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Effect of cationic micelles of cetyltrimethylammonium bromide on the MnO_4^- oxidation of valine

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ABSTRACT

In this paper we report the effect of cationic micelles of cetyltrimethylammonium bromide (CTAB) in the oxidation of valine by permanganate in the absence and presence of sulphuric acid media. The reaction follows fractional- and first-order kinetics with respect to [valine] and [H_2SO_4] in the presence of CTAB whereas [H_2SO_4] has no effect on the reaction rate in the absence of CTAB under our experimental conditions. The observed catalytic effect of CTAB is discussed in terms of penetration of non-polar side chain of valine into the palisade layer of CTAB micelles through hydrophobic interactions. The Menger and Portony model of micelles and the model modified by Bunton's group have been used to explain the catalytic role of CTAB. On the basis of various observations, the most plausible mechanism is proposed and discussed.