Bioscience Discovery, 11(2):100-102, April - 2020

Open Access, Peer Reviewed, Referred Research Journal

Print & Online available on https://jbsd.in
ISSN: 2229-3469 (Print); ISSN: 2231-024X (Online)

Research Article

Synergistic effect of Antibiotics on Aureofungin resistance in *Alternaria tenuis* causing fruit rot of grape

Kadam K. S.

Department of Botany, K. K. M. College, Manwath-431505, Dist. Parbhani (MS)

Article Info

Received: 01-02-2020,
Revised: 04-03-2020,
Accepted: 07-03-2020

Keywords: : Fruit rot, *Alternaria tenuis*, Aurofungin.

Abstract

Fruit rot of grape caused by *Alternaria tenuis* was found to be resistant to Aureofungin. Antibiotics viz. Griseofulvin Mycostatin, Penicillin and Strepomycin individually or in mixture with Aureofungin were tested both *in vitro* and *in vivo* against resistant mutant of *Alternaria tenuis*. Results showed that individually PCE was higher in Mycostatin followed by Griseofulvin, streptomycin and Penicillin. Use of Aureofungin mixed with antibiotics, the PCE was highly increased.

INTRODUCTION

Grape (*Vitis vinifera* L.) is one of the very important fruit crop in India and abroad. However, fruit rot of Grapes is caused by many fungal pathogens. Among these, Fruit rot of grape caused by *Alternaria tenuis* is destructive disease in the field as well as during storage and transport (Chahal and Malhi, 1969; Krishnaiah *et al*., 1983; Rao, 1994). Aureogungin is most effective fungicide against *Alternaria spp.* (Ghosh and Gemawat, 1976; Krishna et al, 1998). Fungicide resistant cases in various plant pathogens have been reported in India as well as in other countries (Wild, 1980; Annamalai and Lalithakumari, 1990; Gangawane *et al*., 1995). The main objective of present study was to find out the synergistic effect of antibiotics on the management of Aureofungin resistant mutant of *Alternaria tenuis.*

MATERIALS AND METHODS

In *vitro* study was undertaken on Czapek Dox agar medium while in *vivo* on grape fruits. For this purpose twenty isolates of *Alternaria tenuis* were collected from fields and markets of different regions of Maharashtra. The sensitivity of these isolates of *Alternaria tenuis to aureofungin* was tested by using food poisoning technique (Nene & Thaplial, 1993). Czapek Dox agar plates containing different concentration (50 – 1000 µg/ml) of Aureofungin were prepared. Disc (4mm) of pathogen isolates taken from the margin of 7 days old colony were placed in the center of agar plates. These plates were then incubated at 26+ 3ºC and linear growth was measured at different intervals up to a week. MIC and ED_{50} were calculated. Thus the sensitivity of twenty isolates was determined. There was a large variation in the sensitivity of isolates. During present investigation, disease resistance of the pathogen was developed by chemical mutation and it was used for further study as suggested by Dekker (1982).Thus the EMS-At-3 mutant was obtained with highest resistant factor 6 and used for present study. The agar plates containing antibiotic individually and in mixture of Aureofungin and antibiotics (10, 50 and 100 µg/ml) were prepared and inoculated with resistant mutant. The plates were incubated at 26±1ºC. The agar plates without treatment served as control. The percentage control efficacy (PCE) was calculated 8 days after incubation period by using following equation

PCE = 100 (1- x/y)

Where, x = Diameter of colony in treated plates or Percentage disease index of treated fruits
y = Diameter of colony in control or Percentage disease index of untreated fruits.

In vivo studies were carried out on fruit of grape. The fruits were surface sterilized by treating them with 1% $Hgcl_2$ solution and were washed ten times with sterilized distilled water. The fruits were then treated with antibiotics individually and in mixture of Aureofungin and antibiotics (50 and 100 µg/ml). The resistant mutant *Alternaria tenuis* was inoculated by pin prick method on the fruits and they were incubated for a week at 26 $\pm$ 3ºC in the laboratory. Fruits without treatment served as control. Percentage disease index (PDI) was calculated as described by Datar and Mayee (1985) and then on PDI, the percentage control efficacy was calculated as above equation.

Table 1. Percentage control efficacy (PCE) of Antibiotics individually and in mixture with aureofungin against aureofungin resistant mutant (EMS-At-3) of *Alternaria tenuis* on agar plates.

Sr. No.	Antibiotics (µg/ml)	Individual (PCE)	Mixture (PCE)
1	Griseofulvin 10	32.20	51.16
	50	46.78	67.32
	100	64.74	76.04
2	Mycostatin 10	37.88	56.76
	50	54.71	70.12
	100	68.44	83.42
3	Penicillium 10	13.25	46.29
	50	28.51	58.33
	100	43.14	64.47
4	Streptomycin 10	22.43	52.34
	50	34.13	62.15
	100	58.66	69.37
6	Aureofungin (800 µg/ml)	44.67	-
	S. E.	4.38	2.99
	C.D. at 0.05	49.46	68.53
	0.01	52.43	70.75

Table 2. Percentage control efficacy (PCE) of Antibiotics individually and in mixture with aureofungin against aureofungin resistant mutant (EMS-At-3) of *Alternaria tenuis* on grape fruits.

Sr. No.	Antibiotics (µg/ml)	Individual (PCE)	Mixture (PCE)
1	Griseofulvin 50	34.26	53.26
	100	46.24	65.49
2	Mycostatin 50	48.79	57.65
	100	56.25	70.00
3	Penicillium 50	18.26	44.25
	100	31.43	52.60
4	Streptomycin 50	21.15	47.33
	100	38.24	58.64
6	Aureofungin (800 µg/ml)	38.04	-
	S. E.	3.91	2.85
	C.D. at 0.05	43.48	60.85
	0.01	46.13	66.64

RESULTS AND DISCUSSION

In vitro and *in vivo* present study revealed that when antibiotics tested individually against *Alternaria tenuis* causes fruit rot of grapes, Mycostatin was found to be higher PCE followed by Griseofulvin, streptomycin and Penicillin. But when Aureofungin was used in mixture with antibiotics, the PCE was highly increased (Table 1 and Table 2). Use of aureofungin in mixture with antibiotics was more effective.

The results are in agreement with the finding of earlier workers, Khilare et al (2001) reported that use of thiophanate methyl in combination with antibiotics against *Penicillium digitatum*, mycostatin gave higher PCE. Gangawane L.V. and Kamble S.S. (2001) found that when carbendazim was used in combination with agrochemicals inhibited the growth of resistant isolate of *Macrophomina pahseolina* causing charcoal rot of potato. Bhale *et al*. (2009) reported that when use of fungicide in mixture with antibiotics against *Fusarium oxysporum*, ampicillin is more effective. Dekker, 1981; Gangawane and Readdy, 1987 suggested that there is significant delay of resistance build up in the pathogen when the mixture of different agrochemicals was used.

REFERENCES

Annamalai P and Lalithakumari D, 1990. Diseased sensitivity of *Drechslera oryzae* field isolates to ediphenphos. *Indian Phytopathol.* **43**:252- 558

Bhale UN, Wagh PM and Kamble SS, 2009. Synergistic effect of agrochemicals on benomyl resistance in *Fusarium oxysporumF, spinaciae* incitant of wilt of spinach. *Science Day Special* Issue, 28 Feb.: 73- 77.

Chahal DC and Malhi CS, 1969. Fungi associated with rotting of stored grape in the northern western India. *Indian Jr. Hort.*, **26**(1&2): 186 – 192.

Dekker J, 1981. Counter measures for avoiding fungicide resistance. In: Fungicide resistance in crop Protection (Eds. J. Dekker and Georgopoulos S.G.).CAPD, Wageningen, Netherlands, pp 128-139

Dekker J, 1982. Counter measures for avoiding fungicide resistance. In: Fungicide resistance in crop Protection (Eds.J. Dekker and Georgopoulos S.G.). CAPD, Wageningen, Netherlands, pp 177-186

Gangawane LV and Kamble SS, 2001. Use other agrochemicals in the management of charcoal rot of potato caused by *Macrophomina phaseolina* resistant to carbendazim. In proceeding of *International conference of frontiers in fungal biotechnology and plant pathogen relation*. Pp. 58-62.

Gangawane LV and Readdy BRC, 1987. Development and management of carbendazim resistance in *Aspergillus flavus*. *Indian Phytopath*, **40**:297

Gangawane LV, Kambale SS and Arora RK, 1995. *Indian Jr. Plant Prot***. 23,** 159

Ghosh SK and Gemawath PD, 1976. Evaluation of fungicides against *Alternaria solani* in vitro. Proc. *Indian Acad. Sci*., **84**(5): 155 – 158.

Khilare VC, Chavan AM and Gangawane LV, 2001. Synergistic effect of Antibiotics and insecticides on thiophanate methyl resistance in green mold of sweet orange. *J. of Indian Bot. Society*, **8**: 177-178.

Krishna K, Akbar M and Kalpana sastry R, 1998. In vitro evaluation of fungicides against *Alternaria carthami* Choudury incitant of leaf spot of safflower. *Indian Journal of Plant Protection*, **26** (2):181-182.

Krishnaiah J, Prasad S, Giridhrrsing T, Shhankarligan T, Thirupatak, 1983. Control of Alternaria rot of grapes by using wax. *Sci. and Cult.* **49**(12): 391 – 393.

Nene YL and Thapliyal RN, 1993. Evaluation of fungicides in Fungicides for Plant Disaease Control (3rd Edn.). Oxford and IHB Pub. Co. New Delhi. pp. 331

Raju K and Rao G, 1985. Effect of combined application of dithane M 45 with different insecticides to control fruit rot and pest complex on chilli. *Indian J. Mycol. and Pl. Pathol.* **15** : 239 - 246

Rao VG, 1994. Alternaria disease of grape, *Drakshvritta Souvenir*. **6:** 137

Wild BL, 1980. Resistance of citrus green mold *penicillium digitatum* Sac. To benozimidazole fungicides Ph. D. Dissertation California University, Riverside. 89

How to cite this article

Kadam K S, 2020. Synergistic effect of Antibiotics on Aureofungin resistance in *Alternaria tenuis* causing fruit rot of grape. *Bioscience Discovery***, 11**(2): 100-102.

Google Scholar citation: https://scholar.google.co.in/citations?user=vPzEyC8AAAAJ&hl=en