YERSINIA ENTEROCOLITICA 0:3 AND SALMONELLA SSP. ON FRESH PORK COLLAR

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SUMMARY

The incidence of *Yersinia enterocolitica 0:3* and *Salmonella* ssp. on the surface of deboned and derinded pork meat was surveyed. Pork collar (neck fillet) was chosen as the object of the survey. Samples were taken from deboned and derinded collars and reference samples were taken from tonsils at the veterinary inspection. 304 tonsil samples were examined for *Yersinia enterocolitica 0:3* and 1124 collar samples for *Yersinia enterocolitica 0:3* and *Salmonella* ssp. Three pig abattoirs participated in the study.

The three abattoirs showed (A) 12%, (B) 0% and (C) 11% *Yersinia enterocolitica 0:3* positive pork collar samples. The corresponding amounts of *Yersinia enterocolitica 0:3* positive samples in tonsils were 58%, 59% and 36%, respectively.

Salmonella ssp. were not detected in the 1124 pork collar samples investigated.

It is surprising that abattoirs A and B showed equal *Yersinia*–frequency in tonsils but differed significantly in *Yersinia*–frequency on collars. This finding indicates that – despite the fact that Danish pig abattoirs are considered very uniform – local differences in slaughter techniques or equipment can significantly affect contamination and/or survival of *Yersinia enterocolitica 0:3* on fresh pork meat during slaughter, refrigeration, handling and storage.

The complete absence of *Salmonella* ssp. in the samples surveyed supports the perception that *Salmonella* ssp. is not a major problem in fresh Danish pork meat.

INTRODUCTION

Among the pathogenic bacteria especially *Yersinia enterocolitica 0:3* and *Salmonella* ssp. attract attention relative to fresh pork meat.

The purpose of the survey was to obtain knowledge of the incidence of *Yersinia enterocolitica 0:3* and *Salmonella* in a product that has been handled and that reaches the consumer as a fresh product. The product chosen was deboned and derinded collar.

It is well documented that *Yersinia enterocolitica 0:3* frequently appears in pigs. A summary of published researches has recently been compiled by BÜLTE et al. (1991).

The incidence of *Yersinia enterocolitica 0:3* on the carcass prior to entering the chilling tunnel has previously been examined in several studies in Denmark. SØRENSEN og ANDERSEN (1989) have shown that the bacteria were spread to the carcass from intestinal contents and to organs from tonsils. *Yersinia enterocolitica 0:3* are found on the surface of approx. 20% of the carcasses, depending on the sampling site, prior to the chilling tunnel. However, material concerning the incidence after emerging from the chilling tunnel is lacking.

The incidence of *Salmonella* ssp. in pork meat so far has not presented a problem in Denmark. Recent studies of pork stock also seem to indicate that only a few per cent of the pigs are healthy carriers of *Salmonella* ssp. Nevertheless, the large incidence of *Salmonella* ssp. in poultry combined with reports from other European countries on the incidence of *Salmonella* ssp. in pork meat have stirred interest to include *Salmonella* ssp. in the investigation.

MATERIALS AND METHODS

Samples

Samples from deboned and derinded pork collars and pork tonsils were taken in three pig abattoirs. The same abattoirs participated in a general hygiene survey reported earlier (CHRISTENSEN and SØRENSEN, 1991). The samples were taken on two occasions with approximately the same number of samples each time. The first sampling took place from November 1990 to February 1991 and the second sampling from April to June 1991.

Samples from tonsils were taken after the plucks had been removed from the carcass. Samples were taken with swabs by rubbing the swabs between the tonsils, while pressing the tonsils around the swab with three fingers.

Samples from collars were taken just before packing. Care was taken to include collars from different operatives. Two samples were taken from each collar. The surface of the cranial/caudal half of the collar was swabbed using two wet cotton-swabs for each half. The collars were handled with sterile gloves. The samples, taken alternately from the cranial and caudal part, were analysed for the presence of *Salmonella* ssp. and *Yersinia enterocolitica 0:3*.

Methods

Detection of *Yersinia enterocolitica 0:3* was done according to Nordic Committee on Food Analysis, Method No. 117, (1987), with a modification of the enrichment step, as the swabs were transferred directly into 10 ml PSB. Furthermore, the biochemical verification was extended with the folloving reactions: raffinose(−), trehalose(+), salicin(−), citrate(−), VP(+) and tween 80(−).

Detection of *Salmonella* ssp. was done according to NCFA Method No. 71, (1991), with a modification of the enrichment step, as the swabs were transferred directly into 10 ml buffered peptone water.

RESULTS AND DISCUSSION

Table 1 shows the results.

No *Salmonella* ssp. were found on the collars.

The first sampling found *Yersinia enterocolitica 0:3* on 14.6% (±5.4%) of the collars from abattoir A and on 1.5% (±1.6%) and 0.5% (±0.9%) of the collars from abattoir B and C, respectively, which marks a great difference. The figures in parenthesis are the 95% confidence limits.

Because the incidence of *Yersinia enterocolitica 0:3* on collars varied so much from abattoir to abattoir, samples were also taken from tonsils on the second sampling to get a measure of the incidence of *Yersinia enterocolitica 0:3* on the pigs delivered to the abattoir.

The second sampling found *Yersinia enterocolitica 0:3* on 12% of the pork collars from abattoir A. That corresponds with the result from the first sampling. The small difference could be explained by random variations. The incidence was 0% at abattoir B. That also corresponds with the result of the first sampling. However, at abattoir C the incidence was 11%, which differs from the first sampling

Table 1. Isolation of *Yersinia enterocolitica 0:3* and *Salmonella* ssp. from pork collar and isolation of *Yersinia enterocolitica 0:3* from tonsils.

	Abattoir					
	A		B		C	
	No. of Samples	% of Samples positive	No. of Samples	% of Samples positive	No. of Samples	% of Samples positive
Yersinia enterocolitica 0:3						
Collars, first sampling	165	15	200	2	200	1
Collars, second sampling	159	12	200	0	200	11
Tonsils	100	58	100	59	100	36
Salmonella ssp.						
Collars, first sampling	165	0	200	0	200	0
Collars, second sampling	159	0	200	0	200	0

The percentage of *Yersinia enterocolitica 0:3* found in tonsils from abattoir A and B was the same, i.e. approximately 60%. The percentage was lower at abattoir C, i.e. 36%. The difference between A/B and C is greater than what would be expected due to random variations.

Furthermore, the great difference in incidence of *Yersinia enterocolitica 0:3* in the collars at abattoirs A and B presented a surprise and it is surprising that the first sampling found so few *Yersinia enterocolitica 0:3* at abattoir C.

Differences in slaughter techniques or processes must cause the varying incidences of *Yersinia enterocolitica 0:3* on collars. The most conspicuous difference between the abattoirs is that in abattoir A the carcasses are sprayed before entering the chilling tunnel, which is not done in B and C. The guess is that this might be the reason or part of the explanation. Initial investigations have not been able to confirm this hypothesis.

Colonies from 44 positive samples have been taken out for extended, further biochemical verification. All colonies were *Yersinia enterocolitica 0:3*.

The above results do not challenge recommendations previously made. CHRISTENSEN (1987), SØRENSEN and ANDERSEN (1989), and KAPPERUD (1991) have previously proposed measures to reduce the spread of *Yersinia enterocolitica 0:3* to the carcass and the fresh meat. The recommendations are directed at eliminating the transfer of *Yersinia enterocolitica 0:3* from tonsils and faeces to the carcass through appropriate changes of the slaughter process.

CONCLUSION

Salmonella ssp. were not found on 1,124 collars from three abattoirs. Even though the incidence may be greater on other parts of the carcass, the result indicates that *Salmonella* ssp. do not present a problem on collars and similar products.

The study shows that *Yersinia enterocolitica 0:3* can be found on fresh deboned and derinded collars. The incidence varies from 0% to 15% among the abattoirs studied. It is surprising that this variation occurs among abattoirs with the same incidence of *Yersinia enterocolitica 0:3* in tonsils. It indicates that differences in slaughter techniques or processes influence the number of collars contaminated with *Yersinia enterocolitica 0:3*.

An educated guess as to the reason for the difference is that the carcasses are sprayed prior to entering the chilling tunnel at abattoir A, where the incidence of *Yersinia enterocolitica 0:3* is greatest. The hypothesis is under investigation.

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