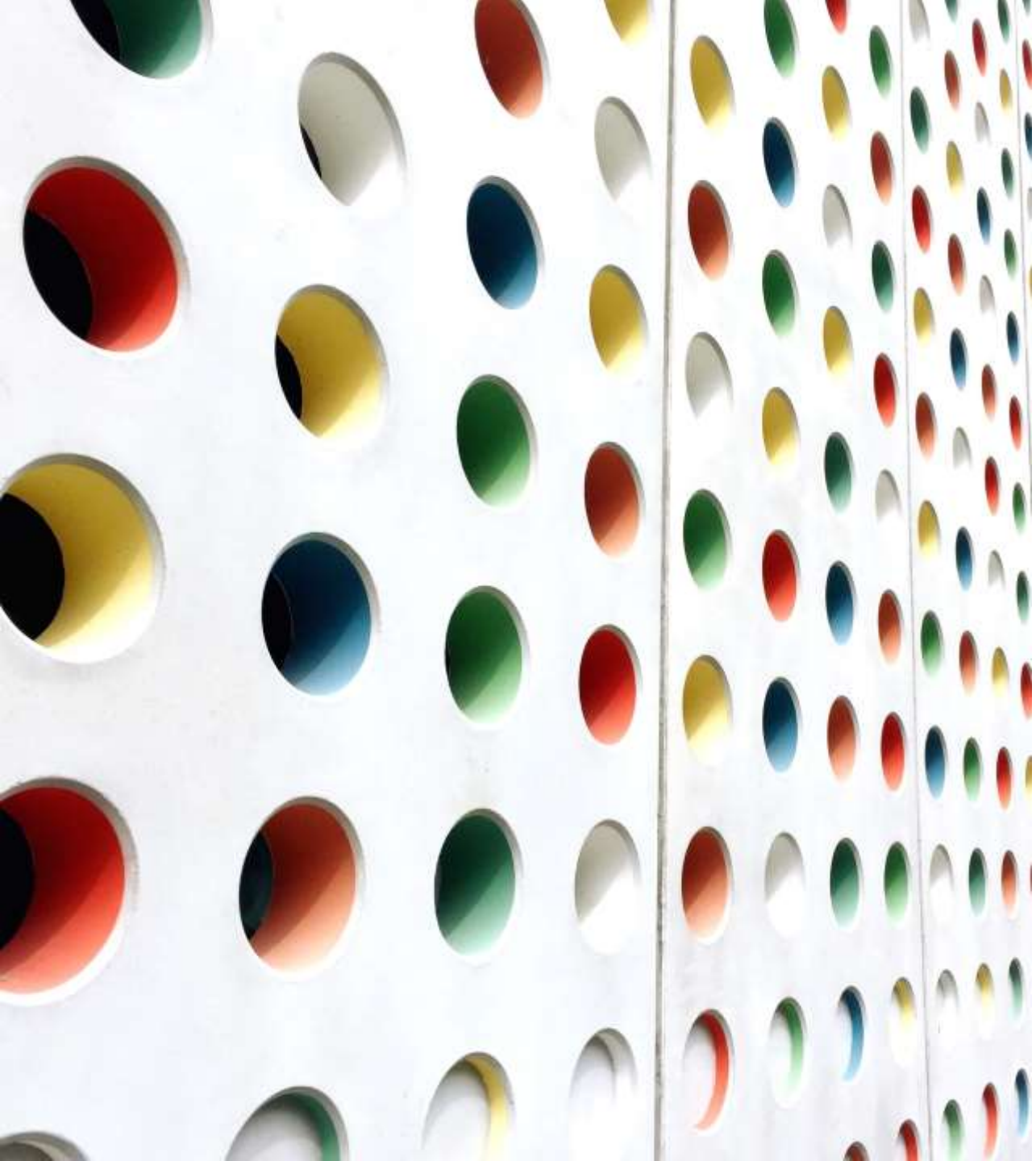

Disinfection & Sterilization.

Disinfection and sterilization

Disinfection and sterilization are the two common methods of killing or inhibiting the growth of microorganisms. Microbes can cause a number of diseases in humans and animals. They are also responsible for food spoilage. Therefore, it is beneficial to kill or inhibit their growth to minimize their harmful effects. This is achieved by sterilization or disinfection. However, both these processes are based on different principles.

Disinfection

Disinfection is a chemical process used to **eliminate or inhibit** the growth of bacteria and other pathogens that may cause infectious diseases in humans and animals. Disinfectants are the **chemical solutions** used to make substance infection-free. These include alcohol, iodine, chlorine, etc.

Sterilization

- Sterilization is a process mainly used to kill all forms of microorganisms and its spores. This process is carried out to maintain a sterile environment.
- Sterilization is classified into 2 types – physical sterilization and chemical sterilization

Physical Methods of Sterilization

- **Moist Heat Sterilization:**

It is one of the best methods of sterilization. Moist heat sterilization is done with the help of an instrument called an autoclave. An autoclave works on the principle of producing steam under pressure.

- **Dry Heat Sterilization:**

This method is used on objects that are sensitive to moisture. Moisture-free heat or dry heat is applied on the surface or objects such that there is denaturation and lysis of proteins which leads to oxidative damage. Some methods of dry heat sterilization include incinerators, hot air ovens and flaming techniques

Physical Methods of Sterilization

- **Filtration**

This is a mechanical method of sterilization in microbiology. This method uses membranous filters with small pores to filter out the liquid so that all the bigger particles and microbes cannot pass through. The three steps of filtration are sieving, adsorption and trapping.

- **Irradiation**

Irradiation is the process of exposing surfaces or objects to different kinds of radiation for sterilization. It is of two types:

✓**Sound Waves Vibration**

✓**Fractional Sterilization**

Chemical Methods of Sterilization

- **Gaseous Sterilization**

Gaseous sterilization is the method where the object is exposed to gas in a closed, heated and pressurised chamber. The gaseous chemical agents used for sterilization include ethylene oxide, formaldehyde, nitrogen dioxide and ozone.

- **Liquid Sterilization**

Liquid sterilization is the process of immersing the object in a liquid such that it kills all the viable microorganisms and their spores. This method is less effective than gaseous sterilization and is used to remove low levels of contamination. Common liquid chemical agents that are used for sterilization include hydrogen peroxide, glutaraldehyde and hypochlorite solution.

Chemical Methods of Sterilization

- **Cold Sterilization Definition**

It is a process in which sterilization is carried out at low temperatures with the help of chemicals, filters, radiation and all other means excluding high temperatures. It is done for products that contain heat-sensitive ingredients and yet require sterilization.

Important difference between disinfection and sterilization:

Disinfection	Sterilization
In this, the number of harmful microbes is minimized to a negligible level.	In this, the medium is made completely free from all microbes.
It kills only vegetative cells and not the spores.	It kills both vegetative cells and spores.
Wounds are disinfected – with agents such as hydrogen peroxide or rubbing alcohol.	Wounds cannot be sterilized – as it may kill surrounding healthy cells.
Disinfection only reduces the effect of microbes.	Sterilization completely rids microbes from the surface
Chemical methods are used for disinfection	Combination of heat, irradiation, high pressure, chemical and physical methods are used for sterilization
Phenol, alcohol, chlorine, iodine are some of the disinfecting agents.	High temperatures, steam, radiation, filtration are some of the sterilization techniques.
Only adequate cleanliness	Extreme cleanliness
Used in daily life.	Used primarily for medical and research purposes.
For eg., pasteurization, disinfecting urinals, etc.	For eg., sterilization of instruments used during surgery by autoclaving.

DIFFERENCE BETWEEN DISINFECTION AND STERILIZATION

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DISINFECTION

DISINFECTION IS THE PROCESS OF ELIMINATION OF PATHOGENIC MICROORGANISMS. HOWEVER, THE PROCESS IS NOT EFFECTIVE IN CASE OF VEGETATIVE SPORES

STERILIZATION

STERILIZATION REFERS TO ANY PROCESS THAT ELIMINATES, REMOVES, KILLS, OR DEACTIVATES ALL FORMS OF LIFE AND OTHER BIOLOGICAL AGENTS PRESENT IN A SPECIFIED REGION

Thanks