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**INFLUENCE OF SILOXANE SURFACTANTS ON THE
RHEOLOGY AND INTERFACIAL PROPERTIES OF OIL
BASED SYSTEMS**

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Abstract

The purpose of this work was to study siloxane surfactants. Their rheological behaviour was examined as well as the stability and rheology of the emulsions into which they were incorporated. Their interfacial properties in an organic medium were studied. These results were then correlated to data obtained from commercially available creams.

Commercially available water-in-silicone and oil-in-water emulsions exhibited a shear thinning behaviour and a relatively low yield stress.

The water volume fraction as well as the surfactant concentration affected the stability and rheology of the emulsions. Increase in either of them resulted in an increase in the stability, viscometry and viscoelastic parameters. The emulsions containing a high water volume fraction exhibited a shear thinning behaviour and a yield stress.

Formulation methods and used equipment altered the formulated emulsions properties. A high shear homogeniser produced smaller droplets and therefore more stable emulsions with higher viscosities. Short mixing times resulted in a relatively weak internal structure, which was linked to a low yield stress.

The prepared emulsions sedimented and flocculated but no evidence for coalescence was found. The rheological parameters after three months were compared to the initial ones and no change was found, suggesting that no change in droplet size had occurred.

Surface and interfacial tension measurements confirmed the surface activity of the siloxanes. For some siloxane surfactants, cmc measurements were conducted successfully.

SANS measurement showed the presence of aggregates in solution. Data fitting suggested that the Benoit star polymer model with hard spheres was the appropriate model.

Publications derived:

- Rheology of siloxan stabilised water-in silicone emulsions
presented at the symposium on “Surfactants - The Workhorses of the Cosmetic Industry”,
7/8 April 1997, Bristol, organised by the Society of Cosmetic Scientists.
Int. J. Cosm. Sci., **19**, 173-191, (1997).
- Book review “An Introduction to rheology”
Int. J. Cosm. Sci., **20**, 193-194, (1998).
- Rheology of two commercially available cosmetic oil in water emulsions
presented at the 32^e Colloque du Group Français de Réologie,
28-30 October 1997, Nantes, France.
Int. J. Cosm. Sci., **20**, 317-326, (1998).