BIOPOLYMER BASED EDIBLE PACKAGING – PROTEIN AND POLYSACCHARIDES AS BUILDING BLOCKS

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The food packaging industry is one of the leading consumers of plastic packaging producers in the world where they produced over 78 million metric tons of plastic packaging. However, a mere 14% of the total plastic packaging is recycled, while others end up in landfills, inland water sources or ocean. Most of the plastic-based packaging materials are derived from the petrochemical refinery byproduct resins, which raise the questions on sustainability, renewability and environmental damage. Biopolymer based edible packaging is a growing area of research and technology commercialization due to their unique advantages. Natural, renewable resources such as polysaccharides, proteins, and lipids provide environmental benefits. Innovative food packaging technologies based on biopolymer-based nanocomposites, which include natural antimicrobial compounds have great potential in answering to some of the critical questions associated with plastic-based packaging materials. In this work, we will demonstrate the success of polysaccharide (sago starch) and protein-based (canola protein) edible packaging material developed using natural antimicrobial compounds in microbial inhibition and their effect on film properties. In our work, we demonstrated that the synergistic effects of two-component essential oil systems (carvacrol/citral) have a significant impact on the inactivation of *Bacillus cereus* and *Escherichia coli*. Similar effects were observed in Canola protein-based edible films as well. The addition of essential oils increased the film flexibility and elongation at break, while tensile strength and water vapor permeability of the films tend to decrease with increasing essential oil content. Further research is required to obtain improved microbial inactivation while maintaining the tensile strength of the films.

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