

EFFECTS OF GLYCEROL AND PROPYLENE GLYCOL ON EXCISED MOUSE SKIN AND SKIN PERMEABILITY

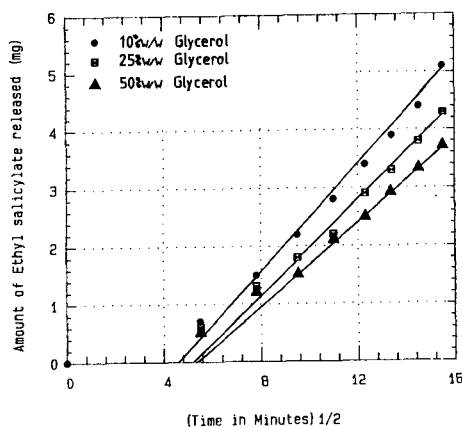
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When a vehicle is applied to the skin, the condition of the skin may be affected. Some vehicle components may penetrate the skin and act as carriers. Others may alter the barrier properties of the skin by direct action on its structure or by providing a reservoir in the skin phase.

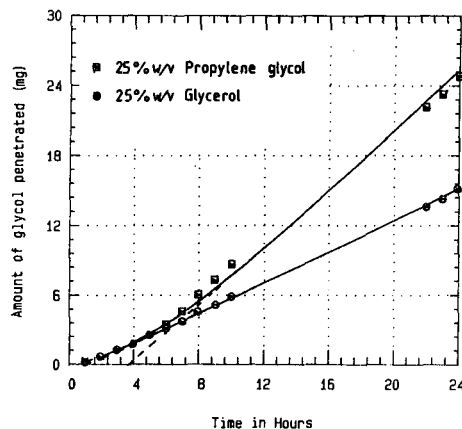
The release of ethyl salicylate from Carbopol gels (1%w/w) containing increasing concentrations of glycerol and propylene glycol was studied using the method described by Billups and Patel (1970). The membrane (Silastic) was shown independently not to be rate limiting. Two effects were noted. Increasing the solubilised drug by the addition of the co-solvent should increase the release rate; however this was counteracted by an increase in solvent viscosity (Fig 1). Ex vivo, using nude mice, it was seen that only high glycol concentrations affected the transdermal absorption of salicylate. The penetration of the glycols through excised mouse skin was however very slow (Fig 2). This correlated with in vivo stripping studies where the concentration of radiolabelled glycol was determined in vertical layers of the epidermis of nude mice. A marked accumulation of both glycols was observed in the outermost layers of the stratum corneum.

A histological assessment of the in vitro and in vivo damage to the epidermal structures indicated no untoward effect on application of glycerol in vivo. The adverse effect seen in vitro for both glycols was mostly due to the general deterioration of the skin. Propylene glycol had affected the skin in vivo, a progressive lessening in the cohesiveness of the cells in the stratum corneum was seen, together with a thickening of the epidermal layer.

The results suggested that both glycols are unlikely to hydrate the skin, but could ensure prolonged drug delivery. High concentrations of propylene glycol alone may increase the transdermal penetration of a drug, probably by lessening the cohesiveness of the cells in the stratum corneum.



Ethyl salicylate release (mg) from gel containing 1% w/w ethyl salicylate at 35°C. Membrane "Silastic".



Penetration of propylene glycol and glycerol in mg through nude mouse skin from gel containing 25% w/w glycerol or propylene glycol.