

Development of Paper Based Analytical Devices for Analysis of Iron (III) in Natural Water Samples

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Abstract : A paper based analytical devices (PADs) for the analysis of Fe (III) ion in natural water samples is developed, using reagent from guava leaf extract. The extraction is simply performed in deionized water pH 7, where tannin extract is obtained and used as an alternative natural reagent. The PADs are fabricated by ink-jet printing using alkenyl ketene dimer (AKD) wax. The quantitation of Fe (III) is carried out using reagent from guava leaf extract prepared in acetate buffer at the ratio of 1:1. A color change to gray-purple is observed by naked eye when dropping sample contained Fe (III) ion on PADs channel. The reflective absorption measurement is performed for creating a standard curve. The linear calibration range is observed over the concentration range of 2-10 mg L⁻¹. Detection limited of Fe (III) is observed at 2 mg L⁻¹. In its optimum form, the PADs is stable for up to 30 days under oxygen free conditions. The small dimensions, low volume requirement and alternative natural reagent make the proposed PADs attractive for on-site environmental monitoring and analysis.

Keywords : green chemical analysis, guava leaf extract, lab on a chip, paper based analytical device

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