



INFLUENCE OF IONIC PLASTICIZERS ON THE PROCESSING AND MECHANICAL PROPERTIES OF STARCH, ZEIN AND THEIR BLENDS.

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From simple grains to wood, many vegetal structures involve combinations of different biopolymers. Using the vocabulary of polymer materials scientists, one could say that nature has developed highly efficient alloys of biopolymers. From this perspective, perhaps the most striking point is that in many cases, those alloys involve the interfacial compatibilization of blends of hydrophobic and hydrophilic biopolymers. In the native structure of a maize grain, starch granules are embedded in a continuous protein rich minor phase, with an interfacial adhesion between starch (hydrophilic) and proteins (mostly hydrophobic) phases that is strong enough to ensure cohesive breaking of the material. When maize flour is melt processed into a thermoplastic material, in presence of water or glycerol, the incompatible polymer blends that are obtained show very bad mechanical properties compared to thermoplastic starch, due to complete lack of adhesion between the starch matrix and the protein nodules. In the present work, we show that the use of ionic plasticizers allows to increase significantly, the mechanical properties of such biopolymer blends, taking the starch/zein system as a model. This approach takes advantage of the unique solvation properties of ionic liquids that can indifferently dissolve starch and zein.