



## Yersinia outbreak under investigation in Sweden and Denmark

Health officials in both Sweden and Denmark are currently investigating an outbreak of *Yersinia enterocolitica* which so far has affected 78 people. Whole genome sequencing has shown that all of the patients are infected with the same strain, which is serotype O3, biotype 4. Illness onset dates range from March 3 to 19.

Epidemiologists at the Statens Serum Institute (SSI) in Denmark, noticed an increase in *Yersinia* serotype 3 biotype 4 infections at the same time that the Swedish authorities notified them about their own outbreak. Whole-genome-sequencing was then performed confirming the Danish outbreak and linking it to the Swedish cases. Both countries are currently working jointly to compile all patient data and find common food items which may have been consumed.

Authorities in Denmark and Sweden launched an urgent inquiry on April 26 on the European Centre for Disease Prevention and Control (ECDC) platform sharing the biotype, serotype and sequence data. So far, no other countries have reported any cases related to the outbreak.

Raw or undercooked meat (typically pork) consumption is often the cause of infection. Outbreaks have also been caused by contaminated ready-to-eat vegetables. After an incubation period of three to seven days, symptoms include fever, diarrhea and abdominal pain in the right lower part of the abdomen.

The right lower quadrant pain can often be misdiagnosed as appendicitis and in my first job as a laboratory technician at the Regional Public Health Laboratory in Leeds, we had several cases of *Yersinia enterocolitica* where the patients had been admitted to hospital with "acute appendicitis" only for the cause to be identified as a foodborne *Yersinia* infection. Some patients had even undergone surgery to remove what was subsequently found to be a normal healthy appendix.

## Products linked to Salmonella outbreak in Canada recalled in Australia

Food production and distribution often happens on a global scale and tracking and tracing outbreaks frequently requires cooperation and intelligence sharing between several different countries.

This has been illustrated by a *Salmonella enteritidis* outbreak in Canada which has been linked to frozen profiteroles and eclairs which were manufactured in Thailand. It emerged that similar products from the same manufacturer had also been exported to Australia and various product recalls of the affected products have now taken place. There has so far been no reported cases of *Salmonella* linked to consumption of these affected products in Australia.

In Canada, 76 people have been affected and there have been 3 reported fatalities, although it has not been determined if the cause of death was due to salmonellosis. Many of the victims reported eating profiteroles or mini chocolate eclairs before becoming ill.

## Sterilisation of Cantaloupe melons in domestic kitchen steamers

Following on from last month's leading article on the *Salmonella* outbreak linked to the consumption of Cantaloupe melons, recently published research has shown that pathogens such as *Salmonella* and *Listeria* can be eliminated from the surface of whole Cantaloupes by placing the melons in kitchen electrical steamers for as little as 60 seconds. The size and temperature of the melons not surprisingly influenced the time required to achieve surface sterilization, but sufficient temperature lethality was achieved without compromising the organoleptic properties of the melon.

It is encouraging to see that the risks from Cantaloupe melons are being widely acknowledged and practical steps to eliminate the associated risks are being investigated and communicated to the public.

## Competitive inhibition of Salmonella in the mammalian intestine may lead to new probiotic therapies

Researchers in Germany have found that the microbiomes of some groups of mice can provide protection against Salmonella due to specific organisms within the host microbiome out-competing Salmonella in the intestine.

The researchers generated two groups of mice, one of which contained the bacterial species *Mucispirillum schaedleri* as part of its intestinal microbiome, and another group where it was absent. They infected both groups with Salmonella, and were able to demonstrate that *Mucispirillum schaedleri* is associated with protection against Salmonella infections.

Further investigation revealed the protective effect of *Mucispirillum schaedleri* centres on its ability to successfully compete with Salmonella for certain essential nutrients, such as nitrate. Without adequate amounts of nitrate, Salmonella typhimurium is unable to express its most important virulence factor, a Type III secretion system so the ability to induce pathogenic changes in the lining of the gut is significantly reduced.

*Mucispirillum* spp. occurs in the gastrointestinal tracts of warm-blooded animals such as mice and humans and the researchers claimed that results from the mice research could lead to development of new strategies to prevent bacterial infections in human gastrointestinal tracts.

## STEC 0103 outbreak in America linked to mince (ground beef).

Nearly 200 people have suffered illness due to an E coli 0103 outbreak in America which has been linked to batches of contaminated mince (ground beef).

First announced by the Centers for Disease Control and Prevention on April 5, the outbreak has grown from 72 people in five states to 196 people across 10 states. Two companies have recalled ground beef in relation to the outbreak. Almost 80 percent of the victims specifically recall eating ground beef in the days before becoming sick.

Investigators in Tennessee have confirmed the outbreak strain of E. coli O103 in ground beef from an unnamed restaurant where people ate before becoming ill. However, the CDC reports that ill people handled or ate ground beef from a variety of sources in addition to restaurants.

## Successful application of clinical bacteriophage therapy

A successful outcome on a patient who had received antibacterial phage therapy recently attracted national news coverage. The primetime BBC news item reported the story of 17 year old Isabelle Carnell-Holdaway who following a lung transplant had developed a severe bacterial infection which did not respond to traditional antibiotic therapy.

Isabelle was born with Cystic Fibrosis and due to the immunosuppressive therapy following a double lung transplant, she developed a severe systemic infection caused by *Mycobacterium abscessus*. Doctors at Great Ormond Street Hospital tried a previously untested cocktail of bacteriophages which ultimately proved successful in combating the antibiotic resistant bacteria responsible for the infection.

This has led to renewed calls for this type of targeted and specific antimicrobial therapy to be developed further.

We have reported in this bulletin on many occasions on the potential uses and benefits of bacteriophage interventions in the food industry but the clinical applications look to be expanding due to the ever increasing cases of bacterial resistance to conventional antibiotics.

## Contaminated Almonds prompt product recalls

Last month 2 of the UK's major retailers Asda and Tesco instigated product recalls due to potential Salmonella contamination of Almonds. The affected products included Tesco Apricot Almond and Yoghurt bars and Asda Cranberry and Nut cereal bars.

## Cluster of French STEC 026 cases linked to the consumption of raw milk cheese

Public Health France is currently investigating an increase in the number of children with hemolytic uremic syndrome (HUS) caused by Shiga Toxin E coli (STEC) 026.

Sixteen children infected with E coli serogroup O26 are currently being investigated by Public Health France and the National Reference Center. Fifteen children had HUS and one child had uncomplicated diarrhea.

Genomic analysis of isolated strains in 14 of these children confirmed that 10 children were infected with an epidemic strain with the same characteristics. The investigations of food consumption, conducted by Public Health France have identified a possible link with the consumption of raw milk cheese Saint Marcellin and Saint Félicien.

A product recall of the two implicated cheeses was announced by the Food Standards Agency on the 1<sup>st</sup> May.