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Plant Protein-Based Films for Food Packaging Applications

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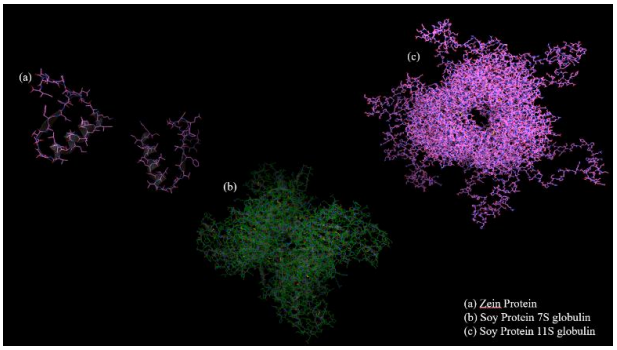
Graphical Abstract



Abstract.

The use of plastics for packaging across many industries has become a standard, however, in recent years there has been an increase in demand for more eco-friendly packaging alternatives. In this vein, the use of plant proteins in film formation has been studied extensively.[1-2] Due to the strong mechanical properties obtained through the use of plant-based proteins, the biodegradability of such materials, and their economic efficiency, these proteins are of substantial interest in the effort to replace current synthetic packaging films.[3-5]

In our work, we focus on combining both experimental and computational techniques in order to develop protein-based films for food packaging applications. By combing the two techniques, we aim to better understand the interactions of plant-based proteins with selected plasticizing modifiers in order to develop films with optimal mechanical properties. In our work we compare the interactions of selected modifiers with soy protein and zein protein from corn. In this regard, we apply various computational techniques, including protein-ligand docking[6-7] and molecular modeling methods[8-9] to assess the interactions and then compare our finding with experimental data[1,3,10-11]. By modeling how choice plasticizing modifiers interact differently with each protein, we aim to better formulate our films in order to achieve mechanical properties that compete with those of current synthetic packaging systems.

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