Evaluating Cinnamaldehyde as an Antibacterial Agent in a Produce Wash for Leafy Greens

Drennan, Allison (School: Lebanon High School)

This research addresses the potential antibacterial effects of cinnamaldehyde against Escherichia coli when used as a produce wash for leafy greens. E. coli is a common food-borne pathogen in produce, especially leafy greens, which are often consumed raw. Post-harvest sanitizing is an essential step in mitigating the risk of food-borne illness associated with raw produce. Cinnamaldehyde was evaluated in concentrations of 0.2%, 0.5%, and 1.0% in duplicate for this experiment. Distilled water and bleach (100 ppm) were also tested as controls. Lettuce samples were treated with either a cinnamaldehyde or control solution, then swabbed to detect the presence of bacteria. Samples from the used treatment solutions were also collected in order to determine the wash's ability to eliminate pathogens without causing cross contamination. All microbial samples were plated onto E. coli specific chromogenic agar to eliminate the influence of possible outside contamination. Data was analyzed using a one-way ANOVA and Tukey post hoc test. Lettuce treated with cinnamaldehyde in any concentration displayed significantly lower CFUs when compared to lettuce treated with bleach ($p<.00001$). 0.5% and 1.0% cinnamaldehyde solutions were also found to be more effective than 0.2% cinnamaldehyde ($p=.00387$). These results demonstrate that cinnamaldehyde has an effect on the survival rate of E. Coli on lettuce that is equal or greater to that of bleach. The concentration of cinnamaldehyde in the solution had a significant effect on the bacterial counts after washing. Future research will study the bacterial regrowth on raw produce after application of cinnamaldehyde.