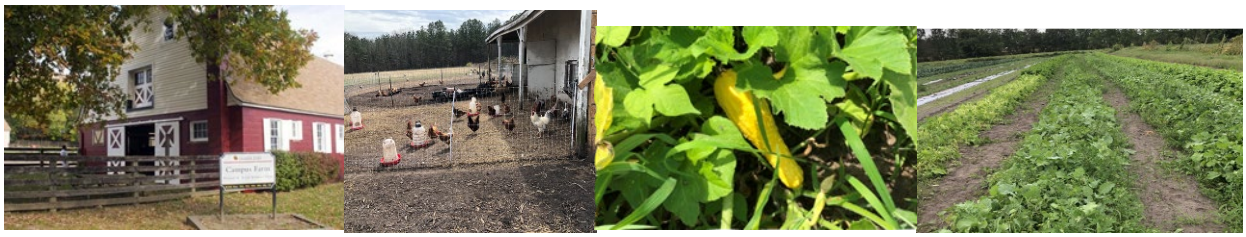
Reducing Cross-Contamination between Animals and Produce

Dr. Melinda Schwarz, UMES Extension Food Safety Specialist

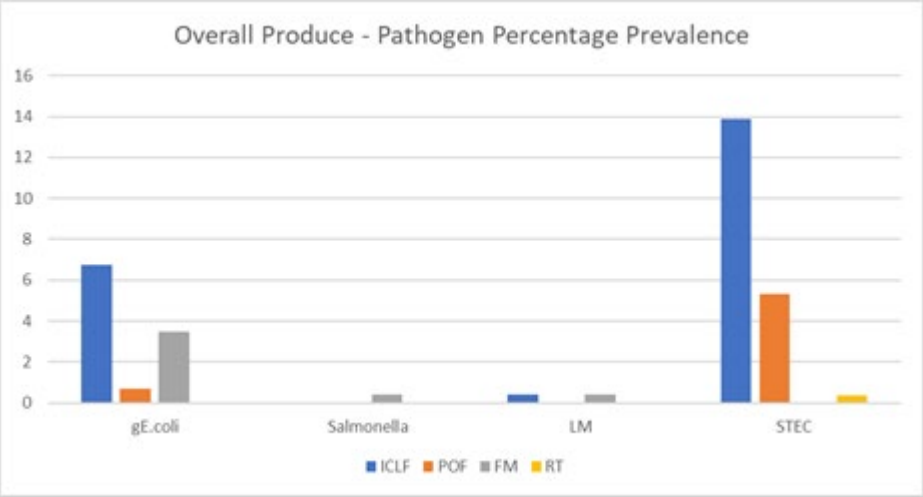


Managing Food Safety on the Farm Can Be a Complex Issue!

No one wants to get sick; No one wants to make others sick.

- Animals are a food safety risk
- Humans are a food safety risk
- Manure and compost are a food safety risk

What source of contamination do you think poses the biggest risk to food safety on your farm?



1. Goodwyn, B., Punchihewage Don, A., Schwarz, M., Millner, P., Meredith, J., Hashem, F., Kim,C., Biswas, D., Parveen, S. 2022. Presence of Indicator and Foodborne Pathogens from Pre- andPost-Harvest Integrated Crop-Livestock Farm Environments and Fresh Produce on the EasternShore of Maryland. IAFP annual meeting. July 31-August 3, 2022. Pittsburg, PA.

2. Goodwyn, B., Punchihewage Don, A., Millner, P., Schwarz, M., Meredith, J., Hashem, F., Kim,C., Biswas, D., Parveen, S. 2021. Examination of the Presence of Shiga Toxin-producingEscherichia coli in Integrated Crop-Livestock Farm Environments on the Eastern Shore of Maryland. ASM annual meeting. June 9-13, 2022. Washington, D.C

Fig 1: Prevalence of generic *E. coli* (gE.coli), *Salmonella, Listeria monocytogenes* (LM), shiga-toxin producing *E. coli* (STEC) among samples Integrated Crop Livestock Farms (ICLF), Produce Only Farms (POF), Farmers Markets (FM), and retail (RT) produce.

Produce grown near livestock operations can harbor more pathogenic bacteria (see Fig. 1), however risks can be reduced when Good Agricultural Practices (GAP) and Produce Safety Rule (PSR) measures are applied. Harmful bacteria can occur more often on produce directly tested from the fields of ICLF compared to POF. Notice produce from FM and RT, which tend to be washed, have less pathogens based on new research[1, 2].

1. Animals Are a Food Safety Risk

- Wildlife/livestock/pets can carry human pathogens:
  E. coli O157:H7, *Salmonella*, *Listeria* monocytogenes
- Animals can spread human pathogens by:
  Leaving feces in fields
  Feeding damage (saliva)
  Spreading fecal material on their feet

***Best ways to minimize problems? Proximity, Prevention, Training**

- If you have animals on the farm, consider their proximity to produce fields and water sources, floods
- Position crop areas appropriately, with barriers in place if they are near animal areas or runoff risks by considering nearby
  - Manure lagoons
  - Manure or compost pile
  - Your neighbors' activity
- Barriers can include:
  - Passive barriers: vegetative strips, fences, uphill, keep **compost covered**
  - Active barriers: plant less-risky crops; have workers "wash out" when working with animals; work with produce first, then animals
- Ways to discourage wildlife/animals from entering production areas:
  - Outside
    - Fencing
    - Animal training
    - Visual deterrents
    - Sonic canons
    - Animal Relocation (Call experts beforehand)
  - Inside
    - Discouraging areas to roost or nest
    - Maintaining buildings in good repair
    - Keeping up to date with pest control programs

- Anyone working with the animals should understand risks and **be trained** to minimize risks.
- Develop SOPs (Standard Operating Procedures) for animal and manure handling and finding feces in the field:
  - Hand-washing
  - Cleaning and sanitizing tools
  - Changing clothes or shoes
  - Flag feces, bury it or remove it, clean hands and tools

- Workers are trained to scout the fields for animal intrusion and to know what is appropriate for harvest.
  - Worker harvest training includes outlining procedures if significant activity is found in the field.
  - Employ "no harvest buffer zones" around sites of significant animal intrusion.

- Radius around intrusion is determined by feces consistency, trampling, splatter from rain or irrigation
- **Cull produce, flag**, **bury**, or **remove feces** from field depending on harvest dates and repicking, clean hands and tools
- Consider keeping a wildlife monitoring log

2. Workers Can Be a Food Safety Risk

- Workers carry human pathogens.
  - *Shigella*, Hepatitis A, Norovirus, *Cyclospora* and others.
  - Can spread pathogens from animals *Salmonella, E. coli,* and *Listeria*.
- Workers can **spread** human pathogens:
  - Through the fecal-oral route, illness and injury.
  - Through clothing, footwear, tools.
  - Workers are often the last to touch produce before it reaches the consumer.

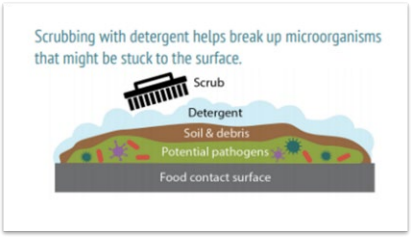
***Best ways to minimize problems? Training, Model Food Safety**

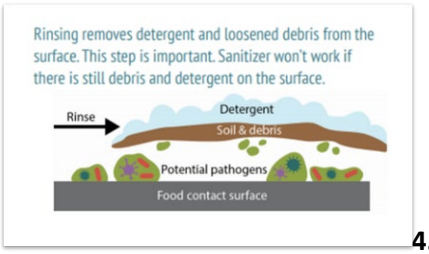
- Good worker training significantly reduces these risks:
  - Hand washing
  - Cleaning and sanitizing equipment
  - Lead by example
  - Recognizing and reporting illness and injury

- What you can provide to reduce cross-contamination:
  - Potable water for drinking.
  - **Break areas** for eating.
  - **Stocked** facilities that are regularly maintained.
  - **Signage** to enforce good hygiene practices.
  - **First aid kit**
- Have plans in place (SOPs) for:
  - If someone becomes injured, clean, bandage, add glove over Band-Aid
  - Discard contaminated produce
  - Clean and sanitize tools
  - If someone comes to work sick (nausea, diarrhea, fever)
  - If a porta potty spills or toilet overflows
  - If someone is not performing their job correctly
- Proper handwashing-training and role-modeling is important
  1. Wet hands with water
  2. Apply soap and lather
     - Be sure to wash the front and backs of hands, wrists, as well as in between the fingers
     - Rub hands together for AT LEAST 20 sec
  3. Rinse hands thoroughly with clean water
  4. Dry with a paper towel

        - Turn off faucet with used towel
    5. Throw the paper towel in a trash can
- Proper cleaning and sanitizing technique for equipment

1. 

2. 

3. 

4. 

5. **Air dry** 

6. **Record/log** 

- Remember – Rinsing with water or only using sanitizers CANNOT replace cleaning of biofilms
- Treatments for Recirculated Water
    - Treating recirculated water does not sanitize the produce but prevents any germs in the water from cross contaminating from one head of lettuce – to every head.
    - Monitor the treatment to ensure the sanitizer is working – test kit, visual debris, pH, temperature

3. Animal manure/compost can be a food safety risk

- Using manure as a soil amendment offers
    - Abundant supply
    - Great source of nutrients
    - Great way to recycle waste
    - Great for soil health
    - BUT it can harbor human pathogens

***Best ways to minimize problems? Barriers, Training, Timing**

- Consider interactions with the crops after planting – are you minimizing the effect of wind, topography, rain events?
- If possible, designate specific shovels, vehicles and other equipment to use with soil amendments.
- Clean and sanitize any multi-use equipment between use with soil amendments and other

farm activities.

- Site soil amendments away from fresh produce production; direct farm traffic flow to reduce cross contamination risk.
- If possible, work with produce before working with soil amendments.
- Wash hands and change clothes if necessary after working with soil amendments before working with produce.
- Consider using specific clothing and boots to work with soil amendments.
- Keep soil amendments covered – a bird pooping on compost makes it manure again.
- Implement barriers to prevent runoff in produce area.
- Separate finished compost from un-finished.
- Don't add manure to finished compost
- Know manure treatment times and temperatures to make compost
- Monitor the manure temperatures and turnings and record
- Seed growth in finished compost is a sign temperatures were not attained and/or maintained.
- Because pathogens can survive in untreated manure, the following time intervals must be maintained between manure application and harvest of contact produce (lettuce, carrots), 120 days, and non-contact produce (peppers, corn), 90 days.
- Anyone working with manure should understand risks and be trained to minimize risks.

Manure	Contact	Time Interval
Untreated	Contact	120 days
Untreated	Non-contact	90 days

Summary

- Animals Are a Food Safety Risk
- Humans Are a Food Safety Risk
- Manure and Compost Can be a Food Safety Risk

What are best ways for you to minimize problems?

- Train Workers
- Model Food Safety
- Use Common Sense
- Use SOPs, GAP and PSR