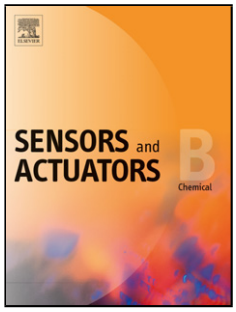

Title: Synthesis, Characterization, and Application of a Novel Water-soluble Polyethyleneimine-based Schiff base Colorimetric Chemosensor for Metal Cations and Biological Activity

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Synthesis, Characterization, and Application of a Novel Water-Soluble Polyethyleneimine-Based Schiff base Colorimetric Chemosensor for Metal Cations and Biological Activity

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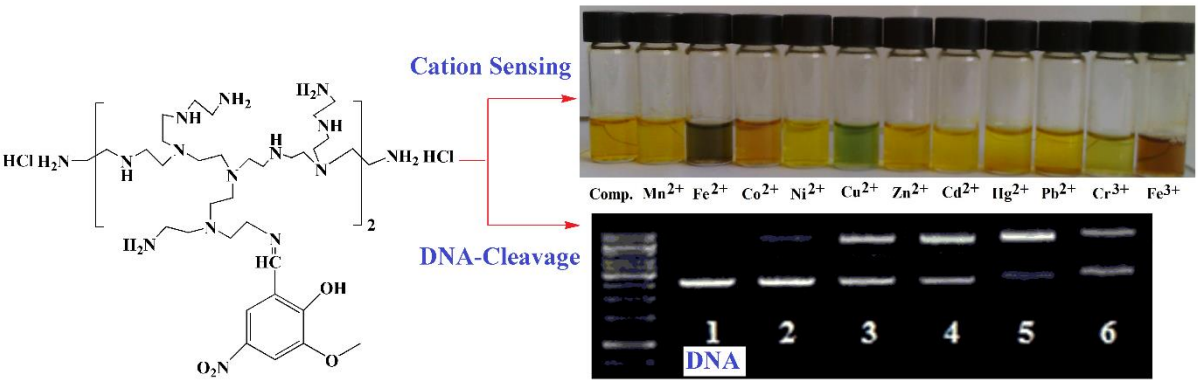
Graphical Abstract



Highlights

- A novel colorimetric cation sensor polyethyleneiminehydrochloride-based Schiff base was synthesized.
- The molecular structure was characterized by using IR, UV-Visible, NMR and LC-MS techniques.
- The chromogenic sensing ability of the Schiff base receptors in H_2O has been investigated.
- The potential binding ability of Schiff base to CT-DNA was characterized by means of UV-VIS spectroscopy.

ABSTRACT

A novel colorimetric cation sensor based on polyethyleneiminehydrochloride (PEI.HCl) as Schiff base was synthesized. The molecular structure of the PEI.HCl-Schiff base was characterized via FT-IR, ^{1}H-NMR, ^{13}C-NMR, LC-MS and UV-Vis spectroscopic methods. The chromogenic sensing ability of PEI.HCl-Schiff base was investigated with colorimetric and UV-Visible spectroscopy. The designed sensor exhibited highly selective recognition for Fe^{2+}, Co^{2+}, Cu^{2+}, Cr^{3+}, and Fe^{3+} amongst a wide range of metal ions tested in water. In the presence of these cations, the sensor underwent a dramatic colour change from yellow to green, while the presence of other metal cations such as Mn^{2+}, Ni^{2+}, Zn^{2+}, Cd^{2+}, Hg^{2+} and Pb^{2+} produced no effect on the colour. The absorption spectral changes were observed upon the addition of Fe^{2+}, Co^{2+}, Cu^{2+}, Cr^{3+}, and Fe^{3+}