Optimization Of Photocatalytic Degradation Of Palm Oil Mill Effluent In UV/Zno System Based On Response Surface Methodology

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ABSTRACT

This paper reports on the optimization of palm oil mill effluent (POME) degradation in a UV-activated-ZnO system based on central composite design (CCD) in response surface methodology (RSM). Three potential factors, *viz.* O_2 flowrate (*A*), ZnO loading (*B*) and initial concentration of POME (*C*) were evaluated for the significance analysis using a 2^3full factorial design before the optimization process. It is found that all the three main factors were significant, with contributions of 58.27% (*A*), 15.96% (*B*) and 13.85% (*C*), respectively, to the POME degradation. In addition, the interactions between the factors *AB*, *AC* and *BC* also have contributed 4.02%, 3.12% and 1.01% to the POME degradation. Subsequently, all the three factors were subjected to statistical central composite design (CCD) analysis. Quadratic models were developed and rigorously checked. A 3D-response surface was subsequently generated. Two successive validation experiments were carried out and the degradation achieved were 55.25 and 55.33%, contrasted with 52.45% for predicted degradation value.

KEYWORDS

Center composite design; Optimization; Palm oil mill effluent; Photocatalysis; Zinc oxide

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