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An Ultra-Specific Chromogenic Reagent for TLC Detection and Identification of Paraquat and Design of an Ultra-Low-Cost Sensor for the Field Detection of Viologens

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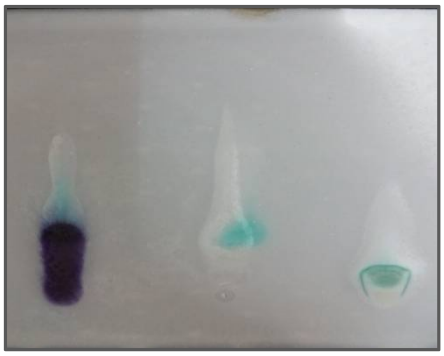
ABSTRACT

A novel chromogenic spray regent is reported for thin-layer chromatographic detection and identification of widely used but highly toxic herbicide paraquat. Paraquat is instantly reduced by alkaline stannous chloride to an intense purple compound which is a radical cation of the parent compound. The reagent is suitable for spot test, wet test and also as a thin-layer chromatographic staining reagent with approximate sensitivity of 10 μg. As the reagent is ultra-specific for viologens, a low-cost chalk based chemosensor is also designed for instant on the field detection of viologens.

Graphical Abstract



TLC showing reduction of paraquat by stannous chloride to purple compound.

Highlights:

- A novel thin-layer chromatographic staining reagent for detection of paraquat herbicide.
- Ultra-low-cost chalk based sensor for on the field forensic investigation of paraquat.

Keywords: Paraquat Herbicide, Viologens, Chromogenic spray reagent, Stannous chloride, Chalk based sensor, Chemosensor for viologens.