



First Year PharmD Students, Academic Year
2019/2020 Faculty of Pharmacy, Libyan International
Medical University



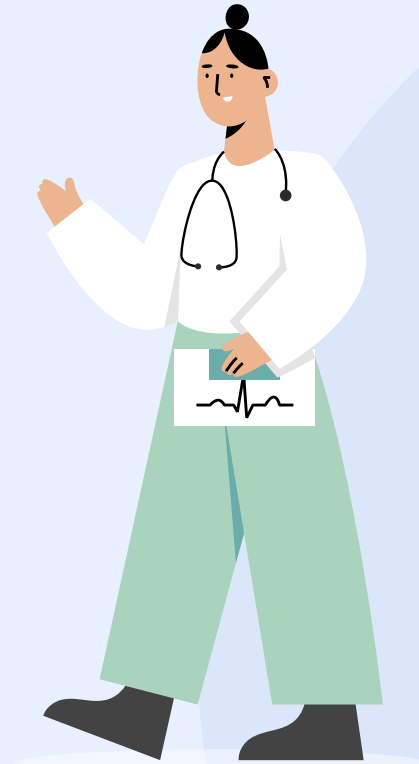
Sterilization, disinfection and antiseptics

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INTRODUCTION

Microorganisms are the agents of contamination, infection. Hence it becomes necessary to remove them from materials and areas.



Sterilization

Heating
(moist & dry)

Filtration

ionizing
radiation

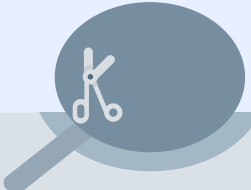
Gas
sterilization



Definition

Sterilization A process that destroys all micro organisms (including bacterial spores) on the surface of an object or in a fluid

Moist Heating



Exposure of microorganisms to saturated steam under pressure in an autoclave achieves their destruction by the irreversible denaturation of enzymes and structural proteins

Dry-heat sterilization

❑ Hot Air Oven

Place objects in an oven (from 50°C to 300°C). Require between 90 and 120 minutes at 160°C for sterilization

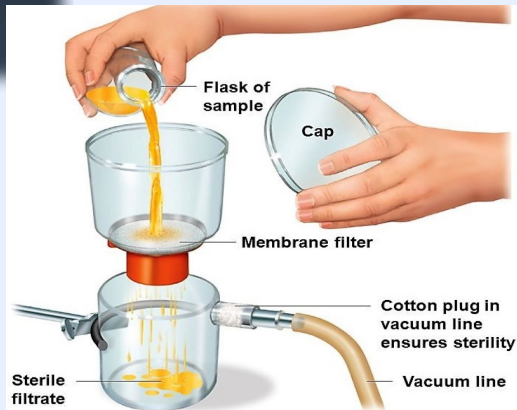


❑ FLAMING

Inoculation loop or Wire, the tip of Forceps and spatulas are held in a bunsen flame till they are red hot



Filtration



Sterilization by filtration is employed mainly for thermolabile solutions. These may be sterilized by passage through sterile bacteria-retaining filters, e.g. membrane filters (cellulose derivatives, etc.)



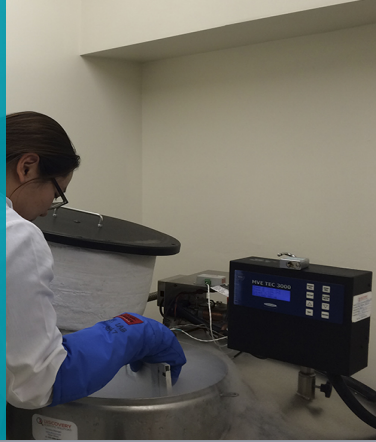
ionizing radiation



Sterilization of certain active ingredients, drug products, and medical devices in their final container or package may be achieved by exposure to ionizing radiation in the form of gamma radiation from a suitable radioisotopic source such as ^{60}Co (cobalt 60) or of electrons energized by a suitable electron accelerator

Gas sterilization

Sterilizing Gases



Sterilizing gases are typically used when exposure to other methods (heat or radiation) could damage the materials or equipment. The most common gases used for sterilization include ethylene oxide (EO), ozone, mixed oxides of nitrogen, and chlorine dioxide



Disinfection



Disinfection does not necessarily kill all microorganisms, especially resistant bacterial spores; it is less effective than sterilization (Reducing the number of pathogenic microorganisms to the point where they no longer cause infection)

Categories of Disinfectants

High-level disinfection

Intermediate-level disinfectants

Low-level disinfectants

High-level disinfections can generally approach sterilization in effectiveness, whereas spore forms can survive Intermediate-level disinfection, and many microbes can remain viable when exposed to low-level disinfection.

High-level disinfection

High-level disinfectants are used for items involved with invasive procedures that cannot withstand sterilization procedures (e.g. certain types of endoscopes, surgical instruments with plastic or other components that cannot be autoclaved).

Examples:

- Use of liquids such as glutaraldehyde, hydrogen peroxide, peracetic acid, chlorine dioxide, and other chlorine compounds

The effecting :
+ with vegetative cell
+ with mycobacteria
+ with spores
+ with fungi
+ with viruses



Intermediate-level disinfectants

Intermediate level disinfectants are used to clean surfaces or instruments in which contamination with bacterial spores and other highly resilient organisms is unlikely. These include flexible fiber optic endoscopes, laryngoscopes, vaginal specula, anesthesia breathing circuits, and other items. These have been referred to as semi critical instruments and devices.

Examples:

Alcohols, iodophor compounds, phenolic compounds.

The effecting :

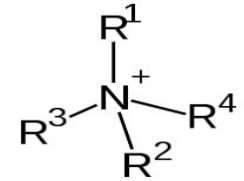
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Low-level disinfectants

Low-level disinfectants are used to treat noncritical instruments and devices such as blood pressure cuffs, electrocardiogram electrodes and stethoscopes. They do not penetrate through mucosal surfaces or into sterile tissues, although these items come into contact with patients.

Examples :
Quaternary ammonium compounds



The effecting :

- + with vegetative cell
- with mycobacteria
- with spores
- +/- with fungi
- + with viruses



Antiseptics

that kill germs or stop their growth from living membranes. It is applied to the skin or mucous membranes to help prevent infection. Medical disinfectants must be strong enough to kill germs with a degree of moderation so that sensitive membranes are not harmed



Types of antiseptics

(Quaternary Ammonium Compounds)

Quaternary ammonium compounds are an excellent choice for disinfection in hospitals, health centers and institutions due to its low cost and rapid efficacy against a wide range of microorganisms.



(Alcohols)

Alcohols are used when diluted with water and are effective against a large group of bacteria, and are used in high concentrations when needed to disinfect surfaces, and one of their drawbacks is that they are volatile, and therefore may not remain on the surfaces for a long time that allow them to kill germs, as they are flammable and therefore should be stored in Cool and well-ventilated place.



(Aldehydes)

Aldehydes are very effective against the bacteria that cause tuberculosis, but they need to be in high concentrations to show their effectiveness..



(Chlorine Compounds)

Chlorine compounds kill many pathogens including resistant viruses, and these compounds are low-cost, and fast-acting, but they can cause skin irritation, or erosion and change the color of surfaces used on them if they are not used according to the instructions and directions recommended by them. .



Hand washing. Medical professionals use antiseptics for hand scrubs and rubs in hospitals.



Apply some soap carefully



Start by wetting your hands



Rub the back of your opposing palms' fingers



Lather the back of your hands



Scrub between your fingers



Rub your hands palm to palm

Disinfecting mucous membranes. Antiseptics can be applied to the urethra, bladder, or vagina to clean the area before inserting a catheter. They can also help to treat an infection in these areas.



Cleaning skin before an operation. Antiseptics are applied to the skin before any kind of surgery to protect against any harmful microorganisms that might be on the skin.



Treating skin infections. You can buy OTC antiseptics to reduce the risk of infection in minor cuts, burns, and wounds. Examples include hydrogen peroxide and rubbing alcohol.



Treating throat and mouth infections. Some throat lozenges contain antiseptics to help with sore throats due to a bacterial infection.



Summary

Sterilization describes a process that destroys or eliminates all forms of microbial life and is carried out in health-care facilities by physical or chemical methods. Steam under pressure, dry heat, EtO gas, hydrogen peroxide gas plasma, and liquid chemicals are the principal sterilizing agents used in health-care facilities. Also, disinfection describes a process that eliminates many or all pathogenic microorganisms, except bacterial spores. There are three types of disinfection high intermediate and low level and antiseptics have a variety of uses both in and out of medical settings. In both settings, they're applied to either the skin or mucous membranes.





THANKS!