



# SOFHT FOCUS

The Magazine of the Society of Food Hygiene and Technology

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## MOLECULAR ANALYSIS DRIVES FOOD SAFETY

Development of molecular methods are driving step change in our ability to understand the cause and trace/track organisms with a higher level of certainty

Image Credit: Campden BRI

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PREDICTIVE MODELLING  
OF FOOD SAFETY

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INDUSTRY'S BEEF WITH  
VACUUM PACKING GUIDANCE

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THE CHANGING FACE  
OF DISINFECTION

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# The changing face of disinfection

EU regulations designed to protect people from chemicals used in agriculture and elsewhere, are severely restricting a number of disinfectants widely used by the food industry.

**Peter Littleton** discusses the implications of this on the sector's cleaning regimes.



The introduction of EU legislation designed to protect the health of workers in the agricultural and other industry sectors from potentially dangerous chemicals has resulted in the severe restriction of many disinfectants commonly used by the food industry.

This is not only driving up the costs for the sector in ensuring safe food, it could also be putting consumer safety at greater risk from more food poisoning outbreaks, since these very effective disinfectants are being abandoned without equivalent replacements being available.

When we consider the moral and legal duty of any business, of whatever size or shape, producing food for sale to the consumer, the fact that this food is safe and wholesome should be the first thing that comes to mind. According to the definition of food in the 1990 Food Safety Act: 'food means any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be ingested by humans'.

Part of this maintenance of the safety of food throughout any business is the control of contaminants that may have a deleterious effect on the consumer, such as chemical residues, unintended or undeclared allergenic ingredients, physical contaminants or pathogenic microorganisms. In this article we shall consider the techniques available to control the last of these – pathogens.

## Pathogen control

The need to control pathogens is simple: if these microorganisms – whether viral, bacterial or fungal – are not contained, then the consumer is at risk of suffering from illness, with potential life-altering effects or, in extreme cases, death. In 2015, the World Health Authority concluded that 5,000 people a year in Europe lost their lives as a result of contaminated food – with 14% of that number being children aged under five.

From reviewing both legislation and retailer codes of practice, it is clear that cleaning and disinfection is a pre-requisite to the production of safe food,

"In practical terms, some of the products used throughout the industry may very well disappear"

as well as being a legal requirement that 'food contact surfaces must be cleaned and, where necessary, disinfected'.

While application techniques may vary, the traditional method for achieving disinfection has involved using biocidal chemical products in the form of a liquid spray or by aerial dispersal, for example as a fog. The basic parameters for the formulation of such products has to be based on: achieving a wide-spectrum of biocidal activity against as wide a range of microorganisms as possible; being of low toxicity to humans; stable in solution to enable application through spray, fog or soak; and being of acceptable cost-in-use.

For many years, one of the leading disinfectant classes utilised was based on quaternary ammonium compounds (QACs or Quats). These products ticked all of the above boxes and were generally recognised as safe (GRAS) by many of those involved in policing the safe production of food.

This disinfectant class is also especially useful in the fight against *Listeria monocytogenes (Lm)*, an organism of particular concern to the UK's ready-to-eat food sector and a growing cause of food poisoning cases and fatalities in Europe and wider afield. Indeed, the largest recorded outbreak worldwide involving this organism occurred in South Africa between 2017 and 2018 with a reported 1,060 cases and 216 deaths.

Other liquid disinfectant products routinely employed include alkyl amine, hydrogen peroxide, alcohol and peracetic acid (PAA), along with some lesser used compounds such as biguanide.

## Biocidal Products Regulation

However, the legislative framework surrounding chemical biocides has been changing for many years with the implementation of the Biocidal Products Regulation (BPR) – formerly Biocidal Products Directive – across the EU. This has required the registration of the active biocidal compounds (known as Article 95 compounds) meaning that only those listed can be legally used in the EU.

The regulation is now progressing through the classes of actives requiring formulators, such as my own company Christeys Food Hygiene, to register and submit dossiers containing scientific data relating to the product as used by food, dairy, beverage and other processors (we're only focusing on 'product type 4 – food and feed' here as there are 22 product types in total).

Now, you may be thinking, this is a chemical industry problem as I only want a disinfectant that works and meets my equipment, targets bacteria and price-point needs. Well, this legislation has big implications for the future availability of disinfectant products, as research into new active substances has all but ground to a halt due to the costs of generating the efficacy, stability and toxicity data as well as the dossier writing, submission and evaluation costs.

For formulators, the submission of a dossier for products depends on the active substance, or substances it contains, but also requires efficacy, stability in the pack as sold, toxicity and use data with the product entering what is termed 'market freeze' once the dossier is submitted, which means that changes cannot practically be made.

For many of these reasons the current range of disinfectant products from all suppliers is under review to assess if the original active is supported; if the product is suitable for support through the BPR; and, lastly, whether there is a commercial justification to commit thousands of pounds to any given product.

In practical terms, some of the products used throughout the industry may very well disappear if their cost of support isn't commercially viable and the development of new disinfectant formulations will be severely restricted as those formulations created after dossier submission date will require possibly two years of assessment prior to being placed on the market for sale.

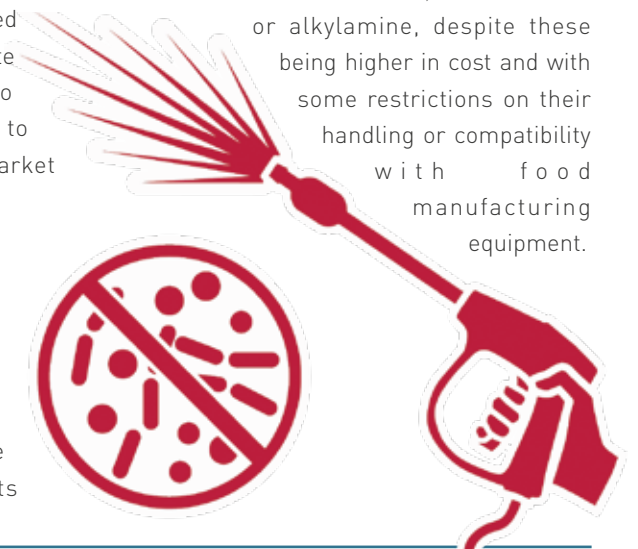
## Plant Protection Products Regulation

A further complication is the application of the Plant Protection Products



(PPP) Regulation 396/2005 on the world of food processing. As previously stated, one of the most widely used disinfectant classes were the Quat-based formulations due to their efficacy, wide action and acceptable cost in use. The use of this product formulation type has dropped in recent years due to the application of the PPP Regulation to products such as sandwiches, ready meals and other processed foods despite their efficacy against low temperature pathogens such as *Lm*.

The maximum residue limit (MRL) of 0.1mg/kg set for food commodities under this regulation has led to the widespread reduction in the use of QAC-based products with many high-risk/high-care food manufacturers switching to alternative classes, such as PAA or alkylamine, despite these being higher in cost and with some restrictions on their handling or compatibility with food manufacturing equipment.





## THE CHANGING FACE OF DISINFECTION

### About the author

**Peter Littleton** is the technical director for Christeyns Food Hygiene Ltd, Europe's only family-owned supplier of specialist detergents and disinfectants for the food, beverage and dairy industries.

In this position, Peter's enthusiasm and commitment has led to an engagement with industry, enforcement and special interest groups to address the issue of consumer safety with regard to the management of food safety and hygiene within food, beverage and dairy manufacturing/processing operations. He was awarded the SOFHT's Trainer of the Year Award in 2011.

Peter works extensively with special interest groups, such as the Anaphylaxis Campaign, research organisations, universities and retailers as well as chairing the Processing, Operations and Preservation Member Interest Group at Campden BRI. He is also proud to serve as vice chairman and training services director of SOFHT.



This application of the PPP Regulation to processed foods has been hotly debated and has led to questions being posed to the specialist committee of the Food Standards Agency that considers and provides guidance on microbiological food safety issues, the Advisory Committee on the Microbiological Safety of Food (ACMSF). In 2018, the ACMSF agreed to set up a working group to evaluate the risks and report back to the committee to enable the scientific case for the application of legislation to the use of this disinfectant class.

During 2018, a further debate began at European level surrounding the levels of the contaminant chlorate that would be permitted in food (based again on the application of PPP legislation). Chlorate interferes with the absorption of iodine – particularly in babies and young adults – and was a widely used pesticide in previous years. However, its presence in food is rarely from this source, but rather from the breakdown and ageing of sodium hypochlorite solutions commonly used in salad or vegetable washing/processing, as well as in irrigation water used during growing to restrict bacterial contamination.

### Food & Biocides Industry Group

At the time of writing, a consultation exercise on these issues is underway across the EU Member States. Meanwhile, the UK is also working on them in a coordinated way through the efforts of the Food & Biocides Industry Group (FBIG), with representation from the Society of Food Hygiene Technology (SOFHT), the British Association for Chemical Specialities, and many other trade associations, all chaired by the Chilled Food Association. The aim of this group is to ensure that food and consumer safety are fully represented during this MRL review process.

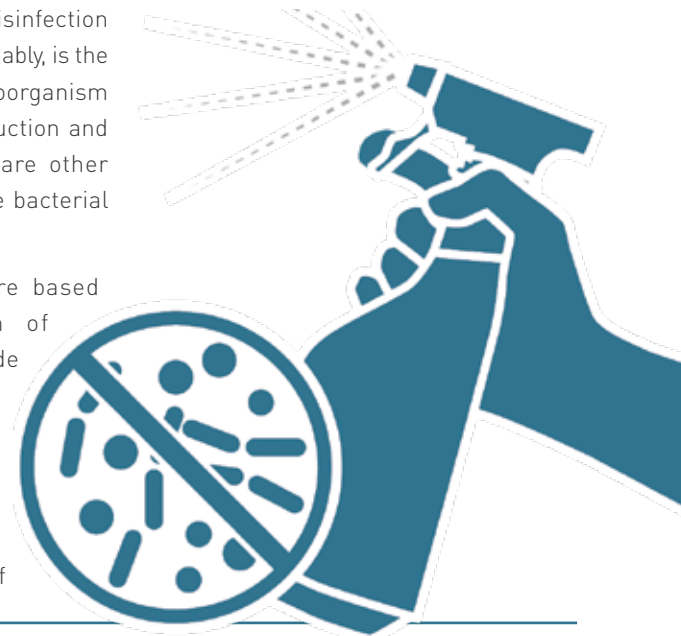
Of course, while chemical disinfection remains widely used and, arguably, is the most common form of microorganism control within the food production and foodservice sectors, there are other methods available to achieve bacterial reduction.

Many of these methods are based on physical destruction of microorganisms and include heat in the form of steam as well as recently reported research methods from Campden BRI, such as cold plasma, UV-C light to decontaminate food itself

and micro/nano-bubbles to denature bacteria present on food contact surfaces.

With any method of decontamination, the same considerations of effect on the target organism, the safety of operators and cost of application have to be considered while all the time ensuring that food safety is maintained and that the consumer is protected.

**Hygiene and food safety professionals are advised to keep themselves apprised of developments in the world of disinfection through regular dialogue with their chemical suppliers and trade associations to ensure that access to effective biocidal products continues.**



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- Forensic audits
- Allergen audits
- Depot audits
- Supplier audits
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- Assured Meat Processing Scheme (AMPS) audits

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- BRCGS Agents and brokers
- BRCGS Storage and distribution
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**BRCGS Certification Body**

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