Brief Research Report

THE BINDING OF CATIONIC SURFACTANTS TO GELATIN *

Claudette Mifsud, Emmanuel Sinagra†, S. Vassallo and Mark A. Scerri
Department of Chemistry, University of Malta, Msida, Malta.
www: http://home.um.edu.mt/chemistry

The interaction between gelatin and anionic surfactants is an important phenomenon and has been reported in a number of articles [1]. The study of the interaction between gelatin and cationic surfactants has been paid less attention in comparison, however, it has been concluded that the interaction is weaker than that between the biopolymer and anionic surfactants[2]. The objective of this work was to investigate the effect of (i) variation of surfactant head-group type and chain length and (ii) variation of pH on the binding of cationic surfactants and gelatin.

The binding studies were performed using either equilibrium dialysis or a purposely-prepared surfactant selective electrode. The gelatin used was of the B type with a bloom stength of 225 and an isoelectric point (IEP) of 4.9.

Dodecyltrimethlammonium bromide was found to bind cooperatively to gelatin above the IEP of the polymer. The cooperativity threshold concentration (ctc) was found to match the critical micelle concentration (cmc) of the surfactant. Below this value very little surfactant adhered to the gelatin. The amount of surfactant bound to the gelatin increased on increasing the pH of the solution. Similarly the amount of dodecylpyridinium chloride binding to the gelatin was found to be negligible below the cmc of the surfactant. Dodecylammonium chloride was found to bind cooperatively with the gelatin even at pH values below the IEP of the polymer. Furthermore the ctc was detected below the cmc of the surfactant and its value was observed to decrease with increasing pH.

The binding of hexadecyltrimethylammonium bromide and hexadecylpyridinium chloride with gelatin was also found to be cooperative above the IEP of gelatin. Unlike their shorter-chained analogues, these surfactants showed ctc values below their cmc. The values of the ctc were also found to decrease with increasing pH.

Through these studies, we were able to conclude that the order of binding strength (BS) is likely to be:

Greatest BS :	dodecylammonium Chloride
Medium BS :	hexadecyltrimethylammonium bromide, hexadecylpyridinium chloride
Lowest BS :	dodecyltrimethlammonium bromide, dodecylpyridinium chloride

References:

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[2] Fruhner, H.; Kretzschmar, G. *Colloid Polym. Sci.* **1989**, 267, 839, Henriquez, M.; Abuin, E.; Lissi, E. *Colloid Polym. Sci.* **1993**, 271, 960.

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† *Corresponding Author. 2340-2396, e-mail: emmanuel.sinagra@um.edu.mt*