

## QUANTIFICATION ASSESSMENT OF MUNICIPAL SOLID WASTE AS AN EVALUATION APROPOS OF SUSTAINABLE WASTE MANAGEMENT IN KUCHING

YU WEE LEE<sup>1,2</sup>, SOH FONG LIM<sup>1\*</sup>, TEO PANG CHOW<sup>2</sup> AND DAVID SING NGIE CHUA<sup>1</sup>

<sup>1</sup>Faculty of Engineering, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia. <sup>2</sup>Trienekens (Sarawak) Sdn. Bhd., 93250 Kuching, Sarawak, Malaysia.

\*Corresponding author: [sflim@unimas.my](mailto:sflim@unimas.my)

Submitted final draft: 5 October 2021

Accepted: 28 October 2021

<http://doi.org/10.46754/jssm.2022.06.010>

**Abstract:** The quantification and characterisation of municipal solid waste are indispensable for waste management forethought. This study quantified the municipal solid wastes from three principal council areas in Kuching, the capital city of Sarawak, Malaysia which are the Kuching South City Council, Kuching North City Hall and Padawan Municipal Council to evaluate and analyse the contemporary waste trend and differentiate between the waste streams. The municipal solid waste samples are amassed directly from the source location and categorised according to the socio-economic level of the sampling location sites. This study discovered that there is no significant difference in the waste composition trend generated by the residents in different residential areas. The composition of the solid wastes was found to vary in different socio-economic categories. Organic waste is found to be the highest waste component in all socio-economic groups. The top three municipal waste compositions from the residential areas are organic wastes (61.58% w/w), plastics (12.06% w/w) and nappies/sanitary napkins (11.67% w/w), which ranged from 44.57% to 72.08%. This study provides a recent waste trend database with a detailed analysis of the differences between the waste streams for sustainable waste management in Kuching.

Keywords: Kuching, municipal solid waste, waste characterisation, waste management, quantification assessment.

### Introduction

According to the World Bank Group (Kaza *et al.*, 2018), the rate of global waste generation is approximately 0.74 kg of waste per capita per day. An uptrend in waste generation was reported, with the global municipal solid waste production at 1.3 billion tonnes in the year 2012 increasing to 2.01 billion tonnes in the year 2016. It is expected to reach 2.59 billion tonnes in 2030. In Malaysia, the waste generated per capita per day is higher than the global municipal solid waste generation rate, which is 1.21 kg of waste per capita per day for the year 2016. With the recent rapid development of Kuching, the capital city of Sarawak, Malaysia, the rate of population has increased rapidly, thus more solid waste is generated, which will threaten the sustainable development of the city. A report by Tang (2020) revealed that 690,000

kg of municipal solid waste was generated in the city every day.

Failure to dispose waste properly and sustainably would significantly increase social and environmental problems. Social and environmental problems due to solid waste mismanagement are a worldwide challenge. For instance, open dumping and open burning of solid waste significantly increase the risk to people's health and the environment (Ferronato & Torretta, 2019). Open burning of hazardous waste may result in the emission of dioxins, furans and particulate matter (World Health Organisation, 2018). Taha *et al.* (2011) highlighted that the operation of a non-engineered landfill will contaminate underground water sources due to the leachate generated from solid waste.