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Hybrid Method Development for the Removal of Crystal Violet Dye from Aqueous Medium

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Abstract : Water scarcity is the much-identified issue all over the world. The available sources of water need to be reused to sustainable future. The present work explores the treatment of dye wastewater using combinative photocatalysis and ceramic nanofiltration membrane. Commercial ceramic membrane and TiO_2 catalyst were used in this study to investigate the removal of crystal violet dye from the aqueous solution. The effect of operating parameters such as inlet pressure, initial concentration of crystal violet dye, catalyst (TiO_2) loading, initial pH was investigated in the individual system as well as the combined system. In this study, 95 % of dye water was decolorized and 89 % of total organic carbon (TOC) was removed by the hybrid system for 500 ppm of dye and 0.75 g/l of TiO_2 concentrations at pH 9. The operation of the integrated photocatalytic reactor and ceramic membrane filtration has shown the maximum removal of crystal violet dye compared to individual systems. Hence this proposed method may be effective for the removal of Crystal violet dye from effluents.

Keywords : advanced oxidation process, ceramic nanoporous membrane, dye degradation/removal, hybrid system, photocatalysis
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