# Degradation Study of Food Colorants by SingletOxygen

**Authors :** A. T. Toci, M. V. B. Zanoni

**Abstract :** The advanced oxidation processes have been defined as destructive technologies treatment of wastewater. These involve the formation of powerful oxidizing agents (usually hydroxyl radical .OH) capable of reacting with organic compounds present in wastewater, transforming damaging substances in CO2 and H2O (mineralization) or other innocuous products. However, the photochemical degradation with singlet oxygen has been little explored as oxidative pathway for the treatment of effluents containing food colorants. The molecular oxygen is an effective suppressor of organic molecules in the triplet excited state. One of the possible results of the physical withdrawal is the formation of singlet oxygen. Studies with singlet oxygen (1O2) show an high reactivity of the excited state of the molecule with olefins, aromatic hydrocarbons and a number of other organic and inorganic compounds. Its reactivity is about 2500 times larger than the oxygen in the ground state. Thus, in this work, it was studied the degradation of some dyes used in food industry (tartrazine, sunset yellow, erythrosine and carmoisine) by singlet oxygen. The sensitizer used for generating the 1O2 was methylene blue, which has a quantum yield generation of 0.50. Samples were prepared in water at a concentration of 5 ppm and irradiated with a sunlight simulator (Newport brand, model no. 67005) by consecutive 8h. The absorption spectra of UV-Vis molecules were made each hour irradiation. The degradation kinetics for each dye was determined using the maximum length of each dye absorption. The analysis by UV-Vis revealed that the processes were very efficient for the colorants sunset yellow and carmoisine. Both presented degradation kinetics of order zero with degradation constants 0.416 and 0.104, respectively. In the case of sunset yellow degradation reached 53% after 7h irradiation, Demonstrating the process efficiency. The erithrosine presented during the period irradiated a oscillating degradation kinetics, which requires further study. In the other hand, tartrazine was stable in the presence of 1O2. The investigation of the dyes degradation products owned degradation by 1O2 are underway, the techniques used for this are MS and NMR. The results of this study will enable the application of the cleanest methods for the treatment of industrial effluents, as there are other non-toxic and polluting molecules to generate 1O2.

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