

UNIVERSITI TEKNOLOGI MARA

**HEAVY METAL CONCENTRATIONS IN
ASIAN SWAMP EEL (*Monopterus albus*),
GOLDEN APPLE SNAIL (*Pomacea canaliculate*)
AND PADDY GRAINS (*Oryza sativa*) FROM A
PADDY FIELD IN SABAK BERNAM**

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

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ABSTRACT

Living organisms require adequate amounts of heavy metals to support their bodies, however, excessive intake of heavy metals can cause adverse health effect to them which rose concerning issues regarding heavy metal contamination. In paddy cultivation, excessive application of fertilizer and pesticide may affect the concentration of heavy metal present in the environment and also in the organism present. This study was conducted to determine the concentration of heavy metal in organisms of interest which was Asian swamp eel, golden apple snail and rice grain. Another objective was also to estimate the possible health risk due to consumption of contaminated organism. Samples of water, soil and organism of interest were collected and analyzed for it content of heavy metal. The findings from this study showed that Asian swamp eels, golden apple snails and rice grains collected was contaminated with heavy metals where overall the highest metal contaminated the organisms was Fe and the opposite was Cd, the trend was $Fe > Zn > Cu > Cd$. For the estimated potential health risk to the consumer of contaminated food, the THQ level for each organism was calculated and resulted as THQ for Asian swamp eel and rice grain exceeding the safe level ($THQ > 1$) and only golden apple snail has the safe value for consumption ($THQ < 1$). Overall, it is recommended not to consume Asian swamp eel every day and a constant monitoring of pollution in Sabak Bernam paddy area need to be conducted since the organisms studied have posed the potential health risk to the consumers.

Keywords: *Heavy metal contamination, paddy field, Asian swamp eel, golden apple snail, rice grain, target health quotient*

CHAPTER 1

INTRODUCTION

1.1 Background

In Malaysia, paddy fields are typically found on Peninsular Malaysia in most of its regions. The most scenic paddy fields are located in Northern Malaysia, in Kedah, Perlis and Penang almost covering these states. Paddy fields also can be found on Malaysia's eastern coast region mainly in Kelantan and Terengganu, and also in Selangor especially in districts of Kuala Selangor and Sabak Bernam.

For domestic paddy production, paddy cultivation in Selangor is classified as Integrated Agricultural Development Area (IADA) Barat Laut Selangor (BLS) which produces 8.1% , the fourth largest paddy production in Malaysia (Omar, Shaharudin, & Tumin, 2019). It shows that paddy cultivation in Selangor have been started for a long period until now. It shows that the long exposure of fertilizer in the paddy cultivation area. The fertilizer management is a major consideration in agricultural production. The contamination by heavy metals in agriculture soil and their transfer in soil-rice system have been increasing concern (Zhao, Liu, Xu, & Selim, 2010). It has been reported by Habibah Jamil, (2012) that various types of pesticides and also fertilizers affecting the heavy metal content in soil. The commonly found parameter in fertilizer is Zn, Fe, Cu, Cd and Pb.