UNIVERSITI TEKNOLOGI MARA

LEAD AND CADMIUM CONCENTRATION IN SWEET POTATOES AND POTENTIAL RISK TO HUMAN HEALTH

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Project paper submitted in partial fulfillment of the requirements for the degree of Bachelor in Environmental Health and Safety (Hons.)

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Declaration by Student

Project entitled Lead and Cadmium Concentration in Sweet Potatoes and Potential Risk to Human Health is a presentation of my original research work. Wherever contributions of others are involved, every effort is made to indicate this clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of Associate Professor Hazilia Binti Hussain as Project Supervisor and and Miss Siti Rohana binti Mohd Yatim as Co-supervisor. It has been submitted to the Faculty of Health Sciences in partial fulfillment of the requirement for the Degree of Bachelor in Environmental Health and Safety (Hons).

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Abstract

Lead and Cadmium Concentration in Sweet Potatoes and Potential Risk to Human Health

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Ingestion of sweet potatoes (*Ipomoea batatas* L.) contaminated by high concentrations of lead and cadmium has been suggested as possible risk to human health. Cadmium and Lead are the heavy metals of greatest concern to human health because plant can introduce them into the human food chain. Cadmium may accumulate in the human body and induce kidney disfunction, and reproductive deficiency. Lead causes liver and central nervous system dysfunction and is classified by the U.S. EPA as a probable human carcinogen. The study was conducted in two ex-mining lands located at Bemban in Batu Gajah, Perak Darul Ridzuan. This study is cross-sectional study. Sampling technique for sweet potatoes and respondents is simplified random sampling and data were collected by questionnaire and interview. Graphite Furnace Atomic Absorption Spectrophotometer (GFAAS) was used to analyzed lead and cadmium in sweet potato samples (n=30) by dry- ashing method. A statistical analysis that is statistical package for the social science (SPSS) version 17.0 was used in this study. The study showed that lead concentrations in sweet potatoes grown with both different water sources were exceeding the maximum permitted proportion under Food Act 1983 and Food Regulations 1985. However, the cadmium concentrations in sweet potatoes were below the standard. There was significance difference (p-value<0.05, p=0.001) of mean lead concentrations in sweet potatoes grown with water sources from ex-mining lake and water pipe. There was significance difference (p-value<0.05, p=<0.001) of mean cadmium concentrations in sweet potatoes grown with water sources from ex-mining lake and water pipe. Mean Hazard index for dietary exposure of cadmium in sweet potatoes was 0.37 (HI < 1) which is less than 1. However, there was significant association between high cadmium exposure and health risk (p-value<0.05). As a conclusion, lead was present in sweet potatoes in high concentration while cadmium was present in sweet potatoes in low concentration. There was significant difference of lead and cadmium concentrations between sweet potatoes grown with water sources from ex-mining pond and water pipe. There was also potential health risk associated with cadmium dietary exposure. It is suggested that regular monitoring regarding the heavy metal contamination should be encouraged as vegetables are the main sources of food to avoid possible consumption of contaminated vegetable food stuffs.

Keywords: Lead, Cadmium, GFAAS, Hazard Index