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Short Communication

Influence of plant growth regulators on severity of post harvest fruit rots of guava and citrus fruits

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Post-harvest disease management is one of the biggest challenges in intensive fruit production systems. Compare to the vast production of fruits in India, the fruit export from the country has been negligible. A major constraint has been the enormous losses to fruits have been estimated to be in the range of 5-50% or more of the harvest. The fruit-exporting countries have strict requirements to meet health standards. These requirements have adversely affected the fungicide application on harvested fruits. The search for alternative treatments have yielded positive results with homeopathic drugs, hot water treatment, plant growth regulators has proved effective against post harvest diseases of harvested fruits. Applications of Gibberallic acid reduced diseases incidence and severity of Botryodiplodia rot and Penicillium rot of guava and orange fruits. Rhizopus rot (*Rhizopus arrhizus* Fischer) and Botryodiplodia rot (*Botryodiplodia theobromae* Pat.) of guava and Penicillium blue mould (*Penicillium italicum* Wehmer) and Botryodiplodia rot (*B. theobromae* Pat.) of sweet orange fruits were most prevalent in the markets. An attempt was made in this study to assess the efficacy of two plant growth regulators on spore germination and disease severity of the fruit rots. Plant growth regulators are known to delay senescence and the onset of fruit rot (Eckert and Sommer, 1967; Gupta and Pathak, 1990; Patel, 1991; Godara, 1994). Gupta and Pathak (1990) reported that IAA and MH were most effective against Aspergillus and Rhizopus rots of Papaya fruits while Planofix (NAA, used at 0.01%) checked all the rots except Fusarium rot in post-inoculation treatment.

Plant growth regulators, planofix (I-Naphthalene-acetic acid) 100 ppm and Gibberellic acid (2, 4a, 7-Trihydroxy-l-methyl-8-methylene gibb-3-ene-l, 10-carboxylic acid-1, 4-lactone) 40 ppm along with control treatments were tested against Rhizopus rot and Botryodiplodia rot of guava and Penicillium rot and Botryodiplodia rot of sweet orange harvested fruits.

One drop of plant growth regulators was mixed with a drop of spore suspension (10^6 spores/ml) on glass slide. The spore suspension was prepared in extract of ripe fruit. The slide was placed in an inverted position in a Petri dish humid chamber. The slides were incubated at 28 ± 2^0 C. Percent spore germination was recorded 24 hours after incubation. To assess spore germination, the slide was taken out, a drop of lactophenol was added to the spore suspension and per cent germination was assessed under the microscope. Each treatment was replicated three times.

Guava & sweet orange fruits of nearly equal size harvested from orchards were brought to the laboratory. Fruits were surface sterilized & separately inoculated with each pathogen by prick-injury method. The injured and control fruits were surface sterilized and then separately inoculated with *Rhizopus arrhizus*, *Botryodiplodia theobromae* of guava and *Penicillium italicum* and *Botryodiplodia theobromae* of sweet orange fruits by dipping them in spore suspension (10^6 spores/ml) for 2 minutes. Each compound with recommended dose was tested against the rots in pre-and post-inoculation treatments. In the pre-inoculation treatment, the fruits were first dipped in the test chemical for 5 minutes, air dried for 15 minutes and then inoculated, while in the post-inoculation treatment, the fruits were first inoculated and then treated with the chemical. The interval between inoculation and chemical treatment or vice-versa was of 12 hours. After inoculation or chemical treatment, fruits were placed at 28 ± 2^0C & 80-100 per cent RH. Proper controls were maintained. Each treatment had 20 fruits. The disease severity was recorded on the basis of fruits area infected.

Effect on spore germination & severity of *Rhizopus arrhius* and *Botryodiplodia theobromae* of guava fruits.

Spores of *Rhizopus arrhizus* and *Botryodiplodia theobromae* started germination within 6 hours of incubation in all the treatments. Of all the plant growth regulators tested, Gibberallic acid proved most effective against spore germination of both the pathogens after 24 hours incubation. Both the plant growth regulators tested against spore germination of *B. theobromae* differed non-significantly from each other but were significantly superior over control. The spore germination increased with time (Table 1).

The lowest severity was noticed in GA against both the rot pathogens, but the severity differed non-significantly from other treatments in pre-and post-inoculation treatments.

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Effect on spore germination & severity of *Penicillium italicum* and *Botryodiplodia theobromae* of sweet orange fruits

Spores of Penicillium italicum and Botryodiplodia theobromae started germination within 6 hours of incubation in all the treatments. GA proved significantly more effective against spore germination of both the rot pathogens of sweet orange after 24 hours of incubation (Table 2).

The lowest disease severity was noticed in GA treatment against both the rot pathogens in pre-inoculation treatment, but both the plant growth regulators differed non-significantly from each other in case of Botryodiplodia rot. In post-inoculation treatments, the severity was lowest in GA treatment against both the rot pathogens.

Of different plant growth regulators screened, GA caused maximum inhibition of spore germination of different rot pathogens of guava and sweet orange fruits at 24 hours of incubation. Gupta and Pathak (1990) found that planofix (NAA) to be most effective against Rhizopus rot of papaya. In the present investigation, GA proved highly effective against various rots of both the fruits. Further studies on mode of action and different concentrations of these compounds may prove a rewarding pursuit.

Table 1. Effect of plant growth regulators on spore germination and severity of *Rhizophus arrhizus* and *Botryodiplodia theobromae* of guava fruits.

Plant growth regulators	Per cent spore germination after 24 hours		Severity			
			Pre-inoculation		Post-inoculation	
	R. arrhizus	*B. theobromae*	*R. arrhizus*	*B. theobromae*	*R. arrhizus*	*B. theobromae*
Planofix	62.32	56.54	35.41	35.29	33.67	35.09
	(78.42)	(69.60)	(33.57)	(33.38)	(30.74)	(33.05)
Gibberallic	54.16	55.94	33.94	35.68	32.15	33.04
acid	(65.72)	(68.63)	(31.17)	(34.02)	(38.32)	(29.73)
Control	80.49	83.40	52.94	48.00	52.94	46.78
	(97.27)	(98.68)	(63.68)	(53.23)	(63.68)	(53.10)
SEm.	0.58	1.11	2.32	2.31	1.97	2.24
CD at 5%	2.01	3.85	6.42	6.40	5.46	6.22

Figures in parentheses are retransformed values

Table 2. Effect of plant growth regulators on spore and severity of *Penicillium italicum* and *Botryodiplodia theorbromace* of sweet orange fruits.

Plant growth regulators	Per cent spore germination after 24 hours		Severity			
			Pre-inoculation		Post-inoculation	
	R. arrhizus	*B. theobromae*	*R. arrhizus*	*B. theobromae*	*R. arrhizus*	*B. theobromae*
Planofix	54.43	52.97	35.79	32.74	37.10	36.74
	(66.15)	(63.66)	(34.26)	(29.27)	(36.40)	(29.27)
Gibberallic	46.54	48.06	29.08	30.91	35.66	31.62
acid	(52.82)	(55.33)	(24.98)	(26.41)	(34.02)	(27.48)
Control	74.71	67.94	49.00	44.15	49.04	42.93
	(92.80)	(85.67)	(56.97)	(48.54)	(56.63)	(46.39)
SEm.	0.57	0.46	0.51	0.71	0.53	0.53
CD at 5%	1.66	1.35	1.59	2.19	1.66	1.65

Figures in parentheses are retransformed values

References

Eckert, J.W., Sommer, N.F. 1967. Control of diseases of fruits and vegetables by post-harvest treatment. *Annu. Rev. Phytopathol.*, 5: 391-432.

Godara S.L. 1994. Studies on post-harvest diseases of sweet orange fruits. Ph.D. Thesis, Rajasthan Agril. University, Bikaner.

Gupta A. K. and Pathak, V. N. 1990. Epidemiology and management of papaya fruit rots. *Summa Phytopathologica*, 16: 92-105.

Patel. K. D. 1991. Studies on post-harvest fungal diseases of guava fruits. Ph.D. Thesis, Rajasthan Agril. University, Bikaner.