

Additional molecular diagnostic testing following a trial of visual-only inspection of fattening pigs from non-controlled housing conditions

Area of research interest: [Foodborne pathogens](#)

Study duration: 2013-09-01

Project code: FS516002

Conducted by: SAC Commercial Ltd (SAC)

Background

Traditional post mortem inspection includes palpation and incision, which can potentially increase the risk of contamination, while visual-only post mortem inspection reduces handling of the carcass. In previous work entitled 'A trial of visual inspection of fattening pigs from non-controlled housing conditions', the frequency and types of conditions that could be identified at slaughter by the two different meat inspection methods was investigated.

This was to see if there was a difference between the two methods that might lead to a change in risk to human health/animal health/animal welfare, if the inspection method was changed for pigs reared outdoors.

Traditional microbiological techniques isolated 12 yersinia species and no salmonella species. No statistical difference was found in the proportion of carcasses contaminated with Yersinia spp. The low numbers of bacteria found (ie the microbiological outcomes) were not unexpected, given that the abattoir had an extremely high level of hygiene. Low levels of total aerobic and coliform bacterial counts were also obtained.

To check the findings of the study discussed above, this project was commissioned to carry out additional molecular testing on samples that had been stored from the original study. Polymerase chain reaction (PCR) tests were used to detect DNA from salmonella and Yersinia spp. Additional techniques were also used to find out more about the species of yersinia that had been found.

Research Approach

The main objective of the study was to apply molecular diagnostic techniques to samples and isolates gathered during the field study to validate the culture results and obtain additional information about the pathogenic potential for humans of the isolates.

To validate the results from the field study, PCR-based methods were used to test stored samples for DNA specific for salmonella and yersinia, rather than repeat the same culture-based tests which were completed on the original samples. This was done to re-determine the presence/absence of salmonella and yersinia using a different method of measurement (PCR as opposed to culture).

The following approach was taken:

- identification of yersinia isolated in project FS145003
- determination of the presence or absence of yersinia and salmonella DNA in frozen samples, archived from project FS145003, using PCR testing and analysis
- comparison of the molecular testing results with the traditional culture results from project FS145003

Results

The additional molecular diagnostic testing did not identify any further samples that were positive for yersinia and did not identify any samples that were positive for salmonella. The testing also provided further information on the biotypes and serotypes of Yersinia spp. present (Yersinia enterocolitica and Yersinia frederiksenii were recovered by culture from the original carcass swab samples).

Therefore, the authors confirmed that the results from the original microbial investigations were valid and reflect the microbiological status of the pigs sampled on the line and the good hygiene practices in place in this abattoir.

From this additional molecular diagnostics study, the authors made recommendations, such as when identification of bacteria is required, ISO standard PCR-based testing for the specific bacteria should be used on enrichment samples first, followed by culture only of those samples that give a positive signal. They also recommend for any study that involves identification of bacterial isolates the key questions that are to be asked within the study should be clearly identified first to lead to the identification of the most appropriate diagnostic methods to use.

Research report

England, Northern Ireland and Wales

PDF

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