Comparison of the survival of *E.coli* on beef caracass surfaces with that of excised beef pieces

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BACKGROUND

Minimising bacterial comtamination of carcasses immediately after slaughter is a major goal of the meat industry in order to increase the shelf life and improve the microbiological safety of meat. Understanding the mechanisms of attachment to various surfaces is critical in finding new methods for inactivating or removing attached microorganisims from these surfaces.

OBJECTIVE

The aim of this study was to investigate and compare the influence of different beef surfaces i.e surface membrane (fascia) and lean cut surface on the survival of *E.coli* on beef carcass surfaces and excised beef pieces at 10°C.

METHOD

Beef carcass surfaces

A sterile coring punch dipped in edible ink, was used to delimit 2.5cm^2 areas of fascia and cut surface on the carcass (Figure 1A). A 5 µl inoculum containing ≅ 3 $\log_{10}$ cfu of *E. coli* was inoculated by pipette onto each surface (Figure 1B). The inoculated carcass sides were left for 30 min prior to chilling to facilitate attachment and then transferred to an experimental chill at 10ºC. At 0, 24, 48 and 72 h, a 5 cm^2 area was excised, using a sterile scalpel and tweezers and examined for *E.coli* numbers.

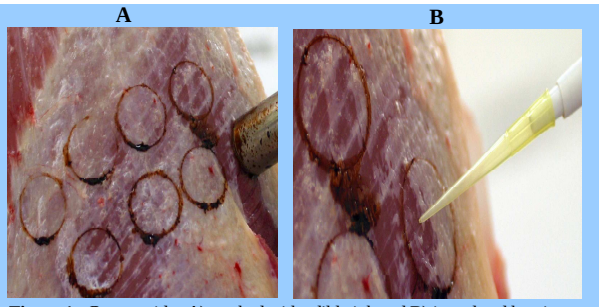

Figure 1. Carcass sides A) marked with edible ink and B) inoculated by pipette

Excised beef pieces

Immediately after carcass washing, a section of rump (fascia) and neck (cut surface) was excised and brought to the laboratory. Inoculated beef pieces were transferred to aqua cups with lids (Figure 2) and stored in a refrigerated incubator at 10ºC. Excised beef pieces were inoculated, treated and sampled in the same manner as described for beef carcass surfaces.

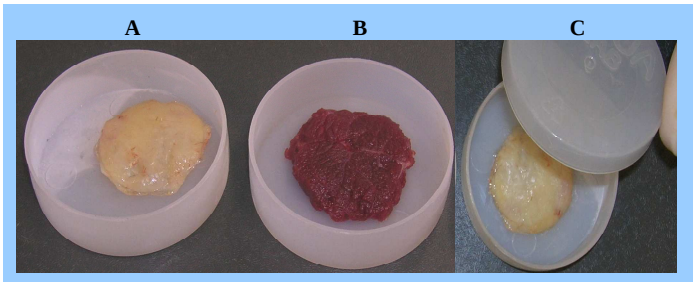

Figure 2. Excised beef pieces: A) fascia, B) cut surface and C) sample in aqua cup with lid

RESULTS AND DISCUSSION

The survival of *E. coli* ($\log_{10}$ cfu cm^{-2}) on A) beef carcass surfaces and B) excised beef pieces is shown in Figure 3. After 24, 48 and 72 h storage, significantly higher numbers of *E.coli* were recovered on the cut surface compared to fascia for both carcasses and excised beef pieces ($P<0.01$). However, at the same time, there was a significant difference in pathogen survival on the carcass compared to the excised beef pieces ($P<0.05$). This indicates that data collected from excised beef pieces cannot be used to predict pathogen survival and behaviour on carcass surfaces.

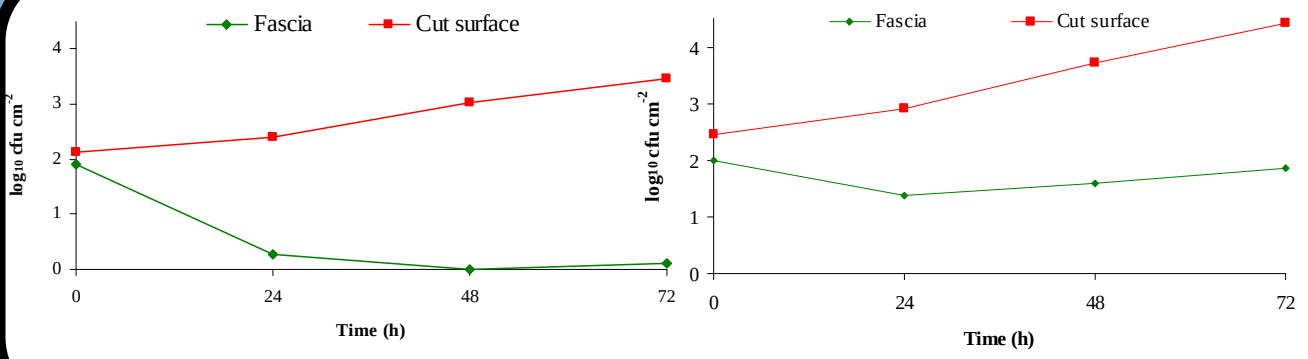

Figure 3. Survival of *E.coli* ($\log_{10}$ cfu cm^{-2}) on A) beef carcass surfaces and B) excised beef pieces

CONCLUSION

Significantly higher numbers of *E.coli* were recovered on the cut surfaces compared to the fascia for both carcass surfaces and excised beef pieces. The data also demonstrated that there was a significant difference in pathogen survival on the carcass compared to the excised beef pieces, indicateing that data collected from excised beef pieces cannot be used to predict pathogen survival and behaviour on carcass surfaces.

Acknowledgements

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