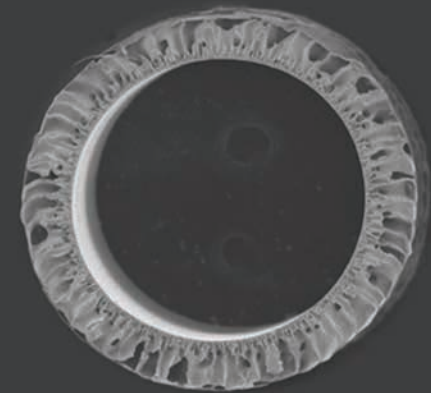


## High Flux Anti-fouling HFM for Water Treatment Application



**Problem Statement:** In wastewater treatment, several biomedical applications and instances that involve separation, membrane technology is widely used. However, one of the major technical challenges is fouling. Fouling is characterised by the adsorption of particles or compounds on the surface or the blocking of pores by particles during the filtration process. Fouling of membrane reduces its efficiency, durability, and increases operational cost. It significantly affects membrane performance by reducing flux membrane durability and rising operating costs due to the cleaning of membranes. Thus, fouling-resistant hollow fibre membranes (HFMs) development is an emerging research area. Taking on this challenge, researchers at IIT Bombay have devised a high flux anti-fouling HFM for water treatment applications.

**Uniqueness of the Solution:** The blending of hydrophilic additives in polyethersulfone to enhance antifouling

property and durability of hollow fibre membranes is a unique feature. The researchers have used carboxylated multi-walled carbon nanotubes (MWCNTs-COOH) that were embedded in hollow fibre membranes (HFMs). This was developed by blending polyethersulfone (PES) and d- $\alpha$ -tocopheryl polyethylene glycol 1000 succinate (TPGS, a vitamin E derivative) to remarkably enhance their permeation flux and fouling-resistance. The antifouling performance of HFMs was examined by calculating the change in pure water permeability (PWP) due to fouling by protein and synthetic municipal wastewater (SMWW). The novel PES composite HFMs containing TPGS and MWCNTs-COOH have shown excellent antifouling properties, which makes them potentially useful for wastewater treatment.

**Current Status of technology:** The module, high flux anti-fouling HFM for water treatment applications, has been tested at a lab-scale and will be scaled up

to the pilot plant.

**Societal Impact:** The proposed module is a low-cost solution for filtration of domestic wastewater to provide water for non-drinking applications.

**Patent(s):** Filed

**Relevant Industries:** Environment, Water Treatment, Effluent Treatment Plants, Materials.

**Faculty:** Prof. Jayesh Bellare, Chemical Engineering.