OPTIMIZATION FOR NANOENCAPSULATION OF VITAMIN C USING NEWLY SYNTHESIZED ALGINATE AND CHITOSAN VIA RESPONSE SURFACE METHODOLOGY (RSM)

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ABSTRACT

Alginate-chitosan matrix is a beneficial component as the shell matrix in encapsulation technology. The two polymeric molecules have many advantages namely nontoxicity, biodegradable, mucoadhesive, and environmentally friendly. Recently, many industrial sectors are increasingly interested in the field of nanotechnology. Nanoencapsulation is a novel and practical branch of nanotechnology . It is the technology of packing nanoparticles in many forms (solid, liquid, gas). Encapsulation of bioactive compounds are the most common practice in pharmaceutical and food industry. Active compounds can behave abnormally when placed in certain conditions. It is affected by variation of temperature, pH, or ionic strength. Therefore, it is important that it stabilizes before hitting the target site. One of the commonly utilized bioactive compounds was vitamin C. In this study, encapsulation of vitamin C using alginate-chitosan matrix as the shell was performed. The optimization of the encapsulation was evaluated using response surface methodology. The experimental design approach is based on central composite design (CCD) with the consideration of three independent variables which are sodium alginate concentration, chitosan concentration, and molarity of calcium chloride ($CaCl_2$) and two response factors which are vitamin C control and vitamin C free. The optimized condition of capsulated vitamin C undergone leachability test to determine its validity. The suggested optimum condition obtained was 0.2 (w/v)% sodium alginate, 0.526 (w/v)% chitosan, and 0.2M Calcium Chloride.

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