition of 684.23 ppm of $HgCl_2$ and monitored by mercury analyzer. BLAST result from the sequence showed that BSDBi4, BSDBii1 and BSDBii2 were closely related to *Bacillaceae* family and specifically identified as *Bacillus thuringiensis* strain SUB1, *Bacillus cereus* strain IHB B 197 and *Bacillus thuringiensis* strain pak2310, respectively. The bioremoval assay showed that *Bacillus thuringiensis* strain SUB1, *Bacillus cereus* strain IHB B 197 and *Bacillus thuringiensis* strain pak2310 removed 99.93%, 99.95% and 99.94% of the Hg^{2+} from the medium.

Keywords: *Bacillus*, bioremediation, bioremoval, Singkawang.