Mechanics of Poultry Processing

First Processing

Broiler Carcass Contamination

Factors affecting:

- Microbial load of live bird arriving at plant
- Conditions and content of GI tract
- Improper processing equipment set-up
- Maintenance of equipment
Main locations of pathogens in birds

Processing Equipment and Machine Set-up

- Breed/ Strain Cross
  - Weight Variation
  - Differences in Feed Conversion
- Uniformity of Flock (Gender)
  - Efficiency of Process (Performance)
Post-Harvest interventions for Salmonella

Processing Equipment and Machine Set-up

Summary of Broiler Weight Variation

- Over 20 Different Processors
- Over 60 Different Facilities

<table>
<thead>
<tr>
<th>Avg. live wt. (lb)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2.0</td>
<td>1.5%</td>
</tr>
<tr>
<td>3.65 – 5.40</td>
<td>37.5%</td>
</tr>
<tr>
<td>5.50 – 6.40</td>
<td>14.1%</td>
</tr>
<tr>
<td>6.50 – 7.40</td>
<td>28.1%</td>
</tr>
<tr>
<td>≥ 7.50</td>
<td>18.8%</td>
</tr>
</tbody>
</table>
Advances in EV Technology

Traditional Evisceration Systems:
- Streamline Inspection System (SIS)
- New Evisceration Line Speed (NELS)

High Speed Evisceration Systems:
- Meyn Maestro
- Stork Nuova

Processing Equipment changes
Vent Cutter

Potential Problems from Vent Failure:
- Opening cut can not be achieved
- No evisceration
- Increased number of carcasses requiring reprocessing
- Potential condemnation and economic loss

Vent Cutter

Performance failures:
- Missed bird
- Vent still attached to bird
- Rosebud still attached to bird
- Cutting the intestine
- Back, kidney and/or hip damage
Vent Cutter - photos

Opening Machine

Function – and output demands:

- Opening of abdominal cavity
- No damage to keel or breast
- Sufficient coverage of keel area of breast
- Minimal or no damage to intestines
Opening Machine

Various models available:

- Traditional, box cutter style opener;
- Scissors type opener; and
- Cross-cut style opener (C. & S. America)

Performance failures that can occur with the opening machine include:

- Missed bird
- Cut guts –
- Long & Short opening –
- Cut Keel (Breastbone) –
Opening Machine - photos

Above: Units of Opening Machine – scissors type

Below: Units of Opening Machine – scissors type

Above: Birds being processed in Opening Machine – scissors type

Evisceration – “Draw” Machine

Operational specifications:
- Positioning of carcass
- “Draw” spoon is guided by cam
- Viscera pack is drawn out of the bird
- Lower unit pushes carcass out
Eviscerator – “Draw” Machine

Eviscerator - Maestro

- New Technology
- Complete removal of viscera pack
- Pack transferred to pack take – over device
- Different colored pans
- Carcass and viscera pack presented in line
Eviscerator - Maestro

Key actions of the Maestro eviscerator:
- Positioning of carcass
- Accurate positioning of the spoon
- Capturing of trachea and esophagus
- Removal of viscera pack from the bird

Key performance indicators for Maestro include:
- % of completely removed packages
- % of properly presented viscera packs to inspectors;
- % of damaged liver
- Synchronization of the pan conveyor and overhead conveyor
Eviscerator – Maestro

Carcass Contamination

Prevention of contamination by process
  • Method of kill
  • Fecal matter removed

Reduction of contamination
  • IOBW
**Method of kill**

<table>
<thead>
<tr>
<th>Location of Cross-section (above)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Esophagus</td>
</tr>
<tr>
<td>B. Trachea</td>
</tr>
<tr>
<td>C. Jugular Veins</td>
</tr>
<tr>
<td>D. Carotid Arteries</td>
</tr>
</tbody>
</table>

**Left Jugular vein**

**Right Jugular vein**

**Location of Cross-section (above)**

**Shallow cut, bleeding less than optimal.**

**Killer:**

- Deep cut through all four blood vessels. Fast and certain brain death.
- Esophagus (gullet) and trachea (windpipe) disconnected from head.

**Crop ruptured during head pulling.**

**Contamination by crop contents.**

**Crop entirely left in neck during head pulling.**

**Intact crop and esophagus removed entirely by Maestro.**

**Cropper removes remaining windpipe etc.**
### Fecal Removal Machine

**Machine operation:**
- Location of machine
- Expression of fecal matter
- Rinse of carcass

![Image of Fecal Removal Machine](image)

---

### Inside/Outside Bird Washer - IOBW

**Machine operation**
- Critical step in process
- Nozzles
- Water usage

![Image of Inside/Outside Bird Washer](image)
Post-Harvest interventions for Salmonella

Conclusion

Broiler Carcass Contamination

- Conditions of bird at arrival
- Critical equipment
- Preventive approach

Contact Information

David McNeal
Product Manager
Meyn America LLC
770-967-0532