UNIVERSITI TEKNOLOGI MARA

HEAVY METALS IN TEA AND ITS POTENTIAL HEALTH EFFECT

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Project paper submitted in partial fulfillment of the requirements

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Bachelor in Environmental Health and Safety (Hons.)

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Declaration by Student

Project entitled "Determination of Lead, Cadmium and Copper Concentration in Tea and its Potential Health Effect on Human" 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 Tn. Hj. Hashim Bin Ahmad as Project 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

Heavy Metals in Tea and its Potential Health Effect

Yasmin Binti Azimee

Consumption of tea is booming because of its multiple health- promoting effects. During the growth period of the tea plant and during tea processing, tea itself can be contaminated by heavy metals, which might increase the metal body burden in humans. This study was conducted to determine the concentration of Lead, cadmium and copper in the tea products, to compare the concentration of heavy metal present from different country of origin, to compare the concentration of lead, cadmium and copper present with the permissible level for local and international food regulation and to estimate the potential health risk. Sixty samples representing 30 local (n=30) and 30 imported (n=30) were purchase from various supermarket, convenient store and pharmacy located at Selangor district. All samples were treated using acid digestion method and concentration of lead, cadmium and copper were determined by using Atomic Absorption Spectroscopy (AAS). Distribution of questionnaire and Health Risk Assessment (HRA) method were also used for data collection. Data obtain were analyse using statistical analysis of social science (SPSS) version 17.0. The mean concentration of Pb in local tea samples is 1.8892 mg/kg while mean concentration of Pb in imported tea samples is 1.9008 mg/kg. For Cd, the mean concentration in local tea product is 0.4842 mg/kg and in imported product is 0.0592 mg/kg. The mean concentration of Cu in local tea samples is 8.04667 mg/kg and in imported products is 8.54750 mg/kg. The mean different for Pb, Cd and Cu concentration between local and import product are statistically no significant different with $p > 0.05$. For the Risk Assessment (RA) calculated, it shows that the Hazard Index (HI) value for Pb, Cd and Cu is less than 1 ($HI<1$). As a conclusion, the mean concentration of Pb and Cd comply with the maximum permitted proportion of metal contaminant in specific food, Regulation 38 of Food Regulation 1985. For Cu the mean concentration is far below the permissible limits set by Chinese Ministry of Health which is 60mg/kg. As the HI value calculated, it is found to be below 1, indicating no non-carcinogenic risks from consumption of the tea. However, there is a potential health risk to occur in the future for consumption of tea product that contain Pb, Cd and Cu as heavy metal have high tendency to accumulate in tea leaves and other part of tea through uptake from soil and other route due to environmental pollution.

Keyword: Tea, lead, cadmium, copper, health risk assessment