

**Spectrophotometric study on the formation of radical cation and dication of the carotenoid astaxanthin at room temperature**

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Radical cations and dications of the carotenoid astaxanthin were prepared at room temperature by chemical oxidation with  $\text{FeCl}_3$  in fluorinated alcohols 1,1,1-trifluoroethanol and 1,1,1,3,3,3-hexafluoroisopropanol at room temperature. Absorption spectra recorded in the 300-1700 nm range were found to be analogous to those determined recently by other authors for canthaxanthin in  $\text{CH}_2\text{Cl}_2$  at  $-70^\circ\text{C}$ . Especially designed experiments have shown the reversibility of dication formation from cation radical. The temporal stability of both cationic species at room temperature indicates a possibility to obtain long-lived radical cations and dications of astaxanthin for spectroscopic studies at low temperature.