UNIVERSITI TEKNOLOGI MARA

ASSESSMENT OF HEAVY METAL CONTENT DURING COMPOSTING OF PALM OIL EMPTY FRUIT BUNCHES COMPOST FERTILIZER

NAZIHAH BINTI BADOR

Project submitted in fulfillment of the requirements for
the degree of
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(Hons.)

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DECLARATION BY STUDENT

Project entitled "Assessment of Heavy Metal Content during Composting of Palm Oil Empty Fruit Bunches Compost Fertilizer" 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, Puan Siti Rohana Binti Mohd Yatim. 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).

Student's signature:

.....

(Nazihah Binti Bador)

2013840148

941028-06-5370

Date: ……

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In the name of Allah, The Most Gracious, The Most Merciful.

Assalamualaikum and Alhamdulillah, all praise to Allah S.W.T The Supreme Lord of the Universe. Peace and blessing to Nabi Muhammad S.A.W., all prophets and their families. I praise Allah S.W.T. for the strength and His blessings in completing my study.

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ABSTRACT

Composting of the empty fruit bunch (EFB) and the palm oil mill effluent (POME) is one of the option to treat the abundance of palm oil wastes in an economically way. The presence of heavy metals in compost fertilizer can be the main cause of adverse effects on animal and human health by transmitting through the food chain from the soil, groundwater, and plants. The main objective of this study is to determine the presence of heavy metals in palm oil mill effluent (POME) and palm oil empty fruit bunches (EFB) composts fertilizer. This study was conducted at Minsawi Vata Biofertiliser Sdn Bhd, a composting plant located in Kuala Kangsar, Perak, Malaysia. A 2 kg of EFB samples were collected at different locations of the windrow, bottom, core and surface. The compost samples were collected by using composite sampling method. POME samples were obtained from a pond that store POME to be sprayed directly onto the composting materials. For POME samples, three bottles of samples are collected for laboratory analysis. The heavy metal in EFB and POME samples were analyzed by using Atomic Absorption Spectrometer (AAS). All the heavy metals (Pb, Ni, Cu, Cd, and Zn) were detected in POME but no Pb and Cu detected in EFB samples. The level of heavy metals Ni, Zn and Cd was varying from day 1, day 20, day 30 and day 45. There were statistical significant difference of Nickel and Zinc concentration throughout the composting process. As a conclusion, very low concentrations of heavy metals were detected in the final compost. The EFB compost fertilizer can be suitable to be used as fertilizer for the oil palm plantation or as a soil amendment.

Keyword: *EFB; empty fruit bunch; POME; palm oil mill effluent; composting; heavy metal*