UNIVERSITI TEKNOLOGI MARA

HEAVY METALS CONTAMINATION IN CANNED TOMATO PASTE AND THEIR RISK TO HUMAN HEALTH

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

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DECLARATION BY STUDENT

Project entitled "Heavy Metals Contamination in Canned Tomato Paste and Their Risk To Human Health" is a presentation of my original research work. Whenever contributions 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, Prof. Madya Rodziah binti Ismail. 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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In the name of Allah, The Most Gracious, The Most Merciful.

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ABSTRACT

This study was carried out to determine the heavy metals concentrations such as copper, iron, cadmium, lead and zinc in canned tomato paste. Since the contaminations of heavy metals are ubiquitous, this study was urged to determine the concentrations of heavy metals in canned tomato paste. The results from this study were compared with permissible limits as provided in the fourteenth schedule of Food Regulations 1985 and other international standard. The health risk assessments also had been calculated to estimate the potential health risk of consumption of canned tomato paste among the consumer. This study was a cross-sectional study. Thirty samples of various brands of canned tomato paste were purchased. The samples were duplicated and undergone acid digestion techniques for sample preparation. Subsequently, the samples were analysed by using Atomic Absorption Spectrophotometer (AAS) Perkin Elmer. One hundred and eight questionnaires were distributed and interviewed had been carried out to obtain the age, weight, consumption rate and frequency of product consumption to determine the health risk assessment. The result of heavy metals concentrations were then analysed by using Oneway Analysis of Variance (ANOVA) test of SPSS version 21 in the assessment of variation in heavy metal concentrations among canned tomato paste of the same brand and across tomato paste of different brands. From sample analysis, the concentrations of iron were within the range of 0.111 to 0.455 mg/kg. Zinc, copper, lead and cadmium were ranged from 0.140 to 0.369 mg/kg, 0.106 to 0.179 mg/kg, 0.031 to 0.120 mg/kg and 0.000 to 0.010 mg/kg, respectively. The results were compared with their standard limits and all were below the limits. The health risk assessment was conducted for one hundred and eight respondents and the Hazard Index (HI) obtained were below 1.0 (HI <1). In conclusion, the concentrations of heavy metals in canned tomato paste were generally low and below the permissible limit as provided in Food Regulations 1985 and FAO/WHO Food Standard (Codex Alimentarius).However, it is advisable to reduce the consumption of processed food since the heavy metals are present in canned food even though the health index shows that the concentrations of heavy metals in canned tomato paste were safe for human consumption.

Keywords: Copper, Iron, Cadmium, Lead, Zinc, Canned Tomato Paste