Food Safety in Organic Poultry
Irene Hanning-Jarquin and Sandra Diaz Lopez
University of Tennessee

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http://www.extension.org/organic_production

Food Safety in Organic Poultry Production
USDA: Keeping Pathogens and Chemical Residues Out of Poultry.

Salmonella Outbreaks
Egg recall

Food Safety Target
Each year in The United States:
76 million cases of Foodborne Illness
325,000 Hospitalizations
5,000 deaths
Economic impact: 152 billion dollars
Industry Impact

Food Recalls are very costly.
  Bankrupt
  Reputation

USDA Food Safety and Inspection Service (FSIS) provides updates on food recalls.

Food Safety Challenges

Population: 314 million eaters (3 meals/day).
Consumer demands fresh and natural, less processing
Eating outside the home. Restaurants
Wide distribution of food, short time.
Salmonella Typhimurium outbreak associated with eggs, 1,800 people sick

Pre-Harvest Food Safety

Pre-harvest
Activities before products is ready to be sold.

Processing
Transformation of raw products into food.

Post-harvest
Preparation of the product for storage or processed: cleaning, cooling, packaging.
Organisms of Concern

Bacteria
• *E. coli*
• *Salmonella* spp.
• *Campylobacter* jejuni
• *Listeria monocytogenes*
• *Clostridium* spp.

Viruses
• Hepatitis A
• Norovirus

Parasites
• *Trichinella spiralis*

Food Safety

*Salmonella*
– Economical impact: $14.6 billion / year
– Poultry and poultry products

*Campylobacter*
– Economical impact: $18.8 billion / year
– Poultry and poultry products

*E. coli* (0157:H7)
– Economical impact: $3.3 billion / year
– Beef
– Jack-In-The-Box: >700 people infected

Pathogens

*Campylobacter*
Colonizes poultry as commensal.
Highly susceptible to stress
2nd cause of foodborne bacterial illness
Low infectious dose
Pathogens

**Campylobacter**
Causes a mild gastroenteritis

- **Long** incubation period 3-5 days
- Duration: 2-3 days
- Mild self-limiting disease
  - Diarrhea
  - Vomiting
  - Cramping
  - Bloody stool

Antibiotic treatments are available

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**Salmonella**
Colonizes poultry, cattle and swine.

- Mainly found in poultry and poultry products
- Leading cause of foodborne bacterial illness.

In 2008, FoodNet reported laboratory confirmed incidence to be **16.2** per 100,000 persons each year

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**Salmonella**
Gastroenteritis

- High infectious dose
- **Short** incubation period: 1h - 2 days
- Duration: 2-3 days
- Self-limiting disease
  - Diarrhea
  - Vomiting
  - Cramping

Antibiotic therapy is available
Salmonellosis and poultry products

In the U.S.

• 145 outbreaks over 10 years sourced to poultry
• 77% to 82% of S. Enteritidis outbreaks have been associated with grade A shell eggs, or egg-containing foods
• CDC estimates that 75% of all Salmonella outbreaks are due to raw or inadequately cooked Grade A whole shell eggs

Pathogens

Colonization
Pre-Harvest Food Safety

On the farm:

Campylobacter and Salmonella control efforts

Source of pathogens

On the farm
- Personnel
- Vectors
  - Rodents
  - Insects
  - Birds
- Feed
- Water
Pre-harvest Interventions

Clean feed
Pest management
Water treatments

Biosecurity

Personnel
Training
Education

Biosecurity Challenges

Rearing conditions
Indoor (Housing)

Outdoor (Pasture)

Heavily populated areas

Rotation versus all-in-all-out

Pre-harvest Interventions

Vector control

Rodent bait station
Light trap
Bird control
Pre-harvest control

- On farm control of *Salmonella* and *Campylobacter*
- For prevention and control of human illness

- Antibiotics are retroactive
- Prevention of initial infection can reduce risk of long term consequences
- Prevention of chronic diseases

**Strategies for on farm control**

- Antibiotics
- Probiotics
- Prebiotics
- Vaccines
  - DFM (direct fed antimicrobials)
  - Botanicals

**Strategies for on farm control**

- Antibiotics
- Vaccines
- Probiotics
  - *Lactobacillus*, *Bifidobacterium*, *Bacillus*
- Prebiotics
  - Fructo-oligosaccharides, alfalfa,
- DFM (direct fed antimicrobials)
  - Organic acids
- Botanicals
  - Plant extracts, grape seed extracts

**Strategies for on farm control**

- Probiotics
  - Delivered in the water or feed
- Prebiotics
  - Delivered in feed
- DFM (direct fed antimicrobials)
  - Feed or water
- Botanicals
  - Feed
Pre-harvest control

Advantages and Disadvantages

- Probiotics
  - Improve weight gain, immune system, exclude pathogens
  - May produce inconsistent results
- Prebiotics
  - Stimulate growth of beneficial bacteria / synergism
  - Adjusting inclusion rate / flavor
- DFM (direct fed antimicrobials)
  - Exclude pathogens
  - Flavor
- Botanicals
  - Stimulate growth of beneficial bacteria / synergism
  - Adjusting inclusion rate / flavor

Processing Interventions

Carcass treatments
- Temperatures
- Scalding
- Chilling
- Chemicals
  - Trisodium phosphate
  - Lactic acid
- Natural extracts
  - Citrus
  - Herbs
GAPs Good Agricultural Practices

Conditions and practices that are necessary for the manufacturing, processing, packing or storage of food to ensure its safety and wholesomeness.

GAP certification can be done with the USDA.

Good Agricultural Practices

Minimum standards to ensure safety

- Disease control
- Hygiene
- Building and facility

HACCP

- Created in 1960
- Provide safe food for space expedition
- Analysis and control of biological, chemical, and physical hazards.
- Tool to reduce, eliminate or control hazards to acceptable levels.
- Mandatory for meat and juice producers depending on volume of production.
Regulations

- Broiler plant:
  - *Campylobacter*  
    - 27 samples out of 51
  - *Salmonella*  
    - 5 Samples out of 51
- Beef:
  - *E. coli*  
    - No tolerance, adulterant.

Food Safety at Home

**Consumer food safety**

Proper preparation of food. Time and Temperature.

Raw ingredients may carry biological agents. Animal products.

Wash hands, equipment and products.

Cross-contamination: Separate animal products and vegetables.
Thank you!

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