Thesis Title	**Development of Ion Chromatographic Method for the Analysis of Arsenic and its Application to Environmental Samples**
Name	**Sairoong Ouypornkochagorn**
Degree	**Master of Science (Applied Analytical and Inorganic Chemistry)**

Thesis Supervisory Commitee

Chatvalee	**Kalambaheti**	**Ph.D.**
Prapin	**Wilairat**	**Ph.D.**
Juwadee	**Shiowatana**	**Ph.D.**
Laddawan	**Pdungsap**	**Ph.D.**

Date of Graduation 8 May B.E. 2540 (1997)

ABSTRACT

Arsenic compounds are one of the many toxicant elements easily found in the natural environment. The toxicity of each arsenic compound is different according to its valency. For example, As(V) is less toxic than As(III), whereas both DMA and MMA were by far the least toxic arsenic compounds. Consequently, a number of analytical techniques are used to determine and

speciate the arsenic compounds. One of the well known techniques, ion chromatography was used by the researcher for this study.

The speciation of arsenic compounds were carried out by using two different chromatographic conditions. In the first system, 1.00 mM of 4-hydroxybenzoate and 1.50 mM KHP adjusted to pH 9.00 were employed to obtain the separation on Wescan Anion/R column (250 x 4.1 mm i.d.). The second system, was conducted on IC-Pak Anion column (50 x 4.6 mm i.d.) using 0.50 mM of KCl, 2.50 x 10^{-3} mM EDTA and 7.48 mM ammonium buffer, pH 9.00. Additionally, compounds were later detected by using a differential refractometor which offered better sensitivity than the conductivity detector. Results showed that both systems had similar disadvantages, such as interferent effect of chloride, nitrate and sulphate. The detection limits of the first system for AsO_2^- were 0.38 ppm, 2.05 ppm for $HAsO_4^{2-}$, and 3.91 ppm for $H_2AsO_3^-$. The second system had the detection limits of 0.27 ppm for MMA, and 0.77 ppm for $HAsO_4^{2-}$.

A new detection technique was applied with heteropolymolybdic reagent as a post-column reagent after separation of arsenic compound. The arsenic compound was detected at 730 nm. However, this technique required a pre-oxidizing step with 10.0 mM of potassium persulfate. More importantly only $HAsO_4^{2-}$, or As(V), could be derivatized with the post-column reagent.

Consequently, this detection system had less interfering effects and provided lower detection limit at the subppb level.