

Study of the Photodegradation Process of Vitamin E Acetate by Optical Absorption, Fluorescence, and Thermal Lens Spectroscopy

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Abstract The stability of vitamin E acetate exposed to ultraviolet (UV) light was studied using three spectroscopic methods. An ethanol solution of vitamin E acetate was treated with either UVC light (254 nm) or UVA light (366 nm) during a period of 10 min followed by a study of UV–Vis optical absorption, then by fluorescence spectroscopy excitation by UV radiation at either 290 nm or 368 nm and, finally the solution was studied by thermal lens spectroscopy. Immediately, the same solution of vitamin E acetate was subjected to the UV irradiation process until completion of six periods of irradiation and measurements. UVC light treatment induced the appearance of a broad absorption band in the range of 310 nm to 440 nm with maximum absorbance at 368 nm, which progressively grew as the time of the exposure to UVC light increases. In contrast, UVA light treatment did not affect the absorption spectra of vitamin E acetate. Fluorescence spectra of the vitamin E acetate (without UV light treatment) showed no fluorescence when excited with 368 nm while exciting with 290 nm, an intense and broad emission band (300 nm to 440 nm) with a maximum at

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