Biofilm prevention strategies

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ECOLAB

Biofilm Basics

What is it?

Biofilm is a structured aggregation of **living microbial cells embedded** in a *self-produced* **extracellular polymeric matrix** (EPS).

The microbial cells are attached to each other but also to surfaces and they interact even across species through **quorum sensing**.

Why does it grow?

Biofilm is a strategy of microorganisms to survive, **access nutrients**, propagate, expand.

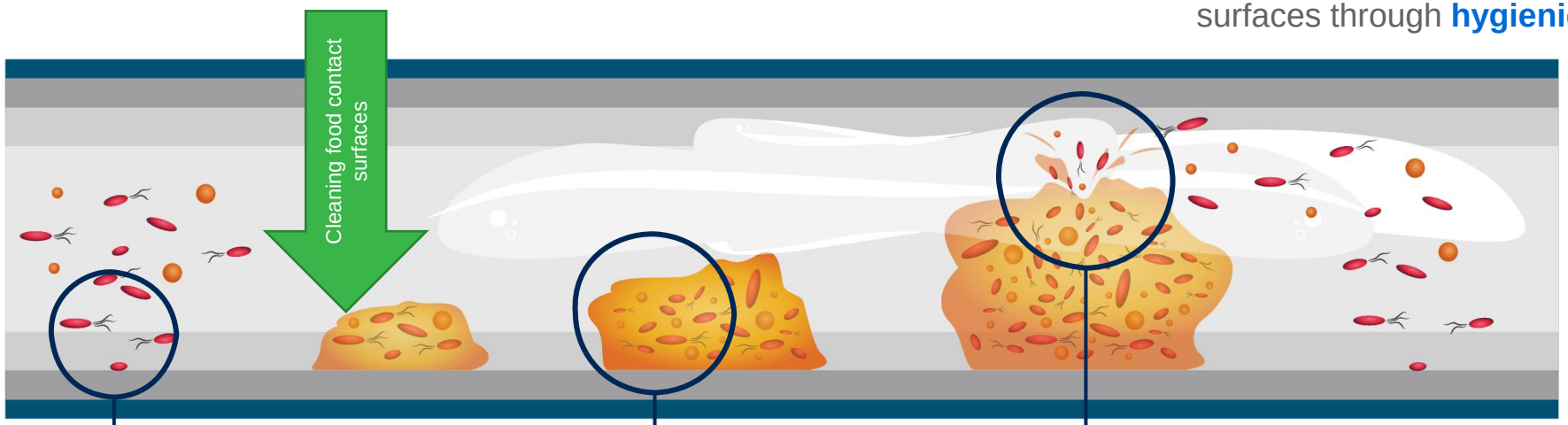
Most food pathogens can generate biofilm if they do, is a **response to environmental conditions**.

How to prevent?

Avoid wet surfaces and **remove nutrients** (food residues) by using suitable detergents.

Apply **cleaning and disinfection regularly** (food contact surfaces: daily)

Make sure cleaning can access all surfaces through **hygienic design**.



Tools

Mapping and Analysis

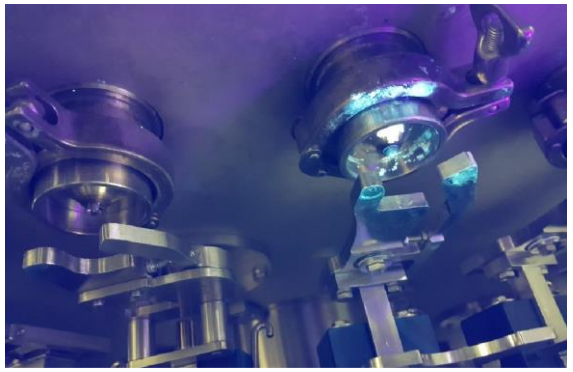
Hygienic design and process functionality

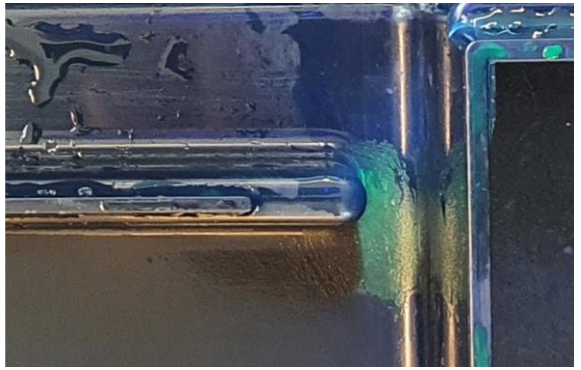
- Spray shadow test
- CIP process functionality
- Visual observation and documentation

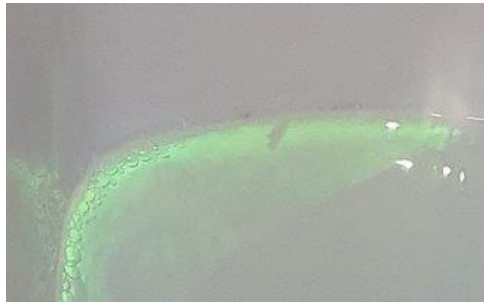
Residues and biofilm rapid detection

- UV-Light examination
- Organic residue detection (Fluorescence staining)
- Catalase positive biofilms (Catalase gel)
- ATP-Bioluminescense (surface and water)
- Protein residue detection (swabs)

Microbial sampling and genome sequencing







Biofilm removal

Efficacy Screening of OPC Foam Cleaners on Biofilm

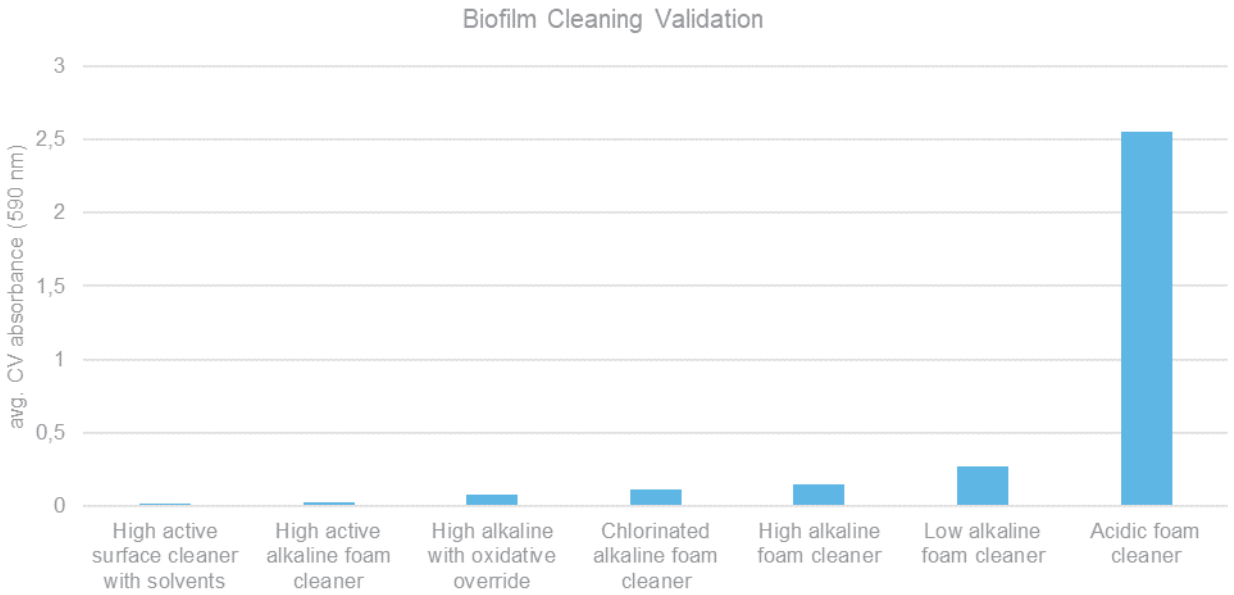
Biofilm growth
Flow condition based
ASTM E2196 & ASTM E2562

Removal step
Effective cleaning products
and procedures

Disinfection step
Effective disinfectants

Crystal Violet Staining

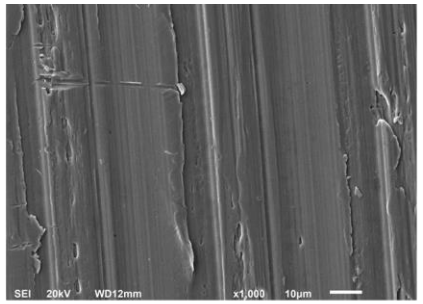
Comparison of chemicals



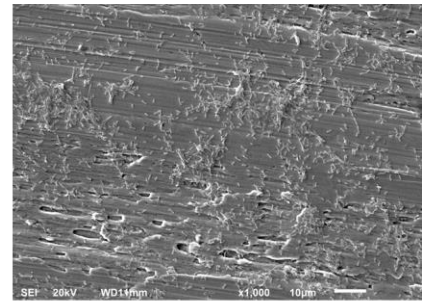
SEM Imaging

1000 x resolution

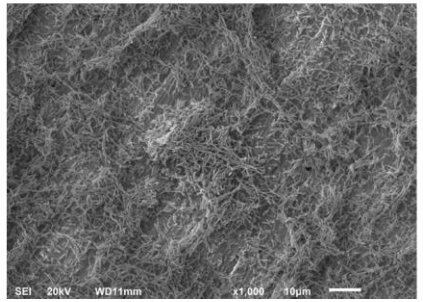
Clean coupon



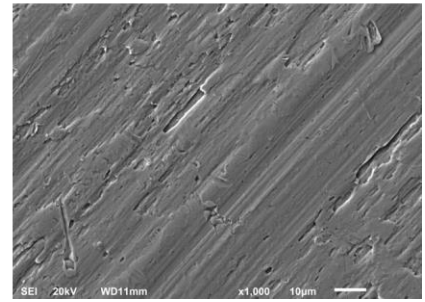
Insufficently cleaned



Biofilm on control coupon

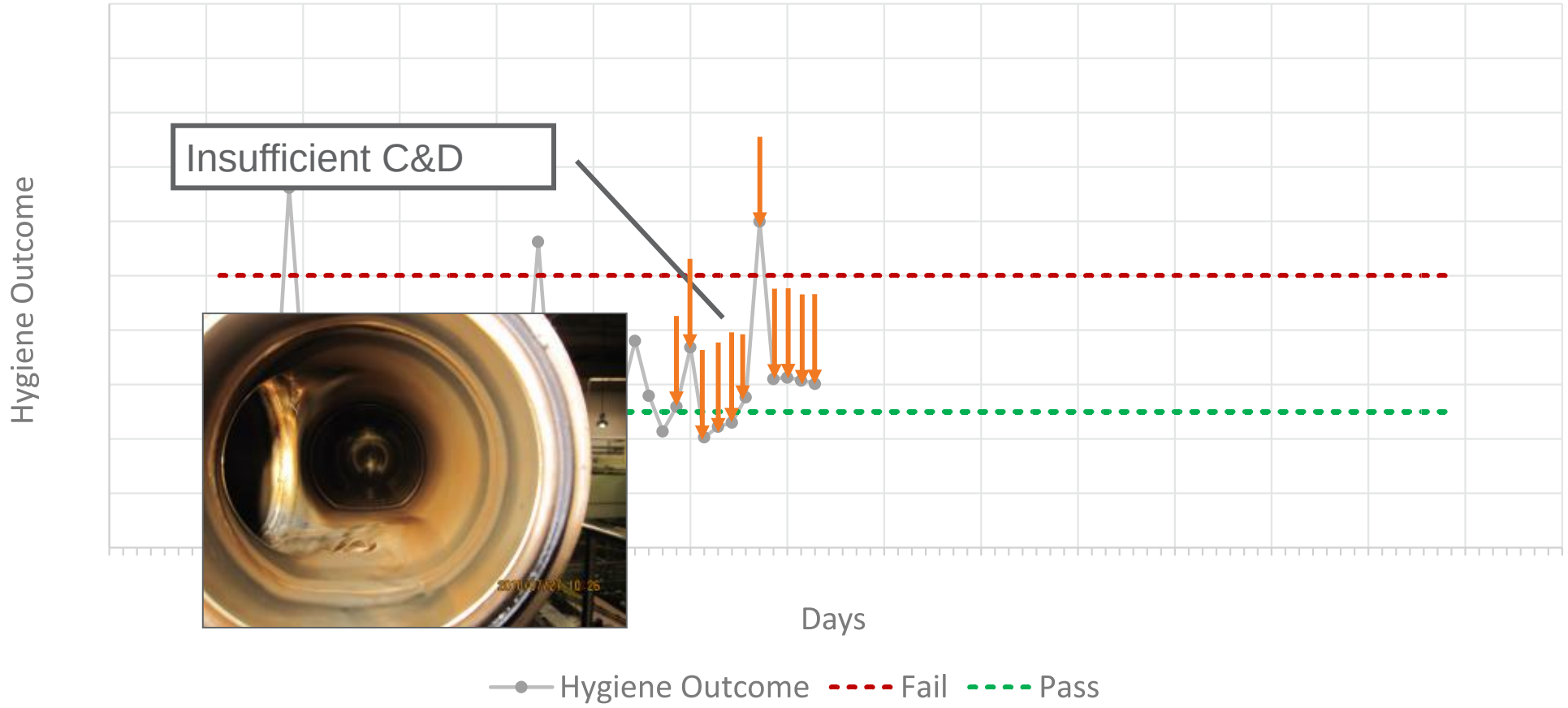


Result with Topaz HD3



C&D VALIDATION PREVENTS

Validating cleaning conditions eliminate troubleshooting, panic modes and extended deep cleans



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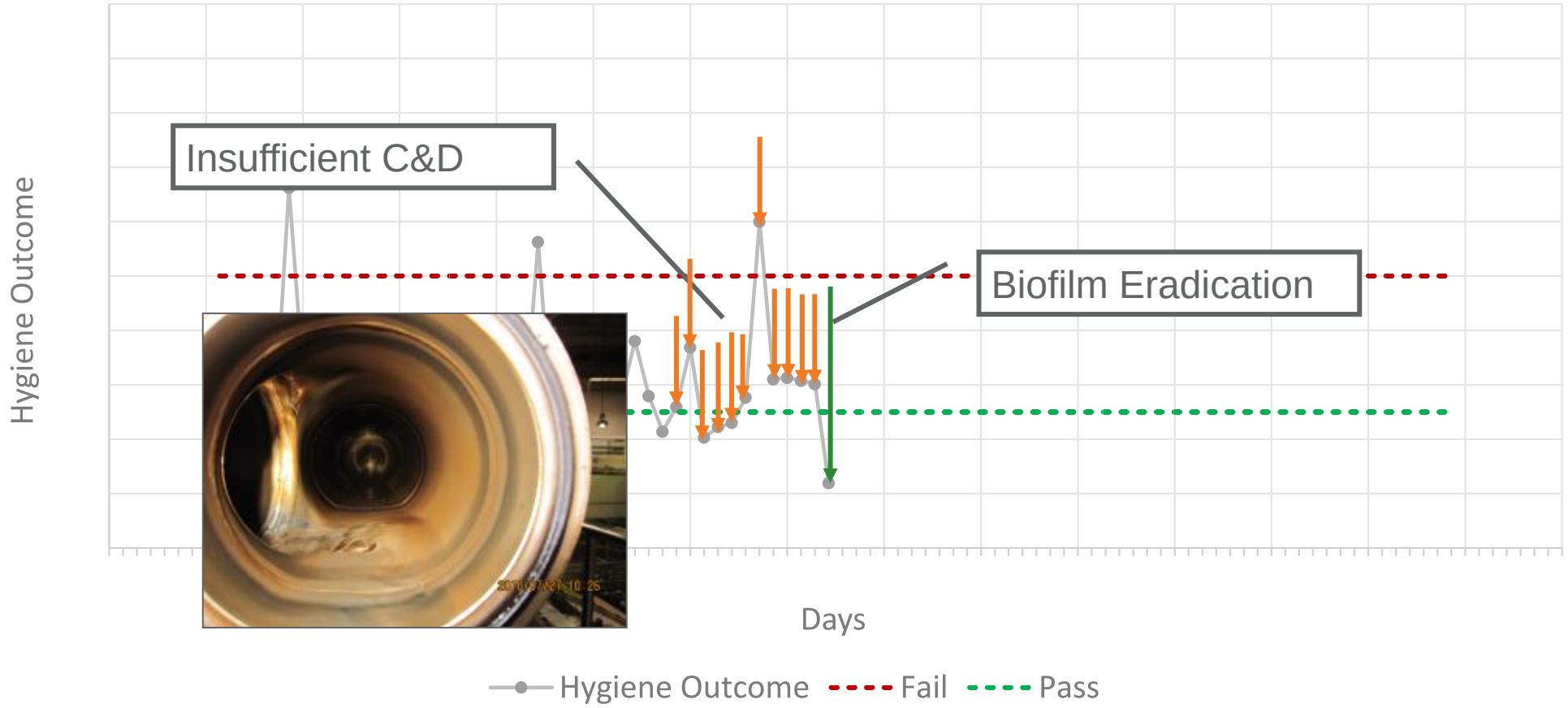

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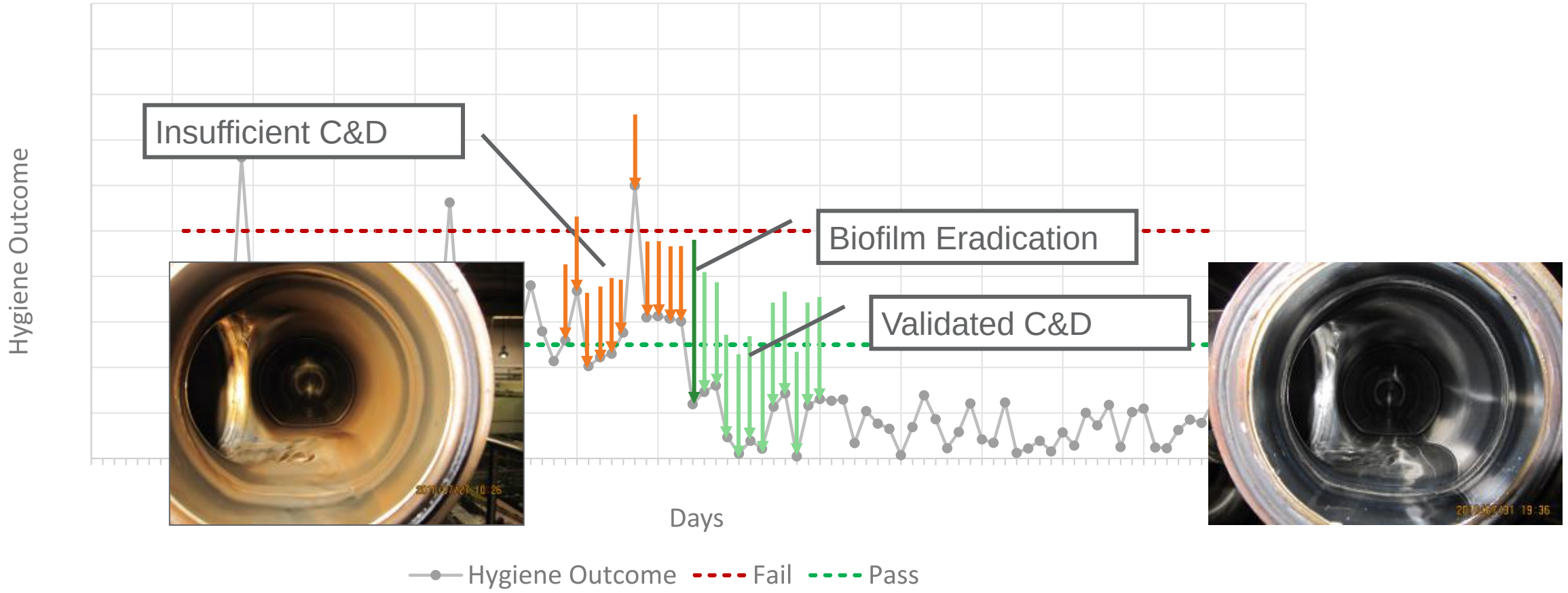
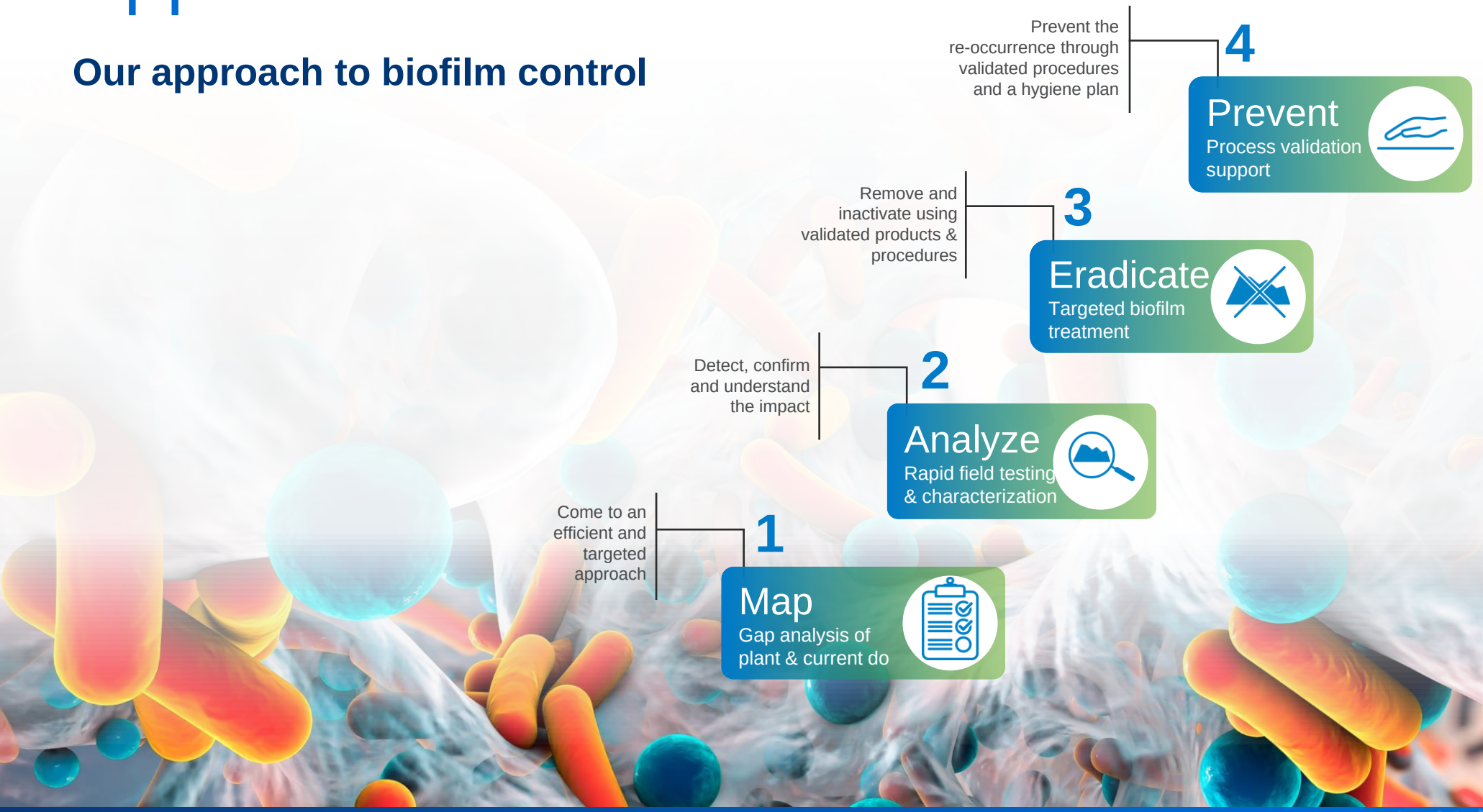


Approach

Our approach to biofilm control



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