Nanocomposites and nanomaterialsone

Effect of stabilizers on preparation of curcumin nanosuspension in microchannel reactors

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Curcumin is a natural polyphenol compound with many important pharmacological properties. In spite of its efficacy, it has not yet been approved as a therapeutic agent, since it is a poorly water-soluble hydrophobic drug. Curcumin dissolution rate can be improved by decreasing its particle size [1].
The present investigation is aimed to improve curcumin particle size via liquid anti-solvent precipitation (LASP) process in microchannels (MCRs). For this purpose, the role of stabilizers were screened on controlling growth and agglomeration of formed nanoparticles. The stabilizers namely included Low molecular weight hydroxyl propyl methyl cellulose (HPMC), Sodium dodecylsulfate (SDS, $C_{12}H_{25}NaO_4S$) Hexadecyl trimethyl ammonium bromide (T-Tab, $C_{19}H_{42}BrN$), 1-ethenylpyrrolidin-2-one (PVP, $(C_6H_9NO)_n$, and Polysorbate 20 (Tween20, $C_{58}H_{114}O_{26}$). Particle size distribution (PSD), SEM imaging, and zeta potential were employed to characterize the precipitated nanoparticles. It was found that in a precipitation system involving PVP, homogeneity of curcumin concentration provides a uniform particle size distribution. In particular, curcumin precipitated from PVP 0.03% and PVP 0.3% demonstrated the smallest median particle sizes. The mean particle size of the as-prepared curcumin nanoparticles decreased from 6.22 μm to 77.72 nm and the specific surface area increased from 3.88 to 17.50 m^2/g after the LASP process in MCR.

1. *Chen J., Zhang J., Shen Z., Zhong J., Yun J.* Preparation and characterization of amrphous cefuroxime axetil drug nanoparticles with novel technology: highgravity antisolvent precipitation// Ind Eng Chem Res.-2006.-**45**.-P. 8723-8727.