Extra-Virgin Olive Oil Microencapsulation by Chitosan Coated Alginate Beads and Influence of Oil Content on Encapsulation Efficiency

Coruhli, T., Ozcelik, B., Istanbul Technical University, Istanbul, Turkey

The aim of this study was to encapsulate extra virgin olive oil (EVOO) into chitosan coated Ca-alginate beads and measure encapsulation efficiencies of the beads that had different oil contents. Firstly, free fatty acid content, peroxide value and total phenolic content of extra-virgin olive oil were determined. After EVOO was characterized, primary emulsion obtained by mixing and homogenizing 1% (w/v) Tween 20 surfactant and olive oil by microfluidizer. The oil content in the primary emulsions were %5, %10 ve %25 (w/v). Particle size of the primary emulsions was measured. The primary emulsion mixed with 2 % (w/v) sodium alginate solution 1:1 (v/v) ratio to form secondary emulsion. Capsule formation performed by ionic gellation method that is also known calcium-alginate cross-linking mechanism. Micro beads were formed via entrapping active ingredients into the biopolymer gel network, one of the most known gel system: calcium-alginate twosome. Homogenized secondary emulsion was dripped into 4% (w/v) $CaCl_2$ solution by a syringe and left hardening for 30 minutes. After that micro beads were taken into 1% (w/v) chitosan solution for 30 min. to abtain chitosan coated alginate beads. Beads were dried at room temperature and their encapsulation efficiency were determined by gravimetric methods. Encapsulation efficiency of the mico beads were evaluated by taking into consideration of the amount of oil on the surface of the beads, released oil content during drying and total oil loaded into the beads. According to the results, encapsulation efficiency decreased by increasing oil content. Analysis by Fourier transform infrared (FT-IR) spectroscopy was performed on the most efficient beads, alginate, chitosan powders and oil.