PP8.

Adsorption characteristics of multivalent cations onto microplastic polymers from aqueous solutions

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Abstract

Microplastics (MP) that are plastic particles of less than 5mm diameter[1] are being increasingly attended by researchers across the world, owing to the pollution threat they pose, in all compartments of the environment including living organisms[2]. They find their way into soil and water usually through sludge, tear and wear, washing machine, cleansing agents etc [3,4,5&6]. Apart from the intrinsic potential to harm the environment, they may serve as carriers of organic[7] and inorganic pollutants[8]. Therefore, adsorption behaviour of MPs towards organic contaminants and inorganic ions (both contaminants and nutrients) needs to be explored.

This pilot study, therefore, addresses the adsorption of cations of different valences - Na^{+}, $Ca^{2+}$and Al^{3+} - on to surfaces of engineered polyethylene (PE), polystyrene (PS) and polyvinylchloride (PVC) microparticles, in aqueous medium. The sorption mechanism as well as the effect of cation sorption on surface characteristics of MP were investigated.

Results revealed that sorptive properties for cations on different polymers differed, depending on characteristics of both the cations and the polymer type. Interestingly, sorption process induced alterations in surface characteristics of polymer particles. These results would imply that pollution threat of MP polymers have added intensity that they can (1) limit the nutrient availability (2) enhance spatial distribution of contaminants both in water and soil.

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