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OXIDATION OF AZO DYE CARMOISINE (E122) IN AQUEOUS SOLUTION BY HETEROGENEOUS CATALYST $\text{CuO}/\text{Al}_2\text{O}_3$ SYSTEM

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Abstract

Heterogeneous oxidation system for the removal of azo-food dye from aqueous solution was studied in the presence of $\text{CuO}/\text{Al}_2\text{O}_3$ catalyst. This catalyst was prepared by impregnation method using a cupric salt solution at pH=5, followed by calcination at 450 °C. The result catalyst was characterized by X-ray Diffraction (XRD) and Scanning Electron Microscopy- Energy Dispersive X-Ray Spectroscopy (SEM-EDX), where the results confirmed a high crystallinity, good chemical stability of the catalyst used in four consecutive cycles and the presence of the elements (Cu, O, Al) composing the catalyst. Several parameters affecting dye degradation such as: solution pH, H_2O_2 concentration, catalyst dose, and reaction temperature were investigated. $\text{CuO}/\text{Al}_2\text{O}_3$ catalyst offers higher activation efficiencies than the homogeneous Cu^{2+} ions, as well as good operational stability and efficiently generate HO^\bullet in neutral aqueous solutions. Complete decolorization (100 %) of Carmoisine (500 mg/L) was achieved in 240 min at neutral pH.

Key words: advanced oxidation processes, copper-impregnated activated alumina, food dye, heterogeneous catalysis, hydrogen peroxide, removal

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