UNIVERSITI TEKNOLOGI MARA

HEAVY METALS CONTAMINATION IN AN AGRICULTURAL SOIL OF A PADDY CULTIVATION AREA IN TANJUNG KARANG AND POTENTIAL HEALTH RISK

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

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Declaration by Student

Project entitled "Heavy Metals Contamination In An Agricultural Soil Of A Paddy Cultivation Area In Tanjung Karang And Potential Health Risk" is a presentation of my original research work. Whenever contributons of others are involved, every effort is made to indicate this clearly, with due reference to literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of Project Supervisor Assoc. Prof. Hazilia Hussain. It has been submitted to the Faculty of Health Sciences in partial fulfilment of the requirement for the Degree of Bachelor in Environmental Health and Safety (Hons).

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ABSTRACT

HEAVY METALS CONTAMINATION IN AN AGRICULTURAL SOIL OF A PADDY CULTIVATION AREA IN TANJUNG KARANG AND POTENTIAL HEALTH RISK

by

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Heavy metals sources generally comes from natural occurrence, as it is derived from the parent materials and from human activities (anthropogenic sources). Children have become the serious subject for ingestion of heavy metals from soils as consumption of contaminated soils could pose adverse health effects. In this study, total of 108 samples were taken at 6 different sampling points. All the composite soil samples were dried in oven at temperature 65^0c for 24 hours. Acid digestion has then carried out. The samples was transferred into vial for analysis by Graphite Flame Atomic Absorption Spectrophotometer. Location 3 contain the highest cadmium levels and exceed the permissible standard. Location 3 have the highest increase in the amount of concentration from 0.045 to 0.7 mg/kg, maybe due to excessive application of fertilizers and pesticides resulting in presence of heavy metals from the inorganic materials, affecting the accumulation rate to be high throughout the 120 sampling days. There are significant differences between the heavy metals concentration in all 6 different locations and all parameters. The statistical analysis using Kruskal –Wallis Test showed there is significant differences in mean for the accumulation of heavy metals concentration for both cadmium and copper with the p value of 0.000 (P-value < 0.05, P=0.001). As data entry is not normal, One-Way ANOVA test was carried out and showed there are significant differences of mean in the accumulation of heavy metals concentration for both lead and zinc with the p value of 0.000 (P-value<0.05, P=0.001). From the result, the hazard index for location 1 is 7.76 $x10^{-4}$, which indicate that the result is less than 1 (< 1). Location 4 have the highest hazard index with the result of 4.64 $x10^{-3}$, but still it is less than 1 (< 1). For location 1, it have the lowest hazard index with 7.76 $x10^{-4}$ and absolutely indicate that it is less than 1. Lead have the perfect correlation coefficient between all parameters with 70% correlation (0.732 Pearson Correlation) while zinc have the weakest correlation with 30% correlation (0.371 Pearson Correlation). It is recommended that the heavy metal content in the agriculture soil must be monitored from time to time to ensure that the heavy metals concentration in the soils does not continuously accumulate and exceed the permissible limit.

Keywords: Heavy metals, soil ingestion, accumulation, fertilizers and pesticides, acid digestion