

FLUORESCENCE LIFETIMES MEASUREMENTS OF α -TOCOPHEROL AND ITS GLYCOSIDES IN DIFFERENT ENVIRONMENTS

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Fluorescence lifetime of newly synthesized dl-alpha-tocopherol (dl-T) β -glucoside, β -galactoside, α -mannoside and glucoside-ortho acetate in organic solvents and DMSO/water solution have been measured in order to find correlations between obtained spectroscopic data and physical properties of the molecule microenvironment. Investigations were also carried out for tocopherol derivatives, 6-chromanol and Trolox and their β -glycosides derivatives.

The shortest lifetime was found for dl-T at 1.12 ns whereas all other glycosides derivatives exhibit longer lifetimes ranging from 4.2 to 6.1 ns. The presented data indicate that after glycosylation of dl-alpha-tocopherol the fluorescence lifetime increases. Also the width FWHM of fitted Gaussian distribution increased significantly compared to dl-tocopherol molecule. 6-chromanol fluorescence lifetime 2.5 ns is close to that of dl-tocopherol whereas for Trolox the calculated lifetime is 5.1 ns. It seems that in 6-chromanol 2a position substituted with CH₃ group still preserves hydrophobic character of phytyl chain present in tocopherol molecule. In Trolox substituted at 2a position with COOH group, its presence changes the electron density distribution what leads longer fluorescence lifetime. Fluorescence lifetimes dl-T glycosides were independent on protic character of organic solvents and was around 4 ns. Measured lifetimes were independent on the glycosides concentration in the range of 50 μ M to 1.5 mM. This observed lack of self-association between glycosides is very probably due to presence of sugar moiety at chromanol ring what imposes steric hindrance precluding formation of aggregates. Fluorescence lifetime increased along with solvent viscosity increase.