

THE MICRO WARS

(AND WHY WE'RE LOSING THEM...)

Most of us conveniently ignore the fact that micro-organisms, not humans, are the dominant life form on our planet. Incredibly resilient and diverse in number, they are not only the foundation of all life on Earth but interact with human life in countless ways (up to 3% of total human body mass consists of bacteria). While most of this inter-species interaction is benign or even beneficial, many micro-organisms do pose a threat to human society and commercial food production is at the leading edge of this challenge - a challenge not made easier by the sheer scale of the integrated global food production supply chain. Add to this the ever-increasing sophistication of analytical methods used to track unwanted micro-organisms combined with a more informed and activist consumer base, and the stage is set for warfare at the micro-scope level.

But there's a problem: mankind is slowly but steadily losing this war; despite our vast knowledge of micro-organisms and technological advances the fact is that microbial infestation, whether related to food spoilage or acute human infection, is on the rise and the WHO has recently warned that increasing levels of bacterial resistance to antibiotics, antiseptics and disinfectants could pose a threat to human prosperity.

Agriculture in the Firing Line

Microorganisms rapidly adapt to environmental, physical and chemical conditions, so it's not surprising that resistance to extensively used antiseptics and disinfectants has been reported. Of the mechanisms that have been identified the most significant are clearly intrinsic, in particular the ability to sporulate, and the protective effects of biofilms. In this context "resistance" can perhaps be more correctly described as "tolerance" - or the protective effects that permit microorganisms to survive in the presence of an active agent. While the WHO has identified the twin priorities of more judicious use of anti-biotics and the development of more powerful alternatives, the global food industry also has

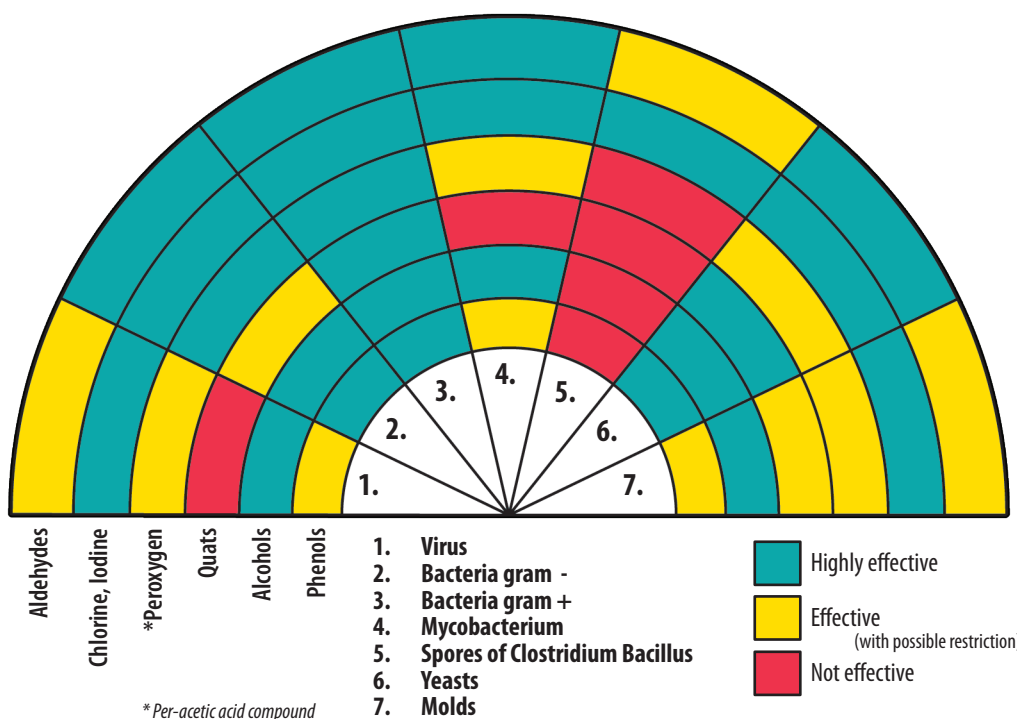
a critical role to play because many reports of microbial resistance cite parallel causes like **inadequate cleaning, incorrect product use** and **ineffective infection control** practices. It has been speculated that low-level resistance may aid in the survival of microorganisms at residual levels of antiseptics and disinfectants. Addressing these challenges seems simple enough in theory, but in practice food producers are overwhelmed by the sheer number of competing disinfectants, methods and (often contradictory) advice. It is also clear that antiseptic and disinfectant products can vary significantly despite containing similar levels of biocides. This underlines the need for closer scrutiny of efficacy claims and adequate test methodologies.

No Shortcuts - Practice Makes Perfect

Although international best practice teaches that cleaning and disinfection should always be treated as two separate processes, in SA the 'shortcut' route of using cleaning-disinfectant 'combo' formulations has proven resilient - with hygiene control suffering as a result. Many formulators and marketers also seem to forget (or ignore) the fact that, besides lifting dirt and grease and attacking organisms, effective cleaning methods should also address biofilm removal and control - preferably on a continuous basis. **Chlorination** is particularly efficient in this application due its innate ability to strip out the Nitrogen bonds holding protein biofilm together. Another concerning trend is the tendency of some vendors and even specialised cleaning & hygiene contractors to use disinfectant compounds more broadly than their demonstrated chemical efficacy. Ultimately the selection of disinfectant always represents some level of compromise. While there are no 'silver bullets', to help make things a little clearer for the end user the United Nations Food and Agriculture Organisation (FAO) has published an interesting chart demonstrating its own assessment of the relative efficacy and spectrum-utility of the most common environmental disinfecting compounds.

MEAT PROCESSING TECHNOLOGY FOR SMALL TO MEDIUM SIZED PRODUCERS (FAO 2008)

Effect of some chemical disinfectants on microorganisms



source :FAO

Looking Ahead

It's not hard to find consensus that microbial resistance is one of the most serious threats the world faces today. What has proven much more difficult has been to raise broad awareness of the role the non-scientific community can play in slowing this progression and minimizing its potential effects. Both food producers and retailers have a role to play here, and awareness of the following principles offer a good starting point:

1. In order to succeed at both, it's imperative to **separate cleaning and disinfection**.
2. Make **biofilm control** part of your product selection procedure
3. Be aware of the capabilities - and limitations – of the disinfectant/s you select, and always ensure formulations contain **sufficient active ingredient** to ensure microbial 'kill'.
4. Where hygiene is contracted out to a third party, ensure that you understand - and **support** – the chemical solutions they employ.
5. **Avoid the use of antibiotics wherever possible**

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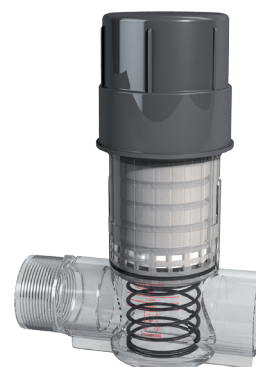
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References: i) FAO; ii) Antiseptics and Disinfectants: Activity, Action and Resistance (ASM)

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