so that, as expected, the slopes are in a ratio of 5/3, i.e., the inverse of the ratio of thicknesses. The actual lag times are found by setting $\ln[M] = \ln[100]$, and they are $t_I = 0.67$ hours and $t_{II} = 0.96$ hours, i.e., again in the correct ratio. t_f is the point of inflection, i.e., occurs when all the drug inside the pellets will have dissolved (although not all will have diffused out).

In stability programs, t_i and k are the logical parameters to follow, i.e., complete dissolution curves should be determined. Again, it is wise to do this at room temperature storage at fairly short intervals at the onset (4, 8, and 12 weeks). Again, accelerated testing is not of much use.

9.2 Erosion Tablets

Tablets can be made of e.g. a waxy substance, which does not dissolve or disintegrate, but erodes away. The drug in the eroded portion will dissolve, and (in theory) the drug in the noneroded part will not have dissolved. There is, however, always some penetration of liquid into the waxy tablet, so that more than the eroded drug will often have dissolved. If pure erosion occurs, then the dissolution equation will be

$$M = M_0^{1/3} - K_e(t - t_i) \tag{10.58}$$

where K_e is an erosion constant (cube root dissolution rate constant) and t_i is the length of time of wetting. Both of these parameters can be calculated at different storage periods, and changes can be monitored in a logical fashion. Accelerated studies of this are not meaningful.

9.3 Insoluble Matrices

If a drug is enclosed in an insoluble matrix that is porous, then the release rate is given by the Higuchi square root law (Higuchi, 1963):

$$Q = K_i(t - t_i)^{1/2} \tag{10.59}$$

or

$$Q^2 = K_i^2 \cdot (t - t_i) \tag{10.60}$$

where

$$K_i^2 = a^2\left[2DS\varepsilon\left\{A - \frac{S\varepsilon}{2}\right\}\right] \tag{10.61}$$

a is here the surface area through which the diffusion takes place, ε is the porosity, and A is the loading, the amount of drug per cm^3 of dosage form. ε, the porosity, is the inherent porosity of the tablet plus the porosity created by the drug that has dissolved (i.e., A/ρ, where ρ is the density of the drug).

Eq. (10.61) applies to situations where the drug dosage, A, is larger than $S\varepsilon 2$. If this is not the case (Table 7), then the equation takes the form (Fessi et al., 1982)

$$Q^2 = a^2 Dt \tag{10.62}$$