13.4.3 Resuspension Washing

This is an alternative approach to addressing the problem of washing a deliquored filter cake. The act of re-suspending the crystals in clean wash solvent results in the residual mother liquor becoming evenly diluted throughout the combined solution volume. This approach is very effective displacing material trapped at points of contact between particles but it requires at least three cake void volumes of solvent and risks damage to the crystals especially if the cake is re-suspended by mechanical agitation.

13.4.4 Wash Solvent Selection – Washing to Purify

It is essential to appreciate that filter cake washing is not just a physical process of forcing a fluid through a packed bed of particles to displace impure mother liquors. Depending on the quantity of API and impurities dissolved in the mother liquor there is the possibility of driving material out of solution as the wash passes through the filter cake. This may occur when the product or impurities are less soluble in the wash solvent than in the mother liquor, or mixtures of the two. Conversely there is the possibility of loss of product yield due to dissolution if the product is soluble in the wash solvent or mixtures of wash solvent and mother liquor. For these reasons it is important to quantify the solubility of the API along with the associated impurities of synthesis, residual reagents, by-products and degradants in the crystallization solvent and potential wash solvents and combinations thereof.

This is illustrated in Figure 13.6 for paracetamol in ethanol – water mixtures across a range of proportions at different temperatures using data

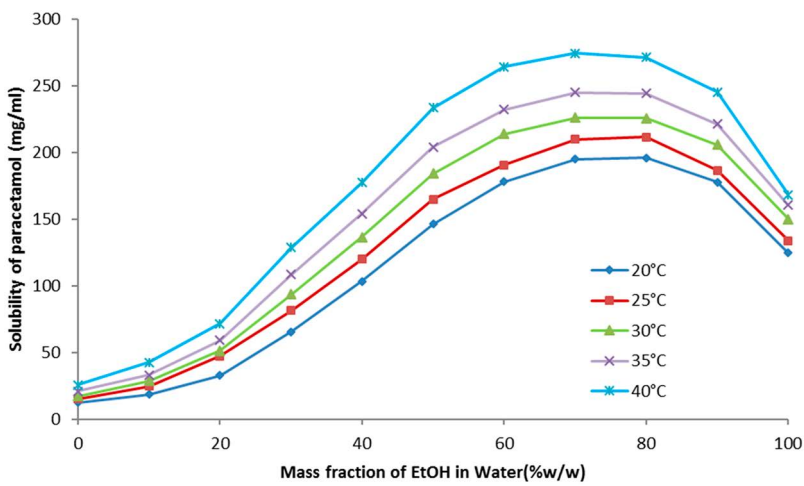

Figure 13.6 Solubility dependence of paracetamol in ethanol water mixtures across a range of temperatures. (Figure plotted from data reported by Jiménez and Martínez.[4])