

DISINFECTING AND SANITISING

In many locations it is vital to go beyond simple cleaning. Bacteria and other microorganisms must be eliminated or reduced in numbers to a safe level. Microorganisms can cause disease, generate odours, create unsightly moulds and stains.

As the person in charge of sanitation, you need some fundamental knowledge of this subject. What are bacteria? What kills or controls them? What government standards apply to the manufacture and sale of disinfectants so as to protect the public and guarantee that the product will do what the labels claim? Here are some basic facts.

MICROORGANISMS

Viruses are the cause of many illnesses, such as herpes, aids, and polio. Under certain conditions in a living body they have the ability to reproduce. Viruses can be killed by some disinfectants.

Fungi may be described as plants without chlorophyll

Bacteria are single cell organisms.

Most bacteria have no harmful effect on man or animal, but pathologists estimate that there are more than 750 organisms responsible for the many diseases which afflict man and animals. Diseases such as pneumonia, tuberculosis, cholera, typhoid fever, most food poisonings, and a wide variety of bacterial irritations are caused by bacteria, or more often, the toxic substances excreted by the bacteria.

Bacteria are generally considered odourless; however, bacteria excrete waste products which have odours in themselves. They also act upon other substances to produce additional odour. It can thus be seen that one of the most effective methods of controlling odours is by killing the bacteria that cause the odours.

DISINFECTION

The primary purpose of disinfecting (the killing of microorganisms) is to control disease, and prevent the spoiling of food. Cleaning alone is effective in removing some bacteria food supplies and waste products. Cleaning alone, however, is not adequate to reduce the bacteria population to an acceptable low level. This fact was established many years ago in hospitals, dairies, bottling plants, canneries, and other food processing industries. As soon as the cleaning process is completed, the bacteria continue to build up at a rapid rate. Disinfecting, on the other hand, at the same frequency of application, reduces the bacteria count to an extremely low level and their multiplication is markedly reduced.

Bacteria cannot live in the presence of certain chemicals, called disinfectants or germicides. Bacteria can also be controlled by extreme heat, such as in boiling water. However you can see that it would be impossible to spread boiling water over all the floors, walls and equipment in a building. That is why disinfectants are so important.

There are a great many chemicals that are known to kill germs. Some of these are more powerful than others. Some may have unpleasant odours or are dangerous to use. Here is a list of disinfectants that are in common use today.

SYNTHETIC PHENOLS

These are chemical compounds that have only been developed in modern times. All in all, they are the best types of disinfectants to use in a hospital or nursing home. Some people still measure the killing power of a disinfectant by comparing it to natural phenol. A chemical with a phenol coefficient of 7.5 is seven and a half times as powerful as phenol (carbolic acid). However the phenol coefficient is no longer required by the Federal government to prove the killing power of a disinfectant. The most commonly used test is the A.O.A.C. Use Dilution Test. This was developed by the Association of Official Analytical Chemists. It consists of using the chemical in the specified use dilution to kill specific strains of bacteria in specific cultures. To be approved by Agricultural Canada, the chemical must pass the A.O.A.C. test. Most synthetic phenols have a mild odour or are odourless. They are not particularly corrosive to equipment. They have high disinfecting power, dilution with water up to 1 to 128 or sometimes even 1 to 256 is possible. They kill many different kinds of bacteria. They are highly recommended for cleaning and disinfecting hospitals and are safe on conductive floors in operating rooms. Synthetic phenols are effective against fungi, bacteria including the tubercle bacillus, and viruses, but not spores.

CHLORINE CONTAINING PRODUCTS

These are germicides such as the common household bleach. Chlorine containing products have one disadvantage, they are used up in the process of cleaning and of killing germs. When they come into contact with waste products, soils, or microorganisms, they begin to oxidize that matter. Thus they are used up and eventually lose their killing power. Sanitation authorities require that surfaces be cleaned thoroughly with detergent and water before a chlorine containing disinfectant is applied. This means that you have a two-step operation - first cleaning, then disinfecting. Nowadays the chlorine containing products are unpopular for this reason. It is simpler and faster to use a combined cleaner/disinfectant that cleans and disinfects at the same time.

QUATERNARY AMMONIUM COMPOUNDS

These are among the newer types of disinfectants. They have some wonderful advantages over the older types.

1. They have no odour.
2. They are less harmful to humans than any other disinfectant.
3. They have extremely high germ killing power.
4. They are non-corrosive to most surfaces.

5. They are non-staining.
6. They are nearly tasteless, so they are ideal for warewashing.
7. They have nearly equal killing power against almost all different kinds of bacteria.
8. They can be safely stored for years.

The only disadvantage of the quats are that they tend to lose some strength in the presence of organic matter. This slows down their killing power. They also lose a little potency in very hard water. The quats are widely used in cleaning and disinfecting food processing plants, farms, hospitals, etc. Quats have no effect on tubercle bacilli and are not effective against spores.

IODOPHORS

Iodophors are compounds in which iodine is carried by a surface-active agent. The germ-killing action results from the liberation of free iodine when the compound is diluted with water, only the free iodine having any appreciable disinfectant action. An iodophor enhances the bactericidal action of iodine and reduces the odour. It does not stain the skin or, materials on which it is used. Iodophors are wide spectrum bactericides, a good tuberculocide, fungicide, and virucide.

ANIONIC ACIDS

Anionic detergents combined with acids have a bactericidal action. Presently the only approved use of this class of disinfectants is in the rest room area for disinfecting toilet bowls and urinals. Anionic acids kill most bacteria, fungi and viruses, but are not effective against tubercle bacilli and spores. Agriculture Canada does not longer require a P.C.P. number for this class of disinfectant.

HOW TO CHOOSE WHICH TYPE OF DISINFECTANT TO USE

Germs will be killed if they come in contact with the right dilution of any of the above chemical categories when used in sufficient quantity and sufficient time is allowed for complete disinfection. Always read the label carefully and follow the directions. The type of microorganism to be killed, the surface to be cleaned, the time available and the temperature of the disinfecting solution all determine which class of disinfectant is the most appropriate.

MICROORGANISM GLOSSARY

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| 1) | Aerobe | An organism depending upon the presence of oxygen for normal development. |
| 2) | Anaerobe | An organism whose normal development is retarded by the presence of oxygen. |
| 3) | Anion | Ion possessing a negative charge. |

- 4) Antiseptic When applied to living tissue, prevents or arrest the growth or action of microorganisms by inhibiting their action or by destroying them.
- 5) A.O.A.C. The standard abbreviation for the Association of Official Analytical Chemists, whose test procedures are the accepted standards by which disinfectant activity is determined.
- 6) Aseptic Free or freed of pathogenic microorganisms.
- 7) Bactericidal Applied especially to chemical agents that kill both pathogenic and non-pathogenic bacteria, but not necessarily bacterial spores.
- 8) Bacteriophage A virus which destroys bacteria.
- 9) Bacteriostatic That which retards or inhibits bacterial growth or development.
- 10) Bacterium Microscopic one-celled living units. Some are infection producing; most are harmless to man and some are of value in such industrial processes as fermentation, etc.
- 11) Broad Spectrum Disinfection qualities of products which pertains to a wide range of microorganisms.
- 12) Cation Ion possessing a positive charge.
- 13) Cidal Means killing. Example: bactericidal.
- 14) Coccus Singular -e.g. staphylococcus, -staphylococci plural -cocci ; a spherical bacteria.
- 15) Conductive Floor Conductive - to serve as a channel or medium of conveyance; namely, in the case of electricity, conductive floors are floors designed with the use of metal or other conductors to drain or prevent building of static electricity.
- 16) Cross Infection Infection transmitted between patients infected with different pathogenic microorganisms.
- 17) Cross-Contamination The transmittal of organisms which might cause infectious conditions.
- 18) Culture Cultivation (growing) of microorganisms, etc. in prepared nutritional substances.
- 19) Detergent By strict definition, this term includes all chemicals that are capable of cleaning.
- 20) Disinfectant When applied to an inanimate object, it destroys all pathogenic microorganisms with which it comes into contact, excepting, of course, spore-formers.
- 21) Disinfectant Claims When disinfectant claims are made in a product's label, that product must be registered by Health Canada as a disinfectant when used as such in hospitals or food processing areas. When used in all other areas the disinfectant must be registered by Agriculture Canada.
- 22) Disinfection The killing of organisms by chemical or physical means.
- 23) Fungus A higher form of microscopic life than bacteria.

- Characterized by spores and filaments (thread-like series of cells). Fungal spores have increased resistance to killing agents.
- 24) Germicide Synonym for disinfectant.
- 25) Gram-Negative Reactions of bacterial cells to a staining procedure in which
Gram-Positive a violet stain is fixed with an iodine solution, then washed
with alcohol and regained with a red dye. Gram-Positive
organisms retain initial violet dye; Gram-Negative organisms
are decolorized by alcohol and take up red dye.
- 26) In Vivo In a living organism; within the living body.
- 27) In Vitro Within a glass; observable in a test tube.
- 28) Ion An atom which has acquired an electrical charge as a result
of the gain or loss of electrons, a charge atom or radical.
- 29) LD LD abbreviation for "lethal dose". Example: LD50 - a dose
killing at least 50% of the subject in 24 hours.
- 30) Non-Ionic A chemical having neither anionic or cationic properties.
- 31) Pathogen An microorganism capable of causing disease.
- 32) pH The pH of a solution is a measurement of its acidity or
alkalinity. The scale covers a range of 0 to 14, with 7 being
the neutral point. All solutions with a value of less than 7 are
acidic in nature, while those above are alkaline.
- 33) Sanitiser Any agent that reduces the bacterial count to safe levels as
may be judged by public health requirements; commonly
used for substances applied to inanimate objects - it is not
synonymous with disinfection.
- 34) Spore A highly resistant form assumed by certain species of
bacteria when grown under adverse influences; the
reproductive cells of certain types of organisms.
- 35) Soap Any compound of one or more of the fatty acids, or their
equivalents, combined with an alkali.
- 36) Sterile Free of living microorganisms and their products.
- 37) Toxin A poisonous substance elaborated during the growth of
pathogenic bacteria.
- 38) Virus Submicroscopic agent of infectious disease: requires living
cells for its proliferation.
- 39) Wetting Action of water in contacting all soil, helps to reduce surface
tension. (Wetting agents usually do a good job of
emulsification).
- 40) Yeast Unicellular fungi.