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Kodambakkam, Chennai - 600024, India

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**Selective and sensitive Chelating Sensor for the detection of Cd^{2+} -
A greener approach**
Dr. B. Medona, Dr .M. Priyadharsani, and S. Abhiseka*

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Selective and sensitive Chelating Sensor for the detection of Cd^{2+} - A greener approach

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Abstract

A Novel chemosensor (L1) derived from 4 aminoantipyrine was synthesized by microwave irradiation in a greener approach. It was characterized by Ft-IR, H- NMR and HR-LCMS mass spectrum. The specific selectivity of the sensor towards the sensing of Cd^{2+} was effectively studied colorimetrically and by fluorescence technique. The synthesized sensor put on display strong "turn-on" fluorescence and promising selectivity towards sensing of Cd^{2+} ions in ethanol. The binding of Cd^{2+} with the synthesized sensor was confirmed by UV-Visible spectrum with an isobestic point at 430 nm. L1 forms 1:1 complex with Cd^{2+} which was further confirmed by HR-LCMS mass spectrum and Job's plot analysis. When Cd^{2+} binds with L1 PET process gets inhibited thereby enhancing the fluorescence intensity. CHEF takes place as a part of the sensing mechanism. The reversibility of L1 was analyzed by EDTA. The detection limit was found out to be $0.02 \mu\text{M}$. Real sample analysis was performed for the practical applicability of L1 using various water samples. DFT study supports the four coordination of Cd^{2+} with L1. Fluorescence cell imaging of $\text{L1}+\text{Cd}^{2+}$ complex was performed which also supports the fluorescent nature of $\text{L1}+\text{Cd}^{2+}$ in L929 cells. Test strips study also confirms the fluorescent nature of $\text{L1}+\text{Cd}^{2+}$.