



Oxidation of bromocresol green by different advanced oxidation processes: Fenton, Fenton-like, photo-Fenton, photo-Fenton-like and solar light. Comparative study

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ABSTRACT

The aim of this study is to test some advanced oxidation techniques (AOTs) in the absence of light (Fenton and Fenton-like) and in its presence (photo-Fenton and photo-Fenton-like) to obtain total decolorization of an anionic dye in aqueous solution: the bromocresol Green (CI Reactive Green 15 and abbreviated as BCG). Experiments were conducted on a laboratory-scale set up with all these processes. Best operatory conditions were found to be of pH 3, hydrogen peroxide to iron (II or III) molar ratio of 30:1, artificial (254 nm) and solar light. Besides, several parameters were investigated like pH, oxygen, dose of H₂O₂, light effect, and reaction time. The obtained results showed that color removal followed the increasing order: Fe(III)/H₂O₂ < Fe(II)/H₂O₂ < Fe(II)/H₂O₂/Solar < Fe(II)/H₂O₂/UV_{254nm} < Fe(III)/H₂O₂/UV_{254nm}. This improvement could be related to a better production of radicals OH[•]. In another hand, decolorization kinetic followed pseudo-first-order type in all cases and no synergic effect was observed when Cu²⁺ ion (10⁻⁴M) was added to the solution of the dye.

Keywords: Advanced oxidation processes; BCG; Photo-Fenton; UV; Solar light

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