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The FSA publish the 12 month survey findings of the incidence of Campylobacter in chickens at retail sale

The UK-wide survey from February 2014 - February 2015 was established to review the levels of Campylobacter on fresh whole retail chickens and their packaging. The survey tested a total of 4,011 chickens distributed evenly throughout the year and throughout the UK in proportion to the population size of each country. Retailers were sampled in proportion to their market share, with the share of free range and organic chickens taken into account.

Foodborne Campylobacter is estimated to make more than 280,000 people ill each year in the UK and is the biggest cause of food poisoning. The FSA has set up a joint target with industry to reduce Campylobacter in chicken. The target is focused on a level of 1,000cfu/g or above. It is thought that chickens with this level of Campylobacter contamination are the most likely to infect consumers. The joint FSA-industry target is to reduce the prevalence of these most contaminated chickens to below 10% at the end of the slaughter process, by the end of 2015.

The findings of the 12 month survey showed that just under 73% of birds were contaminated with just over 19% of birds showing a level of contamination of >1,000cfu/g.

The FSA took the decision to publish the findings of the individual retailers so that consumers could consult the "league table" to see which retailer had the lower incidence. However, the FSA wisely

included the range of results taking into account the 95% confidence intervals for the data which showed that there was little discernible difference between the 7 major retailers listed.

The FSA is planning to conduct a follow-up survey, beginning later in 2015. The follow-up survey will be substantially similar to the current survey, but, in order to facilitate better comparison of retailers, a sample size boost will be applied where appropriate. Updated market share data will be procured to inform this. The initial market share data for the current survey was supplied in 2010 and the FSA acknowledge in their report that there will be a degree of under-representation of any retailer whose market share has risen sharply since June 2010.

The samples were tested by the enumeration method only with 25g of skin (mainly neck skin) used. When analysing samples for Campylobacter it has been acknowledged for some time that the difficulties in obtaining the correct micro-aerophilic atmosphere in the selective broth phase in the presence/absence method means that it is good practice to use both methods when attempting to isolate Campylobacter. Because of the strict atmospheric growth requirements, it is not unusual to obtain counts on the enumeration method but a 'Not Detected' result in the presence/absence method due to the stricter atmospheric control offered in the gas jars used in the enumeration method.

The FSA survey follows publication of figures from Food Standards Scotland (FSS) which show that the number of laboratory-confirmed cases of Campylobacter food poisoning in the first 20 weeks of

2015 was 13.5% higher than during the same period last year, with 2225 laboratory reports compared to 1960. The number so far in 2015 is also higher than in either 2012 or 2013.

The increase in cases observed in 2015 is spread across Scotland, across weeks and ages, with no apparent clustering of cases and no reported outbreaks. Health Protection Scotland is working with colleagues to better understand the increase in *Campylobacter* this year, but the increase also emphasises the importance of the messages in the recent food safety campaigns both north and south of the border designed to reduce the chances of becoming infected with *Campylobacter*.

New research on the sporulation of Clostridial spores

New research using electron microscopy has shed light on the mechanisms involved when Clostridial spores germinate.

Scientists at the Institute of Food Research used electron microscopy to show that spores have an outer coating called an exosporium which has an aperture at one end. Examination revealed that this aperture aligned itself to a spot on the spore where it ruptures during germination. The researchers suggested that spores have a polarity which aligns structures correctly facilitation germination. However, they concede that despite extensive investigations on spore germination, coat structure and Clostridial cell growth, there is a relative lack of knowledge on the mechanisms involved in spore germination.

Short pulsed electric fields – an alternative to pasteurisation

Research carried out at Tel Aviv University has suggested that short pulsed electric fields could provide an energy-efficient alternative to thermal pasteurisation in developing countries.

Through a process called electroporation, bacterial cell membranes are selectively damaged. Applying this process intermittently prevents bacteria

proliferation in stored milk, potentially increasing its shelf life.

According to the study, pulsed electric fields could provide an alternative, non-thermal pasteurisation process that could hold benefits in developing countries as the technology is three times more energy-efficient than boiling and almost twice as energy efficient as refrigeration. The energy required can come from conventional sources or from solar power.

Cold plasma treatment

In another alternative method of reducing potentially pathogenic or spoilage bacteria from fresh produce, researchers have looked into a process known as Microwave-Powered Cold Plasma Treatment (CPT). CPT at 900 W, conducted for 10 min using nitrogen as a plasma-forming gas, was demonstrated to inactivate *Salmonella typhimurium* inoculated on cabbage and lettuce by approximately 1.5 log cfu/g. Similarly *Listeria monocytogenes* was inactivated by 0.3-2.1 log cfu/g on cabbage and lettuce by using a helium–oxygen gas mixture.

Experiments on dried figs showed that as the water activity (A_w) of the figs increased from 0.70 to 0.93, the reductions in numbers of *Escherichia coli* O157:H7 and *L. monocytogenes* increased from 0.5 to 1.3 log cfu/g and from 1.0 to 1.6 log cfu/g, respectively. This is in line with the more traditional methods of heat treatment which show increased thermal inactivation at higher A_w values.

The microbial inactivation by CPT also increased synergistically when the pH of the figs was reduced from 6 to 4.

The researchers state in the article published in Food Microbiology that CTPs have potential application to increase the microbiological safety of vegetables and dried fruits.