Protocol for evaluating retained water in the following single ingredient red meat product: Steer/Heifer Carcasses

Note: The following is an example protocol and should not to be used verbatim. Because each establishment is unique, each establishment should design their protocol to reflect the individual characteristics of their operations.

1.0 Purpose Statement

1.1 The purpose of this protocol is to determine the amount of water absorption and retention in Steer/Heifer carcasses that is unavoidable while achieving the regulatory pathogen reduction performance standard for Salmonella (as set forth in the PR/HACCP regulations – 9 CFR 310.25(b).

2.0 Type of washing and chilling system

2.1 The facility slaughter/dressing line utilizes a final carcass washer at the end of the dressing procedures. This is followed by a carcass rinses that includes the antimicrobial intervention (*insert example) prior to entry into the carcass cooler. The carcass cooler is maintained around 34 °F.

3.0 Configuration and modification of the chiller system components

3.1 The establishment uses a carcass water spray system in the carcass cooler to chill carcasses rapidly. The carcass water spray system consists of intermittent sprays of water during the carcass cooling process.

4.0 Special features in the chilling process:

4.1 Chlorine is added to the carcass water spray as an antimicrobial intervention at 20-50 PPM. The carcasses freely drain before exiting the carcass cooler and prior to further processing in the establishment or prior to shipping.

5.0 Variable factors that affect water absorption and retention

5.1 The final carcass wash cabinet consists of a number of spray nozzles at a selected pressure at selected spray directions by the establishment. The final carcass wash water is the normal ambient water temperature from the municipality or of the well water. The number and size of spray nozzles, direction of nozzles, water pressure, and the length of time in the final wash cabinet may be changed depending upon the size of the carcasses, season of the year, and changes in the dressing procedures. The carcasses are in the chiller system (cooler) usually from 18 to 24 hours. The carcass cooler temperature is usually maintained around 34 °F. The temperature of the water in the carcass water spray is the normal ambient water temperature from the municipality or of the well water. The frequency and length of intermittent sprays of water per bay during the carcass cooling, the carcass cooler temperature and the drain time from the last spray prior to exiting the cooler may be varied.

6.0 Standards to be met by the chilling system:

6.1 The current FSIS *Salmonella* pathogen reduction performance standards, as set forth in the PR/HACCP final rule, will be met.

7.0 Testing methodology

7.1 Water absorption and retention

7.1.1 Samples will be collected immediately prior to the final carcass wash on the slaughter/dressing line to determine the "green" weight of the carcasses.

7.1.1.1. *(insert number) random carcasses will be tagged and weighed in *(insert number) groups of *(insert number) carcasses. The *(insert number) groups will be distributed evenly throughout the production period (beginning, middle, and end) with the production period being defined as sanitation to sanitation.

7.1.2 Samples will be collected from carcasses at point exiting the cooler.

7.1.2.1 The tagged carcasses from 7.1.1.1 will be weighed immediately prior to further processing or shipping.

7.1.2.2 These post-cooler weights will be compared to the pre-final carcass wash weights to determine the retained water gained using a mathematical difference calculation (cooler exit weight minus "green" weight [pre-final carcass wash weight]) as a percentage.

7.2 Pathogen reduction measurement

7.2.1 *(insert number) groups of *(insert number) carcasses will be randomly selected post-cooler from the same lots as those tested in Section 7.1. The *(insert number) groups will be distributed evenly throughout the production period (beginning, middle, and end) with the production period being defined as sanitation to sanitation.

7.2.1.1 The percent salmonella positive rate will be determined using the post-cooler carcass swabs salmonella performance standard methodology.

7.3 Evaluation of cooler factors

7.3.1 The frequency and length of intermittent carcass sprays per cooler bay

7.3.1.1 Three frequency and length of sprays will be evaluated.

7.3.1.1.1 Fifteen minute interval: Spray for 1 minute, spray off for 14 minutes.

7.3.1.1.2 Thirty minute interval: spray for 3 minutes, spray off for 27 minutes.

7.3.1.1.3 Sixty minute interval: spray for 3 minutes, spray off for 57 minutes.

7.3.2 The carcass cooler temperature will remain around 34° F.

7.3.3 The drain time from the last carcass spray until exit

7.3.3.1 Two drain times will be evaluated.

7.3.3.1.1 4 hours after last spray

7.3.3.1.2 6 hours after last spray

7.3.4 Study design

7.3.4.1 A three-by-two factorial table will be used to evaluate the effect of these cooler factor settings on the percent moisture retention (Section 7.1) and on the pathogen reduction measurements (Section 7.2).

7.3.4.2 Each of the six cooler setting combinations will be evaluated for three processing periods (defined as sanitation to sanitation). Each processing period will be considered a replicate.

8.0 Evaluation and Reporting of Data

8.1 The results achieved from the three replicates per cooler setting combination will be averaged and reported as the final result for each cooler setting combination.

8.1.1 Carcass weight differences will be determined using a mathematical difference calculation (cooler exit weight minus "green" weight) for each carcass group resulting in recorded weight difference results. The weight difference obtained per carcass group will be divided by the "green" weight per carcass group to determine the % moisture retention cooler exit per group. The results will be averaged to obtain the estimated average % moisture retention at point of cooler exit.

8.1.2 The salmonella data will be reported as the number of positive samples/number of samples tested x 100 (% positive).

9.0 Explanation of how the conclusions will be determined.

9.1 Conclusions will be determined by comparing the baseline pathogen reduction levels achieved pre-protocol implementation with the post-protocol implementation pathogen reduction results. This comparison will be evaluated according to the specifications detailed in section 6.1.

9.2 The amount of moisture retention that is unavoidable to achieve the above food safety criteria will be reported.

(*) Each establishment should insert statistically significant and verifiable information that reflects their unique operations.