ABSTRACT

Resistant thermophilic strain was isolated from waste water and recognized as *Anoxybacillus rupiensis* on the basis of 16S rRNA gene sequence analysis. It was grown in LB media at 60°C with pH 7.0. It showed typical growth pattern except for the lag phase extended in the presence of copper because of resistance against metal. An efflux system plays an important role in pumping out of metal. Therefore, the effects of copper resistance have been thoroughly investigated. SEM and FT-IR were used to analyze changes in the surface macrostructure and functionality of this strain showing interaction with Cu^{2+}. The ability to adsorb and absorb Cu^{2+} inside their cells was evaluated by AAS, which showed that bacterial cell had the ability to adsorb 72% of the Cu^{2+} and absorb 28% Cu^{2+} inside them. Expression of copper resistant gene was quantified through PCR by adding primers. The result of purified PCR product demonstrated that copper resistant gene was functional. This is the first research to identify *copA* gene in thermophilic *A. rupiensis*. It is concluded that copper-resistant gene *copA* proving that bacteria could make much more efficient inoculum for remediation of copper in contaminated industrial waste water.

Key Words: Heavy metal resistance, copper sensor, copper resistant gene, bioremediation, efflux system