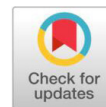


Research Article

Open Access

Management of Pre and Post Harvest Fruit rot diseases of Ber

Mareeswari, P.¹, P. Mahalakshmi², R. Akila³, K. Chitra⁴ and M. Ayyandurai⁵¹Agricultural College and Research Institute, Vazhavachanur – 606 753 Tamil Nadu India.²Agricultural College & Research Institute, TNAU, Coimbatore – 641 003 Tamil Nadu India.³Regional Research Station, Aruppukottai - 626 107 Tamil Nadu India.⁴Krishi Vigyan Kendra, Virinjipuram – 632 104 Tamil Nadu India.⁵Agricultural College & Research Institute, Madurai - 625 104 Tamil Nadu India.**ABSTRACT**

The main focus of this research is to produce the good quality and disease free fruits. In this aspect, the investigation was carried out to reduce or control the pre and post-harvest fungal fruit rot. The study on pre and post-harvest management of fruit rot diseases of ber caused by *Alternaria* and *Colletotrichum* was carried out and the results showed that two pre-harvest sprays of Thiophanate Methyl (0.1 %) at 15 day intervals during the marble stage of ber fruit was found effective against *Alternaria* fruit rot recorded 6.8 PDI compared to untreated control recorded 43.6 PDI. Two pre-harvest sprays of 0.1 per-cent carbendazim at 15 day intervals was found effective against *Colletotrichum* fruit rot during the pea fruit stage of ber recorded 6.6 PDI compared to untreated control recorded 44.2 PDI. The post-harvest studies revealed that dipping of ber fruits in 2 per cent sodium chloride solution for 10 min. recorded the lowest PDI of 5.27 against post-harvest fungal rot as compared to untreated control recorded 25.27 PDI.

Keywords: Ber, fungal fruit rot, *Alternaria*, *Colletotrichum*, pre and post-harvest treatment

Introduction

Ber (*Zizyphus mauritiana* Lam.) is a drought-hardy plant and called as poor man's apple it is highly suited to arid conditions. Ber cultivation is not only increases the income of poor farmers in arid regions but also enriches the nutritional status of people. Ber is cultivated all over the drier parts of the Indian subcontinent for its fresh fruits, which are rich in vitamins (C, A and B-complex) and minerals. In the current ber production areas, work is mainly required for protection against fruit rot, fruit fly, and fruit borer. *Alternaria* and *Colletotrichum* fruit rot are the major diseases in ber (*Zizyphus mauritiana* Lam.) which causes post-harvest loss upto 30 per cent. There are two different types of fruit rot that occur in ber in one type of fruit rot is observed in immature fruits / pea-shaped fruits in natural conditions caused by *Colletotrichum*. Such fruit rot incidence was more in field conditions with a per cent incidence of more than 50 per cent. The affected immature or pea shaped fruits become fully purple coloured which appears during the month of August-September and shed off before maturation. Another type of fruit rot caused by *Alternaria* occurs at the marble stage of fruit in which the rotting partially starts from the pedicel of the fruit and further it extends to cover the entire fruit and cause economic loss to the crop. The ber fruits after harvest are infected very much by post-harvest fungal pathogens such as *Botryodiplodia*, *Colletotrichum*, *Alternaria* and *Rhizopus*. Hence

the study was undertaken to manage the fruit rots in ber both in field conditions and after harvest effectively.

Materials and Methods

The experimental trial was conducted from 2015 to 2018 to study the efficacy of pre-harvest spraying of fungicides in field conditions for the control of fruit rot in ber caused by *Colletotrichum* and *Alternaria*. The experiment was conducted at the Regional Research Station, Tamil Nadu Agricultural University, Aruppukottai in a randomized block design. There were eight treatments and three replications. Two sprays were given one at pea stage and another at marble stage of ber fruits and the spray starts after occurrence of the fruit rot incidence. The per cent disease incidence was calculated and the experimental results are furnished below in table 1.

The efficacy of post-harvest treatment of chemicals on fungal rot incidence was assessed in ber fruits. The harvested fruits were dipped for 10 minutes in different chemicals viz., Potassium metabisulphite (3%), Borax (3%), Sodium chloride (2%), Carbendazim (0.1%), Paushamycin (0.05%) and compared with untreated control. The fruits were frequently examined for the development of rotting and the results of the experiment are presented in table 2.

Results and Discussion

The results of pre-harvest spraying of fungicides for the management of fruit rot in ber are furnished in table 1. The results revealed that two pre-harvest sprays of 0.1 per cent Thiophanate Methyl at 15 day intervals during the marble stage of ber fruit was found effective against *Alternaria* fruit rot which recorded 6.8 PDI followed by 0.25 percent copper oxychloride (7.1 PDI) compared to untreated control which recorded 43.6 PDI. In pea fruit stage of ber, two pre harvest sprays of

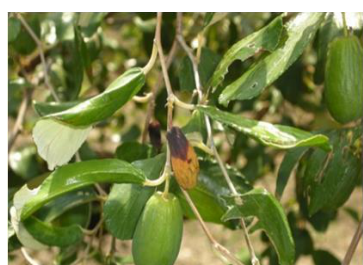
*Corresponding Author: P. Mareeswari

Email Address: mareeswaripetchimuthu@gmail.com

DOI: <https://doi.org/10.58321/AATCCReview.2023.11.04.237>

© 2023 by the authors. The license of AATCC Review. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

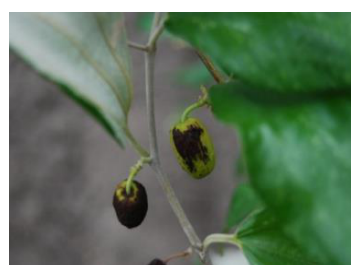
0.1 per cent carbendazim was found effective against *Colletotrichum* fruit rot which recorded 6.6 PDI followed by 0.25 per cent copper oxy chloride (11.1 PDI) which was on par with Thiophanate methyl (0.1%) (11.8 PDI) compared to untreated control which recorded 44.2 PDI.



Alternaria fruit rot of Ber



Colletotrichum fruit rot of Ber



Conidia of Colletotrichum gloeosporioides



Table 1. Effect of pre-harvest spraying of fungicides for the management of fruit rot in ber

Treatments	<i>Alternaria</i> fruit rot *(PDI)	Percent reduction over control	<i>Colletotrichum</i> fruit rot *(PDI)	Percent reduction over control
T ₁ - Mancozeb (0.2 %)	9.2	78.9	25.5	42.3
T ₂ - Carbendazim (0.1%)	30.3	30.5	6.6	85.1
T ₃ - Captan (0.2%)	20.1	53.9	20.1	54.5
T ₄ - Copper hydroxide (0.4%)	16.9	61.2	17.1	61.3
T ₅ - Benomyl (0.1%)	14.1	67.7	17.0	61.5
T ₆ - Thiophanate Methyl (0.1 %)	6.8	84.4	11.8	73.3
T ₇ - Copper oxychloride (0.3%)	7.1	83.7	11.1	74.9
T ₈ - Control	43.6	-	44.2	-
SEd	2.62	-	2.79	-
CD (P=0.05%)	5.24	-	5.57	-

*Mean values PDI – Per cent Disease Incidence

The results of post-harvest treatment of chemicals and fungicides for the management of fruit rot in ber are furnished in Table 2. The results revealed that dipping of ber fruits in 2 per cent sodium chloride solution for 10 min. recorded the lowest PDI of 5.27 against post-harvest fungal rot as compared to untreated control recorded 25.27 PDI. The microorganisms responsible for post-harvest rot in ber were *Botryodiplodia*, *Colletotrichum*, *Alternaria*, and *Rhizopus*. The results were supported by the findings of Misra *et al.* (2013), Maheswari and Haldhar (2018) and Nallathambi *et al.* (2000) and (2009).

Table 2. Effect of post-harvest treatment on fungal rot incidence in ber fruits

Treatments	Per cent fungal rot*	Per cent reduction over control
Potassium metabisulphite (3%)	10.20	59.00
Borax (3%)	14.40	43.00
Sodium chloride (2%)	5.27	79.00
Carbendazim (0.1%)	6.60	73.00
Paushamycin (0.05%)	17.33	31.00
Control	25.27	--
SED	0.80	--
CD (P =0.05)	1.76	--

*Mean values

Future scope of the study:

The research is further strengthened by including SEM studies to magnify the fruits after post-harvest treatment and residual analysis if needed.

Acknowledgement: The author acknowledges the ICAR-Central Institute of Arid Horticulture, Bikaner and Tamil Nadu Agricultural University for their tremendous support and funding in this research.

References

- Misra, D.K., 1 J. Saha, 1P.V. Devidas and F.K. Bauri. 2013. Diseases of ber (*Zizyphus jujube*) in Eastern India. *The Journal of Plant Protection Sciences*, 5(1): 65-69.
- Maheshwari, S. K. and S. M. Haldhar. 2018. Disease Management in Arid Horticultural Crops. Technical Bulletin No. 68. CIAH/Tech./Pub. No. 68, ICAR-Central Institute for Arid Horticulture, Bikaner, Rajasthan, India, P. 42.

3. Nallathambi P, Umamaheswari C, Thakore BBL, More TA (2009) Postharvest management of ber (*Ziziphus mauritiana* Lamk.) fruit rot (*Alternaria alternata* Fr. Keissler) using *Trichoderma* species, fungicides and their combinations. Crop Prot 28:525–532
4. Nallathambi P, Umamaheswari C, Vashishtha BB, Vishal Nath (2000) Fruit rot (*Alternaria alternata*) and sources of resistance in ber germplasm under arid conditions. Annals of Arid Zone 39:477–478