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# Management of *Aspergillus* and blue mould rot of anola fruits

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Aonla, having English name Indian gooseberry (*Emblica officinalis* Gaertn) is an important fruit of future due to its high medicinal and nutritional value, which is grown in arid and semi-arid regions. *Aspergillus* rot (*Aspergillus niger*) and blue mould (*Penicillium isalandicum*) are major post-harvest diseases in which decaying of fruits ranged from 10-18 per cent during the study period. Three years pooled data results revealed that maxinum fruit rots were controlled with *Azadirachta indica* leaf exract (5%) followed by carbendazim (0.1%), *Curcuma longa* rhizome extract (5%) in both pre- and post- inoculation treatment.

**Key words :** *Emblica officinalis*, *Aspergillus* fruit rot, Blue mould rot, Botanicals, Bioagents

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## INTRODUCTION

Aonla (*Emblica officinalis* Gaertn) is an important fruit crop in arid and semi arid growing regions, which is known for its high ascorbic acid content and for its higher medicinal and nutritive value. Several fungal pathogens causes post-harvest diseases of aonla fruits and cause heavy loss, if harvesting/ handling is not properly done (Sumbali and Badyal, 1990, Mishra, 1988 and Omprakash, 2003, Arya and Arya, 2004). *Aspergillus* rot and blue mould rot are predominant post-harvest diseases ranging the incidence from 10-18 per cent in in Chomu, Jobner and Jaipur, vegetable and fruit markets during the surveyed period 2005-2007(Anonymous, 2007). Literature search revealed that except some preliminary work on these fruit rots no management studies was carried out to control the fruit rots. Keeping in view the post-harvest decay of aonla fruits by these fungi, an experiment was laid out for the management of these diseases.

## RESEARCH METHODOLOGY

An experiment was laid out, during three consecutive years 2005-06 to 2007-2008 in Completely Randomized Design with three replications to see the effect of different chemicals, bioagents and botanicals against the rots in both pre and post inoculation treatment. Freshly harvested ripe uniform size fruits of aonla were selected and surface sterilized with mercuric chloride (0.1%) for one minute washed thrice in sterilized water and inoculated separately with the pathogen using a cork wounding method. Plant parts (leaves or rhizomes) were first washed with sterilized water and then air dried. Weighed plant material was crushed in a warring blender. One ml of sterilized water was used for each gram of leaves or rhizomes. The material was homogenized for 6 to 8 minutes and the mixture was filtered through muslin cloth followed by filtration through Seitz filter. The extracts thus obtained were considered as of 100% concentration. In the pre- inoculation treatment, the fruits were first dipped in the treatment solution for seven to eight minutes whereas, in bio-agents treatment the fruits were dipped for half an hour and then inoculated, while in the post- inoculation treatment, the fruit were first inoculated and then treated with the treatment solution. The interval between inoculation and treatment or *vice-versa* was 12 hours. The disease severity was recorded on the basis of per cent fruit area infected using following formula and disease assessment key given by Mayee and Datar (1986) after slight modification.

$$\text{Per cent rot (Area \%)} = \frac{\text{Area of the fruit affected}}{\text{Total area of the fruit}} \times 100$$

Observations were recorded after 7$^{th}$ day of inoculation.

## RESEARCH FINDINGS AND ANALYSIS

Three years pooled data results revealed that in pre-

**Table 1 : Efficacy of different chemicals, bioagents and botanicals against *Aspergillus* rot and blue mould rot in post –harvested aonla fruits (Pooled 2005-06 to 2007-08)**

| Sr. No. | Treatments | Conc (%) | Fruit rot severity (Fruit area infected in %)*, ** | | | |
|---|---|---|---|---|---|---|
| | | | *Aspergillus* rot | | Blue mould rot | |
| | | | Pre-inoc. | Post-ino. | Pre-inoc. | Post-ino. |
| 1. | Potassium metabisulphite | 0.05 | 9.71 | 11.35 | 9.68 | 12.18 |
| 2. | Sodium chloride | 2.00 | 14.85 | 17.14 | 13.23 | 16.07 |
| 3. | Sodium Benzoate | 0.05 | 12.06 | 13.92 | 11.66 | 14.10 |
| 4. | *Pseudomonas. fluorescens* | 3x106 cfu/ml | 9.00 | 10.04 | 9.27 | 10.43 |
| 5. | *Trichoderma viride* | 3x106 cfu/ml | 6.32 | 8.75 | 7.24 | 9.68 |
| 6. | *Azadirachta indica* leaf extract | 5.00 | 4.00 | 6.47 | 4.63 | 6.80 |
| 7. | *Curcuma longa* rhizome extract | 5.00 | 5.66 | 8.65 | 6.26 | 8.45 |
| 8. | *Zinziber officinalis* rhizome extract | 5.00 | 8.19 | 10.02 | 9.66 | 11.48 |
| 9. | Carbendazim | 0.1 | 3.92 | 6.44 | 4.54 | 7.14 |
| 10. | Control | - | 20.45 | 21.75 | 22.03 | 23.68 |
| | C.D. (P=0.05) | | 0.768 | 0.605 | 0.547 | 0.429 |
| | S.E. $\pm$ | | 0.259 | 0.204 | 0.184 | 0.144 |

* Average of three replications
** pooled data of three years

and post- inoculation treatments both the rots could not be completely checked by any treatment applied but both the fruit rots *i.e. Aspergillus* rot and blue mould rot severity was reduced significantly in comparison to control (Table 1). However, extract of *Curcuma longa* was at par with *Trichoderma viride* in pre- and post- inoculation treatments. Maximum fruit rots were controlled with *Azadirachta indica* leaf exract (5%) followed by carbendazim (0.1%) , *Curcuma longa* rhizome extract (5%), *Trichoderma viride* and *Pseudomonas fluroscence* in both pre and post inoculation treatment.

Extracts of the different indigenous plant parts showed success in plant disease control and proved to be harmless and non- phytotoxic unlike chemical fungicides (Spencer *et al*.,1957).The extract of the plant also exhibited marked effect on germination of fungal spores as well (Shekhawat and Prasad, 1971 ; Singh *et al*., 1983). Keeping in view the importance of different plant parts extracts, hence plant extracts were applied against the fruit rots. In the present investigation of plant extracts treatment, *Azadirachta indica* leaf extract proved effective in controlling the aonla rots in pre- as well as post-inoculation treatment. Similarly bio fungicides properties of leaf extract of *A. indica* was also found effective to control fruit rots of pear and pomegranate (Srivastava and Lal, 1997). In the present studies carbendazim was at par with leaf extract of *A. indica* in both pre- and post- inoculation treatment. Lal *et al.* (1982) reported that carbendazim and mancozeb was found effective in controlling the *Phomopsis* fruit rot of aonla caused by *Phomopsis phyllanthi*. In biocontrol treatment *Trichoderma viride* was superior over *Pseudomonas fluroscence*. Similarly biocontol agent *Trichoderma viride* was also found effective in controlling the green mould and blue mould fruit rots of citrus (Bagwan, 2003). Amongest food preservatives, potassium metabisulphite and sodium benzoate proved more effective in controlling the rots in pre- as well as in post- inoculation treatments. Similarly use of potassium metabisulphite was reported effective against white specks of aonla (Premi *et al.*, 1999).

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