The Degradation of Optical Brighteners when Exposed to Ultraviolet Light

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Optical Brighteners are frequently used as an additive in manufactured goods to enhance the appearance of said goods. Concerns regarding their toxicity in freshwater supplies led to an experiment being conducted to determine whether there was a way that ultraviolet light could be used in filtration systems to degrade the brighteners. It was hypothesized that stronger wavelengths of ultraviolet light would cause the brighteners to degrade more readily. To perform the experiment, the brighteners were placed into petri dishes under visible light, ultraviolet lamps with wavelengths of 365 nanometers (nm) and 302 nm, and a control group that was not exposed to any light. After the brighteners were irradiated, the composition of the solution was tested using thin-layer chromatography and spectrophotometry. After viewing the results, it was found that visible light and ultraviolet light with a wavelength of 365 nm were most effective at degrading the brighteners. While the results did not support the hypothesis, the experiment did suggest that, at certain wavelengths, the ultraviolet light did have an effect on the brighteners. Whether these results were due to chance, or if they are scientifically accurate is unknown. As such, more trials will need to be performed to ensure the validity of the experiment.

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