Keywords: *einococcus radiodurans*; Biosorption; Fourier Transform Infrared; X-ray powder di raction; Transmission electron microscope

Introduction

Bioremediation is a natural process which depends on bacteria, fungi, and plants to alternating pollutants as these organisms carry out their normal life functions. us, bioremediation o ers a substitute tool to destroy or reduce the harmful pollutants through biological activity with an e ective cost. In the early 1980s, certain microorganisms were found to accumulate metallic elements at a high capacity [1,2].

ere are a lot of studies about the bioremediation ability of . *radiodurans* and its genetic engineering, for cleaning up heavy metals in nuclear waste contaminated sites [3-7]. e development of bioremediation strategies using *einococcus* spp is therefore vital for the cleanup of contaminated site with radioactive waste. Additional advantages of deinococci are that they are vegetative, easily cultured, and nonpathogenic. As these sites rarely contaminated by a single chemical, it is necessary to bio remediating strain to be multi resistant to various toxic agents. e present work describes the use of a combination of spectroscopic and microscopic methods to characterize the heavy metals around the cells of bacterial strains isolated from extreme habitats as well as to elucidate the interaction mechanisms of these bacteria with these metals.

Materials and Methods

Source of bacterial isolate

e tested isolates, . *radiodurans* used in this study was isolated

selecting the silver section, picking up sections with a grid, then drying with lter paper. Finally the sections were stained with Uranyal acetate for 15 min, and washed by double distilled water. Lead sections were stained for 10 min, washed twice with distilled water. is analysis was done in the Electron Microscope Laboratory, Institute of Bioscience, University Putra Malaysia.

Results and Discussion

FT-IR

One of the most important characteristics of a biosorbent is the presence of its surface functional groups, which are largely characterized by the FTIR spectroscopy method. is technique can only provide a qualitative description for biosorbent functional groups. e studies of FTIR spectra on *einococcus* provided the basis to interpret the results with *ucus vesiculosus* [8], as shown in Figure 1 there was a shi in the bands corresponding to carboxyl (COOH) groups a er the biosorption process. Following metal binding, the asymmetric carboxyl stretching band shi ed from 1630 to 1636 and 1632 Cm^{-1} for Cd and Pb respectively [9], and there was an increase in the distance between this band and the symmetric stretching of the same groups at 1418 Cm^{-1}, to lower wave numbers a er biosorption, indicating that chelating complexes were formed [10,11]. erefore, chelation was another important mechanism involved in the biosorption of Cd and Pb with *einococcus*; as reported by Sheng et al. [12] for *Sargassum* with FTIR

acetate. Figure 3a shows the cells of . *radiodurans* before interaction

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