Interaction and Structure Formation between \(\alpha\)-Lactalbumin and Chitosan Grafted with Poly(ethylene glycol) Chains

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**ABSTRACT**

Complex core-shell micelles (C3M) are a novel type of polymer-surfactant nanomaterials formed by charge interactions, which involve reacting hydrophilic block copolymers containing ionic and non-ionic water soluble segments (block ionomers), and oppositely charged surfactants. Due to the stability and amphiphobic properties [1], C3M can be utilized for the delivery of a variety of bioactive components. In our study, assembling between chitosan or chitosan derivatives and whey protein alpha-lactalbumin (a-lac) were investigated in our research. The successful modification of chitosan-graft-PEG (CH-PEG) as chitosan (CH) derivatives were confirmed by nuclear magnetic resonance spectroscopy (NMR). Assembling between alpha-lactalbumin and different molecular weight of CHO CH-PEG with different molar ratios was confirmed through the measurements of turbidity, light scattering, and zeta-potential. Visible light turbidimetry and light scattering intensity at 90° of the complex sample indicated a trend that complexation occurred at lower pH of the CH-PEG and alpha-lactalbumin complex samples in comparison to the coacervation of alpha-lactalbumin and chitosan complex samples. And the molar ratios of alpha-lactalbumin to chitosan has greater impact on the pH of phasing than the pH of alpha-Lactalbumin and CH-PEG complex.

**INTRODUCTION**

Hydrophobic bioactive components, such as vitamins, drugs, and extracts are in highly needs for healthy life styles and disease prevention. However, due to their hydrophobic properties, these nutrients or bioactive compounds are poorly bioavailable for human absorption or potential degradation during processing or storage. Surfacilant micelles are effective delivery systems for bioactive components but having big concerns of toxicity and high price.

**RESULTS & DISCUSSION**

**PROPOSED SCHEME**

**MATERIALS**

**RESULTS**

**COMPLEX FORMATION**

**CONCLUSIONS & FUTURE WORK**

Conclusions: - The PEGylation of block ionomers are favoring the complex formation at lower pH and stabilizing complex from phasing. - The hydrogel formed by PEGylated Chitosan are small in size and extending the stability in solution

Future Work: - Analyze the size of the particles and confirm the results by Cryo-TEM and AFM imaging technique

**REFERENCES**