the vehicle to its interface with the skin and diffusion across the outer skin. Even in the absence of specific drug–vehicle–skin interactions, there are special circumstances in which dissolution of drug suspended in the vehicle or diffusion through the inner living strata of the skin may become rate-determining.

A theoretical basis for the study of the release kinetics of drugs from both suspension and solution ointments for the case in which release from the vehicle is rate-limiting was established by Higuchi (5). Higuchi first depicted the situation in which the ointment vehicle is initially saturated with solute, with excess solute uniformly suspended as tiny particles. The exact assumptions for the derivation of the time dependency of release are as follows:

1. The particles are present in a fine enough state so that dissolution of the particles is not rate-limiting.
2. Q (the total concentration (mass/volume) of dissolved and undissolved drug) is much greater than C_S (the solubility (mass/volume) of the drug in the ointment).
3. A sink condition prevails at the ointment–receiver phase interface.
4. Release occurs through a planar surface.
5. There is no significant boundary layer adjacent to the ointment (assumed implicitly).
6. Quasi–steady-state diffusion exists between the dissolution interface at the edge of the particle field and the interface with the sink.
7. Although not explicitly stated, the model is semi-infinite, as in the original derivation no limit was placed on how far the boundary could recede.

Assumption (2) is in effect a directive that dissolution takes place rapidly at the edge of the receding particle field in the course of drug release. Thus, unit activity (activity of the crystalline state) is continuously experienced along this front, and, with the passage of time, a well demarcated zone lying between the releasing surface and the suspension phase develops that is spanned by a linear concentration gradient given by the solubility divided by the thickness of the layer, that is, (C_S/h). The release of drug through the surface is controlled by the momentary steepness of this gradient. As time progresses, the distance between the edge of the saturated suspension phase within the ointment and the ointment's sink-side surface widens, resulting in a decrease in the rate of drug delivery. The following equation describing the release of solute was derived (5).

$$M_t = \sqrt{2 D C_S \left(Q - \frac{C_S}{2} t \right)} \qquad [1]$$