Effect of four fungicides on the growth and certain biochemical parameters of *Alternaria solani* and *Pyricularia oryzae* fungi under laboratory conditions

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ABSTRACT

Effect of four fungicides *i.e.* Leader 45% EC (prochloraz), MysticGold 25% EW(tebuconazole), Nativo75% WG (tebuconazole 25% + 50% trifloxystrobin) and Score 25% EC (difenoconazole) on the growth and some biochemical parameters of two important fungal pathogens (*A. solani* and *P. oryzae*) which caused tomato early blight disease (TEBD) and rice blast disease (RBD), respectively. These diseases are caused considerable damage on two crops.The obtained results clearly indicated that *A. solani* fungus was the most frequently isolated fungus from tomato leaves and fruits with 68.26 and 62.35 FO, respectively and was isolated most frequently from leaves than fruits of tomato. On the other hand,*P. oryzae* fungus was the most frequently isolated from leaves and Panicle of rice crop with 50.00 and 54.28 FO, respectively. The present data showed that both fungi were varied in sensitivity between four tested fungicides and theirconcentrations used. Effect of the tested fungicides on mycelial growth of *A. solani* fungus clearly indicated that Leader fungicide followed by Score, Nativo and Mystic Gold with IC_{50} values of 0.16, 0.18, 0.26 and 2.06 ppm, respectively. Also, the efficacy of these fungicides on P. *oryzae*mycelial growth was recorded with IC_{50} values were 0.02, 0.21, 0.28 and 0.40 for leader, Score, Nativo and MysticGold, respectively. These results suggest that both fungi were varied insensitivity to the tested fungicides and the type of fungus. Regarding the results of tested biochemical aspects, the fungicides affected on total carbohydrates, total lipids and total proteins in both fungi and these compounds were varied in this parameters. These results suggested that many researches would needed to determine the sensitivity of bothfungito the tested fungicides to avoid fungicide resistance by important fungal diseases and incrementof tomato and rice yields by controllingthese diseases on crops.

Keywords: Fungicides; *A. solani,P. oryzae*; Biochemical parameters.

INTRODUCTION

Tomato (*Solanumlycopersicon* L. = *Lycoperisiconesculentum* Mill.) is a commonly cultivated vegetable in the world and is the second largest profitable solanaceous vegetable crop after potatoes(Sahu*et al*., 2013). Among the fungal diseases, early blight caused by *Alternaria solani* is one of the most important and frequent occurring disease of thecrop nation and worldwide (Jones *et al*., 1991). Genus Alternaria refers to Deuteromycets of various types, which are harmful plant parasites for families such as Solanaceae, Cucurbitaceae, and Brassicaceae. (Deshmukh*et al*., 2020), and caused crop loss in tomato yield. Alternaria leaf blight of tomato caused by *Alternaria solani* is the worst damaging one that causes reduction in quantity and quality of the tomato crops (Abdel-Sayed, 2006; Abada*et al*., 2008).

Rice (*Oryzaesativa* L.) is a cereal crop and belongs to family Poaceae (Gramineae) which is native in worldwide. Although rice production in the world has increased rapidly during recent years, crop suffers from many biotic and abiotic stresses which result in the lower productivity (Yadav*et al*., 2022). Among the fungal diseases, blast disease is caused by a filamentous, ascomycete fungus *Pyricularia oryzae*Cavara (synonym *Pyriculariagrisea*Sacc., the anamorph of *Magnaporthegrisea*(Hebert, 1971) is the major constraint to rice production. This fungus also is more frequent and ferocious disease in irrigated rice of both temperate and subtropical areas and which cause damage at all stages of crop growth (Bonman*et al*., 1991).

Rice blast is a worldwide problem in rice and dangerous because of its yield losses potential up to100 % under favorable conditions (Luo*et al*., 1998 andNetam*et al*., 2011).

Considering the economic importance of these crops and yield losses caused by early blight disease on tomato (TEBD) and rice blast disease (RBD) on rice crop and its effects on yield.The present study is focused to investigate the efficacy of four tested fungicides against the *A. solani* and *P. oryzae* and their growth and determined the effect of fungicides on some biochemical parameters such as total carbohydrates, lipids, and proteins in the laboratory.

MATERIAL AND METHODS

The experiments were conducted in the laboratory of fungicides at Department of Plant Protection, Fac. of Agriculture (Cairo) Al-Azhar University, Nasr city, Cairo.

Fungal isolates.

*Alternariasolani*fungus was isolated from leaves and fruits of tomato plants (cv.Salymia 65010).Seeds obtained from Central Administration of Seeds (CAS), Agricultural Research Center (ARC), Ministry of Agriculture and Land Reclamation (MALR), these leaves and fruits showing the early blight symptoms were obtained. Also, the *Pyricularia oryzae* fungus was isolated from leaves and panicles of rice plants (cv. Giza 178) which obtained from the same district mentioned above. These crops were sowing during the summer of 2021 season and planted in ItayEL_Baroud district,Behearah Gov.,The isolated of*Alternaria solani* was present according to the method described by (Ali, 2008), while the isolated *P. oryzae* was present according to ElkholyandEl_Shazly(2006).In each fungus on two crops, all isolated fungi were identified in the Department of Agricultural Botany, Branch of Plant Pathology in the same faculty. The frequency percentage for each isolated fungus from tomato and rice leaves were calculated according to the equationofRossi *et al*. (1994)as follow:

Frequency % = No. of isolates for each fungus {Frequency of occurrence (FO)}/ Total number of isolates of all fungi× 100

Stock cultures of all fungi were kept on PDA slants in refrigerator in the laboratory for further studies.

***In vitro* evaluation of fungicides.**

According to Yadav*et al*., (2022) with some modification,the efficacy of four fungicides (Table, 1) was evaluated against *A. solani* and *P. oryzae*by poisoned food technique at different concentrations to assess the sensitivity offungicide. Each fungicide with a control was tested againstboth fungi. Potato dextrose agar media (100 ml) was used as a basal media for assessment of mycelium growth andPDA media which were sterilized in autoclave and distributed about 20 ml in each replicate in 5 plastic petri dishes with 9 cm in diameter. The fungicides were immediately mixed before solidification and poured in sterilized petri-dishes. With the help of sterilized cork borer, the mycelial growth of about 5 mm diameter of 15 days old culture was cut in both fungi and each disc was transferred aseptically to the center of each petri-dishes which was already poured with poisoned media. The PDA media plate without fungicide were also inoculated and maintained as control. The plates were incubated at 25^0C±2 C^0 for different days. The observations of colony growth were recorded until petri dish in control treatment was fully covered with mycelium of both fungi. After that, compare the mycelium growth of each treatment with control. Percent inhibition of mycelium growth was calculated by:-

$$I = C - T / C \times 100$$

Where: **I** = percent inhibition of mycelial growth.

C= mean diameter of growth in the control.

T= mean diameter of growth in a given treatment.

Fungicides used in this study are listed in table (1). Also, the IC_{50}(Inhibition concentration), slop values, toxicity index (T.I.) and relative potency (R.P.) were recorded.

Effect of fungicides on biochemical parameters.

Bothfungi were cultured into 250 ml conical flask capacity, containing 100 ml of liquid Potato Dextrose Broth (PDB) medium amended with different concentrations of different fungicides. The concentrations of fungicides were 0.5, 1, 5, 10 and 25 ppm. The flasks were incubated at 25±2°C for 10 days. The cultures of fungi were harvested by filtration using Buchner funnel and washed thoroughly with sterilized distilled water Patil*et al.* (2011). The fresh weights of the mycelia were determined as milligram. Free cell extracts were obtained by grounding the mycelial matrix with an approximately equal weight of clean sand in mortars under cold condition and extracted with 70 % (v/v) ethyl alcohol in case determination of total proteins and total carbohydrates while using chloroform-methanol 3:1(v/v) in case total lipids (David and Van Etten, 1966). The obtained slurry was centrifuged at 6000 rpm for 20 minutes. The supernatant was used to determine the total carbohydrates, lipids and proteins according to Dubois *et al*. (1956), Zollnerand Kirsch (1962) and Doumas*et al.* (1981), respectively.

Statistical analysis

The method described by Finney (1971) to calculate the IC_{50} andIC_{90} and slope values.

RESULTS AND DISCUSSION

Fungal isolation

The results in Table (2) showed the isolated fungi from tomato and rice plants. The results clearly indicated that, from tomato leaves, the *Alternaria solani* was the most frequently isolated fungus which represented (68.26% FO), whereas from tomato fruits, fungus also was the most frequently isolated fungus which represented (62.35 % FO). Similarly Ali (2008) isolated *A. solani* and *Alternaria* sp. from the infected leaves and fruits of tomato from two cultivars by isolates of36.27 and 42.68 FO and 42.46, 48.15 FO in the seasons of 2005 and 2006 from Castel Rouck cultivar. Also, there were 41.90, 54.46 and 48.74 and 50.92 in 2005 and 2006 seasons, respectively from Money Maker cultivar. Also, El-Shami, Mona *et al*. (1994) isolated *A.solani* from tomato leaves. Also, Rodiging (1997) found that *A. solani* was isolated from tomato leaves more frequently than from fruits. In addition, the obtained results have been supported by Ismail *et al.* (2004), Alhussaen K. M. (2012) and Chaurasia*et al.* (2013). Also, El-Ballat (2021) isolated *A.solani* from leaves and fruits of tomato by 60.81 and 56.82 in season of 2018 – 2019 and 62.31 and 53.08 in season of 2019 – 2020.The results clearly indicated that*A. solani* caused early blight on tomato crop and isolated more frequently from leaves compared with fruits of tomato.

The results obtained in Table (2) indicated that *P. oryzae*was the most frequently isolated from leaves and panicles of rice plant with 50 and 54.28 % FO of this fungus. In this regard,El-Kholyand El-Shazly (2006) isolated this fungus from leaves and panicles of rice plants. Also, Hajano*et al.* (2011)isolated *Magnaportheoryzae* from seeds and leaves of the rice cultivars and they reported that some varieties were more susceptible to rice blast than others. Also,*M. oryzae* was more frequently isolated from leaves than other fungi. The results in this study were supported by Yadav*et al*., (2022) and Shomeet (2023).

In vitro evaluation of fungicides:

The obtained results listed in Table (3) showed effect of four fungicides on mycelium radial growth of *A. solani* fungus. These results clearly indicated that when the fungicide concentration increases the growth of fungus was decreased, and the inhibition % was recorded for each concentration from each fungicide. Leader fungicide completely prevents the growth of *A. solani* at 10 ppm followed by Nativo at 25 ppm, while Mystic Gold and Score fungicides gave the same effect at 100 ppm. These results demonstrated that *A. solani* was more sensitive to Leader followed by Nativo, and Mystic Gold and Score fungicides, respectively.

The results in Table (4) demonstrated the effect of fungicides, on mycelium growth of *P. oryzae* fungus. The *P. oryzae* fungus was more sensitive to Mystic Gold fungicide which caused 97.22 % inhibition at 50 ppm followed by Nativo (91.33 %), Leader (88.33%) and Score at 86.67% inhibition. These results showed that *P. oryzae* fungus varied in its sensitivity to the tested fungicides.

The toxicity of four tested fungicides on *A. solani* growth and $IC_{50\%}$, slope, toxicity index and Relative potency values were recorded in Table (5). From these results,the IC_{50}values of the tested fungicides were 0.16, 2.06, 0.26 and 0.18 ppm for Leader, Mystic Gold, Nativo and Score, respectively. These results indicated that this fungus was more sensitive to Leader, followed by Score, Nativo and Mystic Gold, respectively.

Such results are in accordance with those obtained by several authors;Ali (2008) mentioned that *A. solani* fungus was varied insensitivity to the tested fungicides under laboratory conditions. EL-Ballat (2021) found that the IC_{50} values for azoxystrobin, difenoconazole, mancozeb and metalaxyl-M + mancozeb against *A. solani* fungus were 2.54, 0.99, 10.15 and 10.14 ppm, respectively.

The results in Table (6) showed the IC_{50} values of the tested fungicides on mycelium growth of *P. oryzae* fungus under laboratory conditions. The obtained results clearly indicated that this fungus varied insensitivity to the tested fungicides sinceLeader fungicide was the most effective with IC_{50} = 0.06 followed by Score, Mystic Gold and Native with IC_{50} values of 0.40, 0.55 and 1.14 ppm, respectively. These results were supported by EL-Kholyand El-Shazly (2006). Yadav*et al*. (2022) found that fungicides varied in toxicity to *P. oryzae* fungus and in the same group such as triazole group. In addition, Shomeet (2023) reported that many fungicides varied in reducing the mycelium growth of *P. oryzae* fungus.

Effect of the tested fungicides on biochemical parameters (total carbohydrates, lipids and proteins):

The results in Table (7) showed the effect of tested fungicides on total carbohydrates at different concentrations around the IC_{50}

values.It was observed that there was a reduction of total carbohydrates by increasing concentrations for alltested fungicides.

Concerning the effect of four fungicides on total lipids (Table8), the obtained results showed that there was a reduction in total lipids observed in higher concentrations, and the fungicides were varied in this respect.

Regarding the effect of four fungicides on total protein (Table9), results clearly indicated that fungicide decreased total protein in *A. solani* and *P. oryzae* fungi and this effect was more observed at higher concentrations.

The effect of fungicides on biochemical parameters in *A. solani* and *P. oryzae* fungi were previously reported by EL-Khawaga-Maii (2006) Ali (2008), Mahmoud, Amira, (2016) andShomeet (2018).Similar trend of results was also observed by Ali (2008),who found that total carbohydrates decreased in *A. solani* fungal mycelium. Also, reduction of carbohydrates content was achieved by increasing concentration for such fungicides. He found that the reduction in carbohydrates at 5 ppm was 100, 100, 93, 26, 100, 100, 92,59% for tetraconazole, difenoconazole, Trifloxystrobin, pyraclostrobin + matiram, matiram and mancozeb treatments, respectively.

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Table 1: The used compounds**:**

Trade names*	Concentrations and formulations	Common names (IUPAC)**	Chemical names (IUPAC)***	Sources
Leader	45% EC	Prochloraz	*N*-propyl-*N*-[2-(2,4,6-trichlorophenoxy) ethyl]imidazole-1-carboxamide.	Star-Chem Company.
MysticGold	25% EW	Tebuconazole	(*RS*)-1-*p*-chlorophenyl-4,4-dimethyl-3-(1*H*-1,2,4-triazol-1-ylmethyl) pentan-3-ol.	Nofarm Company
Nativo	75% WG	Tebuconazole + Trifloxystrobin	(*RS*)-1-*p*-chlorophenyl-4,4-dimethyl-3-(1*H*-1,2,4-triazol-1-ylmethyl) pentan-3-ol. + methyl (*E*)-methoxyimino-{(*E*)- α-[1-(◎α,α,α, trifluoro-*m*-tolyl) ethylideneaminooxy]-*o*-tolyl}acetate.	Bayar Company
Score	25% EC	Difenoconazole	Cis, trans-3-chloro-4-[4-methyl-2-(1*H*-1,2,4 triazol-1-ylmethyl)-1,3-dioxolan-2-yl]phenyl 4-chlorophenyl ether	Syngenta Company

*Trade nameswere recorded by the companies.

**Common names were recorded by IUPAC according to active ingredients.

***IUPAC= The International of Pure and Applied Chemistry

Table 2: Numbers and frequency of isolated fungi from leaves and fruits of tomato crop (cv. Salymia 65010) and leaves and panicles of rice crop (cv. Giza 178) from Itay EL-Barouddistrict, Behearah Gov., during the summer season of 2021:

Isolated fungi	Tomato plants				Rice plants			
	Leaves		Fruits		Leaves		Panicles	
	No. of isolates	Frequency%	No. of isolates	Frequency%	No. of isolates	Frequency%	No. of isolates	Frequency%
Alternaria alternata	15.00	23.81	13.00	15.29	11.00	16.67	08.00	22.86
Alternaria solani	43.00	68.26	53.00	62.35	00.00	00.00	00.00	00.00
Aspergillusniger	03.00	04.76	08.00	09.41	03.00	04.54	00.00	00.00
Fusariummoniliforme	00.00	00.00	00.00	00.00	03.00	04.54	02.00	5.71
Fusariumsemiticetum	02.00	03.17	11.00	12.95	00.00	00.00	00.00	00.00
Helminthoporium oryzae	00.00	00.00	00.00	00.00	16.00	24.25	06.00	17.15
Pyricularia oryzae	00.00	00.00	00.00	00.00	33.00	50.00	19.00	54.28
Total	63.00	100.00	85.00	100.00	66.00	100.00	35.00	100.00

Table 3: Effect of four fungicides on mycelium radial growth and inhibition % on *Alternaria solani* fungus under laboratory conditions:

Concentrations (ppm)	Mycelium radial growth of *A. solani* (cm) and inhibition %							
	Leader 45 % EC		MysticGold 25 % EW		Nativo 75 % WG		Score 25 % EC	
	A*	B**	A*	B**	A*	B**	A*	B**
00.00	09.00	00.00	09.00	00.00	09.00	00.00	09.00	00.00
00.01	07.36	18.11	08.69	03.44	07.70	14.42	06.51	27.61
00.10	04.90	45.55	07.55	16.11	05.50	38.88	04.75	47.22
00.50	03.52	60.88	06.22	30.88	03.90	56.66	03.75	58.88
01.00	03.37	73.66	05.45	39.44	03.38	62.44	03.55	60.55
05.00	01.10	87.77	03.77	58.11	01.40	84.44	02.70	70.00
10.00	00.00	100.00	02.50	72.22	01.16	87.11	01.86	79.33
25.00	00.00	100.00	01.50	83.33	00.00	100.00	01.20	86.66
50.00	00.00	100.00	01.37	84.77	00.00	100.00	01.10	87.77
100.00	00.00	100.00	00.00	100.00	00.00	100.00	00.00	100.00

A* = mean colony growth (cm) and five replicates were used in each concentrations.
B** = Inhibition % (I) = C-T / T × 100, where: C and T were mean colony growth (cm) in the control and treatment, respectively.

Table 4: Effect of four fungicides on mycelium radial growth and inhibition % on Pyricularia oryzae fungus under laboratory conditions:

Concentrations (ppm)	Mycelium radial growth of *P. oryzae* (cm) and inhibition %							
	Leader 45 % EC		MysticGold 25 % EW		Nativo 75 % WG		Score 25 % EC	
	A*	B**	A*	B**	A*	B**	A*	B**
00.00	09.00	00.00	09.00	00.00	09.00	00.00	09.00	00.00
00.001	08.30	07.78	09.00	00.00	09.00	00.00	08.90	01.11
00.003	06.50	27.78	09.00	00.00	08.80	02.22	08.60	04.44
00.005	06.00	33.33	09.00	00.00	08.60	04.44	08.10	10.00
00.01	05.05	43.88	08.70	03.33	08.10	10.00	06.50	27.78
00.05	04.12	54.22	07.98	11.33	07.80	13.33	05.71	36.55
00,10	03.53	60.78	06.15	31.66	07.30	18.89	05.31	41.00
00.50	03.10	65.55	04.35	51.66	05.30	41.11	04.00	55.55
01.00	02.80	68.88	03.20	64.44	03.93	56.33	03.50	61.11
05.00	01.90	78.88	02.00	77.78	03.60	60.00	03.00	66.67
10.00	01.46	83.77	01.30	85.55	02.00	77.78	01.70	81.11
25.00	01.30	85.88	00.60	93.33	01.80	80.00	01.50	83.33
50.00	01.05	88.33	00.25	97.22	00.78	91.33	01.20	86.67
100.00	00.00	100.00	00.00	100.00	00.00	10.00	00.00	100.00

A* = mean colony growth (cm) and five replicates were used in each concentrations.
B** = Inhibition % (I) = C-T / T × 100, where: C and T were mean colony growth (cm) in the control and treatment, respectively.

Table 5: TheIC_{50} (µg a.i.ml^{-1}) and slope values of the tested fungicides on Alternaria solani under laboratory conditions:

Trade names	Common name	IC_{50}	IC_{90}	Slope	Toxicity index (T.I.)*	Relative Potency (R.P)**
Leader 45 % EC	Prochloraz	00.02	00.15	00.35	100.00	01.00
Mystic gold 25 % EW	Tebuconazole	00.40	00.75	00.75	05.00	20.00
Nativo 75 % WG	Tebuconazole + Trifloxystrobin	00.28	00.63	00.60	07.15	14.00
Score 25 % EC	Difenoconazole	00.21	00.45	00.26	09.52	10.50

*Toxicity Index = IC_{50} of the most efficient compound / IC_{50} of the tested compound × 100 (Sun, 1950).
**R.P = Relative Potency was calculated by the IC_{50} of the tested compound / IC_{50} of the most effect compound.

Table 6: TheIC_{50} (µg a.i.ml^{-1}) and slope values of the tested fungicides on Pyricularia oryzae under laboratory conditions:

Trade names	Common name	IC_{50}	IC_{90}	Slope	Toxicity index (T.I.)*	Relative Potency (R.P)**
Leader 45 % EC	Prochloraz	0.06	45.67	0.45	100.00	1.00
MysticGold 25% EW	Tebuconazole	0.55	13.20	0.92	10.90	9.16
Nativo 75 % WG	Tebuconazole + Trifloxystrobin	1.14	67.54	0.72	5.26	19.00
Score 25 % EC	Difenoconazole	0.40	63.62	0.58	15.00	6.66

*Toxicity Index = IC_{50} of the most efficient compound / IC_{50} of the tested compound × 100 (Sun, 1950).
**R.P = Relative Potency was calculated by the IC_{50} of the tested compound / IC_{50} of the most effect compound.

Table 7: Percent reduction of total carbohydrates in Alternaria solani and Pyricularia oryzae as affected by different concentrations of the tested fungicides:

Fungicides	Fungicidal concentrations (µg ml^{-1})									
	0.5		1.0		5.0		10.0		25.0	
	*	**	*	**	*	**	*	**	*	**
Leader 45 % EC (prochloraz)	21.69	42.18	27.41	50.77	35.48	59.21	43.15	64.57	47.25	71.76
MysticGold 25 % EW (tebuconazole)	50.76	87.56	58.11	91.21	64.89	92.71	70.64	95.48	77.48	97.36
Nativo 75 % WG (tebuconazole + trifloxystrobin)	56,39	89.91	60.99	93.36	68.95	95.22	75.81	97.10	83.91	97.97
Score 25 % EC (difenoconazole)	35.01	69.25	41.89	73.88	46.25	76.61	48.99	82.64	53.01	87.82

* A. solani
** P. oryzae

Table 8: Percent reduction of total lipids in Alternaria solani and Pyricularia oryzae as affected by different concentrations of the tested fungicides:

Fungicides	Fungicidal concentrations (µg ml^{-1})									
	0.5		1.0		5.0		10.0		25.0	
	*	**	*	**	*	**	*	**	*	**
Leader 45 % EC (prochloraz)	60.43	13.45	64.16	19.65	66.80	26.17	71.74	33.85	77.54	40.05
Mystic Gold 25 % EW (tebuconazole)	89.68	62.05	90.03	71.64	93.53	84.15	93.45	87.39	94.48	91.14
Nativo 75 % WG (tebuconazole + trifloxystrobin)	90.21	65.16	91.60	78.17	93.74	86.76	95.34	91.87	96.58	95.16
Score 25 % EC (difenoconazole)	76.97	38.49	80.85	43.56	84.34	46.25	86.44	49.77	87.37	55.20

* A. solani
** P. oryzae

Table 9: Percent reduction of total proteins in Alternaria solani and Pyricularia oryzae as affected by different concentrations of the tested fungicides.

Fungicides	Fungicidal concentrations (µg ml^{-1})									
	0.5		1.0		5.0		10.0		25.0	
	*	**	*	**	*	**	*	**	*	**
Leader 45 % EC (prochloraz)	29.55	36.92	51.66	43.45	67.53	52.21	74.41	66.20	78.46	77.68
Mystic Gold 25 % EW (tebuconazole)	17.96	62.04	26.72	63.47	49.64	77.68	75.71	81.17	87.53	85.12
Nativo 75 % WG (tebuconazole + trifloxystrobin)	40.00	68.85	56.52	72.76	64.29	80.92	76.03	82.85	92.46	88.99
Score 25 % EC (difenoconazole)	11.09	55.26	22.83	61.96	43.50	65.31	61.94	74.91	75.71	79.61

* A. solani
** P. oryzae

تأثير أربعة من مبيدات الفطريات علي النمو وبعض المقاييس البيوكمياوية في فطري ألترناريا سولاني وبيركيولاريا أوريزا تحت الظروف المعملية

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الملخص العربى

تم دراسة تأثير أربعة من مبيدات الفطريات هي ليدر 45 % ECوميستيك جولد25% EWوناتيفو 75 % WGوسكور 25 % ECعلي إثنين من مسببات الأمراض النباتية المهمة وهما ألترناريا سولاني المسبب لمرض الندوة المبكرة في الطماطم وفطر بيركيولاريا أوريزاالمسبب لمرض لفحة الأرز وهذين المرضينيحدثان ضررا كبيرا علي كلا المحصولين. تم عزل فطر ألترناريا سولاني من أوراق وثمار الطماطم وكان أكثر عزلاً من الأوراق بنسب عزل هي 68.28 و 62.35 علي الترتيب . وأيضا فطر بيركيولاريا أوريزا كان أكثر عزلاً من الأوراق و السنابل في الأرز بنسب عزل هي 50.00 و 54.28 علي الترتيب. وبينت النتائج أن كلا الفطرين اختلفا في حساسيتهما للمبيدات المستخدمة وكذلك للتركيزات المختلفة. كان مبيد ليدر هوالأكثر كفاءة في تثبيط نمو ألترناريا سولاني ثم مبيد سكور ثم ناتيفو ثم مايستك، وكانت قيم IC_{50} هي0.16 و0.18 و0.26 و2.06 جزء في المليون علي الترتيب .وأوضحت النتائج أن مبيد ليدر ثم سكور ثم ناتيفو ثم مايستك كانت علي الترتيب أكثر كفاءه في تثبيط نمو فطر بيركيولاريا أوريزا في قيم IC_{50}هى 0.06 و 0.40 و 0.55 و 1.14جزء في المليون علي الترتيب. بينت النتائج أن كلا الفطرين اختلفا في حساسيتها للمركبات المستخدمة طبقا لنوع المبيد المستخدم ونوع الفطر . وأثبتت النتائج أن هذه المبيدات الكيماوية المستخدمة قد أثرت علي محتويات كل من الكربوهيدرات والبروتين والدهون في كلا الفطرين،كمااختلفتمبيدات الفطريات المستخدمة في مابينها في هذا التأثير. وعموماً فإن هذه الدراسة قد أوضحت أن هناك احتياج لمزيد من الدراسات لتقدير حساسية الفطريات المذكورة لمبيدات الفطريات لتفادي حدوث ظاهرة مقاومة الفطريات لهذهالمبيدات وكذلك لزيادة محصولي الطماطم والأرز وذلك عن طريق مكافحة هذه الأمراض الفطرية المهمة فى كلا المحصولين المذكورين.

الكلمات الاسترشادية : مبيدات الفطريات الكيمياوية, فطر ألترناريا سولاني, فطر بيركيولاريا أوريزا, المقاييس البيوكيميائية .