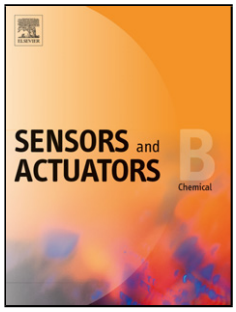

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Synthetic Green Fluorescent Protein (GFP) Chromophore Analog for Rapid, Selective and Sensitive Detection of Cyanide in Water and in Living Cells

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Research Highlights

a) THBI is the first turn-on fluorescent chemodosimeter for rapid (in less than 5s) detection of cyanide in water.
b) THBI is a novel synthetic GFP chromophore analog, synthesized in only three steps (22 % overall yield) with readily available starting materials.
c) The probe exhibited excellent selectivity and 24-fold fluorescence enhancement towards cyanide over all other anions used (F^-, Cl^-, Br^-, I^-, PF_6^-, ClO_4^-, AcO^-, HSO_4^-, NO_2^-, NO_3^-).
d) THBI is found to be feasible for naked eye cyanide detection, since it exhibits rapid colour change from colourless to intense yellow in the presence of cyanide.
e) THBI has a very small detection limit of 0.17 µM (4.5ppb) which is much lower than WHO limit.
f) THBI can efficiently detect cyanide in water, in live cell and on the solid support, which gives opportunity to develop a commercially viable chemosensor kit for cyanide detection.
g) The approximate cost per measurement is calculated which is found to be less than 4 INR (0.07$). Hence this will be a cost effective strategy for detection of cyanide for commercial aspects.

Graphical Abstract