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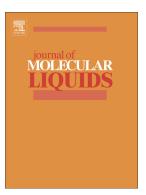
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Influence of surfactants/polyethylene glycols mixture on the kinetics of

alkaline hydrolysis of tetracaine

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Abstract

The influence of the surfactants namely sodium dodecyl sulphate; SDS, cetyltrimethyl

ammonium bromide; CTABr, and Triton-X-100; TX-100 and polymeric surfactants (viz.

polyethylene glycols; PEG) on the rate of hydrolysis of tetracaine in the alkaline medium has

been studied spectrophotometrically. The pseudo-first-order conditions were maintained by

keeping [OH] >> [tetracaine]. The rate of hydrolysis of tetracaine was found to be linearly

dependent upon the concentration of NaOH in the concentration range from 2.0 x 10⁻² mol

 dm^{-3} to 1.7×10^{-1} mol dm^{-3} at a fixed concentration of tetracaine at 4.0 x 10^{-5} mol dm^{-3} . The

values of rate constant were found to be independent on the concentration of tetracaine in the

concentration range from 1.0 x 10⁻⁵ mol dm⁻³ to 6.0 x 10⁻⁵ mol dm⁻³ at a fixed concentration of

NaOH at 5.0 x 10⁻² mol dm⁻³. The rate of hydrolysis of tetracaine decreased with the increase

in the [surfactants] and [PEG-surfactant]. Low molecular weight gave higher values of

binding constant for tetracaine in comparison to higher analogues. This indicates that the

lower molecular weight PEGs give more compact structure with CTABr. The increase in

PEGs concentrations from 1% to 3% (w/v) increased the rate constant values slightly due to

break in the water structure, interfacial adsorption of surfactants and lowering in viscosity of

media. The observed results were treated in the light of pseudophase and pseudophase ion

exchange models and the various kinetic parameters e.g., the binding constants for tetracaine with the micelles (K_s) and PEG-surfactant (K_p) and the values of rate constant in the micellar

(k_m) and PEG-surfactant (k_p) were determined.

Keywords: Alkaline hydrolysis; tetracaine; PEG; SDS; CTABr; TritonX-100

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