Microbiology Bulletin 85 January 2021

FSA updates the 10 day vac-pac guidance for fresh meat

The Food Standards Agency has amended its vac- pac guidance document, which put a 10 day shelf life on all foodstuffs which do not have growth controls for non-proteolytic *Clostridium botulinum*. This follows continued lobbying from the British Meat Processors Association (BMPA) suggesting that unprocessed meat should be exempt from the "one size fits all" policy.

The change to the guidance, which was announced last month follows a joint industry funded research project (which we reported on in March 2019) which surveyed of all the available literature and failed to uncover any cases of botulism associated with fresh chilled Vacuum Packed or Modified Atmosphere Packed meat. The report also conducted various challenge tests which demonstrated that samples of beef and lamb inoculated with spores of non-proteolytic *C. botulinum* and incubated at 8˚C, did not become toxic until day 50 for beef, or day 35 for lamb.

The revised guidance now states that food businesses can set a shelf life for fresh beef and lamb in line with their existing food safety management systems, in the same way they do for other types of food. It does not however apply to meats which are subjected to further processing such as mincing, cooking or mixing with other ingredients like herbs, spices or curing salts.

The FSA stated that processors that have in-house food technicians who are qualified to interpret scientific information and implement it in the production process can apply the guidance with immediate effect. The FSA said it recognises small and medium-sized businesses may not have the resources or expertise needed but they can now apply a shelf life of up to 13-days.

It is still not clear why non-proteolytic *Clostridium botulinum* doesn't appear to be problematic in fresh raw meat, but it is thought that the competing microbiological flora on the surface of the meat may either inhibit or out compete the more dangerous toxin producing pathogen. The 2017 joint industry report also suggested that as fresh beef and lamb will almost certainly always be thoroughly cooked, then any possible toxin production may be denatured before consumption.

Yersinia outbreak in Norway

A Yersinia outbreak in Norway has been linked to the consumption of a pre-mixed salad product.

The outbreak started in mid-November and involved 10 confirmed cases. Analysis of patient interviews found that they all said they had eaten a fresh-cut salad product in the week before illness. Investigations are ongoing to try and find exactly which raw material in the salad was contaminated, however due to the short shelf life of the implicated salad products, tracing the exact source of the contamination may prove impossible.

This is the third such incident in Norway which has been linked to the consumption of salad products in recent years. In 2018, at least 18 people across the country fell ill with Yersiniosis, and an outbreak in May last year affected 23 people, with the spinach ingredient in an imported salad suspected as the source.

Although *Yersinia enterocolitica* has a well-documented association with the consumption of raw or undercooked meat, there has been several instances where it has been found in salad products.

Like the non-proteolytic C botulinum and Listeria, Yersinia is a psychrophilic organism so can still grow at the refrigeration temperatures in which the bagged salad products are held.

Also, recent research has suggested that Yersinia may be a ferrophilic bacterium, which means that it requires a higher level of readily available iron for the initiation of growth than other pathogens, which may explain why it is able to grow on iron rich salad materials such as spinach.

High HUS levels recorded in 2019 in France linked to STEC 026 outbreak

French health officials have produced a report which shows that there were 168 cases of paediatric Haemolytic Uraemic Syndrome in 2019 which is the highest number recorded since surveillance started in 2017.

The incidence was highest in children younger than 3 years old, and decreased with age.

The report stated that the high incidence in 2019 was partly explained by the outbreak of STEC O26 in connection with consumption of raw milk cheese, which was one of three STEC outbreaks reported in 2019 which were all linked to unpasteurised (raw) cheese.

New treatment for Cl botulinum toxin paralysis

A novel treatment for botulism which claims to reverse the effects of the toxin has been published in the journal Science Daily.

Symptoms of botulism include difficulty swallowing or speaking, facial weakness, and paralysis. The paralysis is caused because the botulinum toxin disrupts the normal functioning of the neurones in the nervous system and this affects muscles used for breathing, often requiring patients to be placed on ventilators.

Existing treatment involves the application of anti-toxins, but it is stated that these are only effective before the toxins enter the motor neurons.

The new treatment, which has been developed at the Urology Department at Boston's Children's Hospital involves the administration of a second modified botulinum toxin which triggers an antibody response which (it is claimed) is effective against the original toxin.

Human trials have not yet taken place, but animal studies with mice has shown that the treatment reversed muscle paralysis within hours, and that mice were able to withstand and recover from botulinum toxins that in the past were fatal.

The researchers also claimed that the new botulism treatment may also be used for Botox reversal treatments where Botox has caused unwanted muscle paralysis as a side effect.

Aflatoxins in pet food in America

A rare and unusual outbreak has occurred in America which has resulted in the deaths of over 70 dogs due to Aflatoxin poisoning.

Midwestern Pet Foods Inc. has issued a product recall to include all pet foods containing corn manufactured in the company's Oklahoma plant. No human illnesses have been reported.

Aflatoxin is produced by the mould *Aspergillus flavus*, which can grow on nuts and cereals which are used as ingredients in animal and human food. In humans it can cause liver damage, and in 1974, a major outbreak of hepatitis due to aflatoxin was reported in the states of Gujrat and Rajasthan in India, resulting in an estimated 106 deaths.

The emerging threat of Ciguatera poisoning in Europe

A five year project looking at the risk of ciguatera poisoning in Europe has recently reported its findings.

Ciguatera is a type of food poisoning associated with the consumption of reef fish such as barracuda, grouper, and snapper that contain toxins produced by a microalgae called Gambierdiscus toxicus. The toxin does not affect the appearance, odour or taste of the fish and is not destroyed by cooking, refrigeration or freezing.

It causes an estimated 10,000 to 50,000 cases per year worldwide and outbreaks have been reported in Spain and Portugal. From 2012 to 2018, four European countries reported 23 ciguatera outbreaks and 167 cases.

Results confirmed the appearance of ciguatera in the European Union, having identified native species of fish with ciguatoxins in Macaronesia, Madeira and the Canary Islands. The presence of Gambierdiscus in the Mediterranean Sea, Cyprus and Greece was also detected, as well as the first finding in the Balearic Islands.

The Spanish Food Safety and Nutrition Agency (AESAN) organised the online workshop, which highlighted the potential impact of climate change and globalised markets on ciguatera becoming an emerging risk in Europe.

Researchers claim to have identified a protein involved in the colonisation of intestinal epithelial cells by Salmonella typhimurium

It is acknowledged that Salmonella use a "run-and-tumble" method of short swimming periods (runs) punctuated by tumbles when they randomly change direction, but how they move within the intestine is not well understood.

A new study published in Nature Communications described a protein (McpC) produced by *Salmonella typhimurium* which allows the bacteria to swim in a straight line when they are ready to infect cells. This new study claims that McpC is required for the bacteria to invade surface epithelial cells in the gut.

The study authors suggest that McpC is therefore a potential target for developing new antibacterial treatments to hinder the ability of *S. Typhimurium* to infect intestinal epithelial cells.

Salmonella dominates UK outbreaks in 2020

The start of a new year is often dominated with data summaries of the old year, and Salmonella was the main cause of food poisoning outbreaks in the United Kingdom in 2020. All were reported at the time in the Micro Bulletin, but to recap….

More than 100 *Salmonella typhimurium* infections in the UK were linked to Brazil nuts which were imported from Bolivia. France, Luxembourg, Netherlands, and Canada also reported associated cases.

Salmonella enteritidis infections which were linked to the handling and consumption of frozen raw poultry products affected over 400 people in the UK and Ireland.

The Food Standards Agency also been reported that around 40 cases of *Salmonella enteritidis* have been linked to whole eggs produced in the UK.