

Fluorescence enhancement of propranolol in the presence of anionic micellar media

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Background and Aims: To study possible interaction of surfactants with selected drug molecules and the effect of micellar media on the intrinsic fluorescence of the model drugs. The present work focuses specifically on fluorescence enhancement of propranolol by different surfactants, especially sodium dodecyl sulfate (SDS). The enhancement may be employed as a basis for developing sensitive fluorescence-based assay methods.

Method: Fluorescence intensity of propranolol over a concentration range of 5-50 µg/ml was measured in the presence of different concentrations of three surfactants including SDS (anionic), Brij®35 (non-ionic) and cetyl trimethyl hexamethyl ammonium bromide (CTAB, cationic) and across a wide range of pH between 2 to 10. The excitation wavelength was set at 288 nm.

Results: A profound enhancement (up to 2 folds) in fluorescence intensity of the drug was observed with SDS at a wide range of SDS concentrations, especially with concentrations above critical micellar concentration of SDS.

Conclusions: Propranolol has a basic functional group (NH-alkyl) with a pKa value of 9.5 and due to its basic characteristics, it can adopt a positive charge over a wide range of pH of the medium. Thus, it interacts with negatively charged micellar aggregates of SDS, especially in acidic solutions. This interaction resulted to profound enhancement (up to twice) in fluorescence intensity of the drug compared to the drug solution. No significant increase in fluorescence intensity of propranolol was observed in the presence of Brij®35 and CTAB.

Keywords: Propranolol; Surfactant; Fluorescence Enhancement