

**EFFECT OF CARBON DIOXIDE SUPPLEMENTATION ON
Chlorella PRODUCTION IN A HIGH-RATE POND
TREATING RUBBER EFFLUENT**

by

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ABSTRACT

Rubber Effluent (RE) was proven to be a suitable medium for algal growth in two previous studies. In this present study the effect of inorganic carbon supplementation on the productivity of *Chlorella vulgaris* was investigated in flasks and outdoor pond cultures. In flask cultures the specific growth rate obtained for CO₂ supplemented cultures was between 0.64 and 0.56 day⁻¹. Generally flasks supplemented with CO₂ or molasses or both together showed a better growth rate than the rubber effluent control.

Outdoor pond studies using the High Rate Algal Pond in five different batches had higher growth rate with supplementation of CO₂ and molasses (1.19 day⁻¹) compared to CO₂ alone (0.96 day⁻¹). Algal biomass concentrations up to 602mgL⁻¹ for CO₂ supplementation and 542mgL⁻¹ when supplemented with both CO₂ and molasses were obtained. The *Chlorella* biomass had good nutritional value, with up to 68.3% protein, 22.7% carbohydrates, 13% lipids and 0.7mg g⁻¹ dry weight of carotenoids. Treatment efficiency of ponds was high, giving up to 97.9%, 90% and 52.5% reductions for COD, NH₃-N and PO₄-P respectively for the CO₂ treated ponds. Ponds supplemented with molasses did not have good COD reduction due to the recalcitrant substances in molasses.

TABLE OF CONTENTS

| | PAGE NO. |
|---|----------|
| ACKNOWLEDGEMENTS | i |
| ABSTRACT | ii |
| LIST OF TABLES | ix |
| LIST OF FIGURES | xi |
| LIST OF PLATES | xiv |
| LIST OF APPENDICES | xvi |
| | |
| CHAPTER 1 - INTRODUCTION | 1 |
| | |
| CHAPTER 2 - LITERATURE REVIEW | |
| | |
| 2.1 RUBBER INDUSTRIES IN MALAYSIA | 6 |
| 2.2 CURRENT TREATMENT SYSTEMS IN MALAYSIA | 8 |
| 2.3 CULTIVATION OF MICROALGAE | 12 |
| 2.3.1 Microalgal Cultivation Systems | 15 |
| 2.3.2 Algal Cultivation and Wastewater Treatment | 19 |
| 2.3.3 High Rate Algal Pond (HRAP) | 22 |
| 2.4 MICROALGAL BIOMASS - COMMERCIAL PRODUCTS | 24 |
| 2.5 CULTIVATION OF ALGAE IN RUBBER EFFLUENT | 24 |
| 2.6 PHOTOSYNTHETIC CO ₂ FIXATION | 33 |
| 2.6.1 Role of carbonic anhydrase (CA) in algal photosynthesis | 37 |
| 2.6.2 The Carbon Dioxide Concentrating Mechanism (CCM) | 39 |

| | | |
|-------|---|----|
| 2.6.3 | CO ₂ Fixation Modes | 42 |
| 2.6.4 | Photorespiration - loss of CO ₂ | 43 |
| 2.7 | HETEROTROPHY AND MIXOTROPHY IN ALGAE - UTILIZATION OF ORGANIC CARBON AND INORGANIC CARBON COMPOUNDS | 45 |
| 2.8 | POTENTIAL USES OF MICROALGAE | 47 |

CHAPTER 3 -MATERIALS AND METHODS

| | | |
|-------|--|----|
| 3.1 | <i>CHLORELLA VULGARIS</i> | 49 |
| 3.2 | INNOCULUM PREPARATION | 50 |
| 3.3 | SOURCE OF EFFLUENT | 52 |
| 3.4 | CHARACTERIZATION OF RUBBER EFFLUENT AND MOLASSES | 53 |
| 3.5 | LABORATORY STUDIES | 54 |
| 3.6 | HIGH RATE ALGAL POND STUDIES | 55 |
| 3.6.1 | The High Rate Algal Pond (HRAP) Design | 55 |
| 3.6.2 | Effect of CO ₂ and molasses supplementation in the HRAP | 55 |
| 3.6.3 | Semidiurnal Studies | 60 |
| 3.7 | ANALYTICAL METHODS | 60 |
| 3.7.1 | Algal cell count | 60 |
| 3.7.2 | Chlorophyll-a | 62 |
| 3.7.3 | Determination of algal dry weight | 62 |
| 3.7.4 | pH | 63 |
| 3.7.5 | Light | 63 |

| | |
|--|-----------|
| 3.7.6 Temperature and dissolved oxygen | 63 |
| 3.7.8 Daily solar radiation, sunshine hours and rainfall | 63 |
| 3.8 POLLUTION PARAMETERS | 64 |
| 3.8.1 Chemical Oxygen Demand (COD) | 64 |
| 3.8.2 Ammoniacal - nitrogen (NH ₃ -N) assays | 65 |
| 3.8.3 Dissolved orthophosphate (PO ₄ -P) assays | 66 |
| 3.8.4 Total Solids (TS) | 67 |
| 3.8.5 Total Suspended Solids (TSS) | 67 |
| 3.9 BIOMASS ANALYSIS | 67 |
| 3.9.1 Total crude protein | 67 |
| 3.9.2 Total dissolved carbohydrate | 68 |
| 3.9.3 Total lipids | 69 |
| 3.9.4 Total carotenoids | 70 |
| 3.10 GROWTH RATE | 72 |
| 3.10.1 Heterotrophic and Autotrophic Growth Rate | 72 |
| 3.11 ALGAL GROWTH POTENTIAL | 73 |

CHAPTER 4 -RESULTS

| | |
|---|-----------|
| 4.1 CHARACTERISTICS OF RUBBER EFFLUENT (RE) | |
| USED IN THE STUDY | 74 |
| 4.2 CHARACTERISTICS OF MOLASSES | 76 |
| 4.3 LABORATORY STUDIES | 77 |
| 4.3.1 Experiment I - Effect of CO ₂ supplementation at | |

| | |
|---|-----|
| 15min ⁻¹ in RE and BBM | 77 |
| 4.3.2 Experiment II - Effect of CO ₂ supplementation at 25min ⁻¹ | 77 |
| 4.3.3 pH and other variations during the growth of algae in the flasks | 80 |
| 4.4 GROWTH AND BIOAMSS PRODUCTION OF CHLORELLA IN THE HRAP | 82 |
| 4.4.1 Growth Curves based on cell count and chll-a | 82 |
| 4.4.2 Specific Growth Rate and Biomass Production | 88 |
| 4.4.3 Autotrophic and Heterotrophic Growth | 91 |
| 4.5 POLLUTION PARAMETERS | 93 |
| 4.5.1 Chemical Oxygen Demand (COD) | 93 |
| 4.5.2 Ammoniacal nitrogen (NH ₃ -N) | 98 |
| 4.5.3 Dissolve Orthophosphate (PO ₄ -P) | 101 |
| 4.5.4 Total solids (TS) and Total Suspended Solids (TSS) | 104 |
| 4.6 PHYSICAL PARAMETERS IN THE HRAP | 104 |
| 4.6.1 Dissolved oxygen (DO) | 110 |
| 4.6.2 pH | 113 |
| 4.6.3 Light irradiance and temperature | 116 |
| 4.7 BIOCHEMICAL COMPOSITION OF ALGAL BIOMASS | 116 |
| 4.7.1 Biochemical composition in Batches I and II | 116 |
| 4.7.2 Biochemical composition in Batches III and V | 116 |
| 4.8 SEMIDIURNAL STUDIES | 128 |
| 4.8.1 Algal Cell Density | 128 |
| 4.8.2 Chlorophyll-a content | 133 |

| | |
|--|-----|
| 4.8.3 Chl-a content per cell | 133 |
| 4.8.4 Dissolved Oxygen | 142 |
| 4.8.5 pH levels | 142 |
| 4.8.6 Light and Temperature conditions | 142 |

CHAPTER 5 - DISCUSSION

| | |
|--|-----|
| 5.1 EFFECT OF CO ₂ SUPPLEMENTATION ON <i>Chlorella</i> PRODUCTION | 159 |
| 5.2 EFFECT OF SUPPLEMENTATION OF CO ₂ TOGETHER WITH MOLASSES ON <i>Chlorella</i> PRODUCTION | 163 |
| 5.3 TREATMENT EFFICIENCY OF THE HRAP | 165 |
| 5.4 GENERAL PERFORMANCE OF THE HRAP | 169 |
| 5.4.1 <i>Chlorella</i> Biomass Production | 169 |
| 5.4.2 Biochemical Composition of <i>Chlorella</i> Biomass | 169 |
| 5.4.3 Statistical Analysis on coorelation of algal growth in the HRAP with physical chemical factors | 171 |
| 5.4.4 Mode of nutrition in the HRAP | 173 |
| 5.4.5 Semidiurnal Changes | 174 |
| 5.4.5.1 Cell count and chll-a | 174 |
| 5.4.5.2 Dissolved Oxygen | 175 |
| 5.4.5.3 pH | 175 |
| 5.4.5.4 Temperature and Irradiance | 176 |

| | |
|---|-----|
| 5.6 POTENTIAL USE OF THE HRAP IN THE RUBBER INDUSTRY | 177 |
| CHAPTER 6 -CONCLUSION | 180 |
| REFERENCES | 182 |
| APPENDICES | 194 |

LIST OF TABLES

| | | |
|-----------|--|----|
| Table 1.1 | Regulatory Standards of Water Course Discharge of Effluent from Rubber Processing Factories | 3 |
| Table 2.1 | Effluent characteristics of two main types of rubber processing factories | 7 |
| Table 2.2 | A summary of the different treatment systems currently practiced in Malaysia | 10 |
| Table 2.3 | Review of Efficiency of Treatment Systems | 11 |
| Table 2.4 | Review of HRAP treatment systems | 21 |
| Table 2.5 | Various commercial products from algae | 23 |
| Table 2.6 | Summary of initial experimental runs carried out at the Institute of Advanced Studies, University of Malaya | 31 |
| Table 2.7 | Summary of experimental runs carried out at the Institute of Advanced Studies, with molasses supplementation | 32 |
| Table 2.8 | General Overview of Photosynthetic Process Adapted by Algae | 41 |
| Table 3.1 | Summary of the laboratory experiments for CO ₂ supplementation | 61 |
| Table 3.2 | Summary of High Rate Algal Pond Studies | 61 |
| Table 4.1 | Average Characteristics of RE collected from Lee Latex (June 1993 - Dec 1993) and Atherton Estate, Nillai (Feb 1994 - July 1994) | 74 |
| Table 4.2 | Characteristic of molasses (obtained from Central Sugar Refinery) | 76 |
| Table 4.3 | Exp. I - Growth of <i>Chlorella vulgaris</i> in 1L flasks aerated | |

| | |
|--|-----|
| with 5% CO ₂ at 1L min ⁻¹ , 15min h ⁻¹ - Day 4 data | 78 |
| Table 4.4 Exp. II - Growth of <i>Chlorella vulgaris</i> in 1L flasks aerated with 5% CO ₂ at 1L min ⁻¹ , 25min hr ⁻¹ - Day 5 data | 78 |
| Table 4.5 Summary of growth and biomass results in High Rate Algal Pond studies | 89 |
| Table 4.6 Comparison of algal biomass concentration in different HRAP batches | 90 |
| Table 4.7 Specific Autotrophic and Heterotrophic Growth Rate of <i>Chlorella vulgaris</i> in the HRAP | 92 |
| Table 4.8 Summary of reduction in pollution parameters of RE monitored during HRAP batches | 94 |
| Table 4.9 Range of physical parameters obtained during each batch | 104 |
| Table 4.10 Biochemical composition of algal biomass obtained from HRAP - Batch I & II (Stationary phase) | 128 |
| Table 5.1 Algal Growth Potential (AGP) and the observed yield in the HRAP | 162 |
| Table 5.2 Gross biomass productivity obtained under batch culture conditions | 164 |
| Table 5.3 Final effluent quality in the HRAP | 167 |

LIST OF FIGURES

| | |
|---|----|
| Figure 2.1 Input and Output of microalgal mass culture | 16 |
| Figure 2.2 Calvin Cycle | 36 |
| Figure 2.3 A summary of for photosynthetic CO ₂ fixation | 36 |
| Figure 2.4 C ₄ - CO ₂ Fixation | 37 |
| Figure 2.5 Dual role of RuBisCo | 43 |
| Figure 2.6 Fate of phosphoglycolic acid | 44 |
| Figure 3.1 Inoculum preparation | 51 |
| Figure 3.2 Dimensions of HRAP, the paddle wheel, gas distribution system and motor mounting apparatus | 59 |
| Figure 4.1 Variation in the RE quality used in the HRAP batches | 75 |
| Figure 4.2 Experiment I - Semilogarithmic plots of growth curve of <i>Chlorella vulgaris</i> in BBM and RE supplemented with CO ₂ and molasses | 79 |
| Figure 4.3 Experiment I - Daily pH in flask cultures of <i>Chlorella vulgaris</i> in BBM & RE supplemented with CO ₂ and molasses | 79 |
| Figure 4.4 Experiment II - Semilogarithmic plot for growth of <i>Chlorella vulgaris</i> growth in BBM and RE supplemented with CO ₂ and molasses | 80 |
| Figure 4.5 Experiment II - Semilogarithmic plot of chlorophyll-a values of <i>Chlorella vulgaris</i> grown in BBM and RE supplemented with CO ₂ and molasses | 81 |
| Figure 4.6 Experiment II - Daily pH in flask cultures of <i>Chlorella vulgaris</i> in BBM & RE supplemented with CO ₂ | |

Figure 4.7 BATCH I - Semilogarithmic plot of chl-a and cell count for *Chlorella vulgaris* grown in HRAP where 5% CO₂ in air was bubbled into pond ICO from 0630 to 1830h at 20min h⁻¹ daily at flowrate of 5Lmin⁻¹

83

Figure 4.8 BATCH II- Semilogarithmic plot of chl-a and cell count for *Chlorella vulgaris* grown in HRAP where 5% CO₂ in air was bubbled into pond IICO from 0630 to 1830h at 20min h⁻¹ daily at flowrate of 5Lmin⁻¹

84

Figure 4.9 BATCH III- Semilogarithmic plot of chl-a and cell count for *Chlorella vulgaris* grown in HRAP where 5% CO₂ in air was bubbled into pond IIICO from 0630 to 1830h at 40min h⁻¹ daily at flowrate of 5Lmin⁻¹

85

Figure 4.10 BATCH IV- Semilogarithmic plot of chl-a and cell count for *Chlorella vulgaris* grown in HRAP where 5% CO₂ in air was bubbled into pond IVCO from 0630 to 1830h at 40min h⁻¹ daily at flowrate of 5Lmin⁻¹ and mol. added on day 2, 3 & 4 at 1830 in IVM

86

Figure 4.11 BATCH V- Semilogarithmic plot of chl-a and cell count for *Chlorella vulgaris* in HRAP where 5% CO₂ in air was bubbled into pond VMCO from 0630 to 1830h at 40min h⁻¹ daily at flowrate of 5Lmin⁻¹ and molasses added into VMCO at 1830 on day 2, 3 & 4

87

Figure 4.12 Chemical Oxygen Demand in HRAP (Batch I) where 5% CO₂ in air was bubbled in daily from 6:30 to 18:30

93

| | |
|--|-----|
| Figure 4.13 Chemical Oxygen Demand in HRAP (Batch II) where 5% CO ₂ in air was bubbled in daily from 6:30 to 18:30 | 95 |
| Figure 4.14 Chemical Oxygen Demand in RE treated in a HRAP system(Batch III) where 5% CO ₂ in air was bubbled in daily from 6:30 to 18:30 | 95 |
| Figure 4.15 Chemical Oxygen Demand in RE treated in a HRAP system(Batch IV) where 5% CO ₂ in air was bubbled in daily from 6:30 to 18:30 and 0.05% molasses was added in IVM on day 2,3 and 4 | 96 |
| Figure 4.16 Chemical Oxygen Demand in RE treated in a HRAP system(Batch V) where 5% CO ₂ in air was bubbled into VMCO daily from 6:30 to 18:30 and 0.05% molasses was added in VMCO on day 2,3 and 4 | 96 |
| Figure 4.17 Ammoniacal nitrogen in RE of HRAP (Batch I) where 5% CO ₂ was bubbled in daily from 6:30 to 18:30 | 98 |
| Figure 4.18 Ammoniacal nitrogen in RE of HRAP (Batch II) where 5% CO ₂ was bubbled in daily from 6:30 to 18:30 | 99 |
| Figure 4.19 Ammoniacal nitrogen in RE of HRAP (Batch III) where 5% CO ₂ was bubbled in daily from 6:30 to 18:30 | |
| Figure 4.20 Ammoniacal nitrogen in RE of HRAP (Batch IV) where 5% CO ₂ was bubbled in daily from 6:30 to 18:30 | 100 |
| Figure 4.21 Ammoniacal nitrogen in RE of HRAP (Batch V) where 5% CO ₂ was bubbled in daily from 6:30 to 18:30 in pond VMCO and 0.05% molasses was also added in | |

| | |
|--|-----|
| VMCO on day 2,3 & 4 at 18:30 | 100 |
| Figure 4.22 Orthophosphate in RE of HRAP system(Batch I) where 5% CO ₂ was bubbled in daily from 6:30 to 18:30 | 101 |
| Figure 4.23 Orthophosphate in RE of HRAP system(Batch II) where 5% CO ₂ was bubbled in daily from 6:30 to 18:30 | 102 |
| Figure 4.24 Orthophosphate in RE of HRAP system(Batch III) where where 5% CO ₂ was bubbled in daily from 6:30 to 18:30 | 102 |
| Figure 4.25 Orthophosphate in RE of HRAP system(Batch IV)where 5% CO ₂ was bubbled in daily from 6:30 to 18:30 in IVCO and 0.05% molasses was added in IVM on day 2,3&4 at 18:30 | 103 |
| Figure 4.26 Orthophosphate in RE of HRAP system(Batch V) where 5% CO ₂ was bubbled in daily from 6:30 to 18:30 in VMCO and 0.05% molasses was added in VMCO on day 2,3 & 4 at 18:30 | 103 |
| Figure 4.27 Total Solids in the HRAP treating RE(Batch I) where 5% CO ₂ was bubbled in daily into ICO from 6:30 to 18:30 | 105 |
| Figure 4.28 Total Solids in the HRAP treating RE(Batch II) where 5% CO ₂ was bubbled in daily into IICO from 6:30 to 18:30 | 105 |
| Figure 4.29 Total Solids in the HRAP treating RE(Batch III) where 5% CO ₂ was bubbled in daily into IIICO from 6:30 to 18:30 | 106 |
| Figure 4.30 Total Solids in the HRAP treating RE(Batch IV) where 5% CO ₂ was bubbled in daily into IVCO from 6:30 | |

| | |
|--|-----|
| to 18:30 and molasses was added in IVM at 1830 on | |
| day 2,3 and 4 | 106 |
| Figure 4.31 Total Solids in the HRAP treating RE(Batch V) where | |
| 5% CO ₂ was bubbled in daily into VMCO from 6:30 | |
| to 18:30 and molasses was added in VMCO at 1830 on | |
| day 2,3 and 4 | 107 |
| Figure 4.32 Total Suspended Solids in Batch I with CO ₂ | |
| supplementation in ICO | 107 |
| Figure 4.33 Total Suspended Solids in Batch II with CO ₂ | |
| supplementation in IICO | 108 |
| Figure 4.34 Total Suspended Solids in Batch III with CO ₂ | |
| supplementation IIICO | 108 |
| Figure 4.35 Total Suspended Solids in Batch IV with CO ₂ | |
| supplementation in IVCO and molasses | |
| supplementation in IVM | 109 |
| Figure 4.36 Total Suspended Solids in Batch V with CO ₂ | |
| and molasses supplementation in VMCO | 109 |
| Figure 4.37 Dissolved Oxygen levels in RE of HRAP (Batch I) | |
| where 5% CO ₂ in air was bubbled in daily form | |
| 0630h to 1830h | 110 |
| Figure 4.38 Dissolved Oxygen levels in RE of HRAP (Batch II) | |
| where 5% CO ₂ in air was bubbled in daily from | |
| 0630h to 1830h | 111 |
| Figure 4.39 Dissolved Oxygen levels in RE of HRAP (Batch III) | |
| where 5% CO ₂ in air was bubbled in daily form | |

| | |
|---|-----|
| 0630h to 1830h | 111 |
| Figure 4.40 Dissolved Oxygen levels in RE of HRAP (Batch IV) where 5% CO ₂ in air was bubbled in daily form 0630h to 1830h in IVCO and molasses supplementation in IVM on day 2,3 and 4 at 1830h | 112 |
| Figure 4.41 Dissolved Oxygen levels in RE of HRAP (Batch V) where 5% CO ₂ in air was bubbled in daily form 0630h to 1830h in VMCO and molasses supplementation in VMCO on day 2,3 and 4 at 1830h | 112 |
| Figure 4.42 pH in HRAP (Batch I) where 5% CO ₂ in air was bubbled in daily form 0630h to 1830h in ICO | 113 |
| Figure 4.43 pH in HRAP (Batch II) where 5% CO ₂ in air was bubbled in daily form 0630h to 1830h in IICO | 114 |
| Figure 4.44 pH in HRAP (Batch III) where 5% CO ₂ in air was bubbled in daily form 0630h to 1830h in IIICO | 114 |
| Figure 4.45 pH in HRAP (Batch IV) where 5% CO ₂ in air was bubbled in daily form 0630h to 1830h in IVCO and 0.05% molasses was added on day 2,3 and 4 at 1830h in IVM | 115 |
| Figure 4.46 pH in HRAP (Batch V) where 5% CO ₂ in air was bubbled in daily form 0630h to 1830h in VMCO and molasses was added in VMCO on day 2,3 and 4 at 1830h into VMCO too | 115 |
| Figure 4.47 Irradiance during the HRAP study - Batch I | 117 |
| Figure 4.48 Irradiance during the HRAP study - Batch II | 117 |
| Figure 4.49 Irradiance during the HRAP study - Batch III | 118 |

| | | |
|--------------|--|-----|
| Figure 4.50 | Irradiance during the HRAP study - Batch IV | 118 |
| Figure 4.51 | Irradiance during the HRAP study - Batch V | 119 |
| Figure 4.52 | Temperature of pond water during the HRAP study - Batch I | 119 |
| Figure 4.53 | Temperature of pond water during the HRAP study - Batch II | 120 |
| Figure 4.54 | Temperature of pond water during the HRAP study - Batch III | 120 |
| Figure 4.55 | Temperature of pond water during the HRAP study - Batch IV | 121 |
| Figure 4.56 | Temperature of pond water during the HRAP study - Batch V | 121 |
| Figure 4.57 | Biochemical composition of algal biomass from Batch III - Control | 122 |
| Figure 4.58 | Biochemical composition of algal biomass from Batch III - CO ₂ | 123 |
| Figure 4.59 | Biochemical composition of algal biomass from Batch IV - Molasses | 124 |
| Figure 4.60 | Biochemical composition of algal biomass from Batch IV - CO ₂ | 125 |
| Figure 4.61 | Biochemical composition of algal biomass from Batch V - Control | 126 |
| Figure 4.62 | Biochemical composition of algal biomass from Batch V - Molasses + CO ₂ | 127 |
| Figure 4.63a | Semidiurnal changes in algal cell density in HRAP | |

| | |
|---|-----|
| on day 2 Batch I | 129 |
| Figure 4.63b Semidiurnal changes in algal cell density in HRAP | |
| on day 1 Batch II | 129 |
| Figure 4.63c Semidiurnal changes in algal cell density in HRAP | |
| on day 5 Batch III | 130 |
| Figure 4.63d Semidiurnal changes in algal cell density in HRAP | |
| on day 7 Batch III | 130 |
| Figure 4.63e Semidiurnal changes in algal cell density in HRAP | |
| on day 2 Batch IV | 131 |
| Figure 4.63f Semidiurnal changes in algal cell density in HRAP | |
| on day 4 Batch IV | 131 |
| Figure 4.63g Semidiurnal changes in algal cell density in HRAP | |
| on day 3 Batch V | 132 |
| Figure 4.63h Semidiurnal changes in algal cell density in HRAP | |
| on day 5 Batch V | 132 |
| Figure 4.64a Semidiurnal changes in chlorophyll a concentration in HRAP | |
| on day 2 Batch I | 134 |
| Figure 4.64b Semidiurnal changes in chlorophyll a concentration in HRAP | |
| on day 1 Batch II | 134 |
| Figure 4.64c Semidiurnal changes in chlorophyll a concentration in HRAP | |
| on day 5 Batch III | 135 |
| Figure 4.64d Semidiurnal changes in chlorophyll a concentration in HRAP | |
| on day 7 Batch III | 135 |
| Figure 4.64e Semidiurnal changes in chlorophyll a concentration in HRAP | |
| on day 2 Batch IV | 136 |

| | |
|--|-----|
| Figure 4.64f Semidiurnal changes in chlorophyll a concentration in HRAP on day 4 Batch IV | 136 |
| Figure 4.64g Semidiurnal changes in chlorophyll a concentration in HRAP on day 3 Batch V | 137 |
| Figure 4.64h Semidiurnal changes in chlorophyll a concentration in HRAP on day 5 Batch V | 137 |
| Figure 4.65a Semidiurnal changes in chlorophyll a per cell in HRAP on day 2 Batch I | 138 |
| Figure 4.65b Semidiurnal changes in chlorophyll a per cell in HRAP on day 1 Batch II | 138 |
| Figure 4.65c Semidiurnal changes in chlorophyll a per cell in HRAP on day 5 Batch III | 139 |
| Figure 4.65d Semidiurnal changes in chlorophyll a per cell in HRAP on day 7 Batch III | 139 |
| Figure 4.65e Semidiurnal changes in chlorophyll a per cell in HRAP on day 2 Batch IV | 140 |
| Figure 4.65f Semidiurnal changes in chlorophyll a per cell in HRAP on day 4 Batch IV | 140 |
| Figure 4.65g Semidiurnal changes in chlorophyll a per cell in HRAP on day 3 Batch V | 141 |
| Figure 4.65h Semidiurnal changes in chlorophyll a per cell in HRAP on day 5 Batch V | 141 |
| Figure 4.66a Semidiurnal changes in dissolved oxygen in HRAP on day 2 Batch I | 143 |
| Figure 4.66b Semidiurnal changes in dissolved oxygen in HRAP on day 1 | |

| | |
|--|-----|
| Batch II | 143 |
| Figure 4.66c Semidiurnal changes in dissolved oxygen in HRAP on day 5 | |
| Batch III | 144 |
| Figure 4.66d Semidiurnal changes in dissolved oxygen in HRAP on day 7 | |
| Batch III | 144 |
| Figure 4.66e Semidiurnal changes in dissolved oxygen in HRAP on day 2 | |
| Batch IV | 145 |
| Figure 4.66f Semidiurnal changes in dissolved oxygen in HRAP on day 4 | |
| Batch IV | 145 |
| Figure 4.66g Semidiurnal changes in dissolved oxygen in HRAP on day 3 | |
| Batch V | 146 |
| Figure 4.66h Semidiurnal changes in dissolved oxygen in HRAP on day 5 Batch V | 146 |
| Figure 4.67a Semidiurnal changes in pH in the HRAP on day 2 Batch I | 147 |
| Figure 4.67b Semidiurnal changes in pH in the HRAP on day 1 Batch II | 147 |
| Figure 4.67d Semidiurnal changes in pH in the HRAP on day 7 Batch III | 148 |
| Figure 4.67e Semidiurnal changes in pH in the HRAP on day 2 Batch IV | 149 |
| Figure 4.67f Semidiurnal changes in pH in the HRAP on day 4 Batch IV | 149 |
| Figure 4.67g Semidiurnal changes in pH in the HRAP on day 3 Batch V | 150 |
| Figure 4.67h Semidiurnal changes in pH in the HRAP on day 5 Batch V | 150 |
| Figure 4.68a Semidiurnal changes in solar irradiance in the HRAP on day 2 Batch I | 151 |
| Figure 4.68b Semidiurnal changes in solar irradiance in HRAP on day 1Batch II | 151 |
| Figure 4.68c Semidiurnal changes in solar irradiance inHRAP on day 5 Batch III | 152 |
| Figure 4.68d Semidiurnal changes in solar irradiance in the HRAP on | |

| | |
|--|-----|
| day 7 Batch III | 152 |
| Figure 4.68e Semidiurnal changes in solar irradiance in the HRAP on day 2 Batch IV | 153 |
| Figure 4.68f Semidiurnal changes in solar irradiance in the HRAP on day 4 Batch IV | 153 |
| Figure 4.68g Semidiurnal changes in solar irradiance in the HRAP on day 3 Batch V | 154 |
| Figure 4.68h Semidiurnal changes in solar irradiance in the HRAP on day 5 Batch V | 154 |
| Figure 4.69a Semidiurnal changes in temperature in the HRAP on day 2 Batch I | 155 |
| Figure 4.69b Semidiurnal changes in temperature in the HRAP on day 1 Batch II | 155 |
| Figure 4.69c Semidiurnal changes in temperature in the HRAP on day 5 Batch III | 156 |
| Figure 4.69d Semidiurnal changes in temperature in the HRAP on day 7 Batch III | 156 |
| Figure 4.69e Semidiurnal changes in temperature in the HRAP on day 2 Batch IV | 157 |
| Figure 4.69f Semidiurnal changes in temperature in the HRAP on day 4 Batch IV | 157 |
| Figure 4.69g Semidiurnal changes in temperature in the HRAP on day 3 Batch V | 158 |
| Figure 4.69h Semidiurnal changes in temperature in the HRAP on day 5 Batch V | 158 |

LIST OF PLATES

| | | |
|---------|--|----|
| Plate 1 | <i>Chlorella vulgaris</i> 001 | 56 |
| Plate 2 | View of the two High Rate Algal Ponds with the gas tanks | 56 |
| Plate 3 | The perforated stainless steel pipes used to bubble CO ₂ and air into the pond | 57 |
| Plate 4 | The paddle wheel used to mix the <i>Chlorella</i> culture | 57 |

LIST OF APPENDICES

| | | |
|-------------|---|-----|
| Appendix 1 | Data for HRAP Batches - Cell count (X10 ⁵ ml ⁻¹) | 196 |
| Appendix 2 | Data for HRAP Batches - Chl-a (X10 ³ mgL ⁻¹) | 197 |
| Appendix 3 | Data for HRAP Batches- pH | 198 |
| Appendix 4 | Data for HRAP Batches- Dissolved Oxygen(mgL ⁻¹) | 199 |
| Appendix 5 | Data for HRAP Batches - Temperature (°C) | 200 |
| Appendix 6 | Data for HRAP Batches - Irradiance (μEm ⁻² s ⁻¹) | 201 |
| Appendix 7 | Data for HRAP Batches - Chemical Oxygen Demand (mgL ⁻¹) | 202 |
| Appendix 8 | Data for HRAP Batches - Ammoniacal Nitrogen (mgL ⁻¹) | 203 |
| Appendix 9 | Data for HRAP Batches - Dissolved Orthophosphate (mgL ⁻¹) | 204 |
| Appendix 10 | Data for HRAP Batches - Total Solids (mgL ⁻¹) | 205 |
| Appendix 11 | Data for HRAP Batches - Total Suspended Solids (mgL ⁻¹) | 206 |
| Appendix 12 | Data for HRAP Batches - Biochemical Composition of Algal Biomass | 207 |
| Appendix 13 | Weather Data obtained from Malaysian Metereological Services | 208 |