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A Novel Spot Test for Detection and Identification of Neonicotinoid Insecticide Imidacloprid and Possible Antidote for Imidacloprid Poisoning

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ABSTRACT

A novel chromogenic reagent and colorimetric test is reported for highly specific and sensitive detection and identification of neonicotinoid insecticide Imidacloprid (N-[1-[(6-chloropyridin-3-yl)methyl]-4,5-dihydroimidazol-2-yl]nitramide). Imidacloprid reacts with ferrous (Fe^{2+}) ions in alkaline medium to form a very intense deep pink colour. Conversely alkaline solution of Imidacloprid can be used as colorimetric reagent for detection and identification of biologically important ferrous ions. The probable use of ferrous ions as an antidote for imidacloprid poisoning cases is also discussed.

Graphical Abstract

Spot tile showing reaction product of Imidacloprid, ferrous sulphate and sodium hydroxide with each other. (A) and (D)-First imidacloprid, then NaOH and then ferrous sulphate. (B)-First Imidacloprid and then ferrous sulphate (but no sodium hydroxide), (C)-First ferrous sulphate and then NaOH (but no imidacloprid), (E)-imidacloprid and then NaOH (but no ferrous sulphate)

Keywords: Imidacloprid, Spot test for Imidacloprid, Ferrous ions, Coordination chemistry, Nitramide functional group, organic analytical reagent