PRODUCTS OF FERRATE(VI) OXIDATION OF TRIMETHOPRIM

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Trimethoprim (TMP) is an antibiotic that antagonizes p-aminobenzoic acid in the synthesis of dihydrofolic acid. In recent years, TMP has been detected in the aquatic environment with concentrations of 70-2000 ng/L in surface water and secondary wastewater effluents. The possibility of the residual TMP to form resistant genes raises interest in the development of innovative technologies to degrade this compound to non-toxic pharmacologically inactive by-products. This study presents the oxidation of TMP by ferrate(VI). Ferrate(VI) oxidized TMP with a rate constant of 4.45×10^2 $M^{-1}s^{-1}$ ($t_{1/2}$ = 31sec; [Fe(VI)]=10mgL^{-1}) at pH 7.0 and 25 ^{o}C. The degradation process was followed by using LC-PDA and LC-MS techniques and stoichiometry was determined to be 1:6 ([TMP]:[Fe(VI)]). The identified products include 3,4,5-trimethoxybenzyaldehyde, 2,4-dinitropyrimidine and (Z)-1-nitro-3-((E)-nitromethyleneamino)pro-2-en-1-iminium.