Sanitation

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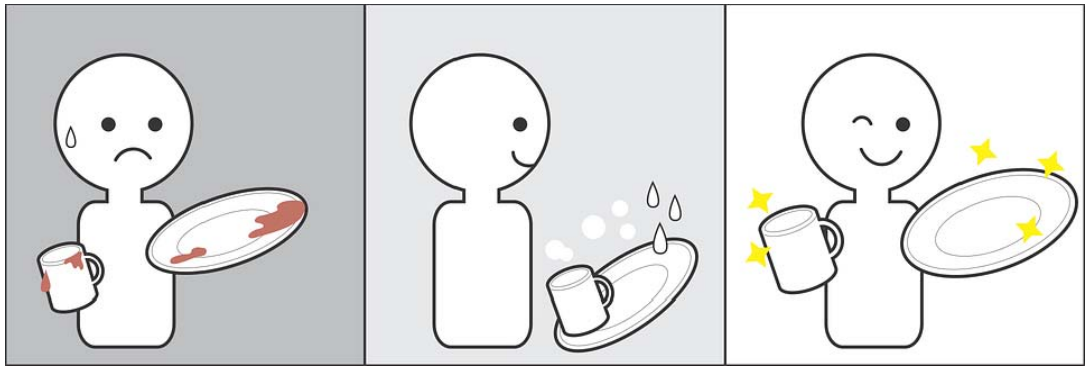
FOOD FROM THOUGHT

THE FOOD PROCESSING CENTER

INFUSE

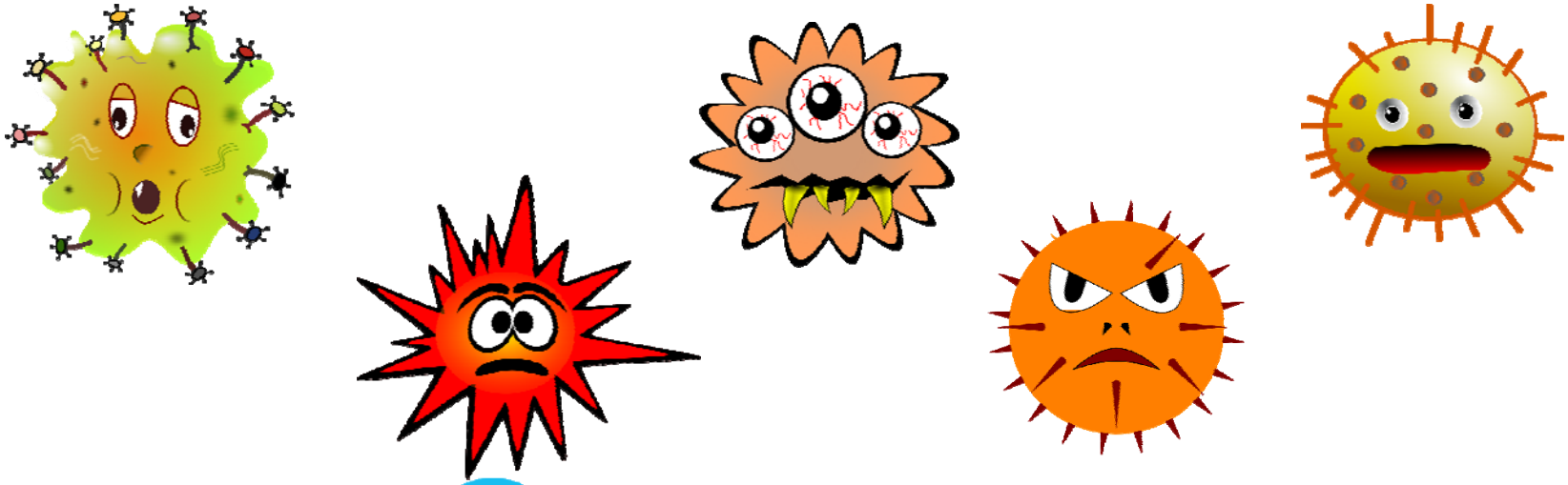
Sanitation

"Adequately treat food-contact surfaces by a process that is effective in destroying vegetative cells of microorganisms of public health significance, […] reducing numbers of other undesirable microorganisms, but without adversely affecting the product or its safety to the consumer."



Why Worry About Sanitation?

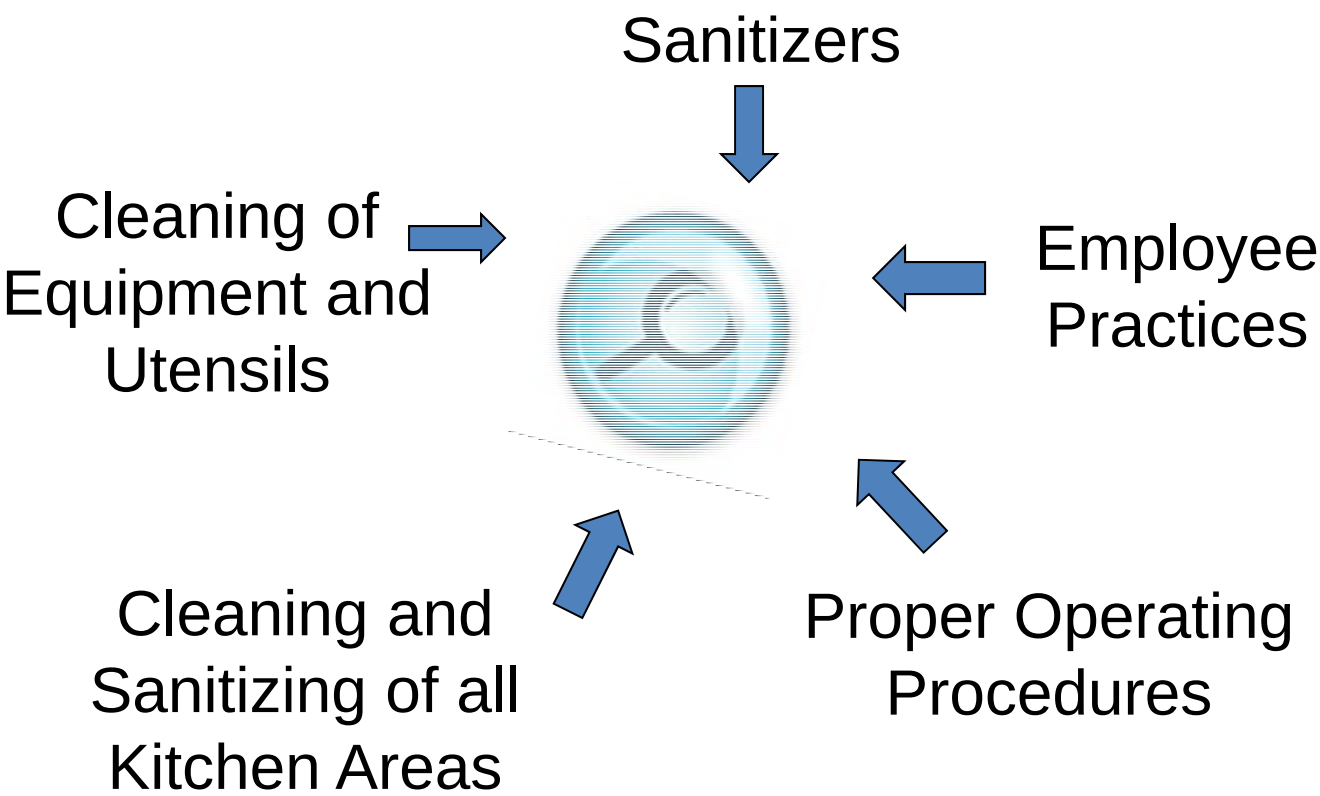
- Cooking processes are not designed to destroy an infinite number of microorganisms
- Steps must be included to minimize the number of microorganisms before thermal treatment is applied



Sources of Bacterial Contamination

- Raw products
- Equipment, appliances and utensils
- Employee handling
- Water
- Added ingredients

Sanitation Program



Sanitizing Starts with Cleaning…

- Cleaning – complete removal of food soil
- Sanitizing – reduce the microbial load to a level considered safe for public health
- Proper cleaning and sanitizing steps:
  1. Rinse
  2. Clean
  3. Rinse
  4. Sanitize

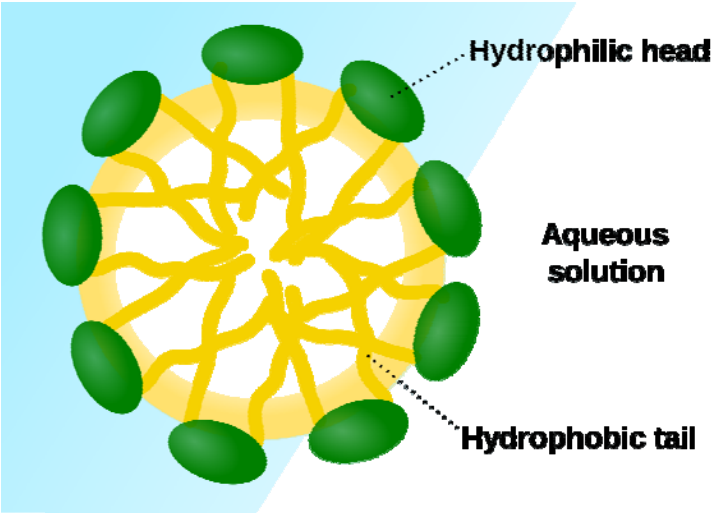
Cleaning

1. Rinse
   - Removes food particles on surfaces
   - Use warm water, NOT hot water
2. Clean
   - Remove carbohydrates, proteins, fats and mineral soils
   - Detergents: Penetrates soils to lift them from surface and wash away with water

<u>Cleaning Considerations:</u>
Type of soil present
Type of surface
Method available for cleaning

Cleaning Detergents

- Mixture of physically active and chemically active ingredients
- Physically active ingredients:
  - Surfactants
  - Have hydrophilic and hydrophobic components
  - Cleaning action: emulsification, penetration, spreading, foaming and wetting
- Chemically active ingredients:
  - Alkaline Builders: Saponify fats
  - Acid Builders: Prevention/removal of stone films



Finish Cleaning…then Sanitizing

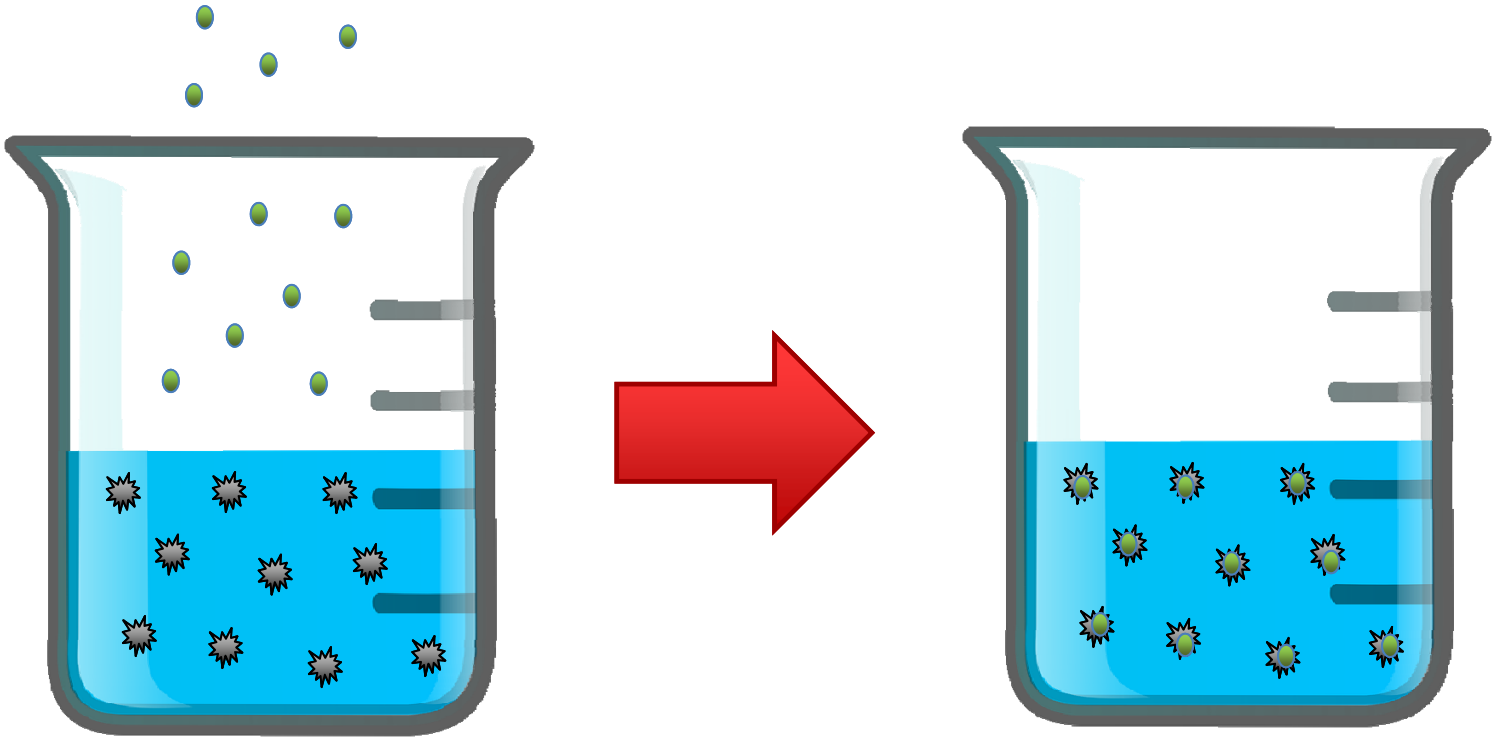
3. Rinse again
   - Use clean, hot water
   - Remove all detergent residue

4. Sanitize
   - Destroy disease causing microorganisms
   - Reduce microbial load to a level appropriate for public health

Types of Sanitizers

- Chlorine
- Iodophors (Iodine compounds)
- Quaternary Ammonium Compounds (QUATs)
- Others:
  - Peroxyacetic Acid
  - Ozone

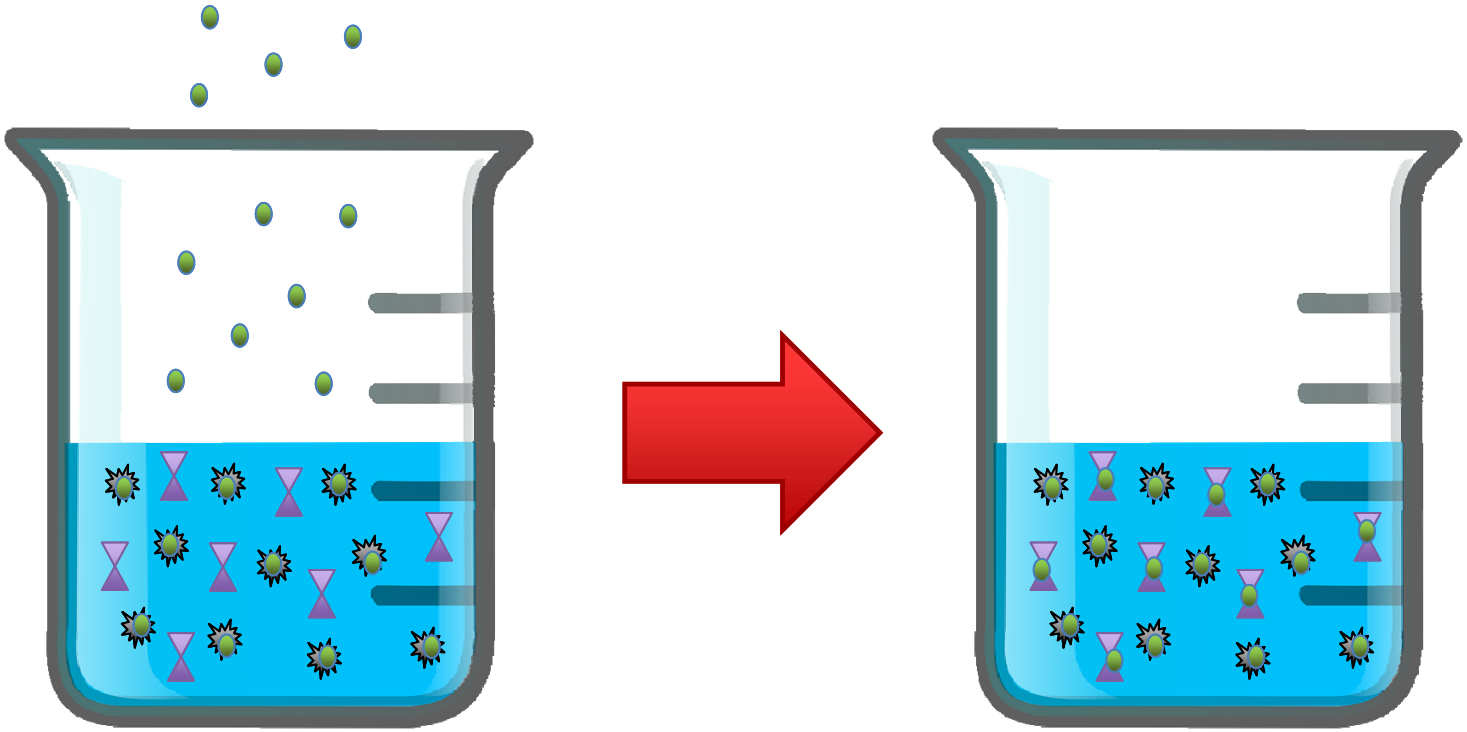
Chlorination Basics



Organic and
Inorganic Impurities

Chlorine Demand
Not effective for disinfection.

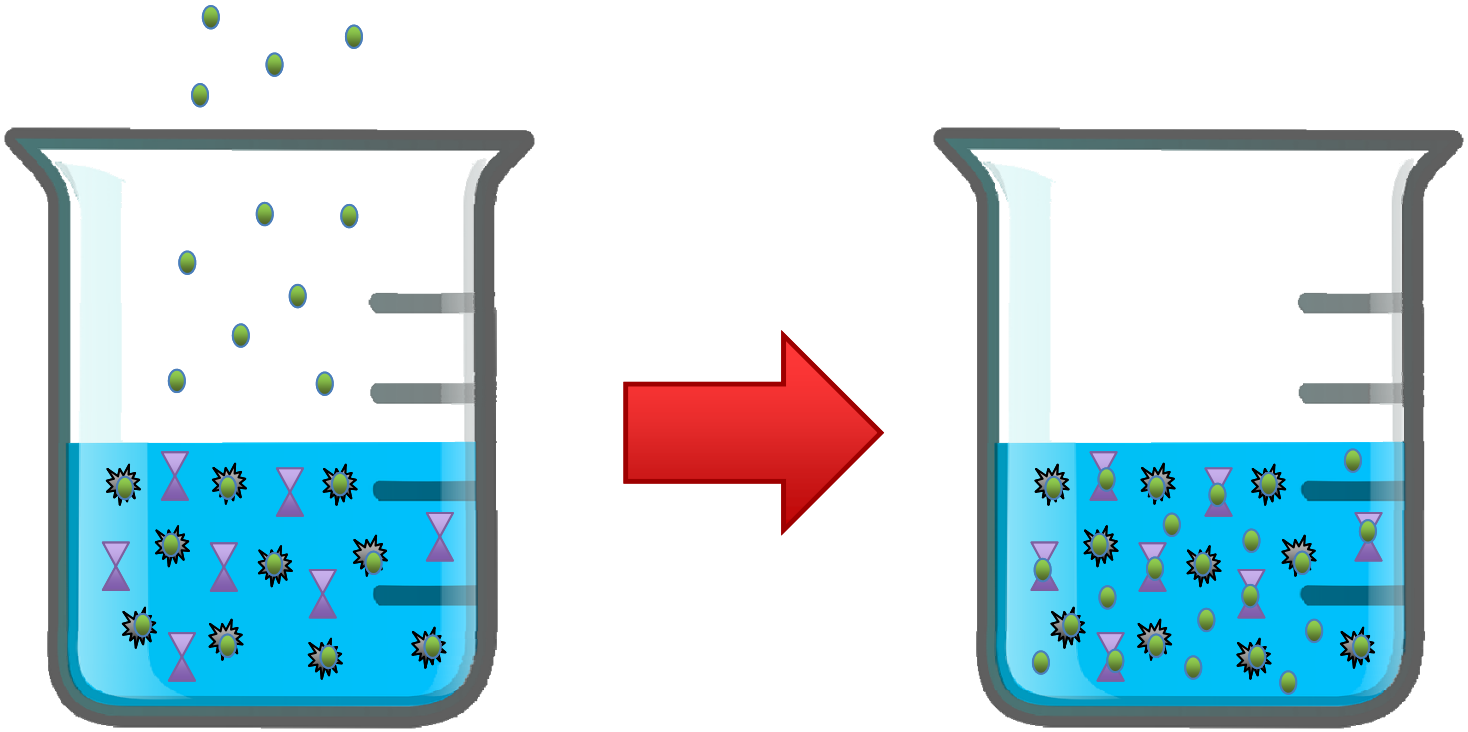
Chlorination Basics



Organic and Inorganic Nitrogen Compounds

“Combined Chlorine”
Not as effective for disinfection.

Chlorination Basics



“Free Chlorine”
Available for disinfection.

Chlorination Basics

Chlorine Added
Initial chlorine concentration added to water

Chlorine Demand
Reactions with organic and inorganic material, metals, other compounds present in water prior to disinfection

Total Chlorine
Remaining chlorine concentration after chlorine demand of water is met

Free Chlorine
Concentration of chlorine available for disinfection

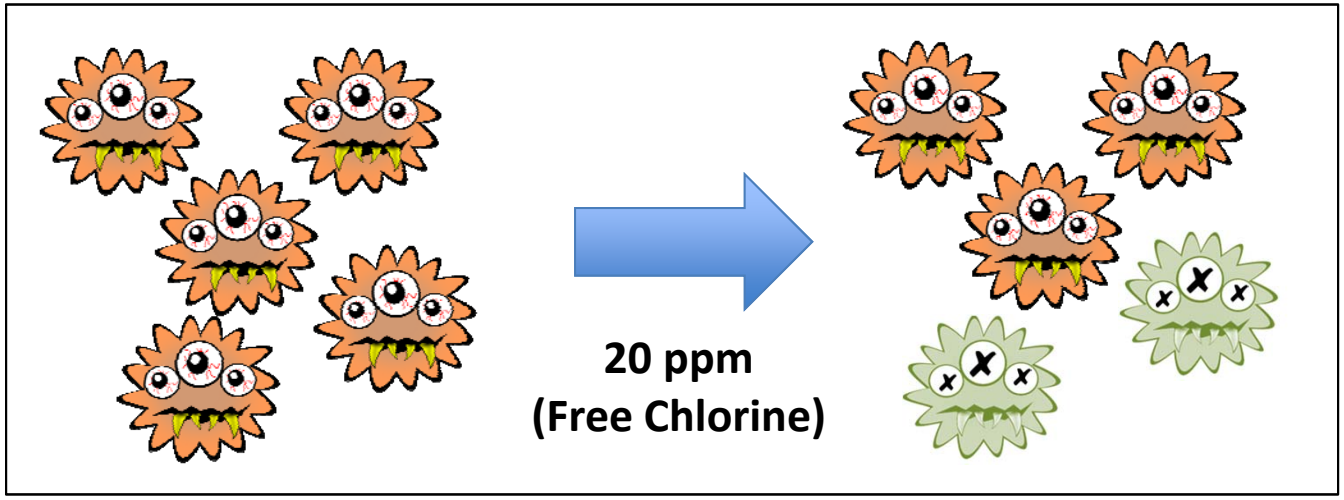
Combined Chlorine
Concentration of chlorine combined with organic and inorganic nitrogen compounds in the water. Not as effective for disinfection.

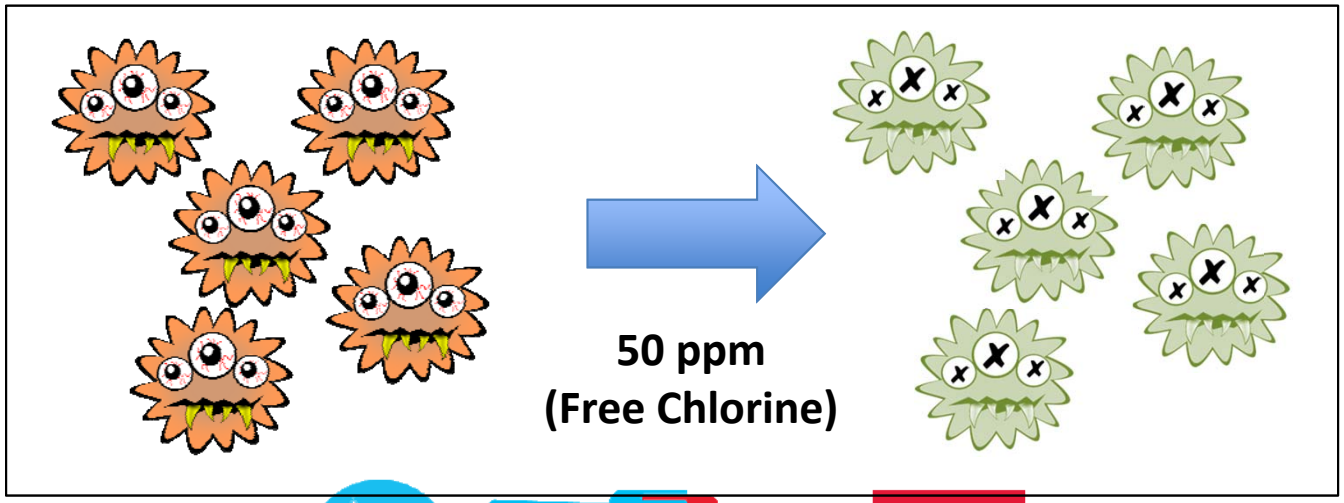
www.cdc.gov

Factors Affecting Chlorination Efficacy

- Chlorine concentration
- pH of the water
- Organic and inorganic matter
- Temperature of the water

Effect of Chlorine Concentration

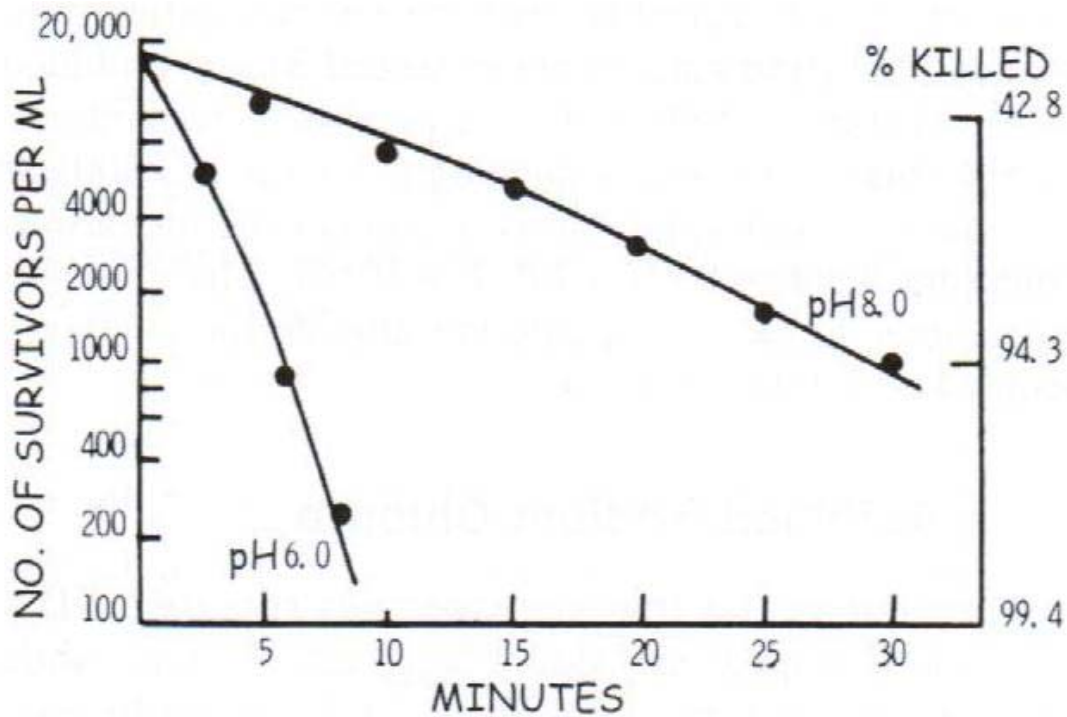




HEALTH DEPARTMENT INFUSE FOOD FROM THOUGHT

Effect of pH

The lower the pH, the faster the kill rate!



Reason: In acidic environment chlorine is in the form of hypochlorous acid (germicidal).

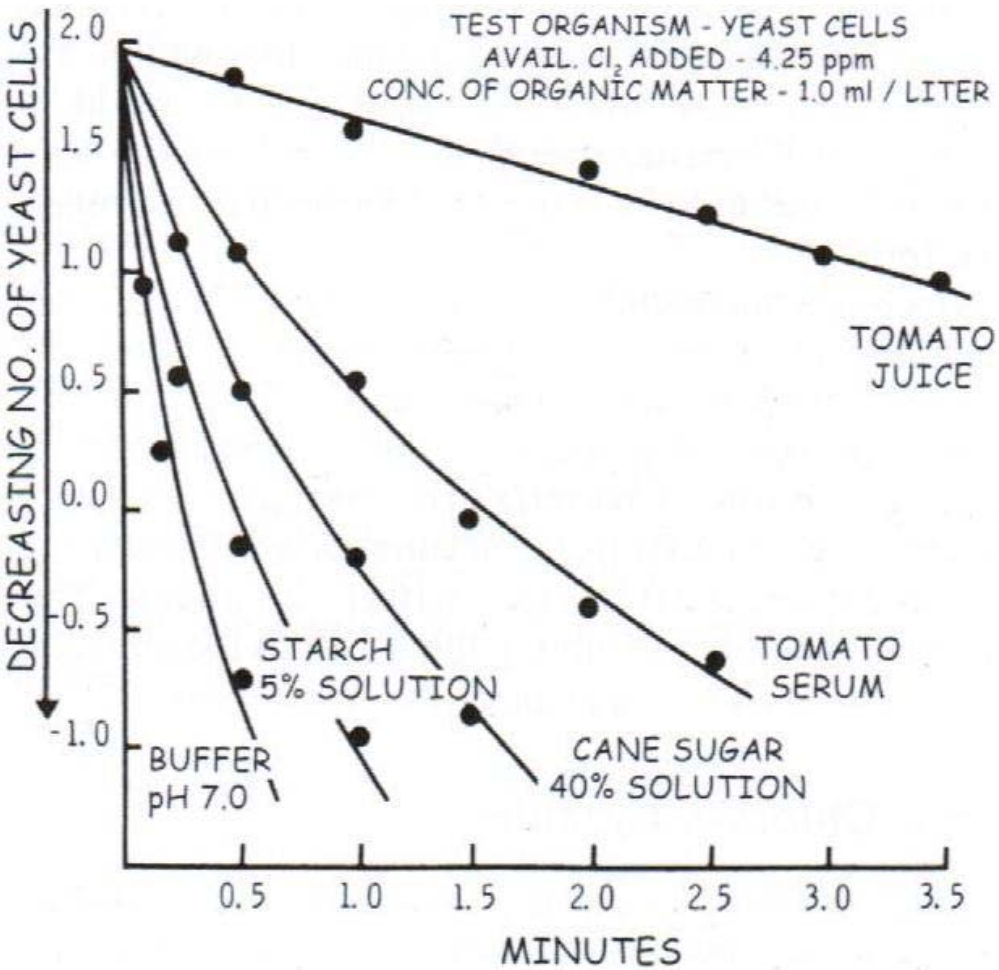
Effect of pH X [Chlorine]

The more chlorine we add…

…the higher the pH of the water becomes!

So…the pH of water *after* chlorine addition determines kill rates!!!

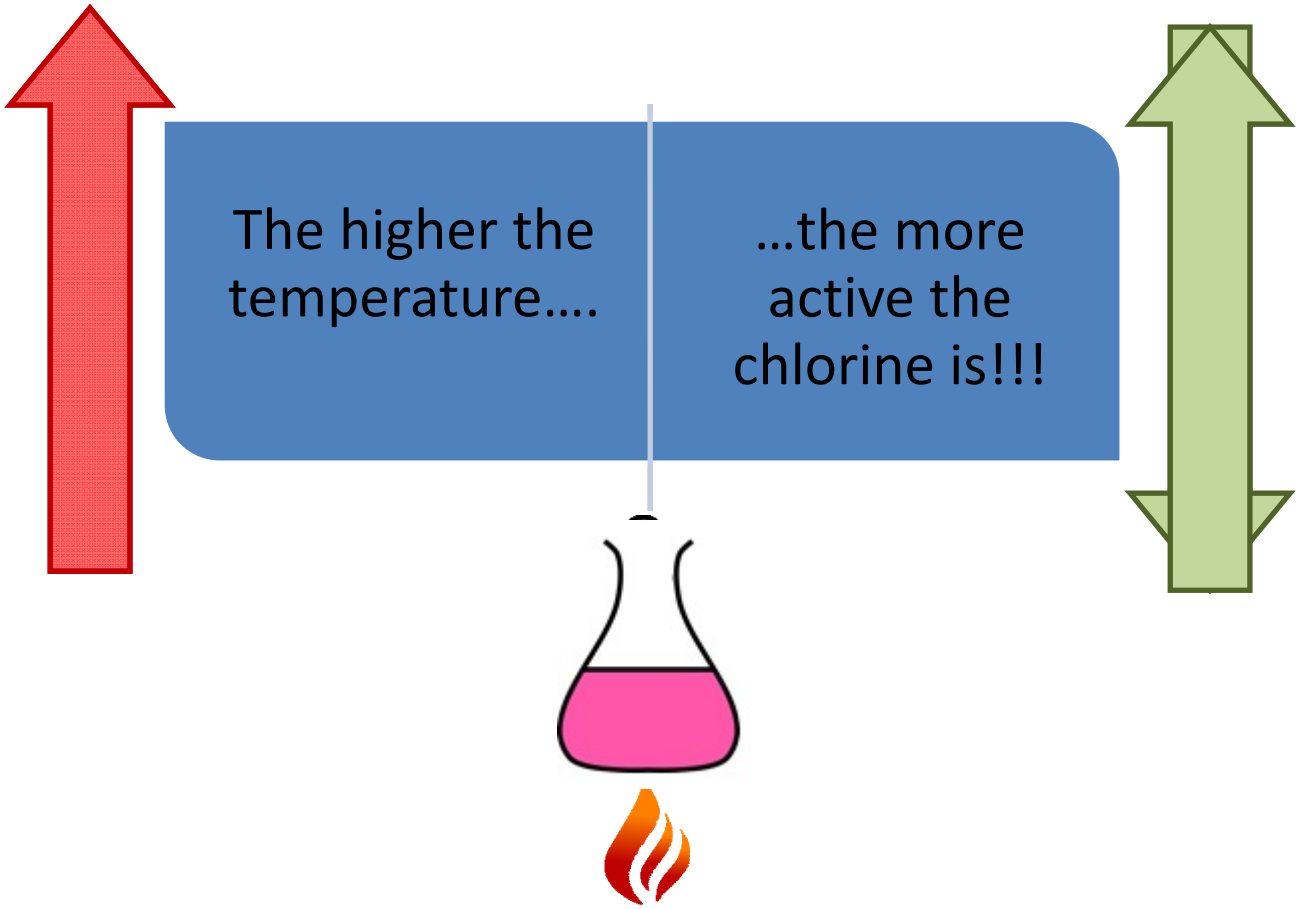
Effect of Organic and Inorganic Matter



Even when the levels of free chlorine are the same…

…suspended matter physically blocks the action of chlorine, protecting the bacteria!

Effect of Temperature



Sanitizer Preparation

Concentration Range (mg/L)	Minimum Temperature °C (°F)	
	pH 10 or less	pH 8 or less
25 - 49	49 (120)	49 (120)
50 - 99	38 (100)	24 (75)
100	13 (55)	13 (55)

Nebraska Food Code, 2016.

Chlorine Measurements

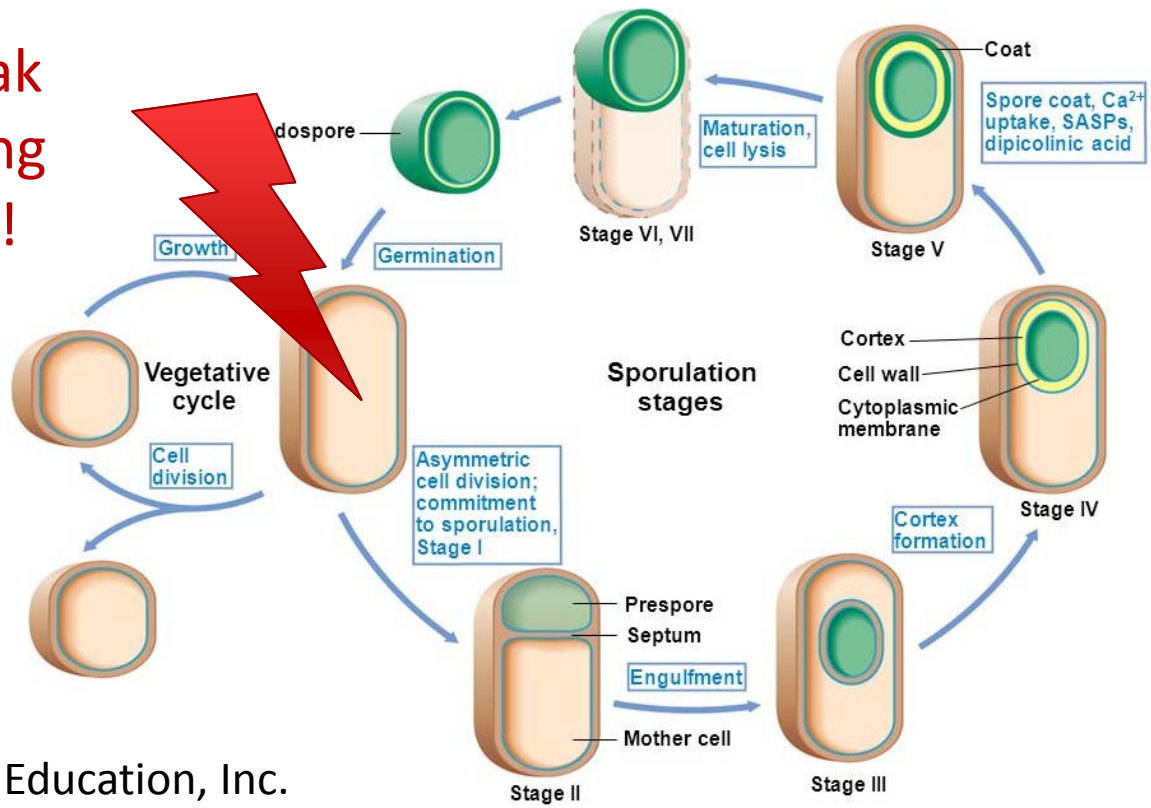
- (Total) Residual chlorine: measured by titrimetric methods or test kits
- (Free) Residual by the DPD reagent method

Neither the University of Nebraska – Lincoln, or the instructors of this training, endorse these specific brands of chlorine test strips. These are only included here as examples of this type of product.

Bacterial Spore Resistance to Chlorine

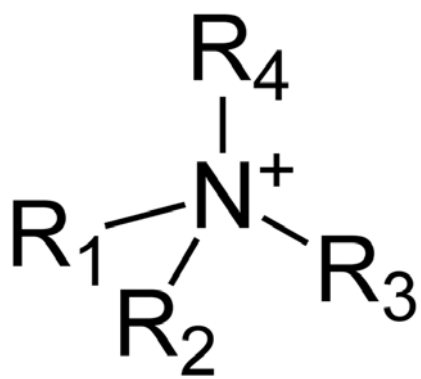
Spores are more resistant (10 to 1100 times) to chlorine than vegetative cells…

Sanitation is designed to break the cycle by killing vegetative cells!



Other Sanitizers

- Quaternary Ammonium Compounds (QUATs)
  - Stable to heat
  - Effective over a wide pH range
  - Less affected by organic matter than chlorine



Other Sanitizers

- Peroxyacetic Acid :
  - Tsunami™, Oxonia™
  - Effective antimicrobial fruits, vegetables, meat and poultry carcasses and parts
  - Effective against a wide range of microorganisms
  - Effective in solutions with organic matter
  - Superior in controlling biofilms

Choosing a Sanitizer

- Kills microorganisms quickly
- Safe and non-irritating to employees
- Rinseable
- No adverse affect on food
- Economical
- Easy to test
- Stable
- Readily soluble in water

Beyond Sanitation…

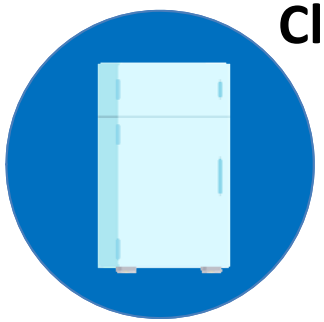
Preventing Contamination and Cross-Contamination

Employee Health

Employee Hygiene

Color Coding Cleaning Supplies

Color Coding/ Separating Utensils



Organizing Food Storage Areas (Top to Bottom)

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Beyond Sanitation…

Preventing Contamination and Cross-Contamination

BE AWARE AND SHARE!!!

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