Development of Equipment Made from Biodegradable Waste for Treatment of Lead-Contaminated Wastewater

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Wastewater contaminated with heavy metals from the industries is an environmental concern in an urbanizing world. Lead (Pb) is hazardous waste commonly found in electronic factories. As Thailand is one of the largest electronic assembly bases in Southeast Asia, we have waste management problem for Lead. Lead treatment generally use costly chemical-based processes with unwanted secondary pollution. Therefore, we aim to treat this hazardous waste based on eco-friendly equipment and zero waste product. This study aims to develop effective equipment for lead detection. Natural, biodegradable wastes were used for implement of the equipment and lead adsorbent capability was investigated. The waste (leonardite, egg shells, or rice hull ash) was mixed and heated with binding material. The amount of 500-g of each mixture was then used in design and implementation of a filter unit. The equipment was tested for lead absorption with the standard solutions of lead. The result showed the filters derived from these materials can absorb lead with the rates of 91.20%, 90.60% and 91.60%, respectively. The filter units were further used in treating 2.16-ppm lead-contaminated wastewater caused by factories in Thailand Northern Industrial Estates. After the treatment, the remaining lead concentration in the wastewater was 0.34, 0.39, and 0.34 ppm, respectively, which are below the standard value (0.5 ppm) of wastewater allowable for release to natural environment. The findings indicate that the filter unit made from wasted materials is low cost and can be used for effective wastewater treatment in the actual polluted environment.

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