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Enhanced aqueous dispersibility of alpha-lipoic acid through complex formation with octenylsuccinylated high amylose starch

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Alpha-lipoic acid (ALA) which engages in mitochondrial energy metabolism as an essential co-factor is well known to possess a potent antioxidant activity. However, problems such as poor water solubility, high sensitivity to light and heat, and limited bioavailability make ALA difficult in potential application. Encapsulation of ALA with starch could be expected to mitigate the disadvantageous properties of ALA. A high amylose maize starch (70% amylose) substituted by octenyl succinic anhydride was used to complex with ALA for the enhanced dispersion properly in aqueous media. An aliquot of ALA-ethanol solution (10%w/v) was dispersed in gelatinized starch solution (1.0% w/v) at 70°C for 3h, and then cooled for 12h under continuous stirring followed by an ultrasonication. OS was more favored in enhancing the dispersibility of ALA (84.20% recovery) than native high amylose starch (70.79% recovery), whereas beta-cyclodextrin dispersion of ALA exhibited extremely fluctuated ALA recovery. The optimally prepared OS-ALA dispersion was milky white and contained particles with a narrow size distribution (200-300 nm). The dispersion contained crystalline V-complexes of ALA and some OSA-modified high amylose starch was effectively retarding the aggregation of ALA in the dispersion. Therefore, OS behaved as a favorable stabilizer for dispersing ALA in aqueous by forming V-amylose complex, which could be used as an efficient method to protect bioactive compounds.

Biography

Yi Xuan Li undertakes research on utilization of nano-encapsulation of bioactive compounds into starch matrices to enhance the dispersibility, stability and bioavailability of labile ingredients. She explored a facile preparation process to disperse labile compounds in aqueous media by using starch matrices encapsulation. She evaluated the stability, in vitro digestibility and in vivo bioavailability of nano-encapsulation systems for targeted delivery of labile ingredients. After years of experience in research, she has the expertise in systematic development of efficiently targeted delivery of bioactives through nano-encapsulation into starch matrices.

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