

Original Research Article

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Effect of Botanicals in Management of Powdery Mildew of Chilli Pathogen *Leveillula taurica*

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ABSTRACT

An pot experiment were conducted during 2014-15 to check the effective botanical against powdery mildew of chilli. Out of seven botanicals evaluated under pot culture experiment three were found very effective against *Leveillula taurica*. However botanicals *i.e.*, neem (5%) recorded the least mean disease incidence (18.88%), with severity (12.66%) This was followed by garlic (5%) which recorded the least mean disease incidence (18.99%), severity (13.88%) and intensity (23.73%) and ghaneri (5%) recorded the least mean disease incidence (20.44%), severity (14.25%) and intensity of 25.70 per cent, respectively. All the Seven botanicals evaluated under *In vitro* condition were found effective against *Leveillula taurica*. Among the botanicals tested neem recorded significantly least mean disease incidence (18.38%), followed by garlic (18.99%) ghaneri (20.44%), turmeric powder (21.55), nargudi (22.22%), tulsi (22.74%), and parthenium (23.06%). Thus of the Botanicals tested neem, garlic ghaneri 5% were found effective in minimizing the disease incidence as compared to untreated control (without spray).

Keywords

Effect of botanicals, Chilli, *Leveillula taurica*.

Article Info

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Introduction

Chilli (*Capsicum annum* L.), belongs to the family Solanaceae is an important spice cum vegetable crop of the world. It is believed to be originated from South America during 15th Century (Pickersgill, 1997). Powdery mildew incited by *Leveillula taurica* Lev. (Arn) is one of the important fungal diseases in chilli (*Capsicum annum*) causing considerable losses. The disease reported to occur and cause yield losses to the tune of 50.55 per cent in the Marathwada region of the state (Hingole and Kurundkar, 2011). The Portuguese during 15th century introduced chilli crop to India from Brazil. India is the

world's largest producer, consumer and exporter of chilli and contributes about 25 percent of total world production. In India chilli is grown in almost all the states. Andhra Pradesh is the largest producer of chilli occupying 27 percent followed by Karnataka (19%) and Maharashtra (12%) (Chandra Nayaka *et al.*, 2009). In India During 2010-11, chilli is grown an area of 792.1 thousand ha, with a production of 1223.4 MT and productivity of 1.5MT/ha (Bijay Kumar, 2011). Maharashtra state have approximately one lakh hectare area under chilli, out of which 68 per cent area is in Nanded, Jalgaon,

Dhule, Nandurbar, Solapur, Kolhapur, Amravati, Chandrapur, and Osmanabad districts.

Materials and Methods

Experimental details

The seven botanicals evaluated under pot culture experiment were found effective against *Leveillula taurica*. The CRD design were layed out for the following trials by taking eight treatments with three replications. The variety Parabani Tejas used for the trial.

$$\text{Per cent disease incidence} = \frac{\text{Number of plant infected}}{\text{Total number of plant examined}} \times 100$$

Further, per cent disease control (PDC) was worked out by applying the formula:

$$\text{PDC} = \frac{\text{PDI in control plot} - \text{PDI in treatment plot}}{\text{PDI in control plot}} \times 100$$

Results and Discussion

Effect on powdery mildew incidence

Result (Table 1) indicated that, all the treatments significantly reduced the powdery mildew disease incidence in chilli. The per cent powdery mildew incidence recorded in the plots before spray treatments ranged from 14.06% to 17.36%. The per cent powdery mildew disease incidence after spray treatment of neem @ 5% (T1) recorded was 23.71%, followed by garlic T4 (23.89%), followed by ghaneri (T5) (26.85%), turmeric powder (27.14%), nirgudi (T6) (27.29%), tulsi (T3) (28.44%) and parthenium (T7) (29.41%). The mean per cent powdery mildew incidence recorded with all the treatments was ranged from (18.88%), neem, to (23.06%), parthenium. In untreated control it was

(24.33%). Among the botanicals tested neem recorded significantly least mean disease incidence (18.38%), followed by garlic (18.99%), ghaneri (20.44%), turmeric powder (21.55%), nirgudi (22.22%), tulsi (22.74%), and parthenium (23.06%). Thus of the Botanicals tested neem, garlic ghaneri 5% were found effective in minimizing the disease incidence as compared to untreated control (without spray) (Fig. 1).

Effect on powdery mildew severity

The lowest per cent disease severity (Table 2) after seven days of spraying (17.67%) was recorded in the pots receiving sprays of neem (T1) which was significantly lower than the other treatments and untreated control (26.83%). The pot culture experiment receiving spray of garlic (T4) recorded the per cent disease severity of (18.37%), which was followed by pots receiving spray of ghaneri (T5) (19.80%), turmeric powder (T2) (21%), nirgudi (T6) (22.27%), tulsi (T3) (23.93%) and parthenium (T7) (25.70%), respectively.

Among botanicals tested, neem recorded significantly least mean disease severity of (12.66%), followed by garlic (13.18%), ghaneri (14.25%), turmeric powder (14.91%), nirgudi (15.66%), tulsi (16.46%), and parthenium (17.41%) respectively. Thus of the botanicals tested neem, Garlic, ghaneri and turmeric powder (0.5%) were found effective in minimizing the disease severity as compared to untreated control. Result (Table 3) revealed that all treatments revealed that all botanicals tested significantly reduced powdery mildew intensity. The per cent disease intensity recorded before spray treatments was in the range of (13.80%) to (17.64 %). The lowest per cent disease intensity after spray (31.80%), was recorded in the pot culture experiment receiving sprays of neem (T1) which was significantly lower than the other treatments and untreated control (48.30%) (Fig. 2).

Treatment details

Sr.No	Treatment	Common Name	Scientific name	Concentration (%)
1.	T ₁	Neem	<i>Azadirachta indica</i>	5%
2.	T ₂	Turmeric powder	<i>Curcuma longa</i>	5%
3.	T ₃	Tulsi	<i>Ocimum sanctum</i>	5%
4.	T ₄	Garlic	<i>Allium sativum</i>	5%
5.	T ₅	Ghaneri	<i>Lantana camara</i>	5%
6.	T ₆	Nirgudi	<i>Vitex negundo</i>	5%
7.	T ₇	Parthenium	<i>Parthenium hysterophorus</i>	5%
8.	T ₀	Control	-	-

Table.1 Effect of botanicals against chilli powdery mildew incidence

	Treatments @ 5%	Disease incidence* %		Mean Incidence (%)
		At first Appearance	After 7 days of spraying	
T1	Neem	14.06 (21.98)	23.71 (29.12)	18.88 (25.55)
T2	Turmeric powder	15.86 (23.44)	27.14 (31.38)	21.5 (27.41)
T3	Tulsi	16.99 (24.32)	28.49 (32.24)	22.74 (28.28)
T4	Garlic	14.10 (22.22)	23.89 (29.24)	18.99 (28.33)
T5	Ghaneri	14.5 (22.35)	26.38 (30.88)	20.44 (30.30)
T6	Nirgudi	17.16 (24.45)	27.29 (31.48)	22.22 (31.48)
T7	Parthenium	16.71 (24.08)	29.41 (32.82)	23.06 (32.32)
T0	Control	17.36 (24.58)	31.30 (34.0)	24.33 (33.10)
	SE+-	NS	0.34	----
	CD@5%	NS	1.07	-----

Table.2 *In vitro* evaluation of botanicals against chilli powdery mildew severity

	Treatments @ 5%	Disease Severity* (%)		Mean (%)
		At first Appearance	After 7 days of spraying	
T1	Neem	7.66 (15.97)	17.67 (24.84)	12.66 (20.39)
T2	Turmeric powder	8.83 (17.23)	21 (27.26)	14.91 (22.24)
T3	Tulsi	9.0 (17.39)	23.93 (29.27)	16.46 (23.33)
T4	Garlic	8.0 (16.36)	18.37 (25.36)	13.18 (20.86)
T5	Ghaneri	8.70 (17.10)	19.80 (26.41)	14.25 (21.75)
T6	Nirgudi	9.06 (17.46)	22.27 (28.14)	15.66 (22.80)
T7	Parthenium	9.13 (17.51)	25.70 (30.44)	17.41 (24.97)
T0	Control	9.80 (18.19)	26.83 (31.18)	18.31 (24.68)
	SE+	NS	0.17	---
	CD@5%	NS	0.52	---

*Mean of three replication. PDI-Per cent Disease Severity
 Figures in Parentheses are angular transformed value

Table.3 *In vitro* efficacy of botanicals against chilli powdery mildew intensity

	Treatments @ 5%	Disease Severity* (%)		Mean	Disease control (%)
		At first Appearance	After 7 days of spraying		
T1	Neem	13.80 (21.68)	31.80 (34.31)	22.80 (27.99)	34.16
T2	Turmeric powder	15.90 (23.42)	37.8 (37.92)	26.85 (30.67)	21.73
T3	Tulsi	16.2 (23.65)	43.10 (41.02)	29.65 (32.33)	10.76
T4	Garlic	14.4 (22.22)	33.06 (35.08)	23.73 (20.86)	31.55
T5	Ghaneri	15.66 (23.24)	35.74 (36.69)	25.70 (29.96)	26.0
T6	Nirgudi	16.32 (23.75)	40.08 (39.26)	28.20 (31.50)	17.01
T7	Parthenium	16.44 (23.83)	46.26 (42.83)	31.35 (33.33)	0.42
T0	Control	17.64 (24.77)	48.30 (44.00)	32.97 (34.38)	-----
	SE+-	NS	0.27	---	-----
	CD@ 5%	NS	0.82	---	-----

*Mean of three replication. PDI-Per cent Disease Intensity
 Figures in Parentheses are angular transformed value

Fig.1 *In vitro* efficacy of botanicals against chilli powdery mildew incidence

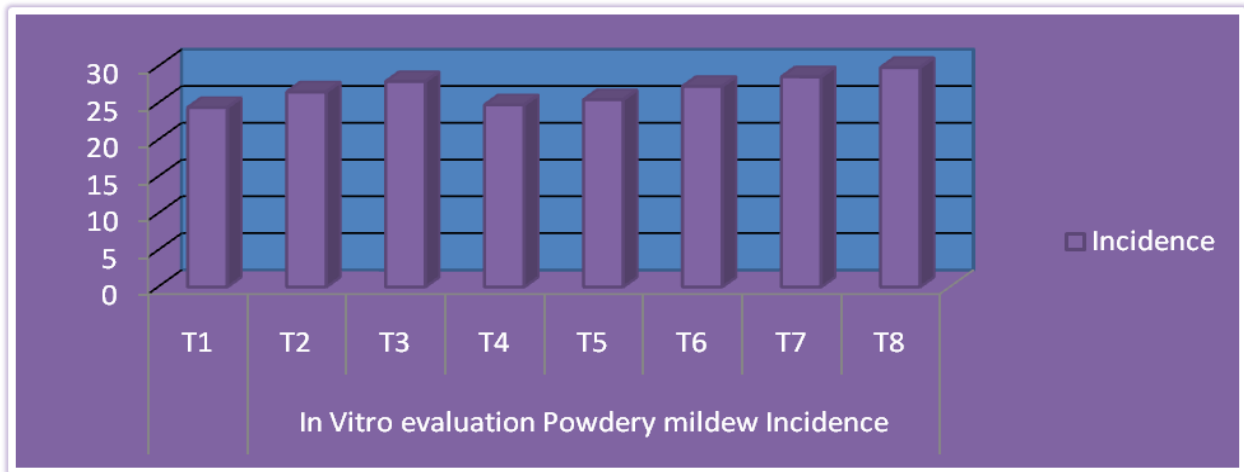


Fig.2 *In vitro* efficacy of botanicals against chilli powdery mildew severity

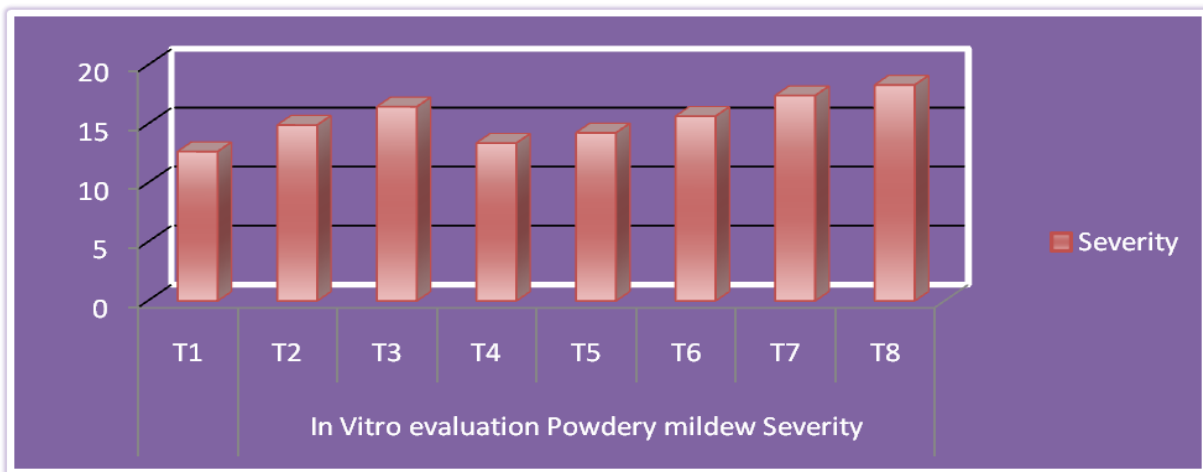
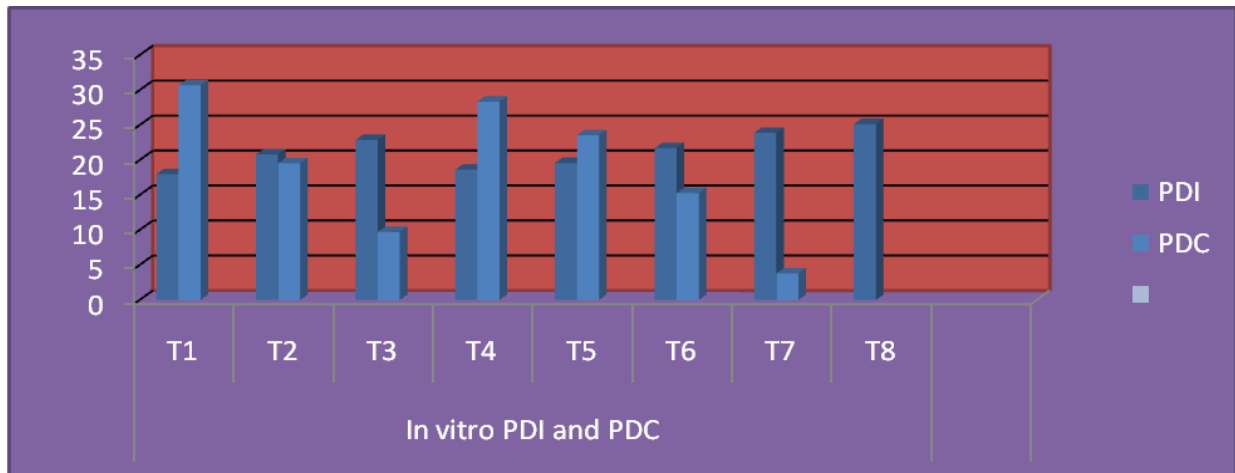


Fig.3 *In vitro* efficacy of botanicals against chilli powdery mildew intensity



Effect on powdery mildew intensity

The pots receiving spray of garlic (T4) recorded the per cent disease intensity of 33.06% which was disease intensity (Table 3) recorded in pots receiving spray of ghaneri @0.5% (T5) (35.74%), turmeric powder @0.5% (T2) (37.8%), followed by nirgudi @0.5% (T6) (40.08%), tulsi @0.05% (T3) (43.10%) and parthenium @0.5% (T7) (46.26%), respectively. Among botanicals tested, neem recorded significantly least mean disease intensity of (24.80%), followed by garlic (23.73%), ghaneri (25.70%), turmeric powder (26.85%), nirgudi (28.20%), tulsi (29.46%), and parthenium (31.35%), respectively. Among the plant product and plant extracts tested neem (0.5%) garlic (0.5%) ghaneri (0.5%) were found to be the most effective in reducing powdery mildew incidence, severity and intensity. These findings are in agreement with the results of Singh and Prithiviraj (1997), Ravikumar (1998), Sindhan *et al.*, (1999), and Rettinassababady *et al.*, (2000) (Sharmila (2004) Similar with those reported earlier by Sudha and Lakshmanan (2007), Surwase *et al.*, (2009), Kachhot Puja *et al.*, (2011), Dinesh *et al.*, (2011), Khalikar *et al.*, (2011) respectively (Fig. 3).

Among the botanicals neem (5%) was found effective and recorded significantly least mean incidence (18.88%), Severity (12.66%) and intensity (22.80%) and second best botanical was garlic (5%) which recorded mean disease incidence of (18.99%), Severity (13.18%) and intensity of (23.73%). Third best botanical was ghaneri which recorded mean incidence (20.44%), Severity (14.25%) and intensity of 25.70 per cent, respectively. Studies on evaluation of botanicals against *Leveillula taurica* in pot culture proved that spray of botanicals *viz.*, neem, garlic, ghaneri, turmeric powder moved to be most effective in minimizing the disease.

References

- Bijay Kumar. (2011). *National Horticulture database*. Pp. 243-245.
- Chandra Nayaka, S. Uday Shankar, A.C. Niranjana, S. R. Prakash, H.S. and Mortensen, C.N. (2009). Anthracnose disease of chilli pepper *Tech. Bull*, pp.1-14.
- Dinesh, B.M. Shripad Kulkarni, Harlapur, S.I and Benagi, V.I. (2011). Management of Sunflower powdery mildew (*Erysiphe cichoracearum*) *J. Mycol. Pl. Pathol.* 41(1): 48-52.
- Hingole, D.G. and Kurundkar B.P. (2011). Estimation of yield losses caused by anthracnose and powdery mildew in chilli in Marathwada region. *J. Pl. Dis. Sci.* 6(2):167-169.
- Kachhot, Pooja Rakesh, Shah Mali, B.L. and Jain, H. K. (2011). Mildew of pea (*Pisum Sativum L.*) caused by *Erysiphe Pisi DC.* *J. Pl. Dis. Sci.* 6 (1): 39-43.
- Khalikar, P.V. Jagtap, G. P and Sontakke, P. L. (2011). Management studies of okra powdery mildew (*Erysiphe cichoroceaum*) using bio-agents, plant extracts and chemical fungicides *Indian Phytopath.* 64(3): 286-290.
- Pickersgill, B. (1997). Genetic resources and breeding of *Capsicum spp.* *Euphytica.* 96(1): 129-133.
- Ravikumar, B.P. (1998), Studies on powdery mildew of rose caused by *Sphaerotheca pannosa var. rosae* (Wallar.) Lev. *M.Sc. (Agri.) Thesis, Univ. Agric. Sci. Dharwad.*
- Rettinassababady, C. Ramadoss, N. and Thirumeni, S. (2000). Effect of plant extracts on the powdery mildew of black gram (*Erysiphe polygoni DC.*) *Agric. Sci. Digest.* 20(3): 193-194.
- Sharmila, A. S. Kachapur, M. R. and Patil, M. S. (2004a). Field evaluation of fungicides against powdery mildew (*Leveillula taurica* (Lev.) Arn) of chilli

- (*Capsicum annum* L.) *J. Mycol Pl. Pathol.* 34, (1): 98-99.
- Sindhan, G.S. Indra Hooda and Parashar, R.D. (1999). Evaluation of plant extracts for the control of powdery mildew of pea. *J. Mycol. Pl. Path* 29:257-258.
- Singh, U.P. and Prithviraj, N. (1997). Neemazol a product of neem (*Azadirchta indica*) induces resistance in pea (*Pisum sativum*) against *Erysiphe pisi*. *Physiol Mol. Pl. Pathol.* 52(3): 181-194.
- Sudha, A. and Lakshmanan, P. (2007). Efficacy of botanicals against chilli powdery mildew caused by *Leveillula taurica* (Lev.) Arn. *Madras Agric, J.* (1-6): 46-50.

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