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A RAPID COLORIMETRIC METHOD FOR MEASURING DISSOLVED
INORGANIC ARSENIC CONCENTRATIONS IN GROUNDWATER

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Arsenic contaminated groundwater consumed by millions of people in the developing world has become a major health concern, particularly in Bangladesh. We report here an optimization of the colorimetric method of Johnson and Pilson (1972) that lowers the detection limit for As to 2 $\mu\text{g/L}$ in groundwater containing up to 30 μM phosphate. The optimization includes an increase in the concentration of three reagents: the oxidizing reagent used for sample pre-treatment and both the ascorbic acid and antimonyl tartrate present in the color reagents. These modifications lower the reaction time from 2-3 hours to 10 minutes. Analysis of a NIST natural water standard by the optimized method yields As concentration of $22 \pm 5 \mu\text{g/L}$ ($n=3$), compared to a certified value of 26.7 $\mu\text{g/L}$. Mean recovery for different groundwater samples was $101 \pm 2.6\%$ ($n=43$). Colorimetric analysis of a set of 43 groundwater samples from Bangladesh also agrees well with laboratory analysis by atomic absorption. Application of this method in the field on 11 groundwater samples with concentrations of As and phosphate ranging from 0 to 250 $\mu\text{g/L}$ and 2 to 35 μM , also compares well with laboratory analysis by atomic absorption.