

Oxidation of Amitriptyline by Bromamine-T in Acidic Buffer Medium: A Kinetic and Mechanistic Approach

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Abstract : The kinetics of the oxidation of amitriptyline (AT) by sodium N-bromotoluene sulphonamide ($C_6H_5SO_2NBrNa$) has been studied in an acidic buffer medium of pH 1.2 at 303 K. The oxidation reaction of AT was followed spectrophotometrically at maximum wavelength, 410 nm. The reaction rate shows a first order dependence each on concentration of AT and concentration of sodium N-bromotoluene sulphonamide. The reaction also shows an inverse fractional order dependence at low or high concentration of HCl. The dielectric constant of the solvent shows negative effect on the rate of reaction. The addition of halide ions and the reduction product of BAT have no significant effect on the rate. The rate is unchanged with the variation in the ionic strength ($NaClO_4$) of the medium. Addition of reaction mixtures to be aqueous acrylamide solution did not initiate polymerization, indicating the absence of free radical species. The stoichiometry of the reaction was found to be 1:1 and oxidation product of AT is identified. The Michaelis-Menton type of kinetics has been proposed. The $CH_3C_6H_5SO_2NHBr$ has been assumed to be the reactive oxidizing species. Thermodynamical parameters were computed by studying the reactions at different temperatures. A mechanism consistent with observed kinetics is presented.

Keywords : amitriptyline, bromamine-T, kinetics, oxidation

Conference Title : ICAP 2016 : International Conference on Applied Physics

Conference Location : London, United Kingdom

Conference Dates : August 25-26, 2016