E Book

Food Safety & Disinfection
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1. The Background

The UK Food Standards Agency (FSA) publishes guidance for the operators of all food handling premises to prevent the risk of cross-contamination of E. coli 0157*. The guidance is issued in response to a Government-led enquiry into occurrences of fatal food poisoning that was widely reported a few years ago.

The first set of guidelines was published in 2011, with subsequent revisions to help improve understanding and address anomalies. The Guidance (Guidance: for the FBO to prevent the risk of cross-contamination of E. coli 0157 Third Edition, Updated September 2013) is currently under review and the FSA hopes to publish the 4th version later this year, replacing all previous versions.

There are branches of the FSA in each of the four UK countries. All work in accordance with the same European and UK legislation, but there is some regional variation between countries where additional local laws apply. For example, some types of food processing using unpasteurised milk is allowed in England but is outlawed in Scotland. In terms of European Food Law (EC) 852/2004 and the E. coli Guidance, however, the same legislation applies across all of the UK.

The FSA is the ‘Competent Authority’ throughout the UK for food and feed legislation. Being top of the command chain, it has a duty to audit Local Authorities (LA) to ensure that relevant food laws and regulations are being followed and applied across the UK and that the Environmental Health Officers (EHOs)* employed by the authority understand and apply legislation in a consistent and proportionate manner.
The relationship between the FSA and the EHOs is governed by a framework agreement, with the EHOs being bound by a Code of Practice. Compliance with Guidance E. Coli 0157 Control of Cross-Contamination is part of the audit programme carried out by the FSA.

In Scotland, there are 32 local authorities but only two FSA auditors. In England, there are over 400 local authorities so similar manpower issues apply. There is a statutory requirement in Scotland for each LA to be audited at least once every 5 years. Reports from each local authority audit are published and can be accessed via the FSA website.

The current audit programme being conducted by FSA is ahead of schedule and achieving an average of one visit every 4 years for all authorities. So in effect, it will take c.4 years for all authorities to be fully audited. This may explain why there seems to be inconsistencies in how the Guidance is interpreted and actioned in some council areas, but as the audit programme progresses, this variance should be addressed.

In Part 2, we examine the objectives of food safety in the context of European law.

* Notes:

**Cross contamination:** is one of the most common causes of food poisoning. It happens when harmful germs are spread onto food from other food, surfaces, hands or equipment. It is critical to clean worktops and utensils with hot water and detergent, remembering to disinfect those surfaces that have come in contact with raw meat, poultry and unwashed raw vegetables. You can disinfect equipment and utensils using a chemical disinfectant or sanitiser or in a dishwasher utilising thermal disinfection.

**E. coli 0157:** can have the following symptoms – diarrhoea, about 50% of people also have blood in their stools; stomach cramps; fever. Some infected people may have mild diarrhoea or no symptoms at all. A very small number of patients may develop ‘haemolytic uremic syndrome’ (HUS) which is associated with kidney failure, anaemia and bleeding. Complications are more common in children under five years of age and the elderly. On average, it takes three to four days for symptoms to develop after swallowing an infectious dose of E. coli O157. Symptoms can last up to two weeks, except in cases with complications. Most people get rid of the bacteria after about one week although children may continue to carry it for longer periods. [http://www.hpa.org.uk/webc/hpawebfile/hpaweb_c/1194947360190](http://www.hpa.org.uk/webc/hpawebfile/hpaweb_c/1194947360190)

**Environmental Health Officer (EHO):** is responsible for carrying out measures for protecting public health, including administering and enforcing legislation related to environmental health and providing support to minimise health and safety hazards. They inspect food facilities, investigating public health nuisances and implementing disease control. Environmental health officers are focused on prevention, consultation,
investigation and education of the community regarding health risks and maintaining a safe environment.
2. European Law

Following the brief overview of the role played by the Food Standards Agency (FSA) covering the use of bactericidal chemical products and the correct procedures for the control of cross-contamination of food poisoning bacteria within commercial food premises, Part 2 presents a summary of European Law in this area.

European Law

For our partners in the Gulf Region, the Middle East is obviously not bound by European law. However, best practice and verification are important considerations no matter where you are in the world and it is clearly important to monitor regulatory changes in other regions.

When EU Law (EC) No 852/2004 was drafted, it tried to take into account the many different types of food processing that existed across Europe. The food industry, in particular, wanted to avoid proscriptive legislation arguing that the industry knew their individual processes best. As a consequence, there is an element of flexibility in how European law can be interpreted for different industry types.

However, there is no ambiguity that each food business bears the ultimate responsibility to ensure that their food is safe. In the UK, the FSA and Environmental Health Officers (EHOs) are duty bound to take action if they think that the actions of a food business are endangering consumers. An individual business may adopt their own processes in their management of a food hygiene plan but ultimately the business needs to be able to prove that any risks to the consumer are controlled.

This may mean, for example, that if an individual food business decides to use an alternative method of disinfection and has knowledge that this method is effective in
their work premises, it may be acceptable to a visiting EHO but the operator should expect to be challenged by the EHO who may reasonably ask for evidence of validation of the process to demonstrate that cross-contamination is prevented.

In the **Guidance**, a hierarchy of simple but effective ways to prevent cross-contamination is provided and the degree of compliance expected by an EHO depends upon the facilities available and the inherent risk of the processes carried out on the individual site. This ranges from the physical separation of all staff and equipment handling raw food from processes involving food that is ready-to-eat, to the more risky situation where raw and ready-to-eat foods are handled in the same area.

Where the risks of cross-contamination are higher, the EHO would expect to see more rigorous controls and personal hygiene in place. This may mean designated areas for different types of food processing, specified equipment and utensils used exclusively for ready-to-eat food, a robust cleaning and disinfection process where the risk of cross-contamination is considered possible and addressing risks associated with movements of staff working in this area.

In Part 3, we look at who is ultimate responsibility for compliance with food safety law and the comparison with chemical safety liability in the workplace.
3. Comparison with COSHH

When an Environmental Health Officer (EHO) visits a site and the Food Business Operator (FBO) is not fully aware of how to dilute chemicals correctly and/or cannot produce evidence that their disinfectant complies with a relevant BS EN standard*, this may lead the EHO to suspect that the FBO is not managing food hygiene effectively.

Reputable chemical manufacturers will provide clear ‘Directions for Use’ for the recommended products, including dilution information covering the ratio of chemical to water in a ready-to-use solutions.

In terms of labelling, especially wall charts and product guidance sheets, the information to the FBO should be clear and unambiguous. The manufacturer should make available to the FBO any relevant test data to show that the product used at the correct dilution is fit for purpose.

Due to increased consolidation of the supply chain, most chemical manufacturers do not deliver direct to the end-user. It is critical, therefore, that all supply chain partners (manufacturer, distributor and consumer) are fully aware of the relevant information.

Suppliers of hygiene chemicals must adhere fully to their legal responsibilities when providing information to support their products and customers, as well as their limitations in relation to the interactions between a FBO and EHO. An analogy can be drawn to the individual responsibilities of the chemical supplier and employer in relation to COSHH risk assessments.

Reputable chemical manufacturers will be more than happy to provide safety data sheets, product information and on-site staff training to demonstrate, for example, how
to dilute and use the cleaning and disinfection products safely, appropriate personal protective clothing and so on, but ultimate responsibility for the safety of staff on site always rests with the employer.

For the FBO, reputable manufacturers will recommend suitable chemicals for hygiene processes, provide guidance on product use, dilution rates and contact times in line with the Guidance from the FSA as well as the relevant information required under Health & Safety Law. But it must be noted, that in accordance with the law, the EHO assumes that the FBO is responsible for their food business activities. Ultimately, legal responsibility for food hygiene management lies with the FBO itself.

Many professional chemical consumers incorrectly assume that legal responsibility for their site COSHH compliance lies with the manufacturer. When the Health & Safety Executive visits, the balance of responsibility sits with the FBO.

The FSA advice to chemical suppliers to the catering and hospitality industry is simple – offer accurate information about how the products comply with the relevant parts of the Guidance and avoid being drawn into situations where any responsibility for the efficacy of food hygiene practices may be transferred from the FBO.

**Remember:** If the Guidance is followed, then there should be no challenge from an EHO. The FSA encourage dialogue between the FBO and EHO in the event of any non-compliance.
4. Two Stage Disinfection

The Food Standards Agency (FSA) Guidance states that where cross-contamination cannot be avoided by physical separation of processes involving raw and ready to eat foods then designated preparation areas and utensils should be used.

Where common utensils are used for raw and ready-to-eat foods, the FSA recommends that a hygiene process involving thermal disinfection is the best approach and this would normally involve the use of a commercial dishwasher.

However, there are situations where a dishwasher does not offer a practical solution. For surfaces such as tables and walls a two-stage disinfection process is the best method of reducing cross-contamination risk – clean first, then disinfect as a second stage.

Clean-As-You-Go Hygiene: No Significant Risk of Cross-Contamination
First, remove gross debris then spray the cleaning product directly onto the surface or equipment. Depending on the degree of soiling allow sufficient time for the product to penetrate the soil. Agitate heavily soiled areas if necessary and then simply wipe away with a clean cloth or absorbent paper to leave a fresh clean surface.

The type of product best suited for Clean-As-You-Go Hygiene depends upon the individual food process, but a good quality detergent is helpful in removing grease and food debris. There is normally no requirement for a separate disinfection stage, unless this is a specific requirement of the site food safety management system.
Cross-Contamination Prevention: Risk of Cross-Contamination
In food handling areas where there is a risk of cross contamination and thermal disinfection is unpractical, a two-stage process using chemical products offers an effective alternative:

Stage 1 – Cleaning: Clean the surface as per above.

Stage 2 – Sanitising: Spray a disinfectant/sanitiser directly onto the surface, ensuring an even coverage. Allow sufficient contact time, as recommended by the manufacturer, before rinsing the surface with fresh clean water or a clean damp cloth. Allow to air-dry, or dry the surface with disposable paper towels.

To make it simple we recommend that the FBO uses two products – a cleaner to act in the first and a separate disinfectant for the second stage. By colour coding the trigger head of the disinfectant for example using RED, the FBO can clearly identify that a disinfectant is being used in the second stage, remembering that disinfectants are normally not good cleaners, they will not get the desired results in terms of cleaning.

Why is a “Two-Stage” Process Required?
In the past it was generally accepted that a good quality sanitiser (a detergent cleaner combined with a disinfecting agent) would be sufficient to clean hygienically. This is still the case where there is a negligible risk of cross-contamination (as with Clean-As-You Go Hygiene).

However, where both raw and ready-to-eat foods are handled in the same area, there is a risk of bacteria being transferred from raw food (fish, meat and vegetables) to cooked or ready to eat items and this may endanger the consumer.

The FSA recognise this danger and cite scientific evidence to support that ‘effective chemical disinfection can only be achieved on visibly clean surfaces’ hence the need for a first stage cleaning process to remove visible dirt, food particles and debris before using the sanitiser for disinfection. The FSA also comments that ‘when used in a single-stage process, sanitising products are only suitable as an interim ‘clean-as-you-go’ measure and never as a disinfection control for cross-contamination.’

Staff Training is Critical
For the FBO, maintaining a satisfactory food hygiene system requires proper training of staff, usually by a qualified food safety expert, and a robust consistent service level from the chemical manufacturer to ensure the right products are used at the correct dilutions in the right areas.

BS EN 1276 is recognised as a robust standard for the food industry as it requires the disinfectant to kill 99.999% of four different test organisms within 5 minutes. While some FBOs may have an issue with 5 minutes being ‘too long’, this needs to be see
within the wider context of protecting consumer health and the overall reputation of the FBO.

In 1996, a Scottish butcher was central to the world’s worst recorded outbreak of E. coli food poisoning. Twenty-one people died after eating contaminated meat supplied by a butcher’s shop in Wishaw, Lanarkshire. The report said that there was inadequate training of staff at the butchers shop implicated in the outbreak, identifying five key failures:

1. Failure to use temperature probes for cooking raw meat
2. Failure to draw up cleaning schedules to reduce the risk of contamination
3. Failure to separate processes relating to raw meat and cooked meat
4. Failure to provide separate knives and equipment for each of the processes
5. Failure to provide clear management structures and adequate supervision to enforce safety measures

Part 5 examines the key issues involved in selecting the right type of disinfecting product.

**Definitions & Explanations:**

1. **Disinfectants:** are chemicals applied to non-living objects to destroy microorganisms living on the objects. Effective disinfectants do not necessarily kill all micro-organisms, especially resistant bacterial spores, but kill sufficient numbers to a safe level.
2. **Sanitisers:** are chemicals that simultaneously clean and disinfect to the levels sated above.
3. **Thermal Disinfection:** achieves high levels disinfection when surfaces are in contact with heated water for an appropriate length of time. Shorter times are required at higher temperatures than at lower temperatures. 70°C for 100 minutes, 75°C for 30 minutes, 80°C for 10 minutes or 90°C for 1 minute.
5. Key Points in Selecting Disinfectants

Previous sections have covered issues such as the Food Standards Agency, European Law, COSHH Regulations (Control of Substances Hazardous to Health) and two-stage disinfection. The bottom line is that the quality of your hygiene process is only as good as the quality of the disinfectant you use.

Part 5 presents ten key points to ensure that you select the right disinfectant products keeping your food premises ‘safe, clean and legal’ at all times.

Some chemical suppliers think that simply offering a product that has been tested to BS EN 1276 or BS EN 13697 disinfectant standards will meet the needs of the Food Business Operator (FBO) and satisfy a visiting EHO. The FBO will be expected to look more closely at their individual hygiene processes and select a product that is appropriate to help control the risk of cross contamination of surfaces and equipment from pathogenic food poisoning organisms.

1. The Food Standards Agency (FSA) Guidance states unambiguously that a two-stage process must take place.

2. The FBO should use two products, cleaning first with a good quality detergent (non-biocidal) to remove all visible surface debris, before then disinfecting with a separate product that meets the BS EN standard. Alternatively, the FBO can conduct a two-stage process using a single sanitising product to initially clean and then use the same product again to disinfect the precleaned surface, as long as it meets the BS EN standard when used in the second disinfection stage.
3. The FBO needs to know that the sanitiser or disinfectant they are using actually meets the basic BS EN disinfectant standard recommended by the FSA.

4. Is the product made by a reputable manufacturer?

5. Can the chemical supplier produce evidence (normally a test certificate) that the product has been tested to the appropriate BS EN standard by a recognised testing laboratory?

6. The BS EN 1276 standard is a suspension test used to evaluate bactericidal activity of chemical disinfectants. Four test organisms are used, including E. coli, and to satisfy the test a 5-log reduction (99.999%) is required within 5 minutes.

7. The BS EN 13697 standard tests bactericidal performance on a non-porous surface. The same four test bacteria used in the BS EN 1276 standard are also used in this test, but BS EN 13697 can also be extended to include fungicidal activity. To meet the BS EN 13697 standard, a 4-log reduction (99.99%) in bacteria is required within 5 minutes.

8. Additional bactericidal testing may be required for products that are used in specific food process operations, if identified in the food hygiene system used by the FBO.

9. Clear information must be provided to the FBO by the chemical supplier with regard to the product dilution needed to meet the BS EN standard for disinfection.

10. This information should be provided on pack labelling, dilution bottles, Product Guidance Sheets or other information provided by the supplier.
6. Ten Key Disinfection Issues

Part 5 provided detailed advice on selecting the right disinfectant for your business. Here we highlight ten key issues that Food Business Operators should consider regarding food safety and disinfection practices.

1. Food debris harbour bacteria. It is vital, therefore, to carry out a first stage cleaning process to physically remove bacteria from the surface.

2. Bacteria are invisible to the human eye. Sanitisers and disinfectants from a reputable chemical manufacturer should be chosen to ensure trusted, effective disinfection even on surfaces that are visibly clean.

3. Products tested to a BS EN 1276 or 13697 standard demonstrate that the product is capable of reducing bacteria commonly found in food premises to a safe level. These disinfection standards are recognised internationally within the food industry.

4. It is important to be aware of the dilution and test conditions used in the BS EN test carried out on the product. For example: “Conforms to BS EN 1276 at a dilution of 50:1 in 2 minutes under clean (or dirty) conditions”.

5. A product that has passed BS EN 1276 at a dilution of 10:1 may not be safe to use as a disinfectant at higher dilutions.

6. If one product is being used for both the cleaning and disinfecting stages of a two-stage hygiene process, it obviously needs to be an effective cleaner/degreaser.
7. Some disinfectants may have excellent disinfection properties but it will not clean a surface adequately to allow meaningful disinfection in the second stage.

8. Products meeting the BS EN standard MUST be used in accordance with the manufacturer’s dilution instructions as this is the dilution at which the product has been tested.

9. Based on the above, a controlled dilution procedure must be followed with a simple to use and accurate dispensing system provided by the chemical manufacturer.

10. Free hand dosing of concentrated product into sinks and spray bottles might not deliver the dilution required for disinfection efficacy and will lead to avoidable increased costs.

Controlled dilution systems are readily available from most reputable chemical manufacturers. These ensure that a controlled dose of disinfectant/sanitiser is vended into a clearly labelled bottle filled with water, or where chemical and water are mixed together as a ready to use solution. At a basic level a 5lt pelican pump will suffice if operators adhere to the manufacturers recommendations. For smaller operations where controlled dilution systems cannot be located, the FBO can utilise pre-packed ready-to-use products which are pre-diluted at the manufacturing stage and offer protection but are relatively expensive per bottle used over dilutable concentrates.
7. Washing Up Considerations

We are frequently asked, is it a legal requirement that a bactericidal washing up liquid must be used for manual pot washing applications? There seems to be a lingering perception (particularly in Scotland) that in manual washing up applications it is a legal requirement to use a bactericidal washing up liquid.

The Food Standards Agency (FSA) has confirmed there is no specific legislation in place that requires this type of product and it is thought that the confusion may relate to the long since revoked Scottish Food Hygiene Regulations 1959. No current regulation exists that specifies that a bactericidal detergent is needed for the manual cleaning of dishes and utensils.

Is a Bactericidal Washing Up Liquid a Credible Proposition?
We believe that there is no “credible” bactericidal washing up liquid available on the market for the reasons below:

A typical washing up liquid is a high foaming, relatively safe, neutral pH detergent that can be used at a high dilution.

Maintaining these characteristics whilst achieving a meaningful BS EN disinfectant standard would require such a high concentration of active biocide that would lead to the product being classified as hazardous to the user and might also trigger an environmental hazard classification.

Alternatively, reducing the active biocide content to avoid a hazard classification would mean that the volume of washing up liquid that would need to be added to the sink would render the product uneconomic.
Neither approach would be acceptable to the typical end-user as there would either be a safety concern and/or the new product would significantly drive up the associated cost of using what is generally accepted as a relatively low cost, high volume commodity product.

The simple fact of the matter is as follows: if a washing up liquid is used only in the initial cleaning stage of a 2-stage process, there is no requirement for the washing up liquid to have any bactericidal action or comply with any disinfection standards. This is very clear from the Guidance issued by FSA, confirmed in subsequent communications.

**Automatic Dish Washing**
A well maintained commercial dishwasher using a good quality detergent will comply with FSA guidance as it utilises a two-stage-process (initial cleaning programme, followed by a high temperature rinse) where the bacteria are killed to a safe level as a consequence of thermal disinfection in the rinse stage. For optimum results, your WASH temperature should be set between 60-65°C with the second stage RINSE temperature between 82-88°C.

The next subject we will be covering in a new series of future blog posts will be the issue of **CLP**, which is new legislation covering the classification, labelling and packaging of chemical products. The irony here is that the very products that are designed to protect human health from food poisoning will be regarded as "more hazardous to the environment" – an interesting debate could ensue – what is more important human health or the health of fish?