

## EXPERIMENT NO: 10

### AIM OF THE EXPERIMENT:

To study different types of disinfectants & marketed preparation.

### THEORY:

Disinfection is a process in which chemical or physical means is used to control or destroy the microorganisms that are capable of causing diseases. There are three levels of disinfection (i.e. high, intermediate & low level) with respect to the effectiveness of the disinfection. Disinfecting agents are substances used to control or destroy harmful microorganisms such as bacteria, viruses or fungi. Many disinfectants are non-specific in their action & will act against a spectrum of microorganisms.

Chemical disinfectants can be grouped in accordance with their chemical properties. They work on various modes of action to destroy the microorganisms such as by rupturing the cell wall, denaturing protein or lipids, oxidation, alkylation etc. the efficacy of a disinfectant hinges on various factors including concentration, contact duration, temperature pH, the presence of organic matters & metal ions.

Choice of the disinfectant to be used depends on the particular situations. Some of the disinfectants are adopted because of the wide spectrum of destroying microorganisms in order to achieve effective disinfections. Others destroy a smaller range of disease causing organisms but are preferred because the chemical disinfectants are less or non-toxic to human & the level of disinfections required is low.

There are disinfectants which possess surfactant effect & are used to clean & disinfect in “one-step” process. Workers in hospital, health care facilities, poultry facilities, abattoirs, food products manufacturing plants, sanitary & similar service etc. frequently use chemical disinfectants to destroy diseases causing microorganisms. Some of the chemical disinfectants are flammable & explosive. There are disinfectants that would react with incompatible chemicals violently & generate toxic gases posing hazard to workers. All chemical disinfectants are, by their very nature, potentially harmful or toxic to living organisms. Like other toxic substances, the chemical disinfectants can enter the body through several routes, including absorption through skin or mucous membrane, inhalation & ingestion. Sometimes a chemical substance can enter through various routes. However, chemical disinfectants would be effective & safe tools when handled properly with the safety measures in place. If misused, they can be hazardous & harmful to workers & the environment.

Disinfectant can be divided into classes on the basis of their chemical compositions & each class has its characteristics, hazards, toxicities & efficacy against various microorganism. The classes are as follows:

- **Alcohols:** It is usually in the form of 70% IPA or 60 to 80% ethyl alcohol, are commonly used topical disinfectants. They are effective against bacteria & enveloped viruses. Alcohols are not effective against bacterial spores & non enveloped viruses. Alcohols are somewhat slow in their germicidal action.
- **Aldehydes:** it is broad spectrum disinfectants. The most commonly used agents are formaldehyde & glutaraldehyde. Aldehydes are very effective against bacteria, fungi, viruses, mycobacteria & bacterial spores.
- **Chlorine Compounds:** It is considered broad spectrum, being effective against bacteria, enveloped & non enveloped viruses, mycobacteria & fungi. At high concentration, chlorine compound can be sporicidal. The most common used agents are chlorine dioxide, sodium hypochlorite (chlorine bleach) & calcium hypochlorite.
- **Iodine Compounds:** iodine compounds are broad spectrum & considered effective for a variety of bacteria, mycobacteria, fungi & viruses. Tincture of iodine is used as an antiseptic for skin cuts & scrapes. Iodine agents are inactivated by quaternary ammonium compounds & organic debris. An

iodophor is a combination of iodine & a solubilizing agent or carrier; the resulting complex provides a sustained release reservoir of iodine & releases small amounts of free iodine in aqueous solution to kill microbes.

- **Phenolics:** the disinfectants are phenol (carbolic acid) derivatives. They have a characteristic pine tar odour & turn milky in water. Phenols at 5% concentration are considered bactericidal, tuberculocidal, fungicidal & virucidal for enveloped viruses. They retain more activity in the presence of organic material than iodine or chlorine-containing disinfectants. Cresols, hexachlorophene, alkyl & chloro derivatives & diphenyl are more active than phenol itself.
- **Quaternary ammonium compounds:** such as benzalkonium chloride, are generally odorless, colorless, non-irritating and deodorizing. The compounds has disinfectant effect and some have detergent action. However some quaternary ammonium compounds are inactivated in the presence of some soaps or soap residues. Their antibacterial activity is reduced in the presence of organic material. Quaternary ammonium compounds are effective against bacteria but only and somewhat effective against fungi and viruses.
- **Oxidizing agents:** common oxidizing agents are hydrogen peroxide ozone per acetic acid and potassium permanganate. The hydrogen peroxide is used as an antiseptic and also effective in disinfection of inanimate objects. It could be sporicidal if operated at high temperature. Per acetic acid is one of the effective liquid sporicidal and is used widely in disinfection of food processing equipment & medical instruments because it does not leave toxic residues. Potassium permanganate has broad anti-microbial properties. It is an effective algicide (0.01%) and virucide (1%) for disinfection but tends to irritate tissues at concentration >1:10000.
- **Others:** Ethylene oxide has wide use as a disinfecting agent with very broad biocide activity against micro-organism including bacterial spores and viruses. It is highly flammable chemical. it is toxic mutagenic and carcinogenic. Chlorohexidine is a biguanide compound is one of the widely used disinfectant, it is effective against most bacteria and it is nonirritating to tissues. Biguanides has broad antibacterial spectrum, however it is limited its effectiveness against viruses and is not sporicidal, mycobactericidal, fungicidal.

**RESULT:** Understood the study about Disinfectant & their marked products.