If this is differentiated so that dx/dt is expressed as a function of x, not of t, then

$$\frac{dx}{dt} = b + ct \tag{4.67}$$

To eliminate t, Eq. (4.66) is solved with respect to t, and

$$t = -\frac{b}{2c} \pm \left[\frac{b^2}{4c^2} - \frac{a-x}{c}\right]^{1/2} \tag{4.68}$$

If

$$\left[\frac{a-x}{b}\right]^2 \ll \frac{b^2}{4c^2} - \frac{a-x}{c} \tag{4.69}$$

then

$$t \approx \frac{a-x}{b} \tag{4.70}$$

so

$$\frac{dx}{dt} = b + \left\{\frac{a-x}{b}\right\}c = A + Bx \tag{4.71}$$

where

$$A = b\left[1 + \frac{a}{c}\right] \tag{4.72}$$

and

$$B = -\frac{c}{b} \tag{4.73}$$

It is noted that even with a fairly simple function (a second-order polynomial) it is not possible to obtain an equation of the type of Eq. (4.60), where there is a definitive k. At best one might expect B to follow an Arrhenius equation.

Hence the method only has theoretical basis if $dx/\phi(x)$ can be presented in a form, and in such a way, that the rate constant, k, is a meaningful quantity.

The method, nevertheless, has great practical importance, because it allows extrapolations in a simple manner.

The data by Yoshioka are shown in Fig. 12. Again, the "activation energies" are high, but no theoretical importance should be placed on them.

3. ANTIOXIDANTS

Antioxidants work by consuming oxygen at a faster rate than the rate at which the drug substance reacts with oxygen; and in such cases they will protect the drug substance until they are completely used up.

This means that the use of antioxidants imposes a lag time upon the decomposition profile of the drug.