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Problems in Urinary Iodine Determination Methods and an Automated Kinetic Assay As a Solution

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Abstract: Accurate, fast and economical urinary iodine measurement is very important in diagnosing iodine deficiency disorders. The urinary iodine determination method using ammonium persulfate digestion based on the Sandell-Kolthoff reaction was optimized and modified to kinetic and automated assay. Ammonium persulfate digestion was performed at +95 ºC in a water-bath to ± 0.1 ºC precision. The performance of both the Sandell-Kolthoff reaction at 37 ºC and its kinetic measurement at 340 nm was tested in a random access automated analyzer. For method comparison, urinary iodine concentrations were measured using both the conventional chloric acid digestion method and the kinetic automated method in 66 randomly selected apparently healthy peoples' urine samples and five working iodine calibrators. The method agreed well with the conventional chloric acid digestion method (n = 66; r = 0.937 ;y = 0.895x + 0.149; Sy/x = 0.136). The detection limit of assay was 0.10 µmol/L. The mean recovery of iodine was 97% (87-107%). The intra- and interassay CVs for samples with iodine concentrations between 0.20 and 3.14 µmol/L were £ 10%. Our study suggested that urinary iodine should be determined by kinetic reading at 340 nm wavelength in an automated analyzer instead of by manual endpoint measurement at 410 nm.The kinetic procedure presented here therefore offers an easier,faster,more accurate,and more economical method.

Key Words: Iodine, ammonium persulfate digestion, photometric assay, urine, automation

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