

Adsorption rate study of persistent organic pollutants in function of physical and chemical degradation of marine microplastics

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Over marine microplastics they are adsorbed large amount of persistent organic pollutants (POPs), mainly polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OPs) and polychlorinated biphenyls (PCBs). These POPs have much more affinity for the plastics than seawater and therefore they tend to accumulate over microplastic surface. But this affinity and preconcentration is not the same for all kind of plastics. This study compare POPs adsorption rate over the most abundant plastics: Polyethylene Terephthalate (PET), High Density Polyethylene (HDPE), Polyvinyl Chloride (PVC), Low Density Polyethylene (LDPE), Polypropylene (PP) and Polystyrene (PS).

Moreover adsorption rate vary on function of physical and chemical degradation state of the plastics. POPs adsorption on microplastic is generated over the surface layer, mechanical friction of microplastic fragments (physical degradation) increase their surface and therefore their capacity to POPs preconcentration. But also, the chemical degradation of the plastic, measure by microplastic yellowness (Brandon 2016), varies the adsorption rates of these pollutants over microplastic, added to the fact that the most yellowish fragments are also the ones with more microfractures. In this study it has been evaluated on one side the adsorption rate of persistent organic pollutants (POPs) over different kind of plastic composition fragments, and on the other, the evaluation over the same kind of plastic (HDPE), with similar size and shape, but at different physical and chemical degradation conditions.

Keywords: degradation, diferent kind of microplastics, yellowness, POPs

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