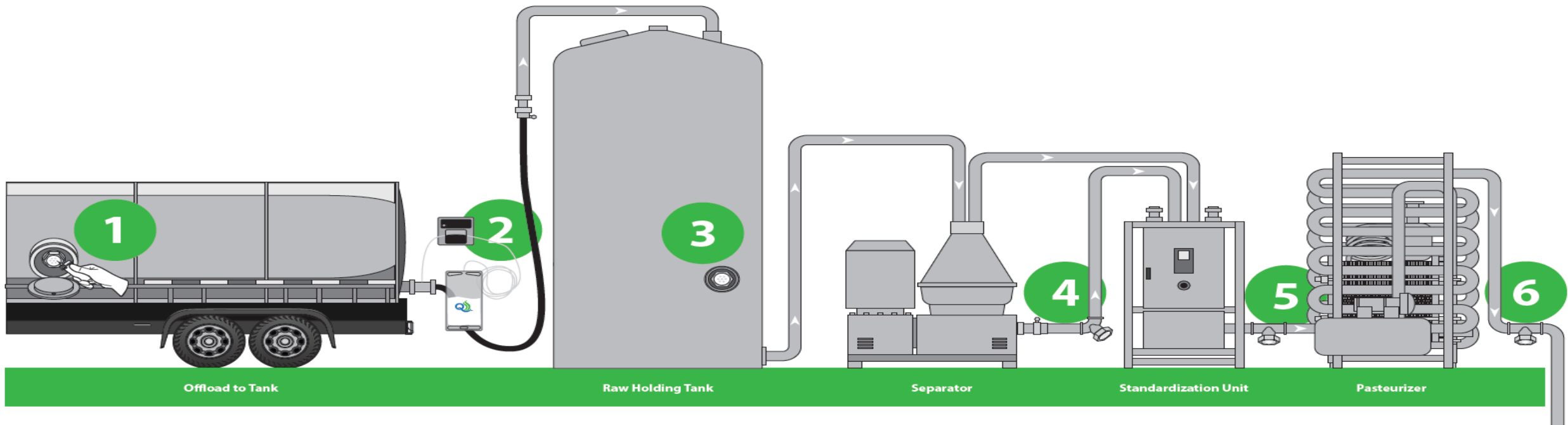


IN-PROCESS MONITORING

Proactive Approach to Achieving Product Quality



GOAL FOR PRESENTATION



Goal: Produce contamination free and quality dairy products



Topics:

1. Process monitoring bacterial risks
2. Inline contamination case studies
3. Practical tools to identify risks
4. Manage in-process & environmental data

BACTERIAL HAZARDS IN DAIRY



POLISHED STAINLESS STEEL



**PSEUDOMONAS GROWING ON
POLISHED STAINLESS STEEL**

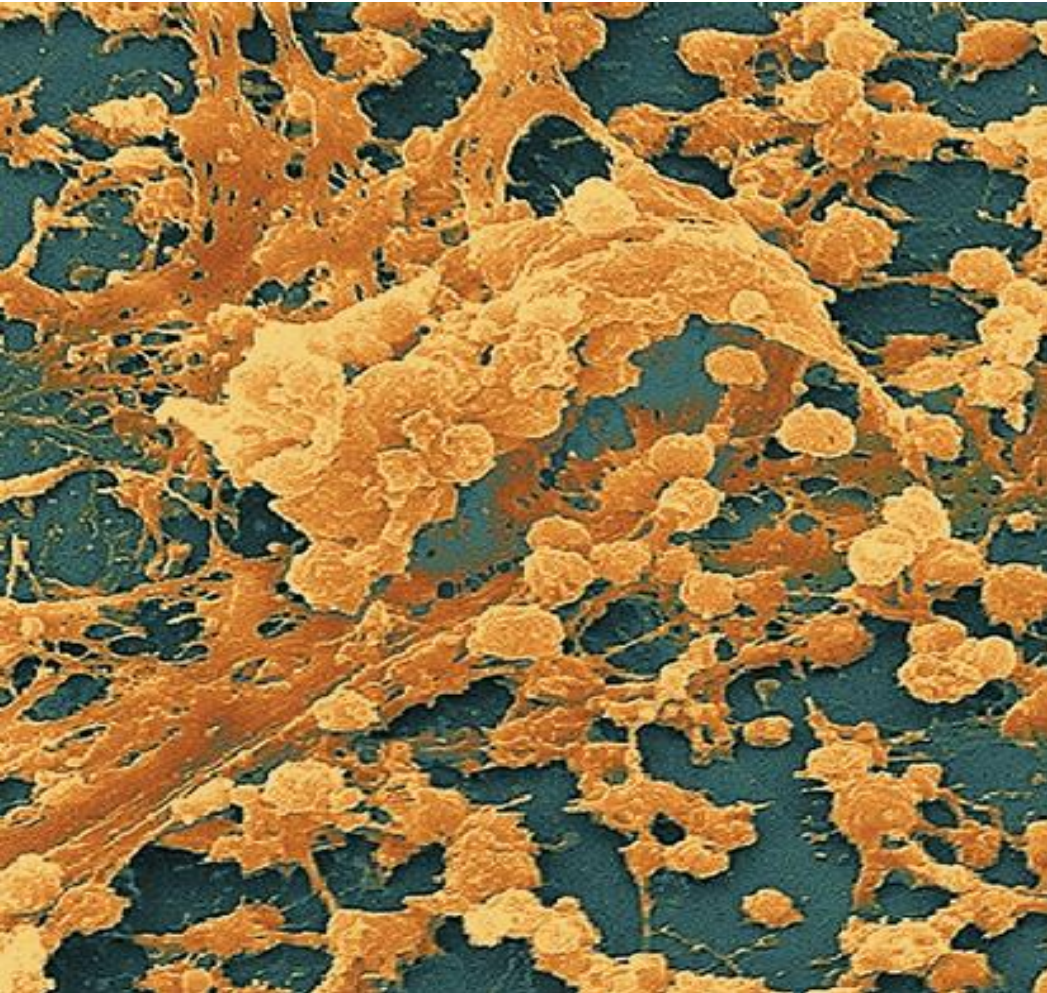
PATHOGENS (HARMFUL)

- Salmonella
- Yersinia
- Shigella
- Listeria
- Coliforms (pathogenic strains)
- Campylobacter
- Staphylococcus

SPOILAGE (SHELF-LIFE)

- Bacillus
- Paenibacillus
- Gram-positive
- Gram-negative

HOW DO WE IDENTIFY BACTERIAL ISSUES?



1. Raw milk quality
 - Psychotrophic bacteria or gram-positive bacteria (survive pasteurization)
2. Process sanitation & hygiene
 - Equipment design, dairy handling equipment & proper Clean in Place (CIP)
 - Biofilm detection
3. Post pasteurization contamination
 - Gram-negative bacteria (majority do not survive pasteurization)

PPC VS RAW MILK QUALITY SPOILAGE



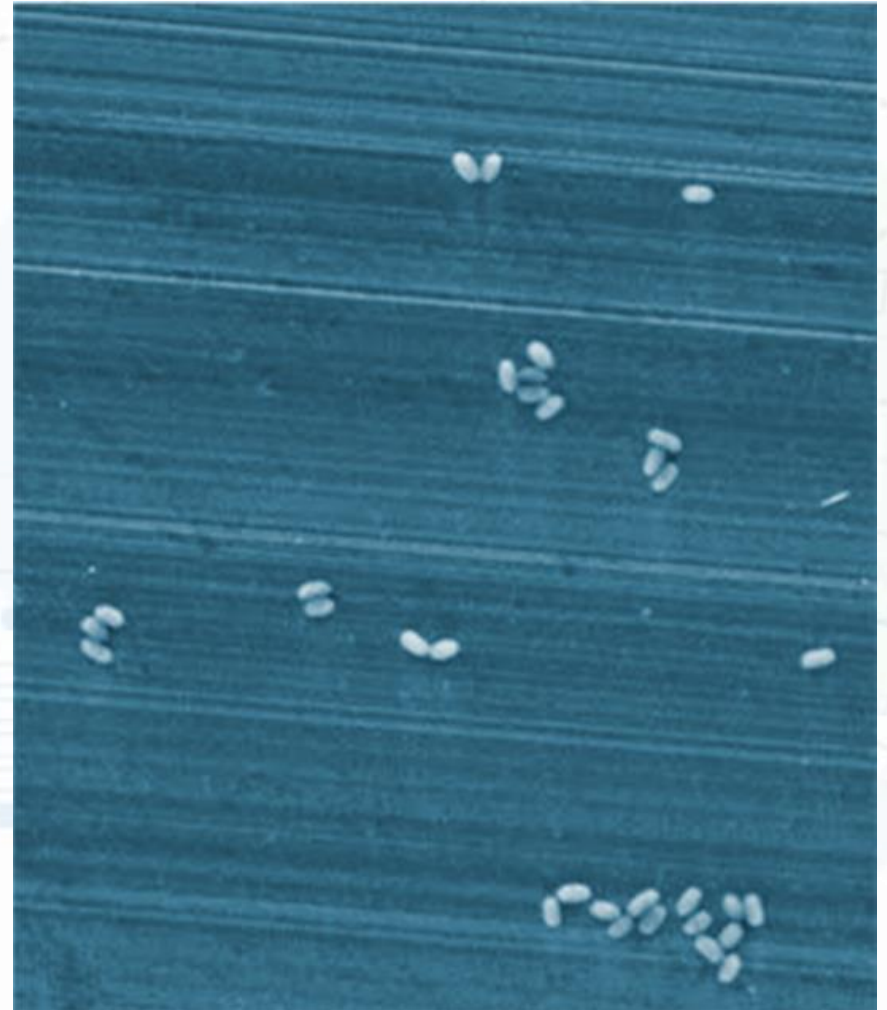
Post-Pasteurization Contamination:		Heat-Resistant Psychrotrophs:
Gram-Negative Spoilage 10-14 days		Gram-Positive Spoilage 18+ days

WHAT ARE YOU TESTING FOR IN YOUR PROCESS?



WHAT IS POST-PASTEURIZATION CONTAMINATION?

- Two risks: spoilage & food safety
- Psychrotrophic spoilage (grow at low temperatures)
- Gram-negative rods indicate post-pasteurization contamination
- What tests?
 - Coliform
 - SPC
 - Stress test for gram negatives

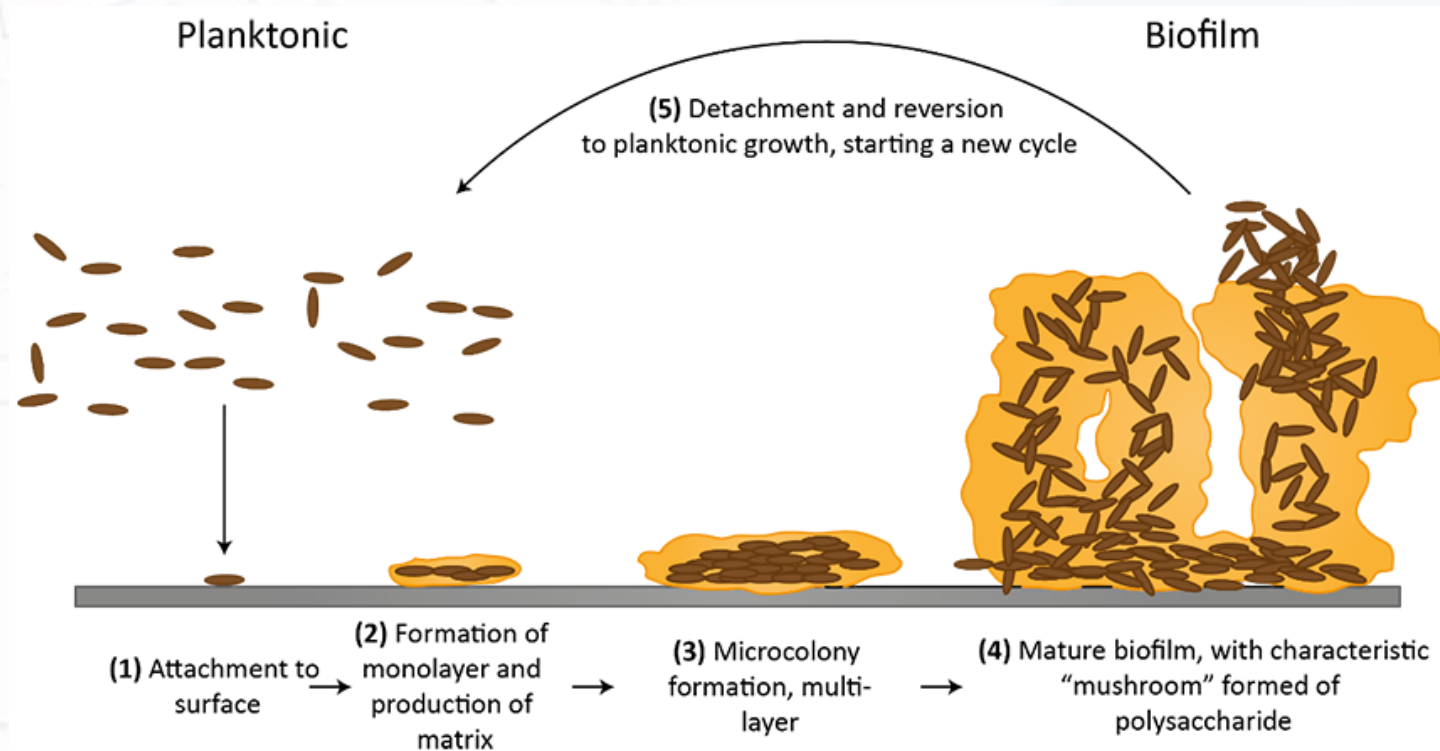


CASE STUDY: POST PASTEURIZATION



- Issue:
 - Fluid milk dairy plant had spotty premature spoilage
 - Gram-negative bacteria
- Test:
 - Aseptic sampling before & after HTST
 - Verified cracks and pinholes in cooling section of HTST plates
 - Glycol contaminated with the same spoilage bacteria found in milk samples
- Solution:
 - Replaced HTST plates
 - Daily sampling to prevent future occurrence

WHAT ARE BIOFILMS?



(Image courtesy of [British Society for Immunology](#))

WHERE ARE BIOFILMS?

- Silos are common sources for biofilms
- Others include farm bulk tanks and tanker trucks
- Common issues:
 - Survive pasteurization
 - Gram positive
 - Heat-resistant psychrotrophic
 - Gram-negative or psychrotrophic bacteria can grow at refrigeration temperatures



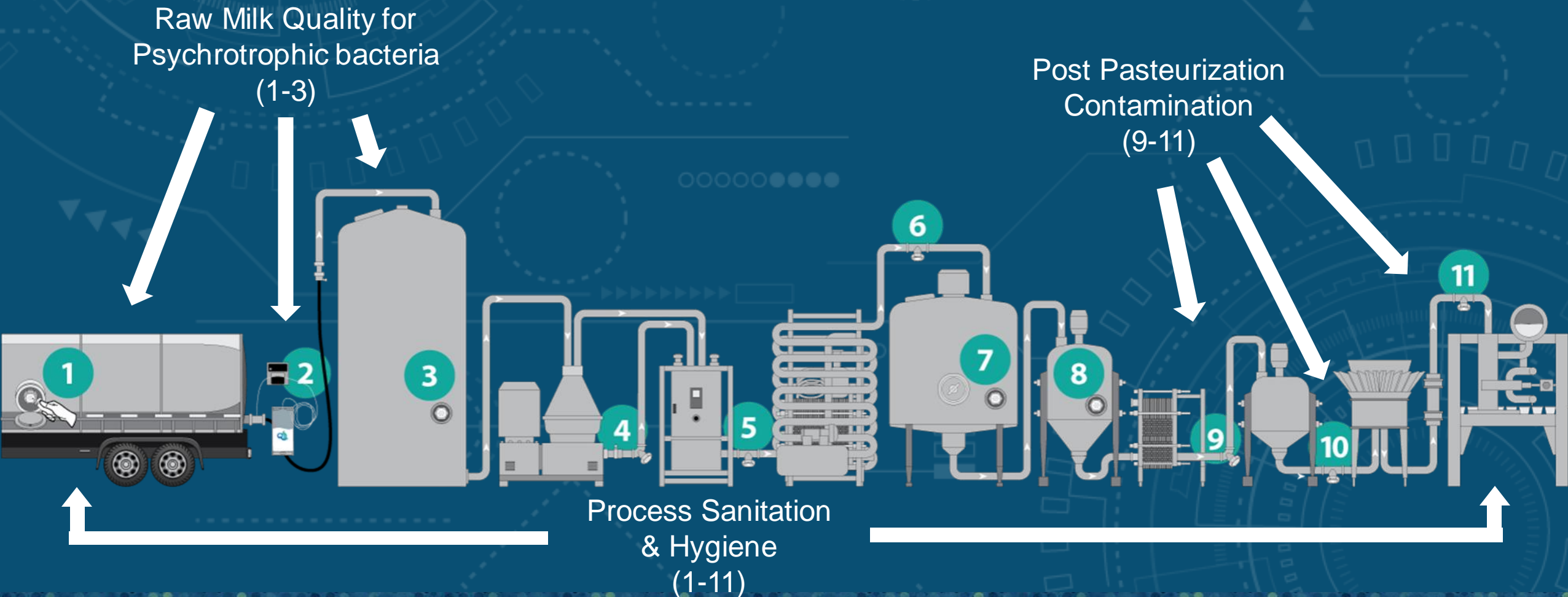


CASE STUDY: SILO SAMPLING



- Issue:
 - Ice cream mix plant had 20 day shelf life
- Test:
 - Lab pasteurized counts (PLC) on tankers and raw silos
 - Heat resistant psychotrophic bacteria from farm bulk tanks, tankers and plant silos
- Solutions:
 - Implemented strict cleaning procedures
 - Daily indicator sampling

WHERE TO MONITOR YOUR PROCESS



HOW TO PREVENT INLINE CONTAMINATION?

- Evaluate your HACCP plan
 - Managing raw milk quality
 - Sanitation & equipment checks
 - Post pasteurization contamination
- Data Management
 - Sterile equipment
 - Aseptic procedures
 - Representative data



ASEPTIC VS. SANITARY

ASEPTIC

- Free from bacteria, viruses, or other microorganisms

SANITARY

- Conditions that affect hygiene and health, hygienic and clean

Your test result is only as accurate as your sample



ENVIRONMENTAL DATA

- What is it designed to find?
- How does it improve product quality?
- How is your team involved?

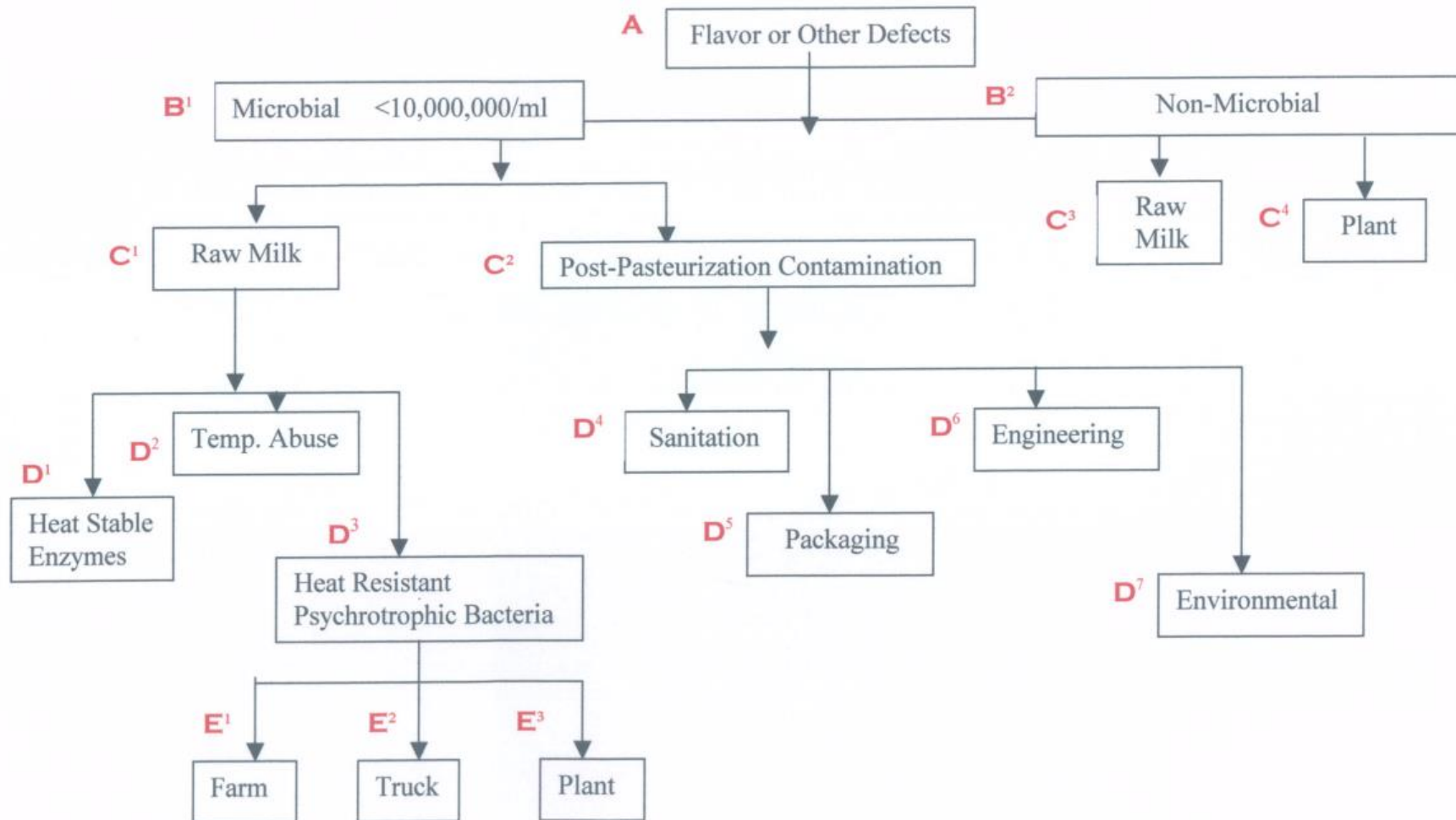
LAYERING INLINE & ENVIRONMENTAL SAMPLING

- Trend data
 - Zone 1 & 2 to inline critical control points (CCPs)
 - Consider regular spores, coliforms & LPCs
 - Monthly deep dive test for gram negatives
- Operations & Quality work together
 - Review results
 - Identify improvements

If you cannot measure contamination accurately, you cannot control it

Contact Sales@QualiTru.com

IV. Quality Factors To Achieve Objective: Improve Shelf-life of Pasteurized Fluid Milk:



TAKE AWAYS

- Process monitoring includes
 - Raw milk quality
 - Process sanitation & hygiene
 - Biofilms & equipment defects
 - Post pasteurization contamination
- What are your Quality objectives?
 - Pathogens vs spoilage
 - Aseptic vs sanitary sampling
 - Layer Zone 1 & 2 to your CCPs





Contact
Sales@QualiTru.com