

Confounding effect of wetting, compaction, and fouling in an ultra-low-pressure membrane filtration: A review

ABSTRACT

Ultra-low-pressure membrane (ULPM) filtration has emerged as a promising decentralized water and wastewater treatment method. It has been proven effective in long-term filtration under stable flux without requiring physical or chemical cleaning, despite operating at considerably lower flux. The use of ultra-low pressure, often simply by hydrostatic force (often called gravity-driven membrane (GDM) filtration), makes it fall into the uncharted territory of common pressure-driven membrane filtration. The applied polymeric membrane is sensitive to compaction, wetting, and fouling. This paper reviews recent studies on membrane compaction, wetting, and fouling. The scope of this review includes studies on those phenomena in the ULPM and how they affect the overall performance of the system. The performance of GDM systems for water and wastewater treatment is also evaluated. Finally, perspectives on the future research direction of ULPM filtration are also detailed.