

Control of Cross-Contamination During Field-Pack and Retail Handling of Cantaloupe

SUMMARY

Following recent melon-associated foodborne outbreaks, California cantaloupe growers voluntarily developed and implemented commodity specific food safety guidelines for the safe handling of cantaloupes and other netted melons. While this document details best food safety practices to reduce the risk of contamination during production, packing, and distribution, science-based metrics describing the cross-contamination potential of whole melons under typical field-packing conditions is needed (e.g., transfer coefficients for pathogen contamination onto melons during each field-packing step). Furthermore, there is a lack of data on handling practices related to cross-contamination risks for melons in the retail distribution supply chain, as well as guidance on the safe and uniform handling of melons throughout the retail environment. Therefore, this project will identify potential cross-contamination points likely to increase risk and will develop intervention strategies targeted to reduce the occurrence of pathogen transfer events during the handling of melons at harvest and retail.

OBJECTIVES

This project will be accomplished through the following objectives:

- Obj. 1.** Quantify the transfer of *Salmonella* and *Listeria monocytogenes* onto melons in field-packing operations from each potential cross-contamination surface
- Obj. 2.** Compare the effect of different sanitizers on *Salmonella* and *Listeria monocytogenes* survival on potential cross-contamination surfaces
- Obj. 3.** Assess melon handling practices at retail through case study methodologies, including interviews and observation to identify potential risk factor points

METHODS

Data will be generated on potential cross-contamination scenarios (e.g., contaminated melon to packing tables, contaminated packing tables to other melons) for field-packed melons. A series of inoculation experiments, using a dry inoculum, will be performed to quantify the coefficients of contamination onto melons during field-packing from each potential cross-contamination surface. A series of survival studies for *Salmonella* and *L. monocytogenes* will be performed to determine the rates at which the respective pathogen survives on each contact surface over the course of a day (8h). Contact surfaces where *Salmonella* and *L. monocytogenes* are observed to survive throughout the day, will be subjected to efficacy tests of different sanitizers used in field-packing operations. A Delphi methodology will be employed to capture melon handling practices at retail. This approach is essentially an interactive process of questions and answers confirmed through an expert panel of 15-20 retail industry specialists (industry, regulatory and academic).

RESULTS TO DATE

We have scheduled a visit (June 13-17) to sample melon operations in Yuma, Arizona. While melons are being harvested and packed, we will swab contact surfaces (100 cm², 10 by 10 cm) to determine microbial loads on those surfaces. We plan to sample six potential cross-contamination points, including gloves, knives, packing table surfaces, rags, brushes, and bins (Fig. 1). Swabs will be collected from contact surfaces over the course of the harvest/packing day prior to start and every 2 h afterwards for up to 8 h. Approximately 360 swabs will be collected from Yuma melon operations. Test trial experiments are also being performed to evaluate different dry inoculum protocols (Fig. 2) to determine which will work best/most effectively for Obj. 1 experiments (i.e., transfer coefficients for pathogen contamination onto melons during each field-packing step). Lastly, environmental swabbing and manager interview appointments at retail are being scheduled for the summer (Fig. 3).

BENEFITS TO THE INDUSTRY

This project will yield data on pathogen transfer between melons and typical field-pack contact surfaces, including gloves, knives, packing tables, rags, brushes, and bins. This data will be used to provide science-based recommendations for field-packed melon operations to reduce the likelihood of cross-contamination events by quantifying the transfer of *Salmonella* and *L. monocytogenes* onto melons from each potential cross-contamination surface (e.g., stainless steel, polyethylene, corrugated-cardboard lined packing tables). Furthermore, this research will test several sanitizers to provide effective decontamination regimes to reduce the potential transference of pathogens to melons. Additionally, this project will investigate the risk of cross-contamination during retail handling of melons. Mitigation and intervention strategies specific to melon distribution, storage, handling, and display will be developed for retailers to limit these identified cross-contamination points to ensure the continued safety of melons from harvest to consumer. Guidance will be communicated by hands-on trainings and a report to the industry.



Figure 1. Field-packing melons (highlighting several potential cross contamination points including gloves to melons, packing table to melons, etc.)

photo credit: Sandstone Melons



Figure 2. Dry inoculum test trials (evaluating different carrier mediums: sand, white chalk, blue marking powder used to inoculate glove coupons)

photo credit: Strawn Lab



Figure 3. Retail display of melons (exhibiting potential risky handling practices)

photo credit: Sandstone Melons



CONTACT Dr. Laura Strawn
Assistant Professor and Extension Specialist
Virginia Tech
Lstrawn@vt.edu
(757) 414-0724, ext. 12

AUTHORS PI: Dr. Laura Strawn
Co-PIs: Dr. Michelle Danyluk and
Dr. Ben Chapman

ACKNOWLEDGEMENTS

This research was supported by the Center for Produce Safety. We appreciate the support of the California and Arizona melon growers; special thanks to Milas Russell Jr. of Sandstone Melons. The technical support of Rachel Pfuntner and Laura Truitt is greatly appreciated.

LENGTH OF FUNDING

January 1, 2016 – December 31, 2017