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Kinetic Spectrophotometric Determination of Trace Amounts of Iodide in Food Samples

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A simple, selective and sensitive kinetic method has been developed for the determination of trace amounts of iodide. This method is based on a catalytic effect of iodide on the reaction between Janus Green and bromate in acidic media. Trace amounts of iodide increase the rate of a reaction that is monitored spectrophotometrically at 618 nm by a fixed-time method at 30 s. Effective parameters on the reaction rate, such as the concentration of reactants, temperature and reaction time, were investigated and the optimum conditions were obtained (6.0×10^{-2} mol L^{-1} of sulfuric acid, 2.50×10^{-5} mol L^{-1} of Janus Green, 1.75×10^{-2} mol L^{-1} of bromate, 30°C and 180 s). The calibration curve was linear between 0.5 – 190.0 μg L^{-1} of iodide, and the relative standard deviations (n = 5) for 10.0 and 100.0 μg L^{-1} of iodide were 1.2 and 1.8%, respectively. The limit of detection was 0.12 μg L^{-1} of iodide concentration. The effects of various substances upon the reaction rate were determined for assigning the selectivity of the method. The proposed method was successfully applied to the determination of iodide in food samples. The new developed method was found to have fairly good selectivity, sensitivity, simplicity and rapidity.

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