



How Salmonella can gain access to the internal structures of plants pre-harvest

An interesting piece of research by scientists working in India has shed light on how Salmonella may be able to access the internal structures of plants through the plants own root systems.

Most Salmonella outbreaks are linked to contamination from post-harvest handling and transportation but a joint study from the Indian Institute of Science and the University of Agricultural Sciences has shown that the organism can enter the plant earlier in the growing process, directly from contaminated soil.

The researchers found Salmonella can enter the plant through a gap created when a lateral root branches out from the plant's main root and that the bacterium can then penetrate into the deeper layers of the root. When a lateral root pierces the wall of the primary root to spread across the soil, it leaves a tiny opening. Using fluorescent tagging and imaging, researchers discovered that Salmonella bacteria were using this gap to enter the plant. They used thale cress and tomato as plant model systems. Tomatoes from these plants also tested positive for Salmonella, revealing the organism's ability to travel up through the plant to the fruit.

This mode of entry is different to other disease-causing bacteria that enter the root, fruit or leaf by producing enzymes to break down the plant's cell wall. Salmonella is incapable of utilising cellulose or pectin so invasion by degrading the cell wall of the plant is not possible.

The team found that when salt concentration in the soil increases, plants produce more lateral roots increasing the risk of Salmonella colonisation on roots and transmission to the fruits. The study concluded that outbreaks due to consumption of raw fruits and vegetables could be attributed to soil stress factors in addition to climatic, agronomic and plant factors.

How foodborne bacteria move in restricted environments

Scientists from the University of York have discovered that some types of bacteria have evolved complex flagella made up of many different types of proteins which enable them to escape when trapped in small spaces.

In many of their natural environments flagellated bacteria have to move through structured environments, such as sediments, mucus layers or biofilm matrices, where the bacteria are at risk of getting stuck in passages too narrow for cells to pass. In these environments, bacteria which poses polar flagella can use a flagella-mediated screwing motion to facilitate additional movement.

The researchers created a mutant incapable of this screwing motility. The strain retained vigorous free swimming, but spreading through soft agar was diminished, demonstrating that this mode of movement possibly gives an advantage for moving through structured environments.

Co-author of the work, Laurence Wilson, from the department of physics at the University of York, stated that the study gives a better understanding of the physics of bacterial infection which could lead to new ways of blocking the transmission of harmful infections.

He said, "The question of why some bacteria such as E. coli have flagella made up of one type of protein while others have more complicated flagella made up of many different types has been a longstanding mystery. Nature likes to keep things simple. In any machine, more components mean more things that could go wrong. Our study has shown that complicated flagella have a function which helps bacteria escape when they get stuck in tight spaces, an advantage which outweighs the cost of maintaining genes to encode the various protein building blocks."

Scotland STEC guidance updated

Scotland has updated guidance for the public health management of E. coli O157 and other Shiga toxin-producing (STEC) infections. The Scottish Health Protection Network (SHPN) document replaces the previous 2013 guidance. Reports of STEC O157 infection in Scotland increased in the mid-1990s and rates remain high compared with other UK and European countries.

The number of STEC O157 infections in the country has remained steady in the last 10 years, with an average of 220 per year. There has been an increase in the number of non-O157 STEC infections, partially due to a change in referral pattern for diagnostic testing. Over the past five years, non-O157 infections have accounted for an average of 20 percent of all STEC cases.

For cases between 2012 and 2016, children under 16 accounted for 33 percent of infections with the highest rate in the zero to four year old age group.

Numbers tend to be higher in summer months. Approximately 60 percent of cases in Scotland in 2012 to 2016 were reported between May and September.

Listeria and botulism risks identified in traditional Norwegian fermented fish

The number of people affected by Listeria in Norway in the past few months has grown to 13. Two-thirds ate a traditional dish made with fermented, uncooked fish before becoming ill.

The Norwegian Institute of Public Health said most cases are more than 70 years old and have compromised immune systems. The agency is investigating the increase as an outbreak but not all cases are part of it.

Eight cases ate røktfisk before they fell ill. This is a traditional seasonal Norwegian fish dish made from trout which is salted and then fermented for up to a year before being eaten without cooking.

In a further development, several days after the link with the Listeria outbreaks was announced, a similar product manufactured by a different company was recalled due to fears over the potential lack of botulinum controls in the product.

UK Annual zoonosis report published

December and January are the time when many authorities and regulatory bodies publish their annual reports and this month has seen the publication of the UK Zoonosis report for 2017. Zoonoses are diseases that can be transmitted from animals to humans.

Campylobacter remained the most commonly reported human gastrointestinal pathogen and cases increased in 2017 after a decline over the previous two years. A total of 63,946 cases were reported compared to 58,938 in 2016 and 63,201 in 2015. There were nine foodborne outbreaks of Campylobacteriosis in the U.K., compared to eight in 2016. Seven were associated with consumption of poultry products, of which six were chicken or duck liver parfait or pate. Two outbreaks were linked to unpasteurized, raw milk and one Campylobacter jejuni outbreak which affected 69 cases in England was linked to a product made from raw milk.

Slightly more than 10,000 cases of laboratory confirmed Salmonellosis were reported in 2017. It is the first time since 2009 that more than 10,000 cases had been reported and continues the trend of a rise in infections every year since 2014.

Salmonella enteritidis remained the most commonly reported serovar, accounting for 27 percent of cases.

Salmonella typhimurium (including monophasic strains) was the second most common serovar, comprising 21 percent of cases, which was actually an increase of 10 percent from 2016. This was due to a rise in cases in England; decreases were seen in other U.K. countries. Other common serovars were newport, infantis, agona, stanley, java and kentucky.

The incidence of STEC O157 decreased compared to 2016. The reporting rate for the U.K. overall is the lowest it has been in the last 10 years and follows a year on year decline in England since 2015. The report states that the incidence of non-O157 STEC is underestimated, but labs introducing polymerase chain reaction (PCR) to directly find Shiga toxin genes has improved detection of serogroups other than O157. This may lead to increases in the detection rate of this group of organisms in the future, but care needs to be taken when looking at trends when changes in laboratory methodology may be the reason behind the elevated levels.

Waiter....get me a crocodile sandwich, and make it snappy!!!!

I know.... it's a poor excuse for an old joke, but the European Commission has proposed a limit for Salmonella in reptile meat.

The EC said that considering the potential significant health risk posed by the possible presence of Salmonella in reptile meat, food safety criteria should be set for the products.

Currently, regulation (EC) No 2073/2005, which sets such criteria to define the acceptability of a product placed on the market, does not cover reptile meat. The draft regulation states Salmonella must not be detected in a 25 gram sample and it applies to products placed on the market during shelf-life.

