BATTLING BIOFILM WITH TRISTEL RINSE ASSURE (RA)

FINDING AN ANSWER TO BIOFILM AND INFECTION PREVENTION

Building on surfaces and causing infection, biofilms are cultures of microbial species. These include bacteria and fungi, which are protected by an extracellular polymeric substance (EPS) matrix casing. Biofilms are a growing concern in the infection prevention field due to their high resistance to disinfection. When growing inside water pipelines or layering in medical device lumens, biofilms can put patient lives at risk.

What can we do to stop biofilm from building

We need to **ensure that the disinfectants used are effective against biofilm**. Where disinfectants fail to affect all parts of the biofilm, new biofilms can generate more quickly. Microorganisms can be released into the surrounding environment, leading to further contamination. This is especially a concern for heat-sensitive lumened devices, where sterilisation to remove biofilm accumulation is not possible.

Tristel's proprietary chlorine dioxide (ClO_2) chemistry is proven effective against both the microbial species and EPS matrix casing of the biofilm. It is also compatible with a wide range of materials.[1] Microbial species do not develop anti-microbial resistance over time to Tristel ClO_2, which is a common risk with other disinfectants. Tristel's ClO_2 chemistry prevents the formation of biofilms in medical device lumens and pipelines.

How Tristel RA kills microorganisms with it's ClO_2 chemistry

Tristel RA uses ClO_2 chemistry to kill microorganisms through electron exchange, sequestering electrons from important proteins within the microorganism that allow it to function.

Rather than needing to obliterate all parts of the biofilm to prevent formation, including the cell walls, membranes and the EPS matrix casing, Tristel ClO_2 works through these barriers to tackle the vital functioning parts.[2] Therein, Tristel ClO_2 can ensure the death of microorganisms and prevent further biofilm formations.[3]

Tristel ClO_2 can strike the best balance between non-corrosivity and efficacy. Using a lower concentration than alternative disinfects such as peracetic acid and hydrogen peroxide, Tristel ClO_2 can produce a much stronger effect on killing microorganisms.[4] As a result, Tristel ClO_2 is also less corrosive than peracetic acid and hydrogen peroxide, and is ideal as a water treatment disinfectant.[5]

The research - Tristel ClO_2 in action

In a study performed by Biotech-Germande laboratory[6] following EN ISO 15883[7], Tristel ClO_2 was put to the test as a curative and/or preventative measure in the fight against biofilms. The internal channels of endoscopes were simulated with pieces of tubing. Over four weeks, the efficacy of preventative and curative treatments was assessed by recording the quantities of viable bacteria, residual proteins and polysaccharides in test tubes. Each test line consisted of two tubes; one initially contaminated with *Pseudomonas aeruginosa* biofilm and one sterile tube. This way, biofilm removal and control were assessed.

One test line was fitted with a 0.2µm filter, designed to create bacteria-free water with no chlorine dioxide treatment. Despite the use of the filter, the water samples collected contained microbial contamination.

For a control, another test line was not treated with Tristel ClO_2 and had filtered tap water flushed through it. The filtered water control line showed a partial removal of the biofilm, resulting from a 'wash-off effect' of the water circulating through the tube. Here, the remaining bacteria could then begin to accumulate on nearby surfaces and contaminate the circulating water.

The other two scenarios flushed the tubing with Tristel ClO_2 solution at differing intervals: ten times a day at five parts per million (ppm) for preventative action and twice a day with a 50 ppm for curative action. These two scenarios demonstrated that biofilm was effectively removed from tubing through flushing with Tristel ClO_2 solution, inducing a complete and irreversible elimination of biofilm.

To find out more about how Tristel RA works against biofilm or put theory into practice for your procedures, visit our website at www.tristel.com. Alternatively, you can speak to one of our Sales Representatives today on +44 (0)1638 721 500.

References:

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[2] Chlorine Dioxide Is a Size-Selective Antimicrobial Agent (plos.org)
[3] Frontiers | Integrity of the *Escherichia coli* O157:H7 Cell Wall and Membranes After Chlorine Dioxide Treatment | Microbiology (frontiersin.org)
[4] Penghui Du et al. (December 2018), 'Oxidation of amino acids by peracetic acid: reaction kinetics, pathways and theoretical calculations' Water Research X, 1
[5] Penghui Du et al. (December 2018), 'Oxidation of amino acids by peracetic acid: reaction kinetics, pathways and theoretical calculations' Water Research X, 1
[6] Biotech-Germande (2004). Evaluation of The Biocidal Activities of Tristel Chlorine Dioxide Solution Against Biofilm. Document number 254.TRII.04. 7 pr EN ISO 15883-1:2003 Washer Disinfectors Part 1: General requirements definitions and tests.
[7] pr EN ISO 15883-1:2003 Washer Disinfectors Part 1: General requirements definitions and tests.

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