

# Minimizing Food Waste Using a Nature-Derived Coating - An Innovative Step Towards Addressing Global Food Security

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More than 72 billion pounds of food goes to waste globally while 50 million people struggled with hunger in 2020. To combat this, packinghouses coat produce with a fruit wax that must be heated before spraying onto produce and is composed of a variety of natural and non-digestible compounds, including blended petroleum-based waxes and fungicides. This research project aims to reduce food waste by testing the efficiency of chitosan-based crosslinked polymeric gel as a biofriendly alternative to the wax coatings. Chitosan is a sugar obtained from the hard shells of shellfish, used as a dietary supplement and for biomedical uses. Preliminary experiments were conducted on several produce, including a shelf life test to understand the effectiveness of the gel and a phytotoxicity test with mung beans to analyze any harmful effects of the coating on plants at their most vulnerable state. Treated produce were generally more tolerant to fungal growth and the more concentrated gel solutions had no phytotoxic effects on the produce. Additional tests were conducted on strawberries that measured the color, weight, and hardness difference, along with rotting count, over several days. The gel did not have harmful effects on weight and color difference (such as phytotoxicity) between the treatment and control groups (including coconut oil). Overall, the oil, 0.01%, and 5% diluted gel treatment groups performed the best. Current steps include studying the gel and plant tissue interface to understand the wetting property. This will lead to optimizing the gel concentration and composition for achieving maximum efficacy.

## Awards Won:

Third Award of \$1,000