



P-ISSN: 2349-8528

E-ISSN: 2321-4902

www.chemijournal.com

IJCS 2020; 8(2): 913-915

© 2020 IJCS

Received: 16-01-2020

Accepted: 18-02-2020

Meera Choudhary

Department of Plant Pathology,
SKN College of Agriculture
(SKNAU), Jobner, Jaipur,
Rajasthan, India

RP Ghasolia

Department of Plant Pathology,
SKN College of Agriculture
(SKNAU), Jobner, Jaipur,
Rajasthan, India

Tejpal Bajaya

Department of Plant Pathology,
SKN College of Agriculture
(SKNAU), Jobner, Jaipur,
Rajasthan, India

Manisha Shivran

Department of Plant Pathology,
SKN College of Agriculture
(SKNAU), Jobner, Jaipur,
Rajasthan, India

Efficacy of natural products and fungicides against powdery mildew of ber

Meera Choudhary, RP Ghasolia, Tejpal Bajaya and Manisha Shivran

DOI: <https://doi.org/10.22271/chemi.2020.v8.i2n.8884>

Abstract

Indian jujube or ber (*Ziziphus mauritiana* Lamk.) is one of the most common fruit, indigenous to an area joined from India to China. Powdery mildew of ber incited by *Oidium erysiphoides* f. sp. *ziziphi*, Yan and Wang is the most important disease that causes maximum reduction in yield and quality of ber fruits. Exclusive reliance on fungicides for the control of disease of various crops resulted in residue and environmental hazards. Therefore, in recent years, efforts are being diverted to employ higher plants, natural products and their derivatives as a tool for integrated disease management because they do not cause bio-accumulation, bio-magnification and environmental pollution. In present investigation, six natural products (buffalo milk, cow milk, garlic extract, neem oil, mustard oil, butter milk/chhach) were evaluated for their efficacy against powdery mildew of ber. The jujube or ber is an ancient fruit of India and China. It was one of the prominent fruits on which the sages in ancient India lived during the Vedic age and lived even today. Ber is a hardy crop which grown in arid conditions of Rajasthan, characterized by sandy soils, scanty rainfall (400-600mm), thermal oscillations (5-35 °C) and low relative humidity. Therefore, the area of cultivation is increasing in this zone (arid and semi arid) and is expected that in near future ber will be a leading fruit crop of arid zone. The cultivation of ber requires the least input and care. In natural products maximum intensity over control was observed with garlic extract followed by neem oil, mustard oil, cow milk, buffalo milk and least effective was butter milk. Among the five systemic and non systemic fungicides (difenoconazole, dinocap, hexaconazole, tridemorph and wettable sulphur) tested against powdery mildew of ber, the maximum reduction in disease intensity over control was observed in dinocap (0.1%) with lowest per cent disease intensity (9.60) followed by hexaconazole, wettable sulphur, tridemorph and least effective was difenoconazole.

Keywords: Ber, *Ziziphus mauritiana*, powdery mildew, natural products and fungicides

Introduction

Indian jujube or ber (*Ziziphus mauritiana* Lamk.) is one of the most common fruit, indigenous to an area joined from India to China. The genus *Ziziphus* has been derived from 'Zizai' which is the Arabic name of the fruit (Bailey, 1947) [2]. The ber belongs to the family *Rhamnaceae* which has about 50 genera and more than 600 species (Pareek, 1983) [11]. In India, ber is being cultivated on an area of about 4,845 hectares with production of 66,296 metric tonnes and productivity of 13.68 metric tonnes (Anonymous, 2014) [1]. Ber is a hardy crop which grown in arid conditions of Rajasthan, characterized by sandy soils, scanty rainfall (400-600mm), thermal oscillations (5-35 °C) and low relative humidity. Powdery mildew of ber incited by *Oidium erysiphoides* f. sp. *ziziphi*, Yan and Wang is the most important disease that causes maximum reduction in yield and quality of ber fruits (*Ziziphus mauritiana* Lamk.). Due to powdery mildew recorded per cent disease index 17-71 at fruiting stage of ber (*Oidium* sp.) in Bijapur, India (Jamadar *et al.*, 2009) [9]. Ber is attacked by many of the diseases caused by fungi and other pathogenic agents. Among these, powdery mildew is one of the most important, wide spread and easily recognized diseases. Among these, powdery mildew caused by *Oidium erysiphoides* f. sp. *ziziphi*, Yan and Wang (*Microsphaera alphitoides* f. sp. *ziziphi* Griffon and Maublanc) is a major disease of jujube in India (Jamadar *et al.* 2009) [9]. Due to powdery mildew (*Oidium* sp.) per cent disease index recorded 17-71 at fruiting stage of ber in Bijapur, India (Jamadar and Desai, 1996) [10].

Corresponding Author:**Meera Choudhary**

Department of Plant Pathology,
SKN College of Agriculture
(SKNAU), Jobner, Jaipur,
Rajasthan, India

Material and Methods

Disease Control through natural products

In lieu of organic produce for the consumers, the following natural products were used to test their efficacy against powdery mildew of ber on ten years old susceptible variety Gola. The concentration of natural products was decided as per available information in literature.

The concentration of natural products was decided as per available information in literature.

Natural products	Dose (%)
Buffalo milk	10
Butter milk (Chhach)	10
Cow's milk	10
Garlic extract	10
Mustard oil	0.5
Neem oil	0.5

Neem oil, mustard oil, cow milk, buffalo milk and butter milk (Chhach) were applied as per required concentration while garlic extract was prepared as follows. Hundred gram garlic cloves were taken with 100 ml of water and then grinded in juicer mixer grinder and filtered through double layered muslin cloth. This was considered as 100 per cent concentration and sprayed (10%) on ber trees (Sindhan *et al.*, 1999) [13].

The experiment was conducted at Asalpur Farm, Jobner in RBD with four replications. Two sprays of each natural

product was applied, first spray at the time of disease initiation and second at fifteen days interval. Observation for disease intensity was recorded at fifteen days after second spray. Per cent disease control over check was calculated as follows.

$$\text{Per cent disease control} = \frac{\% \text{ disease intensity in control} - \% \text{ disease intensity in treatment}}{\% \text{ disease intensity in control}} \times 100$$

Disease control through fungicides

The following five systemic and non-systemic fungicides were evaluated by applying as foliar spray in RBD with four replications on ten year old susceptible variety Gola. Two sprays of each fungicide were applied, first spray at the time of disease initiation and next at fifteen days interval. Observation and calculation of per cent disease intensity and per cent disease control were as per followings

Observation and calculation of per cent disease intensity and per cent disease control were as per followings

Common Name of fungicide	Trade Name	Dose (%)
Wettable sulphur	Sulfex 80% WP	0.2
Dinocap	Karathane 48% EC	0.1
Tridemorph	Calixin 80% EC	0.1
Hexaconazole	Contaf 5% EC	0.1
Difenoconazole	Score 25% EC	0.1

Table 1: Efficacy of natural products against powdery mildew (*Oidium erysiphoides* f. sp. *ziziphi*) of ber

Natural products	Concentration (%)	Per cent disease intensity*	Per cent disease control
Buffalo milk	10	29.91 (33.21)	16.45
Cow milk	10	29.2 (32.58)	18.43
Garlic extract	10	19.8 (26.57)	44.69
Neem oil	0.5	21.5 (27.97)	39.94
Mustard oil	0.5	25.1 (30.00)	29.89
Butter milk (Chhach)	10	32.46 (34.45)	9.33
Check (Without any spray)	-	35.8 (36.87)	-
SEm±	-	0.28	-
CD (p=0.05)	-	0.85	-

*Average of four replications

Figures given in parentheses are angular transformed values

Table 2: Efficacy of fungicides against powdery mildew (*Oidium erysiphoides* f. sp. *ziziphi*) of ber

Fungicides	Concentration (%)	Per cent disease intensity*	Per cent disease control
Difenoconazole	0.1	16.26 (23.58)	54.58
Dinocap	0.1	9.6 (17.95)	73.18
Hexaconazole	0.1	12.15 (20.27)	66.06
Tridemorph	0.1	14.8 (22.79)	58.67
Wettable sulphur	0.25	14.4 (22.38)	59.78
Check (Without any spray)	-	35.8 (36.87)	-
SEm±	-	0.45	-
CD (p= 0.05%)	-	1.40	-

*Average of four replications

Figures given in parentheses are angular transformed values

Result and Discussion

Disease control through natural products

It is evident from the Table 1 that out of six natural products (buffalo milk, cow milk, butter milk, garlic extract, mustard oil and neem oil) the maximum reduction in disease intensity was observed with garlic extract (44.69%) followed by neem oil (39.94%), mustard oil (29.89), cow milk (18.43%) and buffalo milk (16.45%) and butter milk (9.33%) was found least effective in reducing disease intensity over check. However buffalo milk and cow milk were found at par with each other. Bettiol *et al.* (2008) [3] have also been tested effectiveness of whey against powdery mildew (*Podosphaera xanthii*) of cucumber and zucchini squash in greenhouse. Plants were sprayed once or twice a week with whey at concentrations of 5, 10, 15, 20, 25, and 30 per cent in water. Disease progress was more slowly in plants treated with 25-30 per cent whey than lower concentration was used. Surwase *et al.* (2009) [14] also reported that NSKE was found most effective and economic against *Erysiphe polygoni* causing pea powdery mildew and gave better seed yield.

Disease control through fungicides

Out of five (difenoconazole, dinocap, hexaconazole, tridemorph and wettable sulphur) systemic and non-systemic fungicides tested (Table 2), the maximum reduction in disease intensity was observed with dinocap (73.18%) followed by hexaconazole (66.06%), wettable sulphur (59.78%) and tridemorph (58.67%) and difenoconazole (54.58%) was found least effective in reducing disease intensity over check. However wettable sulphur and tridemorph were found at par with each other in controlling each other. The results are in agreement with several workers (Das, 1994 [5], Reddy *et al.*, 1996 [12], Dang *et al.*, 1997 [4], Jamadar and Desai, 1998 [8] and Jamadar *et al.*, 2009) who reported dinocap as most effective in reducing powdery mildew. Similar result have also been observed excellent with dinocap in controlling powdery mildew of ber (Gupta *et al.* 1977) [7]. It have also been obtained good control of ber powdery mildew with various fungicides including dinocap and sulfex (Das *et al.* 1994, Desai 1998 and Thind and Kaur 2006) [5, 6, 15].

Conclusion

It can be concluded that in natural products the maximum reduction in disease intensity was observed in garlic extract and in fungicides maximum reduction in disease intensity was observed in dinocap.

Acknowledgement

The authors are thankful to the Head, Department of Plant Pathology and Dean, SKN College of Agriculture (SKNAU), Jobner for providing all required facility to completed this task.

References

1. Anonymous. Indian Horticulture Database-2014, National Horticulture Board, Gurgaon, 2014.
2. Baily LH. The Standard Cyclopaedia of Horticulture. Macmilan and Co., New York, 1947, 3547-8.
3. Bettiol W, Silva HAS, Reis RC. Effectiveness of whey against zucchini squash and cucumber powdery mildew. Scientia Hort. 2008; 117:82-84.
4. Dang, JK, Sangwan MS, Mehta, Naresh, Kaushik CD and Mishra BP. Flusilazole (Punch)-a potential fungicide for control of different powdery mildews. Annals Agri Bio Res. 1997; 2(1):15-19.

5. Das ND, Rao MSM, Sankar BRM. Efficacy of two new fungicides for the control of powdery mildew of ber and compatibility test of recommended fungicides with insecticides. Annals PI Prot Sci. 1994; 2(2):76-78.
6. Desai SA. A note on the spray schedule for the control of powdery mildew of ber in Karnataka. Karnataka J Agri. Sci. 1998; 1(1):242-243.
7. Gupta JH, Ramnath, Srivastav VP. Chemical control of powdery mildew of ber (*Ziziphus mauritiana* Lamk.). Progressive Hort. 1977; 9(1):81-83.
8. Jamadar MM, Desai SA. Chemical control of powdery mildew of ber. J Agri Sci. 1998; 11(2):415-418.
9. Jamadar MM, Balikai RA, Sataraddi AR. Status of diseases on ber (*Ziziphus mauritiana* Lamk.) in India and their management options. Acta Hort. 2009; 840:383-390.
10. Jamadar, MM and Desai, SA. 1996. Varietal screening of ber against powdery mildew. Karnataka J Agri Sci. 1983; 9(3):545-546.
11. Pareek OP. The Jujube. Indian Council of Agricultural Research, New Delhi, 1983, 7.
12. Reddy MM, Reddy GS, Madhusudan T. Efficacy of fungicides against powdery mildew (*Oidium erysiphoides* f. sp. ziziphi) of ber (*Ziziphus mauritiana* Lamk.). Indian J PI Prot. 1996; 24:64-68.
13. Sindhan GS, Hooda I, Parashar RD. Evaluation of plant extract for the control of powdery mildew of pea. J Myco PI Pathol. 1999; 29(2):257-258.
14. Surwase AG, Badgire DR, Suryawanshi AP. Management of pea powdery mildew by fungicides, botanicals and bioagents. Annals Plant Prot Sci. 2009; 17:384-388.
15. Thind, SK, Kaur N. Management of ber powdery with fungicides. Indian J Hort. 2006; 63(3):267-269.