

UNIT-1

NON-IONIZING RADIATION

1.2 ULTRAVIOLET RADIATION AND ITS BIOLOGICAL EFFECTS

Ultraviolet (UV) radiation is a form of non-ionizing radiation that is emitted by the sun and artificial sources, such as tanning beds and play a crucial role in biological processes, such as vitamin D synthesis and triggering chemical reactions in the atmosphere.

Ultraviolet rays have higher frequencies and photon energies than visible light. UV rays lie in the wavelength range from around 10 nm to around 400 nm and have a frequency between the ranges 800 THz to 30 PHz.

UV radiation is classified into three primary types: ultraviolet A (UVA), ultraviolet B (UVB), and ultraviolet C (UVC), based on their wavelengths. Almost all the UV radiation that reaches earth is UVA though some UVB radiation reaches earth. UVA and UVB radiation can both affect health, but UVA penetrates deeper into the skin and is more constant throughout the year.

Wave Type	Wavelength	Absorption Level
UVA	315-400 nm	Not absorbed by the ozone layer
UVB	280-315 nm	Mostly absorbed by the ozone layer, but some does reach the Earth's surface
UVC	100-280 nm	Completely absorbed by the ozone layer and atmosphere

While it has some benefits for people, including the creation of Vitamin D, it also can cause health risks.

Benefits

- The production of vitamin D, a vitamin essential to human health.

Vitamin D helps the body absorb calcium and phosphorus from food and assists bone

development. The World Health Organization (WHO) recommends 5 to 15 minutes of sun exposure 2 to 3 times a week.

Risks

- Sunburn is a sign of short-term overexposure, while premature aging and skin cancer are side effects of prolonged UV exposure.
- UV exposure increases the risk of potentially blinding eye diseases if eye protection is not used.
- Overexposure to UV radiation can lead to serious health issues, including cancer.

Anyone can have harmful health effects from UV radiation, but the risks increase in people who

- Spend a lot of time in the sun or have been sunburned.
- Have light-color skin, hair, and eyes.
- Take some types of oral and topical medicines, such as antibiotics, birth control pills, and benzoyl peroxide products, as well as some cosmetics. These medications may increase skin and eye sensitivity to UV in all skin types.
- Have a family member with skin cancer.
- Are over age 50.

To protect Ourselves from UV radiation

- Stay in the shade, especially during midday hours.
- Wear clothes that cover your arms and legs.
- Wear a wide brim hat to shade your face, head, ears, and neck.
- Wear wraparound sunglasses that block both UVA and UVB rays.
- Use sunscreen with sun protection factor (SPF) 15 or higher, for both UVA and UVB protection.
- Avoid indoor tanning. Indoor tanning is particularly dangerous for younger users; people who begin indoor tanning during adolescence or early adulthood have a higher risk of developing melanoma.