CHAPTER 4

CONCLUSIONS

Arsenic is considered to be a potentially toxic element in the environment. It is very well known that toxicity of As depends not only on the total concentration but also on the chemical species in which this analyte is present (Vassileva *et al*., 2001). The toxic and carcinogenic properties of arsenic species make their speciation in environmental samples vitally important.

This work describes the comparison of the performance of two techniques, FI-HG-AAS and CSV (SWCSV) for inorganic arsenic speciation in edible plant samples. From the comparative study of two techniques, it was found that each method has its own merits and limitations. FI-HG-AAS represents a useful technique for inorganic arsenic speciation, with good performance results (LOD, LOQ, precision, accuracy and sensitivity) but suffers with high costs and laborious sample preparation. Moreover, HG-AAS has limited linearity to the concentration of only 50 μgl^{-1} and it is recommended for analyte with low concentrations (Akter *et al*., 2005). In case of CSV, especially, in the SWCSV mode is a simple, new, cheap, selective and less labor technique but limited by its poor sensitivity (high LOD and LOQ). Although, CSV suffers with LOD value, it can provide wide linear range which can go up 100 μgl^{-1}. CSV presents also the benefits of much shorter warm up times prior to analysis compared with FI-HG-AAS. From this study, it may be stated that CSV is promising and alternative method for inorganic arsenic speciation in biological samples. However, these samples have to be contain arsenic much highly enough to be in above mentioned LOD values.

From the application of the two techniques to edible plant samples taken from contaminated areas, it can be concluded that water is an effective extractant for the extraction of inorganic species from Lemongrass and Turmeric samples. Greater than 93 % of total water-extracted arsenic has been extracted after ultrasonical extraction of As spiked samples.

The CSV technique represents poor sensitivity for trace amount of inorganic arsenic species detections in samples while FI-HG-AAS represents excellent sensitivity for both arsenic species. CSV was able to detect inorganic species (As^{III} and As^{V}) in only one sample of each

type of edible plant samples because of its high limit of detection ($>0.4\ \mu g l^{-1}$ for both As species). However, there were the similar values between total acid-digested arsenic values obtained by using FI-HG-AAS and SWCSV technique in edible plant samples and certified reference material (CTA-VTL-2). Moreover, it can also be concluded that inorganic arsenic species mainly found in edible plant samples were As^{V}. And it can be confirmed that As contents found in both samples not exceed the food safety limits for Thailand and several countries.