



## Laboratory studies and CFD modeling of photocatalytic degradation of colored textile wastewater by titania nanoparticles

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### ABSTRACT

This paper presents photocatalytic decolorization, computational fluid dynamics (CFD) modeling of decolorization and mineralization of textile dyes, Astrason Blue FGGL (AB) and Solophenyl Yellow FFL (SF), by photocatalysis using immobilized titania nanoparticle. UV-Vis spectrophotometry, Ion chromatography (IC) and total organic carbon (TOC) analyses were employed to obtain the details of the photocatalytic decolorization and mineralization of AB and SF. The CFD model was used to solve the mathematical equation describing decolorization process numerically taking into account finite volume descretization scheme. The CFD model predictions were compared to those results obtained from experimental tests for the decolorization of dyes by photocatalysis and close agreement was achieved. Ninety-five percent total organic carbon of both dyes can be eliminated after 240 min of irradiation time.

*Keywords:* Photocatalysis; CFD modeling; Decolorization; Mineralization; Titania nanoparticle

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