

STUDIES ON VIRUS INFECTING SOME ALGAE ISOLATED FROM SOIL AND WATER

By

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B.Sc. Agric. Sc. (Agricultural Microbiology), Ain Shams University, 2003

M.Sc. Agric. Sc. (Agricultural Viruses), Ain Shams University, 2007

A thesis submitted in partial fulfillment

of

the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

**Agricultural Science
(Agricultural Viruses)**

Department of Agricultural Microbiology

Faculty of Agriculture

Ain Shams University

2011

Approval Sheet

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ACKNOWLEDGEMENT

Praise and thanks be to ALLAH, the most merciful for assisting and directing me to the right way

I would like to express my sincere gratitude to my supervisor **Prof. Dr. E.K. Allam**, Professor (Emeritus) of Agricultural Virology, Department of Agricultural Microbiology, Faculty of Agriculture, Ain Shams University, for his Supervision, encouragement, continuous guidance and fruitful discussions.

Also, I would like to express my sincere thanks, special gratitude and appreciation to my advisor **Prof. Dr. B.A. Othman**, Professor of Agric. Viruses, Faculty of Agriculture, Ain Shams University for his valuable help, guidance, supporting, supervising the present investigation, fruitful discussions constructive criticism, supporting with all facilities available and played a major role in this investigation.

Also, to my advisor **Prof. Dr. Khlid A. El-DougDoug**, Professor of Agric. Viruses, Faculty of Agriculture, Ain Shams University, for his help, providing facilities and giving advices during this investigation.

And also my advisor **Dr. Pelal Abd El-Samea Kandel**, Senior Researcher, Biofertilizer Unit., Soil, Water and Environment Research Institute, Agricultural Research Center, El-Giza, Egypt, for providing me with isolates of cyanobacteria, and *N. mascaurum*, and for his help and support during this investigation.

I am sincerely thankful to all staff members of Agric. Microbiology Dept., Faculty of Agric., Ain Shams University.

ABSTRACT

Eman Mohammed Mokhtar Mareii Studies on Virus Infecting Some Algae Isolated From Soil and Water. Unpublished Ph.D. Thesis, Department of Agricultural Microbiology, Faculty of Agriculture, Ain Shams University, 2011.

In this study, isolation and different characteristic of *Anabaena* cyanophages are described. Three isolates of cyanobacteria were isolated by the streaking method from rice field. The isolates were defined as *Anabaena* spp. depending upon their morphological characters and signed as Sp₁, Sp₂ and Sp₃.

Two *Anabaena* cyanophages (virulent and temperate) were successfully isolated from soil and *Anabaena* (Sp₁). The virulent cyanophage produced clear, circular plaques, and the temperate cyanophage produced turbid, circular plaques. Electron microscopy examination showed that the particles of both have isometric heads and short tails. The one step growth experiment revealed that, the virulent cyanophage has latent period of about four hours and a half, and the phage particles release from the infected cells after eleven hours from infection.

Electron microscopy examination of infected *Anabaena* spp. ultrathin sections showed marked changes in protoplasm and cell membrane, i.e. coagulation of the cytoplasm, formation of vesicles and vacuoles and compact of photosynthetic lamella. The putative major capsid protein of virulent and temperate phages were successfully amplified using specific primer set by PCR technique and expected nucleotide size 181.94 bp for the both isolates. The DNA sequences of two cyanophages (virulent and temperate) were performed using PCR produced and appeared to be containing 195 and 203 bp for virulent and temperate cyanophage, respectively. Translation of partial nucleotide sequences of CP-gene for the lytic and

temperate cyanophages produced 65 and 67 amino acids starting with leucine and proline respectively.

Restriction enzymes revealed sequencing variation among virulent and temperate cyanophages. the polymorphism among 2 cyanophage isolates were differed whereas 20 unique fragments as a genetic marker.

Key words: *Anabaena*, Cyanophages, CP-gene, PCR, sequencing, Restriction enzymes.

دراسات على فيروس يصيب بعض الطحالب المعزولة من التربة والمياه

رسالة مقدمة من

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للحصول على

درجة دكتور فلسفة في العلوم الزراعية

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قسم الميكروبيولوجيا الزراعية

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رسالة مقدمة من

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تاريخ المناقشة: / / 2011

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من التربة والمياه
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تاريخ التسجيل: 2008/ 2/ 11

الدراسات العليا

أجيزت الرسالة بتاريخ

ختم الإجازة

2011/ /

موافقة مجلس الجامعة

موافقة مجلس الكلية

2011 / /

2011 / /

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَقُلْ رَبِّیْ زِدْنِیْ عِلْمًا

صَدَقَ اللَّهُ الْعَظِيمُ

LIST OF ABBREVIATIONS

bp	: base pair
CaCl ₂	: Calcium chloride
cfu	: colony forming unit
cm	: centimeter
ds-DNA	: Double stranded Deoxy ribonucleic acid
dNtd	: Dideoxy nucleotide triphosphate
EG	: Egyptian
g	: Gram
h	: Hour(s)
H ₂ O ₂	: Hydrogen peroxide
KDa	: Kilo Daltons
mA	: Milliamper
mg	: Milligram
Min	: Minute
ml	: Milliliter
Mol.wt.	: Molecular weight
nt	: Nucleotide
NaCl	: Sodium chloride
PAGE	: Polycrylamide gel electrophoresis
PCR	: Polymerase chain reaction
PDA	: Potato dextrose agar
pfu	: Plaque forming unit
rpm	: Revolution per minute
SDS	: Sodium dodecyl sulfate
μl	: Micro liter
Taq	: Thermus aquaticus
Xg	: Gravity centrifugal

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