UNIVERSITI TEKNOLOGI MARA

ACCUMULATION OF CU, ZN, AND FE IN SOIL IRRIGATED WITH INDUSTRIAL WASTEWATER AND ITS EFFECT ON GROWTH OF PAK CHOI (*BRASICA RAPA VAR CHINENSIS*)

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DECLARATION BY STUDENT

Project entitled "Accumulation of Cu, Zn, and Fe in soil irrigated with industrial wastewater and its effect on growth of pak choi (*Brasica rapa var chinensis*)" 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, Dr. Shantakumari Rajan. 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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ABSTRACT

Introduction: Reuse of wastewater for irrigation can benefit the soil and crops as it contain nutrients that necessary for plant growth and it may also harm the soil and plant quality as the wastewater contain too much constituent that may exceed the plant need and accumulation of heavy metals may occur. **Objectives**: The objective of this study was to investigate the accumulation of selected heavy metal (Cu, Zn, and Fe) in soil irrigated with different concentration of tempeh wastewater and its effect on germination of Pak Choi (*Brasica rapa var chinensis)*. **Methods**: 30 nursery polybags were sown with 5 seeds of Pak Choi. The polybags than randomly separated into 5 sets with 6 polybags each sets. The five sets than irrigate with different concentration of tempeh wastewater which label as T1 (0%), T2 (25%), T3 (50%), T4 (75%), and T5 (100%) respectively. Sample of soil were than taken after 5 weeks and analysed for selected heavy metal while the crop analysed for germination percentage and fresh weight than the result being compared for each concentration. **Result**: Selected heavy metal found to accumulate in all soil samples. Accumulation of heavy metal in soil samples sequences are Fe > Zn > Cu. Analyzing the data using Tukey test showed that irrigation with tempeh wastewater really does have an effect in accumulation of Cu, Zn, and Fe with p-value < 0.05. Germination percentage for Pak Choi was almost 97% in T1 that act as control and range between 70 - 87% in soil irrigated with wastewater. Fresh weight of Pak Choi treated with T1 was heavier followed by T2 compared to other treatment. Although T5 seeds germinate first, the mean of Pak Choi weight treated with T5 much lower than T1 and T2. While T3 and T4 treatment shows the lowest weight of Pak Choi. **Conclusion**: Study on Pak Choi irrigate with tempeh wastewater resulted that this crops cannot cope very well with the amount of nutrient and pollutant contain in the water as the leaf and steam does not develop well in effluent irrigation. Appropriate wastewater treatments have to be done to remove excessive nutrient which could be hazard to vegetable production and environment.

Keyword: *Heavy metals, accumulation, soil, wastewater, reuse*