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**PUBLIC HEALTH ASPECTS OF *YERSINIA PSEUDOTUBERCULOSIS*
IN DEER AND VENISON**

**A THESIS PRESENTED IN PARTIAL FULFILMENT (75%) OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF PHILOSOPHY
IN VETERINARY PUBLIC HEALTH
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September, 1992**

DEDICATED TO

MY PARENTS (MR. RICHARD BOSI AND MRS. VICTORIA CHUAN)

MY WIFE (EVELYN DEL ROZARIO)

AND MY CHILDREN (AMELIA, DON AND JACQUELINE)

Abstract

A study was conducted to determine the possible carriage of *Yersinia pseudotuberculosis* and related species from faeces of farmed Red deer presented for slaughter and the contamination of deer carcass meat and venison products with these organisms. Experiments were conducted to study the growth patterns of *Y. pseudotuberculosis* in vacuum-packed venison stored at chilling and freezing temperatures.

The serological status of slaughtered deer in regards to *Y. pseudotuberculosis* serogroups 1, 2 and 3 was assessed by Microplate Agglutination Tests. Forty sera were examined comprising 19 from positive and 20 from negative intestinal carriers. Included in this study was one serum from an animal that yielded carcass meat from which *Y. pseudotuberculosis* was isolated.

Caecal contents were collected from 360 animals, and cold-enriched for 3 weeks before being subjected to bacteriological examination for *Yersinia* spp.

A total of 345 and 321 carcasses surface samples for bacteriological examination for *Yersinia* were collected at the Deer Slaughter Premises (DSP) and meat Packing House respectively.

A total of 70 venison sausages were purchased from local supermarkets. Direct plating and plating after 21 days cold-enrichment were carried out to examine for *Yersinia*.

Venison samples were obtained from the DSP and seeded with a known approximate number of *Y. pseudotuberculosis* organisms. The samples were vacuum-packed and stored at temperatures of +10 °C, +4 °C, -1 °C, -10 °C, -13 ± 2 °C, and -20 °C; recovery and enumeration of the test organism was made at predetermined times.

The results of the Microplate Agglutination Tests showed that deer presented for slaughter at this DSP had low (1:10) or undetectable antibody titres to *Y. pseudotuberculosis*. The prevalence of *Yersinia* spp. in faeces was 5.3% (19/360) of *Y. pseudotuberculosis*, 2.6% (9/360) of *Y. enterocolitica*, 3.6% (13/360) of *Y. kristensenii*, 20.5% (74/360) of *Y. frederiksenii*, 0.6% (2/360) of *Y. intermedia* and 0.6% (2/360) of *Y. rohdei*. Five of nine strains of *Y. enterocolitica* isolated were found to be potentially pathogenic by means of the virulence marker tests. Two of them were identified as biotype 3 serovar O:5,27.

There was only one isolation (0.3%) of Y.pseudotuberculosis from 321 carcasses sampled at the Packing House.

The prevalence of Yersinia spp. in venison sausages was 11.4% (8/70) Y.enterocolitica, 1.4% (1/70) Y.kristensenii and 5.7% (4/70) Y.intermedia.

Y.pseudotuberculosis grew very well in vacuum-packed venison stored at chilling temperature although a long lag phase was observed at -1 °C. When frozen, the organisms remained viable for a long period of time and recovered and multiplied rapidly when transferred to chill temperature.

The study showed that there was no serological evidence of yersiniosis in deer presented for slaughter during the study period despite the fact that 5.3% of the animals were carrying Y.pseudotuberculosis in their faeces. While there was a low prevalence of Y.pseudotuberculosis on carcase meat their presence could be a source of cross contamination of other carcasses especially during deboning. The finding of Yersiniae in venison sausages showed that there was contamination during their preparation. The multiplication of the bacteria in vacuum-packed venison and their long survival in frozen venison are of public health concern while its presence may affect export markets.

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