

UNIVERSITI TEKNOLOGI MARA

**POTENTIAL HEALTH RISKS FROM
HEAVY METAL CONTAMINATION
IN STREET DUST FROM URBAN
AND RURAL SCHOOLS IN WEST
COAST DIVISION, SABAH**

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ABSTRACT

Street dust is made up of mineral and organic particles that collect on the road's surface and come from a variety of sources such as industrial emission, vehicular activity and natural sources. The purpose of this study is to assess the heavy metal concentrations in street dust from selected urban and rural schools in West Coast Division, Sabah and the potential health risk to human health. Twenty street dust samples were collected from schools in urban and rural areas at ten different sampling sites where two samples were collected at two random locations for each school. PinAAcle 900T Atomic Absorption Spectrometer (AAS) was used to determine the heavy metals concentrations and health risk assessment via inhalation was conducted in children. The results from this study revealed that all heavy metals, cadmium (Cd), lead (Pb), iron (Fe), Nickel (Ni) and Zinc (Zn) are present and decreasing in the order of $Fe > Zn > Ni > Pb > Cd$ for both urban and rural schools. The statistical analysis performed in this study revealed that the mean concentration of all heavy metals in street dust between urban and rural schools were significant at $p < 0.05$. Meanwhile, the health risk assessment through inhalation exposure indicated that there was no harmful adverse effect of noncancer and cancer risk of these heavy metals in the street dust on children. Therefore, further research is required to be improvised to assess the presence of other toxic heavy metals that may be more dangerous towards human health.

Keywords: *Street dust, heavy metals, urban school, rural school, health risk.*

CHAPTER 1

INTRODUCTION

1.1 Background of study

Street dust is made up of mineral and organic particles that collect on the road's surface and come from a variety of sources, including industrial emitters, vehicular traffic, and natural sources (Zgłobicki et al., 2018). Particulate heavy metals are deposited on the surface of streets, sidewalks, and windows, creating street dust (Rahman et al., 2019). Simultaneously, by resuspension, street dust can become a source of pollutants that are rinsed away by rainwater runoff (Wijesiri et al., 2018).

Because of their substantial effect on human health and the environment, heavy metals have been widely studied in several environmental samples (Kim et al. 2015; Sun et al. 2010; Tchounwou et al. 2012). Moreover, due to their poisonousness and probable to accumulate, they are observed most important environmental pollutants (Krishna and Govil 2004; Tüzen 2003). Metal contaminants in the environment can be easily moved by the wind and water runoff from one location to another (Alsbou & Al-Khashman, 2018).

Automobile emissions, traffic events, industrial events and any other human caused activity can all root heavy metals to penetrate into urbanized areas (Harrison et al. 1981). The probability of secondary emission and occurrence at low height, in the life zone of humans, plants, and animals, makes pollutant accumulation in street dust particularly dangerous (Zgłobicki et al., 2018).