

Supaporn Srisupap 2014: Inorganic Arsenic Speciation by a Detector Tube and Hydride Generation Atomic Absorption Spectrometry. Master of Science (Chemistry), Major Field: Analytical Chemistry, Department of Chemistry. Thesis Advisor: Associate Professor Pakawadee Sutthivaiyakit, Ph.D. 112 pages.

Arsenic toxicity is a problem worldwide and in Thailand. It was first recognized in Ron Piboon District, Nakhon Si Thammarat Province. In this study, inorganic arsenic speciation in water samples based on detector tube method and hydride generation atomic absorption spectrometry were developed.

A detector tube containing a new color complex of 2-(5'-chloro-2'-pyridylazo)-5-aminoanisolepalladium(II) chloride as a sensing materials coated on silica gel was prepared. The method based on conversion of arsenic in water to arsine which the color of the sensing materials changed from blue to yellow and the length of color change was proportional to concentration of arsine. Total inorganic As(III) and As(V) were changed to arsine using Zn and sulphamic acid while arsenic(III) was changed to arsine using NaBH<sub>4</sub>. The linear range of 5 – 25 ppb for both As(III) and total inorganic arsenic with coefficient of determination of 0.9913 and 0.9911, respectively, were obtained. The precision of arsenic determination at 10 ppb (n=6) was 13.07% for As(III), and at 5 ppb and 20 ppb (n=10) were 8.85%, 11.05% for total arsenic.

In hydride generation atomic absorption spectrometry technique, citric acid was found to be a better selective medium for As(III) determination when compared with tris-(hydroxymethyl)aminomethane hydrochloride. Therefore, determination of As(III) was performed in citric acid. The total arsenic was determined in KI/HCl medium. The linear range of 1- 20 ppb for As(III) and As(V) with coefficient of determination of 0.9931 and 0.9972, respectively. The precision of arsenic determination at 5 ppb, 10 ppb and 20 ppb (n=10) were 5.38%, 1.96% and 3.57% for As(III), and 3.05%, 1.23% and 1.24, for total arsenic. The developed method has been successfully applied to determine arsenic(III) and arsenic(V) in well water samples collected in Nakorn Si Thamarat province, Thailand. Of ten samples, four samples contained total arsenic higher than 10 ppb.

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Thesis Advisor's signature