May 2009

ARTICLE FOR FOOD PROCESSING

Conquering the problems of disinfection in the food production sector

Modern detergents are effective in removing soils, but generally ineffective at killing bacteria. Consequently, poor cleaning practices are recognised as a primary cause of spreading contamination and infection within processing areas. Neil Brown of leading contract cleaning company Hygiene Group examines the issues surrounding disinfection.

The first important distinction to make is between sterilisation and disinfection. Sterility is the absence of all viable micro-organisms and spores. Sterility may not be a necessary or desirable target, but in any event the only practical option for most food production equipment and surfaces is steam; however, it is risky to operatives, and can damage electrical and other components.

Disinfection is a reduction in micro-organisms, but not necessarily spores, to a level representing no risk to health or product integrity. This is only achievable where the treated surface is already clean, so terminal disinfectants are used within a two-stage cleaning process. The most widely quoted standard is the 'modified 5-5-5' test, with a 5 log kill on five target organisms within five minutes. Products passing this test generally deliver consistent, predictable kill rates.

Why disinfection is not always effective

Yet the quality of the results achieved with disinfection is variable and affected by many factors. One phenomenon is resistance to the biocide. Readily

demonstrated in a laboratory setting, this is rare in real-life situations but can require an alternation between disinfectants with different modes of action to maintain kill rates.

Effective disinfection also requires even coverage. Processing plant can present complex surface geometries and hollow spaces, and achieving this with hand sprayers or lances is problematic. Fogging can resolve some access issues, but is difficult to achieve without affecting whole rooms at a time.

Disinfectant films are not highly visible, so operatives can easily miss areas, while any foam or froth can ‘bridge’ from one raised point to another, leaving surfaces in-between untouched. Similarly, trapped air bubbles in a soak bath can leave surfaces totally untreated.

Applying excess disinfectant creates its own problems. Pooled disinfectants can cause taints but, when allowed to dry, also become increasingly concentrated. It is not widely appreciated that, with quaternary ammonium compounds (quats) in particular, this concentrated liquid can reach corrosive levels capable of etching copper and weakening aluminium alloys.

Many disinfectants require rinsing after their required contact time. Water ingress is a common cause of electrical failure of production equipment, and, while most sensitive equipment is bagged for cleaning, it is difficult to prevent some water contact during disinfection. Furthermore, pooled rinse water can leave scale and streaks, and cause sour smells on conveyor belting or inside confined spaces.

So, why not use alcohol to avoid these wetting and drying problems completely?

Alcohol disinfectants deliver a rapid kill, but offer no persistent or residual effect, while issues of storage and health & safety are behind an increasing trend towards lower alcohol concentrations. It was common to use these

directly on water sensitive surfaces, including control panels, when products contained 70% or more alcohol, but with typical concentrations around 40-50%, their usefulness on water sensitive surfaces is questionable. Despite these drawbacks, disinfection is still necessary.

Innovations in disinfection

The latest innovation is a novel application system delivering a disinfectant based on both alcohol and quats. New to the UK, but 10 years old in Japan and widely used in the USA, it is now under evaluation in the UK.

The system uses CO_2 to pick up and propel an atomised spray of disinfectant in a clearly visible plume for rapid and even surface coverage. The plume continues to expand for several feet, and in tests covers internal surfaces and confined spaces much more completely than with hand sprays. Treated surfaces were dry within minutes.

The disinfectant contains three separate quaternary ammonium disinfectants in 70% alcohol; these are present at just 140ppm, and so under FDA regulations do not require rinsing. Kill rates appear comparable with conventional terminal disinfectants, and are combined with long-term bacteristasis. And, on the question of safety, the CO_2 plume actually extinguished the naked flames that were applied to test for flammability.

This suggests potential uses in diverse processes. The virtually dry disinfectant is ideal in cereal manufacture and with high-risk cooked meats, for chocolate manufacture and for many pharmaceutical processes including enteric coater cleaning and in lyophilised powder handling. It also has applications in infection control, and appears not to be susceptible to increasing bacterial resistance.

Evaluating this technology for use within the UK food and pharmaceuticals industry is already suggesting many potential applications, with the system

likely to be attractive for use in any area where effective, lasting disinfection is required but rinse water needs to be kept to a minimum.

-Ends-

Notes to Editors

Hygiene Group has grown from modest beginnings more than 25 years ago to become the largest and leading supplier of hygiene management in the UK. It can be visited at www.hygiene.co.uk.

For further information, please contact Luke Bull at Wyatt International -
Tel 0121 454 8181
lbull@wyattinternational.com