

UNIVERSITI TEKNOLOGI MARA

**HEAVY METAL CONTAMINATION IN LEAFY
VEGETABLES AND HEALTH RISK ASSESSMENT**

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Declaration by Student

Project entitled "Heavy Metal Contamination in Leafy Vegetables and Health Risk Assessment" 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 discussion. The project was done under the guidance of Mr. Nasaruddin bin Abd Rahman as Project Supervisor and Madam Nadiatul Syima Mohd Shahid 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

Heavy Metal Contamination in Leafy Vegetables and Health Risk Assessment

NORFARAZATUL SAHRINA BOLHASSAN

Introduction: Vegetables are needed in human diet and high consumed by Malaysian. However, vegetables may contain both essential and toxic elements, such as heavy metals, at a wide range of concentrations. Consumption of toxic heavy metals in unsafe concentrations through vegetables may lead to accumulation of these metals in human body and cause health effects. This study was carried to determine level of heavy metal in edible leafy vegetables and compare between two different farms which are Klang and Kuala Selangor.

Methodology: The design of this study is a cross sectional comparative study and was conducted at two different vegetables farm in Selangor which are in Klang and Kuala Selangor district. There are five different types of leafy vegetables for each farm. Six sample of each type of vegetables was collected to represent the total area of the farm. Soil sample was collected to be analyzed. The samples were analyzed using Atomic Absorption Spectrophotometer (AAS). Data of vegetable consumption was gathered using questionnaire based on Food Frequency Questionnaire (FFQ). All the data and result was analyzed using Microsoft Office Excel 2007 and Statistical Package Social Science.

Results: The results show that for Klang area, levels of Cadmium is ranged from 0.101 mg/kg to 0.365 mg/kg in vegetable, while 1.631 to 2.367 mg/kg in soil sample. The level of copper in vegetables ranged from 0.255 to 3.047 mg/kg while 39.467 to 40.473 mg/kg in soil. For Kuala Selangor area, level of Cadmium is ranged from 0.001 to 0.02 in vegetables, 0.733 to 0.882 in soil. While for copper, the levels in ranged from 0.194 to 1.423 mg/kg in vegetables and 36 to 39.233 mg/kg in soil. The level of heavy metals is higher in Klang compare to Kuala Selangor and there is significant difference of heavy metal concentration in different types of vegetables. Furthermore, it was found that higher concentration of heavy metals related to low pH in soil since p-value is < 0.05.

Conclusion: In conclusion, based on health risk assessment done, all type of leafy vegetables were safe to consume because there is no concern on the carcinogenic effect of heavy metal being consumed since exposure is low.

Keywords: Heavy metal, Leafy Vegetables, Tolerable Daily Intake