Liposome as Delivery Vehicle for Encapsulation of Β-Cryptoxanthin

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Carotenoids are a class of phytonutrients that are synthesized *de novo* in biological cells of a wide variety of plants, algae, bacteria and accumulate in various biological tissues Some carotenoids are provitamin A which is essential for vision and normal growth and development. Carotenoids are antioxidants , having anti-inflammatory activities and are also associated with cardiovascular disease prevention. The carotenoid that we have worked on is β-Cryptoxanthin, - effective in preventing various forms of cancer. Due to its antioxidant abilities, it can reduce chronic inflammation. It may be helpful in reducing the risk of inflammatory polyarthritis which includes rheumatoid arthritis. Cryptoxanthin, a xanthophyll carotenoid that possesses pro-vitamin A activity due to the presence of beta-ionone ring structure in one half of its molecule. Vitamin A is an essential nutrient required for maintaining immune function, eye health, vision, growth and survival in human beings. The availability of stored vitamin A also depends on a child's general nutritional status. As β-Cryptoxanthin is a health promoting carotenoid, it is essential to have it in some form in the diet. In order to improve the nutritional status, fortification of food will be an effective way to address these deficiencies. Since the amount of β-Cryptoxanthin present in fruits and vegetables is less and the bioavailability of the carotenoid becomes difficult, it is therefore necessary to encapsulate the carotenoid in a delivery vehicle. In order to exert a health benefit, the compound of interest, whether hydrophilic or lipophilic, needs to withstand food processing, be released from the food matrix post-ingestion and be bioaccessible in the gastrointestinal tract, undergo metabolism and reach the target tissue of action. Cryptoxanthin, being lipophilic in nature will be encapsulated as liposome. β-Cryptoxanthin was encapsulated in Liposome using Egg Yolk Phosphatidylcholine (EYPC) and Tween80. The Encapsulation Efficiency of β-Cryptoxanthin was calculated and Loading Content of the encapsulated β-Cryptoxanthin was also studied. The Antioxidant Efficiency of the encapsulated β-Cryptoxanthin was evaluated. *In vitro* release studies in Simulated Gastric Fluid (SGF) and Simulated Intestinal Fluid (SIF) were studied to see the rate at which β-Cryptoxanthin was being released. The encapsulated liposome with β-Cryptoxanthin was characterized by Optical microscope, Particle size analysis and Zeta Potential, FTIR analysis, FE-SEM and AFM. It was observed that Encapsulation Efficiency was highest at 1% Initial Concentration and was found out to be 99.8252%. β-Cryptoxanthin retained its antioxidant capacity and showed good release profile under simulated conditions. Characterization studies confirmed good encapsulation of β-Cryptoxanthin in the liposome. Due to the successful encapsulation of β-Cryptoxanthin in liposome, it can be used to increase the bioavailability of β-Cryptoxanthin.

Biography

Dr. Dutta has been working in the area of food biotechnology for over 13 years. Her doctoral studies were carried out in the Food Technology & Biochemical Engineering department, Jadavpur University where she studied stability of carotenoids extracted from different food. Her thesis was titled as "Retention and stability of carotenoids in fruits and vegetables during processing and preservation" She started her research activities in the Biotechnology department by screening identifying and characterizating carotenoids from different natural sources. She also got a project from UGC based on similar lines She is now focusing her research career in application of bioactive compounds such as carotenoids and mangiferin in a delivery system. She has supervised five PhD students

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