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Optimization of photo-Fenton to work at neutral pH using NTA–Fe^{2+}

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ABSTRACT

The potential of photo-Fenton treatment to remove organic pollutants was already demonstrated in the last decades. However, the strategies to perform it at neutral pH are frequently associated with the reduction in efficiency when compared to the system performed at pH around 3. The objective of this work was to study the color removal optimization at acidic and neutral pH using NTA–Fe^{+2} complex with posterior application for the disinfection of a secondary effluent. The Doehlert matrix and the rotatable central compound designs were used for the system optimization and H_2O_2, Fe^{2+} and dye concentrations were used as variables. The importance of each variable for the system at neutral and acidic pH was analyzed by means of Pareto charts and their relations were analyzed by the response surface methodology. The optimized conditions using NTA–Fe were able to achieve a reduction of more than 4 logs in total coliforms and 6 logs for *E. coli* at the end of 60 min of treatment.

Keywords: Optimization; Chelation; Advanced oxidation; Effluent treatment; NTA

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