

A Highly Sensitive Dip Strip for Detection of Phosphate in Water

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Abstract : Phosphorus is an essential nutrient for plant life which is most frequently found as phosphate in water. Once phosphate is found in abundance in surface water, a series of adverse effects on an ecosystem can be initiated. Therefore, a portable and reliable method is needed to monitor the phosphate concentrations in the field. In this paper, an inexpensive dip strip device with the ascorbic acid/antimony reagent dried on blotting paper along with wet chemistry is developed for the detection of low concentrations of phosphate in water. Ammonium molybdate and sulfuric acid are separately stored in liquid form so as to improve significantly the lifetime of the device and enhance the reproducibility of the device's performance. The limit of detection and quantification for the optimized device are 0.134 ppm and 0.472 ppm for phosphate in water, respectively. The device's shelf life, storage conditions, and limit of detection are superior to what has been previously reported for the paper-based phosphate detection devices.

Keywords : phosphate detection, paper-based device, molybdenum blue method, colorimetric assay

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