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Degradation of Gesaprim Herbicide by Heterogeneous Photocatalysis Using Fe-Doped TiO₂

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ABSTRACT

Fe-doped TiO₂ was prepared by the sol gel method and characterized by X-ray diffraction. All the Fe-doped TiO₂ were composed of an anatase crystal form. The activity of the Fe-doped TiO₂ for the degradation of the gesaprim commercial herbicide (which contains atrazine as active compound and formulating agents) was studied by varying the iron content during UV (15 W), visible light and solar irradiations. The visible light came from commercial saving energy lamps (13, 15 and 20 Watts). The gesaprim degradation rate depended on the iron content in the photo catalyst. The Fe-doped TiO₂ (0.5% by weight of TiO₂) showed higher TOC removal under visible light and was more active than the undoped TiO₂ photo catalyst under the light irradiation sources tested. Over 90% of chemical oxygen demand abatement was achieved with both UV and visible light but less time was required to decrease the chemical oxygen demand content by using the catalyst doped with iron at 0.5% under visible light. It was observed that the degradation of gesaprim increased by increasing the iron content in the catalyst under visible light.

KEYWORDS

 Atrazine, Iron Doped TiO₂, Solar Irradiation, Visible Light Irradiation

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