

Formation of Sub-micron Particles of Poorly Water Soluble API by RESOLV

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RESOLV, Rapid expansion of supercritical solutions into a liquid solvent, has been used to form and stabilize sub-micron particles of a poorly water soluble API, Fenofibrate (FNB). This is a simple but very effective modification of the conventional rapid expansion of the supercritical solution (RESS) where the supercritical solution is expanded into the liquid solvent instead of ambient air. The rapid expansion of supercritical solutions generates high levels of supersaturation responsible for precipitation of ultrafine particles, particle size and its distribution (PSD). Supercritical solutions of FNB prepared at 200 bar and 333 K, were expanded in water with and without stabilizers. Stabilizers such as Tween 80, Sodium Dodecyl Sulphate (SDS), Pluronic F-68, Poloxamer-188, Hydroxypropyl methyl cellulose (HPMC), and Sodium Alginate (SA) were used. Co-precipitation of FNB with Poly(lactide-co-glycolide) (PLGA) was also attempted to minimize particle growth and prevent agglomeration. Electrostatic stabilization compared to steric stabilization was found to be more effective in controlling PSD. FNB particles with sizes from 800 nm to 5 μm can be precipitated as a function of type and the amount of stabilizer used. In addition, multiple expansions of supercritical solutions of FNB in to a single collection sample was also attempted to achieve higher particle concentrations of FNB in aqueous suspensions. There is a lack of systematic study on particle stabilization and the choice of a stabilizer. So it demands future study.