Application of Surfactant-Dye Binding Degree Method for the Determination of Codeine in Pharmaceutical Preparations

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The surfactant to dye binding degree (SDBD) method is a new analytical approach, which is based on the competitive aggregation in a ternary amphiphilic system [1,2]. In the present work, this methodology has been used to determine codeine as a model basic drug. The cationic dye Neutral red (NR) and Bis(2-ethylhexyl) sulfosuccinate (AOT) were used as the dye and reactant surfactant, respectively, to form mixed AOT-NR aggregates. The formation of these assemblies was monitored from changes in the spectral features of the dye. The addition of codeine (cationic drug) to the dye-surfactant mixture resulted in the formation of drug-AOT aggregates and, hence, in decreased interactions between the dye and the anionic surfactant. The change in the surfactant to dye binding degree was proportional to the concentration of the drug in the aqueous solution. The effect of several experimental variables such as pH, concentrations of buffer, NR and AOT were studied. Under the optimum conditions, the proposed method permitted the determination of codeine in the range of 1.0-28 μg mL⁻¹ with correlation coefficient of 0.9986. The limit of detection was found to be 0.35 μg mL⁻¹. The proposed method was applied to determination of codeine in pharmaceutical formulations with acceptable precision and accuracy.

References