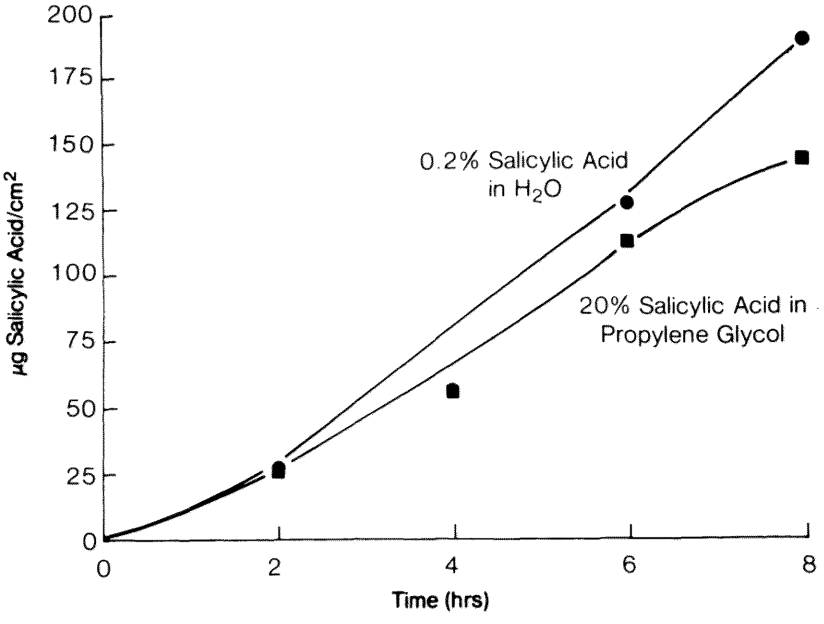

Figure 1.1 Penetration of salicylic acid across human epidermis in vitro from saturated solutions.

$$\frac{\partial C}{\partial t} = D \frac{\partial^2 C}{\partial x^2} \qquad [7]$$

$$C(x, 0) = 0, C(h, t) = 0 \qquad [8]$$

$$C(0, t) = R C_V(t) \qquad [9]$$

where h is the thickness of the stratum corneum, D is the diffusion coefficient, C_V is the concentration in the vehicle, R is the partition coefficient between skin and the vehicle, C is the concentration in the skin. These equations reflect the assumptions that diffusion in the vehicle is much faster than in the skin, and that sink conditions exist below the skin. The solution of Eqs. 6 through 9 can be obtained from the existing solution for heat conduction (2) and is

$$J = -D\left(\frac{\partial C}{\partial x}\right)_{x=h} = 2J_s \sum_{n=1}^{\infty} \frac{\alpha_n^2 \exp[-\alpha_n^2 \tau/6]}{\cos \alpha_n [\beta^2 + \beta + \alpha_n^2]} \qquad [10]$$