

A study of UV care by molecules contained in aloe—UV protection and singlet-oxygen quenching —

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The UV protection and singlet oxygen ($^1\text{O}_2$) quenching activity of intramolecularly hydrogen-bonded hydroxyanthraquinone derivatives found in aloe have been studied by means of laser spectroscopy. The UV protective activity provided by excited-state intramolecular proton-transfer (ESIPT) in these molecules correlates with their $^1\text{O}_2$ quenching activity, and the UV protective molecules have high $^1\text{O}_2$ -quenching function. The reason for this correlation can be understood by considering ESIPT-induced distortion of ground-state potential surfaces in encounter complexes with $^1\text{O}_2$. Some molecules contained in aloe have a quenching rate constant larger than that of vitamin E and have a long duration of action due to its resistance to UV degradation and chemical attacks by singlet oxygen and free radicals.