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 CO_2 supplemented cultures was between 0.64 and 0.56 day^{-1}. Generally flasks supplemented with CO_2 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 CO_2 and molasses (1.19 day^{-1}) compared to CO_2 alone (0.96 day^{-1}). Algal biomass concentrations up to 602mgL^{-1} for CO_2 supplementation and 542mgL^{-1} when supplemented with both CO_2 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, NH_3-N and PO_4-P respectively for the CO_2 treated ponds. Ponds supplemented with molasses did not have good COD reduction due to the recalcitrant substances in molasses.

TABLE OF CONTENTS

CHAPTER 3 -MATERIALS AND METHODS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

LIST OF APPENDICES