



Adsorption Studies of Non-Ionic Surfactants at Different Vegetable Oil-Water Interfaces

Rao A. HAMEED¹, Mehboob-e-RABBANI¹, Syed N.H. SHAH¹, Shujaat A. KHAN²,
Muhammad A. YAMEEN², Muhammad H.H.B. ASAD² & Ghulam MURTAZA^{2*}

¹ Faculty of Pharmacy, Bahauddin Zakariya University, Multan, Pakistan.

² Department of Pharmaceutical Sciences, COMSATS Institute of Information Technology,
Abbottabad, Pakistan.

SUMMARY. The adsorption studies of non-ionic surfactants (tween 20, tween 40 and tween 80) were conducted at olive oil-water, sunflower oil-water and corn oil-water interfaces by ring detachment method with a du Nouy Tensiometer at 20 °C. A decrease in interfacial tension with an increase in surfactant concentration was observed at all the oil-water interfaces under investigation. Surface excess was calculated from Gibb's equation while area per molecule was computed from surface excess. Surface pressure-area curves were plotted to study the states of films formed. On close examination of π -A graphs, it was indicated that all the graphs have three distinct parts. The extreme left portion (a) of the graphs represents condensed state, called solid film region, the curved region (b) of the π -A graphs corresponds to liquid film region, while the gaseous film region (c) is indicated by the shallow right hand part of the curves. The solid film region was more prominent in corn oil-water system while a more distinct gaseous film region was observed in olive oil-water system than in other oil-water systems studied. However, liquid film region was observed in all the systems investigated. The observed difference in the behaviour of surfactants at different vegetable oil-water interfaces could be attributed to the difference in types of interacting forces between the surfactant molecules and various vegetable oil phases.

KEY WORDS: Boiling point, Critical micelle concentration, Interfacial tension, Specific capacity, Surface tension, Tween 20, Tween 40, Tween 80.

* Author to whom correspondence should be addressed. *E-mail:* gmdogar356@gmail.com