A low-cost iron (II) test kit for wastewater analysis using smartphone color capture application

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A paper-based test kit for determination of iron (II) in wastewater was developed from the reaction of 1,10-phenanthroline obtaining absorption spectrum of tris-(1,10-phenanthroline) iron (II) complex. A series of standard iron (II) solutions at various concentrations was quantified by spectrophotometry at 510 nm. The color intensities of standards were recorded with color capture application on IOS smartphone. All color data were compared with color capture application in order to generate color code pattern. A set of iron (II) standard color photos was produced as benchmarking paper-based test kit for fieldwork analysis. Either standard color photos stored in smartphone or printed standard photos can be conveniently used on fieldwork analysis. Several parameters affecting color intensity patterns of iron (II) determination in wastewater analysis were also identified. The determined linear range concentration was 1.0-10.0 mgL^{-1} (r^2 = 0.9995). This paper-based test kit reduces chemicals uses and decreases cost of analysis. It is suitable for fieldwork analysis.

Keywords: Colorimetry; mobile phone detection; iron (II); 1,10-phenanthroline