



Microbiology bulletin 31

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Further applications of Bacteriophages

In this month's bulletin we seem to be revisiting several topics which have been mentioned in previous editions, which illustrates the fact that new or novel ideas can have a multitude of different applications.

We have previously discussed the applications of bacteriophages in replacing conventional antibiotic therapy, but new research which has benefited from a \$100,000 grant from the Bill and Melinda Gates Foundation has looked into how bacteriophages can help prevent intestinal illness in children in developing countries. The researchers are looking at how bacteriophages can restrict the potential growth of Salmonella and other intestinal pathogens in the intestines of pigs. These animals are being studied as they have similar gut bacteria and similar functionality of their immune system to ourselves. Work is being carried out jointly in the universities of Nottingham, Washington and Florence.

Joint applications of nanotechnology and natural antimicrobial substances

We have also previously considered how new advances in nanotechnology can have applications in microbiology and how the natural antimicrobial compounds found in many products can be commercially utilised.

New joint research carried out at the Southern Illinois University and the Volcani Centre in Israel has managed to combine these two areas by

investigating how nanoparticles can help to coat food packaging with natural antimicrobial products.

They have looked into several natural antimicrobial products including curcumin (found in turmeric), resveratrol (grapes) and hydroxytyrosal (olives). The researchers built nanovesicles which were able to adhere to the curcumin compound and enable it to bind to glass and other surfaces. These nanocoated surfaces can therefore be incorporated into food packaging with the hope and expectation that they will kill potential pathogens and spoilage organisms which come into contact with the particles.

Nanotechnology and culture free rapid detection

Another new application of nanotechnology was recently announced by a company promoting an assay system which is claimed to detect food pathogens in samples in less than 2 hours.

By using a carbon nanotube biochip platform they detect specific microbial DNA which produces an electrical signal which in turn denotes the presence of the organism in the food matrix.

Campylobacter in the UK and the rest of the world

Tesco have published figures claiming to show that they have further reduced the incidence of the number of chickens showing the highest level of contamination of Campylobacter (>1,000 cfu/g). According to the retailer, Campylobacter at the highest incident level has fallen to 7% in the final quarter of 2014/15, compared to almost 9% for the previous quarter.

The latest figures released by the food standards agency which covered the period from July-September 2015, stated that in total 15% of all chickens purchased at retail contained *Campylobacter* at the highest level of contamination. *Campylobacter* was detected (at any level) in 76% of all the chickens purchased.

How do we compare with the rest of the world? Well, an EFSA study carried out surveying chickens at slaughter houses across the European Union in 2008 came up with exactly the same figure, 76%. However, a recent survey in Israel claimed that 93% of all retail poultry contained pathogens (which were predominantly *Campylobacter*). A survey published in 'Eurosurveillance' on levels of *Campylobacter* illness in Switzerland showed that from 1988-2013 notified *Campylobacteriosis* cases doubled from 3,127 to 7,499. The report stated that food safety interventions on the sale of poultry meat are urgently required to reduce contamination frequencies.

The UK Food Standards Agency survey has just concentrated on whole chickens sold at retail, but in America the USDA is debating what levels should be considered as acceptable in processed chicken and poultry pieces such as breasts, wings and drumsticks.

And still on the subject of poultry, a recent article in the independent highlighted the continued use of antibiotics in the poultry industry in the UK. Industry figures obtained by the Bureau of Investigative Journalism show that UK poultry producers raised their use of a class of antibiotics known as fluoroquinolones by 59 per cent in the latest 12-month reporting period prompting fears that this may lead to the development of drug resistant strains of bacteria. These antibiotics were banned from use in poultry farms in America in 2005.

Australian Salmonella outbreak linked to bagged salad

Bagged salads produced in Victoria by Tripod Farmers have been implicated in an outbreak of *Salmonella*. More than 23 different types of bagged

salad were believed to have been contaminated by lettuce containing *Salmonella anatum*. There are 128 probable cases of people becoming ill after consuming the salad. Bags of salad were also exported to Singapore, Hong Kong and Thailand. Investigations as to how the leaves became contaminated are on-going.

FSA launches consultation on the safety of lightly cooked eggs

The Food Standards Agency has launched a 10-week public consultation on a draft report looking at the safety of raw or lightly cooked eggs. An expert group, set up by the Advisory Committee on the Microbiological Safety of Food (ACMSF), to look at egg safety, found there has been a reduction in the risk from *Salmonella* in UK shell eggs since its last report on this issue 15 years ago. The group found that UK eggs produced under the Lion Code scheme have a very low risk in comparison to other eggs. The report recommends that Lion Code eggs, or eggs produced under equivalent schemes, can be served raw or lightly cooked to those in most vulnerable groups, including pregnant women, the young and the elderly.

Imported eggs however continue to be sporadically associated with *Salmonella*. Israel has currently reported *Salmonella* in a batch of imported Spanish eggs.

In Spain at least 112 people have fallen ill and one person has died from suspected *Salmonella* poisoning at a bar in the southern coastal city of Cádiz. The source appears to be a bocadillo (small sandwich) of tortilla casera, made of potatoes and eggs, which was ordered by many of the affected people.

French Oysters implicated in Norovirus outbreak

Around 130 people (70 in Sweden and 60 in Denmark) have been affected by a Norovirus outbreak which is believed to have been caused by contaminated oysters imported from France.

Salmonella in low Aw product....again

Once again Salmonella has demonstrated its ability to survive in a low water activity environment. In America a multistate outbreak of *Salmonella virchow* has been linked to contaminated organic leaf powder used in Garden of Life organic shakes.