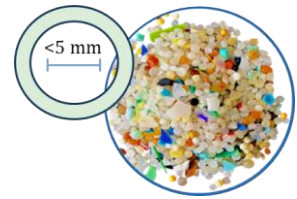


Removal of Microplastics from Wastewater Effluents using Coconut Husks and Bamboo

“Priority” emerging pollutants in the hydrocycle: microplastics, nanomaterial, PFAs and PPCPs

Introduction



Microplastics (MPs) are ubiquitous pollutant in the environment and pose a serious potential threat to the ecology and human health.

The presence of MPs in aquatic environments has become a global concern as they are entering the food chain. MPs are predominately originating from the wastewater effluent coming from the wastewater treatment plants (WWTPs).

Aim

To evaluate the potential of coconut husk and bamboo for the removal of polyethylene and polypropylene MPs of sizes 146-500 μm from wastewater effluents.

Objectives

To Identify the MPs present in the wastewater effluents

To carry out fixed-bed column adsorption

To characterise the adsorbents

Methodology

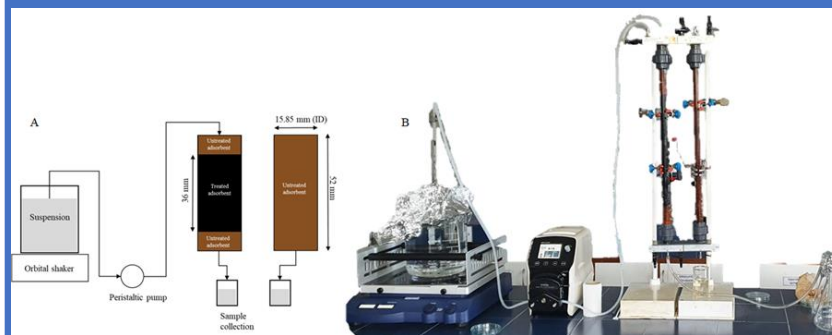
Sampling and Preparation

Sampling of wastewater effluents from 3 WWTPs Collection of coconut husk and bamboo wastes Adsorbent Production

Characterisation Method

MP Identification Adsorbents properties

Experimental Design: Fixed-bed column adsorption



Schematic diagram (A) and experimental setup (B) of the adsorption process setup

Key Results

- An average abundance of 276.3 ± 137.3 particles.L⁻¹ were found from the wastewater effluents coming from three WWTP;
- 80% of MPs were in the ranged of 250 to 500 μm ;
- Activated coconut husk and magnetic bamboo biochar had higher iodine values showing greater porosity development;
- 100% removal efficiency was obtained over 400 minutes using fixed-bed column adsorption.

Impact of Research

The results of this study shows a novel and simple removal approach using coconut husk and bamboo wastes to remove MPs from water, which has potential application. This preliminary study provide salient data to advocate for subsequent research on the removal of MPs. Further research is required to determine the retention mechanism involve between the different adsorbents and type of MPs.