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Fluorescent probes for detection of Picric acid explosive: A greener approach

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ABSTRACT:

Green materials with advantages of low cost and high sensitivity is important from the perspective of human health, environment and homeland security. Herein, we have reported two cost effective modified biomaterials as fluorophores for detection of picric acid in aqueous state. The biomaterials Scutellarin - Hispiduloside and Curcumin have been modified with green solvent glycerol for Picric acid detection in aqueous solution. The Limit of detection for Picric acid by Scutellarin- Hispiduloside- glycerol and Curcumin- glycerol are 9.1×10^{-8} M and 6.03×10^{-8} M respectively. These luminescence based sensors have also been able to detect Picric acid in real samples with high efficiency. The fluorescence quenching efficiency of Scutellarin- Hispiduloside- glycerol has been found to be 99% while that for Curcumin- glycerol, it is 88.9% for 0.5 μ M Picric acid in aqueous state. In both the cases, the quenching is governed by FRET between the fluorophore and the quencher and the FRET efficiency has been found to be 0.968 and 0.792 respectively. In addition, both the systems show excellent selectivity towards PA in presence of other nitroaromatic compounds and are also statistically accessible. The utilization of readily available cheap biomaterials without using multistep protocol for synthesis and devoid of any kind of sophisticated equipments for the process further enhances the utility of the method.

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