

# Bio-efficacy of Nativo (Tebuconazole 50% + Trifloxystrobin 25%) against *Alternaria* blight and powdery mildew diseases of cumin

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## Abstract

Blight and powdery mildew are destructive diseases of cumin may cause heavy yield losses, if timely precautionary measures for the management not taken. For the effective and economic management of cumin blight and powdery mildew, field trial was undertaken at Seed Spices Research Station, Jagudan during *rabi* 2016–17 and 2017–18 to determine the effectiveness of Nativo (Tebuconazole 50% + Trifloxystrobin 25%) against blight and powdery mildew diseases of cumin. Eight treatments including in different concentrations of Nativo (Tebuconazole 50% + Trifloxystrobin 25%), Trifloxystrobin, Tebuconazole and Azoxystrobin were compared with untreated control. Two years results revealed that Nativo (Tebuconazole 50% + Trifloxystrobin 25% WG) formulation @ 350 g/ha was found effective against *Alternaria* blight (*Alternaria burnsii*) and powdery mildew (*Erysiphe polygoni*) diseases of cumin with higher seed yield. Higher dose of Nativo (Tebuconazole 50% + Trifloxystrobin 25% WG) @ 700 g ha<sup>-1</sup> did not showed any phytotoxic symptoms on cumin crop at different crop stages during sprays. This indicated that Nativo (Tebuconazole 50% + Trifloxystrobin 25% WG) is non-phytotoxic to cumin crop even at higher dose.

**Key words:** Blight, cumin, disease, management, powdery mildew

## Introduction

Cumin (*Cuminum cyminum*) is grown in India on large scale besides several other countries like Bulgaria, Egypt, Argentina, Turkey, Bangladesh, Iran, China, Italy, Pakistan etc. It is an important crop of Rajasthan and Gujarat and some adjoining states. During 2016-17, cumin was grown in 7.60 lakh hectares with 4.86 lakh tones production and 0.64 tons per hectare productivity in India, where as, in Gujarat cumin was grown in 2.79 lakh hectares with 2.91 lakh tones production and 1.05 tons per hectare productivity (Anon, 2017). It is exported to many countries including Bangladesh, Japan, Malaysia, Nepal, Pakistan, Singapore, USA etc. Its value added products viz., oleoresins, oils etc are exported to USA, UK, Germany etc. Demand of cumin seed as whole or as value added products increased in many fold during recent past but main constraint for export is only pesticides residues. Cumin seeds contain 2.5-4.0% volatile oil, aldehydes, cuminol which attributes to its medicinal properties. The crop is subjected to many pathogens causing diseases which negatively influence the yield (Dange, 1995 and Sharma *et al.*, 2010). In cumin-growing districts of Rajasthan and Gujarat, incidence of wilt (*Fusarium oxysporum* f.sp. *cumini*), blight (*Aternaria burnsii*), and powdery mildew (*Erysiphe polygoni*) are in moderate to severe form. (Sharma *et al.*, 2013). Blight (*Aternaria burnsii*) was reported first time

in Gujarat by Uppal *et al.* 1938. Now, it is a common disease in all cumin growing areas in the state. The powdery mildew disease caused by *Erysiphe polygoni* reduced seed yield up to 50 per cent under favourable weather conditions. Under severe disease condition, the total failure of the crop has been observed (Champawat and Singh, 2008). As no resistant variety available against this disease, it has become inevitable to go for the use of fungicides for the management of diseases. Few fungicides were reported earlier for the management of disease by Akbari *et al.*, (1996), Solanki *et al.*, (1973), Dange *et al.*, (2012), Sharma *et al.*, (2013) and Patel *et al.*, (2017). Disease is still causing yield losses under favorable environmental conditions. Many fungicides also pose pesticides residue problem in cumin. To overcome pesticides residue problem, fungicides having less residue effect is essentially required. Therefore new fungicide Nativo (Tebuconazole 50% + Trifloxystrobin 25% WG) was tested under field conditions to find out bio-efficacy against blight and powdery mildew diseases of cumin.

## Materials and methods

A field experiment was conducted at Seed Spices Research Station, Jagudan, Gujarat during *rabi* 2016–17 and 2017–18 to evaluate the bio-efficacy of Nativo (Tebuconazole 50% + Trifloxystrobin 25%)

against *Alternaria* blight (*Alternaria burnsii*) and powdery mildew (*Erysiphe polygoni*) diseases of cumin. The trial was laid out in randomized block design (RBD) with eight treatments and four replications. Popular variety Gujarat Cumin 4 (GC 4) was planted with row spacing of 30 cm in the plots measured 4.0 m × 3.0 m. All the recommended agronomic practices were adopted as per package of practices except fungicidal sprays. Three foliar sprays of respective fungicides were given by manually operated knapsack sprayer. First spray was made at initiation of disease and subsequent two sprays were applied at ten days interval. Observations were recorded from ten randomly selected plants as per the disease scale (0-4 Point scale) (Rathore and Rathore, 1995) and percent disease index (PDI) was calculated. The data also recorded for seed yield after harvesting of the crop. The individual plant was kept for sun drying for a day and yield was recorded plot wise and later extrapolated to per hectare basis and statistically analyzed.

Phytotoxicity symptoms were recorded using scale (0-10) given below at 1, 3, 7 and 10 days after each spray. Ten plants were selected at random from each plot and the total number of leaves and those showing Phytotoxicity symptoms such as leaf tip and surface injury, wilting, vein clearing, necrosis, epinasty and hyponasty were rated and converted into percentage and given in tabular form.

### Results and discussion

The data on the efficacy of fungicides against *Alternaria* blight disease revealed that all the treatments found significantly superior over untreated control. The lower percent disease intensity (PDI) was recorded in the treatment of Nativo (Tebuconazole 50 % + Trifloxystrobin 25% WG) @ 350 g ha<sup>-1</sup> i.e 25.65 per-cent and 27.62 % at 10 days after 2nd spray during 2016-17 and 2017-18 respectively.

Score	Percent crop affected	Score	Percent crop affected
0	No adverse effect	6	51-60
1	1-10	7	61-70
2	11-20	8	71-80
3	21-30	9	81-90
4	31-40	10	91-100
5	41-50		

**Table 1: Bio-efficacy of Nativo (Tebuconazole 50 % + Trifloxystrobin 25% WG) against *Alternaria* blight and powdery mildew diseases of cumin**

Treatment	Dose (g ha <sup>-1</sup> )	Per cent disease intensity (PDI)								Seed yield (Kg ha <sup>-1</sup> )	
		Before spray				10 days after last spray					
		<i>Alternaria</i> blight		Powdery mildew		<i>Alternaria</i> blight		Powdery mildew		2016-17	2017-18
2016-17	2017-18	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18		
control	-	12.11 (4.42)	12.06 (4.38)	12.46 (4.67)	12.47 (4.67)	47.87 (55.00)	44.14 (48.50)	34.74 (32.50)	33.65 (30.75)	262	258
Nativo 25WG	250	11.92 (4.27)	12.02 (4.34)	12.56 (4.73)	12.51 (4.70)	26.74 (20.25)	28.72 (23.10)	24.72 (17.50)	22.98 (15.25)	390	377
Nativo 25WG	300	12.17 (4.45)	12.12 (4.41)	12.15 (4.43)	12.29 (4.53)	25.84 (19.00)	28.14 (22.25)	23.57 (16.00)	22.38 (14.50)	394	387
Nativo 25WG	350	12.15 (4.43)	12.16 (4.41)	12.61 (4.77)	12.65 (4.80)	25.65 (18.75)	27.62 (21.50)	22.98 (15.25)	22.05 (14.10)	408	400
Trifloxystrobin 25% WG	175	12.31 (4.55)	12.26 (4.51)	12.10 (4.40)	12.13 (4.43)	34.75 (32.50)	33.52 (30.50)	29.83 (24.75)	27.79 (21.75)	300	292
Tebuconazole 250 EC	700	12.15 (4.43)	12.13 (4.42)	12.37 (4.60)	12.41 (4.63)	33.05 (29.75)	31.79 (27.75)	26.56 (20.00)	24.54 (17.25)	317	310
Azoxystrobin 23 SC	500	12.04 (4.36)	12.09 (4.39)	12.20 (4.47)	12.52 (4.70)	38.35 (38.50)	35.97 (34.50)	27.07 (20.75)	27.25 (21.00)	286	279
<b>S.Em. ±</b>		0.32	0.30	0.31	0.28	0.57	0.57	0.72	0.47	9.64	10.77
<b>C.D. at 5%</b>		NS	NS	NS	NS	1.70	1.80	2.20	1.40	28.70	32.00

The data on the efficacy of fungicides against powdery mildew disease presented in table-1 revealed that all the doses of Nativo (Tebuconazole 50 % + Trifloxystrobin 25% WG) was found significantly superior over control against powdery mildew of cumin. The percent disease intensity was recorded in Nativo (Tebuconazole 50 % + Trifloxystrobin 25% WG) @ 350 g ha<sup>-1</sup> i.e. 22.98 % at 10 days after 2nd spray during 2016-17. While during 2017-18 percent disease intensity was recorded in Nativo (Tebuconazole 50 % + Trifloxystrobin 25% WG) @ 350 g ha<sup>-1</sup> was 22.05 percent at 10 days after 2nd spray.

Phytotoxicity symptoms such as chlorosis, necrosis, wilting, scorching, epinasty and hyponasty recorded on cumin crop sprayed with Nativo (Tebuconazole 50 % + Trifloxystrobin 25% WG) @ 700 g ha<sup>-1</sup> revealed that no phytotoxicity symptoms exhibit in any case on cumin crop during both the years (2016-17 and 2017-18).

Yield was also recorded separately for both the years from each plot. Data revealed that application of Nativo (Tebuconazole 50 % + Trifloxystrobin 25% WG) @ 350 g ha<sup>-1</sup> significantly increased cumin yield (408.0 Kg ha<sup>-1</sup> and 400.0 Kg ha<sup>-1</sup>, in 2016-17 and 2017-18, respectively) in both the years over untreated control (262.0 Kg ha<sup>-1</sup> and 258.0 Kg ha<sup>-1</sup>, in 2016-17 and 2017-18, respectively).

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