Microbiology bulletin 16 November 2014

New innovations to reduce levels of Campylobacter in poultry processing

Two different techniques designed to reduce the levels of Campylobacter on the carcases of poultry have been announced recently.

The first technique; rapid surface chilling, involves spraying the surface of the bird post slaughter with a liquid cryogen which has the effect of rapidly freezing and thawing the surface tissues (and any bacteria which are present there). The freezing and thawing disrupts the cell wall of the bacteria and initial trials have suggested that this technique can result in a significant reduction in the number of Campylobacter recovered.

The second technique involves the application of steam and ultrasound to the poultry carcasses during processing. The principle behind this technique is that the ultrasound facilitates better penetration of the steam to the target areas and therefore results in a greater reduction in Campylobacter than would occur with steam alone.

Both techniques are in the process of entering full scale production trials and it will be interesting to see which intervention proves to be the most cost effective and whether one, or both are adopted by the wider poultry processing industry.

Campylobacter looks like it will remain the hot topic this month as the FSA are set to release the second quarterly interim report from their yearlong survey into the prevalence of the bacteria in poultry on the week commencing 17th November. The FSA have indicated that with this data set, they intend to release details of where the poultry has been purchased, which potentially could put further pressure on the already beleaguered retail sector.

It is dangerous however to link a high incidence of Campylobacter to inadequate animal husbandry or bad practices in poultry processing. Campylobacter is not normally introduced during processing, but is often present in the intestines of the majority of birds at slaughter. It has been established that free range birds (although raised in conditions that most people would describe as preferable to housed birds) have a greater risk of Campylobacter due to the biosecurity issues around raising flocks in the open.

Watch this space….I am sure we will be analysing the latest numbers from the FSA in next month's bulletin.

The dangers associated with reformulation

I attended a very interesting presentation last month which shed light on an outbreak of botulism associated with hazelnut yoghurt in 1989 in which 27 people were affected and 1

person died. I was aware of the incident, but never knew why it had ocured.

The product consisted of a canned hazelnut puree added to a yoghurt base. Type B botulinum toxin and *Clostridium botulinum* type B was isolated from patients, the yoghurt and the hazelnut conserve.

The conserve had been made from roasted hazelnuts, water, starch and sugar and had a pH of 5.0-5.5. The processing involved a non-lethal heat treatment of cooking at 90^0C for 10 minutes followed by canning and heating at 100^0C for 20 minutes with ambient storage. The sugar content was responsible for a water activity of <0.93 which was the only hurdle for the potential growth of *C botulinum*.

The product had undergone a reformulation with the sugar being replaced by Aspartame, and the manufacturer had not appreciated that whilst the Aspartame had many of the organoleptic properties of the sugar it replaced, it did not lower the water activity to the same degree. Therefore there were no hurdles to prevent the germination of any spores of *C botulinum* within the anaerobic conditions in the canned hazelnut conserve.

It serves as a salutary reminder that whenever changes are made to existing products or new products developed, great care should be taken to access the potential microbiological impact such changes make to the stability and safety of the product. There has been a lot of pressure on food manufacturers lately to reduce the amount of sugar and salt (both are preservatives as they contribute to a reduction in the water activity) in products and although this may be desirable, the microbiological impact of such reductions should always be considered.

Selectivity and Specificity….and antibiotic resistance

The two key principles which underpin all bacteriological isolation methods are selectivity and specificity.

In order to achieve selectivity, we find something which we know our target organism can tolerate, but which other organisms which may outnumber our target organism in the food sample are susceptible to, and we incorporate that into the method. In many methods we incorporate antibiotics into the selective media. If our target organism is resistant to the antibiotic then it will stand a better chance of being recognised by its characteristic morphology on the agar plate and correctly selected for confirmation and identification; which is the principle of specificity.

It is interesting to note that whilst some methods do not use antibiotics as a selective agent, the antibiotics which are incorporated into the selective enrichment and plating media for Campylobacter can include a veritable cocktail of antibiotics including Cefoperazone, Vancomycin, Trimethoprim, Amphotericin B, Polymyxin B, Rifampicin, and Cyclohexamide. I wonder if there is a link between the broad resistance of Campylobacter to these antibiotics and the historical widespread use of antibiotics as feed supplements in the poultry industry over the years.

Only recently the Chief Medical Officer Dame Sally Davies described antibiotic resistance as a bigger threat than terrorism, and the role of its transmission through the food chain should not be underestimated.

Expect this to be discussed this month as November 18th is world antibiotic awareness day.