

Ultraviolet Radiation: How it Affects Life on Earth

Anupam Rajak

Department of Botany, Visva-Bharati University, Santiniketan, 731235, India

1. Introduction

Living organisms on Earth have evolved over millions of years as the planet. Sun is necessary for life. The sun emits electromagnetic radiation of different wavelengths. Invisible rays that are part of the energy that comes from the sun. Sunlight contains a significant UV component, much of which is absorbed by Earth's atmosphere but some of which penetrates. Ultraviolet light is a type of electromagnetic radiation, which comes from the sun, is invisible to human eye. UV intensities increase with altitude.

We know that, ozone layer present at the stratosphere. Ozone layer absorbs UV radiation. UV radiation, a carcinogen, can have a number of harmful effects on the skin. The two types of UV radiation that can affect the skin- UVA(320-400nm) and UVB(280-320nm). UV-A and UV-B, most powerful rays which are not absorbed by the ozone layer or partially absorbed deep into the skin and causes skin cancer. It can also cause problems with the eyes, premature aging, melanoma and the immune system.

More than 1 million people in the United States are affected with skin cancer. It is estimated that 90% of non melanoma skin cancers and 65% of melanoma skin cancers are associated with exposures to UV radiation from the sun.

2. Protection Against Exposure to Ultraviolet Radiation:

Early civilizations used a variety of plant products to help protect the skin from sun damage.

- Wear tightly-woven clothing that blocks out light.
- Slap on sunscreen.
- Slap on a hat.
- Wrap on sunglasses to protect the eyes.

3. How Can We Protect Our Children?

Children need special attention. Because children will be exposed to UV radiation for their whole lives. They spend more time outdoors, can burn more easily and may not be aware of the dangers. Parents protect children from excess sun exposure using hats and protective clothing. Keep babies or children out of direct sunlight.

4. How Do Sunscreens Work?

Sunscreens protect our skin by absorbing or reflecting UVA and UVB rays. Sunscreen is perhaps the best weapon available in the fight against skin cancer and premature aging. Sunscreen prevents ultraviolet light reaching the skin but reduces the synthesis of vitamin D.

5. Cyanobacteria: The Future of Sunscreen?

Sunscreen and moisture derived from biological sources such as cyanobacteria. Cyanobacteria are photosynthetic, oxygen-evolving prokaryotic organisms present on Earth for approximately 3.5 billion years. Cyanobacteria have higher growth rates. Cyanobacteria make compounds such as mycosporine-like amino acids and scytonemin. So, cyanobacteria are bio-factories for production of UV-screening compounds.

6. Role For Governments and Other Agencies

- Establish education programmes for teachers (primary and secondary school)
- UV protection materials for distribution to the public.
- Save lives by increasing awareness of skin cancer and how to protect against it.
- Support and encourage research on health effects of UV and protective measures.

References

- [1] Browne N, Donovan F, Murray P, Saha SK, Cyanobacteria as bio-factories for production of UV-screening compounds.
- [2] Ultraviolet Radiation, Environmental Health Criteria 160, World Health Organization, United Nations Environmental Programme, International Commission on Non-Ionizing Radiation Protection, WHO, Geneva, 1994.