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## Bio-efficacy and phytotoxicity of chili against leaf spot, powdery mildew, anthracnose, die back and twig blight diseases of chilli in red-lateritic zone and coastal saline zone of West Bengal

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### Abstract

One of the most significant cash crops in India is the chilli (*Capsicum annum*), which is produced year-round under a variety of agro-climatic conditions. The destruction of this crop by insects, mites, and diseases is a major barrier to its cultivation. Among the diseases, *Choanephora cucurbitarum* blight, powdery mildew caused by *Leveillula taurica*, anthracnose caused by *Colletotrichum capsici*, die back caused by *Colletotrichum capsici*, and Leaf spot caused by *Cercospora capsici* are major causes of crop losses ranging from 10 to 50%, depending on the severity of the disease and environmental factors.

Farmers use a variety of fungicides to manage the diseases. But because the same fungicides are used frequently, the pathogens become resistant, making it necessary to constantly search for new, more effective fungicides to manage the diseases.

In this experiment the combined management of leaf spot, powdery mildew, twig blight, and anthracnose diseases of chilli results in the lowest percent disease index and highest yields. Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500-625g/ha is very effective in this regard.

At any of the concentrations tried, Kresoxim methyl 40% WG + Hexaconazole 8% WG has not observed any phytotoxicity symptoms in the chilli plant.

**Keywords:** Chilli, leaf spot, powdery mildew, disease index, phytotoxicity

### Introduction

Chilli (*Capsicum annum*) is one of the most important cash crops grown extensively under a wide range of agro-climatic conditions throughout the year in India. Major constraints for cultivation of this crop are damage by insects, mites and diseases. Amongst diseases leaf spot caused by *Cercospora capsici*, powdery mildew caused by *Leveillula taurica*, anthracnose caused by *Colletotrichum capsici*, die back caused by *Colletotrichum capsici* and blight caused by *Choanephora cucurbitarum* are major causing crop losses ranging from 10-50%, depending upon the disease intensity and environmental conditions.

Several fungicides are used by farmers to control the diseases. But due to regular use of same fungicides, the pathogen develop resistance and to combat these problems a constant search is required to find out the effective fungicides for the management of the diseases.

Considering the economic importance of disease problem, few fungicides were tested to find out its efficacy for the management potential of these diseases of chilli.

### Materials and Methods

The treatments were imposed to chilli plants as foliar spray with knapsack sprayer fitted with hollow cone nozzle. Initial spraying was given 75 days after transplanting and second spray was given at 90 days after transplanting with 15 days interval. Observations were recorded before spray, 10 days after each spray. Phytotoxicity was assessed before spray, 3, 7, 10 and 15 days after first spray as per CIB guidelines.

Percent Disease Index (PDI) was recorded from 5 plants in each plot selected at random. Scoring method was 0-9 scale as described by Mayee and Datar, (1986; Phytopathometry) [3].

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**Table 1:** Disease scoring Scale for Leaf spot of chilli

Score	Symptoms
0	No infection
1	1-5% infection
2	6-10% infection
3	11-25% infection
4	26-50% infection
5	>50% infection

**Table 2:** Disease scoring Scale for Powdery mildew of chilli

Scale	Symptoms
0	No symptoms on the foliage
1	Small white Powdery specks on leaves or foliage covering 1% leaf or foliage area.
3	Small lesions with white to grey powdery growth covering 1-10% of the leaf or foliage areas.
5	Powdery lesions enlarging covering 11-25% of the leaf or foliage area
7	Powdery lesions spreading and coalescing cover an area of 26- 50% of the foliage or leaves.
9	Big Powdery patches covering 51% or more of foliage or leaves area

**Table 3:** Disease scoring Scale of Anthracnose of chilli

Scale	Symptoms
1	1-2% of fruit area shows necrotic lesion or a larger water-soaked lesion surrounding the infection site
3	>2-5% of the fruit area shows necrotic lesion, acervuli may be present, or water-soaked lesion up to 5% of the fruit surface
5	>5-15% of the fruit area shows necrotic lesion, acervuli present, or water-soaked lesion up to 25% of the fruit surface
7	>15-25% of the fruit area showed necrotic lesion with acervuli
9	>25% fruit area showed necrosis, lesion often encircling the fruit, abundant acervuli

**Table 4:** Disease scoring Scale of Die back & Twig blight of chilli

Scale	Area covered by disease
0	No disease.
1	Up to 5% area infected.
2	> 5 – 10% area infected.
3	> 10 – 25% area infected.
4	> 25 – 50% area infected.
5	Above 50% area infected.

The percent disease index was calculated by using the formula

$$\text{PDI} = \frac{\text{Sum of all numerical Ratings}}{\text{Total no units observed} \times \text{Maximum rating scale}} \times 100$$

### Phytotoxicity on chilli plants

Phytotoxicity symptoms *viz.* Leaf injury, Wilting, Vein clearing, necrosis, epinasty and hyponasty were recorded before spray, 3,7,10 and 15 days after first spray. Phytotoxicity on chilli plants was measured based on visual rating scale 0-10, as following below.

**Table 5:** Disease scoring Phytotoxicity

Score	Phytotoxicity (%)
0	No phytotoxicity
1	1-10
2	11-20
3	21-30
4	31-40
5	41-50
6	51-60
7	61-70
8	71-80
9	81-90
10	91-100

### Yield

The fruits were harvested from the individual plots and yield was recorded in Kgs. Cumulative yield of five pickings were recorded and converted into quintal/ha.

### Statistical analysis

The data thus obtained were subjected to appropriate transformations and analyzed as per RBD experimental designs.

### Results

The effect of Kresoxim methyl 40% WG + Hexaconazole 8% WG treatments on the incidence of leaf spot, powdery mildew, Twig blight & anthracnose and yield of chilli is presented in the tables (Table 6 to 14).

### Leaf spot

**I. Season:** Before treatment imposition Percent Disease Index (PDI) of leaf spot disease ranged from 6.73% to 9.65% in various treatments and control.

Ten days after second spray, lowest leaf spot PDI was recorded in Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 625g/ha (8.19%) followed by Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500g/ha (9.04%), Sarthak 71% WG @ 1000g/ha (10.60%) followed by Kresoxim methyl 50% SC @ 500ml/ha (11.15%), Hexaconazole 75% WG @ 66.7 g/ha (11.38%) treatments followed by Kresoxim methyl 50% SC @ 400ml/ha (11.72%), Hexaconazole 75% WG @ 53.3g/ha g/ha (12.54%) treatments respectively. However highest PDI was recorded in control (31.76%).

### II. Season

Before treatments imposition Percent Disease Index (PDI) of leaf spot disease ranged from 1.38% to 2.05% in various treatments and control.

Ten days after second spray, lowest leaf spot PDI was recorded in Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 625g/ha (4.24%) followed by Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500g/ha (5.17%), Sarthak 71% WG @ 1000g/ha (5.54%) followed by Kresoxim methyl 50% SC @ 500ml/ha (5.72%), Hexaconazole 75% WG @ 66.7g/ha (6.15%) treatments followed by Kresoxim methyl 50% SC @ 400ml/ha (6.84%), Hexaconazole 75% WG @ 53.3g/ha g/ha (7.13%) treatments respectively. However highest PDI was recorded in control (19.86%).

These results showed that Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 625g/ha, Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500g/ha followed by Sarthak 71%WG (Kresoxim methyl 15% + Chlorothalonil 56%) @ 1000g/ha were recorded to be the best chemicals in controlling the disease.

## **Powdery mildew**

### **I. Season**

Before treatments imposition Percent Disease Index (PDI) of powdery mildew disease incidence was ranged from 1.93% to 3.05%, in various treatments. Ten days after second spray, lowest powdery mildew PDI was recorded in Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 625g/ha (4.03%) followed by Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500g/ha (5.26%), Sarthak 71%WG @ 1000g/ha (6.32%) followed by Kresoxim methyl 50% SC @ 500 ml/ha (7.22%), Kresoxim methyl 50% SC @ 400 ml/ha (8.10%) treatments and are followed by Hexaconazole 75% WG @ 66.7 gm/ha (10.16%), Hexaconazole 75% WG @ 53.3 gm/ha (11.31%) treatments respectively. However highest PDI was recorded in untreated control (26.48%).

### **II. Season**

Before treatments imposition Percent Disease Index (PDI) of Powdery mildew disease was ranged from 4.98% to 8.09%, in various treatments with the control.

Ten days after second spray, lowest powdery mildew PDI was recorded in Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 625g/ha (9.40%) followed by Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500g/ha (10.38%), Sarthak 71%WG @ 1000g/ha (11.12%) followed by Kresoxim methyl 50% SC @ 500 ml/ha (11.26%), Hexaconazole 75% WG @ 66.7 gm/ha (12.38%) treatments followed by Kresoxim methyl 50% SC @ 400 ml/ha (12.70%), Hexaconazole 75% WG @ 53.3gm/ha (13.72%) treatments respectively. However highest PDI was recorded in untreated control (42.30%).

These results showed that Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 625g/ha, Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500g/ha and Sarthak 71%WG @ 1000g/ha were recorded to be the best chemicals in controlling the disease.

## **Twig blight / Choanephora blight**

### **I. Season**

Before treatments imposition Percent Disease Index (PDI) of Twig Blight disease was ranged from 4.51% to 6.39%, in various treatments with the control.

Ten days after second spray, lowest Twig Blight PDI was recorded in Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 625g/ha (6.26%) followed by Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500g/ha (6.79%), Sarthak 71%WG @ 1000g/ha (7.78%) followed by Kresoxim methyl 50% SC @ 500 ml/ha (10.13%), Kresoxim methyl 50% SC @ 400 ml/ha (10.46%) and are followed by Hexaconazole 75% WG @ 66.7 gm/ha (12.54%), Hexaconazole 75% WG @ 53.3 gm/ha (13.15%) treatments respectively. However highest PDI was recorded in untreated control (25.15%).

### **II. Season**

Before treatments imposition Percent Disease Index (PDI) of Twig Blight disease was ranged from 4.36% to 6.24%, in various treatments with the control.

Ten days after second spray, lowest Twig Blight disease PDI was recorded in Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 625g/ha (6.77%) followed by Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500g/ha (7.08%), Sarthak 71%WG @ 1000g/ha (8.37%) followed by Kresoxim methyl 50% SC @ 500 ml/ha (10.64%), Kresoxim methyl 50% SC @ 400 ml/ha (12.15%) and are followed by Hexaconazole 75% WG @ 66.7 gm/ha (13.38%), Hexaconazole 75% WG @ 53.3 gm/ha (14.29%) treatments respectively. However highest PDI was recorded in untreated control (28.05%).

## **Anthracnose**

### **I. Season**

At harvest, anthracnose on fruits was measured and mean PDI indicated that, all the fungicidal treatments found significantly superior to untreated control. Results revealed that, Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 625g/ha recorded least mean PDI (7.83%) followed by Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500g/ha (8.85%), Sarthak 71% WG @ 1000g/ha (9.40%), followed by Kresoxim methyl 50% SC @ 500ml/ha (11.20%), Kresoxim methyl 50% SC @ 400ml/ha (12.31%) followed by Hexaconazole 75%WG @ 66.7g/ha (12.50%), Hexaconazole 75%WG @ 53.3g/ha (13.80%) treatments respectively. However highest PDI was recorded in untreated control (31.64%).

### **II. Season**

At harvest, anthracnose on fruits was measured and mean PDI indicated that, all the fungicidal treatments found significantly superior to untreated control. Results revealed that, Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 625g/ha recorded least mean PDI (6.73%) followed by Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500g/ha (7.21%), Sarthak 71% WG @ 1000g/ha (8.23%), followed by Kresoxim methyl 50% SC @ 500ml/ha (10.30%), Kresoxim methyl 50% SC @ 400ml/ha (11.44%) followed by Hexaconazole 75%WG @ 66.7g/ha (11.83%), Hexaconazole 75%WG @ 53.3g/ha (12.99%) treatments respectively. However highest PDI was recorded in untreated control (27.65%).

These results showed that Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 625g/ha, Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500g/ha and Sarthak 71% WG @ 1000g/ha were recorded to be the best chemicals in controlling the disease.

## **Yield**

### **I. Season**

The treatments differed significantly with respect to yield. Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 625g/ha (30.06 q/ha) recorded significantly highest yield than all the treatments, followed by Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500g/ha (28.28 q/ha), Sarthak 71%WG (Kresoxim methyl 15% + Chlorothalonil 56%) @ 1000g/ha (26.91 q/ha) followed by Kresoxim methyl 50% SC @ 500ml/ha (24.67 q/ha), Kresoxim methyl 50% SC @ 400ml/ha (21.78 q/ha) treatments and are followed by Hexaconazole 75%WG @ 66.7g/ha (21.63 q/ha) are the next best treatments and are followed by), Hexaconazole 75%WG @ 53.3g/ha (19.61 q/ha). Control treatment (14.31 q/ha) recorded with lowest yield than all the treatments.

## II. Season

The treatments differed significantly with respect to yield. Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 625g/ha (29.00 q/ha) recorded significantly highest yield than all the treatments, followed by Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500g/ha (27.28 q/ha), Sarthak 71%WG (Kresoxim methyl 15% + Chlorothalonil 56%) @ 1000g/ha (25.43 q/ha) followed by Kresoxim methyl 50% SC @ 500ml/ha (23.81 q/ha), Kresoxim methyl 50% SC @ 400ml/ha (20.78 q/ha) treatments and are followed by Hexaconazole 75%WG @ 66.7g/ha (21.19 q/ha), Hexaconazole 75%WG @ 53.3g/ha (18.98 q/ha). Control treatment (13.36 q/ha) recorded with lowest yield than all the treatments.

### Effect of Kresoxim methyl 40% WG + Hexaconazole 8% WG 48%WG on Phytotoxicity of chilli plant: The effect of

different treatments of Kresoxim methyl 40% WG + Hexaconazole 8% WG on the phytotoxicity of chilli plant was recorded by following the 0-10 grade scale and results are presented in tables 6 & 14. No symptoms of leaf injury on tips and leaf surface, wilting, vein clearing, necrosis, epinasty and hyponasty were observed on chilli plant at any days after the spray application.

### Discussion

Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500-625g/ha is highly effective in the combined management of leaf spot, powdery mildew, twig blight and anthracnose diseases of chilli were we are recorded least Per cent Disease Index for the aforementioned diseases and with highest yields. Kresoxim methyl 40% WG + Hexaconazole 8% WG 48%WG has not recorded any phytotoxicity symptoms on chilli plant at any of the concentrations tried.

**Table 6:** Efficacy of Kresoxim methyl 40% WG + Hexaconazole 8% WG 48%WG against leaf spot of chilli -2021

Tr. Nos.	Treatments	Dosage /ha (formulation)	Before spray	Per cent Disease Index		% ROC 10 days after 2 <sup>nd</sup> spray
				10 days after 1 <sup>st</sup> spray	10 days after 2 <sup>nd</sup> spray	
1	Kresoxim methyl 40% WG + Hexaconazole 8% WG	500 g	7.21 (15.57)	8.62 (17.05)	9.04 (18.20)	80.13
2	Kresoxim methyl 40% WG + Hexaconazole 8% WG	625 g	7.29 (15.64)	7.83 (16.23)	8.19 (17.09)	84.78
3	Kresoxim methyl 50%SC	400 ml	6.73 (15.01)	10.89 (19.26)	11.72 (20.01)	69.41
4	Kresoxim methyl 50%SC	500 ml	9.65 (18.09)	10.36 (18.76)	11.15 (19.48)	72.72
5	Hexaconazole 75%WG	53.3 g	8.25 (16.67)	11.64 (19.94)	12.54 (20.73)	57.28
6	Hexaconazole 75%WG	66.7 g	7.52 (15.84)	11.18 (19.52)	11.38 (19.71)	61.64
7	Sarthak 71%WG	1000 g	8.33 (16.70)	9.22 (17.67)	10.60 (18.97)	76.14
8	Control	-----	8.11 (16.53)	20.72 (27.05)	31.76 (34.29)	
S.Em+			NS	0.41	0.50	
CD at 0.05			NS	1.26	1.53	

Figures in the parenthesis are arc sine transformed values. ROC= Reduction over control

**Table 7:** Efficacy of Kresoxim methyl 40% WG + Hexaconazole 8% WG 48%WG against powdery mildew of chilli -2021

Tr. Nos.	Treatments	Dosage /ha (formulation)	Before spray	Per cent Disease Index		% ROC
				10 days after 1 <sup>st</sup> spray	10 days after 2 <sup>nd</sup> spray	
1	Kresoxim methyl 40% WG + Hexaconazole 8% WG	500 g	2.32 (8.70)	3.98 (11.45)	5.26 (13.24)	80.13
2	Kresoxim methyl 40% WG + Hexaconazole 8% WG	625 g	2.65 (9.36)	2.87 (9.72)	4.03 (11.57)	84.78
3	Kresoxim methyl 50%SC	400 ml	2.02 (8.17)	6.23 (14.37)	8.10 (16.44)	69.41
4	Kresoxim methyl 50%SC	500 ml	2.49 (9.03)	5.21 (13.10)	7.22 (15.44)	72.72
5	Hexaconazole 75%WG	53.3 g	1.93 (7.98)	8.04 (16.47)	11.31 (19.63)	57.28
6	Hexaconazole 75%WG	66.7 g	3.05 (10.04)	7.35 (15.70)	10.16 (18.57)	61.64
7	Sarthak 71%WG	1000 g	2.60 (9.22)	5.08 (12.96)	6.32 (14.53)	76.14
8	Control	-----	2.58 (9.13)	16.57 (24.00)	26.48 (30.94)	
S Em+			NS	0.81	0.89	
CD at 0.05			NS	2.49	2.71	

Figures in the parenthesis are arc sine transformed values. ROC= Reduction over control

**Table 8:** Efficacy of Kresoxim methyl 40% WG + Hexaconazole 8% WG 48%WG against Twig Blight of chilli -2021

Tr. Nos.	Treatments	Dosage /ha (formulation)	Before spray	Per cent Disease Index		% ROC
				10 days after 1 <sup>st</sup> spray	10 days after 2 <sup>nd</sup> spray	
1	Kresoxim methyl 40% WG + Hexaconazole 8% WG	500 g	4.51 (11.70)	6.19 (14.38)	6.79 (15.45)	73.01
2	Kresoxim methyl 40% WG + Hexaconazole 8% WG	625 g	5.25 (13.22)	5.97 (14.10)	6.26 (14.48)	75.11
3	Kresoxim methyl 50%SC	400 ml	4.87 (12.72)	8.05 (16.46)	10.46 (18.86)	58.41
4	Kresoxim methyl 50%SC	500 ml	5.03 (12.88)	7.72 (16.12)	10.13 (18.55)	59.73
5	Hexaconazole 75%WG	53.3 g	6.39 (14.62)	9.15 (17.59)	13.15 (21.20)	47.71
6	Hexaconazole 75%WG	66.7 g	5.26 (13.20)	8.80 (17.22)	12.54 (20.73)	50.15
7	Sarthak 71%WG	1000 g	6.16 (14.34)	6.55 (14.77)	7.78 (16.18)	69.09
8	Control	-----	4.73 (12.43)	20.03 (26.57)	25.15 (30.08)	
S.Em+			NS	0.62	0.50	
CD at 0.05			NS	1.88	1.53	

Figures in the parenthesis are arc sine transformed values. ROC= Reduction over control

**Table 9:** Efficacy of Kresoxim methyl 40% WG + Hexaconazole 8% WG 48%WG against Anthracnose of chilli -2021

Tr. Nos.	Treatments	Dosage /ha (formulation)	Per cent Disease Index	% ROC
1	Kresoxim methyl 40% WG + Hexaconazole 8% WG	500 g	8.85 (17.26)	72.04
2	Kresoxim methyl 40% WG + Hexaconazole 8% WG	625 g	7.83 (16.23)	75.24
3	Kresoxim methyl 50% SC	400 ml	12.31 (20.53)	61.10
4	Kresoxim methyl 50% SC	500 ml	11.20 (19.51)	64.60
5	Hexaconazole 75% WG	53.3 g	13.80 (21.79)	56.38
6	Hexaconazole 75% WG	66.7 g	12.50 (20.67)	60.50
7	Sarthak 71% WG	1000 g	9.40 (17.85)	70.38
8	Control	-----	31.64 (34.21)	
S Em+			0.59	
CD at 0.05			1.80	

Figures in the parenthesis are arc sine transformed values. ROC= Reduction over control

**Table 10:** Efficacy of Kresoxim methyl 40% WG + Hexaconazole 8% WG 48%WG against leaf spot in chilli -2022

Tr. Nos.	Treatments	Dosage /ha (formulation)	Before spray	Per cent Disease Index		% ROC 10 days after 2 <sup>nd</sup> spray
				10 days after 1 <sup>st</sup> spray	10 days after 2 <sup>nd</sup> spray	
1	Kresoxim methyl 40% WG + Hexaconazole 8% WG	500 g	1.69 (7.47)	3.26 (10.39)	5.17 (13.13)	73.98
2	Kresoxim methyl 40% WG + Hexaconazole 8% WG	625 g	1.71 (7.51)	3.04 (10.02)	4.24 (11.87)	78.67
3	Kresoxim methyl 50%SC	400 ml	1.40 (6.81)	4.49 (12.13)	6.84 (15.15)	65.55
4	Kresoxim methyl 50%SC	500 ml	1.38 (6.73)	3.65 (11.00)	5.72 (13.76)	71.20
5	Hexaconazole 75% WG	53.3 g	2.05 (8.21)	5.03 (12.90)	7.13 (15.47)	64.12
6	Hexaconazole 75% WG	66.7 g	1.27 (6.45)	4.35 (12.02)	6.15 (14.35)	69.01
7	Sarthak 71%WG	1000 g	1.01 (5.77)	3.91 (11.38)	5.54 (13.61)	72.08
8	Control	-----	1.56 (7.16)	12.01 (20.28)	19.86 (26.43)	
S Em+			NS	0.60	0.58	
CD at 0.05			NS	1.83	1.78	

Figures in the parenthesis are arc sine transformed values. ROC= Reduction over control

**Table 11:** Efficacy of Kresoxim methyl 40% WG + Hexaconazole 8% WG 48%WG against powdery mildew in chilli -2022

Tr. Nos.	Treatments	Dosage /ha (formulation)	Before spray	Per cent Disease Index		% ROC
				10 days after 1 <sup>st</sup> spray	10 days after 2 <sup>nd</sup> spray	
1	Kresoxim methyl 40% WG + Hexaconazole 8% WG	500g	5.35 (13.12)	8.67 (17.11)	10.38 (19.23)	74.34
2	Kresoxim methyl 40% WG + Hexaconazole 8% WG	625g	7.51 (15.86)	8.06 (16.48)	9.40 (17.84)	77.79
3	Kresoxim methyl 50%SC	400ml	4.98 (12.86)	11.27 (19.60)	12.70 (20.87)	69.97
4	Kresoxim methyl 50%SC	500ml	6.20 (14.40)	9.41 (17.78)	11.26 (19.60)	73.37
5	Hexaconazole 75% WG	53.3g	8.09 (16.51)	12.37 (20.58)	13.72 (21.71)	67.56
6	Hexaconazole 75% WG	66.7g	6.97 (15.30)	10.58 (18.95)	12.38 (20.59)	70.74
7	Sarthak 71% WG	1000g	6.93 (15.18)	8.91 (17.34)	11.21 (19.43)	73.71
8	Control	-----	5.90 (14.00)	30.56 (33.54)	42.30 (40.55)	
S Em+			NS	0.63	0.55	
CD at 0.05			NS	1.94	1.68	

Figures in the parenthesis are arc sine transformed values. ROC= Reduction over control

**Table 12:** Efficacy of Kresoxim methyl 40% WG + Hexaconazole 8% WG 48%WG against Twig blight of chilli -2022

Tr. Nos.	Treatments	Dosage /ha (formulation)	Before spray	Per cent Disease Index		% ROC
				10 days after 1 <sup>st</sup> spray	10 days after 2 <sup>nd</sup> spray	
1	Kresoxim methyl 40% WG + Hexaconazole 8% WG	500 g	4.36 (12.02)	6.07 (14.15)	7.08 (15.42)	74.76
2	Kresoxim methyl 40% WG + Hexaconazole 8% WG	625 g	5.22 (13.19)	5.45 (13.47)	6.77 (15.06)	75.87
3	Kresoxim methyl 50%SC	400 ml	4.97 (12.84)	9.52 (17.97)	12.15 (20.39)	56.70
4	Kresoxim methyl 50%SC	500 ml	4.64 (12.38)	8.49 (16.93)	10.64 (19.01)	62.07
5	Hexaconazole 75% WG	53.3 g	6.24 (14.46)	10.26 (18.67)	14.29 (22.19)	52.98
6	Hexaconazole 75% WG	66.7 g	5.85 (13.96)	9.87 (18.30)	13.38 (21.39)	54.63
7	Sarthak 71% WG	1000 g	5.41 (13.42)	7.16 (15.51)	8.37 (16.80)	70.17
8	Control	-----	4.94 (12.81)	17.64 (24.81)	28.05 (31.96)	
S. Em+			NS	0.60	0.55	
CD at 0.05			NS	1.85	1.68	

Figures in the parenthesis are arc sine transformed values. ROC= Reduction over control

**Table 13:** Efficacy of Kresoxim methyl 40% WG + Hexaconazole 8% WG 48%WG against Anthracnose of chilli -2022

Tr. Nos.	Treatments	Dosage /ha (formulation)	Per cent Disease Index	% ROC
1	Kresoxim methyl 40% WG + Hexaconazole 8% WG	500 g	7.21 (15.57)	73.91
2	Kresoxim methyl 40% WG + Hexaconazole 8% WG	625 g	6.73 (14.94)	75.65
3	Kresoxim methyl 50%SC	400 ml	11.44 (19.53)	58.64
4	Kresoxim methyl 50%SC	500 ml	10.30 (18.65)	62.75
5	Hexaconazole 75%WG	53.3 g	12.99 (21.12)	53.01
6	Hexaconazole 75%WG	66.7 g	11.83 (20.07)	57.21
7	Sarthak 71%WG	1000 g	8.23 (16.66)	70.23
8	Control	-----	27.65 (37.71)	
S.Em+			0.91	
CD at 0.05			2.79	

**Table 14:** Effect of Kresoxim methyl 40% WG + Hexaconazole 8% WG 48%WG on fruit yields of chilli-2021-2022

Tr. Nos.	Treatments	Dosage /ha (formulation)	Fruit yield (q/ha)	
			I Season	II Season
1	Kresoxim methyl 40% WG + Hexaconazole 8% WG	500g	28.28	27.28
2	Kresoxim methyl 40% WG + Hexaconazole 8% WG	625g	30.06	29.00
3	Kresoxim methyl 50%SC	400ml	21.78	20.78
4	Kresoxim methyl 50%SC	500ml	24.67	23.81
5	Hexaconazole 75%WG	53.3g	19.61	18.98
6	Hexaconazole 75%WG	66.7g	21.63	21.19
7	Sarthak 71%WG	1000g	26.91	25.43
8	Control	-----	14.31	13.36
S. Em+			0.59	0.77
CD at 0.05			1.80	2.37

### Conclusion

The combination of Kresoxim methyl 40% WG + Hexaconazole 8% WG @ 500-625g/ha is highly effective in managing leaf spot, powdery mildew, twig blight, and anthracnose diseases of chilli, with the least disease index and highest yields. It has not been found to cause phytotoxicity symptoms on the chilli plant at any concentrations tested.

### References

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