

## Environmental Research, Technology Demonstration and Conference Project

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| <b>ECF Project:</b>                      | ECF 2018-46   |
| <b>Project Title:</b>                    | Microplastics accumulate and transfer persistent organic pollutants to Hong Kong marine fish  |
| <b>Principal Investigator:</b>           | Dr Cheung Siu Gin, Department of Chemistry, City University of Hong Kong  |
| <b>Total Approved Grant:</b>             | \$496,000   |
| <b>Duration:</b>                         | 1/11/2019 to 31/10/2021   |
| <b>Project Status/Remarks:</b>           | Completed   |
| <b>Project Scope:</b>                    | Plastic debris makes up to nearly 80% of marine litter in Hong Kong. The plastics are broken down into microplastics (<5mm) that have high surface to volume ratio, porosity, and high binding coefficients to persistent organic pollutants (POPs). These characteristics enable them to concentrate POPs in the aqueous phase, and pass onto a wide range of marine organisms. In the principal investigator's previous report, the project team detected POPs including polychlorinated biphenyls, polycyclic aromatic hydrocarbons, and organochlorinated pesticides in sedimentary microplastics collected in Hong Kong. In this study, the project team extends the study to determine the toxicological effects of microplastics to marine fish.   |
| <b>Summary of the Findings/Outcomes:</b> | More than 1,300 marine fish samples from 10 sites were collected. It was found that 32.8% of fish contained at least one microplastic particle. As microplastics are known to be a vector of toxic organic chemicals, the project team tried to correlate the body burden of DDT and the numbers of microplastic ingested. However, no correlation was found. In addition, the project team studied the hepatotoxicity of microplastic in the model organism, marine medaka, but no toxicity was found if CYP1A1 enzyme concentrations and ALT/AST ratio were considered. The project team selected DDTs to represent POPs contamination in both microplastic and fish samples because it was the most abundant types of POPs in marine fish tissue and microplastic in Hong Kong. However, the data showed that the concentrations of DDTs in microplastics were below detection limits even when the project team pooled the samples. |