SANI MARC
The Experts in Sanitation Solutions

Spring Speaker's Evening

Biofilms in Food Production Environments

André Côté, M.Sc Microbiology & Regulatory Manager, SM Group

FOOD & BEVERAGE DIVISION
OPTI safe®
OPTIMIZING FOOD SAFETY

Oriented Scientific Research

- Sani Marc's Biofilm Research Program
  - Started in 2010
  - Partnership with the Montana State University Center for Biofilm Engineering
  - Significant investment
  - Development of unique Theoretical, Practical and Regulatory expertise on Biofilm

SANI MARC
OPTI safe®

The Experts in Sanitation Solutions

What is a Biofilm?

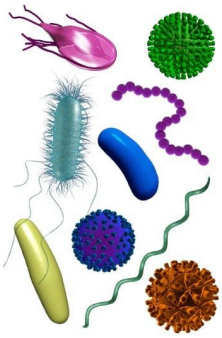
- Microorganisms
  - Attach to a surface
  - Trapped in an extracellular matrix
  - Living in an organized community
  - Capable of molecular communication (quorum sensing)
  - Showing altered metabolism

SANI MARC OPTI safe

The Experts in Sanitation Solutions

What are Biofilms Made of?

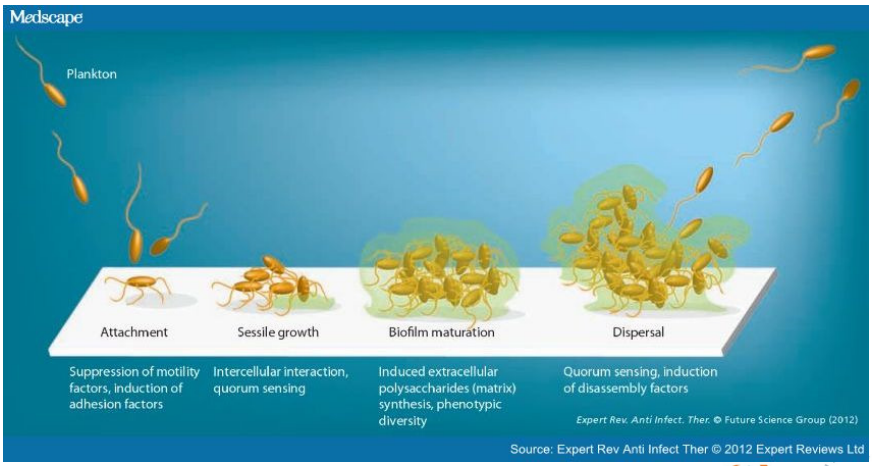
- Pure Biofilms do not exist in the environment
- Biofilms are composed of
  - Bacteria
  - Yeast, Mold and other Fungi
  - Viruses
  - Microscopic Algae



SANI MARC OPTI safe

The Experts in Sanitation Solutions

How Does a Biofilm Form?



SANI MARC

OPTI safe

Biofilm in the Real World

SANI MARC

OPTI safe

Biofilms and Foodborne Illness

- Biofilms are known to be a reservoir of harmful microorganisms including:
  - Listeria
  - Salmonella
  - E coli
  - Staphylococcus
  - Campylobacter
  - Norovirus

SANI MARC OPTI safe

The Experts in Sanitation Solutions

Characteristics of Biofilms in Food Processing Environments

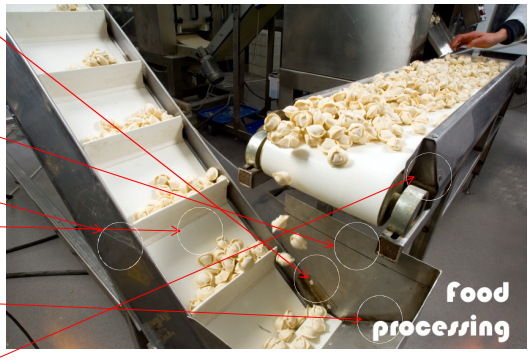
- Biofilms in food plants are:
  - Visible or invisible
  - Very hard to remove
  - Resist to conventional sanitation methods
  - Persistent under harsh conditions (survival protection mode)

SANI MARC OPTI safe

The Experts in Sanitation Solutions

Biofilms in our Food Plants

- Screws and holes
- Rims
- Scratches
- Corners
- Junctions
- Hard to reach areas



SANI MARC

OPTI safe

Biofilm Detection

SANI MARC

OPTI safe

BioDetect: Sani Marc's Solution for Biofilm detection

BioDetect reacts in seconds in the presence of biofilm

SANI MARC

OPTI safe

The Experts in Sanitation Solutions

Video sample…

SANI MARC

OPTI safe

The Experts in Sanitation Solutions

How does it work?
Who's uncovered with BioDetect?

- Minimum concentration for detection is 4 log
- Detects Fungi and Yeast
- Bacteria detected
  - Listeria monocytogenes
  - Escherichia coli
  - Staphylococcus aureus
  - Staphylococcus epidermidis
  - Salmonella enterica and other species
  - Pseudomonas aeruginosa

SANI MARC OPTI safe

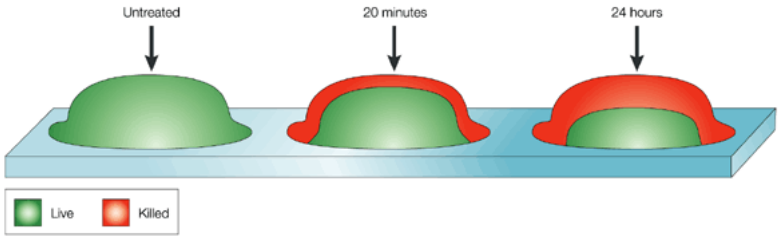
The Experts in Sanitation Solutions

Biofilm Control

SANI MARC OPTI safe

The Experts in Sanitation Solutions

The Challenge of Controlling a Biofilm



Nature Reviews | Drug Discovery

A. Reduced metabolic activity may result in less susceptibility to antimicrobials

B. Cells death on surface form a protective shield for the inner cells

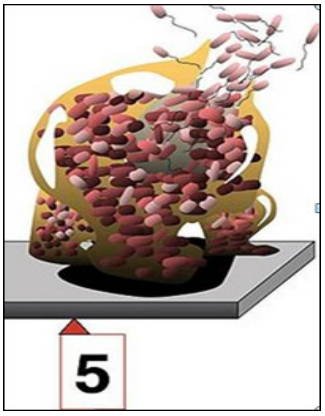
C. Limited diffusion of the antimicrobial active principal

D. Resistant cells accumulate in biofilms

SANI MARC OPTI safe

The Experts in Sanitation Solutions

Be Careful as You Proceed



A. Scrubbing will spread bacteria

B. Products that only disrupt the matrix will spread microorganisms, allow the dormant ones into the biofilm to come back

C. Products that only kill bacteria will not penetrate very deeply into the structural protection

D. A biofilm structure (even dead) that stays on a surface is the starting point for a new one to form.

SANI MARC OPTI safe

The Experts in Sanitation Solutions

The Only Way to Solve the Biofilm Issue

- Control microorganisms growth
- Remove all bacterial structure from the surface

SANI MARC

The Experts in Sanitation Solutions

BioDestroy is Sani Marc's Answer to Biofilm Concerns

Health Canada DIN certification pending

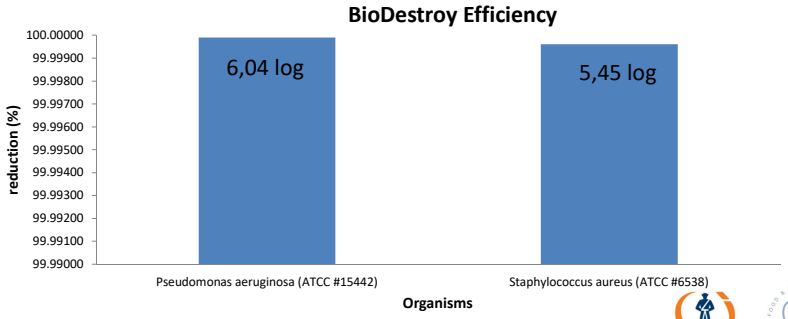
SANI MARC

The Experts in Sanitation Solutions

Antimicrobial Efficacy on Biofilm

GMP Study

- ASTM Method E2562-12
- 5 minutes, 1% of BioDestroy, hard water

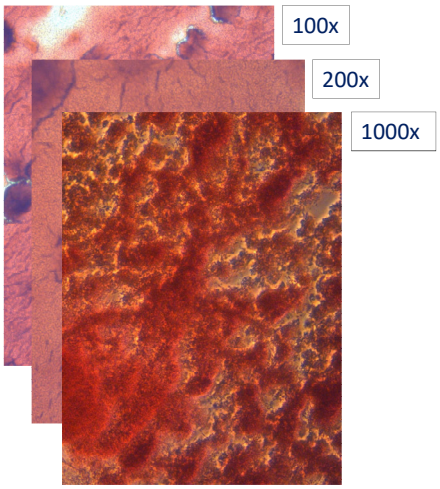


SANI MARC

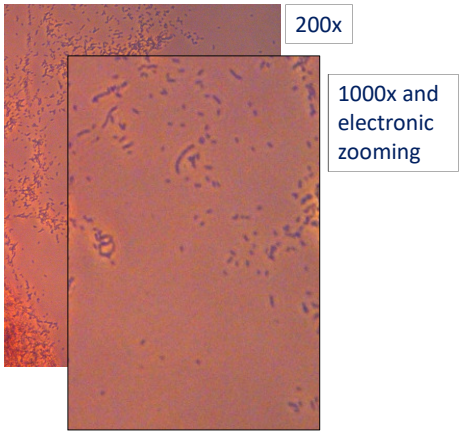
OPTI safe

The Experts in Sanitation Solutions

Let's Take a Close Look



Before treatment : 9 log



After treatment : < 1.6 log

SANI MARC

OPTI safe

The Experts in Sanitation Solutions

Benefits of BioDestroy

- **5 minutes** contact time for quick turnaround
- Easy to apply – **one product** with a trouble-free dilution method
- Foam application offers prolonged contact time and decreased scrubbing action
- Drain application – thick, dense foam @ 2% works against tougher biofilm in drains
- Results in **ONE** application
- **Phosphate-free** formula

SANI MARC OPTI safe

The Experts in Sanitation Solutions

Summary

- Biofilms can be the cause of foodborne illnesses and increase the need for equipment maintenance
- Biofilms are hard to see and hard to remove

- We need to be cautious when removing biofilm to prevent bacteria from spreading all around

SANI MARC OPTI safe

The Experts in Sanitation Solutions