

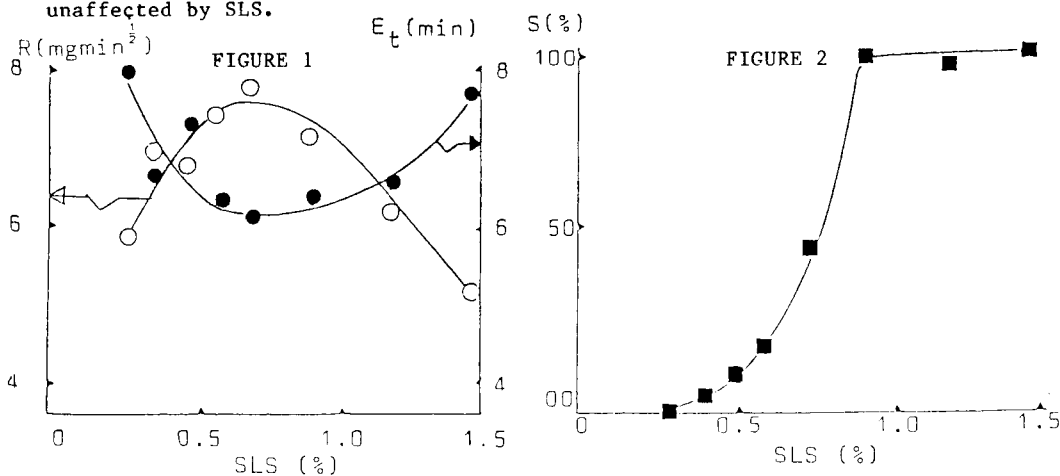
THE EFFECT OF SODIUM LAURYL SULPHATE ON TOPICAL DRUG AVAILABILITY

J. Hadgraft and P. Ashton, Pharmacy Dept., Nottingham University, University Park, Nottingham NG7 2RD and K.A. Walters, Pharmaceutical Div., Fisons p.l.c., Loughborough.

The effect of the anionic surfactant sodium lauryl sulphate (SLS) specially pure, supplied by BDH Chemicals Ltd., on the activity of two esters, methyl nicotinate and hexyl nicotinate, in aqueous gels has been studied. Both nicotinate esters produce local erythema when applied to the skin and the time of onset of this effect is indicative of the speed at which they penetrate the skin.

Carbopol 941 gels (1%) were prepared containing nicotinate and varying amounts of SLS (0 to 1.5%). The release of methyl nicotinate, measured in-vitro (Billups and Patel) was unaffected by surfactant concentration as was its thermodynamic activity, measured by head space analysis, and the time of onset of erythema (E_t) it produced in volunteers. However the release rate (R) of hexyl nicotinate was affected (Fig.1). As surfactant concentration was increased the release reached a maximum at 0.7% before decreasing at higher S.L.S. concentrations (Fig 1). This was matched by a minimum in onset of erythema between 0.6% and 0.9% SLS (Fig.1). The thermodynamic activity of hexyl nicotinate within the gels was independent of surfactant concentration up to 0.9%, at which point it was fully solubilised, increasing SLS content beyond this caused a reduction in thermodynamic activity. Measurement of the optical density of the gels allowed the amount of solubilised hexyl nicotinate present (S) to be estimated (Fig.2).

It would appear that as surfactant concentration is increased from 0.3%, the highly insoluble hexyl nicotinate, present in the gel as small, unsolubilised droplets becomes solubilised within surfactant micelles causing a reduction in optical density and an increase in its release from the gel. Once all the nicotinate is solubilised (at 0.9% SLS) the addition of more surfactant merely reduces its thermodynamic activity and hence its release from the gel. Methyl nicotinate however is readily soluble in water and would not be expected to partition to a large extent into surfactant micelles and its release is thus largely unaffected by SLS.



Billups N.F. and Patel N.K., Am.J.Pharm.Ed., 34, 190 (1970)