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Selective and efficient detection of picric acid among other nitroaromatics by NIR fluorescent cyanine chemosensors

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Abstract

Designed and synthesized a fluorescent probe composed of a Hemi cyanine dye bearing conjugated N, N-dimethyl amino benzaldehyde based fluorophore **C1** and **C2** as a new visible and near-infrared chemo dosimeter type sensor on highly sensitive and selective chemosensors. The color change and quenching of the dye emission are selective detections of picric acid at nanomolar concentration is accomplished in water medium without having any interference from other NAC's. The protonation and deprotonation between N,N-dimethylaniline, and N,N-diethyl aniline units will prompt to the changes in the targeted ICT molecules and the emission response can be detected on distinct NAC. The dyes C1 and C2 set out toward NACs was explored in the THF-H_2O medium by UV-vis and fluorescence spectra situated around 560 nm with high molar absorption coefficient. NMR spectroscopic titrations in DMSO-d_6 for affirming the interface between the picric acid with C1 ^{1}H NMR was utilized to confirm our proposed mechanism. The as-synthesis of cyanine dyes C1 and C2, involves condensation reaction between (1.0 equiv) of 1,1,2,3-tetramethyl-1H-benzo[e]indol-3-ium iodide 2 with (1.1 equiv.) p-N,N-dimethyl amino benzaldehyde, and catalytic amount of piperidine in ethanol continued by reflux for 7 h under idle states, in this