EFFECTS OF SALINITY ON THE SPECIFIC ACTIVITIES
OF ANTIOXIDATIVE ENZYMES IN *Asiraema*
ciliatum CULTURES

NORFAIZAH BINTI MOHAMED ZAID

FAKULTI SAINS DAN TEKNOLOGI
UNIVERSITI MALAYSIA TERENGGANU
2007

EFFECTS OF SALINITY ON THE SPECIFIC ACTIVITIES OF ANTIOXIDATIVE ENZYMES IN *Aglaonema simplex* CULTURES

By

Norehan Binti Mohamad Zaid

Research Report submitted in partial fulfillment of
the requirements for degree of
Bachelor of Science (Biological Sciences)

Department of Biological Sciences
Faculty of Science and Technology
UNIVERSITI MALAYSIA TERENGGANU
2007

This project should be cited as:

Norehan, M. Z. (2007). Effects of Salinity on The Specific Activities Of Antioxidative Enzymes In *Aglaonema Simplex* Cultures. Undergraduate thesis, Bachelor of Science (Biological Sciences), Faculty of Science and Technology, Universiti Malaysia Terengganu, Terengganu. 45p.

UNIVERSITI MALAYSIA TERENGGANU

JABATAN SAINS BIOLOGI
FAKULTI SAINS DAN TEKNOLOGI
UNIVERSITI MALAYSIA TERENGGANU

PENGAKUAN DAN PENGESAHAN LAPORAN
PROJEK PENYELIDIKAN I DAN II
RESEARCH REPORT VERIFICATION

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **EFFECTS OF SALINITY ON THE SPECIFIC ACTIVITIES OF ANTIOXIDATIVE ENZYMES IN *Aglaonema simplex* CULTURES.**Oleh **NOREHAN BINTI MOHAMAD ZAID**. no. matrik: **UK10592**. telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah **SARJANA MUDA SAINS (SAINS BIOLOGI)**, Fakulti Sains dan Teknologi, Universiti Malaysia Terengganu.

Disahkan oleh: / Verified by:

.....

Penyelia Utama / *Main Supervisor*

Nama: PUAN NORHAYATI BINTI YUSUF

Cop Rasmi: NORHAYATI BINTI YUSUF
Pensyarah
Jabatan Sains Biologi
Fakulti Sains dan Teknologi
Universiti Malaysia Terengganu
21030 Kuala Terengganu.

Tarikh: 7/5/07

.....

Penyelia Kedua (jika ada) / *Co-Supervisor (if applicable)*

Nama:DR. AZIZ BIN AHMAD.

Cop Rasmi DR. AZIZ AHMAD
Pensyarah
Jabatan Sains Biologi
Fakulti Sains dan Teknologi
Universiti Malaysia Terengganu
21030 Kuala Terengganu.

Tarikh: 7/5/2007

.....

Ketua Jabatan Sains Biologi /*Head, Department of Biological Sciences*

Nama:DR. AZIZ BIN AHMAD.

Cop Rasmi: DR. AZIZ BIN AHMAD
Ketua
Jabatan Sains Biologi
Fakulti Sains dan Teknologi
Universiti Malaysia Terengganu
21030 Kuala Terengganu

Tarikh: 7/5/2007

ACKNOWLEDGEMENT

Firstly, I would like to express my gratefulness to Allah S.W.T for His blessing that my project was successfully completed.

I'm also want to dedicate this special thanks to my supervisor, Mdm Norhayati Binti Yusuf and my co-supervisor, Dr. Aziz bin Ahmad, with their guidance and taught, I had finished my project and completed my thesis writing.

To Dr. Chuah Tse Seng, thanks for guiding me to do the statistical analysis and also to all laboratory assistants, thanks for helping me to prepare all the materials in the laboratory and also to staff of Department of Biological Sciences for their assist during my project.

My mostly thanks extended to my family for their support and encouragement. Lastly, for all my friends who always help me to complete this project. Thank you.

CONTENTS

LIST OF ABBREVIATIONS

ABA	Absisic acid
APX	Ascorbate peroxidase
CAT	Catalase
Cl^-	Chloride ion
CO_2	Carbon dioxide
DNA	Deoxy ribonucleic acid
EDTA	Ethylene Diamine Tetraacetic Acid
Fe-SOD	Ferum superoxide dismutase
GPX	Glutathione peroxidase
GR	Glutathione reductase
g/L	gram per litre
GSH	Glutathione
GSSG	Oxidized glutathione
H_2O_2	Hydrogen Peroxide
mM	milimolar
Mg^{2+}	Magnesium ion
Mn-SOD	Mangan superoxide dismutase
Na^+	Sodium ion
NaCl	Sodium chloride
$O_2^{\cdot -}$	Superoxide radical
$OH^{\cdot}$	Hydroxyl radical
PMs	plasma membranas
POD	Peroxidase
RNA	Ribonucleic acid
ROS	Reactive oxygen species

SO_4^{2-}	Sulphate ion
SOD	Superoxide dismutase
Zn-SOD	Zinc superoxide dismutase
^0C	degree celcius

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

ABSTRACT

Aglaonema simplex are among popular ornamental plants which are suitable for household and office decoration. They are highly adapted to light intensity, resistant to pest and not much effort needed to grow this kind of species. The effects of NaCl treatment on the specific activities ascorbate peroxidase (APX), catalase (CAT) and guaiacol peroxidase (POD) were investigated in *Aglaonema simplex* cultures. The *A. simplex* plantlets were treated with 0, 25, 50 or 100mM of NaCl in Murashige and Skoog solid medium for 28 days. The activities of these antioxidative enzymes were detected at 0, 1, 2, 7, 14 and 28 days of treatment periods. Generally, APX, CAT and POD exhibited similar pattern in response to NaCl treatment. No significant differences ($P>0.05$) were observed in APX, CAT and POD specific activities were observed up to 7 days of treatment periods. After 7 days, the specific activities of all enzymes markedly increased ($P<0.05$) to a maximum activities. Specific activities of each enzymes decreased significantly at the later stage of treatment periods. Above result revealed that NaCl treatment induced by oxidative stress in *A. simplex* cultures inducing the APX, CAT and POD specific activities.

KESAN SALINITI KE ATAS AKTIVITI SPESIFIK ENZIM ANTIOKSIDATIF TERHADAP KULTUR *Aglaonema simplex.*

ABSTRAK

Aglaonema simplex adalah sejenis tumbuhan hiasan yang popular sesuai ditanam di pejabat atau rumah kerana spesies ini boleh beradaptasi dalam keamatan cahaya yang tinggi, tidak memerlukan penjagaan yang rapi dan ia juga tahan kepada serangan serangga perosak. Kesan NaCl keatas aktiviti spesifik pada APX, CAT dan POD telah dikaji pada kultur *A. simplex. A.simplex* telah dirawat pada kepekatan NaCl yang berbeza iaitu 0, 25, 50 dan 100mM di dalam medium Murashige dan Skoog selama 28 hari. Umumnya, APX, CAT dan POD menunjukkan tindakbalas kepada NaCl pada corak yang sama. Tiada perbezaan yang ketara ($P>0.05$) diperhatikan pada aktiviti spesifik APX, CAT dan POD sepanjang 7 hari rawatan. Selepas 7 hari, aktiviti spesifik semua enzim telah meningkat dengan kadar yang maksimum. Aktiviti spesifik ini kemudiannya menurun pada peringkat akhir rawatan. Keputusan menunjukkan rawatan NaCl meningkatkan tegasan oksidatif pada kultur *A.simplex* dan meningkatkan aktiviti spesifik enzim APX, CAT dan POD.