Title Encapsulation of conjugated linoleic acid (CAL) using spray drying

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Abstract

Conjugated linoleic acid (CLA) found primarily in the dairy products of ruminants provide various health benefits including antioxidant and antitumor effects. Especially, CLA help reduce abdominal fat and serum total lipid in human body. However, CLA should be protected from lipid oxidation for food applications. Microencapsulation improves the oxidative stability of CLA by providing a barrier against both oxygen and light which are critical factors for accelerating the oxidation. The stability of CLA is influenced by the type of wall material and its composition. An aqueous phase including a wall material such as whey protein (WP), maltodextrin (MD), or WP/MD mixture was dispersed in pH 7.4 phosphate buffered saline using a magnet stirrer. An oil phase, CLA was heated up to 40°C in a water bath prior to adding into the aqueous phase. The mixture of both aqueous and oil phases were homogenized using a high shear homogenizer. The homogenized emulsions of the CLA and the wall material were dried in a spray drier with inlet and outlet temperatures of 180 and 80°C, respectively. The physical properties of the spray-dried CLA powder including particle size, solubility, dispersibility, moisture contents, density, encapsulation efficiency, and oxidative stability were analyzed in order to investigate the effect of the wall materials on the encapsulation properties of the CLA. The WP, MD, and WP/MD product were effective on the protection from the CLA oxidation. The type of the wall material and its composition affected the physical properties and the oxidative stability of the CLA powder. This work has shown that these wall materials can be used as effective emulsifying agents for spray-dried encapsulation of CLA. The encapsulated CLA has a potential to be used for various food applications.