

Cytological and Molecular Studies on The Effect of Some Chemical and Biological Pesticides on The Plant Cell

A Thesis
Submitted for Partial Fulfillment of Master
Degree of Science in Botany
(Cytology and genetics)

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(قَالُواْ سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ)



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Title of Thesis : "Cytological and molecular studies on the effect

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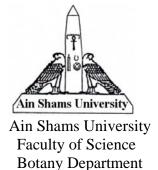
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My Parents,

My Wife,

My Great Kids

Maher Abd Elfattah Mohammed



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Abstract

The chemical pesticides are used, nowadays, on a large scale to protect crops against pests. Pests cause annually a drastic loss of the economical crops allover the world. The wide production and uses of chemical pesticides causes a serious pollution to the surrounding environment.

Man today is concerned very much with the pollution of his environment. Biological control agents for plant disease are currently being examined as alternative to synthetic pesticides due to their perceived increased level of safety and minimal environmental impacts.

The present investigation was planned to compare the mutagenic effects of two chemical fungicides (mancozeb and nimrode) with the two biological fungicides (plant guard and rhizo-N). In addition, effect of these pesticides on polyacrylamide gel electrophoresis profiles of *Allium cepa* seed proteins, and the different parameter of the cell cycle were investigated.

At the cytological level, the four fungicides used in this study induced a decrease in the mitotic index accompanied with considerable percentage of chromosomal abnormalities. These abnormalities include stickiness, C-metaphase, disturbed chromosomes at metaphase and anaphase, bridges, laggards and

trimultipolar cells. True clastogenic abnormalities including chromosome bridges and micronuclei were observed after treatment with the fungicide mancozeb and plant guard.

Image cytometric measurements of mitotic cell cycle showed accumulation of cells in the G_2 phase in roots treated with the fungicide mancozeb, while the cells accumulated at G_1 phase in roots treated with the biofungicide plant guard. On the other hand, the four fungicides caused changes in the protein-banding pattern. These changes include the absence of some bands and the appearance of few novel bands as well as overexpression of the others. The results showed that the chemical fungicides mancozeb and nimrod have more mutagenic potentialities than the biological fungicides.

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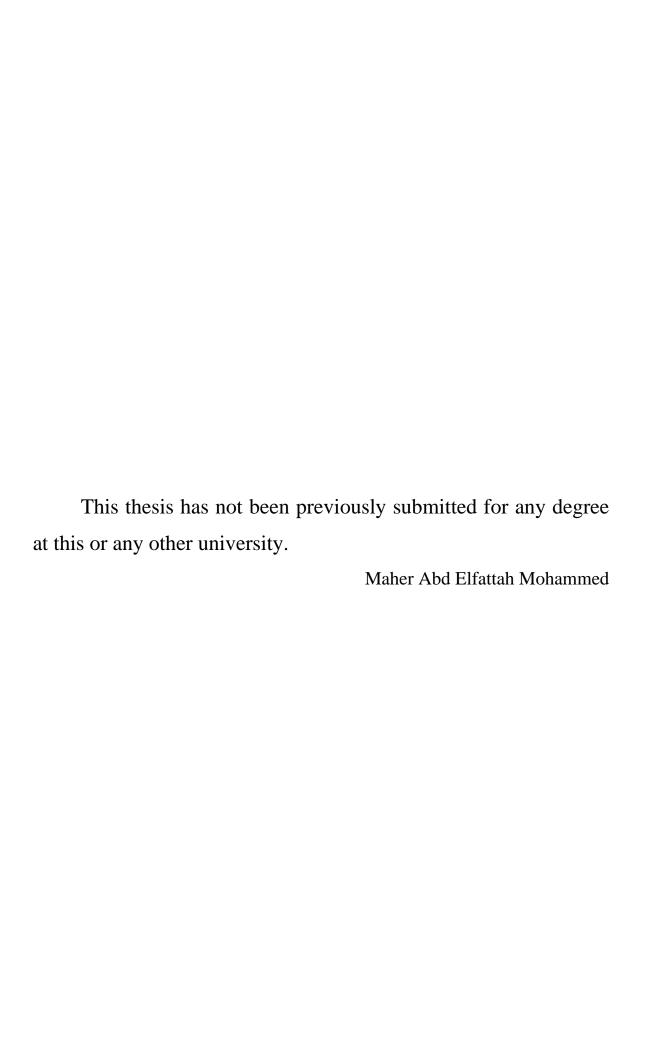
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Contents

Int	rod	uction	1
Lit	era	ture Review	4
Ma	teri	ials and Methods	15
	sult		24
I.	_		24
1.		e Cytological Studies	24
	Α.	Cytological Studies on the Effect of Mancozeb Fungicide	24
		1. Effect of mancozeb fungicide on root	24
		tips of Alluim cepa after 3 hours	
		treatment	24
		2. Effect of mancozeb fungicide on root	27
		tips of Alluim cepa after 6 hours	
		treatment	32
		3. Effect of mancozeb fungicide on root	32
		tips of Alluim cepa after 24 hours	
		treatment	40
		4. Effect of mancozeb fungicide on root	
		tips of Alluim cepa after 48 hours	
		treatment	47
	B .	Cytological Studies on the Effect of Nimrod	
		Fungicide	60
		1. Effects of nimrod fungicide on root tips	
		of Alium cepa after 3 hours treatment	60
		2. Effects of nimrod fungicide on root tips	
		of Alium cepa after 6 hours treatment	68
		3. Effects of nimrod fungicide on root tips	
		of Alium cepa after 24 hours Treatment	75
		4. Effects of nimrod fungicide on root tips	
	_	of Alium cepa after 48 hours treatment	82
	<i>C</i> .	Cytological Studies on the Effect of Rhizo-	
		N Biofungicide	93
		1. Effect of rhizo-N biofungicide on root	
		tips of Allium cepa after 3 hours	0.2
		Treatment 2. Effects of which N. his formainide and work	93
		2. Effects of rhizo-N biofungicide on root	
		tips of Allium capa after 6 hours	101
		treatment	101

		3.	Effects of rhizo-N biofungicide on root tips of Allium cepa after 24 hours	
			treatment	108
		4.	Effect of rhizo-N biofungicide on root	
			tips of Allium cepa after 48 hours	
			treatment	115
	D.	Cy	tological Studies on the Effect of Plant	
		Gu	uard Biofungicide	126
		1.	Effects of plant guard biofungicide on	
			root tips of Allium cepa after 3 hours	
			treatment	126
		2.		
			root tips of Alluim cepa after 6 hours	
		2	treatment	134
		3.		
			root tips of Allium cepa after 24 hours	1 / 1
		4	treatment Effects of plant award histograpiside on	141
		4.		
			root tips of <i>Allium cepa</i> after 48 hours treatment	148
II	Cw	tani	hotometric Measurement of Nuclear	140
11	•	-	Content.	
			of the chemical fungicide mancozeb	
			he biological fungicide plant guard on	
		l cy		161
111		·	emical Studies.	101
111.	Dio		micui Biautes.	
	Eff	ect	of the four pesticides on seed protein	
			ophoretic profiles as revealed by SDS-	
		GE	- · ·	164
Dis	cus	sio	n	169
Sur	Summary References			186
Ref				193
Ars	hic	Si	ımmary	
			<i>u</i>	

List of Tables

Tables No.	Title	Page
Tables (1-12):	Cytological studies on the effect of mancozeb fungicide on <i>Allium cepa</i> root tips	27-52
Tables (13-24):	Cytological studies on the effect of nimrod fungicide on <i>Allium cepa</i> root tips	63-86
Tables (25-36):	Cytological studies on the effect of rhizo-N biofungicide on <i>Allium cepa</i> root tips	96-120
Tables (37-48):	Cytological studies on the effect of plant guard biofungicide on <i>Allium cepa</i> root tips	129-153
Table (49):	The percentage of mitotic index and total abnormal mitosis after treating <i>Allium cepa</i> root tips with different concentrations of the four pesticides for different treatment	157
Table (50):	Effect of the chemical fungicide mancozeb and the biological fungicide plant guard on the cell cycle parameters in root meristematic cells of <i>Allium cepa</i> treated for 24 hours	163
Table (51):	Effect of the chemical fungicide mancozeb and the biofungicide rhizo-N on the protein banding pattern of <i>Allium cepa</i> seed separated using SDS – PAGE technique	166
Table (52):	Effect of the chemical fungicide nimrod and the biofungicide plant guard on the protein banding pattern of <i>Allium cepa</i> seed separated using SDS – PAGE technique	167

List of Figures

Figures No.	Title	Page
Figures (1-14):	Cytological studies on the effect of mancozeb fungicide on <i>Allium cepa</i> root tips	30-59
Figures (35-48):	Cytological studies on the effect of nimrod fungicide on Allium cepa root tips	66-92
Figures (67-80):	Cytological studies on the effect of rhizo-N biofungicide on <i>Allium cepa</i> root tips	99-125
Figures (93-106):	Cytological studies on the effect of plant guard biofungicide on <i>Allium cepa</i> root tips	131-159
Figure (125):	Electrophotographs produced by SDS-PAGE analysis of protein patterns of <i>Allium cepa</i> after treatment with different concentrations of the four fungicides	168

List of Plates

Plates No.	Title	Page
Plates (1-4):	Types of mitotic abnormalities induced by mancozeb fungicide in <i>Allium Cepa</i> root tips	57-60
Plates (5-7):	Types of mitotic abnormalities induced by nimrod fungicide in <i>Allium Cepa</i> root tips	90-92
Plates (8-9):	Types of mitotic abnormalities induced by rhizo-N biofungicide in <i>Allium Cepa</i> root tips	124-125
Plates (10-12):	Types of mitotic abnormalities induced by plant guard biofungicide in <i>Allium Cepa</i> root tips	158-160

Introduction

Pesticides constitute a heterogeneous category of chemical specifically designed for the control of plant diseases. Chemical pesticides are widely used in Egypt in order to minimize the loss in economic crops due to pest invading. These chemicals,

-a—part from affecting the target pest, also affect economicalplants, animals, and human. Evidences accumulated in the past two decades have indicated that a large number of pesticides mutagenic effects and are capable of inducing chromosomal aberration or DNA damage in cells of different organisms. The mutagenic potentiality of pesticides have been studies by many investigators using different living system (Amer, 1965; Wuu and Grant, 1966; Mann, 1977; Njagi and Gopalan, 1981; Badr, 1988; Sobhi and Haliem, 1990; Saeed and Robina, 1992; Salam et al., 1993; Datta et al., 1995; Abdelsalam et al., 1997; a & b; Ghareeb, 1998; De Marco et al., 2000; Bolognesi, 2003; Bolle et al., 2004; Dane and Dalgic, 2005; Singh, Kaymak and Muranli, 2005; Chauhan and Gupta, 2005 and Bouilly et al., 2007 and Renata-Kontek et al., 2007).

Some of these pesticides may persist in the environment for many years. Most of them were found to be a major source of soil and water pollution in rural areas of Egypt. The danger of these pesticides doesn't necessary be due to direct contact, since it was found that some of these pesticides may accumulate Formatted: Indent: Before: 0", Hanging:

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