

RESEARCH NOTE

DOI: 10.15740/HAS/IJPPHT/6.1/125-127

Reduction of post harvest diseases and prolonging the shelf-life of banana through chemical and botanicals

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■ Research chronicle : Received : 08.12.2014; Accepted : 31.05.2015

SUMMARY :

For reducing the post-harvest losses and extension of shelf-life of banana, the fungicides were found beneficial. The botanicals are also useful to reduce the post harvest losses and to enhance the shelf-life. A study was conducted to find the best method to control post-harvest diseases and extension of shelf-life of banana through chemicals and botanicals. The treatment of dipping fruits in 0.1 per cent carbendanzem was found more effective for control of decay and crown rot. The second best treatment for this purpose was dipping of banana fruits with 50 per cent extract of *Solanum torvum*. The best treatment dipping the banana fruits in (0.1%), respectively against untreated fruits. Post-harvest loss of these varieties was reduced, respectively by 95 per cent and 70 per cent against untreated fruits. Firmness of treated fruits for both varieties was found higher than that of untreated fruits during ripening.

KEY WORDS : Shelf-life, Banana, Chemical, Botanical, Post-Harvest

How to cite this paper : Pardeshi, S.R., Shaikh, N.B. and Chitodkar, S.S. (2015). Reduction of post harvest diseases and prolonging the shelf-life of banana through chemical and botanicals. *Internat. J. Proc. & Post Harvest Technol.*, **6** (1) : 125-127.

Banana is one of the important tropical fruits. Banana is a staple food of many people of the tropical countries. The ripe fruit contains many of the elements that are essential for a balanced diet. The minimum dietary requirement of fruit per day per person is 115 g, whereas our availability is only 30-35 g. Per capita availability of fruits is further reduced sometimes due to high level of post-harvest losses by 95 per cent and 70 per cent against untreated fruits.

Banana is a popular fruit worldwide due to its flavour, texture, nutritional value and convenience, being

easy to peel and eat (Robinson, 1996). However, banana is susceptible to several diseases resulting in massive and extensive post-harvest losses during transportation and storage (Basel *et al.*, 2002). Anthracnose caused by the fungus *Colletotrichum musae* (Berk. and Curtis) Arx, is the most important post-harvest disease of banana that can result in 30-40 per cent losses of marketable fruit (Ranasinghe *et al.*, 2002). Anthracnose is a latent infection where fungal spores infect immature banana in the field but symptoms occur as peel blemishes, as black or brown sunken spots of various

Table 1 : Assessment of anthracnose disease severity of (2010-11 to 2013-14) means data

Treatments	Green life (in days)	Yellow life (in days)	Total shelf life (in days)	PDI(0-4 scale)%
Dipping the banana fruits in <i>Carbendazim</i> (0.1%)	3.5	11.5	15.00	1.75
Dipping the banana fruits in <i>Solanum torvum</i> extract (50%)	3.25	9	12.25	2.50
Dipping the banana fruits in <i>Trichoderma viride</i> solution @20 g/lit of water	03	7.5	10.50	3.25
Dipping the banana fruits in <i>Pseudomonas virideflava</i> solution @20 g/lit of water	03	7	10.00	3.50
Banana fruits alone	03	3.5	6.50	3.75

Green life: From the day of harvest to the day the fruit starting yellow; Yellow life: From the day the fruit started turning yellow until rotting; Disease scale – 0-4 scale : 0-no lesions; 1- small restricted lesions covering 25 per cent of the fruit surface; 2-large lesions covering 50 per cent of the fruit surface; 3-radiating lesions formed by coalescence of small ones covering 75 per cent of the fruit surface; 4-Fruits completely rotten

sizes on fruit that may bear masses of salmon-coloured acervuli with their associated conidia on the fruit peel after ripening (Ranasinghe *et al.*, 2002). Thus, any potential control measure which can effectively delay symptoms of anthracnose infection would have an important role in extending the shelf-life of banana fruit during transit or storage. Synthetic fungicides e.g. benomyl and thiabendazole (TBZ) are the most commonly used methods for controlling post-harvest diseases (Khan *et al.*, 2001). However, persistent use of these fungicides has resulted in the emergence of resistant strains of *C. musae* (de Lapeyre *et al.*, 2008). In addition, there is a concern that residues of chemical fungicides may cause health problems e.g. carcinogenic risk (Wilson *et al.*, 1997). In order to find out the suitable alternative to the fungicides commonly used for control of decay and anthracnose, the use of botanicals to reduce the disease infections have been tried in this experiment.

Bunches of properly matured bananas of Graind Naine were harvested from experimental field of Banana Research Station. A second and third hand of each bunch was selected to conduct the experiment and four fingers of uniform size and shape were taken per replication per treatment. They were washed in fresh water to remove dirt and latex. There were five treatments with one control

without treatment with four replication. The treated fruits were dried quickly by an electric fan and kept on a wooden table for study at room temperature extended the shelf-life.

Treatment details :

- Dipping the banana fruits in carbendazem (0.1%).
- Dipping the banana fruits in *Solanum torvum* extract (50%).
- Dipping the banana fruits in *Trichoderma viride* solution @20 g/lit of water.
- Dipping the banana fruits in *Pseudomonas virideflava* solution @20 g/lit of water.
- Banana fruits alone.

The results were recorded for three years and are presented in Table 1. All the treatments with fungicides as well as botanicals were significant superior over control. The treatment of dipping the banana fruits in carbendazem 0.1 per cent was found more effective to minimize anthracnose diseases 1.75 per cent with maximum extended shelf-life up to 15 days. The treatment of dipping the banana fruits in 50 per cent in extract of *Solanum torvum* was found second best treatment for minimizing the post harvest disease 2.50 per cent infection with a shelf-life of 12.25 days.

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