

# Sanitation Best Practices



# Topics

- Four Factors of Cleaning
- Sanitizers
- Biofilms
- Equipment

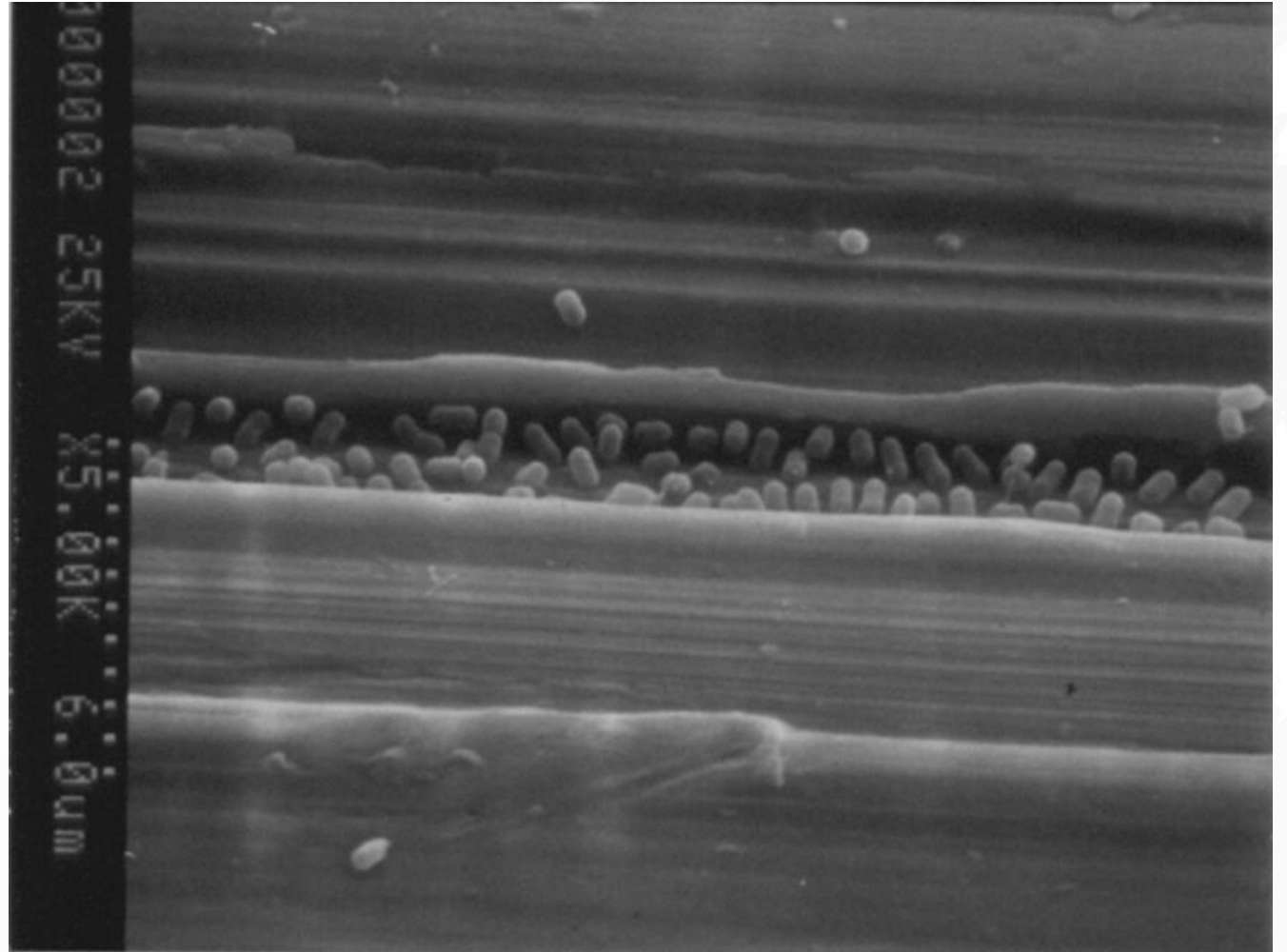
# The Perfect Solution Doesn't Exist

- No Miracle in a drum
- No silver bullet
- Not even irradiation is a perfect solution



# Enemy – What Your Eyes Don't See

- Electron microscope view of bacteria growing in a scratch on stainless steel
- Highlights Importance of:
  - Chemistry
  - Temperature
  - Mechanical Action

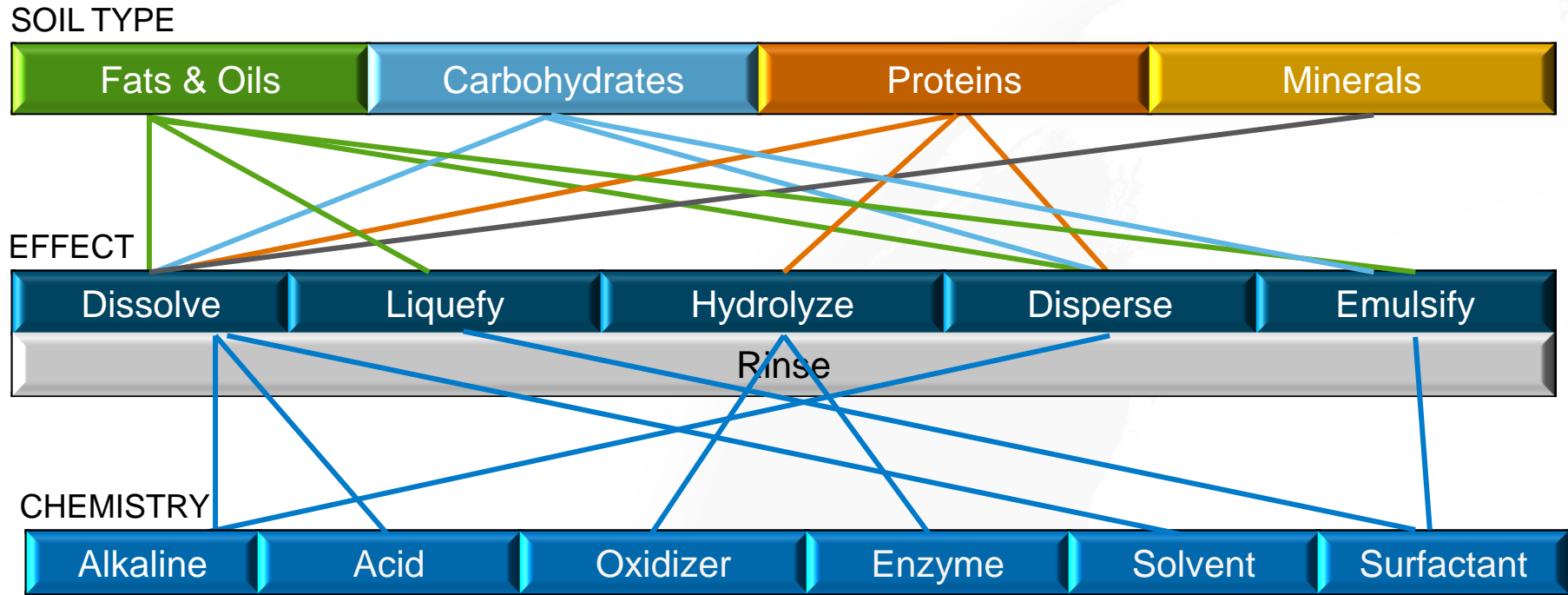


# Four Factors of Cleaning

- Chemistry (type & concentration)
  - Proper detergent and concentration for the job
- Temperature
  - Necessary for proper cleaning performance (within a range)
- Time
  - To complete all necessary cleaning procedures and pre-op
- Mechanical Force
  - Scrubbing, brushing, boosted water, CIP, COP



# Choosing the Right Cleaner



# Chemistry – Coverage!

- Everything must be covered
- Work bottom to top when foaming
- Belts should be running
- Sanitary Design can be a friend or an enemy



# Four Factors of Cleaning – Temperature

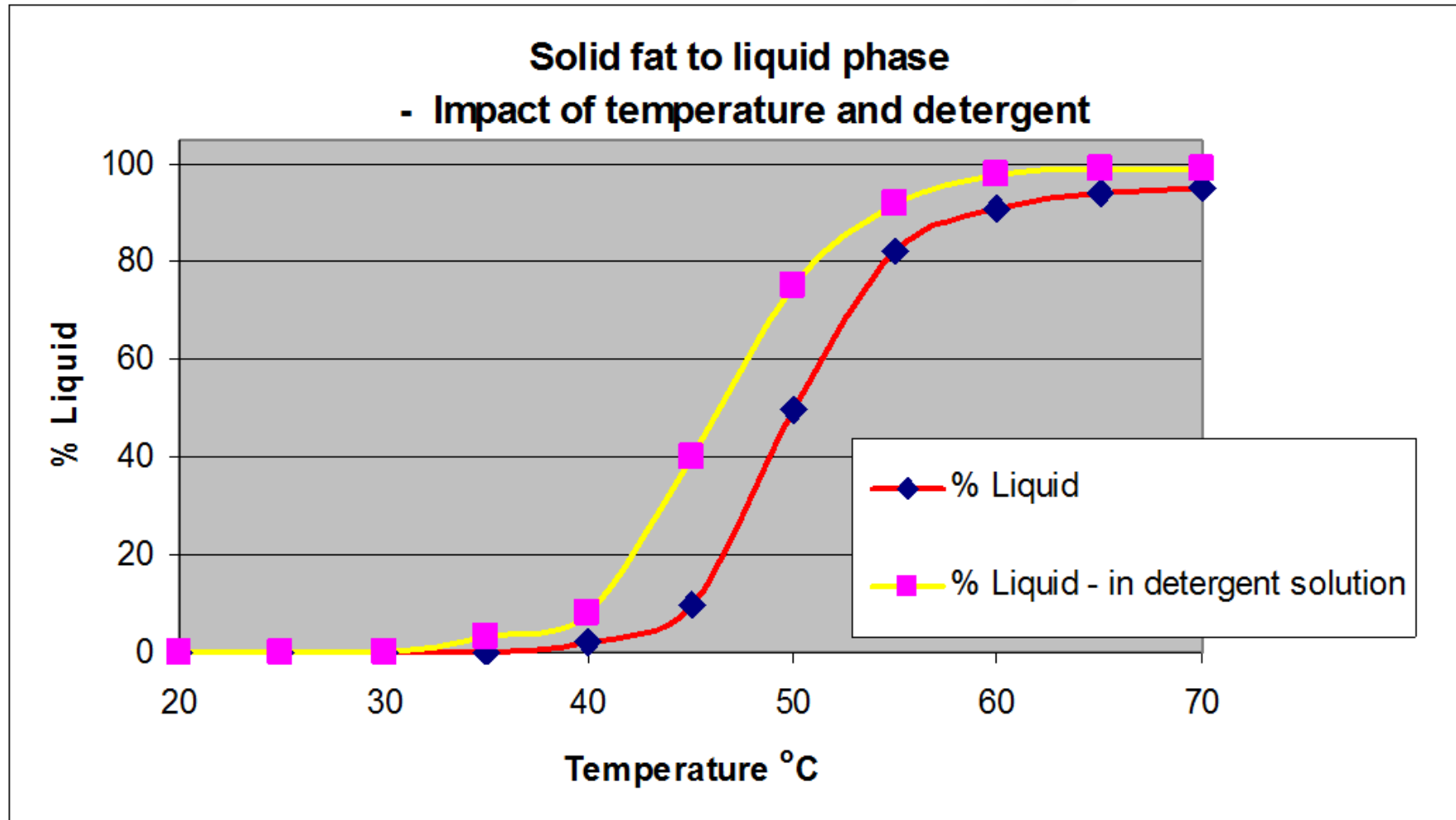
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# Temperature – Hot Water Rinse

Fatty soils require temp & detergent for effective removal

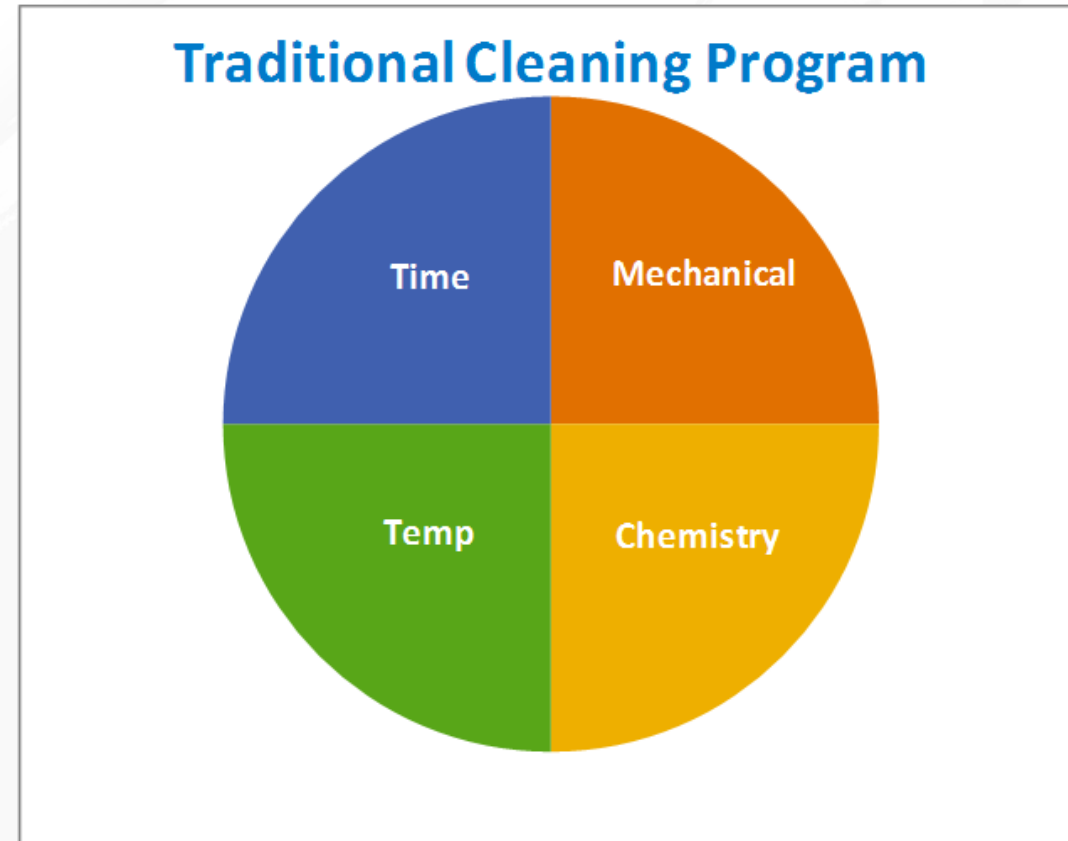


# Rinse Water Hose Temps

- Optimum rinse hose temperature is 130 – 140°F, at the hose nozzle, for effective removal of animal fats
- Above 140°F will start to bake soils on to surfaces causing build-ups and potential biofilms and can cause increased condensation
- 130 - 140° F is also the optimum temperature for the detergents to perform - need hot water through foam cleaning
- 5 – 10 degrees in water temperature from point of heating to rinse hose nozzles
- Water temperatures at nozzle should be verified and monitored nightly and recorded on log sheet for historical reference

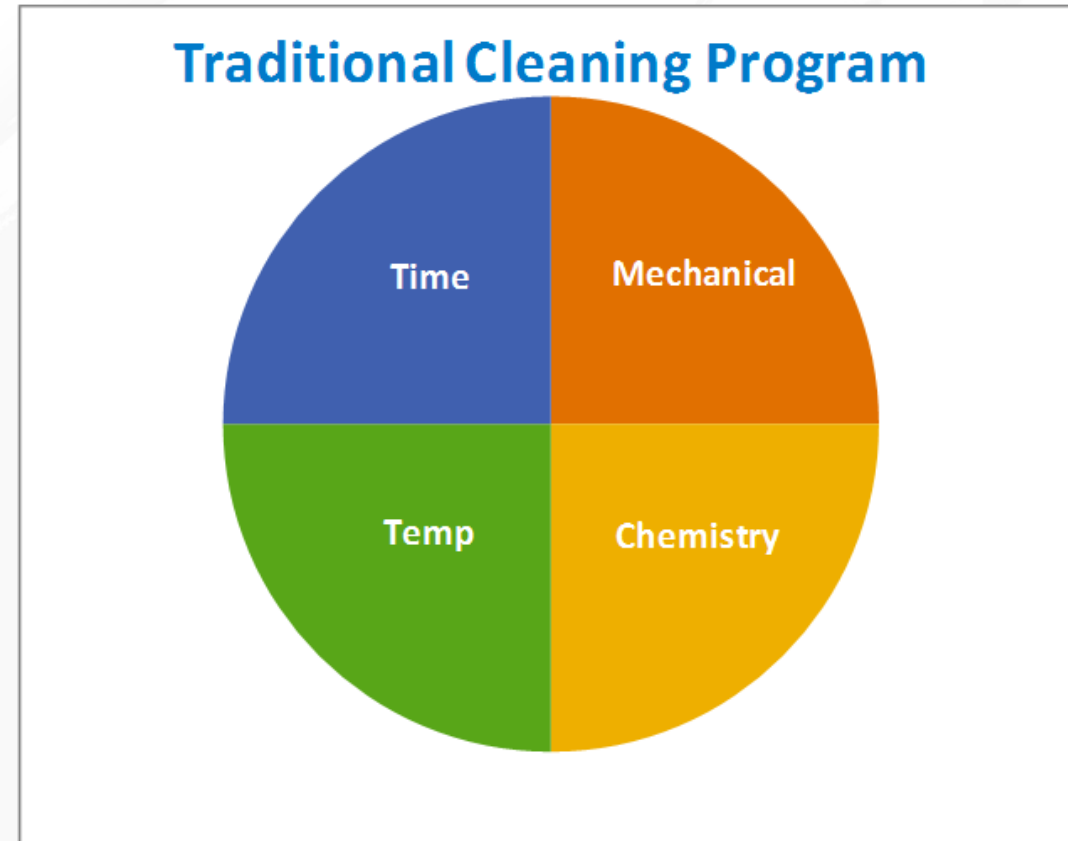
# Four Factors of Cleaning – Time

- Chemistry (type & concentration)
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# Four Factors of Cleaning – Mechanical Force

- Chemistry (type & concentration)
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# Mechanical – Manual Cleaning

Mechanical

**FOAM**



**SPRAY**



**HAND WASH**



pH range: 2-12

Rinse: 120-140°F

Foam and spray: Ambient temperature

Hand wash: Ambient – 120°F

# Mechanical Action Cleaning

Mechanical

## CIP Clean In Place



- ▲ pH range 1-13
- ▲ Max temp 180°F
- ▲ Low foam

## COP Clean Out Of Place



- ▲ pH range 2-12
- ▲ Max temp 140°F

## ASC Automated Surface Cleaning

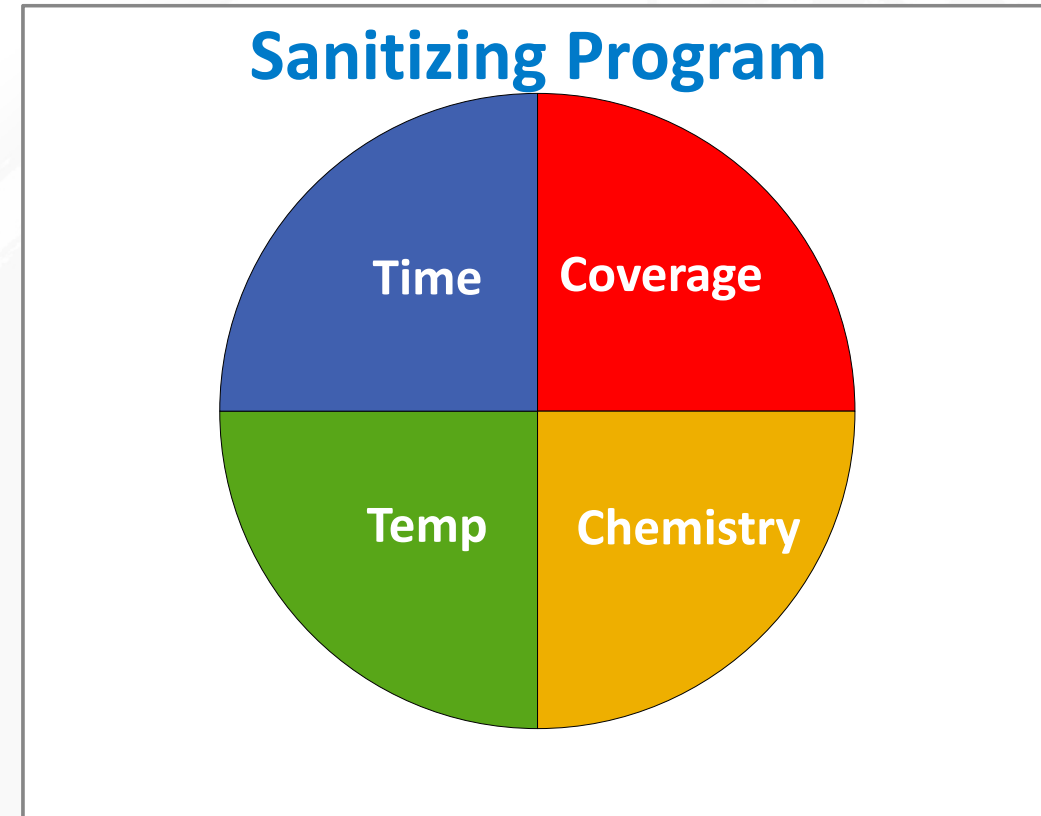


- ▲ pH range 2-12
- ▲ Max temp 130°F

Max temperature based on employee exposure and equipment compatibility

# Four Factors of Sanitizing

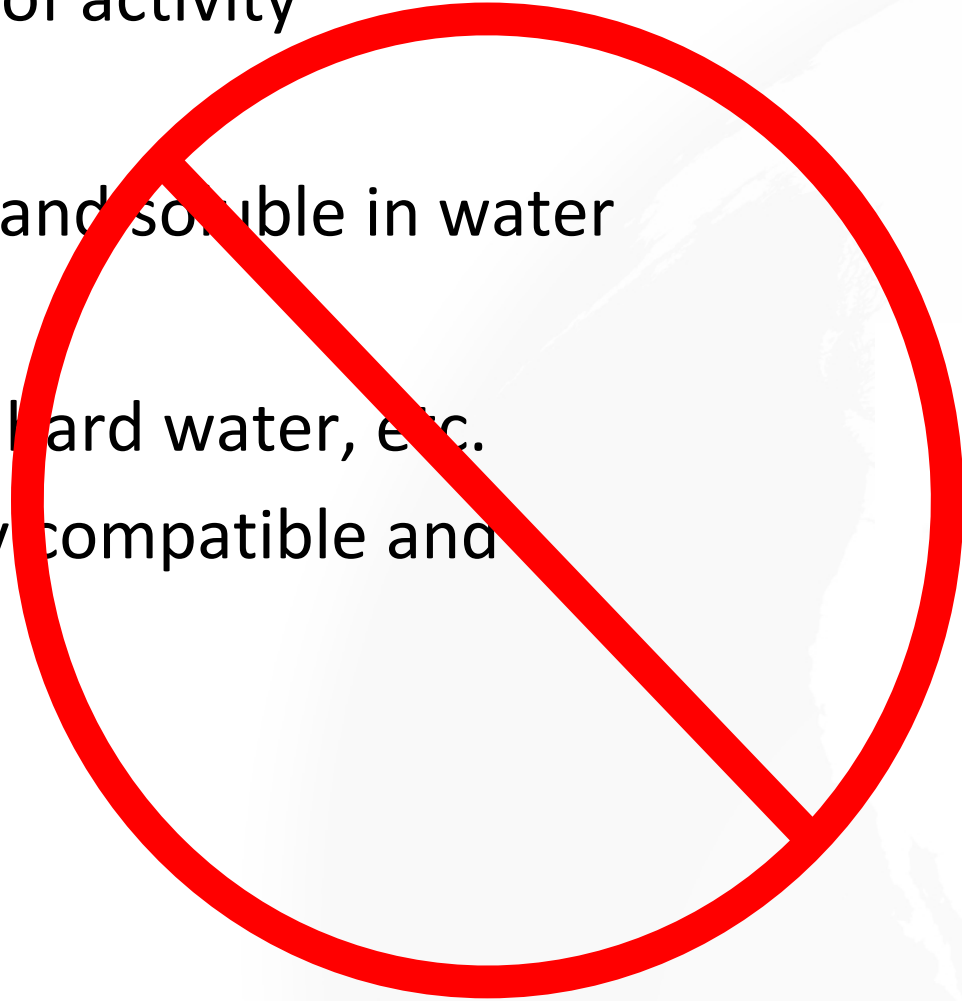
- Chemistry (type & concentration)
  - Proper sanitizer and concentration for the job
  - Water quality, material compatibility, label claims
- Temperature
  - Necessary for proper performance (within a range)
- Time
  - Allow enough time to perform “kill”
- Coverage
  - Complete coverage of surface areas to reduce micro levels



**Coverage! Coverage! Coverage! Coverage!**

# The Perfect Sanitizer Doesn't Exist

- Broad spectrum of activity
- Rapid Kill
- Easily prepared and soluble in water
- Stable
- Tolerant of soil, hard water, etc.
- Environmentally compatible and non-toxic
- Noncorrosive
- Economical
- Safe to use





# What a Sanitizer is/does

- Reduce microbial contamination to a safe level
- Two Types:
  - No rinse food contact surface sanitizer
    - Approved for incidental food contact
    - Must be adequately drained from the surface
  - Non-food contact surface sanitizer
- Usage restrictions:
  - Only prepare in potable water
  - Do not reuse for sanitizing (prepare fresh)
  - Use the accurate concentration
    - Below = Questionable efficacy
    - Above = Violate regulatory approvals

A Sanitizer

**Does Not**

Sterilize

&

Disinfect

**Does**

Reduce

contamination to  
safe level

&

Surface sanitizer  
kills 5 logs in 30  
seconds at 25 C

# Sanitizers - Follow directions!

## **DIRECTIONS FOR USE:**

**It is a violation of Federal law to use this product in a manner inconsistent with its labeling.**

- Be sure to read the label carefully and follow the Directions for Use
- Contact your product supplier if you have ANY questions

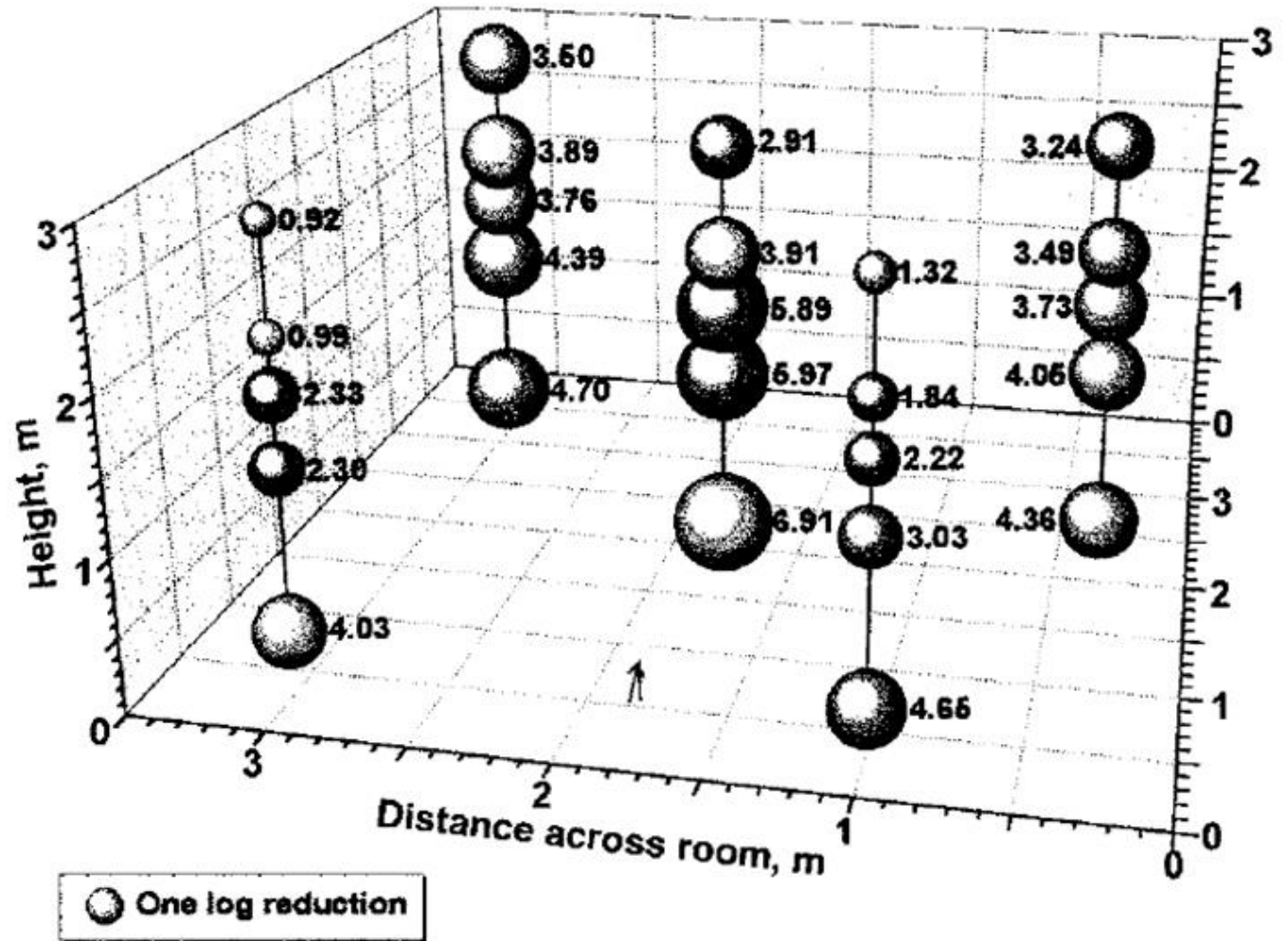
# Methods of Sanitizer Application

Method	Time	Concentration	Initial Challenge	Survivor/ml
Wet Spray	2 min	200 ppm	$5.3 \times 10^6$	<10
		400 ppm	$5.3 \times 10^6$	<10
Foaming	2 min	600 ppm	$3.0 \times 10^4$	<10
		1200 ppm	$3.0 \times 10^4$	<10
Fogging	30 min	1200 ppm	$3.0 \times 10^4$	$3.0 \times 10^3$ - $1.2 \times 10^4$

QAC *S. aureus* ATCC 6538, on stainless steel

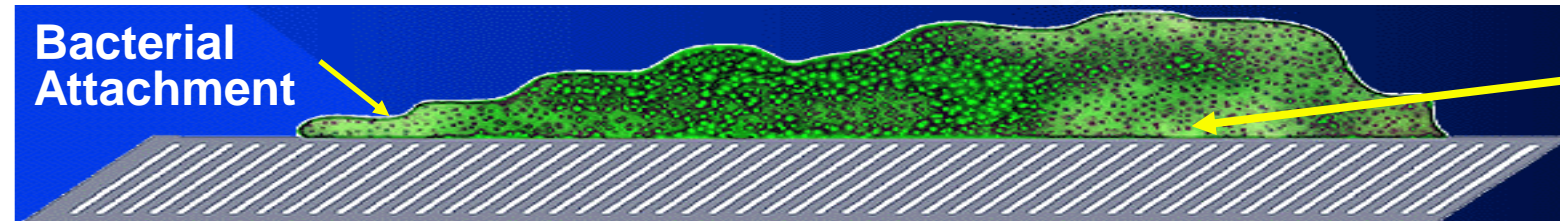
# Fogging

- Not for vertical surfaces or undersides of equipment
- Non-specific approach to a food safety issue

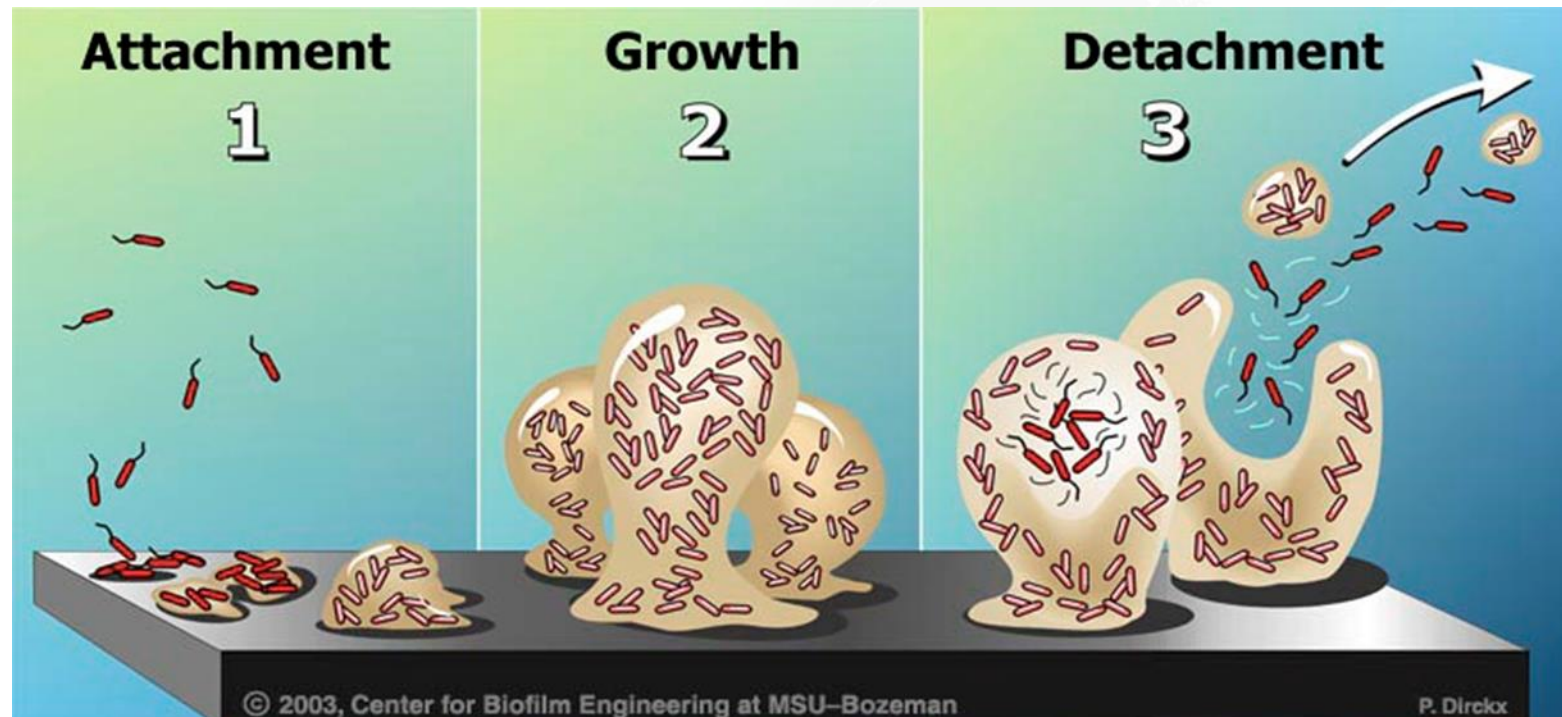


# Biofilm – The Science

A thin layer of growing microorganisms adhering to the surface of a structure which may be organic and/or inorganic, together with the polymers they secrete.



Nutrients and Bacteria are trapped



# Biofilm – The Practical

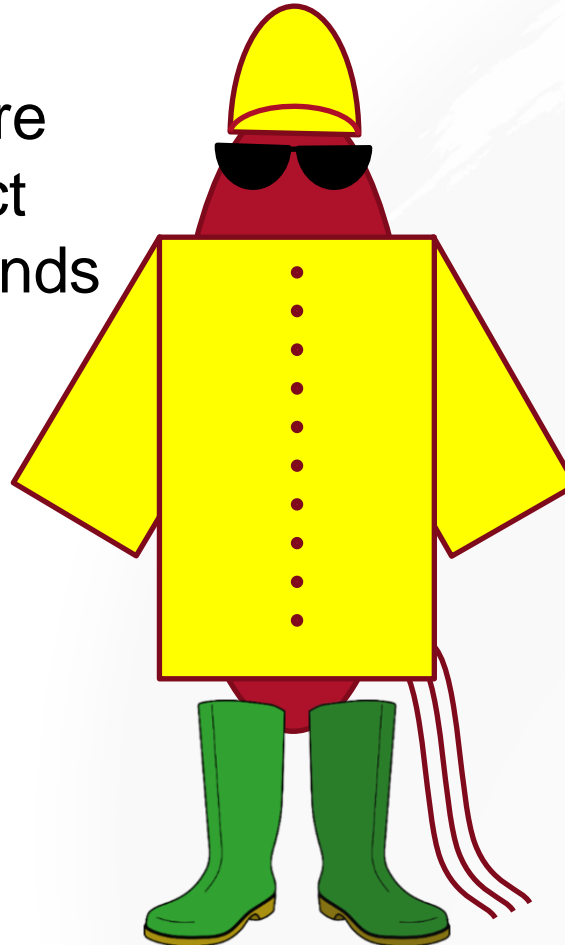
Biofilm is a bacteria's personal protection equipment!

Protects from chemical exposure

- Shields from chemical contact
- Inactivates chemical compounds

Insulates from heat exposure

Helps bacteria remain viable

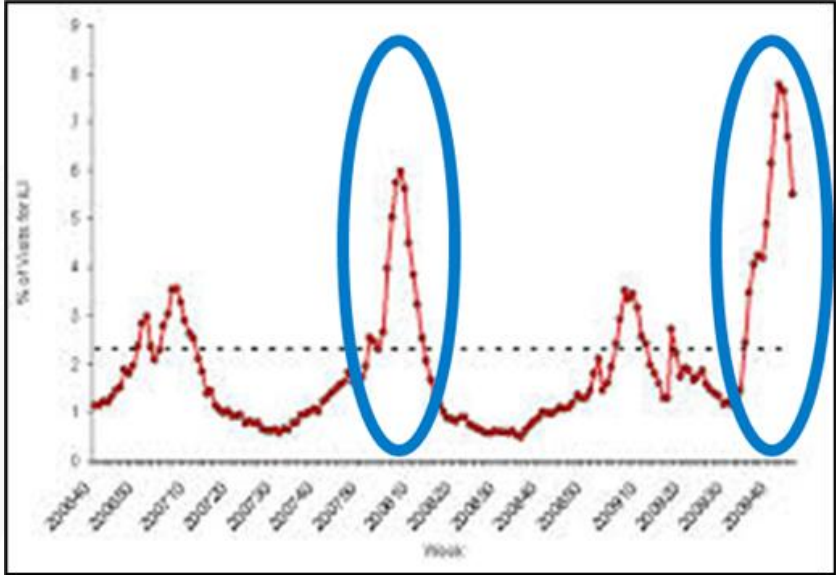
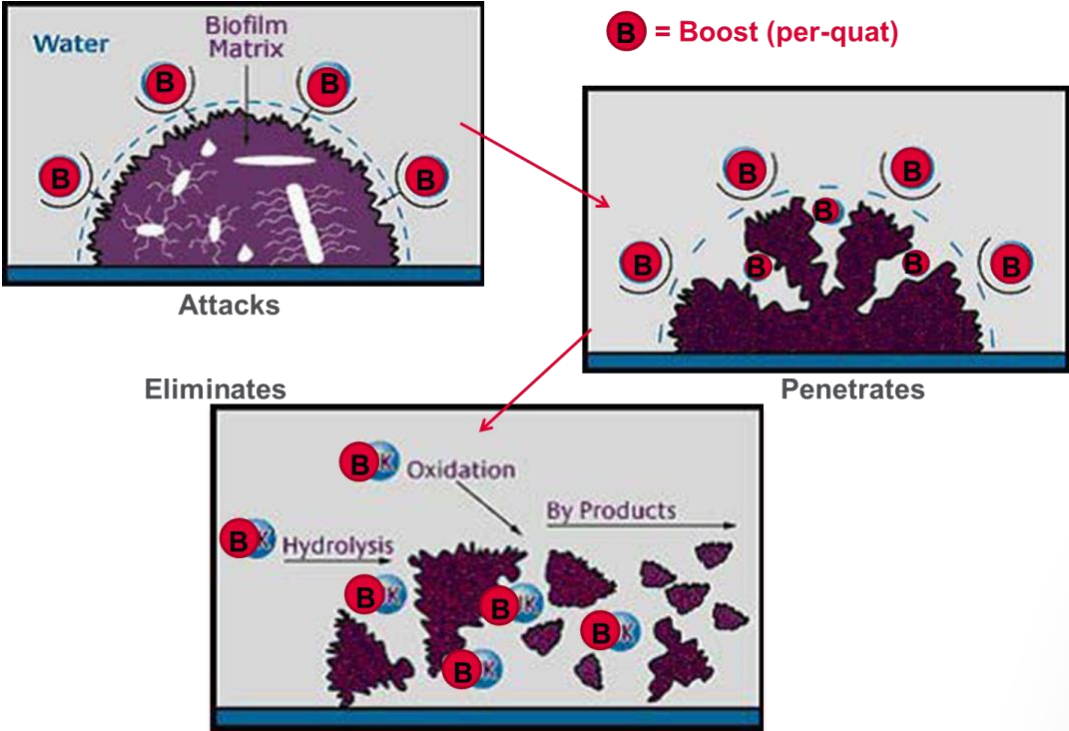


Helps resist physical removal

- Aids in attachment
- Unifies colony

Protects from dehydration

# Treatment of Biofilms



**Things may get WORSE!**

As a biofilm is lysed open, biofilm organisms are released and can result in environmental counts that are higher than before use if not rinsed thoroughly.

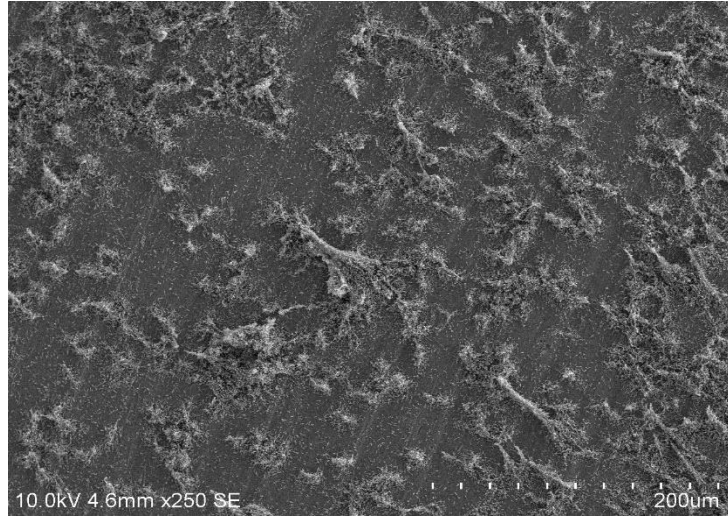
# Best Practices Targeting Biofilms

- Disinfect Zones 1 – 3
  - Zone 1: Product contact surfaces
  - Zone 2: Non-product contact surfaces close to Zone 1
  - Zone 3: Non-product contact surfaces in processing area
- Follow written procedures
  - What is available works if applied correctly
- Use a peroxide based cleaner, disinfectant, or sanitizer
  - PAA boosted caustic cleaner
  - Hydrogen peroxide followed by caustic (CIP)
  - Hydrogen peroxide and quaternary ammonium (PerQuat)
  - PAA

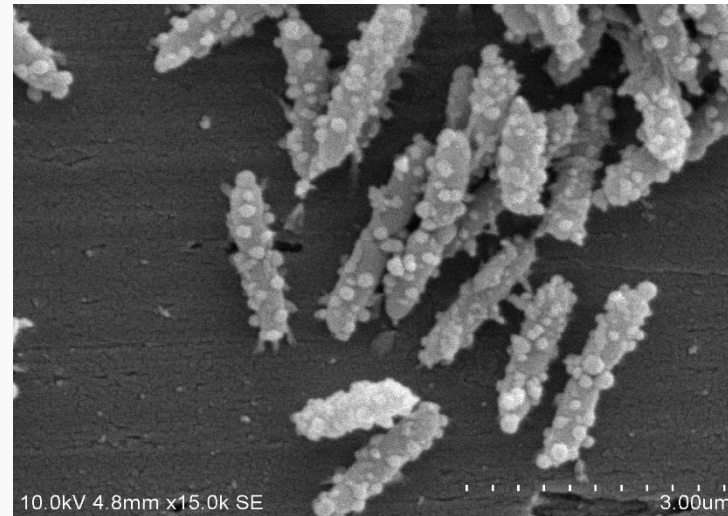
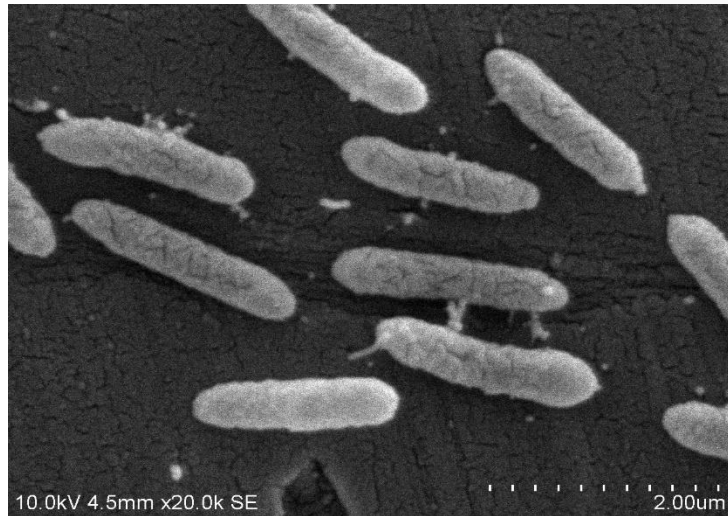
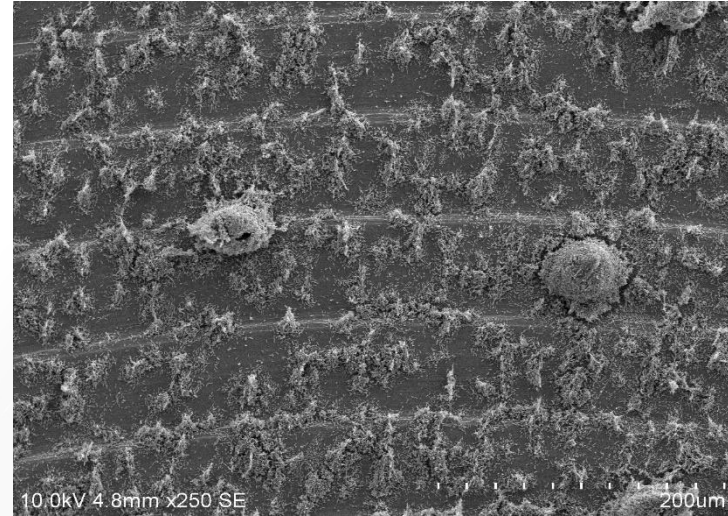


# PAA biofilm treatment

No Treatment

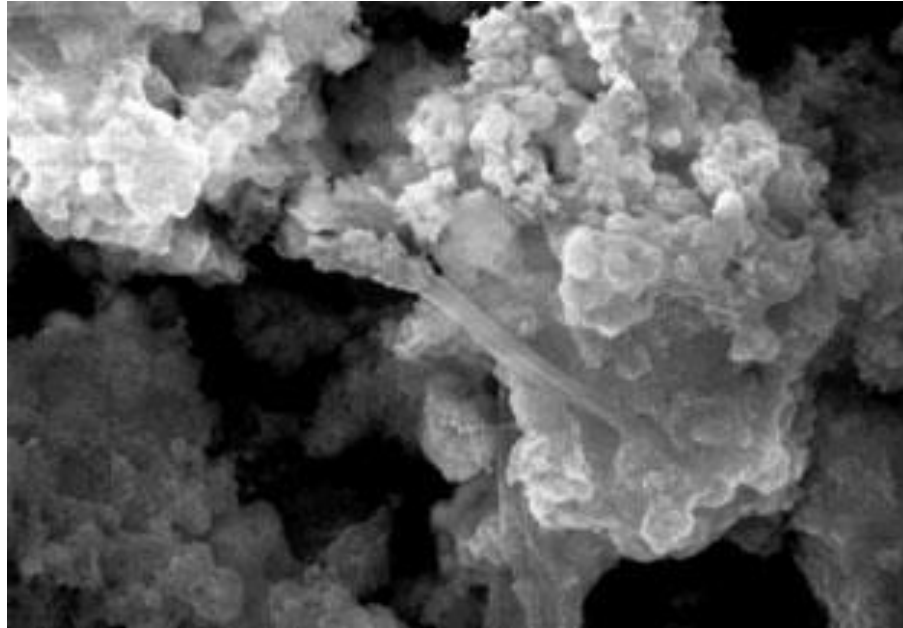


1950 ppm Peroxyacetic acid

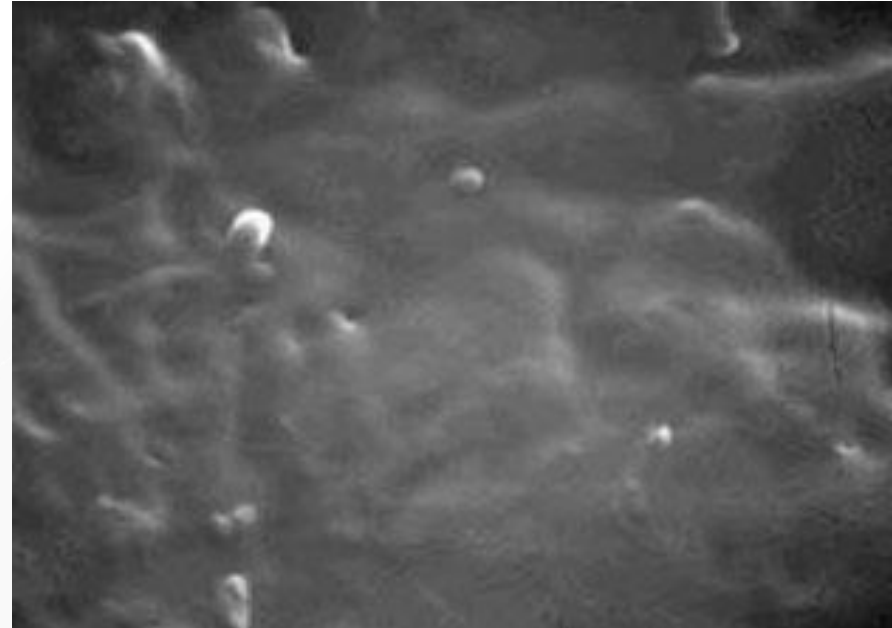


# Effective Treatment of Biofilms

View of effectiveness with Boost 3200/3201



BEFORE



AFTER

“Results showed that the formulation was 100 percent effective, providing total kill and more than 90 percent biofilm removal. This disinfectant is **more effective than currently used disinfectants** in reducing *L. monocytogenes* biofilm growth, thus minimizing the risk of pathogenic contamination.”<sup>1</sup>

<sup>1</sup> “Biofilms Have a New Foil”. USDA-ARS press release, <http://www.ars.usda.gov/is/AR/archive/oct09/biofilms1009.htm>, October, 2009.

# Transient



- Removed during sanitation
- Source usually plant traffic

# Persistent Biofilm is source



- Reoccurring (daily, monthly, or yearly)
- Need enhanced sanitation to remove
- Trackable through the plant
- Source usually a harborage point

# Bacterial persistence

Conclusion from the current available data

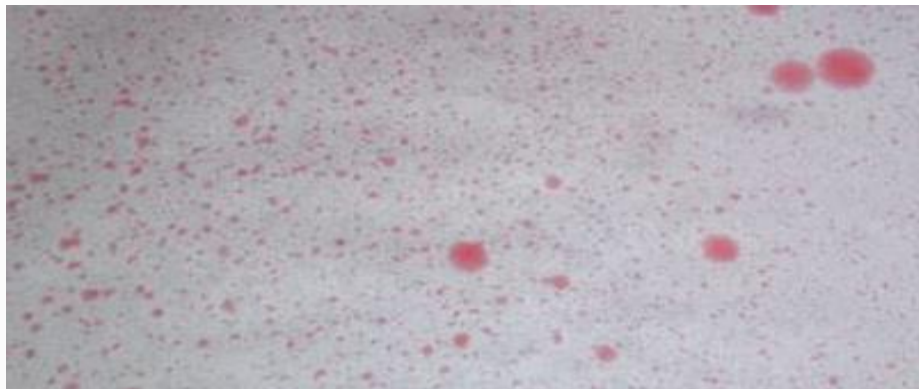
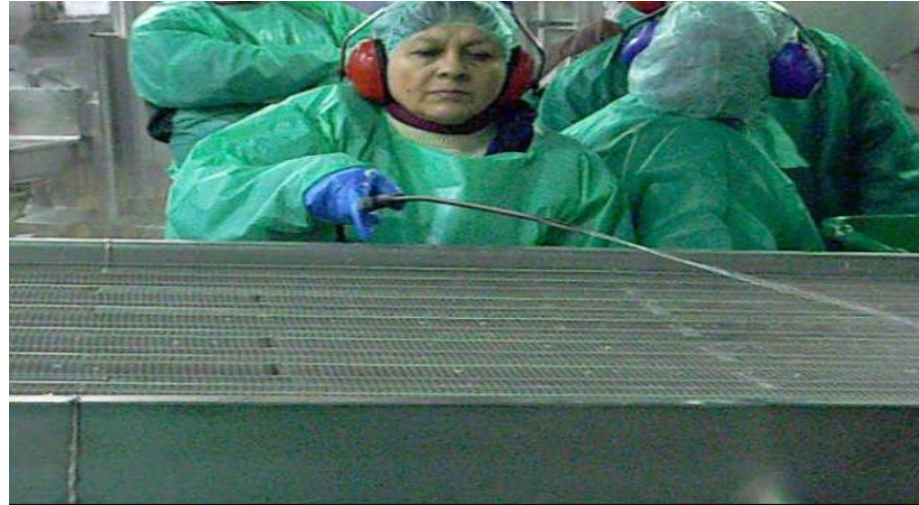
Poor Sanitation + Poor Sanitary Design = *Listeria* persistence

## Listeria Control Equation



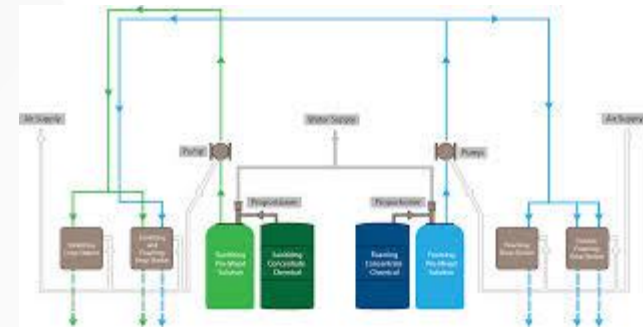
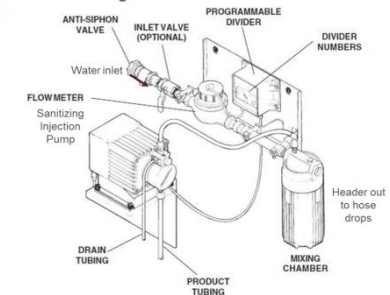
# Equipment – Pump-up Sprayer

- Too low volume for proper coverage
- Don't hold up to rigors of the industry



# Equipment – Central System

- Centralized injection system accurately pre-dilutes chemistry and supplies it to sanitation hose drops throughout the department
- Also available for filling hand dips, and other equipment dips
- Available on demand during production
- Less variability in no rinse concentrations
- Only one system to verify from a documentation standpoint – helps with audit readiness
- Eliminates overages in no rinse sanitizer applications
- Much more effective and efficient than pump-up sprayers, tank or wall units



# Equipment – Doorway Sanitizing

- Spray or foam applications
- Foam quality is critical
- Replenishing sanitizer is important for effective treatment



- Dry powders
- Water activated
- Replenishing sanitizer is important for effective treatment



# Summary

- Four Factors of Cleaning
- Sanitizers
- Biofilms and Bacterial Persistence
- Equipment