# Plastic Debris as a Vector for Heavy Metal Transport and Contamination in the Marine Environment

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The persistence of plastic in the marine environment has become an environmental crisis and concern for human and aquatic health. Similarly, heavy metals in the environment do not biodegrade and are extremely toxic even at low concentrations. Despite constituting significant sectors of water research, the interactions of these two pollutants are not well known. To expand knowledge of the interactions of these two pollutants, plastics (polyvinyl chloride-PVC, polystyrene-PS, expanded polystyrene/Styrofoam-PSEx) were exposed to copper leached from antifouling paint into marine and distilled water. In order to quantify the concentrations of copper sorbed to the plastics and leached into the waters, modified atomic flame emission spectroscopy tests were conducted on the samples. Various nebulizers were designed using the Venturi effect and 3D printed. Using the optimal nebulizer, the intensity of the wavelength (580nm) was used to determine the concentration of copper II. The sorption of Copper to PVC was significantly greater than sorption to PS or PSEx. In the test containing antifouling paint and PVC, the concentration of copper was 13020% greater in the plastic than in the surrounding water, showing the ability of plastic to sorb and concentrate heavy metals. This research shows significant interaction between copper II and plastics, which can have implications for marine life, the environment, and human health. These interactions may also be similar for other heavy metals in the waterways and highlights the importance of further researching the interactions of plastics, heavy metals, and other water pollutants as they circulate.

**Awards Won:**