A Food Safety Primer for Farm to School

Webinar for Implementation Grantees
February 27, 2013

Housekeeping
How to make a comment or ask a question:

- Type your question or comment using the Q&A Tab
- Ask your question or comment on the phone by pressing *1

Objectives

- Review Good Agricultural Practices (GAPs)
- Apply GAPs to school gardens
- Understand industry practices for processing produce
- Processing produce in school facilities
Speakers

- Kathleen Staley, USDA Agricultural Marketing Service, kathleen.staley@ams.usda.gov
- Cyndie Story, PhD, RD, CC, Consultant and Trainer, chefcyndiephd@gmail.com

Polling Question #1

Good Agricultural Practices
Production & Packing of
Fresh Produce

Kathleen Staley
Agricultural Marketing Service

A Food Safety Primer for Farm to School
Overview

• Good Agricultural Practices (GAPs)
• Food Safety Modernization Act (FSMA)
• Resources

Microbial Hazards

• Can’t see, taste or smell
• Only a few cells may cause illness
• Pathogens multiply quickly when conditions are favorable

FDA Guidance

Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits & Vegetables
FDA Guidance

- Commodity Specific - Leafy Greens, Melons, Tomatoes
  
  [Link]

GAPs

- Food Safety Plan
  - Person to manage food safety program
  - Standard Operating Procedures (SOPs)
  - Documentation & records

- Soil
- Water
- Animals
- Worker Health & Hygiene
- Equipment
- Traceability
Soil
- Location – land use & history
- Test Soil – heavy metal contamination
- Soil Amendments

GAPs

Raw manure
- Applied 2 weeks prior to planting
- Minimum of 120 days prior to harvest

Compost – properly treated

GAPs

Water
- Know your water source
- Test to verify water quality

A Food Safety Primer for Farm to School
A Food Safety Primer for Farm to School

GAPs

Animals
✓ Take steps to keep pets, wild animals, & insects out

GAPs

Worker Health & Hygiene
✓ Training
✓ Wash hands
✓ Eating & drinking
✓ Avoid product near animal droppings

GAPs

Equipment
✓ Clean tools & containers
✓ Use harvesting containers only for their intended purpose
GAPs

Traceability
✓ Know where the product was received from (one step back)
✓ Where product was sent (one step forward)

FDA Proposed Regulations

Food Safety Modernization Act (FSMA)
• Standards for the Growing, Harvesting, Packing, and holding of Produce for Human Consumption (FDA-2011-N-0921)
• Current Good Manufacturing Practice Hazard Analysis Risk-Based Preventive Controls for Human Food (FDA-2011-N-0920)

http://www.regulations.gov

Resources

National GAPs  http://www.gaps.cornell.edu
USDA GAPs  www.ams.usda.gov/gap/ghp
Polling Question #2

School Gardens

Cyndie Story, PhD, RD, CC
Consultant and Trainer

Food Safety Tips for School Gardens
www.nfsmi.org/produce safety
School Garden Planning

- Work with school garden coordinator to plan:
  - Start discussion with the major food safety concerns:
    - Clean hands
    - Safe growing medium
    - Safe water source
    - Cleaned and sanitized work surfaces
  - Provide food safety resources

Source: [http://growingsafergardens.com](http://growingsafergardens.com)

School Garden Site Selection

Location should be away from:

- Garbage
- Utilities
- Animals
- Water runoff
- Flooding
- Septic systems

Soil for School Garden

- Determine soil history
- Soil testing recommended for some areas
- Consider purchasing commercial soil
- Contact your county extension office for assistance. Locate them online: [www.nifa.usda.gov/Extension/index.html](http://www.nifa.usda.gov/Extension/index.html)
Protect School Garden from Animals

Create reasonable barriers to keep wildlife/animals away from garden

- Fencing
- Electrified fencing
- Cages
- Fish emulsion
- Nets

Materials for School Garden

- Non-toxic, non-leaching material
  - Cedar, untreated pine or fir
  - Terra cotta pots
  - Concrete
  - Unused livestock water troughs (drill drain holes)
  - Burlap filled with straw
  - Straw bale gardens

- Avoid pressure-treated lumber (especially if made prior to 2004), tires, rail road ties, old bricks with paint, plywood, etc.

Plant Selection

- Select non-allergenic and non-toxic plants
- Known allergens should be avoided
- Contact local extension agent for assistance
- Minnesota Department of Agriculture:
  https://www.mda.state.mn.us/plants/badplants/poisonplants.aspx
Water for School Gardens

- Municipal water source is safe
- Test all non-municipal sources including ponds, rain barrels or cisterns (large systems)
- Maintain water testing records
- Use food grade containers to transport water
- Use drip irrigation

Chemical and Fertilizer Use

- Avoid use of pesticides or herbicides
- Check with local cooperative extension agent for non-chemical pest reduction methods
  - [www.ourwaterourworld.org](http://www.ourwaterourworld.org)

Chemical and Fertilizer Use, cont.

- Use according to manufacturer’s directions
- Store in secure location
- Post American Poison Control Center Help Hotline number: 1-800-222-1222
- Restrict handling to adults only
- Maintain Materials Safety Data Sheets
- Contact health department regarding applicable OSHA hazard communication requirements
Composting and Manure Use

- Avoid raw or composted manure
- Consider purchasing commercially prepared compost
- Store compost away from garden
- Protect compost from pests, especially rodents
- Compost should be in small, 2 inch pieces
- Keep compost off the ground to prevent leaching

Source: [http://growingsafergardens.com](http://growingsafergardens.com)

Composting and Manure Use, cont.

- Vermicompost
- Add only plant products to compost
- Fruit and vegetable trimmings may be used (collected before service)
- Do not use food discarded after meals (cafeteria waste)
- Locate compost away from potential contamination

Composting and Manure Use, cont.

- Food Scrap Digesters

Composting Resource

- Mike McGrath: *Book of Compost*
- Wisconsin Compost Resource Guide
  - [http://www.cias.wisc.edu/foodservtools/6-Educate-students/school-composting.pdf](http://www.cias.wisc.edu/foodservtools/6-Educate-students/school-composting.pdf)

Hydroponic Gardening

- Crops are grown in a non-soil medium
- Water plus nutrients
- Non-aggregate system
  - Roots hang in nutrient solution
- Aggregate system
  - Perlite
  - Rockwool (looks like spun wool)
  - Coconut fiber

Hydroponic Gardening

- Produce could still become contaminated
  - Microbial risk from water
  - Cross-contamination of potable and non-potable water sources
  - Pest infestation
  - Poor hygiene of workers and visitors
Hydroponic Gardening

- Recommendations from 2009 FDA draft guidance for hydroponic tomatoes:
  - use a safe growth medium and fertilizer
  - test water sources for quality
  - clean and sanitize food contact surfaces
  - prevent pest infestation
  - provide training for all employees/handlers—handwashing, glove use, etc.
  - keep food safety records

Growing and Harvesting Produce

- Training for students, staff, and volunteers
- Liability coverage for garden staff
- Signed permission slip for all student gardeners

Growing and Harvesting Produce, cont.

- Wash hands and practice good personal hygiene
  - Prior to harvest
  - After handling compost
  - After using the restroom
- Create portable handwashing station
- Harvest garden regularly
- Use potable water for cleaning produce

Source: http://growingsafegardens.com
Water for School Gardens

Provide single use, disposable gloves for harvesters if handwashing station is not available.

Water for School Gardens

Produce Wash Station

Growing and Harvesting Produce, cont.

- Use acceptable harvest containers - cleaned and sanitized
- Clean harvesting tools before and after each gardening session
Using School Garden Produce in School Meals

- Check local regulations
- Receiving
  - Reject if unacceptable
  - Avoid using if noticeably contaminated
- Storing
- Traceability
- Liability coverage

Donations from Community Gardeners

- Communicate with stakeholders
- Check local and/or state regulations
- Determine if the source is safe
- Determine if liability coverage necessary
- Develop guidelines
- Visit garden

Polling Question #3
Industry Practices for Processing Produce

Kathleen Staley
Agricultural Marketing Service

Overview
• Good Manufacturing Practices (CGMPs)
• Hazard Analysis Critical Control Point (HACCP)

FDA Guidance
• Guide to Minimize Microbial Food Safety Hazards of Fresh-cut Fruits & Vegetables
2009 Food Code

- Provides guidance for states & municipal authorities
- Classifies fresh-cut leafy green, tomatoes, & melons as “hazardous foods.”

CGMPs

Focused on prevention of
- unsanitary conditions
- contamination to food, water supply, equipment or utensils that contact food

CGMPs

- Verify suppliers’ food safety practices (GAPs)
- Specifications for raw product
- Maintain appropriate temperature of product
- Traceability back to field
CGMPs

Sanitary Operations
- Cleaning & sanitizing
  - Equipment
  - Utensils
  - Food contact surfaces
- Pest control

CGMPs
- Quality of water
- Monitor temperature of water relative to produce temperature

CGMPs

Production & Process Controls
- Maintain proper temperature
- Monitor pH
- Proper disposal of adulterated product
GMPs

Employee Practices
• Training
• Policies for:
  - Hand washing
  - Reporting illness
  - Clean outer garments
  - Gloves
  - Hairnets
  - Jewelry

Polling Question #4

Food Preservation: Processing Farm to School Produce

Cyndie Story, PhD, RD, CC
Consultant and Trainer
Food Preservation

- Canning, drying, and freezing
- Extends shelf life
- Prevents spoilage
- Controls microbial growth using FAT TOM principles

Canning in Schools

- Home-canned foods may NOT be used in school meals (as stated in Food Buying Guide)
- All canned foods must be produced and processed in an approved facility
- All canned foods must be produced and processed under federal, state, and local food safety guidelines
- FNS is developing fact sheets on preserving foods

Drying

- Preserves fruit or vegetable by removing moisture
- Increases food safety due to water removal
- Best drying temperature for fruits and vegetables is 140° F
- Methods:
  - Dehydrator
  - Convection oven
**Drying**

- Schools challenges: Yield, equipment, and cost
- Example:
  - Bananas: 40 lb case yields ~25 lbs EP
  - 25 lbs of EP fruit yields ~6 lbs banana chips
    - Dehydration time: 8 to 10 hours
  - 19.6 ¼ c servings per pound
  - 117 servings per case
  - $0.17 per ¼ c serving (NOT including labor)
  - $0.09 per ¼ c serving- fresh

**Freezing**

- Easy and convenient: If you have all the right tools
- Safest method
- May have quality concerns
- May not work well for all products
  - Cucumbers
  - Lettuce
  - Potatoes
  - Tomatoes
- USDA recommends minus 10 to 0˚ F for optimal freezer storage shelf life

**Innovative Local Bounty Preservation Strategies**

- Freezing on-site in school kitchens
- Mobile freezing units
- Commercial kitchen and small freezing operations
- Co-pack relationships with current freezing companies
- *What works best?*

Source: Frozen Local: Strategies for Freezing Locally Grown Produce for the K-12 Market, Institute for Agriculture and Trade (2012); Minneapolis MN
Innovative Local Bounty Preservation Strategies

- Freezing on-site in school kitchens
  - More suited to scratch and modified scratch operations
  - Cost varies greatly depending on method, labor, and product price
  - Benefits may include perceived higher quality product, and increased student acceptance
    - Quality dependent upon processing methods utilized
  - Barriers may include staff time, lack of equipment, and funding

Source: Frozen Local; Strategies for Freezing Locally Grown Produce for the K-12 Market, Institute for Agriculture and Trade (2012); Minneapolis MN

Innovative Local Bounty Preservation Strategies

- Steps to IQF freezing in school kitchens:
  1. Inspect and store produce
     - Weigh product upon receiving
     - Receiving scale required
  2. Clean and sanitize work stations, sinks, and equipment
  3. Wash product
  4. Process into desired form (manual or mechanical)
     - Clean and sanitize every 4 hours
     - Inspect equipment for chips/cracks

Source: Frozen Local; Strategies for Freezing Locally Grown Produce for the K-12 Market, Institute for Agriculture and Trade (2012); Minneapolis MN

Innovative Local Bounty Preservation Strategies

- Steps to IQF freezing in school kitchens:
  5. Blanch, when required (Why blanch?)
     - Boiling water- Some nutrients lost
     - Microwave
     - Steam- Best method for schools
  6. Shock in ice bath and drain WELL
  7. Place on trays and freeze overnight in walk in freezer

Source: Frozen Local; Strategies for Freezing Locally Grown Produce for the K-12 Market, Institute for Agriculture and Trade (2012); Minneapolis MN
Innovative Local Bounty Preservation Strategies

• Steps to IQF freezing in school kitchens:

  8. Place frozen product pieces in container and store until ready to use
     • Maintain chain of custody (traceability)
     • Product may be vacuum packed prior to storing
     • Non-IQF product packed after processing; must be pulled from freezer for thawing prior to cooking
     • Consider amount of storage space available

Source: Frozen Local: Strategies for Freezing Locally Grown Produce for the K-12 Market, Institute for Agriculture and Trade (2012); Minneapolis MN

Innovative Local Bounty Preservation Strategies

• Process may be automated with equipment such as:

  • Corn strippers
  • Hard squash peelers
  • Green bean trimmers
  • Broccoli floret machine
  • Sprayers to replace ice bath
  • Centrifuges (spinners) to remove water
  • Blast or tunnel freezers for IQF ($45,000 and up)

• What is benefit of quick freeze?

Source: Frozen Local: Strategies for Freezing Locally Grown Produce for the K-12 Market, Institute for Agriculture and Trade (2012); Minneapolis MN

Innovative Local Bounty Preservation Strategies

• What’s in the freezer now

  • Squash for zucchini bread and muffins
  • Broccoli
  • Rhubarb for crisps
  • Squash ratatouille for soups, pizza topping, or Stromboli
  • Onions and carrots for soup
  • Onions and peppers for fajitas

Source: Frozen Local: Strategies for Freezing Locally Grown Produce for the K-12 Market, Institute for Agriculture and Trade (2012); Minneapolis MN
Cost Comparison:
In house vs. Commercial

- **Scenario**
  - 3,300 student enrollment
  - Equipment available: Knives, 4 qt mechanical processor, tilting skillet, 50 gallon bins, vacuum sealer
  - Labor rate: $12 to $20 per hour
  - Labor hours estimated based on Food Processing Center Greenfield, MA
  - Supervisor present periodically, or at all times when volunteers used
  - Yields based on processing center and The Book of Yields, Lynch (2008)

Source: Frozen Local; Strategies for Freezing Locally Grown Produce for the K-12 Market, Institute for Agriculture and Trade (2012); Minneapolis MN

---

Processing Cost Comparison:
In house vs. Commercial

- **Scenario continued**
  - Produce cost estimated based on farmer interviews (Minnesota)
  - First and second quality quotes were included
  - Packaging costs estimated at $0.05 per pound (plastic bags and cardboard boxes used)
  - Products: Zucchini, broccoli, and winter squash (butternut)

Source: Frozen Local; Strategies for Freezing Locally Grown Produce for the K-12 Market, Institute for Agriculture and Trade (2012); Minneapolis MN

---

### Processing Cost Comparison:
In house vs. Commercial

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Product</th>
<th>Labor Hours</th>
<th>Labor Rate</th>
<th>Cost per Pound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchased zucchini: 533 lbs</td>
<td>$.40</td>
<td>18</td>
<td>$12.00</td>
<td>$.91</td>
</tr>
<tr>
<td>Purchased zucchini: 533 lbs</td>
<td>$.60</td>
<td>18</td>
<td>$12.00</td>
<td>$1.12</td>
</tr>
<tr>
<td>Purchased zucchini: 533 lbs</td>
<td>$.90</td>
<td>18</td>
<td>$12.00</td>
<td>$1.44</td>
</tr>
<tr>
<td>Purchased zucchini + volunteer, supervised labor</td>
<td>$.60</td>
<td>5.5</td>
<td>$20.00</td>
<td>$.91</td>
</tr>
<tr>
<td>Donated zucchini + paid labor</td>
<td>$.00</td>
<td>18</td>
<td>$12.00</td>
<td>$0.48</td>
</tr>
<tr>
<td>Donated zucchini + volunteer, supervised labor</td>
<td>$.00</td>
<td>5.5</td>
<td>$20.00</td>
<td>$0.27</td>
</tr>
</tbody>
</table>

Commerically purchased, frozen, cut zucchini: $0.90 per pound
Fresh-cut zucchini: $2.92 – $2.97 per pound

Source: Frozen Local; Strategies for Freezing Locally Grown Produce for the K-12 Market, Institute for Agriculture and Trade (2012); Minneapolis MN
Innovative Local Bounty Preservation Strategies

- Mobile freezing units
- North Dakota and Vermont Pilots
  - Identify farmers’ interest level and skill
  - May be more relevant to food processing entrepreneurs
  - Space for processing large batches is limited
  - Volume required for K-12 should be determined prior to investment
  - Other challenges:
    - Management/staffing
    - Scheduling
    - Food safety

Source: Frozen Local: Strategies for Freezing Locally Grown Produce for the K-12 Market, Institute for Agriculture and Trade (2012); Minneapolis MN

Innovative Local Bounty Preservation Strategies

- Multi-use facilities and small freezing operations
  - Keep cost low with efficient processing
  - Lease or share space and equipment rather than own
  - Complement freezing with fresh products that can be processed all year long
  - Focus on higher value specialty items or organic
    - Asparagus
    - Asian vegetables
    - Mushrooms

Source: Frozen Local: Strategies for Freezing Locally Grown Produce for the K-12 Market, Institute for Agriculture and Trade (2012); Minneapolis MN

Innovative Local Bounty Preservation Strategies

- Co-pack relationships with freezing companies
  - May offer best option for K-12 operations
  - Drop size, required food safety requirement, and traceability may be hurdle for small farmers
  - Smaller operations may be more compatible

Source: Frozen Local: Strategies for Freezing Locally Grown Produce for the K-12 Market, Institute for Agriculture and Trade (2012); Minneapolis MN
Food Safety Considerations

- Wash hands
- Wash produce
- Avoid cross contamination
- Clean and sanitize surfaces

Wash Produce

- Wash produce under running water
  - Produce wash sinks
- Use vegetable brush
  - Melons, potatoes
- Identify designated produce sink
- Never use unapproved chemicals

Prevent Cross Contamination

- Equipment, knives, cutting boards
- Storage containers
- Raw meat, poultry, and eggs
- Hands, gloves, aprons
**Clean and Sanitize Equipment**

- Food processors (Manual)
- Sectionizers, slicers
- Food processors (Mechanical)
  - Vegetable cutters
  - Food processor

**Results of Cleaning and Sanitizing**

A clean and sanitized cutting board shows no sign of microorganisms

Source: Iowa State University Extension Service

**Traceability**

A Food Safety Primer for Farm to School
Farm to School Grants

- 2012 F2S grants included processing local harvest

Produce Safety Resources

- Fact Sheets
- Videos
- Activities
- Lessons

www.nfsmi.org/producesafety

Questions?

- Kathleen Staley, USDA Agricultural Marketing Service, kathleen.staley@ams.usda.gov
- Cyndie Story, PhD, RD, CC, Consultant and Trainer, chefcyndiephd@gmail.com