PREFACE

Chemical analysis of sediments is one of the reliable techniques employed for the monitoring of metals in aquatic environments. To-date a number of reports are available on the baseline values of 'total metals' from different environments. Concurrently consistent efforts have been directed at developing techniques that could yield better information. Sequential chemical extractions that provide better insight into the environmental behaviour of trace metals by quantifying sediment bound trace metals susceptible to short-term processes, have caught the attention of many scientists. This thesis reports the attempts made by the author to explore the possibilities of a sequential chemical extraction scheme in delineating the behaviour of sediment bound trace metals, in the highly dynamic environments of a tropical estuary.

The thesis is presented in five chapters.

CHAPTER 1, the introduction, reviews the historical development of chemical partitioning technique as an effective tool in trace metal monitoring programmes. An update on scientific information about trace metals in the Cochin estuary is also provided together with the aims and objectives of the present investigation.
CHAPTER 2 describes the study area and details the materials and methods employed in this study.

CHAPTER 3 presents the data recorded on the physical and chemical parameters of the sediments such as moisture content, texture, organic carbon content and total trace metal concentration along with results and discussion. The seasonal and spatial variations observed have been critically analysed in relation to the varying estuarine conditions.

CHAPTER 4 presents the results and discussion on chemical partitioning of trace metals. The seasonal and spatial variations in distribution of the various fractions of iron, manganese, zinc, copper, cadmium, lead, cobalt, nickel and chromium have been discussed individually and the variations explained.

CHAPTER 5 deals with the interrelationship between metals, metal fractions and environmental parameters. Metal enrichment factors have also been worked out phase-wise. A critical commentary on the role of chemical partitioning of trace metals in the tropical estuarine environment is also presented.
The results of the present investigation have been/ are being published, as given below.


ii) Speciation of Mn, Fe, Cr, Ni, Zn and Co in the sediments of a tropical estuary (communicated to Environmental Geology and Water Science).

iii) Seasonal and spatial distribution of chemically determinable species of trace metals in sediments of Cochin estuary. (under preparation)

iv) An investigation on total trace metals in sediments of the Cochin estuary. (under preparation)

v) State of art in metal speciation - new perspectives. (under preparation)

vi) Exchangeable and organically bound trace metal levels in sediments in relation to estuarine chemical reactivity. (under preparation)

vii) Implications of metal fractionation in sediments - strategies in assessing trace metal levels in aquatic environments. (under preparation)