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EFFECT OF SALT SOURCES ON THE GROWTH AND SPORULATION OF *ASPERGILLUS NIGER* SENSITIVE AND RESISTANT TO CARBENDAZIM CAUSING FRUIT ROT OF BER

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ABSTRACT
Different Chloride 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 for the management of Zizyphus fruit rot caused by resistant mutant of Aspergillusniger.

KEYWORD: *Aspergillus, niger*, Carbendazim Resistant, Chloride Zyzyphus.

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. Thegenus Zizyphus belongs to family Rhaminaceae 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.*

MATERIAL AND METHODS
Different Solt were used for the integrated management of carbendazim resistance in *Aspergillus niger*. It was studied by mixing different solt like Alluminium, Ammonium, Barium, Calsium, Ferric, ChloridesThese chlorides 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 Aspergillus *niger* strain. A.N. EMS.9 was inoculated on Ber fruits for pathogenicity test. Ber fruit were surface sterilized with 0.01%$HgCl_2$ 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 subleathal dose of carbendazim (2.5mg/ml). The plate with carbendazim only served as control and different Chloride like Alluminium, Ammonium, Barium, Calsium, Ferric, Chlorides 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 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 cabendazim.

Experimental Results
All the chlorides reduced the growth of sensitive isolate more vigorously when compared to resistant strain. Among the Chloride Alluminium chloride, Sodium Chloride more support the growth of sensitive and Resistant isolate Ammonium Chloride was more support the growth of Resistant strain while Ferric chloride and Mercury Chloride were not supportive for the growth of carbendazim resistant strain.

***In vitro* effect of salt sources on the growth and sporulation of *Aspergillus niger* sensitive and resistant to carbendazim causing fruit rot of Ber**

Salts (3%)	Wild Sensitive		Resistant strain	
	Dia. of Colony (mm)	Sporulation	Dia. of Colony (mm)	Sporulation
Alluminium chloride	3.33	+	7.66	+
Ammonium chloride	2.66	+	7.33	+
Barium chloride	3.33	+	6.66	+
Calcium chloride	3.33	+	7.33	++
Ferric chloride	0	-	0	-
Magnesium chloride	2.33	+	4.33	+
Potassium chloride	0	-	10.00	+++
Sodium chloride	6.66	+	10.00	+++
Mercuric chloride	0	-	0	-
Control	12.66	+	14.33	+++
S.E.	1.40		1.06	
C.D. P 0.05	3.60		2.72	

+ = Few, ++ = Moderate, +++ = Good, ++++ = Abundant, - =

DISCUSSION
Use of Chlorides individually or in combination with carbendazim appeared in to be more beneficial for managing this fruit rot in present investigation. But carbendazimin mixture with these agrochemicals enhanced the percentage control. All the chlorides reduced the growth of sensitive isolate more vigorously when compared to resistant strain.

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 Aspergillus niger causing fruit rot of *Zyzyphus*.

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