



Microbiology bulletin 54

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FSA Campylobacter survey – latest results

The top nine retailers across the UK have published their latest testing results on Campylobacter contamination in UK-produced fresh whole chickens (covering samples tested from January to March 2018).

The latest figures show that on average, across the major retailers, 3.8% of chickens tested positive for the highest level of contamination which is set at >1,000 cfu/g. The corresponding figure for the previous set of results (October-December 2017) was 3.6%. The Director of Policy and Science at the Food Standards Agency stated that the latest figures were consistent with previous results and showed that the industry is consolidating on the significant progress made so far.

New data on the economic burden of Campylobacter infections has recently been published and Campylobacteriosis has been estimated to account for 2.4 billion euros annually in Europe, with estimates of £50 million in 2008–2009 in the United Kingdom and 82 million euros in the Netherlands in 2011.

A new French study using Multilocus Sequence Typing (MLST) data has identified poultry as the most common cause of Campylobacter infections (no surprise there), but interestingly the data did appear to show a significant link to the consumption of ruminants which was much higher than previously thought. The authors of the study concluded that further investigation of potential transmission routes from ruminants to humans would be useful.

UK review of meat cutting plants and cold stores

Phase one of the UK-wide review into meat cutting plants and cold stores launched by Food Standards Scotland

(FSS) and the Food Standards Agency (FSA) in March is now complete.

The agencies have stated that the review has now moved to Phase Two where they will carry out more detailed work to identify options for improvement, develop recommendations, and to implement a plan outlining how they could be delivered. The final report and recommendations will be published in September 2018.

CO₂ shortage may affect the way food is packaged

There have been several news articles recently reporting on a shortage of carbon dioxide gas in Northern Europe which has left beer and soft drinks producers struggling to meet demand. The current heatwave and the World Cup has compounded matters by driving up sales of beer and fizzy drinks across the continent.

The deficit is due to the closure of several ammonia plants (one of the largest sources of food grade CO₂ in Europe). With just one major CO₂ plant operating in the UK, we find ourselves heavily reliant on imports from Scandinavia and the Netherlands.

CO₂ gas is also a common component of the modified atmospheres used in chilled food packs. This has left some food manufacturers looking at alternatives for gasses to use when creating modified atmosphere packaging (MAP). However industry bodies are urging that care is taken if a reduction in the amount of CO₂ is contemplated as this will almost certainly have an effect on the microbiology of the food with lower levels of carbon dioxide resulting in a reduced shelf life and having an adverse impact on the safety of chilled foods.

Children's cough syrup recalled

A cough syrup manufacturer has recently recalled 15 batches of children's glycerine and blackcurrant cough syrups (which was sold as an own brand label by the top 4 supermarkets) as a precautionary measure due to a small number of reports of mould.

A statement on the Government's, Medicines and Healthcare products Regulatory Agency, website reads: "Penicillium brevicompactum and Penicillium corylophilum can produce mycotoxins. Reactions to these mycotoxins are rare in reported literature but there is a low risk they could induce non-specific toxin reactions that could include rashes, breathing difficulties and Gastro-Intestinal symptoms.

Such recalls of these types of products are thankfully very rare as the high levels of glycerine and sugar mean that the water activity is prohibitively low for the growth of most microorganisms.

Another outbreak linked to pre-cut melons

The U.S. Food and Drug Administration (FDA) are investigating a multistate outbreak of Salmonella adelaide illnesses that may be linked to cut melons.

As of June 19, it was reported that there were 70 cases in seven states with 34 hospitalizations, and the authorities have stated that fruit salad mixes that include pre-cut melons are a likely source of this outbreak.

This follows the publication of new control measures in Australia following a Listeria outbreak in April of this year which was linked to the consumption of melons.

Survival of Listeria in different soil types

Soil is an important reservoir for Listeria monocytogenes, and its survival in different types of soil may be an important factor in the many produce-related outbreaks.

New research published in the Canadian Journal of Microbiology looked at the survival rate of L monocytogenes in differing soil types. Not surprisingly the results showed that soil with a high moisture content and neutral pH are likely to increase the ability of L. monocytogenes to persist in soil. One important factor however in the survival of the organism is how it reacts and competes with the myriad of other organisms which are present in soil. 1 gram of soil will contain 10^9 bacteria (which is the same number of humans

currently living in the continent of Africa). 1 kg of soil will contain more microorganisms than the total number of people who have ever lived on our planet, so competition for nutrients and water are also an important factor in the ability of L monocytogenes to survive in these highly competitive environments.

Which leads me neatly on to my next subject....

Microbiology by numbers

For me, part of the fascination of microbiology is the sheer weight of numbers which are involved when studying anything related to this amazing subject. Some examples are;

If all the 1×10^{31} viruses on earth were laid end to end, they would stretch for 100 million light years. Furthermore, there are 100 million times as many bacteria in the oceans (13×10^{28}) as there are stars in the known universe.

The bacteria present in the average human gut weigh about 1 kilogram, and a human adult will excrete their own weight in faecal bacteria each year. The number of genes contained within this gut flora outnumbers that contained within our own genome 150-fold, and even in our genome, 8% of the DNA is derived from remnants of viral genomes.

Perhaps the scariest numbers in microbiology relate to pathogenic microorganisms. Worldwide, 16 million people die from infectious disease every year, of which 2.2 million are related to the consumption of contaminated food or water. Approximately one in every 12 individuals, or 500 million people worldwide, is living with chronic viral hepatitis, and the estimated number of new chlamydial infections per year is approximately 50 million, more than the population of South Korea. The bacterium Clostridium botulinum produces a toxin so potent that 3 grams would be enough to kill the population of the United Kingdom and 400 grams would kill everyone on the planet.

In total, there are approximately 1,400 known species of human pathogens (including viruses, bacteria, fungi, protozoa and helminths), and although this may seem like a large number, human pathogens account for much less than 1% of the total number of microbial species on the planet.

What these figures do illustrate is the incredible impact microorganisms have on all our lives and emphasises the tremendous importance of the work we all do.