Interaction of Polyacrylic acid (carbopol 940) Microgels with Sodium dodecylsulfate

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Carbopol is very useful as a main component of drug delivery gel systems. The incorporation of small amounts of surfactants into polymer dispersion can change the viscosity of the system. The increases or decreases in viscosity can be use for developing drug delivery systems with preventing irritations and achieving better contact.

The aim of this study was to investigate interactions between sodium dodecylsulfate (SDS) and carbopol using viscometry and conductometry. In this case polymer-surfactant association is mainly influenced by hydrophobic interaction and is favored when the polymer is non ionized [1]. Although several studies have already reported interaction in carbopol-ionic surfactant systems we wanted to clearly establish these interactions as a function of SDS concentrations using constant carbopol content in the mixtures. Carbopol and SDS dispersions in water are general homogeneous. Usually, nonionic polymers/SDS dispersions present very similar conductivities as those in the absence of polymer, as in this case [2]. In conductivity determinations of polymer-surfactant mixtures could be noticed two break pints. First one is critical aggregation concentration (cac) which presents the beginning of interactions and the other one is polymer saturation concentration (psp), the concentration at which interaction finishes. Addition of SDS causes the decrease of the specific viscosity of SDS-carbopol mixtures. The surfactant effects on the viscosity of carbopol dispersions can be explained through hydrophobic association between small SDS molecules and carbopol tails in mixed micelles [2].

Influence of SDS concentration on A) specific viscosity and B) conductivity of SDS-carbopol mixtures. Carbopol concentration was kept constant: A) 0.06 g/100 ml and B) 0.03 g/100 ml.