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PROPHYLACTIC MEASURES IN ORDER TO REDUCE CONTAMINATION OF PIG CARCASSES WITH *YERSINIA ENTEROCOLITICA* DURING SLAUGHTER

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Background

The pig is considered to constitute the most important source of *Yersinia enterocolitica* infection in man. This has been demonstrated by epidemiological studies (4, 5). The spread of *Yersinia enterocolitica* to the pig carcass during slaughter could be reduced by sealing off the rectum with a plastic bag (1). This indicates that *Y. enterocolitica* O:3 probably spreads via faeces/intestinal contents to the carcass during slaughter and dressing operations. A slaughtering procedure which prevents the dissemination of any pathogenic bacteria in the faeces to the carcasses and then to cut meat, is of great significance for the hygienic production of pork. It is thus very desirable that this technique is evaluated. In the study described here, the use of the plastic bag technique in one Norwegian and one Swedish slaughterhouse was evaluated with regard to its effect on the spread of *Y. enterocolitica* to pig carcasses.

Materials and Methods

Materials and methods are presented in Figure 1 and Table 1.

Sampling. Pig carcasses were sampled with cotton swabs. Sampling was carried out on two days during slaughtering. In all, 120 pigs were sampled in each country, half with normal slaughtering procedure and half applying the plastic bag technique. Sites which were likely to become contaminated with faeces were chosen. In addition, one site (exposed split surface) was chosen in order to register any contamination caused by the cleaving saw/splitter. Swab samples were taken from the following sites (each $50cm^2$) on both halves of the carcass: Ham incision, surface of the ham and exposed meat (5cm x 10cm) x 2; exposed split surface (5cm x 10cm a handsbreadth below the last lumbar vertebra) x 2; abdominal incision (2.5cm x 20 cm from the attachment of the sternum and upwards) x 2; foreleg, above the elbow (5cm x 10 cm) x 2.

Methods of Analysis. Examination for *Y. enterocolitica* was carried out using an abbreviated version of the Nordic Committee on Food Analysis method (3) (Figure 1). Colonies resembling *Yersinia spp*. were subjected to a biochemical, cultural and serological screening as detailed elsewhere (2).

Results

Results are presented in Figure 2 and Table 2.

No difference was seen in the occurrence of *Y. enterocolitica* O:3 on pig carcass between Norway and Sweden, no matter whether plastic bags were used or not (Odds Ratio = 1.18; p = 0.99).

The use of a plastic bag reduced the spread of *Y. enterocolitica* O:3 to the pig carcass (Odds Ratio = 0.08; p = 0.005).

Conclusions

Y. enterocolitica O:3 was recovered from 10% of pig carcasses when eviscerating procedures did not include the use of the plastic bag technique. The organism was recovered from only 0.8% of carcasses when the plastic bag technique was employed.

The plastic bag technique was effective both in connection with manual excision of the rectum/low throughput (90/hour), and mechanical freeing of the rectum/high slaughter rate (240/hour).

By incorporating the plastic bag technique into the slaughtering procedures, the meat industry would contribute to preventing the dissemination of *Y. enterocolitica* and other pathogens which spread via the faeces.

References

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Table 1. Slaughterlines

Slaughterline	Norway	Sweden
State of slaughterhouse	EU	EU
Slaughter rate	90 pigs/h	240 pigs/h
Circumanal incision	Manual	Mechanical

Fig. 1. Methods of analysis

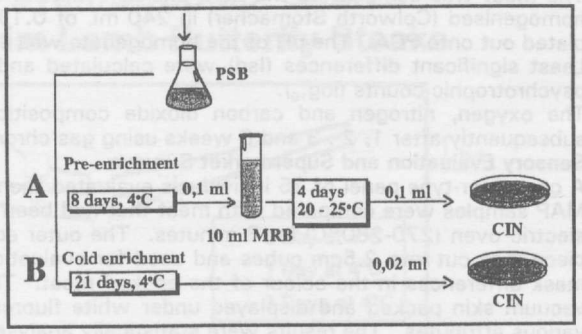

Table 2. Comparison of isolation procedures of *Y. enterocolitica* O:3

Isolation procedure	Norway	Sweden
A (only)	0	6
B (only)	5 + 1*	1
A + B	5	1
All	10 + 1*	8

* *Y. pseudotuberculosis* serovar I

Fig. 2. Occurrence of *Y. enterocolitica* O:3