

Effect of solvent concentration and cooling modes on morphology, particle size distribution, and yield of dihydroxystearic acid (DHSA) crystals

ABSTRACT

Palm-based dihydroxystearic acid was purified by employing solvent crystallization using ethanol and ethanol/water mixture as solvents. Two different cooling modes, rapid and natural cooling, were employed for the crystallization process. In this study, the cooling effects on morphology, habit, particle size distribution, and yield of dihydroxystearic acid crystals were investigated. The dihydroxystearic acid crystals appeared to agglomerate into sphere-like and plate-like structures, depending on the cooling modes and the presence of water. By manipulating the solvent and cooling modes, the crystal yield ranged from 0.8% to 42.1%, while the crystal purity ranged from 73.3% to 91.4%. Solvent crystallization using ethanol was best achieved through natural cooling with the dihydroxystearic acid to ethanol ratio of 1.0:1.0, which produced the narrowest particle size distribution curve with the largest average particle size.

Keyword: Crystal habit; Crystal morphology; Dihydroxystearic acid; Solvent crystallization; Particle size distribution