

The photodegradation of carbamazepine was studied in artificial estuarine water, under conditions relevant to the Rhône delta. Chloride substantially enhances the photodegradation of carbamazepine, most likely because of the interaction between Fe(III) colloids and Cl^- ions under irradiation, yielding $\text{Cl}_2^{\bullet-}$. For a given compound, prerequisites for the described degradation enhancement by chloride to be significant are faster degradation via reaction with $\text{Cl}_2^{\bullet-}$ compared to charge-transfer processes on the surface of Fe(III) colloids and an important role of indirect phototransformation compared to direct photolysis. A major photodegradation intermediate of carbamazepine is acridine, formed by direct photolysis, while hydroxylated/ oxidized compounds are formed in the presence of ^\bullet OH , and chloroderivative formation is observed in the presence of Fe(III) and chloride.