Microchemical Journal
Volume 65, Issue 3, October 2000, Pages 237-244

Spectrophotometric determination and kinetic studies of condensation of aromatic aldehydes with 1,3-dimethylbarbituric acid

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https://doi.org/10.1016/S0026-265X(00)00123-5

Abstract

The condensation reaction of 1,3-dimethylbarbituric acid with aromatic aldehydes in ethanol has been investigated spectrophotometrically at 25–35°C. The reaction follows overall second-order kinetics, first-order each in reactant. From the dependence of the rate constants on temperature, activation parameters have been calculated. The rate of condensation increases with the presence of electron donating groups on the aromatic ring of the aldehyde. The rate-determining step involves dehydration of the aldol intermediate. The reaction was found to be catalyzed by HCl solutions. Based on this reaction, determination of 10 aromatic aldehydes in a concentration range of 0.13–70.25 μg/ml is proposed. The method was applied for determination of barbituric and 1,3-dimethylbarbituric acids also.

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Keywords

Aromatic aldehydes; Condensation; 1,3-Dimethylbarbituric acid; Spectrophotometric determination

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