

**REMOVAL OF LEAD AND CADMIUM FROM AQUEOUS
SOLUTION USING BANANA PEEL POWDER**

RAJA NURAIN IZZAH BINTI RAJA ZUBAIREI

**BACHELOR OF SCIENCE (Hons.) BIOLOGY
FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA**

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This Final Year Project Report entitled “**Removal of Lead and Cadmium from Aqueous Solution Using Banana Peel Powder**” was submitted by Raja Nurain Izzah binti Raja Zubairei in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Biology, in the Faculty of Applied Science, and was approved by

Dr Nur Maisarah binti Sarizan

Supervisor

B. Sc. (Hons.) Biology

Faculty of Applied Science

Universiti Teknologi MARA

02600 Arau

Perlis

Mr. Muhammad Syukri bin Noor Azman

Project Coordinator

B. Sc. (Hons.) Biology

Faculty of Applied Science

Universiti Teknologi MARA

02600 Arau

Perlis

Dr Rosyaini Afindi Zaman

Head of Programme

B. Sc. (Hons.) Biology

Faculty of Applied Science

Universiti Teknologi MARA

02600 Arau

Perlis

Date: _____

ABSTRACT

REMOVAL OF LEAD AND CADMIUM FROM AQUEOUS SOLUTION USING BANANA PEEL POWDER

Water contamination due to excessive discharge of heavy metals that comes from rapid industrialization and agriculture-based waste management problems has become a global issue that can affect human health and the environment. Banana peels which is one of the agriculture-based waste can be seen as a potential alternative material for the biosorption of heavy metals in contaminated water due to its cellulose, hemicellulose, pectin, and lignin, as well as functional groups such as carboxyl, hydroxyl, and amine that helps in biosorption process. In this present study, the ability of banana peel powder to remove heavy metals lead (Pb) and cadmium (Cd) from a solution was determined, as well as the effect of biosorbent dosage (0.25, 0.50, 0.75, and 1.00 g of banana peel powder) on heavy metal removal. In this work, heavy metal ions (Pb^{2+} and Cd^{2+}) was removed using banana peel powder via an adsorption procedure, and the biosorption capacity (mg/g) was analysed using Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES) whereas Langmuir and Freundlich's adsorption isotherm model were utilized for data analysis. Langmuir monolayer coverage reveals that 1 g of banana peel powder can adsorb 0.023 mg of Pb^{2+} and 0.025 mg of Cd^{2+} and the biosorption process using banana peels powder is favourable for the removal Pb^{2+} and Cd^{2+} . Maximum removal of metal ions for lead and cadmium (100 ppm) was found at 98.1% and 90.1% for the dose of 0.75 g banana peel powder. The current study suggests that large volume of banana peel waste can be applied to treat the Pb and Cd contaminated water after observing its excellent adsorption performance. In addition, the waste management issue can be resolved in an environmentally responsible manner by utilizing it for the removal of heavy metals from wastewater.

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