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Abstract

This research studies preparation of microsphere wax by Rapid Expansion of Supercritical Solutions (RESS) method. Supercritical carbon dioxide was used as a solvent. scCO₂-Paraffin wax homogeneous solution was sprayed into aqueous solution which is mixture of water and surfactant. Morphology and Particle size that were analyzed by using SEM (Scanning Electron Microscope) were used to study experimental variable, pre-expansion pressure and temperature, nucleating agent and surfactant. The experimental results revealed that microsphere wax can be prepared by RESS and particle sizes were found to be 400-7,000 nm depending upon experimental conditions. Comparison between spray to air and water at pre-expansion pressure and temperature which are 120 bar 80 °C respectively showed that the particle sizes sprayed into water have 700-1,000 nm diameter which is smaller than particle sprayed to air 3-5 µm. It could describe by We number. The studies of the pre-expansion pressure and pre-expansion temperature found that increasing of pre-expansion pressure 120-160 bar and temperature 70-90 °C result to decreasing of the particle size from 1,000 to 400 nm. It could describe by supersaturation ratio. Next, the sorbitol additional study as a nucleating agent, 0.3 wt% of sorbitol will be decrease particle sizes from 1,000 to 400-600 nm with the narrow size distribution. In addition, spraying of scCO₂-Paraffin wax homogeneous solution through spiral nozzle into 150 rpm spinning of 5-15 v/v% mixture of water and ethylene glycol solution as a surfactant and stabilizing of particles growth. It was found that paraffin wax become spherical shape and it can be retarded the agglomeration. The particle size was decreased from 7 to 1 µm when the concentration of ethylene glycol increases.