On ageing, the consistencies of A and B changed during the first 10 days and then remained essentially constant. The changes were shown in A by maxima in apparent viscosities and amplitude ratios and minima in phase lags and total compliances, and in B by decreasing apparent viscosities and amplitude ratios and increasing creep compliances and phase lags over the first 10 days. Thereafter, these parameters did not change markedly. In contrast, C exhibited considerable consistency increases on ageing, particularly over the first few days, when the emulsion changed from a mobile liquid to a semisolid. Emulsion D was semisolid initially (as A and B) but showed considerable consistency increases during the first 2 days (as C). Thereafter consistency changes were slight. Apparent viscosities indicated that D was more resistant to breakdown than the other emulsions.

Microscopical examinations supported the view that networks formed in C differed from those in A and B, and that those formed in D were the most extensive. Although the ceto-macrogol/pure alcohol networks were diffuse, they did not rapidly disintegrate on storage as did the ionic surfactant/pure alcohol networks examined previously.

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Transit in free films: casting solvent effects

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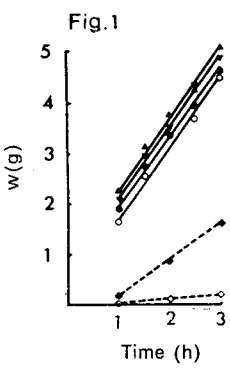
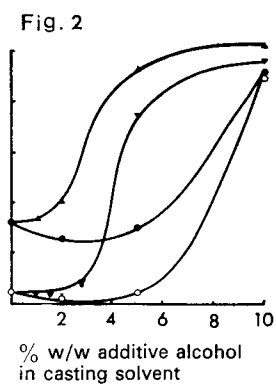
The permeability of polymer films may be affected by varying the solvent(s) used in casting (Johnston & Sourirajan, 1973). Permeation rate for urea has been shown to be greater when the lower side of acrylic-methacrylic ester copolymer film is exposed to the solute (upper-lower side-difference) (Anderson, Armstrong & Abdel-Aziz, 1973). Casting solvent variation is now shown to determine permeation rate and degree of side-difference in acrylic-methacrylic ester copolymer (Eudragit RL100, Rohm and Haas) film which was cast from acetone and acetone plus variable methanol or ethanol content. Films were mounted in a permeability cell such that one side was exposed to 10% w/v aqueous urea solution and the other to water; the urea appearing in the acceptor compartment being determined (Watt & Chrisp, 1954). Lower and upper surfaces of the film were exposed to solute in the donor compartment, these terms signifying contact with casting substrate or atmosphere respectively during casting.





FIGS. 1 and 2. Effect on permeability of solvent additives in film casting solutions. Fig. 1. 10% w/w methanol or ethanol in acetone in the casting solvent. Fig. 2. 3 h values with variable alcohol levels. w = quantity (g) urea transferred to the acceptor cell. Acetone, ◆ lower surface, ◇ upper surface; ethanol, ▲ lower surface, ▼ upper surface; methanol, ● lower surface, ○ upper surface.

Fig. 1 shows that inclusion of 10% w/w methanol or ethanol in acetone casting solvent reduces upper-lower side-difference in permeation rate but increases overall urea permeation rate. Lower methanol or ethanol content had variable effect on rate in a 3 h experiment (Fig. 2). Scanning electronmicroscopy revealed increased surface porosity when methanol or ethanol were included in the casting solvent for both pre- and postpermeation films. These results have obvious significance in the use of films in permeation studies.

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The relationship between the physical and drug release properties of polyethyleneglycol bases

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Baichwal & Lohit (1970) have demonstrated that the consistency of theobroma suppository bases can be correlated with drug release. Chiou & Riegelman (1971) have shown that lipophilic drugs dissolved more rapidly when incorporated in polyethyleneglycols (PEG) and the release rates and blood levels of indomethacin have been shown to be superior from PEG than from conventional lipophilic bases (Kerckhoffs & Huizinga, 1967). The present work examines the relation between *in vitro* release of prednisolone and the elastic moduli and breaking strength of solid PEG bases.

Cylindrical blocks of PEG 15 mm in diameter and length were prepared by pouring the appropriate molten base, which was just above its congealing point (Collins, Hohmann & Zopf, 1957), into a brass mould. The prednisolone (0·625% w/w) was dissolved in the molten base to produced blocks for release testing and water, if required, was added immediately prior to pouring.

Prednisolone release was measured on four similar blocks simultaneously using a rotating basket dissolution apparatus at 37°. 2 litres of distilled water was used as the dissolution medium and 5 ml samples were withdrawn every 120 s and analysed for prednisolone content. The times for 25, 50, 75 and 100% release of drug were determined from the concentration/time curves. The elastic modulus and breaking strength of the blocks were determined at 22°, face on, in a compression unit against a load cell, using a constant strain rate of 60 mm h^{-1}.

The samples tested were commercially available PEG 1000, 1540, 4000 and 6000 and intermediate molecular weights were produced by blending PEG 1000 with 4000 and 6000. A significant linear relation was observed between molecular weight and the times for 25, 50, 75 and 100% drug release. When water was incorporated into PEG 4000 a linear decrease in release times was observed for increase in water content. Because of the difficulty in casting, blocks containing more than 15% water could not be tested. The release times also exhibited a linear correlation with the breaking strength of the bases.

The relation between the elastic modulus and the release times was of a complex nature and no apparent trend was obvious. Similar results were observed when the elastic modulus and breaking strength were compared with the PEG molecular weight. It is possible that the lack of correlation in these results may be due in part to the anomalous behaviour exhibited by the elastic modulus of PEG 6000. However, definite trends were apparent when the elastic moduli and breaking strengths of 4000/1000 and 1000/400 mixtures were measured. The former blend produced a linear relation, the latter curvilinear.

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