

Anthropogenic particles in the muscle, gill, and gastrointestinal tract of marine fish sold for human consumption

ABSTRACT

Contamination of marine fish with the widespread distribution of anthropogenic particles (APs) becomes increasingly severe, however, related research on the assessment of the occurrence of APs in the edible tissue of commercial fish is scarce. The objective of this study was to evaluate the features of APs pollution based on seven species of commercial marine fish (n = 12 per species) and investigate the accumulation of APs in different tissues of fish namely gill and gastrointestinal tract (GIT), and muscle. The results show that a total of 62 APs were detected in 33 out of 84 (39.3%) fresh fish samples using a micro-Raman spectrometer which in particular is characterized by a blue color, shape-like fiber, and size smaller than 0.5 mm. Among them, 47 (75.8%) particles were identified as pigments such as indigo, chrome yellow-orange, disperse yellow, and pigment black. The other 11 (17.7%) particles were plastic including polypropylene (PP), polyethylene terephthalate (PET), and polyacrylonitrile (PAN). And the rest 4 (6.5%) particles were anthropogenic cellulose fibers. Muscle tissue from six species of fish was detected to contain a total of 15 APs. Based on the total mean of APs found in fish muscle (0.018 AP items/g tissue) and on the consumption of fish in Malaysia (59 kg/capita/year), the estimated human intake of APs through fish consumption was 1062 AP items/year/capita. Considering that food consumption is an important route of human exposure to APs, it is suggested to add APs testing into the guidelines of food safety management systems and adopt mitigation measures to reduce the APs pollution in food.