

Investigating the Potential of Withered Leaves as Adsorbents of Heavy Metal Ions

— *Darryl Chai Min Shen, Shawn Tan Cheng Yue, Daniel Ong Hong Yu*

This study aims to investigate the effectiveness of withered leaves, specifically Khaya leaves, in the adsorption of three heavy metal ions, cadmium(II), lead (II) and chromium(VI), and whether chemical modification can enhance the adsorption of these metal ions. Chemical modification was carried out by treating the withered leaves with dilute hydrochloric acid, dilute sodium hydroxide and isopropanol. Further study on the optimum combination of conditions (e.g. pH) which can maximise the adsorption ability of the withered Khaya leaves was also carried out. Adsorption studies were carried out by stirring 1.0 g of leaves with 50 ml of solution containing 50 ppm of each metal ion for 90 minutes. Results show that untreated and all types of chemically modified leaves were able to remove lead (II) ions effectively. Leaves treated with sodium hydroxide were most effective in removing cadmium(II) ions while leaves treated with hydrochloric acid were most effective in removing chromium(VI). Adsorption of all the metal ions by the withered leaves is affected by changes in pH. Adsorption of lead(II) and cadmium(II) ions by the Khaya leaves is most effective at pH 6 and pH 4 and least at pH 2 while for chromium (VI), greatest adsorption occurred at pH 2. Withered leaves from Khaya tree has the potential to be used as metal ion adsorbents in industry to remove toxic metal ions.