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One-step green synthetic approach for the preparation of multicolor emitting copper nanoclusters and their applications in chemical species sensing and bioimaging

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Abstract

One-step green microwave synthetic approach was developed for the synthesis of copper nanoclusters (Cu NCs) and used as a fluorescent probe for the sensitive detection of thiram and paraquat in water and food samples. Unexpectedly, the prepared Cu NCs exhibited strong orange fluorescence and showed emission peak at 600 nm, respectively. Under optimized conditions, the quenching of Cu NCs emission peak at 600 nm was linearly proportional to thiram and paraquat concentrations in the ranges from 0.5 to 1000 μ M, and from 0.2 to 1000 μ M, with detection limits of 70 nM and 49 nM, respectively. In addition, bioimaging studies against *Bacillus subtilis* through confocal fluorescence microscopy indicated that Cu NCs showed strong blue and green fluorescence signals, good permeability and minimum toxicity against the various

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