Optimising food safety through good cleaning tool maintenance

The importance of good cleaning tools maintenance is now recognised by the Global Food Safety Initiative (GFSI) and reflected in their approval of global food safety schemes, including the British Retail Consortium (BRC); and the Food Safety System Certification (FSSC), which now contain sections specifically related to this.

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Typically, cleaning tools are used over large surface areas and are therefore capable of collecting (and subsequently spreading) contamination.

Unpublished data from Campden BRI, used to establish guidance on effective microbiological sampling of food processing areas, showed that 47% of the cleaning tools sampled were positive for Listeria monocytogenes.

Whether this observation was due to poor hygienic practices or to the poor hygienic design of the cleaning tools (or both) is unknown.

Regardless, the observation gave rise to the concept of cleaning tools as major 'collection' points for the isolation of pathogens.

To minimise the risk of cleaning tools becoming a source and vector of cross-contamination they must be appropriately cleaned, disinfected, and maintained:

- Cleaning and disinfection methods/protocols should be developed and validated for cleaning tools, as appropriate, based on risk assessment.
- Cleaning and disinfection of cleaning tools should be conducted to an appropriate, defined frequency/schedule, based on risk assessment.
- Documentation and records of these actions should be kept so that they can be used internally and in support of audits and due diligence defence, if required.

The methods and frequencies of cleaning tool decontamination will depend on many things, including:

- What is being cleaned, for example, environmental or food contact surface.
- Type of contamination, for example micro-organisms, allergens, foreign bodies, product residues (meat or fish species, organic or non-organic).
- The risk level of the food being produced, for example low risk, high care, high risk, ambient stable.
- Type of food product/environment, (wet/dry).
- Type of clean, for example interim, daily, weekly, periodic deep clean.
- Type of consumer, for example infants, elderly, allergic, health compromised.

Wet cleaning

In general, food industry cleaning tools used in wet environments are decontaminated at the end of the production day, or more frequently if required, through immersion in warm water containing a detergent; by use of a hose (low, medium or high pressure); and/or use of manual cleaning; or by loading it into an onsite cleaning system, like a tray washer. These actions are usually followed by the application of a chemical disinfectant, before being rinsed and hung up or placed in an oven to dry.

During the day, cleaning tools may also be placed in a 'sanitiser bath.' The sanitisers used in these baths tend to be a combined detergent-disinfectant chemical that is perceived to help remove soiling and disinfect the tools simultaneously.

However, the organic soiling on the cleaning tool can quickly reduce the efficacy of the disinfectant component of the sanitiser, and act as a protective barrier to the micro-organisms present.

Consequently, if the sanitiser solution is not changed at an appropriate frequency, it can became a 'soup' of food debris and microbes that can increase the risk of cross-contamination from the cleaning tool.More recently, some manufacturers have started to use industrial dishwashers or washing machines to effect both cleaning and a thermal disinfection step into the decontamination process. A few food manufacturers also use an autoclave to subject the tools to a thermal sterilisation step following cleaning.

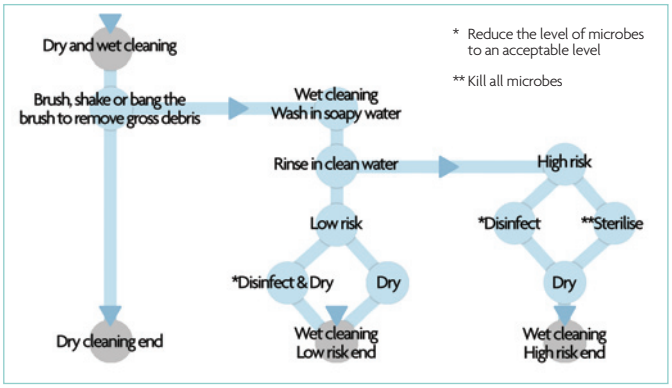

Fig. 1. Generalised cleaning process decision tree.

Dry cleaning

In some dry goods industries cleaning tools are not wet cleaned at all, for fear that the moisture introduced by the cleaning may not be completely removed by drying, subsequently leading to microbial growth and increasing the risk of cross-contamination.

Instead tools, are used until they are deemed 'unfit for purpose' and then thrown away and replaced. In some high risk dry goods environments, like baby formula manufacture, brushes are sometimes just used once and thrown away rather than risk the possibility of cross-contamination. This is an expensive and wasteful practice but it has been deemed the best way to ensure food safety for this critical consumer group.

The decision tree in Fig. 1 provides a generalised overview of the cleaning processes that could be undertaken for cleaning tools used in dry and wet (high and low risk) environments. However, the best way to ensure that an effective decontamination program is developed is to base it on risk assessment.

Risk assessment

The key to determining an effective decontamination program for cleaning tools is to base it on risk assessment. This requires the determination of risk based on consideration of the hazards present, the likelihood that they will occur, and the severity if they do, followed by the subsequent implementation of appropriate controls to reduce the risk to an acceptable level.

It is essential that those involved in conducting the risk assessment have the appropriate level of

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Wet cleaning

Dry cleaning

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knowledge, experience and access to existing information to enable them to competently identify the hazards, assess the risk and implement the correct controls.

Professional cleaning tool, and cleaning chemical manufacturers/suppliers should be able to offer additional, bespoke information and advice on the most appropriate and effective way to clean/use their products in any given food production environment.

The Hazard Analysis and Critical Control Point (HACCP) system is commonly used in the food industry to identify, evaluate, and control hazards which are significant for food safety. This system can also be applied to the development of a cleaning and disinfection program for control of the hazards associated with cleaning tools in order to minimise risk.

Start by identifying any hazards (biological, chemical or physical agents) associated with the cleaning activity that have the potential to cause harm. Typical hazards associated with cleaning tools include:

- Food debris (including allergens).
- Plastic (fragments and bristles).
- Cleaning chemical residues.
- Food poisoning and spoilage organisms.

The risk associated with each hazard is determined by comparing the likelihood of the hazard occurring with the severity if it does. If the likelihood and severity are both low then the risk will be low and the hazard may not require control.

However, if the likelihood and severity are both high then the risk will be high and controls should be considered. Priority should be given to the control of the high risk scenarios identified. Assessment of likelihood and severity will be based on knowledge, experience and any existing information available.

Controls are any action and activity that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Validation

There is a requirement within FSSC 22000 to validate, monitor and verify cleaning tool decontamination.

Validation, in the context of this article, is the development of a consistently effective and appropriate method of cleaning tool decontamination.

Different methods may need to be developed for different types of cleaning tool or for the same type of cleaning tool used for different tasks. The method development may require a degree of trial and error to ultimately determine an effective method that consistently achieves the level of decontamination required.

Each different method should detail:

- Items of cleaning equipment (types and usage) that the method is suitable for.
- Cleaning and disinfection chemicals to be used (water; detergent and disinfectant, including supplier, name, and product code). The temperature, concentration and contact time of the chemicals used should also be provided.
- Decontamination equipment to be used, brush, tray washer.
- Decontamination method/actions, scrubbing, rinsing.
- Decontamination frequency, daily, weekly.
- Level of decontamination required and how this should be measured and recorded.

Monitoring

Monitoring, in the context of this article, is the use of methods that determine whether the validated cleaning methods have been conducted effectively, in a time frame that allows for rapid detection and correction of any shortfall in the decontamination achieved.

Should shortfalls be identified, the decontamination procedure can be repeated immediately until the desired level is achieved.

Examples of monitoring methods include the use of:

- Visual inspection.
- Adenosine Tri-Phosphate (ATP) rapid detection sampling swabs.
- Protein rapid detection sampling swabs.
- Allergen rapid detection lateral flow sampling devices.

The analytical monitoring methods used should themselves be validated. This validation should be conducted by the method manufacturer (will it work under defined controlled conditions of use) and by the end user (will it work under my conditions of use). Just because the manufacturer has validated the method, does not necessarily mean it will work at point of use.

Verification

Verification is the use of methods, in addition to monitoring, which determine whether the validated cleaning methods have been conducted effectively and/or are still effective.

These tend to involve sample analysis where the results can take longer (days) to obtain, and the review of monitoring data (trend analysis).

Examples of verification methods include the use of:

- Microbial sampling and analysis.
- Periodic review of visual inspection check/sign off sheets.
- Periodic review of ATP, protein, allergen, microbial swab test results.

Colour coded storage.

Should individual monitoring and verification results, and/or a review of past results indicate acute or chronic hygiene issues it should prompt the implementation of corrective actions. These could include a review of the validated decontamination method, and the monitoring and verification sampling methods.Records of method validation, monitoring, and verification, and of the results, reviews and corrective actions taken should be kept for auditing/due diligence purposes.

Cleaning tool preventative maintenance

Both BRC and FSSC 22000 require cleaning tools to be maintained through appropriate decontamination, inspection, replacement and storage. Cleaning tools should be regularly (to a defined schedule, as part of the cleaning and sanitising program) inspected for damage and wear and tear, and replaced as appropriate, based on risk assessment. It is recommended that descriptions/ images of what is acceptable and what is not, and records of tool inspection and replacement be kept for auditing/due diligence purposes.

Do not make poor quality repairs to damaged equipment as this can increase the safety risk to the product.

Colour coded storage

Storage of cleaning tools can help minimise damage to the equipment and cross-contamination. It also improves efficiency by providing a place for the tools to be stored and quickly found when needed.

Use of colour-coded cleaning tool storage systems and colour zoning plans can provide a visual check that only tools colour-coded for use in that area are used. It also aids compliance with HACCP prerequisite programs with regard to allergen and microbial control, and provides auditors with evidence of equipment control. Some cleaning tool manufacturers can help develop appropriate colour zoning plans.

Cleaning tools can either be stored on colour-coded wall racks or on shadow boards, which can provide a quick visual check as to whether something is missing from a cleaning station. Shadow boards can also be colour-coded so that they provide a visual check that the correctly-coloured tools are being used and stored in the correct area.

To minimise the risk of cross-contamination brushes, squeegees, scrapers etc on racks and shadow boards should be stored:

- Head down.
- With heads distant from other equipment handles.
- In a single row so that equipment above does not drip onto equipment below.
- On racks and shadow boards that are regularly cleaned and disinfected, as appropriate.

Racks and shadow boards should be either freestanding; mounted at a distance from the wall that allows the wall and the back of the rack/board to be cleaned; or secured to the wall by an easy attach/detach mechanism that makes them easy to remove and clean behind.

Shadow boards should be made of waterproof/non-absorbent material. Ideally, both the board and the printing inks used for the shadows should be food-contact compliant and appropriately temperature and cleaning chemical-resistant.

The use of coloured stickers should be avoided as they can peel and flake (creating a foreign body issue) or bubble and crack (creating a crevice for contamination to accumulate in). ■

References are available from the author on request