

## **PREPARATION OF SUBMICRON PARTICLES AND NANOPARTICLES OF CAFFEINE USING SUPERCRITICAL FLUID**

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### **Abstract**

Use of supercritical fluid (SCF) is fast developing and promising way of submicron particles and nanoparticles preparation. The methods of preparation are relatively cheap and allow many modifications, which give a great potential to using supercritical fluids. CO<sub>2</sub> is the most used SCF because of low critical points and non-toxic properties. One of possible methods is rapid expansion of supercritical fluid (RESS). This process is consisted of the saturation of the supercritical fluid with solid substrate followed by the depressurization of the solution through a heated nozzle into a low pressure chamber.

This research introduces results from preparation of submicron particles and nanoparticles of caffeine particles by supercritical CO<sub>2</sub> using supercritical rapid expansion of supercritical solution method. Commercial system Spe-ed SFE-4 (Applied Separations, Inc.), which is primarily designed for extractions of organic compounds from solid matrices, was used. The aim of the work was to determine effect of supercritical conditions - pressure and especially temperature on the particle size. The aim was to prepare caffeine submicron particles and nanoparticles in the narrowest particle size distribution. The products were characterized with using SEM and particle size distribution analyses.

**Keywords:** Caffeine, supercritical fluid, Spe-ed SFE 4, nanoparticles

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