

a. Inactivation mechanisms of UV-light

Microorganisms are **inactivated** by **UV light** as a result of damage to nucleic acids. The high energy associated with short wavelength **UV** energy, primarily at 254 nm, is absorbed by cellular RNA and DNA. This absorption of **UV** energy forms new bonds between adjacent nucleotides, creating double bonds or dimers.

b. How does UV-light inhibit bacterial growth?

Ultraviolet (UV) light kills cells by damaging their DNA. The light initiates a reaction between two molecules of thymine, one of the bases that make up DNA.

c. What is UV-light sterilization?

Ultraviolet germicidal irradiation (UVGI) is a **disinfection** method that uses short-wavelength **ultraviolet (UV-C) light** to kill or inactivate microorganisms by destroying nucleic acids and disrupting their DNA, leaving them unable to perform vital cellular functions.

d. Does UV-light effect bacterial growth?

If **UV light** hits a DNA, it is absorbed by the purine and pyrimidine molecules in the chain. ... When **UV light** is in operation of DNA viruses, **bacteria** and other pathogens impacted. This will reduce the ability of the DNA to multiply and cause disease.

e. How long does it take for UV-light to sterilize?

UV light can have efficient inactivation of bacteria up to a distance of eight feet on either side and exposure time of 30 minutes is adequate.

f. Is UV-light sterilization is safe?

The use of **UV sterilization**, or **ultraviolet germicidal** irradiation, has been found to be extremely effective. Sources of **UV sterilization** can kill over 99% of viruses, bacteria, and fungi in an extremely short amount of time.

g. Can UV kill virus?

A room should be ventilated after **UV** disinfection, and people are suggested to enter the room half an hour later. Although **UV** is effective in **killing** the **virus** indoors, **UV** lamps should not be used to sterilize hands or other areas of skin, as the radiation **can** cause skin irritation.

h. How does a UV-light work in a pond?

UV lights work when water from your **pond** is pumped through their **light** path. The single-celled, free-flowing algae within your **pond** water is then exposed to these high levels of **ultraviolet light**. This **light** destroys their DNA and kills them.

I. Mechanism of UV-light for disinfection.

Recently, ultraviolet light-emitting diodes (UV-LEDs) have emerged as a new UV source, bringing flexibility for various UV wavelength combinations due to their unique feature of wavelength diversity. In this study, we investigated inactivation mechanisms of representative microorganisms at different wavelength combinations using UV-LEDs. Two types of indicator microorganisms were examined, namely *Escherichia coli* (*E. coli*) as a representative bacteria and bacteriophage MS2 as a representative virus. Different inactivation effects were observed, and the results for UVA pretreatment followed by UVC inactivation were particularly interesting. While a substantial shoulder in the *E. coli* UVC inactivation curve was observed, this was reduced by UVA pretreatment (365 nm) at 17 J/cm². Further, 52 J/cm² UVA eliminated the shoulder in the fluence-response curves, resulting in improved UVC (265 nm) inactivation of *E. coli* by over two orders of magnitude. No inactivation improvement was observed for MS2. Moreover, UVA pretreatment eliminated photoreactivation of *E. coli* but did not affect dark repair. Detailed investigation of inactivation mechanisms revealed that hydroxyl radicals ($\bullet\text{OH}$) played a significant role in the effects of UVA pretreatment. This study demonstrated that $\bullet\text{OH}$ radicals were generated inside *E. coli* cells during UVA pretreatment, which accounted for the subsequent effects on *E. coli*. The impact of UVA pretreatment on *E. coli* inactivation and reactivation was mainly due to increased levels of $\bullet\text{OH}$ radicals in *E. coli* cells, impairing cell functions such as DNA self-repair.

j. How does UV-light kill bacteria in water?

UV systems expose water to the light from a special lamp. The light is at a specific wavelength, capable of killing common bacteria. The percentage of organisms killed depends on the intensity of the UV light, the contact time that the water has with the light, and the amount of suspended solid particles in the water.

k. Ultraviolet germicidal irradiation

Ultraviolet germicidal irradiation (UVGI) is a disinfection method that uses short-wavelength ultraviolet (UV-C) light to kill or inactivate microorganisms by destroying nucleic acids and disrupting their DNA, leaving them unable to perform

vital [cellular](#) functions.^[1] UVGI is used in a variety of applications, such as food, air, and [water purification](#).

UV-C light is weak at the Earth's surface as the [ozone layer of the atmosphere](#) blocks it.^[2] UVGI devices can produce strong enough UV-C light in circulating air or water systems to make them inhospitable environments to [microorganisms](#) such as [bacteria](#), [viruses](#), [molds](#) and other [pathogens](#). UVGI can be coupled with a filtration system to sanitize air and water.

The application of UVGI to disinfection has been an accepted practice since the mid-20th century. It has been used primarily in [medical sanitation](#) and sterile work facilities. Increasingly it has been employed to sterilize [drinking](#) and [wastewater](#), as the holding facilities are enclosed and can be circulated to ensure a higher exposure to the UV. In recent years UVGI has found renewed application in [air purifiers](#).

L. HEPA filter working mechanism

A HEPA filter is designed to target very small particles, and therefore doesn't work like a typical membrane filter, where particles larger than a given pore size of a filter are captured. ... The first mechanism is interception, where particles being carried in the airflow around the filter fibers adhere to the filter.

m. How does a HEPA filter work?

HEPA stands for high-efficiency particulate air. A HEPA filter is a type of mechanical air filter; it works by forcing air through a fine mesh that traps harmful particles such as pollen, pet dander, dust mites, and tobacco smoke. You can find HEPA filters in most air purifiers.

N. How many types are HEPA filter there?

How Many Types of HEPA Filters Are There? According to the Institute of Environmental Science and Technology, (IEST) with regard to performance, there are 6 types – A, B, C, D, E & F. Each has its own distinct characteristics as shown by chart 1 below.

o. Do HEPA filter remove bacteria?

HEPA is good at removing larger particulate matter like pet dander, pollen and dust mites. Unfortunately, mold, VOCs, viruses, bacteria, and small particulates under 0.3 micrometers can not be removed safely from the air with an HEPA-based air purifier.

p. What is HEPA filter?

High-efficiency particulate air (HEPA), also known as high-efficiency particulate absorbing and high-efficiency particulate arrestance, is an efficiency standard of [air filter](#)

Filters meeting the HEPA standard must satisfy certain levels of efficiency. Common standards require that a HEPA air filter must remove—from the air that passes through—at least 99.95% (European Standard 99.97% (ASME, [U.S. DOE](#) of particles whose diameter is equal to 0.3 μm ; with the filtration efficiency increasing for particle diameters both less than and greater than 0.3 μm . See the [Mechanism](#) and [Specifications](#) sections for more information.

HEPA was commercialized in the 1950s, and the original term became a registered [trademark](#) and later a [generic term](#) for highly efficient filters. HEPA filters are used in applications that require contamination control, such as the manufacturing of disk drives, medical devices, semiconductors, nuclear, food and pharmaceutical products, as well as in [hospitals](#), [homes](#) and [vehicles](#).

q. Meaning of Incineration?

The destruction of something, especially waste material, by burning. 'waste disposal by **incineration**'.

s. Can you incinerate plastic?

Burning plastic creates harmful dioxins and if incinerators are inefficient, these leak into the environment. ... The consultancy Eunomia says plastics burned in incinerators set up to generate only electricity create heat at 25% efficiency.

t. What is the meaning of Desiccation?

Dryness, waterlessness, xerotes - the condition of not containing or being covered by a liquid (especially water) 2. desiccation - the process of extracting moisture. drying up, evaporation, dehydration. extraction - the process of obtaining something from a mixture or compound by chemical or physical or mechanical ...

u. What can be desiccated?

1 : to dry up or become dried up 2 : to preserve (a food) by drying : dehydrate 3 : to drain of emotional or intellectual vitality. Examples: Weeks of blazing heat along with a prolonged lack of rain have desiccated many of the plants in our garden. "

v. What causes of desiccation?

Disc **desiccation** is usually **caused** by wear and tear on your spine, which happens naturally as you age. Several other things can also **cause** disc **desiccation**, such as: trauma from a car accident, fall, or sports injury. repeated strain on your back, especially from lifting heavy objects.

w. Where does desiccated thyroid come from?

Desiccated thyroid extract: thyroid hormone pill made from animal thyroid glands. Currently desiccated thyroid extract is made from pig thyroids and is available as Armour Thyroid and Nature-Throid

x. Definition of desiccation.

Desiccation (from Latin de- "thoroughly" + siccare "to dry") is the state of extreme dryness, or the process of extreme **drying**. A **desiccant** is a **hygroscopic** (attracts and holds water) substance that induces or sustains such a state in its local vicinity in a moderately sealed container.