

CHAPTER V

DISCUSSION

The most important factors for the co-precipitation of As with $\text{Fe}(\text{OH})_3$ were the sample volume which was limited to ≤ 100 ml. and the arsenic concentration in the sample ($\leq 50 \mu\text{g./l}$) while the other factors eg. acidity, Fe^{3+} concentration and the stirring time had either wide reasonable ranges on less effect.

The optimum pH selected for the group preconcentration of Zn, Co, Cd; Sb, Mo, W, Hg; Cr (VI) and Se compounds on activated charcoal was respectively predominant on the rather sharp pH range found for each Zn, Sb, Cr (VI) and Se.

The decreasing of Zn-APDC chelate recovery yield on activated charcoal in relation to the increasing of the charcoal used as well as the stirring time was probably due to the deformation of the chelate on the charcoal's surface. Therefore the short contact time was preferable. This could be performed by the direct filtration of the chelate on the charcoal layer mounted on the radiochemical shimney instead of mixing the charcoal in the water aliquot.

In most cases there were no influence of salinity on the recovery yield, except for Cr (VI) in which the yield determination should be performed during the real analysis to solve this problem.

It is believed that these developed techniques can be applied to the wide varieties of water sample.

The reliability of the developed techniques was checked by analysing the Standard Reference Material. The results were in good agreement with the certified values for As, Sb, Co, Zn, Hg, Se, W and Mo. The proposed method was considered really fast and easy for operation.

Additionally, the pre-concentration techniques which could be done on board was having more advantages in avoiding the problem of the trace element composition change during storage and to reduce the difficulty in handling large amount of samples to the laboratory.

The group preconcentration of Co, Zn, Cd; Sb, W, Mo, Hg; Se and Cr (VI) on activated charcoal were very convenient since these techniques could be performed on the moving vessel at the sampling sites resulting very small concentrated fraction of the charcoal (not more than 100 mg./sample) which could be kept for a long period of time with out any deterioration. In addition, the charcoal itself was non-reactive in the thermal neutron irradiation thus allowing the direct gamma ray spectroscopic measurement where a very pure brand of charcoal was used.

Although the preconcentration of As by co-precipitation with $\text{Fe}(\text{OH})_3$ could not be performed on the moving vessel as the need of the stable floor where the precipitate could be settle down to avoid the long time filtration, the volume needed for the analysis

was quite small to handle (not more than 100 ml/sample). In addition, the time consumed during the ^{76}As adsorption on Al_2O_3 was only about 15 minutes. In general, the whole set of samples could be simultaneously processed. Therefore this technique was also practical for the routine analysis.

The limit of detections of the developed techniques were between 0.01-0.1 $\mu\text{g./l.}$ which were suitable for the analysis of natural water.