SYNTHESIS AND CHARACTERIZATION OF THE WATER-SOLUBLE $^1O_2$ TRAP ANTHRACENE-9,10-DIVINYLSULFONATE

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Singlet oxygen ($^1O_2$) is a potent oxidant and can react with several biomolecules. Anthracene-9,10-divinylsulfonate (AVS) is a hydrophilic and ionic anthracene derivative, intermediate of a 2-steps synthesis of anthracene-9,10-diethylsulfonate (AES), that is also suitable as a $^1O_2$ trap.The aims of this work is to synthesize high quantity and to evaluate important characteristics of AVS that are fundamental to its application in biological investigations. UV/Vis spectrum of AVS shows four mainly absorption peaks at 259, 360 (shoulder), 380 and 396 nm (ε = 3982, 592, 983 and 1036 $M^{-1}cm^{-1}$, respectively), while its fluorescence is maximized with λ_{ex} = 396 nm and λ_{em} = 493 nm. Product analyses (HPLC with UV/Vis, fluorescence and MS detection) of AVS photosensitization with methylene blue or rose bengal showed the corresponding 9,10-endoperoxide ($AVSO_2$) as the main product. Other three products were identified, probably due to side reactions of these sensitizers. However, product analyses of AVS reaction with a clean source of $^1O_2$ (1,4-dimethylnaphthalene endoperoxide) showed only the presence of $AVSO_2$. A preliminary cellular viability test showed AVS was not toxic for neuroblastom SH-SY5Y cells until 5 mM. The properties of AVS characterized in this work demonstrate its potentiality as a $^1O_2$ chemical trap in biological investigations.

Keywords: singlet oxygen; chemical trap; anthracene endoperoxide.
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