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Polarimetric Study of System Gelatin / Carboxymethylcellulose in the Food Field

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Abstract : Proteins and polysaccharides are the two types of biopolymers most frequently used in the food industry to control the mechanical properties and structural stability and organoleptic properties of the products. The textural and structural properties of these two types of blend polymers depend on their interaction and their ability to form organized structures. From an industrial point of view, a better understanding of mixtures protein / polysaccharide is an important issue since they are already heavily involved in processed food. It is in this context that we have chosen to work on a model system composed of a fibrous protein mixture (gelatin)/anionic polysaccharide (sodium carboxymethylcellulose). Gelatin, one of the most popular biopolymers, is widely used in food, pharmaceutical, cosmetic and photographic applications, because of its unique functional and technological properties. Sodium Carboxymethylcellulose (NaCMC) is an anionic linear polysaccharide derived from cellulose. It is an important industrial polymer with a wide range of applications. The functional properties of this anionic polysaccharide can be modified by the presence of proteins with which it might interact. Another factor may also manage the interaction of protein-polysaccharide mixtures is the triple helix of the gelatin. Its complex synthesis method results in an extracellular assembly containing several levels. Collagen can be in a soluble state or associate into fibrils, which can associate in fiber. Each level corresponds to an organization recognized by the cellular and metabolic system. Gelatin allows this approach, the formation of gelatin gel has triple helical folding of denatured collagen chains, this gel has been the subject of numerous studies, and it is now known that the properties depend only on the rate of triple helices forming the network. Chemical modification of this system is quite controlled. Observe the dynamics of the triple helix may be relevant in understanding the interactions involved in protein-polysaccharides mixtures. Gelatin is central to any industrial process, understand and analyze the molecular dynamics induced by the triple helix in the transitions gelatin, can have great economic importance in all fields and especially the food. The goal is to understand the possible mechanisms involved depending on the nature of the mixtures obtained. From a fundamental point of view, it is clear that the protective effect of NaCMC on gelatin and conformational changes of the α helix are strongly influenced by the nature of the medium. Our goal is to minimize the maximum the α helix structure changes to maintain more stable gelatin and protect against denaturation that occurs during such conversion processes in the food industry. In order to study the nature of interactions and assess the properties of mixtures, polarimetry was used to monitor the optical parameters and to assess the rate of helicity gelatin.

Keywords : gelatin, sodium carboxymethylcellulose, interaction gelatin-NaCMC, the rate of helicity, polarimetry
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