

**Title:** Synthesis and characterization of new coumarin-based fluorophores.

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Fluorophores based on organic molecules have become powerful tools in the bioscience field, especially those with absorption and emission within the far-red and near-infrared (NIR) region of the electromagnetic spectra, since this radiation is optimal for *in vivo* bioimaging applications owing to the lack of toxicity and deep tissue penetration. Recent studies have evidenced that coumarin-based derivatives are ideal candidates for developing new fluorescent dyes as a result of their well-established photophysical properties, high cellular permeability and biocompatibility.

This work has been focused on the synthesis of new coumarin derivatives in which the position 2 of the coumarin skeleton has been modified with *N*-alkylated heterocycles (pyridine and pyrimidine) to red-shift the absorption and emission maxima. In addition, the synthesis of 2-(1,3,5-triazin-2-yl)-acetonitrile has been explored, which will be used for the synthesis of triazinyl-containing fluorophores. Finally, a new coumarin scaffold has been prepared in two synthetic steps, which will be a key precursor in the synthesis of novel coumarin-based caging groups.

**Keywords:** fluorophores, bioimaging, coumarins, organic synthesis, coumarin-based caging groups.