# TABLE OF CONTENTS

Appendices

1. List of tables
2. List of figures

1. Introduction
2. Review of Literature
   2.1 Historical perspective of the problem
   2.2 Microorganisms in detritus of marine macrophytes
      2.2.1 Detritus of *Spartina alterniflora*
      2.2.2 Detritus of seagrasses
      2.2.3 Detritus of macroalgae
      2.2.4 Detritus of mangroves
   2.3 Biomass estimation
   2.4 Biochemical changes in detritus
   2.5 Feeding ecology of detritivores
   2.6 Objectives of the present investigation
3. Materials and methods
   3.1 Litter bag experiments with *Sargassum cinereum*
      3.1.1 Area of study
      3.1.2 Experimental procedure
   3.2 Tank experiment with *Sargassum cinereum*
   3.3 Litter bag experiments with *Rhizophora apiculata*
      3.3.1 Area of study
      3.3.2 Experimental procedure
   3.4 Isolation and enumeration of fungi
   3.5 Biomass estimations
3.5.1 Direct microscopic biomass estimations of mycelial fungi in detrital material of \textit{S. cinereum} and \textit{R. apiculata} 31

3.5.2 Immunofluorescence detection and biomass estimation for thraustochytrids 32

3.5.2.1 Raising antibodies 33

3.5.2.2 Conjugation with fluorescein isothiocynate 34

3.5.2.3 Detection of thraustochytrids using immunofluorescence 35

3.5.3 Acridine orange direct counting and biomass estimation for bacteria 36

3.6 Biochemical analyses 37

3.7 Feeding experiments 38

3.7.1 \textit{S. cinereum} detritus as feed for the prawn \textit{Metapenaeus dobsoni} 38

3.7.2 \textit{R. apiculata} leaf detritus as feed for the prawn \textit{Metapenaeus dobsoni} 39

3.7.3 \textit{R. apiculata} leaf detritus as feed for the crab \textit{Sesarma quadrata} 40

3.7.4 Fungi as feed for the prawn \textit{Metapenaeus dobsoni} 41

4. Results 43

4.1 Detritus of \textit{Sargassum cinereum} 43

4.1.1 Numbers, species and succession of fungi using cultural techniques 43

4.1.2 Fungi isolated frequently from the detritus 50

4.1.3 Biomass estimation of thraustochytrids using immunofluorescence 51

4.1.4 Biochemical changes 53
4.1.5 Detritus of *S. cinereum* as feed for the prawn *Metapenaeus dobsoni* 56

4.2 Detritus of *Rhizophora apiculata* leaves 57

4.2.1 Qualitative and quantitative studies using cultural techniques 57

4.2.2 Fungi isolated frequently from the detritus 61

4.2.3 Biomass estimation of mycelial fungi using direct observation 63

4.2.4 Biochemical changes 64

4.2.5 Detritus of *R. apiculata* leaves as feed for the prawn *Metapenaeus dobsoni* 66

4.2.6 Detritus of *R. apiculata* leaves as feed for the crab *Sesarma quadrata* 66

4.2.7 Mangrove fungi as feed for the prawn *Metapenaeus dobsoni* 67

5. Discussion 68

5.1 Evaluation of Techniques 68

5.1.1 Litterbag experiments 68

5.1.2 Plating on nutrient media 72

5.1.3 Seawater incubation 73

5.1.4 Moist chamber incubation 74

5.1.5 Plating of homogenized material versus whole bits 74

5.1.6 Baiting and plating to isolate thraustochytrids 75

5.1.7 Surface sterilization 76

5.2 Species and succession of fungi in detritus of *S. cinereum* 78

5.3 Species and succession of fungi in detritus of *R. apiculata* leaves 81

5.4 General comments on species and succession of the two substrates 85
5.5 Numbers and biomass of fungi 87
5.6 Immunological techniques 91
5.7 Biochemical changes in detritus 96
5.8 Feeding experiments 112

6. Summary 119

7. References 123