

## Documents

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**INVESTIGATION OF ENHANCED ELECTROCOAGULATION MEMBRANE PROCESS FOR WATER RECLAMATION FROM PALM OIL MILL EFFLUENTS**

(2024) *IJUM Engineering Journal*, 25 (1), pp. 12-25.

DOI: 10.31436/iiumej.v25i1.2629

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**Abstract**

The process of electrocoagulation (EC) enhanced with adsorbent addition, as a pre-treatment for ultrafiltration membrane, is widely unexplored in oil palm-based wastewater treatment. Utilizing predetermined EC operational parameters and a defined activated carbon (AC) dosage for biotreated palm oil mill effluents (BPOME), membrane fouling was studied during crossflow membrane filtration at 0.5 bar transmembrane pressure and 1 kDa membrane pore size. The dominant fouling mechanism in membrane filtration without EC-AC pretreatment of BPOME, was cake formation, which was determined through Hermia's pore blocking models. However, after EC-AC pre-treatment, the membrane fouling was mitigated. Moreover, the pre-treatment process, AC assisted EC, sustainably enhanced the final treated effluent quality in addition to enhancing fouling mitigation in the subsequent membrane filtration. The removal of Total Suspended Solids (TSS), turbidity and color were nearly 100% and Chemical Oxygen Demand (COD) was 99.7% removed with final value of  $5\pm 1$  mg/L, which is within the range of reusable water standards. © (2024) International Islamic University Malaysia-IIUM.

**Author Keywords**

activated carbon; electrocoagulation; membrane filtration; membrane fouling

**Funding details**

Ministry of Higher Education, Malaysia MOHEFRGS/1/2019/TK02/UIAM/01/1  
International Islamic University Malaysia IIUM

The authors express their gratitude to the Ministry of Higher Education (MOHE) Malaysia for granting a Fundamental Research Grant Scheme (FRGS), project no. FRGS/1/2019/TK02/UIAM/01/1 to support this work. The authors also express thanks to the International Islamic University Malaysia, Kulliyah of Engineering, for the financial support under Kulliyah of Engineering Merit Scholarship 2021 scheme.

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**Publisher:** International Islamic University Malaysia-IIUM

**ISSN:** 1511788X

**Language of Original Document:** English

**Abbreviated Source Title:** IIUM Eng. J.

2-s2.0-85186947101

**Document Type:** Article

**Publication Stage:** Final

**Source:** Scopus

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