Hydroxyapatite as a Novel, Efficacious, and Marine Friendly UV-Filter

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Annually, skin cancers make up a high proportion of preventable deaths. By applying sunscreen, the risks of developing skin cancers decrease considerably. However, sunscreens significantly contribute to coral bleaching. Using a calcium-based, novel UV-filter Hydroxyapatite, this investigation tested its UV-absorbance properties, and impacts on the survival of the algae Chlorella vulgaris. Varying concentrations of Hydroxyapatite and an existing UV-filter Oxybenzone were analyzed with UV-spectrophotometry to conduct spectra absorbance analysis. Subsequently, both compounds were introduced to C. vulgaris for 7 days, with changes to color representing the compounds' impacts on algal survival. Results showed that 0.4% Hydroxyapatite had equivalent peak absorbance to 0.005% Oxybenzone (2.0748 and 2.1976 AU respectively). Additionally, whilst Oxybenzone only demonstrated absorbance between its active range, Hydroxyapatite demonstrated consistent absorbance throughout the measured spectrum (280.0 – 480.0nm). 0.4% Hydroxyapatite exhibited a positive 44.76% change to C. vulgaris color (SD 1.3315, n=5/concentration), and thus promoted C. vulgaris survival. On the contrary, 0.005% Oxybenzone exhibited a negative 8.53% change (SD 0.9149, n=5/concentration), demonstrating inhibitory effects on C. vulgaris survival. Therefore, this investigation concludes that Hydroxyapatite is an efficacious, and marine-friendly alternative to conventional UV-filters. Consequently, the use of Hydroxyapatite in sunscreens may promote the stability of coral reefs and marine ecosystems and provide more effective sun care products with hopes of reducing skin cancer deaths. However, further experiments will need to analyze the specific pathways in which Hydroxyapatite impacts algal survival.

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