An Alternative Solution to Traditional Cleaning

Jennifer Braun, Technical Manager
U.S. Water Process Technologies
Overview of Traditional CIP

The 4 T’s when using a sodium hydroxide solution.

1. Time
2. Temperature (180° F maximum)
3. Turbidity
4. Titration (3-5% sodium hydroxide)

Rate of flow through the system
Acid Wash is Important

Most plants also utilize an acid wash step to for mash trains.
**The same rules apply here as well.**
CIP is Key to Efficiency

- **ENERGY**
  - Heat Transfer

- **YIELD**
  - Always looking for ways to improve

- **COSTS**
  - Less downtimes, less upsets, more profit
Benefits of Traditional CIP

- Reduces & Removes Organic Fouling (residual mash, fiber, biofilm from bacteria)
- Less Corrosive to Carbon Steel
- Readily Available = Commodity Based Pricing
Drawbacks of Traditional CIP

- Foaming Issues
- Must Add Spent CIP to the Process to Dispose
- Additional Sodium Added to Fermentation Process
- Reaction with CO2 in Fermentor Cleanings Reduces Potency
- Additional Testing for M and P Alkalinity can help determine potency
- No Known Bacterial Control Capabilities
Sodium & Yeast

- Only nutrient with no known nutritional benefit to fermentation
- Can cause osmotic stress
  - Difficult to pinpoint inhibition and toxicity levels because of other synergistic factors in fermentation
A New Solution

Utilize current CIP system

Iodine complex solution as replacement for traditional sodium hydroxide

ProClean 253 (Iodine complex & surfactant)

Improvement on the 4T system with higher temps

Iodine levels that are utilized are not inhibitory to yeast population but can inhibit bacterial populations
Alternative Cleaning Aid-- Same Principle

The 4 T’s when using a Iodine complex.

1. Time
2. Temperature (190° F target)
3. Turbidity
4. Titration (Target PPM of Iodine Complex)

Rate of flow through the system
Alternative CIP Solution Plant Trial

- Replaced 5% CIP solution with ProClean 253
- Kept acid wash step
- Utilized this solution for cleaning
  - Beer/mash exchangers and mash coolers
    - Kept the current acid wash step being used
  - Prop
  - All piping leading to fermentors
  - Fermentation vessels
Alternative CIP Solution Plant Trial Cont.

Ethanol Production

- 5% CIP
- ProClean 253
- 5% CIP post trial

Liquefaction solids  Ethanol at Drop
Alternative Solution… ProClean 253

Cleaning Solution comprised of an iodine complex and surfactant

- Can be used as post CIP rinse or as CIP replacement
- Can reduce residual soil after CIP
- Reduces the probability of contamination during the critical start-of-fill of propagators and fermentors
  - Can leave solution in the fermentors, lines and propagators
- Can inhibit the formation of mineral scales
- Low-foaming when applied correctly
- Will not harm S. cerevisiae when applied as directed
- Is concentrated for efficient handling, storage and shipment
How will this effect my current piping?

Will this change the color of the distillers grains?

Are there special permits need to store a concentrated iodine solution on site?
Thank you for your attention!

Questions?

Contact:
Jennifer Braun
jennifer.braun@uswaterservices.com
(P) 913-827-2528