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FAECAL AND TONSILLAR CARRIAGE OF *YERSINIA* SPP. BY PIGS

**A DISSERTATION PRESENTED IN PARTIAL FULFILMENT (25 %) OF
THE REQUIREMENTS FOR THE DEGREE OF MASTER OF VETERINARY
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ABSTRACT

Pigs are considered important reservoirs for pathogenic *Yersinia* spp. which cause disease in humans. Results of many surveys have demonstrated the common occurrence of *Y. enterocolitica* and related species in the tonsils and intestinal tract of healthy slaughter-age pigs. However, the source of infection remains unclear. There is a dearth of information as to when pigs become infected hence, there is a need to conduct further studies not only among slaughter pigs but also among pigs belonging to different age groups on the farm. This study was conducted to determine the faecal and tonsillar carriage of different *Yersinia* spp. by pigs belonging to different age groups, characterise the species isolated by biochemical and serological methods, and determine the *in vitro* virulence characteristics of the isolates by simple assays.

The study was conducted in two phases: first on a known or suspect *Y. enterocolitica*-positive farm within Massey University and second in a slaughterhouse where pigs from the suspect farm are sent for slaughter. A total of 54 faecal samples were collected from pigs belonging to six different age groups including 3-4 days, 2 weeks, 3 weeks, 4 weeks, 8 weeks and 12 weeks together with samples from the sow and one pooled sample from the floor. All of the 54 faecal samples collected were found negative for *Yersinia* spp. after the 21-day cold enrichment, subsequent plating onto CIN agar and use of primary screening tests. In the second phase, a total of 50 samples representing 25 faecal and 25 palatine tonsils were collected from slaughter pigs with ages ranging from 20-24 weeks. Out of the 25 faecal samples, there were two isolates of *Yersinia frederiksenii* and one isolate of the unusual or new biotype of *Yersinia enterocolitica*. Of the 25 samples of palatine tonsils collected, three of the isolates were unusual strains of *Y. enterocolitica* and two were *Y. pseudotuberculosis* Group I or serotype I. All isolates were confirmed by biochemical tests. The two isolates of *Y. pseudotuberculosis* were confirmed as Group I by serological tests. In this study, sample collections were done in the months of August and October when Group I was isolated conforming to the results of De Allie (1994) when serotype I was found only in winter and spring.

The pathogenic potential of the eight isolates of *Yersinia* spp. were tested for *in vitro* virulence associated characteristics using the four simple tests namely salicin fermentation/aesculin hydrolysis, D-xylose fermentation, pyrazinamidase (PYZ) test and Congo Red-magnesium oxalate (CR-MOX). In this study, the unusual strains of *Y. enterocolitica* isolated from the

tonsils and faeces were salicin-aesculin positive, xylose-positive, CR-MOX negative and PYZ negative. Except for PYZ, all three tests suggest the non-pathogenic potential of this unusual strain of *Y. enterocolitica*. The pathogenic potential of *Y. pseudotuberculosis* Group I isolated from the pig tonsils was shown by CR-MOX and PYZ tests. Both isolates were CR-MOX positive and PYZ negative. *Y. pseudotuberculosis* is considered a potential pathogen as shown by *in vitro* virulence tests and should not be overlooked as a causative of human disease.

It was shown in this study that not all pigs are infected with pathogenic and non-pathogenic species of *Yersinia* even if they have been established to harbour the organisms either in their tonsils or faeces. However, pigs sent for slaughter may carry *Yersinia* spp. in their tonsils or faeces suggesting the role of other factors such as management and husbandry practices or contact with other animals during lairage, or from possible cross-contamination during processing at the slaughterhouse. Slaughter pigs are important source of *Y. enterocolitica* infections in humans, hence it is important to prevent or reduce the risk of possible contamination in the slaughterhouse by these organisms. Further investigations are needed to determine the pathogenic potential of the unusual strains of *Y. enterocolitica* and its possible role as a causative agent in human disease. Since *Yersinia* spp. were not recovered from faecal samples of pigs in the farm belonging to different age groups in this study, there is a need to conduct further studies using tonsillar samples or swabs instead of faeces. As shown in this study and other published reports, tonsils yield more isolates of *Yersinia* spp. compared to faecal samples.

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