

Microbiology I

Lab1 :- Sterilization and Disinfection

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Lab/2:- Sterilization and Disinfection

Sterilization: is the perfect killing of the MO that found on the substances, since become free from this MO (vegetative cell or spores) by using physical methods.

Disinfections: is the removing of MO that hanging with substances by using of disinfectants: chemical agents that have bacteriocidal or bacteriostatic effects.

Bacteriocidal or microcidal: is killing the growth of the MO.

Bacteriostatic or microriostatic: is inhibiting the growth of the MO.

Methods of sterilization

There are three methods:

Physical, Chemical, & Mechanical methods.

Physical methods

A- Heat:

1-Dry heat:

a- Red heat: is sterilizing the tools (loope, needle, and forceps).

b- Flaming is the sterilizing of upper pit of the glasses (test tubes, flasks, and the surface of slides) on the Bunsen light flame with sloping way.

c- Burning: is the burning the clothes and dead infected animals when happened dangerous epidemic microbial diseases such as (anthrax) that caused by Bacillus anthracis.

2. **Dry hot air:** by using apparatus oven (at 160-180°C for 1.5-2 hr) is sterilizing the glass (Petri dish, pipettes, bottles, test tubes) filter papers and metal tools .

3. **Moisture heat:** is sterilizing the culture media& clothes by autoclave (1.5 bar for 20 mint).

B-radiation (UV, X-ray & Gamma ray): UV, X-ray & Gamma ray used for this aim since the sterilization with rays depending on if the wave length was short it harmless to microorganisms cell the effect of ultraviolet is equal for G +ve &G-ve

bacteria. This type of rays used for sterilization of the culture hood & plastic Petri dish & laboratories but care from it become it have harmless effect of biological tissue.

Chemical methods

There are two terms in these methods: Antiseptic & Disinfectant.

Antiseptic: is the chemical agent that used in sterilization of biological surface (skin).

Disinfectant: is the chemical agent that used in sterilization of non biological surface such as bench.

example of antiseptic are alcohol and iodine. Alcohol is effective in reducing the number of MO on skin, may be used disinfection of contaminated objects. Alcohol denatures proteins, extracts membrane lipids, and acts as dehydrating agent. All of which contribute to its effectiveness as an antiseptic even viruses are inactivated by alcohol, iodine is another effective antiseptic agent, killing all types of bacteria including spores. It is frequently applied to minor wounds to kill MO that contaminated surfaces for preventing infection. Various dyes used in selective media such as crystal violets, are similarly used as antiseptic agents such as stains are normally effective bactericidal agents at concentrations of less than 1:10000 for examples of disinfectants are phenol 2-5% used for surfaces sterilization of floors of rooms, surfaces of benches (is killed the bacteria because it act to collecting & coagulation of cell protein of bacteria) while 0.5 concentration used for preservative the serums. formalin (0.04-0.1)% for preservative the microbial suspensions and it used for sterilizing the clothes and polluted surfaces & room floors. Mechanical methods: such as ultra filtration, these methods using for sterilization the biological fluids; serum, enzyme, antibiotics, these

solutions are spoiled in high temperature, that depending on:

1. Size of substances that contaminated the liquid.

2. Nature of liquid.

3. Diameter of filter pits

4. Electric charge of filter.

5. Electric charge of MO that found in the liquid.