Ecotoxicological evaluation of Single and joint effects of toxicity of microplastic pellets contaminated - Acenaphthene to marine fish (*Coptodon guineensis)*

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Abstract

Microplastics and polycyclic aromatic hydrocarbon (PAHs) are environmental pollutants of great concern. Some studies have shown the ability for microplastics pellet particle to act as a absorbance surface for other contaminants that may perhaps that released into the aquatic fauna and environment. Persistent organic pollutants have been extracted from microplastics particles collected from field survey, suggesting that microplastics particles are possible source of environmental contaminants that are likely to be exposed organism. This study focuses on the investigation of whether microplastic pellets (MPs) can influence the bioavailability of Acenaphthene exposed marine fish, *Coptodon guineensis*. The fish, *Coptodon guineensis* were acutely exposed to Acenaphthene -contaminated microplastics (PAHs-MPs) singly and in binary mixture. My results demonstrated that acute exposures to MPs resulted in mortality at environmentally low concentrations. Based on derived 96h LC_{50} was approximately 4.6 x 104 and 6.8 x 104 MPs/L was quantified for *C. guineensis*. Interestingly, Acenaphthene were less toxic to exposed *C. guineensis*, where mortality was observed at concentrations as low as > 18.5 MPs/L. When MPs are contaminated with Acenaphthene, acute exposures can result in an increase in Acenaphthene bioavailability to fish. In comparison to MPs in binary mixture to Acenaphthene exposures to *C. guineensis resulted* in significantly greater mortality and reductions in both growth and the mixtures caused significant reduction of the changes in fish behavioral responses. Finally, my results demonstrated that Acenaphthene that was adsorbed to MPs surfaces can readily bioavailable to aquatic organisms' marine fish. These results demonstrate that microplastics can have both acute effects and behavioral responses on aquatic organisms, and that the presence of microplastics in the environment needs to be taken into consideration when evaluating the exposure to environmental contaminants. Therefore, MPs can acts an absorbance for organic contaminants in aquatic ecosystems.

Keywords: Microplastic pellets (MPs), *Coptodon guineensis,* Acenaphthene