

SHORT COMMUNICATION

Eco-friendly management of post-harvest fruit rot of Ber caused by *Pestalotiopsis palmarum*

S.L. Godara*

Department of Plant Pathology, College of Agriculture, Swami Keshwanand Rajasthan Agricultural University,
Bikaner- 334006, Rajasthan, India.

Ber (*Zizyphus mauritiana* Lamk.) is one of the most ancient and common fruits consumed by people of India. It is often called the poor man's fruit. In India, ber is being cultivated on an area of about 87674 hectares with the production of about 8,94,848 million tonnes (Raturi, 2001). In Rajasthan, it is grown in an area of 959 hectares with annual production of 17038 tonnes fruit. (Anonymous, 2004). In market conditions a number of fungi causes rotting of ber fruits. The most frequently occurring fungi are *Pestalotiopsis palmarum*, *Alternaria alternata*, *Cladosporium oxysporum*, *Rhizoctonia solani*, *Fusarium solani*, *Fusarium pallidroseum*, *Phoma hisorensis*, *Rhizopus stolonifer*, *Colletotrichum* sp. and *Aspergillus niger*. Average incidence of various fruit rotting diseases ranged from 2.00 to 15.30 per cent (Jat *et al.*, 1997). The yield and quality of ber fruits are adversely affected by many diseases particularly powdery mildew and leaf spots. Nevertheless, fruit rots are also important problems of orchards and markets in arid and semi-arid regions. Ber fruit rots have been identified as major problem next to powdery mildew. Endemic forms of fruit rot diseases are persisting in western parts of Rajasthan (Nallathambi *et al.*, 2000). Therefore, it was considered imperative to investigate the occurrence of various types of ber fruit rots caused by the *Pestalotiopsis* sp. and other fungi and their management in this part of Rajasthan.

The plant extracts (leaf extracts viz; *Aloe barbadensis*, *Withania somnifera*, *Azadirachta indica*, *Ocimum sanctum*, *Aegle marmelos* and *Pongamia pinnata* and root or rhizome extracts viz; *Withania somnifera*, *Zingiber officinale*, *Cyperus rotundus*, *Curcuma longa*, *Asparagus adscendens* and *Allium sativum*) were tested at 5 and 10 per cent (w/v) concentration. Leaves, roots or rhizomes were first washed with sterile distilled water and then air dried. 100 gm of fresh leaves/roots/rhizomes was grounded in 100 ml sterile distilled water. The macerate was filtered through double layered cheese cloth and centrifuged at 3500 rpm for 20 minutes. The supernatant was filtered through Whatman filter paper. The plant extracts (leaf and root or rhizome) were tested at 5 and 10 per cent (w/v) concentration.

$$\text{Disease severity (\%)} = \frac{\text{Area of the plant tissue affected by the disease}}{\text{Total area}} \times 100$$

The severity was recorded on the basis of per cent fruit area infected. This was assessed with the help of an

assessment key suggested by Mayee and Datar (1986) after slight modification for this purpose. After finding out per cent area infected on each fruit, the mean for the treatment was calculated. There were four fruits in each treatment.

In the present investigation, the lowest disease severity in semi-ripe ber fruits was noticed in fruits treated with 5 and 10 per cent concentration of *Aloe barbadensis* followed by *Ocimum sanctum*, *Withania somnifera* and *Azadirachta indica* leaf extracts after 8 and 12 days of inoculation of *Pestalotiopsis* rot pathogen. Similarly, the per cent disease control was also observed highest in semi-ripe fruits treated with 5 and 10 per cent concentration of *Aloe barbadensis* followed by *Ocimum sanctum*, *Withania somnifera* and *Azadirachta indica* leaf extracts (Table 1).

The lowest disease severity in semi-ripe ber fruits was noticed in fruits treated with 5 and 10 per cent concentration of *Curcuma longa* root extract followed by *Zingiber officinale* and *Withania somnifera* root extracts after 8 and 12 days of inoculation of *Pestalotiopsis* rot pathogen. Similarly, the per cent disease control was also observed to be highest in semi-ripe fruits treated with 5 and 10 per cent concentration of *Curcuma longa* followed by *Zingiber officinale* and *Withania somnifera* root extracts (Table 2).

Aloe barbadensis (Aloe-vera) fresh leaf gel applied as anti-microbial compounds, anti burn, anti pyretic, anti ulcer in human kind. The gel contains aloin, isobarbaloin, aloin and aloesone compounds. It appears that Tulsi (*Ocimum sanctum*) which is having highest religious honour in Hindu Mythology, can serve as an important source of anti-microbial compounds. Tulsi leaf contains eugenol, caryophyllene, terpenin 4-01, -selinene, -pinene and camphene compounds. *Curcuma longa* due to its strong antiseptic properties is considered useful for all kinds of poisonous viz., ulcers and wounds. It purifies blood by destroying pathogenic organisms. The rhizome contains campesterol, stigma sterol, curcumin and turmeric oil. *Zingiber officinale* contains terpenes, gingerol, shogaol, zingerone and zingiberin compounds. (Grewal, 2000).

The results of present investigations corroborate with the findings of Meena (2006), who reported the efficacy of *Aloe barbadensis* leaf extract rendered lowest severity of *Pestalotiopsis palmarum* rot of guava followed by *Ocimum sanctum* and *Azadirachta indica* leaf extracts. Similar observations were reported by Godara and Pathak (1995) who also observed that *Ocimum sanctum* leaf

*Corresponding author's e-mail: godarasl.62@gmail.com

extract was highly effective against conidial germination and disease severity of *Penicillium italicum* and *B. theobromae* causing fruit rots of sweet orange. The present results also get support from the observations of Kumar (2002), who observed that the leaf extracts of *Azadirachta indica*, *Ocimum sanctum* provided effective control in pre-

and post-inoculation treatment of *Alternaria* and *Aspergillus* fruit rots of ber. Similar results were also reported by Pandey *et al.* (1983) that leaf extracts of *Azadirachta indica* and *Ocimum sanctum* have been found effective against *Pestalotiopsis psidii*.

Table 1 : Effect of leaf extracts on disease severity of *Pestalotiopsis* rot of ber fruits

Leaf extract	Per cent disease severity (after 8 days of inoculation)		Per cent disease severity (after 12 days of inoculation)	
	5%	10%	5%	10%
<i>Aloe barbadensis</i>	8.75	7.50	12.50	10.00
<i>Withania somnifera</i>	10.00	8.75	15.00	12.50
<i>Azadirachta indica</i>	10.00	8.75	15.00	11.25
<i>Ocimum sanctum</i>	10.00	7.50	15.00	11.25
<i>Aegle marmelos</i>	15.00	10.00	30.00	20.00
<i>Pongamia pinnata</i>	12.50	10.00	18.75	15.00
Control	18.75	18.75	35.00	35.00
SEm ±	0.79	1.18	0.89	0.99
CD (P=0.05)	2.32	3.47	2.60	2.93

* Fruit were incubated at $25 \pm 2^\circ\text{C}$

Table 2 : Effect of root/rhizome extracts on disease severity of *Pestalotiopsis* rot of ber fruits

Root/rhizome extract	Per cent disease severity (after 8 days of inoculation)		Per cent disease severity (after 12 days of inoculation)	
	5%	10%	5%	10%
<i>Withania somnifera</i>	10.00	8.75	15.00	11.25
<i>Zingiber officinale</i>	8.75	7.50	12.50	8.75
<i>Cyperus rotundus</i>	16.25	12.50	32.50	25.00
<i>Curcuma longa</i>	8.75	6.25	10.00	8.75
<i>Asparagus adscendens</i>	12.50	10.00	18.75	15.00
<i>Allium sativum</i>	15.00	11.25	27.50	18.75
Control	18.75	18.75	35.00	35.00
SEm ±	1.01	1.19	1.85	1.76
CD (P=0.05)	2.98	3.51	5.43	5.18

* Fruit were incubated at $25 \pm 2^\circ\text{C}$

References

- Anonymous. 2004. Vital Horticultural Statistics of Rajasthan, Directorate of Agriculture, Pant Krishi Bhawan, Rajasthan, Jaipur.
- Godara, S.L. and Pathak, V.N. 1995. Effect of plant extracts on post-harvest rotting of sweet orange fruit. Global conference on "Advances in Research on Plant Diseases and their Management" held at RCA, Udaipur, Feb. 12-17, 172 pp.
- Grewal, R.C. 2000. Medicinal plants. Campus Books International, New Delhi. 430 pp.
- Jat, R.G., Agarwal, V.K. and Goyal, S.K. 1997. Studies on post harvest fungal disease of ber fruits. Proceedings of Golden Jubilee International Conference on Integrated Plant Disease Management for Sustainable Agriculture, Indian Phytopathological Society, 11-15 Nov, IARI, New Delhi. 313 pp.
- Kumar, S. 2002. Studies on post harvest fruit rots of ber caused by *Alternaria alternata* and *Aspergillus niger*. M.Sc. (Ag.) Thesis, Rajasthan Agricultural University, Bikaner.
- Meena, O.P. 2006. Studies on post harvest fruit rot of guava caused by *Pestalotiopsis palmarum*. M.Sc. (Ag.) Thesis, Rajasthan Agricultural University, Bikaner.
- Nallathambi, P., Umamaheswari, C., Vashistha, B.B. and Nath, Vishal. 2000. Fruit rot (*Alternaria alternata*) and sources of resistance in ber germplasm under arid conditions. *Ann. Arid Zone*, 39 (4): 477-478.
- Pandey, R.S., Bhargava, S.N., Shukla, D.N. and Dwivedi, D.K. 1983. Control of *Pestalotiopsis* fruit rot of guava by leaf extracts of two medicinal plants. *Revista Mexicana de Fitopatologia*, 2: 15-16.
- Raturi, G.B. 2001. Status Report on Arid Zone Fruits. CIAH, Bikaner, 3 pp.