

Title: Precipitation of Ultra-fine Particles of Fenofibrate with Controlled Size Distribution by RESOLV: Rapid Expansion Vs Stabilizer Concentrations

Session: 03A06 Particle Formation in Supercritical Fluids for Food and Pharmaceuticals

Abstract: Supercritical fluids (SCF) are being used to precipitate fine particles of variety of chemicals ranging from pharmaceuticals to explosives. While there are different SCF processes available, **Rapid Expansion of Supercritical Solutions in SOLvent (RESOLV)** in particular, offers an attractive alternative to conventional precipitation processes as it avoids the use of organic solvents and aqueous suspension of fine particles is readily obtained. Literature demonstrates the use of RESS to precipitate ultra-fine particles but the problem of stabilization of particles is poorly reported. High and rapid supersaturation produced by rapid expansion of supercritical solutions results in ultra-fine particles however, growth and agglomeration of particles after precipitation also controls the particle size and its distribution. Use of water as a solvent for collection of particles allows one to add stabilizers such as surfactants and polymers to stabilize the particle size and size distribution. This work focuses on precipitation of Fenofibrate (FNB) particles using RESOLV with controlled particle size and distribution by identification and manipulation of process parameters and stabilizer concentrations. Attempts are also made to co-precipitate FNB with a poly (lactic co-glycolic acid) to control the particle size and distribution.

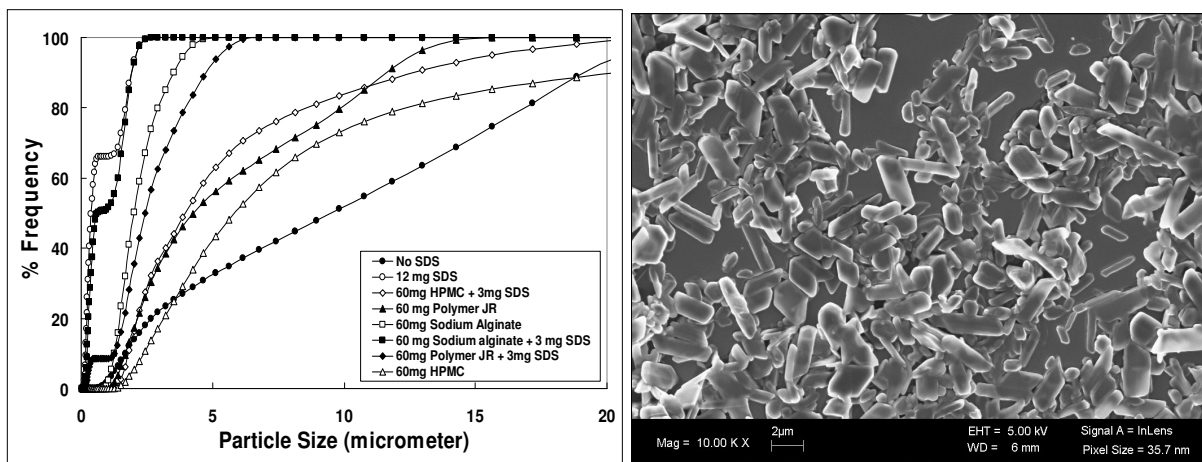


Fig. 1. (a) Cumulative particle size distribution of FNB precipitated by RESOLV with various stabilizers in 300 ml water with pre-expansion pressure of 200 bar, temperature of 60 °C, and 125 μm nozzle ID with length of 3 cm and (b) SEM micrograph of FNB particles collected in water (SDS:Drug of 1:20) at pre-expansion pressure of 200 bar, temperature of 60 °C, and nozzle ID of 125 μm and length of 3 cm