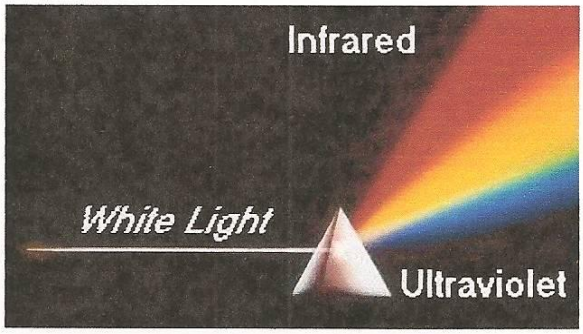
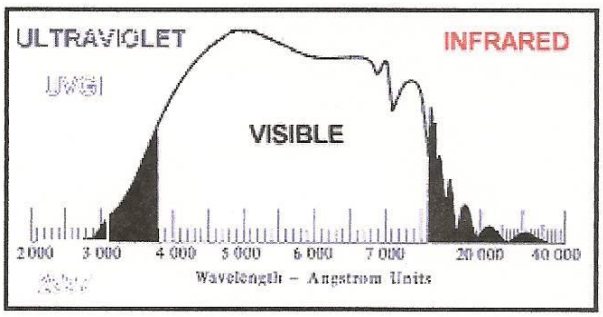
As many people know, white light can be passed through a prism to separate the white light into a rainbow of colors.



On the blue side of the rainbow, which corresponds to higher frequencies and shorter wavelengths, one finds ultraviolet (UV) light which is actually invisible to the naked eye.

The ability to use ultraviolet irradiation for sterilization of DNA-based microorganisms has been known since the 1930s when it was learned that all such microbes are vulnerable to the effects of light at wavelengths in the vicinity of 253.7 nanometers. The vulnerability stems from the proximity of the 253.7 nm wavelength to the resonance of molecular structures, particularly DNA.



A structural resonance occurs at a wavelength (or associated frequency) where a structure has difficulty dissipating the energy at that frequency. As a result, to dissipate the energy, the structure must itself 'vibrate' at the same frequency but with progressively greater amplitude. Relative to DNA for microbes the high amplitude vibration eventually rips the DNA apart and renders a pathogen inactive and unable to reproduce. It is the ultraviolet component of sunlight that causes microbes to die in the outdoor air.

Although the same resonance phenomenon occurs with humans, the damage is restricted to the skin and the eyes. This is because these outer cell layers, even after they've been destroyed (badly sunburned), still remain with the body and continue to absorb all UV-C light, thereby preventing further immediate lethal damage.

For further information visit Penn State University:
http://www.engr.psu.edu/ae/iec/abe/