UNIVERSITY TEKNOLOGI MARA

ASSESSMENT OF HEAVY METAL UPTAKE BY *Cosmos Caudatus* CULTIVATED ON SEWAGE SLUDGE

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DECLERATION OF STUDENT

Study entitled " Assessment of heavy metal uptake by *Cosmos Caudatus* cultivated on sewage sludge" is my original research work. Wherever contributions of others are involved, every effort is made to indicate this clearly, with due reference to the literature, acknowledgement and discussion. This study was done under the supervision by Mr.Ahmad Razali bin Ishak as my research 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).

Signature,

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TABLE OF CONTENT

ABSTRACT

Vegetables are important to our body as it contain lots of essential nutrients. Nevertheless, vegetables may contain both essential and toxic elements at a wide range of concentrations. These toxic elements namely heavy metals if ingested at unsafe concentration may lead to chronic and acute health effects. The general objective of this study is to assess heavy metals uptake by *cosmos caudatus* cultivated on sewage sludge. While the specific objective is to assess the heavy metals (lead, cadmium and chromium) in sewage sludge, to compare the heavy metals concentration in *Cosmos Caudatus* grown on sludge and top soil, and to estimate potential health risk of consumption of *Cosmos Caudatus*. This study designed for comparative cross-sectional study and data were collected from the sludge analysis and *cosmos caudatus* grown on it. The sample is analyzed using Atomic Absorption Spectrophotometer (AAS) to identify the heavy metals content. Besides, Microsoft Office Excel 2007 and statistical Package Social Science (SPSS) were used as a tool to interpret the data from the AAS readings. The result of the sludge and soil analysis represent the composition of the heavy metal content such as lead (Pb), Chromium (Cr) and Cadmium (Cd).The mean concentration of the heavy metals were from sludge sample is lead (Pb=0.031 mg/g), Chromium (Cr=0.023 mg/g), and Cadmium (Cd=0.001 mg/g), while the concentration in top soil is, Lead (Pb=0.006 mg/g), Chromium (Cr= 0.010 mg/g) and Cadmium (Cd=-0.001mg/g). Through this analysis the concentration level of heavy metals in sludge is higher than in top soil. Next, the analysis of heavy metals uptake by *Cosmos Caudatus* cultivated on sludge represent the result as follow, Lead (Pb= 0.0250mg/g), Cadmium (Cd=0.0004 mg/g) and Chromium (Cr=0.0185 mg/g) while cultivated in the top soil are lead (Pb=0.0143 mg/g), Cadmium (Cd=-0.0015 mg/g) and Chromium (Cr=0.0093 mg/g). There is a significant difference ($P<0.05$) between grown on sludge and top soil where the concentration of heavy metals from *Cosmos Caudatus* cultivated in sludge is higher than in top soil. In addition, there is a significant difference between mean concentration of sludge and top soil with the *Cosmos Caudatus* grown on them. The health risk assessment found that both grown on sludge and top soil estimated to male group and female is considered safe to be consuming according to the hazard index which is less than one (1).

Key words: Sewage sludge, Heavy metals, Atomic Absorption Spectrophotometer (AAS), and Health Risk Assessment