

INTEGRATED MANAGEMENT OF ZYZYPHUS FRUIT ROT CAUSED BY CARBENDAZIM RESISTANT MUTANT OF ASPERGILLUS NIGER USING ANTIBIOTICS COMBINATION WITH CARBENDAZIM

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Abstract: Different agrochemicals and botanical pesticides were used for the integrated Management of Carbendazim resistance in *Aspergillusniger*. It was studied by mixing different herbicides and plant part extracts which have antifungal activity were mixed in carbendazim. In vivo studies carried out. Carbendazim and effective concentration of selected Antibiotics extracts of Medicinal plants were mixed well and ber fruits were treated with this solution Plant extracts alone and in combination with carbendazim and other Insecticide were used individually and in combination with carbendazim for the management of Zizyphus fruit rot caused by resistant mutant of *Aspergillusniger*

Keywords: *Aspergillus, niger*, Carbendazim Resistant, Antibiotics *Zyzyphus*

I. INTRODUCTION

The fruit Ber (*Zizyphus mauritiana* Lamk) are very nutritious fruit and are available at low cost hence it is really a poor man's fruit It is xerophytes in nature In Maharashtra the *Zizyphus* plant is found every field wherever irrigation facilities are less. The genus *Zizyphus* belongs to family Rhamnaceae and consists of 40 species in tropical and subtropical regions. There are more than 125 cultivars grown in India However Ber suffers from various diseases like powdery mildew, sooty mold, *Alternaria*, Leaf spot and phoma leaf spot. The fruit are attacked by many pathogens at pre and post-harvest condition and spoil test and market quality. Among the post-harvest pathogens *Aspergillus niger* was observed to be most common in Maharashtra state.

There are reports that pre and post-harvest diseases of various fruits can be managed through systemic and conventional fungicides including carbendazim However during last 30 years application of fungicides has plagued with several environmental problem and development of fungicide resistance in pathogen is major one. Many examples of fungicide resistance in fungal pathogens have been reported from U.S.A. Australia Europe, Israel, Japan, and from South East Asian countries. In India, it appears that management of pathogenic fungi with systemic and non-systemic fungicides has become more and more common over past 15 years. The aim of present study was therefore to examine the possibility of development of resistance in *Aspergillus niger* against carbendazim and to find out the integrated methods to manage this pathogen causing fruit rot of *Zizyphus*. Integrated management of a disease have been emphasized now a day's hence agrochemicals were used individually and in combination with carbendazim for management of *Zizyphus* fruit rot caused by resistance mutant of *Aspergillus niger*.

II. MATERIAL AND METHODS

Different insecticides were used for the integrated management of carbendazim resistance in *Aspergillus niger*. It was studied by mixing different insecticides like Atrazine Gramoxone Weed off, 2,4-D. These agrochemicals were used individually and in combination with carbendazim for the management of *Zizyphus* fruit rot caused by resistance mutant of *Aspergillus niger* in vivo studies were carried out. This was done by using mycelia suspension of *Aspergillusniger* strain. A.N. EMS.9 was inoculated on Ber fruits for pathogenicity test.

Ber fruit were surface sterilized with 0.01% HgCl₂ solution and washed 10 times with sterile distilled water. They were inoculated with spore suspension of *Aspergillus niger* isolates or mutant resistant to carbendazim. Percentage Control Efficacy (PCE) was calculated (Cohen, 1989). In order to study the effect of carbendazim and other agrochemicals. Percentage control Efficacy (PCE) was calculated by using following formula.

$$PCE = 100(1-X/Y)$$

Where X= Diameter of the colony on the plates containing carbendazim.

Y= Diameter of the colony on absolute control plates

Percentage control efficacy (PCA) was recorded after 12 days. In vitro wild sensitive isolate AN-9 was cultured on agar plates containing sublethal dose of carbendazim (2.5mg/ml). The plate with carbendazim only served as control and different fungicides like Atrazine Gramoxone Weed off, 2,4-D were mixed in carbendazim by food poisoning technique (Nene and Thaphiyal, 1982). The principle involved in this technique is to "poison" the nutrient medium with a fungi toxicant and allowing a test fungus to grow on such medium (Zapek-Dox) medium (2x) was prepared. It was sterilized and 10 ml of this medium was properly mixed with 10ml of carbendazim alone and combination with other insecticides (2x a.i. concentration) selected for study in sterile petriplates. These agrochemicals were used individually and in combination with carbendazim.

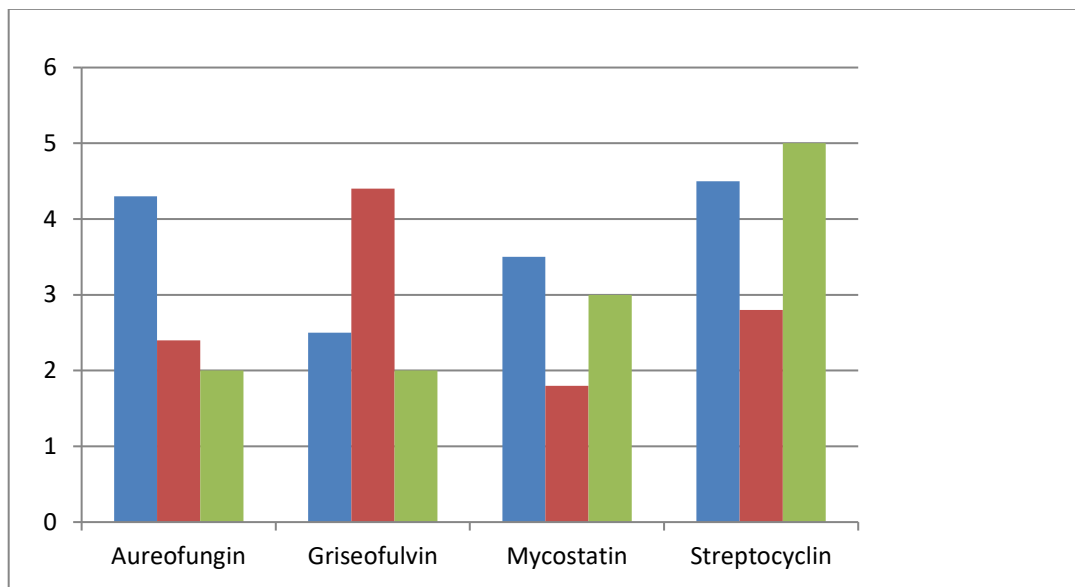
III. EXPERIMENTAL RESULTS

Antibiotics such as Atrazine Gramoxone Weed off, 2,4-D.s were selected for this study. Individually all the Herbicide showed their efficiency for the control of *Aspergillus niger* rot of *Zyzyphus* fruits. 2,4-D appeared to be more effective followed by Atrazine Gramoxone Weed off, decreasing manner. However mixing of carbendazim again increased in PCE. The increase was more due to mixing of 2,4-D followed by and other Herbicides (Table No. 1 and fig no 1.)

Table 01: Percentage control efficacy (PCE) of carbendazim individually and in mixture with other Antibiotics against Resistant strain mutant (AN EMS-9) of *Aspergillus niger* on fruits of Ber

Sr. No.	Antibiotics (µg/ml)	PCE	
		Individual	In Mixture with Carbendazim
1	Aureofungin 50	62.8	70.0
	100	63.2	82.0
2	Griseofulvin 50	54.0	59.2
	100	70.4	78.1
3	Mycostatin 50	62.0	70.4
	100	66.8	75.2
4	Streptocyclin 50	51.2	72.0
	100	70.8	79.2
5	Carbendazim only (2.5 µg/ml)	52.8	--

Table 01: Percentage control efficacy (PCE) of carbendazim individually and in mixture with other Antibiotics against Resistant strain mutant (AN EMS-9) of *Aspergillus niger* fruits of Ber.



IV. DISCUSSION

Use of agrochemical individually or in combination with carbendazim appeared in to be more beneficial for managing this fruit rot in present investigation. Atrazine Gramoxone Weed off, 2, 4-D. Gave higher percentage control efficacy individually. But carbendazimin mixture with these agrochemicals enhanced the percentage control efficacy for controlling this disease investigation. Use of fungicides or Insecticide in combination have been suggested for the management of the level of fungicide resistance in pathogen(Dekker,1981) with the combination of two specific site inhibitors the possibility exist that the pathogen will acquire resistance to both compounds.

These results are also confirmative with findings of earlier workers (Dekker, 1981.). In addition (Raju and Rao, 1985) have found that combined application of Diathane-M-45. With different insecticides' can control the fruit rot and pest complex on chilli. (Gangawane and Reddy, 1986.) Showed that certain micronutrients when used singly or in mixture with carbendazim reduce resistance in *Aspergillusniger* singly or mixture with carbendazim reduces resistance in *Aspergillusflavus*. There are theoretical models developed in this basis.(Kable and Jaffery,1980;Skylakakis,1981;Levy et. al.,1983) and practical examples (Delp,1980;Dekker,1981;Gangawane and Shaikh,1988; Gangawane et.al.,1990.).(Gangawane L.V. andDekker,1981;Gangawane and Shaikh,1988; Gangawane et.al.,1990.).(Gangawane L.V. and B.R.C.Reddy, 1985).(Gangawane L.V.,1981.) Dekker, 1981. Suggested that there is a significant delay of resistance build up in the pathogens when mixture of different Insecticides or fungicides has been used. In the present study agrochemicals other than Insecticides have also been proved useful in the management of carbendazim resistance in *Aspergillusniger* causing fruit rot of *Zyzyphus*.

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