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New research into natural antimicrobials

It has been known for many years that some plant based foods contain chemicals which have natural antimicrobial properties. Examples include eugenol in cloves, allicin in garlic, cinnamic aldehyde in cinnamon, allyl isothiocyanate in mustard and thymol in oregano. Animal based antimicrobials include lysozyme (a small protein which can hydrolyse the cell wall of bacteria) in eggs and milk. In addition to these, food processing can also result in antimicrobial components being produced in the food. Fish smoking produces phenolic compounds, which are not only antimicrobial but also result in a reduction of the surface pH of the product.

New research has investigated the possibility of incorporating sachets containing the volatile oils of both Rosemary and Thyme into food packaging and has demonstrated a 1.4 log reduction in *Listeria monocytogenes* in packaged cheese inoculated with the organism.

This approach has the obvious advantage of using natural antimicrobials opposed to synthetic chemical preservatives. However it wasn't all good news; the researchers noted that the sachets gave off a distinct odour and affected the organoleptic properties of the product.

High pressure pasteurisation – What is it and how does it work?

Over a century ago, scientists began investigating the fact that harmful bacteria found at sea level were actually not able to survive at deep sea levels (under high water pressures). Within the last decade, advancements in technology have allowed for the duplication of this phenomenon for use on natural and organic foods to kill bacteria while preserving taste, and overall nutritional integrity.

High pressure pasteurisation (HPP) is a non-thermal pasteurisation process in which food is subjected to a mechanical pressure up to the region of 7,000 bar for a given time. There is a volume reduction of around 12% as the pressure is applied, which is reversed as the pressure is released.

As this is a non-thermal process, there are minimal associated heat damage problems and there is better retention of freshness, flavour, texture and colour of the product.

The big disadvantage is that bacterial spores are very resistant to the commercially available pressures; which are sufficient to disrupt the bacterial cell wall, but do not damage the more impenetrable wall of the spores. Additional food preservation hurdles such as pH and water activity therefore need to be incorporated.

The effects of stomach acid on pro-biotic bacteria

Researchers at University College London assessed eight different pro-biotic products to find out whether they contained as many live bacteria as they claimed; whether the bacteria survived the journey through the acidic conditions of the stomach; and whether the bacteria which did survive were able to flourish in their new environment.

4 of the products tested failed on all 3 counts. I yoghurt drink did contain the amount of bacteria claimed but failed on the other 2 stages, whilst another leading brand yoghurt drink fell short on the number of bacteria surviving the journey through the stomach.

The only product to pass all 3 tests was a water based barley drink. Study author Dr Simon Gaisford stated “I certainly wouldn’t buy a product where nothing seems to be getting through….just swallowing them is no good if the stomach then kills everything”.

This study serves as a reminder that the infective dose of a food pathogen is dependent on the food matrix in which the pathogen is consumed.

The fat globules produced by very fatty food matrices such as cheese, cream and chocolate can actually protect the bacteria from the acidic conditions in the stomach, so it must be remembered that the infective dose of a pathogen is potentially much lower in these types of products.

In addition, people who take long-term antacid medication will have a greater susceptibility to infection as the increase in the pH of their stomachs will not provide the same bactericidal conditions of people with normal functioning stomachs which have a range between pH 3-4.

Food poisoning outbreak at Food Safety Summit – report published

It has to be an event convener’s worst nightmare, especially if your event is on food safety!!

Maryland health officials have issued a report into an outbreak of food poisoning at a food safety convention in Baltimore earlier this year, indicating that a batch of Chicken masala contaminated with *Clostridium perfringens* was the likely source of the outbreak. A total of 216 people were affected with symptoms of abdominal pain and diarrhoea which commenced within 16 hours of exposure.

Food borne infections by spore forming bacteria like *Cl perfringens* and *Bacillus cereus* normally occur when spores which survive the cooking process are allowed to germinate, grow and produce toxin due to lack of temperature control. Food should be cooked to recommended temperatures and served immediately. If they can’t be served right away they should be kept a temperature warmer than 60°C or cooler than 5°C to prevent bacterial growth. Leftovers should be refrigerated at 5°C or below within two hours of preparation.

The effect of packaging on the survival of *Campylobacter jejuni*

I did try to produce a monthly bulletin without mentioning *Campylobacter,* but…….A recent survey investigated the effects of different packaging conditions and temperatures on the survival kinetics of *Campylobacter jejuni*.

The results indicated that vacuum or semi-aerobic packaging on poultry products at 4°C (which is the most popular method at retail markets, and presumably chosen as this will inhibit the common aerobic spoilage bacteria), created the highest risk for *C. jejuni* survival !!!!