Fresh Produce Food Safety in Edible Crop Production in Greenhouses

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Providing Context

• Greenhouse business: intensive management yet lots of opportunities

• Nationwide, continued increase in greenhouse grown (GH) edibles such as herbs, leafy greens, and berries

• In Virginia, growing increase in edible crops especially leafy greens and herbs

• My goal today is to share about the importance of understanding associated food safety risks, routes of contamination, and practical guidance as you start your business

• When sharing about risks, not trying to discourage but want you to have foundational knowledge to guide your decision making process as you move forward in your business, with the important goal of reducing your liability and promoting fresh produce food safety!
Foodborne pathogens

“Preventing foodborne illnesses & death remains a major public health challenge”
Foodborne Illness in the US

- Happens across all types of foods: vegetables, fruits, nuts, meats, dairy, eggs, shellfish, etc., whether fresh or processed

- Despite attempts to provide a safe food supply, each year there are an average of:
  - 48 million foodborne illnesses
  - 128,000 hospitalizations
  - 3,000 deaths

Data Source: Centers for Disease Control and Prevention
What do these numbers mean?

If you added up the population of the 20 largest US cities, you’d have total number of foodborne illnesses per year!
Food Safety Modernization Act

• Passed in Jan. 2011 and was response to on-going incidence of outbreaks

• Major shift from reactionary response to prevention

  • Risk Assessment framework for all risk factors along the farm-to-table continuum (production to consumption food chain)

  • Uses risk assessment to guide implementation of specific measures aimed at reducing hazards at points along the continuum
Farm to Table Continuum

Each stage of the continuum represents potential for exposure to various risk factors.
Risk Assessment Framework & Response

1. Identifying Hazards
   - Biological
   - Chemical
   - Physical

2. Understanding Routes of Contamination
   - How edibles are exposed to hazards

3. Implementing Measures to Prevent or Minimize Hazards
   - Specific steps taken to reduce and prevent exposure of edibles to hazards
Risk Assessment Framework for Production, Harvest, & Post-Harvest Handling in GH Setting

- **Identifying Hazards**
  - **Biological**
    - Pathogenic Microorganisms
    - Rodents, flies, small animals, birds
  - **Chemical**
    - Pesticides, Fertilizers, Cleaning products, lubricants, etc.
  - **Physical**
    - Debris, Nails, Screws, Staples, Metal, Glass, Wood, etc.
Risk Assessment Framework for Production, Harvest, & Post-Harvest Handling in GH Setting

- Understanding Routes of Contamination
  - Plant material (seeds, transplants)
  - Soil media (if used)
  - Water (irrigation, chemigation, ice/cooling, washing)
  - Animals (feces, vectors)
  - Workers and others (health and hygiene practices)
  - Equipment (growing trays, containers, gutters, tools, harvest bins & wagons, packing containers)
  - Facilities (construction materials and integrity, light fixtures, packing areas, cooling unit & storage conditions)
  - Transport vehicles (cleanliness, environmental conditions)
Risk Reduction Response at Production, Harvest, & Post-Harvest Handling Stages

- Implementing Measures to Prevent or Minimize Hazards
  - Specific steps on farm taken to reduce and prevent exposure of edibles to hazards: **Good Agricultural Practices** (GAPs) and **Good Handling Practices** (GHPs)
  
  - Practices focus on **primary routes of contamination** at the different stages of production, harvesting, and post-harvest handling
Conducting a GH Risk Assessment

- Important to walk through entire process from start to finish: pre-plant, production, harvest, post-harvest handling

- What are the potential hazards at each stage (i.e. biological, chemical, physical)?

- What are the routes of contamination each at stage?

- What practices can be implemented at each stage to reduce and minimize those hazards?
Let’s Do this Together!!

What are the possible risk factors for each stage?
Pre-Plant Stage

- Understanding **risks of specific crops** being grown and know incidence of outbreaks in that crop
Pre-Plant Stage

- Plant Propagation Issues
  - Seed Source
  - Media/substrate
  - Growing containers/trays
  - Irrigation water
  - Growth Conditions
Production Stage

- Production System
  - Hydroponic
Production Stage

- Beds
Production Stage

- Water Quality
Production Stage

- Animals
Harvest Stage
Post-Harvest Handling Stage
Post-Harvest Handling Stage
Post-Harvest Handling Stage
Overall Risks

- Facilities
Overall Risks

- Workers
Some Final Thoughts

- As you move forward in planning your GH business, I encourage you to integrate a risk assessment framework, most especially if you decide to produce edible crops.

- Determining the various hazards, understanding the routes by which contamination can occur, and then implementing best practices to reduce and minimize those risks is crucial to promoting fresh produce food safety in your greenhouse.

- VCE is here to assist you in this process and to help provide the expertise and resources you need to promote fresh produce food safety!
Contact Information

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THANK YOU!!