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## G98-1374 *Escherichia coli*: Testing for Process Control Verification: Beef Carcass Sampling

Mindy Brashears

*University of Nebraska - Lincoln*

Dianne Peters

*University of Nebraska - Lincoln*

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# *Escherichia coli*

## Testing for Process Control Verification

### *Beef Carcass Sampling*

In July 1996, the U.S.D.A. published the Final Rule on Pathogen Reduction for meat and poultry processing facilities. Its goal is to reduce the occurrence of food-borne pathogens in meat and poultry products. The rule requires carcass sampling for "generic" *E. coli* in meat and poultry slaughter operations. The U.S.D.A. has developed guidelines for acceptable, marginal and unacceptable amounts of *E. coli* to be used by the processor to determine if their process is controlling microbial hazards. If *E. coli* testing indicates that the process is not in control of the microbial hazards, then the processors may have to make changes to make the process safer. This guide was developed to assist processors in sampling of the carcass and in interpretation of the results.

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*Mindy Brashears, Extension Food Safety Specialist*  
*Dianne Peters, Manager Microbiology Services Laboratory, FPC*

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All information taken from Federal Register 9 CFR Part 304. Pathogen Reduction; Hazard Analysis and Critical Control Point (HACCP) Systems; Final Rule

### **Supplies Needed**

1. Template (10 cm x 10 cm; 3.94 in x 3.94 in)
  - A. Reusable

Metal

Plastic

Both can be sanitized in bleach solution (500 ppm) or rinsed in hot water between samples, but should be dry before it is used again.

B. Disposable

Aluminum

Paper

These can be "homemade," but should be autoclaved before use and discarded after use.

2. Butterfield's Phosphate Diluent (BPD) - 25 ml

Store at room temperature.

Do not use cloudy solutions.

3. Sterile gloves

The only items that may contact the surface of the glove are the exposed sampling area and the sponge. The glove surface must not contact the outside of the collection vessels.

4. Sample collection bags containing sterile specimen sponge

5. Hand sanitizer and soap

6. Sterile "Zip-Loc" or Stomacher bag

7. Step ladder

## General Information about Sampling

- Samples should be analyzed as soon as possible.
- Samples should be refrigerated until analyzed.
- If analyzed by an outside laboratory, they should be shipped overnight and analyzed no later than the day after collection.
- Arrange materials and label bags before beginning sampling process.

## Sampling Frequency

- 1 test per 300 carcasses (unless low volume)  
Very low volume for swine is not more than 6,000 head/year
- Very low volume establishments should collect samples from predominant species (if more than one species is slaughtered) at the rate of once a week until 13 test results are obtained. Following the initial 13 samples, the establishment again will collect 13 test results at least once a year (June through August) or when there is a change in slaughter process or personnel.

## Carcass Selection

- Should be random and chosen by:
  - Random number tables
  - Computer-generated random numbers, etc.
- Carcasses should be in the cooler at least 12 hours before sampling.
- Select a predetermined point on chain and count back five carcasses to select carcass.
- Cattle — Both "leading" and "trailing" sides should have equal chance of being selected.

## Sampling Procedure

1. Wash hands and arms up to the elbow with an antimicrobial soap.
2. Gather all materials and label bags.

3. Locate the flank, brisket and rump sampling sites according to regulations.
4. Position ladder so ham area can be reached.
5. Hold the sampling bag at the top corner and tear off clear perforated strip and open the bag.
6. Pour about half of the BPD solution into the sponge bag to moisten the sponge.
7. Close the bag and massage the sponge until it is fully hydrated.
8. Push the sponge to the top of the bag (from the outside of the bag).
9. Open bag.
10. Put on sterile gloves being careful not to contaminate the outside surface.
11. Remove sampling sponge from bag with gloved sampling hand.
12. With the other hand, pick up the template and position it on the belly area of the carcass. Be careful not to touch the inside of the template.
13. Wipe the sponge over the enclosed sampling area for a total of 10 times in the horizontal direction.
14. Transfer the template to the same hand that is holding the sponge.
15. Climb ladder and use the same technique to sample the ham area. The same surface of the sponge that was used to sample the belly should also be used to sample the ham.
16. Climb down from the ladder and sample the jowl area using the "clean" side of the sponge.
17. Add the remaining BPD to the bag.
18. Expel excess air from the bag and close. Fold down 3-4 times.

## **Analytical Methods**

- *E. coli* Biotype I must be quantified in samples. ("Generic" *E. coli*)
- Samples should be analyzed according to the methods found in Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC), International, 16th ed.
- If a "generic 1 ml plating technique" is used, plate count values should be divided by 12 to equal the count per cm<sup>2</sup>.
- Generally, a 1:10, 1:100, 1:1000, 1:10000 dilution should be made.
- Results should be reported as colony forming units/cm<sup>2</sup>.

## **Record Keeping**

- Results should be recorded in order of sample collection.
- Include the following information for each sample:
  - Date and time of collection
  - Slaughter line
- These results should be maintained in plant for 12 months.

## **Performance Criteria**

- Acceptable range: negative
- Marginal range: Not more than 100 cfu/cm<sup>2</sup>
- Unacceptable range: above 100 cfu/cm<sup>2</sup>

## **Unacceptable Results**

### ***Plant Response:***

- One unacceptable should result in a review of process controls.
- More than three marginal or unacceptable results in 13 consecutive results also merits a review.

***FSIS Response:***

- Unacceptable results may trigger greater inspection activity.
- They may also result in the establishment being selected for intensified agency testing for *Salmonella*.
- Repeated failures indicate that process controls are inadequate and will result in suspension or withdrawal of inspection.

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