Comparison of sampling methods – need for clearer guidelines for microbiological quantification on broiler carcasses

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Gunvor Elise Nagel Gravning
DVM, PhD
Animalia
Sampling methods compared

- Whole-carcass rinsing (WCR)
- Neck skin excision
- Breast skin excision
- Gauze cloth swabbing

Total 100 samples
  - 25 x four methods
Analysis of samples

- Total plate count (TPC), *Enterobacteriaceae, E.coli* using 3M™ Petrifilm™

- Conversion of unit of measurement to cfu/cm²
  - WCR: with total surface area of 1300 cm² (Gill and Badoni, 2005)
  - Neck and breast skin: Measure 10 g of neck (n=10) and breast skin (n=10) by ruler to get cm² (Neck skin 37.5 cm² (24.5-56.0) and breast skin 56.3 cm² (38.5-71.2))
  - Swabbing: results divided by 300 cm²

(Combined swabbed area of 100 cm² breast, 100 cm² on the back and 100 cm² around and inside pelvic cavity)
Results

- Mean recovery results presented as log cfu/cm$^2$:

<table>
<thead>
<tr>
<th>Indicators</th>
<th>WCR log cfu/cm$^2$ (SD)</th>
<th>Neck skin log cfu/cm$^2$ (SD)</th>
<th>Breast skin log cfu/cm$^2$ (SD)</th>
<th>Swabbing log cfu/cm$^2$ (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPC</td>
<td>4.4 (0.6)a</td>
<td>4.3 (0.7)a</td>
<td>2.8 (0.7)b</td>
<td>2.3 (0.4)b</td>
</tr>
<tr>
<td>Enterobacteriaceae</td>
<td>4.0 (0.7)r</td>
<td>3.4 (0.6)s</td>
<td>2.2 (0.6)t</td>
<td>1.9 (0.5)t</td>
</tr>
<tr>
<td>E.coli</td>
<td>3.95 (0.7)x</td>
<td>3.4 (0.6)y</td>
<td>2.2 (0.6)z</td>
<td>1.8 (0.6)z</td>
</tr>
</tbody>
</table>

For recovery of *Enterobacteriaceae* and *E.coli*:

- Neck-skin excision recovered 80-100% of WCR
- Breast-skin excision recovered 50-65% of WCR
- Swabbing recovered 40-50% of WCR

Calculated from log-numbers
Discussion, summary and some concluding remarks

- Initial results transformed, same unit of measurement (bacteria per cm²)
  - Distortion can occur (newly slaughtered vs chilled, shape and elasticity of broiler skin...)
  - Log values allow for this level of accuracy (Brown et al., 2000) and sample methods can be compared
- Our results indicate that the WCR recovers the most bacteria when comparing methods
- This study contributes to the knowledge regarding choice of sampling method and expected recovery of microbiological contamination
- Comparison of study results are generally difficult
- Several studies have attempted to calculate relationship between excision and rinsing method
- Yet no conversion factor exists - Should establish conversion factors to ease the comparison of sampling methods and results
- Increase the knowledge regarding «true» contamination level of carcasses
- Can contribute to increased food safety
Thank you for the attention!

Questions or comments?