

## **A comparison study on performance of thin film composite membrane embedded with graphene oxide for Acetaminophen, Diclofenac and Ibuprofen separation from waste water**

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### **ABSTRACT**

Pharmaceuticals and personal care products (PPCPs) are one of the threats to water safety and security. These contaminants are hard to be removed due to toxicity and resistant to breakdown. In this study, thin film composite polypiperazine-amide membrane modified with graphene oxide (GO) was synthesized as a rejection medium for this groups of contaminants. Acetaminophen (ACT), Diclofenac (DCF), and Ibuprofen (IBF) was selected as pharmaceutical pollutants and was rejected at different pH ranging from 4 to 9. ATR-FTIR, surface hydrophilicity, pure water permeability and rejection % was evaluated. The effect of GO on rejection showed that PES/GO-0.2 had the greatest hydrophilic effect, pure water permeability and rejection efficiency on all three drugs. The effect of pH on the membrane showed that DCF had the highest rejection (99.13%) at pH8–9, followed by IBF (95.78%) at pH 8–9, and lastly ACT (97.7%) at pH 7. Thus, thin film composite polypiperazine-amide membrane modified with graphene oxide can be effectively and sustainably applied in water treatment processes.

### **KEYWORDS**

Ultrafiltration; Ppcps removal; Water treatment; Interfacial polymerization

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