

F-Files

Yersinia - what we know and what we don't know

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In September 2014, we heard of over 100 people across New Zealand with confirmed cases of *Yersinia pseudotuberculosis* illness (The Press, 2014). Symptoms from this illness include abdominal pain, fever, diarrhoea and joint pain that can last for several months.

Carrots and lettuces were flagged in the media as being the source of the illness and with this came a nationwide concern about what appeared to be a mysterious and new food safety issue. However, this is not the first time that carrots have been implicated in the spread of this food poisoning bacterium. In Finland in 2004, *Y. pseudotuberculosis* illness in school children was associated with carrots and was traced to farms where the carrots were grown and to rodents found on the farm.

Yersinia food poisoning is common

Yersinia food poisoning is one of the most frequently reported cases of notifiable food poisoning in New Zealand with 484 cases reported in 2013. Most of these cases are sporadic, rather than outbreaks, but 39% of yersiniosis cases are attributed to food purchased from retail premises (ESR report "Notifiable and other diseases in New Zealand, Annual Report, May 2014). Other potential sources are contact with farm animals, faecal matter and untreated water. Only 12 of the 484 cases reported in 2013 in New Zealand were due to *Y. pseudotuberculosis* with the remainder, 398 cases, being attributed to *Y. enterocolitica*.

Y. enterocolitica is found in pigs and is capable of being transmitted to humans through the inappropriate handling of raw or undercooked pork products (Forsythe, 2013). Pork is ranked the 3rd most commonly consumed meat in New Zealand ("Beef + Lamb New Zealand 2013).

In certain countries, *Y. enterocolitica* rivals *Salmonella* as a foodborne pathogen. However, *Y. enterocolitica* is capable of growing at refrigeration temperatures that are adequate to hinder the growth of most foodborne pathogens (Ray, 1989). This bacterium can also survive quite acid pH making it resistant to some cleaning agents (Sutherland and Bayliss 1994).

There is very little work being done on this bacterium in New Zealand. At Massey University, Palmerston North, PhD student, Haoran Wang is working with a group of clinical isolates of *Y. enterocolitica* and looking at how this bacterium survives in pork and the food processing environment. Her focus is on biofilm development as a source of persistent contamination that may contaminate food. As pork is generally well cooked, the most likely cause of infection is in handling the raw meat, either

through purchasing packaged meat in the supermarket or while preparing a meal at home. What Haroan has found is that strains vary in their ability to form biofilms but in general, biofilms form best in broth prepared from pork meat.

The bacteria are motile at room temperatures or refrigeration temperatures and this motility has been associated with biofilm formation (Tae-Jong et al. 2008). We know that once microorganisms form biofilms, colonising the surface of food preparation areas or the surface of meat, they develop resistance to cleaning agents. Biofilm development may be one mechanism that results in the persistence of these bacteria in food systems and the aim of Horan's work is to determine how we can manipulate conditions to prevent biofilm formation of *Yersinia*.

Meanwhile, the best way of avoiding illness is to make sure that when handling raw pork, benches and any equipment used to handle the pork are not used for any other food preparation and that the area and hands are washed thoroughly. Pork should always be cooked thoroughly with the biggest risk likely to be with pork meat balls, pork burgers or any pork product made with minced pork.

Vegetables that have spoiled should be discarded as they may be growing *Y. pseudotuberculosis*. Washing vegetables before use will help reduce any chance of infection from that food source.



Yersinia enterocolitica

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