

Abstract: Pharmaceutical contaminants in water have emerged as a pressing global concern because of their persistence, toxic nature, and potential risks to both ecosystems and human health. Among these, paracetamol (acetaminophen) is one of the most commonly detected drugs in wastewater and surface water, owing to its extensive use as an analgesic and antipyretic. Conventional treatment processes often fail to completely remove such micro pollutants, highlighting the urgent need for more efficient and sustainable solutions. In this research, the use of a polyethylene terephthalate (PET) membrane was explored for its potential to remove paracetamol from aqueous environments. The fabricated membrane was characterized using Fourier Transform Infrared Spectroscopy (FTIR) to confirm its structural stability and the presence of functional groups. Additional analyses were conducted to assess its morphology and mechanical strength. Batch adsorption experiments, performed under varying conditions, were used to evaluate both the adsorption mechanism and removal efficiency. The results demonstrated that the PET membrane exhibited strong adsorption capacity, mainly facilitated by π - π interactions and hydrogen bonding. Overall, the study highlights the potential of PET membranes as an eco-friendly, reusable, and cost-effective material for the treatment of pharmaceutical wastewater.

KEYWORDS: Paracetamol Removal 1; Polyethylene Terephthalate (PET) Membrane 2; Water Treatment 3; Adsorption/Filtration Mechanism 4; Pharmaceutical Contaminants 5.