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Preparation of Nanodispersions by Solvent Displacement Using the Venturi tube

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Abstract

The Venturi tube (VT) is an apparatus that produces turbulence which is taken advantage of to produce nanoparticles (NP) by solvent displacement. The objective of this study was to evaluate the potential of this device for preparing NP of poly-ε-caprolactone. Response Surface Methodology was used to determine the effect of the operating conditions and optimization. The NP produced by VT were characterized by Dynamic Light-Scattering to determine their particle size distribution (PS) and polydispersity index (PDI). Results showed that the Reynolds number (Re) has a strong effect on both PS and process yield (PY).The turbulence regime is key to the efficient formation of NP. The optimal conditions for obtaining NP were a polymer concentration of 1.6 w/v, a recirculation rate of 4.8 l/min, and a stabilizer concentration of 1.1 w/v. The predicted response of the PY was 99.7%, with a PS of 333 nm, and a PDI of 0.2. Maintaining the same preparation conditions will make it possible to obtain NP using other polymers with similar properties. Our results

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