

RESEARCH GRANT PROPOSAL REPOSITORY

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Salutation : DR.
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Research Alliance : RESOURCE SUSTAINABILITY
Faculty / PTJ : FAKULTI KEJURUTERAAN
School : SEKOLAH KEJURUTERAAN AWAM
Research : IMPACT & RESTORATION ON WATER BODIES - SD - FAKULTI
Classification : KEJURUTERAAN
Category : Science Technology (ST)
Type of Service : PERMANENT
Staff Classification : Major Research
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Title :

Interactions of Microplastics in Urban Rivers with Heavy Metals

Maximum Duration : 36 month

Start Date :

01/01/2020

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31/12/2022

Duration :

3 years 0 months 0 days

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UTM Fundamental Research

Grant Category :

Internal Grant

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EXECUTIVE SUMMMARY

To date, understanding on the impacts of microplastics ($\leq 5\text{mm}$ in size) in freshwater environments is still limited and insight into interactions between microplastics and heavy metals is also poor. Concern arises when heavy metals carried by microplastics may potentially affect aquatic life health through ingestion. As of today, the abundance of microplastics between urban rivers is still lacking and only a few investigation conducted in freshwater ecosystems. Therefore, the present study aims to evaluate the abundance of microplastics in different urban rivers in Johor Bharu. This is the first study to quantify a range of microplastics and also heavy metals, lead, cadmium and chromium carried by microplastics from surface water, surface sediment and also wild fish. Studies on the interaction of microplastics with heavy metals are also very limited. Therefor more research is needed since metals can potentially be transferred to aquatic life through ingested microplastics. In this study, the accumulation of heavy metals, by microplastics in the actual environments will be carried out as to understand the severity of the impact. As well as, the exposure of juvenile catfish, *Claria sp.* to microplastics with and without metals will be performed since both pollutants may act as multiple stressors to biota. To achieve this, the adsorption of metals to polyethylene resin pellet will be performed in freshwater as to understand its interaction prior to exposure under laboratory controlled condition. In this study, the physical observations of microplastics will be conducted using microscope. Chemical analysis of subsamples will also be performed using attenuated total reflection–fourier-transform infrared (ATR-FTIR) spectroscopy. The analysis of heavy metal will be carried out using atomic absorption spectroscopy (AAS). It is expected that juvenile catfish will ingest the microplastic and subsequently heavy metals will be absorb to its guts and tissues.