ABSORPTION THROUGH CADAVER SKIN OF IBUPROFEN, APPLIED AS DRY FILMS; EFFECTS OF SOLVENTS

S.A. Akhter, B.W. Barry, and M.C. Meyer*, School of Pharmacy, University of Bradford, Bradford, West Yorkshire, BD7 1DP. *The Boots Company, Nottingham.

In the treatment of arthritis and allied conditions the topical use of potent non-steroidal anti-inflammatory drugs warrants investigation.

We investigated the penetration of Ibuprofen from deposited dry films (Scheuplein and Ross 1974; Franz 1978). Full thickness, dermatomed skin (M) was mounted on stainless steel support (S) in glass diffusion cells shown below. The donor (D) was exposed to 22 ± 1°C and 60 ± 5% relative humidity and the receptor (R) stirred with teflon coated bar magnet (T) contained phosphate buffer pH 7.4 (37 ± 0.5°C). Dry films (0.1, 0.7 and 5.0 mg, 4 replicates) were deposited by acetone evaporation (50 µl) from radiolabelled Ibuprofen (4µCi/Cell) solutions. We monitored the cumulative penetration for the first 60 h, representing penetration from acetone (Ac control) and then a dry film; the next 40 h under occlusion and finally added 100 µl of either dimethyl isosorbide (DS) or N-methyl-pyrrolidone (NP) to the dry film.

DIFFUSION CELL

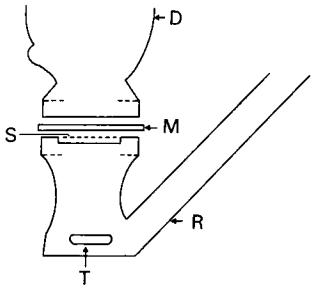
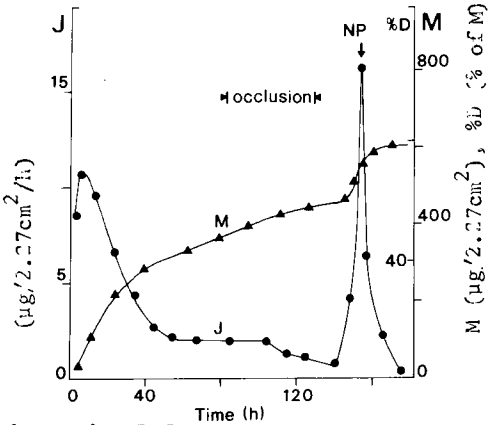
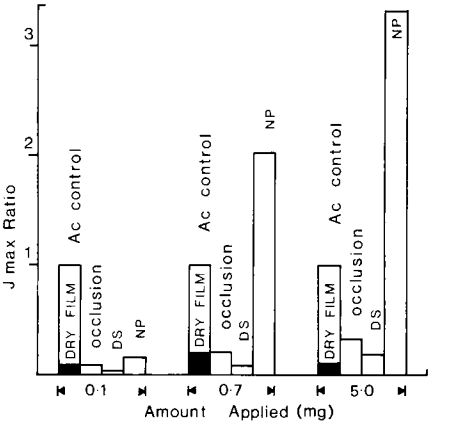


Table 1 Ibuprofen penetration from 100, 700 and 5,000 mg. Data expressed as µg penetrated (µg) and ratio of µg (R.µg) relative to 100 µg dose, at 11, 24 and 49 h.

Applied Dose	11 h		24 h		49 h	
	µg	R.µg	µg	R.µg	µg	R.µg
100	19.7	1.0	30.5	1.0	42.6	1.0
700	91.3	4.6	174	5.7	250	6.1
5,000	311	15.8	697	22.9	1342	31.5

Fig. 1. shows typical rate (J) and cumulative (M) profiles (0.7 mg deposited film). The overall effect on the three doses due to acetone, dissolution, occlusion, DS or NP treatment, is shown in Fig. 2. Maximal rates obtained are expressed as ratios (J max Ratio) relative to the acetone control. Dry film, occlusion and DS produce little change in the penetration profile, however NP produces a dramatic increase. The results are explainable in terms of solubility, dissolution characteristics of the deposited dry film and penetration enhancement effects.





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Franz, T.J. (1978) Curr. Probl. Dermatol. 7:58-68

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