

Plant-Based Antimicrobials Inactivate *Salmonella enterica* and *Listeria monocytogenes* on Melon Rinds

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Introduction: In the past few years melons have been involved in several foodborne outbreaks. Effective control measures are needed for improving melon safety.

Purpose: The objective of this study was to evaluate the efficacy of plant-based antimicrobials against *Salmonella* Newport and *Listeria monocytogenes* on melon rinds.

Methods: Melon varieties and hybrids were grown in Georgia, Arizona, Texas, North Carolina, Indiana and California and shipped to Tucson, AZ. The tested melons included 5 cantaloupe varieties, 3 honeydew varieties and 7 cantaloupe hybrids. Melon rinds were cut into 10 g pieces and inoculated with 10⁶ CFU/mL of *S. Newport* or *L. monocytogenes* culture. Rind samples were then immersed in 5% olive extract or 0.5% oregano oil antimicrobial solution and gently agitated for 2 min. Phosphate buffered saline was used as a control. After treatment, the surviving populations of *S. Newport* and *L. monocytogenes* were enumerated at Day 0 and 3. The rind samples were mixed with 90 mL of buffered peptone water and stomached for 2 min. Serial dilutions were plated on xylose lysine desoxycholate agar and Modified Oxford agar for enumeration of *S. Newport* and *L. monocytogenes*, respectively.

Results: The plant-based antimicrobials reduced *S. Newport* and *L. monocytogenes* population on all rind samples, regardless of the melon types, varieties or growing locations. Compared to PBS control, the plant-based antimicrobial treatments caused 2-3.6 and 1.6-3.7 log reductions in populations of *Salmonella* and *L. monocytogenes*, respectively. In most cases, the plant-based antimicrobial treatments reduced pathogen population to below the detection limit (1 CFU/g) at Day 3. In general, oregano oil had better antimicrobial activity than olive extract. The antimicrobial treatments were more effective on *Salmonella* than on *L. monocytogenes*. The antimicrobial treatments exhibited better reductions on honeydews than on cantaloupes.

Significance: The results showed that plant-based antimicrobials have the potential to be used as sanitizers for decontaminating melons.