

Table I—Calculated Initial Amount Required According to Eq. 1

Temperature	Solubility, g/ml	Initial Amount Required According to Eq. 1, $W_0 = C_e V$, g	Initial Amount Used, g
27°	0.00231	1.04	0.5
37°	0.00320 ^a	1.44	0.5
47°	0.00465 ^b	2.09	0.5

^aDetermined in this laboratory. ^b Reference 8.

10^{-6} cm²/sec, $V = 450$ ml, $d_0 = 0.003$ cm, $\rho = 1.4$ g/ml, and $X = 34 \times 10^{-4}$ cm. Then:

$$\psi(W) = \psi(W_0) - \frac{DS_w W_0^{1/3}}{XV} t = 1.326 - 0.0036t \quad (\text{Eq. 7})$$

Equation 7 is obtained by substituting the given values in Eq. 3. It is important to note that the value of the diffusion layer (X) chosen here is taken from Ref. 1 but really it is an arbitrary value. The amount dissolved *versus* time is calculated under these conditions using Eq. 7 and is shown in Table II.

The data in Table II are treated according to Kawashima and Takenaka (1); the best-fit regression equation obtained was:

$$\log [d(C_L/C_e)/dt] = 2.16 \log \{1 - (C_L/C_e)\} - 2.613 \quad (\text{Eq. 8})$$

with a correlation coefficient of 0.989. The theoretical slope of this plot is 1.66, which is in conflict with Eq. 8. The diffusion layer thickness value calculated from Eq. 8 is 90 μ m, which also does not agree with the value used in Eq. 7 ($X = 34 \mu$ m).

Therefore, it is demonstrated here that Eq. 1 is not an appropriate model to fit the experimental results of Ref. 1. The slope of 1.66 reported in Ref. 1 is also questionable.

The best method for calculating the diffusion layer thickness (X) for the experiments carried out in Ref. 1 would be to use data points where the total amount dissolved is less than 20% of W_e and to treat the data according to the Hixson-Crowell cube root law (2). This method was used for the first five data points in Table II and gave a diffusion layer thickness (X) of 39 μ m, which is quite close to the chosen value of 34 μ m.

Table II—Amount Dissolved *versus* Time Calculated Using Experimental Conditions from Ref. 1 and Eq. 7

W_L^a , g Dissolved	W , g Un-dissolved	$\psi(W)$, g ^{-2/3}	Time, t , sec	$W_0^{1/3} - W^{1/3}$, g ^{1/3}
0	0.5	1.326	0	0
0.05	0.45	1.268	16	0.027
0.1	0.40	1.203	34	0.057
0.15	0.35	1.130	54	0.089
0.20	0.30	1.046	78	0.124
0.25	0.25	0.945	101	0.164
0.30	0.20	0.833	137	
0.35	0.15	0.689	177	
0.40	0.10	0.499	230	
0.45	0.05	0.216	308	

^aThe W_L (grams) values were assumed, and $\psi(W)$ was calculated. By using this value of $\psi(W)$ and Eq. 7, the corresponding time value was calculated.

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Reduced Acid-Neutralizing Velocity of Spray-Dried Agglomerated Magnesium Carbonate: A Response

Keyphrases □ Magnesium carbonate, agglomerated—spray dried, acid-neutralizing velocity □ Spray drying—agglomerated magnesium carbonate, acid-neutralizing velocity □ Acid-neutralizing velocity—spray-dried agglomerated magnesium carbonate

To the Editor:

It is appreciated that the estimates of the encapsulation ratio of spray-dried products depend on the method used for the calculation of diffusion layer thickness, and the validity of Patel's (1) general comments is accepted. However, his statement regarding the use of an initial weight of 0.5 g of salicylic acid in our studies requires modification.

In our investigations, samples of salicylic acid of 1.18, 1.55, and 2.24 g were placed in 450 ml of water at 27, 37, and 47°, respectively. This point is not immediately evident from our publication (2), since only the equilibrium concentration of solute was reported. Since flotation of part of the salicylic acid was observed at the initial stage of the dissolution study, a small excess of salicylic acid was added to the solvent. Therefore, our experimental conditions, where $W_0 \approx W_e$, can meet the requirement for applying the rearranged equation (2) of the Hixson-Crowell cube root law (3). The slope of plots of data based on this equation was 1.66 over 80–90% of the total amount dissolved.

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