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Soy Protein Nanocapsules Fabricated by Flash Desolvation Approach (FDA)[1] YU-CHUNG CHANG, LI-JU WANG, GENG JIAN, LEI LI, Washington State Univ — Nanocapsules (NCs) are promising carriers for drug delivery, food enhancement, nutraceuticals, and for self-healing materials. Among numerous candidate materials, soy protein (SP) has enabled a wave of research due to its unique functional structures, biocompatibility, and low cost. In this study, we discovered a new self-assembly mechanism to control the formation of soy protein nanocapsules (SP-NCs). For the first time, our group utilized Flash Desolvation Approach (FDA) to fabricate SP-NCs. In FDA, three jets of desolvating agent are used to impinge the stream of SP suspension inside a micromixer. Desolvating at nanoscale processes only within milliseconds and SP-NCs are self-assembly while solvent shifting. The size of SP-NCs is controllable between 80 $\sim$ 200 nm. The effects of SP concentration, solvent ratio, and impinging speed were systematically studied. The size, surface charge, stability, and morphology of SP-NCs were characterized. It was found that the NC size decreased with increasing the SP concentration. With the increase of desolvating agent ratio by FDA, the NC size decreased. Both results are significant different from conventional desolvation method. It reveals that FDA drives a new self-assembly mechanism to form NCs.

[1]Archer Daniels Midland Company (ADM)

Yu-Chung Chang
Washington State Univ

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