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Development of Nanoparticles from Colostrum Whey Protein Through Coacervation Technique Using Na-Caseinate

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Bovine Colostrum (milk of early lactations from 3-7 days after parturition) whey contains many bioactive components such as immunoglobulins and lactoferrin. These bioactive proteins are required for the development of passive immune system of neonate in early few days but are highly sensitive to pH, temperature, and processing operations. The nanoparticle formation of proteins can improve the stability and digestibility in different environments. In this study, colostrum whey was used to fabricate the nanoparticles with Na-caseinate in the presence of Ca^{2+} . The nanoparticles were prepared by mixing the sodium caseinate (0.1-0.4 gm) and colostrum whey protein (0.1-0.4 gm) solutions. The optimum nanoparticles were obtained at 0.3 gm of colostrum whey and 0.4 gm of Na-caseinate concentrations in the presence of 150 mM CaCl_2 . A particle size of 180 nm (PDI 0.32) was obtained at this condition at pH of 6.5. Furthermore, the effects of pH (3 to 7), ionic

strength (50-300 mM of CaCl_2) and temperature using differential scanning calorimetry (DSC) were evaluated on the stability, charge density and particle size of optimized nanoparticles. The DSC showed that the thermal stability of nanoparticles was higher (125 °C) as compared to that of native proteins (whey and casein). These nanoparticles were stable at pH 6.5 in aqueous medium for 1 week at 25 °C. The nanoparticles containing high concentrations of immunoglobulins and other bioactive proteins of colostrum, can be utilized as dietary supplements to boost the immune system of can be further explored to cure many pathogenic infections and gut related disorders. These nanoparticles can also be used as delivery system for the targeted action to cure specific disease.

Key words: Colostrum, Whey, Na-caseinate, Immunoglobulins, Bio accessibility, Nanoparticles, Delivery systems

Biography

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