Understanding the Power of Light to Kill Germs

Deoxyribonucleic Acid (DNA) and Ribonucleic Acid (RNA) are the genetic materials that make up all living organisms. These are responsible for controlling the growth, development, functioning, and the reproduction of these organisms. These acids that make up all living organisms can be damaged by UV radiation. UV or Ultraviolet radiation produces electromagnetic energy that can disrupt an organism’s ability to reproduce and when prolonged exposure occurs, it can lead to permanent inactivation and can lead to either mutation or cell death (VioletDefense.com).

How UV-C light kills Microbes

According to Ploydaeng et al., since mid 18-th century, there have been studies relating to UV-C lights and their capacity to prevent microbial growth. UV-C lights are mostly absorbed by DNA and RNA of an organism which can make them unable to produce and will eventually lead to mutation and/or cell death. The radiation frequently causes thymine and cytosine, two pyrimidine nucleoside bases, to cross-link and become non-pairing bases in the same DNA strand. Cyclobutyl pyrimidine dimers are the most prevalent photoproducts in DNA (CPD). By interfering with DNA replication, transcription, and translation, this product impairs cellular activity, which in turn causes bacterial cell death and viral inactivation.

UV-C Effectiveness towards Pathogens

MDR or Multidrug-Resistant Pathogens are one of the reasons why there are certain increases in mortality rates. The number of these pathogens is significant to the increase of deaths because these make it harder for professionals to cure their patients when they are inflicted with these pathogens that are resistant to drugs such as antibiotics. Researchers Yang et al. conducted a research regarding these pathogens and their reaction towards UV-C lights especially to those MDR pathogens that are common in hospital areas. They exposed MDR-Pseudomonas aeruginosa, MDR- Acinetobacter baumannii, methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant Enterococcus faecium (VRE), Mycobacterium abscessus and Aspergillus fumigatus to UV-C lights and observed if there will be an effect to these pathogens. The research concluded that UV-C light can deactivate and kill these MDR pathogens after the 15-minute-long exposure to UV-C light.

*How UV kills germs*. Violet Defense. (2017). Retrieved July 4, 2022, from <https://www.violetdefense.com/howitworks>

Ploydaeng, M. (2017, September). *UV-C light: A powerful technique for ... - Wiley Online Library*. Retrieved July 4, 2022, from <https://onlinelibrary.wiley.com/doi/10.1111/phpp.12605>

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