


Food Safety Begins on the Farm

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support local farms and food.

Why is food safety important?

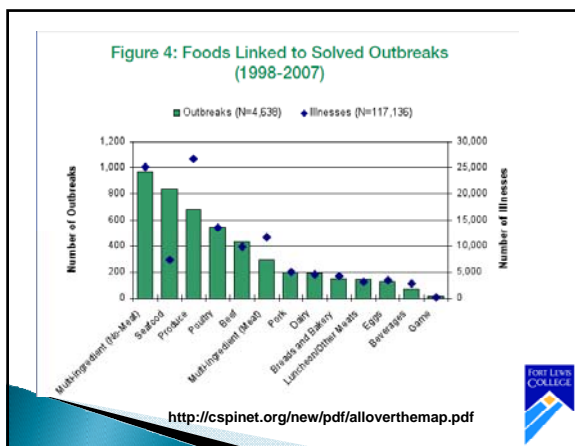
- ▶ 1 in 6 (48 m) people in U.S. suffer from foodborne illness/year (www.cdc.gov; Scallan et al. 2011)
 - 128,000 hospitalized
 - 3,000 die
- ▶ It is estimated that 76 million cases of foodborne illness occur in the United States each year (Mead et al. 1999)
 - 325,000 hospitalizations
 - 5,000 deaths



Why is food safety important?

- ▶ Not all cases are reported to CDC
- ▶ Approximately 34% of them are "solved"
 - Source and product verified
- ▶ Economic costs
 - \$152 billion/ year
 - \$39 billion/year is related to produce (www.makeourfoodsafesafe.org/cost_map)





Microbial contamination of fresh produce is one of the most challenging public health issues


- ▶ Why?
 - Eaten raw
 - Produce characteristics
 - Uneven surfaces and consumption of entire plant
 - Contamination is a result of cross-contamination
 - Eaten in a lot of different venues
 - Direct contact handling

Colorado State Extension logo and Fort Lewis College logo are present at the bottom.



Breath!!!

Fort Lewis College logo is present at the bottom right.

GAPs





- ▶ Good Agricultural Practices
- ▶ Reduce the chance of causing on-farm microbial contamination of food
- ▶ Fruits and Vegetables



Are there reasonable steps that a grower can take to reduce the risk that pathogens will contaminate the food produced on the farm?

Absolutely.



Steps to reduce or limit contamination?

- ▶ Identify Risks
 - Educate and Train yourself
- ▶ Develop Standard Operating Procedures
 - Educate and Train others
- ▶ Begin to Develop Food Safety Plan





Keep PACE with safe handling practices on the farm

- ▶ Prevention
- ▶ Accountability
- ▶ Control
- ▶ Education

 <http://edis.ifas.ufl.edu/pdffiles/FY/FY96600.pdf> 

Keep PACE

- ▶ Prevention
 - A commitment to prevent microbial contamination
 - Fixing a problem takes more time than preventing it
 - Some problems can't be fixed
 - Developing Standard Operating Procedures (SOPs)
- ▶ Accountability
 - You are accountable for all inputs, products and processes on your farm (including employees)
 - Must be prepared for the responsibility that comes with it.

 <http://edis.ifas.ufl.edu/pdffiles/FY/FY96600.pdf> 




Keep PACE

- ▶ Control
 - All aspects of product from field to consumer
 - Including both the human and the environmental factors that affect your farm.
- ▶ Education
 - Everyone involved in production and distribution must be properly trained.
 - All (employees, family, volunteers) need to be well trained in proper food handling procedures

 <http://edis.ifas.ufl.edu/pdffiles/FY/FY96600.pdf> 

Components of GAPs

- ▶ Clean Soil
- ▶ Clean Water
- ▶ Clean Hands
- ▶ Clean Surfaces



Clean Soil

- ▶ Field Location
- ▶ Manure Application
- ▶ Animal Access



Clean Soil Field Location



- ▶ Review land history for prior use and applications of sludge or animal manure.
- ▶ Choose fields upstream from animal housings.
- ▶ Did you bring your map with you?




Clean Soil Field Location





- ▶ Know upstream uses of surface water and test water quality as needed.
- ▶ Prevent runoff or drift from animal operations from entering produce fields.



Clean Soil Manure Application



- ▶ Harvest ready-to-eat produce at least 120 days after application of raw manure.
 - Requirement varies with audit program
- ▶ Do not sidedress ready-to-eat crops with fresh or slurry manure.



Clean Soil Manure Application



- ▶ Follow composting standards
 - Follow same standards required for garden application
- ▶ Compost Tea
 - Use potable water and know compost source
- ▶ Keep records of application rates, source, and dates.



Clean Soil Animal Access








- ▶ Minimize wild and domestic animal traffic in produce fields.
 - Don't graze livestock near produce fields
 - Document methods used
 - Fencing, decoys, noise deterrents
 - Scout for signs of livestock in fields
 - Manure, sleeping spots, damaged crops
 - What about employee's dogs???









Clean Water

- ▶ Irrigation Water
 - Risk varies with source (low to high)
 - Municipal
 - Well
 - Surface
 - Test for fecal coliforms
 - Quantified test
 - If not zero, lower potential risk
 - Keep copies of all water tests



Clean Water

- ▶ Irrigation Water
 - Risk varies with type of irrigation (high to low) and crop
 - Overhead
 - Flood
 - Drip
 - Test for fecal coliforms
 - Quantified test
 - If not zero, lower potential risk by changing method
 - Keep copies of all water tests



Clean Water

- ▶ Are there different levels of risk associated with the source and method of irrigation water for these crops?



Clean Water

- ▶ Monitor Wash Water Quality

- Use potable water
 - Zero Fecal coliforms allowed
- Treat contaminated water
 - Use only FDA-approved disinfectants.
 - Read and follow all label instructions.
 - 1 tsp chlorine bleach per 10 gallons of water
 - Monitor chlorine levels
 - 5 ppm
 - Keep pH between 6.5 and 7.0
 - Above 7.5; chlorine ineffective



Clean Water


- ▶ Monitor Wash Water Quality

- Use potable water
 - Zero Fecal coliforms allowed
- Don't wash in dirty water
 - Dirt increases pH
 - High pH (>7.5) decreases chlorine's effectiveness
 - Cross contamination





Clean Water

- ▶ Monitor Wash Water Quality
 - Cooling
 - Avoid tank water temperatures more than 10°F cooler than produce pulp internal temperature
 - Is your ice potable?







<http://www.fda.gov/Food/FoodSafety/RetailFoodProtection/FoodborneIllnessandRiskFactorReduction/RetailFoodRiskFactorStudies/ucm111325.htm#slide>






Clean Water

- ▶ Monitor Wash Water Quality
 - What do you advertise to your customers?
 - "Hydro cool" versus "Washed"



Clean Hands

- ▶ Worker Health and Hygiene
 - Education
 - Training and appropriate signage
 - Setting a good example.
 - Show commitment to good practices
 - Wash Hands
 - Soap, water and single use towels
 - Never use hand sanitizer to replace hand washing
 - Gloves do not take the place of washing hands
 - Single-use latex gloves recommended



When to wash your hands...

▶ BEFORE

- Returning to the field or entering the packing line
- Touching clean produce
- Putting on new gloves
- Preparing or consuming food
- Working your shift
- Cleaning equipment and preparation surface

▶ AFTER

- Visiting the rest room
- Touching bare human body parts (ears, nose, hair, etc)
- Working with soil, rotten produce or garbage
- Smoking or doing other activities that dirty your hands



Clean Hands



▶ Worker Health and Hygiene

- Monitor health symptoms
 - Sick employees should not harvest or process vegetables
- Appropriate rest room facilities
 - Within 5 minute walk of field (1/4 mile)
 - Appropriate hand washing station with signage



Clean Surfaces



▶ Equipment

- Field
 - Avoid cross contamination of manure
 - Look for oil/fuel leaks
- Packing House
 - Use food grade lubricants
- Have plan for spill/leak






Clean Surfaces


- ▶ Tools
 - Wash and sanitize
 - Harvesting tools (knives, blades, etc)
 - Are they easy to clean?
 - Scissors
 - Where are they stored?

Processing surfaces

- Need to be easy to clean (non porous)
 - Wood versus plastic versus stainless steel
- Wash and sanitize
- Tables/Bins/Coolers





Clean & Sanitize Your Kitchen To Prevent Illness



1 teaspoon household bleach 1 gallon cool water



Wash kitchen equipment and utensils with soap and warm water, then sanitize. To mix a sanitizing solution: add ONE TEASPOON of bleach to ONE GALLON of cool water. Make a new sanitizing solution every 2 hours or when cloudy. Do not use scented bleach. Do not mix bleach with any other products. Too much bleach can be harmful, follow label instructions. For other sanitizing solutions such as quaternary ammonium or iodine, follow the manufacturers' directions.

Clean & Sanitize After Each Use

What is the difference between washing and sanitizing?

- ▶ Remove field dirt
- ▶ Wash and scrub with soapy water to remove soil and food particles.
- ▶ Rinse with running water. Remove all traces of food and detergent.

What is the difference between washing and sanitizing?

- ▶ Sanitize by immersing for one minute in (or wiping down with) lukewarm sanitizing solution.
 - Potable water: 1 tsp/10 gallons of water = 5 ppm
 - Sanitizing: 1 tsp/gallon of water = 50- 200 ppm
 - Disinfectant: 1 tsp/quart of water = 200 ppm

Know the difference

- ▶ Air dry without wiping.



Recordkeeping



▶ Types of Records

- Farm map
 - Identifying potential contaminants
- Keeping copies of water tests
- Cleaning and sanitizing logs
- Training logs
- Harvest logs
 - Date, field, workers, product
- Sales logs
 - Buyer, product, date



Traceback




▶ What is Traceback?

- Following produce back to farm
 - Put a label and date on your bag of produce
 - Put a label and date on your box delivered to restaurant
- Following produce back to specific field
 - Including workers who picked and processed produce

▶ Develop a simple traceback system



Traceback Develop a simple system



Traceability: Deciphering the Code

EMPIRE	Farm Location: 10 (Rose Farm)
DATE: OCTOBER 11, 2011	Block: 01
FARM: ROSE FARM	Fruit Type: 01 (Apples)
BLOCK: 01	Variety: 05 (Empire)
CHEN: ALL	Harvest Date: 284 (Julienne calendar)
LOT CODE: 10-01-01-05-284	

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What are the steps to prevent or limit contamination?

- ▶ Educate yourself
- ▶ Analyze your risks
- ▶ Educate and train others
- ▶ Develop SOPs
 - Standard Operating Procedures
- ▶ Food Safety Plans

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What are your Options?



- Start with something simple!
 - Make a farm map
 - Identify your risks
 - Test your water



What are your Options?



- ▶ Implement Good Agriculture Practices
 - Clean soil
 - Clean water
 - Clean hands
 - Clean surfaces



What are your Options?



- Review PACE principles
 - Prevention
 - Accountability
 - Control
 - Education
- Develop SOPs
 - Standard Operating Procedures
 - Hand Washing
 - Harvesting
 - Post-handling



What are your Options?



- ▶ Develop a Food Safety Plan
 - Increase recordkeeping
 - Develop system for traceability
- ▶ Consider a Third Party Audit
 - Could be required by schools, restaurants or grocery stores




Start now.....





- ▶ Identify your 3 greatest risks
 - Divide into three groups
 - Farms in same groups
 - Identify your farm's greatest risks
 - Be very specific
 - Share with group and identify 3 common risks
 - 5 minutes to make your list
 - Each group will have a facilitator to assist
 - Report back to group



Start now.....



- ▶ Develop SOPs
 - Same three groups
 - Identify an SOP that addresses an identified risk
 - 10 minutes to outline steps needed in SOP
 - Each group will have a facilitator to assist
 - Share with others



SOP Example



- ▶ Washing your hands
 - Wet your hands
 - Warm water
 - Potable water
 - Apply soap
 - How much
 - Wash for 20–30 seconds
 - Where and how?
 - Rinse all dirt and soap with clean water
 - Dry with single use paper towel



Resources

<http://gaps.nmsu.edu/welcome.html>

www.gaps.cornell.edu

<http://edis.ifas.ufl.edu/pdf/files/FY/FY74300.pdf>

<http://www.fda.gov/Food/FoodSafety/RetailFoodProtection/FoodborneIllnessandRiskFactorReduction/RetailFoodRiskFactorStudies>



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