

## CHAPTER I

## INTRODUCTION

At present, the vast majority of the country's population depend on natural water resources, while only a few percent are being served by water supply systems. Water pollution problems arise in the country recently as a consequence of the industrial development. They are caused by the fact that people have been deprived of their natural use of river and canal water since many factories have gained access to rivers in order to utilize great quantities of river water for their manufacture-process and discharge the effluents back to the river without proper treatment. The control of industrial sewage treatment plants could be performed only when the pollution sources could be identified. Accurate and rapid methods for the analysis of water are therefore important. Apart from the assay for BOD, DO, salinity, pH, turbidity and bacterial count, which values give the general pollution condition of the water resource, it is necessary to investigate the metallic contaminants, since many elements are essential in trace concentration but become toxic in higher concentration.

Neutron activation analysis is a very important technique for the quantitative assay of a large proportion of the elements in the periodic table over a very large range. Nondestructive instrumental approach is very attractive, but

not always successful since the complex mixture of nuclides cannot be easily analyzed by gamma spectrometry. In the analysis of certain materials, excessive amount of certain nuclides, such as Na-24, so effectively mask the gamma spectrum that some short half-life nuclides cannot be detected. A particular useful approach for multielements analysis is to separate the complex nuclides mixture. The subsequent gamma spectrometric analysis of these nuclides is then much simpler and more reliable.

The purpose of the present study was to develop a separation scheme for the determination of some toxic elements in surface water samples after subjected to irradiation by neutrons. Major interests were Hg, Se, As, Sb and Cu. Since the normal contents of these elements in surface water are low, extreme sensitive method is required. The present investigation involves two chemical separation processes, the distillation of easily volatile hydride compounds and the formation of dithizonate complexes. The gamma activity of the separated samples were measured by a NaI detector.

Some typical results on the concentration of the mentioned elements in the water along the Lower Chao Phya River are reported.