

Synthesis, Characterization and Physico-chemical Investigation of Renewable Piperazinium Cationic Surfactants

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Cationic surfactants, is an important class of surfactant that find countless applications in household, industrial and biomedical fields.¹⁻³ In recent years surfactants synthesized by cost effective and energy saving methodology has become priority in the field of colloid and interface science. Recently, studies related to physico-chemical interaction of surfactants and biologically active molecules have gained increased attention. Earlier we have reported the synthesis and properties of new generation imidazolium and pyridinium amphiphiles.⁴⁻⁷ In the continuation to our work six new renewable cationic surfactants have been synthesized by cost effective methodology and investigated for their self aggregation properties. We have also investigated their interactions with promethazine hydrochloride drug. These new amphiphiles have been characterized by NMR, Mass and FTIR spectroscopic techniques. Further these amphiphiles have been evaluated for their thermodynamical physical parameters like critical micelle concentration (cmc), aggregation number (N_{agg}), surface tension at the cmc (γ_{cmc}), adsorption efficiency (pC_{20}), effectiveness of surface tension reduction (Π_{cmc}), maximum surface excess concentration (Γ_{max}) and minimum surface area/molecule (A_{min}) at the air-water interface, Gibbs free energy of the micellization (ΔG^0_{mic}) and Gibbs free energy of adsorption (ΔG^0_{ads}) by using surface tension, fluorescence and conductivity techniques. The drug interaction of these renewable surfactants has been investigated by using various spectroscopic techniques.

References

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