

Efficient Synthesis of Mono- and Diselenylated Fluorescein Derivatives: Arylseleninic Acids as Selenylating Agents to Prepare Fluoroprobes

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ABSTRACT

Benzeneseleninic acids (BSA), are bench-stable selenium(IV) species that can be used as a selenylating agent in reactions under thermal or photochemical conditions. They selectively form C-Se bonds with electron-rich species, producing only water as a byproduct.¹ Considering the structure of fluorescein (**1**) with electron-rich sites, its reaction with BSA (**2**) resulted in mono- and (bis)selenylated fluorescein derivatives (**3** and **4**), using ethanol as a green solvent, thus avoiding the use of unstable and harmful reagents (Scheme 1). A total of 14 derivatives, of which 9 are new, with yields ranging from 10% to 98%. Furthermore, complementary studies were carried out on the photophysical properties of compounds **3a** and **4a** (Ar = Ph) to explore new applications (Figure 1). In addition, fluorescence emission occurs when the molecules are subjected to an oxidizing medium, indicating that the molecules can act as indicator probes in redox environments (Scheme 2).²

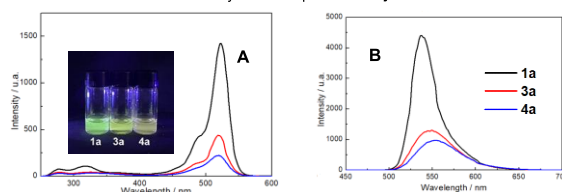
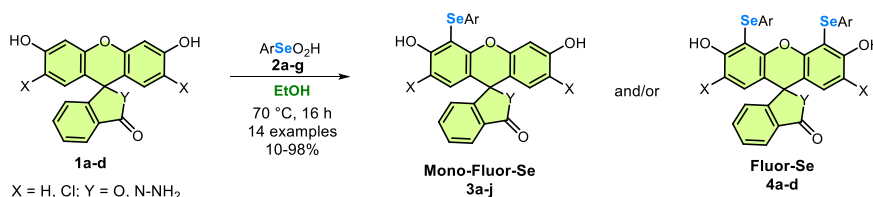
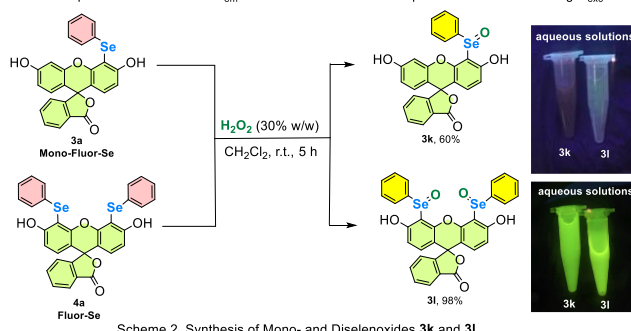


Figure 1. Excitation (A) and emission (B) spectra of **1a**, **3a**, and **4a** in DMSO in the presence of 0.1 mol L of TEA. The inserts show solutions of the probes exposed to UV light ($\lambda_{\text{exc}} = 365$ nm). The concentration of the probes was 3.0×10^{-6} mol L⁻¹. The excitation spectra were carried out $\lambda_{\text{em}} = 550$ nm and the emission spectra were collected using $\lambda_{\text{exc}} = 550$ nm.



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