CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

"BIOCHEMICAL STUDIES ON ECONOMIC IMPORTANCE OF MICROALGAE"

BY

Naeem Mohamed Elhoseny Mohamed Doha

Chemistry Department,
Faculty of Science,
Helwan University.

ABSTRACT

Five microalgae strains *viz*. *Anabaena flos aquae, Nostoc linkia*, *Nostoc ellipsosporum, Anabaena variabilis* and *Chlorella vulgaris* were exposed for testing their biomass production and their chemical and biochemical composition, which was related to examine some of their economic importance uses. The growth biomass of these microalgae ranged between 9.16 mg L^{-1} (*N.linkia*) to 13.52 mg L^{-1} (*N. ellipsosporum*), nitrogen content ranged between 2.08 % (*N. linkia*) and 3.60 % (*C. vulgaris*) and organic carbon ranged between 20.16% (*C. vulgaris*) and 33.15% (*N. ellipsosporum*). After 4 weeks growth *Chlorella vulgaris* recorded the highest total lipids content of 10.35%, crude protein content ranged between 13.00 % and 22.50% for *N. linkia* and *N. ellipsosporum*, respectively, *N. ellipsosporum* recorded the highest free amino acids content of, 4.75% and *A. flos aquae* the least free amino acids content of 2.42%.*Nostoc ellipsosporum* recorded the highest chlorophyll a content of 25.20µg ml^{-1} and C. *vulgaris* recorded the least Chl. a content of 9.68 µg ml^{-1}. While, Chl b amount of 7.20 µg ml^{-1} was recorded by *C. vulgaris*. Finally, the highest amount of carotenoids was scored by *N. ellipsosporum* (58.12 µg ml^{-1}) and the least one was

10.56 µg ml^{-1} for *C. vulgaris*. Due to the economic uses, these microalgae strains were tried in different economic fields. The use of the studied microalgae in some economic fields revealed that microalgae as nitrogen biofertilizer for wheat had successfully saved 25% form the mineral nitrogen required for wheat cultivation and moreover, they improved the physical and chemical properties for the sandy soil and subsequently improved its fertility. As well as, this study proved that microalgae can serve as bio-agent in bioremediation of the industrial textile wastewater effluent. This operation by microalgae was able to recycle this wastewater to be used in irrigating the crops as such tried in this study for irrigation of faba bean plants. The textile wastewater effluent treated with *N. ellipsosporum*, when was used in faba bean irrigation achieved strong and good plant growth. This plant growth was significantly higher than that recorded by the use of untreated textile wastewater effluent in irrigation, and was comparable with plants irrigated with the normal greenhouse water.

Generally, the microalgae tested are of grate economic importance and need more studies to confirm and may recommend the results of the current study.

Key words: Microalgae, economic importance, biochemical composition, biofertilizer, wheat, antifugal agent, bioremediation and faba bean.