



Microbiology bulletin 33

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FSA release final results of current Campylobacter survey

Following on from the news last month that the FSA are to suspend their retail Campylobacter survey, they announced the final figures from the existing survey on the 26th May.

The results for January to March 2016 continue to show a decrease from the equivalent quarter last year. They found that 9.3% of chickens tested positive for the highest level of contamination in this quarter, down from 21.8% for the three months from December 2014 to February 2015. Campylobacter was present on 50% of chicken samples, down from 71% in the equivalent quarter of the previous year.

Steve Wearne, Director of Policy at the FSA, said "one of the reasons the survey results are lower this quarter is because of the decision taken by a number of retailers and their suppliers to remove neck skin from the bird before it goes on sale. This is good news for the consumer because the neck skin is the most contaminated part of the chicken. However it is also the part of the bird that we have been testing in our survey and this means that comparisons with previous results are not as reliable as we would like".

The FSA have confirmed that they will be starting a new survey in the summer but have not yet confirmed which methodology will be followed. The first results from this survey, will be due in January 2017.

Recalls in the USA of products containing sunflower seeds

Whilst I have mentioned on many occasions how Salmonella can survive on low water activity products there have been recalls of many products recently in America

because of *Listeria monocytogenes* contamination of Sunflower Seeds.

This has involved the recalls of a huge number of products which emphasises the difficulties associated with modern food manufacturing whereby a single batch ingredient is incorporated into a large variety of finished products. It appears that to date there have been no illnesses associated with consumption of the affected products.

Report published on an outbreak of Listeriosis associated with Pork Pies

On a similar theme to that outlined above, a report has been published detailing an outbreak of listeriosis in the UK associated with the consumption of pork pies. One of the first Salmonella outbreaks I was involved with was due to a local butcher in Leeds selling contaminated pork pies in 1980. At the time I was puzzled as to how a fully baked product could become contaminated until I realised that the gelatin at the top of the pie is added post bake.

The report describes an outbreak of listeriosis in England affecting 14 people between 2010 and 2012 which was linked to the consumption of pork pies. All 14 individuals were older than 55 years, 12 were men, and 10 reported the presence of an underlying condition. All were resident in or had visited either of two English regions and were infected with the same strain of *Listeria monocytogenes*. In interviews with 12 patients, 9 reported eating pork pies. Pork pies were purchased from seven retailers in South Yorkshire or the East Midlands, and the outbreak strain was recovered from pork pies supplied by the producer in South Yorkshire. The outbreak strain was also recovered from samples of finished product and from environmental samples collected from the manufacturer. The report states that the likely source of contamination was environmental sites within the manufacturing environment, and the contamination was associated with the process of adding



gelatin to the pies after cooking. Inadequate temperature control and poor hygiene practices at one of the retailers were also identified as possible contributory factors allowing growth of the pathogen.

Assessment of the Microbiological Safety of Precut Fruit from Retail and Catering Premises in the United Kingdom

Fresh fruit has been associated with a number of foodborne outbreaks in recent years. In particular, a large outbreak of listeriosis in the United States in 2011 was associated with consumption of cantaloupe melon, and an outbreak of *Salmonella newport* in the United Kingdom and Europe (also in 2011) was linked to watermelon consumption.

A study has just been published of precut fruit products from catering and retail premises in the United Kingdom which was carried out to assess their microbiological safety. Between January and March 2012, samples (1,188) of ready-to-eat precut fruit were collected from retail and catering premises in the United Kingdom, and 99% were of satisfactory microbiological quality.

However, four samples (0.3%) were of an unsatisfactory quality (one with 800 cfu/g *Listeria monocytogenes* and three with >100 cfu/g *Escherichia coli*), and five samples (0.4%) were of a borderline quality owing to the presence of *E. coli*, *Staphylococcus aureus* or *L. monocytogenes* (one sample with a level of 80 cfu/g). *L. monocytogenes* or other *Listeria* species were detected in a further 54 samples (4.5%) at levels below the threshold considered to be borderline or unsatisfactory.

This study concludes that overall, the microbiological quality of ready-to-eat precut fruit was good. However, the presence of *Listeria* species in 5% of samples highlights the need for good hygiene during preparation and satisfactory temperature and time control during storage of these food products.

Research on the 2011 cantaloupe outbreak strains

The 2011 listeriosis outbreak (mentioned above) attributed to whole cantaloupes involved several genetically distinct strains of serotypes of *Listeria monocytogenes* 1/2a and 1/2b that had not been previously reported in invasive listeriosis outbreaks.

A recently published paper in the Journal of Food Protection investigated the potential of strains from the

2011 cantaloupe outbreak to adhere, survive, and grow on cantaloupe rind and flesh and in juice extracted from cantaloupe at different temperatures. However, no significant differences in growth potential were noted among the different strains or between them and unrelated strains from other listeriosis outbreaks

The absence of marked differences in adherence or growth between the cantaloupe outbreak strains and strains from other outbreaks highlights the need to further characterise the 2011 cantaloupe outbreak strains and better understand the potential biological attributes that contributed to their implication in the outbreak which caused 33 fatalities.

Study on sporulation

A new study published in Molecular Systems Biology, sheds light on what causes stressed bacteria to make the move to cease normal functions and form spores

To form a spore, which can survive for years without food, the organism must pour its energy into sporulation. Becoming a spore too soon can lead to death by competition but delaying the sporulation can lead to death before the process is complete.

How do spore-forming bacteria like Bacillus make this decision? Is there a specific biochemical trigger that activates one of the network proteins or is sporulation more of a general physiological response? In the new study, researchers claim to have found that the slowdown of cellular growth can trigger sporulation.

Sporulation is very sensitive to the concentration of a key protein that the cell produces at an essentially constant rate. During adverse conditions, when the cell's growth rate slows, the concentration of this protein builds up, and the bacteria are more likely to form spores. Experiments performed at the University of California-San Diego showed that only cells that slow down their growth beyond a threshold value proceed to sporulation. The experimental data indicated that the amount of sporulation network proteins (not the activity of the proteins) was modulated by cell growth, a finding that contradicts the theory that there is a specific biochemical trigger for sporulation. The researchers stated that "to kill spores, we need to apply both heat and high pressure. So people have been looking for other methods to inhibit sporulation. If sporulation was triggered by a specific molecule, then perhaps a drug could be found to block that molecule, but our research suggests that sporulation is a general physiological response and

that food safety engineers will need to look for other methods of control".