Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2021-03
Project Title:	Evaluation of the recycled plastics-containing designated garbage bags under the municipal solid waste charging scheme for food-contact applications
Principal Investigator:	Dr Wang Yi, Department of Chemistry, Hong Kong Baptist University
Total Approved Grant:	$459,000
Duration:	1/4/2022 to 30/6/2023
Project Status/Remarks:	Completed
Project Scope:	Plastic waste, 0.87 million tonnes dumped in the landfills in 2018, poses an urgent challenge for Hong Kong. The use of recycled plastics can highly reduce the large amount of the waste of the disposable plastics. The Hong Kong government implements the Municipal Solid Waste Charging Scheme, under which the designated plastic bags will be widely used for garbage collection. However, the large amount of designated bags will definitely become a potential source of plastic wastes. To avoid this problem, the designated bags could be improved in two ways, 1) made by recycled plastics and 2) for multiple times of use, such as for raw food and grocery shopping, before the final use for dumping garbage. For this purpose, the critical point is that the recycled plastic-containing bags should be safe for food-contact applications. This project will measure the contents of the harmful chemical compounds of the designated garbage bags and evaluate their impacts to human health. Principal component analysis (PCA) will be used for the analysis of the huge amount of measurement data, to show the effects of the simulant types, and the testing time and temperature on the contents of the chemical compounds of the designated garbage bags.
Summary of the Findings/Outcomes:	Each year, millions of tonnes of plastic waste is dumped in landfills, posing an urgent challenge for Hong Kong. The Hong Kong government implemented a municipal solid waste charging scheme, and designated plastic bags will be widely used to collect garbage. However, the abundance of designated bags may be another potential source of plastic waste. To avoid this problem, designated bags are improved in two ways, made of recycled plastic, and used multiple times before being discarded. For this, the key point is that recycled plastic bags should be safe for food contact applications. In this project, we tested the content of various harmful compounds in recycled plastics and assessed their impact on human health. These include tests for endocrine disruptors bisphenols, polycyclic aromatic hydrocarbons, plasticizers phthalates, biotoxins aflatoxins, heavy metals Cd, Pb, As, pesticide residues, and cytotoxicity. After our testing and comparison with the regulations of Hong Kong, Mainland China, the United States, and the European Union, the designated plastic bags used by the Hong Kong government are safe to use in daily life. Among them, due to the materials of the plastic bag, the use of the plastic bag in high temperatures and acidic environments should be

	avoided.