

Title Extension of fresh produce shelf-life with novel chitosan coatings
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Abstract

Fruits are generally susceptible to rapid post-harvest degradation due to high respiration rates and microbial spoilage. Many natural, edible and / or biodegradable materials have been explored as potential coatings for extension of fresh produce shelf-life. Recent studies have indicated chitosan as effective antibacterial and antifungal agent suitable for coating applications. The objective of this study was to demonstrate the effectiveness of chitosan coatings with or without addition of essential oil (EO) to reduce spoilage microorganisms typically found on fresh fruits. Strawberries and blueberries were used to examine the feasibility of chitosan coatings. Each berry was inoculated with *Botrytis cinerea*, dried under aseptic conditions, and dipped in appropriate solution for 30 sec. Treatments included (a) 1% chitosan in 0.5% aq. acetic acid, and (b) 1% chitosan in 0.5% aq. acetic acid with addition of 4% anise EO. Non-dipped berries and those dipped in 0.5% acetic acid served as controls. Berries were dried, packed in polyethylene bags, and stored at 4 °C for 21 d. Samples were taken in 3-d intervals and mold count was assessed using Rose Bengal agar with antibiotic supplement. Strawberries treated with chitosan and anise EO showed complete microbial reduction with no mold growth up to 18 d. After 9-d storage the mold count was 4.40, 2.90 and 0 cfu/ml for nontreated, chitosan, and chitosan + EO coated strawberries, respectively. Although the mold growth increased after 21 d to 3.17 and 1.51 cfu/ml for chitosan and chitosan + EO treated strawberries, respectively, it was still considerably lower than in nontreated control. Chitosan with anise EO was also the most effective in reducing the mold growth on blueberries. However, standard deviations were too large for significant difference between the treatments. Natural, biodegradable chitosan-essential oil system has been proven effective as a feasible antimicrobial coating for application on fruits to extend post-harvest shelf-life.