

## **Comparison of the efficiency of washing treatments of post-consumer plastic waste to remove odorous constituents**

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Plastics are key materials within the circular economy and are used in a great variety of different industrial and consumer applications. However, in Europe until today the majority of plastic post-consumer waste still ends up in incineration or in low-value applications such as piping, garden furniture and garbage bags. One of the major issues that impedes high-end recycling of most post-consumer waste into high-value applications is the presence of persistent odorous substituents making recyclates unattractive for many applications. Odour components have a broad diversity in terms of origin and chemical properties, which makes the current industrial state-of-the-art techniques such as a cold or hot water wash with or without detergent or caustic insufficient to remove the odour completely.

In this presentation, the results of various washing treatments to remove odorous constituents are discussed. The washing tests are performed in a pilot-scale friction washer. The concentration of odour components present in post-consumer waste is measured before and after the washing treatment with a GC-method using a dynamic headspace sampling method with activated charcoal tubes followed by solvent desorption. The performed washing treatments are compared in terms of efficiency, greenness and cost estimate of the process. Results confirm that common industrial washing techniques are unable to remove the odour completely; typically only between 40-60%. Instead, more aggressive washing procedures, such as a solvent treatment, achieve removal efficiencies up to 99% for most odour components and as such they are able to broaden the application scope of post-consumer plastic waste.