

Cations, as a whole, are less soluble in the oil phase than anions, and this gives rise to negatively charged droplets (akin to the creation of a zeta-potential in suspensions). The potential drop over the film depends on the nature of the electrolyte (and it should be noticed that there is a diffuse double layer in both liquids as opposed to the case of suspensions, where there is only one diffuse double layer).

Electrolytes may either improve or worsen the stability: If they eliminate the protection offered by the surfactant/protective colloid system then coalescence occurs. Most often electrolytes have the effect of reducing the emulsifying powers of surfactants and causing salting out or actually precipitating the surfactant. However, in some cases, electrolytes will favorably affect the potential drop over the two double layers, and in this case they may stabilize the suspension system.

4.8. Semisolid Dosage Forms

Semisolid emulsions (cold creams, vanishing creams) are not different, in general philosophy, from the above, except that the rheology is checked differently. Davis (1984) has reviewed sophisticated means of checking the stability of these types of systems. He lists the following properties as being important in stability programs for semisolid emulsions:

1. Particle size
2. Polymorphic/hydration/solvation states
3. Sedimentation/creaming
4. Caking/coalescence
5. Consistency
6. Drug release

Of these, particle size, sedimentation/creaming, caking-coalescence, and consistency have been discussed earlier.

Following viscosity as a function of time is here of particular interest. The problem is how to measure the viscosity, and what viscosity in essence means. Davis (1987) points out that changes in viscoelastic properties are much more sensitive than simple continuous shear measurements (Barry, 1974). He demonstrates this via data published by Eccleston (1976). Here (Fig. 12) the variation of the dynamic viscosity (η) and the storage modulus (ϕ) are shown and compared with the same type of graph for apparent viscosity (μ') from continuous shear experiments. It is obvious that the two former measurements are much more sensitive.

4.9. Transdermals

The most important concern about transdermals is the release of drug substance from them and the stability of this property. Other properties (stickiness, appearance, etc.) are of importance as well, but the release characteristic is paramount. Kokobo et al. (1991) have described a means of checking this in vivo by using a single diffusion cell. The volume could be, for instance, 2.5 mL, and the diffusion area could be of the order of 1 cm². The matrix is placed, e.g., in contact with a 40% polyethylene glycol solution, which can be, e.g., removed in 500 μ L quantities.