

UNIVERSITI TEKNOLOGI MARA

**POTENTIAL HEALTH RISK OF HEAVY METAL
EXPOSURE FROM THE CONSUMPTION OF
CENTELLA ASIATICA SOLD IN SELECTED
MARKETS IN KUALA SELANGOR**

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

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ABSTRACT

Centella asiatica is a commonly consumed medicinal plant in Malaysia as side dish due to its benefits and availability at low cost. This study was conducted to assess the potential health risk of Pb, Cd, Cu, Zn, and Fe exposure from the consumption of *Centella asiatica* sold in selected markets in Kuala Selangor district. 30 samples of *Centella asiatica* were bought from markets in nine subdistricts. The concentration of the heavy metals was determined by the Atomic Absorption Spectrophotometer. The results were compared with Food Regulations 1985 and FAO/WHO. It revealed that Pb concentrations violated the standard. There were significant differences ($p < 0.05$) for Pb concentration in 4 subdistricts. There were significant differences for Cd concentrations in 4 subdistricts. 8 subdistricts showed significant differences in Cu concentration. 6 subdistricts had significant differences in Zn concentration. 8 subdistricts had significant differences in Fe concentration. Target Hazard Quotient (THQ) for Pb and Hazard Index (HI) of the heavy metals indicated possible adverse non-cancer health risks associated with long-term consumption of *Centella asiatica*. All results were complied with threshold value for the cumulative cancer risk (TCR). Precautionary actions to prevent the excessive buildup of heavy metals in *Centella asiatica* are essential in order to ensure consumer safety.

Keywords: *Centella asiatica*, heavy metal, Kuala Selangor.

CHAPTER 1

INTRODUCTION

1.1 Background

After thousands of years of use as traditional folk remedies, medicinal plants have gained greater importance in the pharmaceutical, health food, and natural cosmetic industries (Luo et al., 2021). Ekor (2014) stated that approximately four billion people or 80% of the population in the world trust herbal medicines for some aspect of their primary healthcare. Prior to this, herbal medicines were widely used in disease treatment, prevention, and management due to their numerous benefits.

Malaysia cuisine is known for its usage of medicinal plants or side dish, as these herbs are believed to have well-being properties, aid in preventing degenerative diseases with regular intake, prolong aging, and enhance overall health (Chan et al., 2018). Young leaves of herbs that are often consumed as side dish include pegaga (*Centella asiatica*), ulam raja (*Cosmos caudatus*), tenggek burung (*Melicope ptelefolia*), and others. These herbs are usually easily available because they can be commonly found growing wild in Malaysia. Research from Ong et al., (2016) mentioned that in many Asian countries, *Centella asiatica* (*C. asiatica*), which belongs to the Umbelliferae family, is one of the most widely consumed medicinal plants. Ong et al., (2016) also stated that the World Health Organization (WHO) has listed *C. asiatica* as a useful medicinal plant.

The use of *C. asiatica* in food and beverages has grown over time due to its health benefits, which include antioxidants, anti-inflammatory properties, memory enhancement, and many others (Hashim, 2011). However, concerns about the safety of herbal medicines grew after studies revealed that some herbal medicines contained high levels of heavy metals (Luo et al., 2021).