Synergistic Toxicity of Micro-Plastic and Micro-Pollutants in Human Cells

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Abstract

Our research focuses on the potential synergetic toxicity of microplastics and micropollutants. We conducted a set of adsorption tests using primary polystyrene microplastics with varying physicochemical properties and a commonly used pesticide (Triclosan) under environmentally relevant conditions. Sorption capacity of triclosan onto 1-μm polystyrene-beads was found to be highly dependent on surface functionality with enhanced sorption onto oxidized surfaces. We used the sorbed plastics to test the joint toxicity effect following sorption of contaminates onto microplastic. PS beads following sorption of _˜0.1 mg/L triclosan onto their surface were spiked to the Caco2 assay with and without desorption time. While control experiments showed minor toxicity rate of triclosan and beads (separately), 48 hours of desorption resulted in 25% greater toxicity than that obtained with no desorption time. Our results suggest that microplastics act as a potential vector of micropollutants toward human cells, resulting in an increased toxicity due to elevated local concentration effects.

Keywords: Microplastic, Polystyrene microbeads, Environmental pollutants, Triclosan, Adsorption, Toxicity, Viability test, Caco, 2.

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