

ABSTRACT**INVESTIGATION OF SEPARATION AND PRECONCENTRATION OF SOME METAL IONS BY USING SOME THERMOPHILIC BACTERIA**

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In this study, a method has been developed for Cu^{2+} , Zn^{2+} , Cd^{2+} , Co^{2+} , Pb^{2+} and Ni^{2+} preconcentration by using columns packed with *Geobacillus stearothermophilus* DSMZ 22, *Geobacillus toebii* HBB 218, *Anoxybacillus puschionensis* HBB 246, *Geobacillus thermoglucosidasius* HBB 269 (thermophilic bacterial biomass) immobilized on silica gel. Thermophilic bacterial biomass immobilized on silica gel selectively accumulated analytes from water samples. Metal ions were determined by ICP-OES. The influences of analytical parameters including pH, amount of bacterial biomass, sample volume, eluent volume, type of eluent etc. on the quantitative recoveries of analytes were investigated. The effects of some alkaline, alkaline earth and some metal ions on the recoveries of analytes were also examined. Optimum pH values for the biosorption of Cu^{2+} , Zn^{2+} and Pb^{2+} were 6 and optimum pH values for Cd^{2+} , Co^{2+} and Ni^{2+} were 8. 10 mL of 1 M HCl solution for Cu^{2+} , Zn^{2+} , Cd^{2+} , Co^{2+} , Pb^{2+} and 10 mL of 1 M HNO_3 solution for Ni^{2+} were found to be satisfactory for the quantitative elution. The recoveries of Cu^{2+} , Zn^{2+} , Cd^{2+} , Co^{2+} , Pb^{2+} and Ni^{2+} ions were ranged from 94.6 to 103.1% under the optimum experimental conditions. In order to validate the accuracy of the method for determination of Cu^{2+} , Zn^{2+} , Cd^{2+} , Co^{2+} , Pb^{2+} and Ni^{2+} ions, certified reference material (sewage sludge-BCR 146-R) was used. The determined values were in good agreement with the certified values. Proposed separation and preconcentration method was applied to spring, tap and river water samples. The recoveries of Cu^{2+} , Zn^{2+} , Cd^{2+} , Co^{2+} , Pb^{2+} and Ni^{2+} added to water samples were in between 95.9-105.7, 85.8-106.3, 96.0-103.5, 93.6-105.2, 92.5-99.6 and 97.4-103.0%, respectively.

Key words: Preconcentration, separation, thermophilic bacterium, biosorption, immobilization, ICP-OES