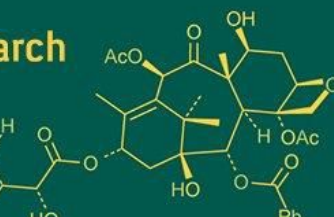
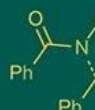


International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating: 5.29
IJABR 2025; 9(6): 952-953
www.biochemjournal.com
Received: 16-04-2025
Accepted: 19-05-2025

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Field evaluation of fungicides against early blight of tomato caused by *Alternaria solani*

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DOI: <https://www.doi.org/10.33545/26174693.2025.v9.i6k.4640>

Abstract

Early blight of tomato disease caused by *Alternaria solani* is an important fungal disease of tomato which causes considerable yield loss to the crop. The present study was carried out to know the efficacy of different fungicides against early blight of tomato caused by *Alternaria solani*. Results revealed that Azoxystrobin 11% + Tebuconazole 18% was found best in reducing the disease severity (15.63%) and getting higher yields (202.25 q/ha) followed by Carbendazim 12% + mancozeb 63%. Propineb was found least effective in managing the disease.

Keywords: Early blight, *Alternaria solani*, fungicides, management

Introduction

Tomato (*Solanum lycopersicum* Linnaeus) is one of the most important vegetable crops grown in the world which belongs to family Solanaceae. Odisha ranked fifth with respect to tomato production in India. Tomato can be grown in a wide range of climatic condition from tropical to temperate. Tomato crop suffers from many fungal, bacterial, viral and nematode diseases. Among the fungal diseases, early blight of tomato caused by *Alternaria solani* (Ellis and Martin) Jones and Grout, is an economically important disease, because it causes considerable yield losses to the crop. The disease attacks all the above ground parts of the plant and in severe cases causes complete defoliation of foliage. Diseases affects the fruits also. It reduces both the fruit quality and tomato yield. Disease is favoured by high temperature and high relative humidity, plants become more susceptible to this disease during fruiting stage (Chohan *et al.*, 2015) [2]. Yield loss due to the pathogen was estimated to the extent of 50% to 86% (Parvin, *et al.*, 2021) [5]. The fungicides presently used are costly and not able to manage the disease effectively. Therefore a field trial was conducted to know the efficacy of five different fungicides against early blight of tomato.

Materials and Methods

A field experiment was conducted during Rabi, 2023 at College of Agriculture, Chiplima to evaluate five different fungicides against early blight of tomato. The experiment was laid out in a randomized block design with six treatments and four replications. F1 hybrid SW1508 was used for this trial. 21 days old seedlings of tomato were transplanted in the main field in the month of December at a distance of 60 cm x 45 cm. spacing. Recommended doses of fertilizers were applied in each plot. All recommended agronomic practices were followed. Six different treatments used were T₁-2 sprays of Blitox (Copper oxychloride @ 0.3%), T₂-two sprays of Curzate M-8 (Cymoxanil 8% + mancozeb 64% @ 0.25%), T₃-two sprays of Astron (Azoxystrobin 11% + Tebuconazole 18% @ 0.2%), T₄-Two sprays of Acoreli (Propineb @ 0.3%), T₅-Two sprays of Saaf (Carbendazim 12% + mancozeb 63% @ 0.2%), T₆-Control (Untreated). First spray was done after appearance of the disease in the foliage. Two sprayings of each fungicide at 15 days interval were done. Data on disease severity was recorded from five selected plants of each plot based on 0-5 scale (0= No disease in the foliage, 1= Small irregular spots covering less than 5% leaf area, 2= Small irregular spots covering 5.1 to 10% leaf area, 3 =lesions covering 10.1 to 25% leaf area, 4= lesions covering 25.1 to 50% leaf area, 5= lesions covering more than 50% leaf area) (Mayee and Datar, 1986) [3].

Leaf blast disease severity was calculated by using the following formula. (Chester, 1959; Wheeler, 1969) [1, 8]

$$\text{PDI} = \frac{\text{Sum of individual ratings}}{\text{Number of leaves assessed} \times \text{maximum disease grade value}} \times 100$$

Results and Discussions

A field trial was conducted to know the efficacy of five different fungicides against early blight of tomato and data were presented in Table 1. The data revealed that all the treatments proved to be superior over the control. Among all the treatments, T₃ treatment i.e. Azoxystrobin 11% + Tebuconazole 18% was found most effective (15.63%) in reducing disease severity, followed by T₅ treatment i.e. Carbendazim 12% + mancozeb 63% (20.50%) which was on par with T₂ treatment i.e. Cymoxanil 8% + mancozeb 64%. (22.25%). Among all the treatments, T₄ i.e. Propineb was found least effective (39.38%) in reducing disease severity of early blight of tomato.

Data on effect of different fungicides on yield of tomato were recorded and presented in Table 2. All the treatments have significantly increased the yield by reducing disease severity when compared to control (119.50 q/ha). Highest

of tomato (202.25 q/ha) was obtained in T₃ treatment (Azoxystrobin 11% + Tebuconazole 18%) followed by T₅ treatment i.e. Carbendazim 12% + mancozeb 63% (184.50 q/ha) which was on par with T₂ treatment i.e. Cymoxanil 8% + mancozeb 64% (182.50 q/ha). Lowest yield was obtained in T₄ treatment i.e. Propineb (163.75 q/ha).

Our results are in agreement with the observations recorded by previous workers. Palaiah *et al.* (2020) [4] reported that Azoxystrobin 11% + Tebuconazole 18.3% showed the least incidence of early blight of tomato compared to other treatments. They also obtained maximum fruit yield in Azoxystrobin 11% + Tebuconazole 18.3%. Treatment under field condition. Sreenivasulu *et al.*, (2019) [7] reported that Tebuconazole 25.9% EC was most effective for the management of early blight of tomato along with significantly highest fruit yield. Sharma *et al.*, (2018) [6] reported that the lowest disease intensity (PDI) was observed in Carbendazim 12% + mancozeb 63% treatment (18.77%). They recorded highest yield of tomato with Carbendazim 12% + mancozeb 63% treatment (35257 kg/ha.).

Table 1: Effect of fungicides on disease severity of early blight of tomato

Treatment No.	Treatment details	Dosage	Percent disease Index (PDI)	% reduction of disease severity over control
T ₁	Copper oxychloride 50% WP	0.30%	29.55 (32.93) *	46.52
T ₂	Cymoxanil 8% + mancozeb 64% WP	0.25%	22.25 (28.14)	59.72
T ₃	Azoxystrobin 11% + Tebuconazole 18% SC	0.20%	15.63 (23.29)	71.71
T ₄	Propineb 70% WP	0.30%	39.38 (38.86)	28.72
T ₅	Carbendazim 12% + mancozeb 63% WP	0.20%	20.50 (26.92)	62.90
T ₆	Control		55.25 (48.00)	
S.E.m±			1.94	
CD at 5% level			5.84	

* Figures in parenthesis are angular transformed values

Table 2: Effect of fungicides on yield of tomato

Treatment No.	Treatment details	Dosage	Yield (q/ha)	% increase in yield over control
T ₁	Copper oxychloride 50% WP	0.30%	172.38	44.25
T ₂	Cymoxanil 8% + mancozeb 64% WP	0.25%	182.50	52.72
T ₃	Azoxystrobin 11% + Tebuconazole 18% SC	0.20%	202.25	69.25
T ₄	Propineb 70% WP	0.30%	163.75	37.03
T ₅	Carbendazim 12% + mancozeb 63% WP	0.20%	184.50	54.39
T ₆	Control		119.50	
S.E.m±			1.27	
CD at 5% level			3.84	

Conclusion

In our present investigation we observed that among all the fungicides tested, Azoxystrobin 11% + Tebuconazole 18% was the best fungicide in reducing disease severity of early blight of tomato and also increasing yield of tomato followed by Carbendazim 12% + mancozeb 63%

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