Food Science and Technology Notes

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SANITIZING INFORMATION

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This article will deal essentially with definitions and a brief discussion in outline form of the common materials being used in food processing plants.

Definitions:

ANIONICS - Soaps or surfactants that carry a negative electric charge and through their surface action exert an anti-infective effect. Good action against Gram positive organisms.

ANTISEPTIC - This term is usually reserved for agents applied to living tissues. Therefore a skin antiseptic would be used to inhibit or destroy microorganisms on the body surface.

BACTERICIDE - An agent when employed at recommended use levels and conditions will kill bacterial cells. The suffix "cide" indicates killing or destroying. The terms fungicide and virucide are examples.

BACTERIOSTAT - An agent, usually chemical, when used as recommended prevents bacterial cells from reproducing. Bacterial organisms are not killed except possibly after long term exposure. Bactericidal agents may be bacteriostats when used at concentrations below the bactericidal level.

BIOCIDE - An agent that destroys living organisms.

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CATIONICS - Compounds which carry a positive electric charge and through their surface action are anti-bacterial against Gram positive and Gram negative organisms.

DETERGENT - A cleansing or purging agent. May include quats, fatty amine salts or alkyl pyridinium compounds.

DISINFECT - To destroy infectious agents. A disinfectant is an agent that frees from infection. A disinfectant is usually a chemical agent which destroys disease germs or other microorganisms or inactivates viruses. The American Public Health Association definition for disinfection is "Killing of pathogenic agents by chemical or physical means directly applied."

NONIONICS - These are neutral or uncharged substances and have little if any effect on bacterial organisms. Some are excellent solubilizers and foaming agents.

SANITIZE - To make sanitary or healthful. A sanitizer is an agent that reduces the microbial contaminants to safe levels as determined by Public Health requirements. The term also implies that in the process of rendering an object sanitary there are no harmful residues or contamination which might be esthetically objectionable.

SURFACTANT - A surface active agent. Agents which alter the physico-chemical nature of surfaces and interfaces, lowering the interfacial tension. These include wetting agents, surface tension depressants, detergents, dispersing agents, emulsifiers, quaternary ammonium compounds, etc. Reduction of surface tension per se has little or no effect on microorganisms.

COMMON SANITIZING AGENTS

CHLORINE RELEASING AGENTS

Most effective compounds

1. Sodium and calcium hypochlorite
2. Organic chloramines
3. Chloroisocyanurates
4. Chlorine dioxide

Spectrum of Activity

1. Gram positive and Gram negative bacteria - effective
2. Acid-fast bacilli - slightly effective
3. Bacterial spores - moderately effective
4. Fungi - effective
5. Viruses - moderately effective

Advantages

1. Wide spectrum
2. Deodorize
3. Safe at use concentrations
4. No toxic residues
5. Economical

Disadvantages
1. Corrosive
2. Rapidly inactivated by organic matter
3. Tends to be irritating

Recommended Use Levels
50-200 ppm available chlorine

Primary Uses
General disinfection, water purification, sanitizing rinse

QUATERNARY AMMONIUM COMPOUNDS

Most Effective Types
1. Hexadecyl trimethyl ammonium bromide
2. Methyl dodecylbenzyl trimethyl ammonium chloride
3. Alkyl dimethylbenzyl ammonium chloride
4. Cetylpyridinium chloride

Spectrum of Activity
1. Gram positive and Gram negative bacteria - effective
2. Acid fact bacilli - Bacteriostatic
3. Bacterial spores - not effective
4. Fungi - certain types are very effective
5. Viruses - effective against most large viruses and some small viruses

Advantages
1. Broad spectrum
2. Non-corrosive
3. Deodorant
4. Odorless

Disadvantages
1. Tend to be bacteriostatic
2. Residues on food contact surfaces
3. Incompatable with soap and anionic detergents

Recommended Use Levels
Sanitizing - 200 ppm. Hard surface disinfecting - 400 ppm

Primary Uses
General disinfectant and deodorant

IODOPHORS-IODINE COMPLEXED WITH SURFACE ACTIVE AGENT

Spectrum of Activity
1. Gram positive, Gram negative and acid fast bacteria-effective
2. Bacterial spores - moderately effective
3. Fungi - effective
4. Viruses - moderately effective

Advantages
1. Rapid kill
2. Broad spectrum
3. Color indicator
4. Fairly active in presence of organic matter

Disadvantages
1. Moderately low residual action
2. Iodine loss in hot solutions

Recommended Use Levels
Disinfection - 50 to 100 ppm. Sanitization - up to 25 ppm (NO RINSE)

Primary Uses
General disinfectant and sanitizer

ACID ANIONIC SURFACTANTS - ANIONIC SURFACTANT COMPLEXED WITH ORGANIC OR INORGANIC ACID

Spectrum of Activity
1. Gram positive and Gram negative - effective
2. Fungi and bacterial spores - not effective
3. Viruses - effective against certain types

Advantages
1. Non-staining
2. Odorless
3. Removes and prevents waterstone and milkstone formation
4. Non-corrosive

Disadvantages
1. High foam in C.I.P. operations
2. Low activity on spore forming bacteria
3. Effective only at low pH

Primary Uses
Sanitizing food processing equipment

Summary

There are a vast number of cleaning, disinfecting and sanitizing agents available to the food processing industry. The selection and proper use of these materials must necessarily depend considerably on the technical information and label recommendations of the manufacturers. The majority of the products used are either approved locally or by the U. S. Department of Agriculture. Products approved by the U.S.D.A. can be identified by the U.S.D.A. Registration Number on the label and in this case are permitted in interstate commerce with the approval of state agencies. These products and their labels are reviewed by the U.S.D.A. and any products used in the U.S.D.A. inspected meat & poultry processing plants must be examined and approved by the Consumer and Marketing Service. If products pass these requirements, they then appear in the list of Chemical Compounds authorized for use in the U.S.D.A. Poultry, Meat, Rabbit and Egg Product Inspection Programs published by the U.S.D.A.