$$\frac{\partial \tilde{n}}{\partial \tilde{L}} + \frac{\partial \tilde{n}}{\partial \tilde{x}} = \frac{1}{\mathrm{Pe_G}} \frac{\partial^2 \tilde{n}}{\partial^2 \tilde{L}} \tag{2.43}$$

where $\tilde{n}$, $\tilde{L}$ and $\tilde{x}$ are the dimensionless variables for population density, crystal size and axial distance, respectively, defined as

$$\tilde{n} = \frac{n}{n_0}; \tilde{L} = \frac{L}{G_0 \tau}; \tilde{x} = \frac{x}{\bar{x}} \tag{2.44}$$

where n_0 (# μm^{-1} m^{-3}) is the initial nuclei density, G_0 (μm s^{-1}) is the initial crystal growth rate, τ (s) is the residence time and $\bar{x}$ (m) is the effective length of the crystallizer. $\mathrm{Pe_G}$ is the Péclet number for size dispersion resulting from growth rate fluctuation, defined as

$$\mathrm{Pe_G} = \frac{G\bar{L}}{D_G} \tag{2.45}$$

$\mathrm{Pe_G}$ is a dimensionless number which provides information on the relative strength of the crystal growth rate and dispersion due to growth rate fluctuation. If $\mathrm{Pe_G}$ is large, then the relative importance of the dispersion is low and *vice versa*. By fitting the experimentally obtained CSD with the simulation results, the value of $\mathrm{Pe_G}$ is found to be 5. In Figure 2.12 comparison of the

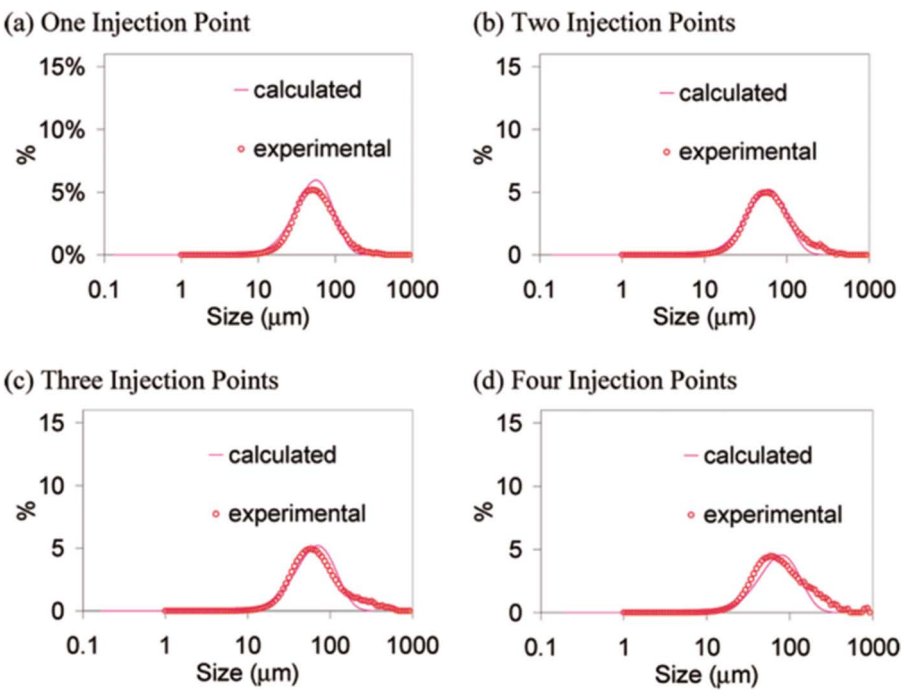

Figure 2.12 Comparison of calculated and experimental crystal size distribution for flufenamic acid using the growth rate dispersion model ($\mathrm{Pe_G}$ = 5) for various injection points ((a)–(d)). Reprinted from ref. 22 with permission of the American Chemical Society, Copyright 2010.