



Studies On Integrated Management Of Ber [Zizyphus] Diseases Using Plant Extract Combination With Carbendazim

Purnima Sable¹ and L.V.Gangawane²

¹ Assistant Professor ,Department of Botony S.M.B.S.T.College Sangamner .

².Msc,Ph.D,FPSI,FBS,FPPAI,Soil microbiology And Pesticides Laboratory Department Of Botany Dr.B.A.M.UNI. Aurangabad.

ABSTRACT

Pathogen Aspergillus niger was found on various varieties of Zizyphus hence the isolates of *Aspergillus niger* were tested against carbendazim integrated disease management of diseases have been emphasized now a days hence plant extracts alone and in combination carbendazim were used for management of zizyphus fruit caused by resistant mutant as *Aspergillus niger* Altogether 18 plant were selected for this study .it was observed that individually all the plant extract showed PCE on the Zizyphus fruits.this PCE was higher due to *Azadirachta indica* ,*Calotropis Procera* ,*Terminaria chebula*,*Carcuma Loga* ,*Ziziber Officinale* and *Withenia Somnifera* other plant extract showed PCE 42.1 to 59.6. It appears that addition of carbendazim in the extract increased the PCE in all cases. This increases was found higher in the extract of *Annona squamosa*,*Capsicum annum* *Vitex nigundo* and *Allium cepa* PCE increased.

KEY WORDS: *Aspergillus Niger* , Ber, Carbendazim , PCE, Fruit rot.

INTRODUCTION

The Ber (*Zizyphus mauritiana* Lamk) is an important fruit crop of arid and semi arid tropics in our country .However the ber suffers from various diseases .the fruits are attacked by many pathogens at pre and post harvest condition and spoil taste and market quality .among the post harvest pathogens *Aspergillus niger* was observed to be most common in Maharashtra state . Integrated disease management of a disease has been emphasized now –a- days. Hence plant extracts alone and in combination with carbendazim were used for management of Zizyphus fruit rot caused by resistant mutant of *Aspergillus niger*

MATERIALS AND METHOD

Diseased fruit samples of *Zizyphus mauritiana* were collected from various places. The observation for the pathogen was made by preparing slide and isolation on the medium. The identification of pathogens was through the referring earlier literature. It was noted that *Aspergillus niger* was present on maximum fruits

Sensitivity of *Aspergillus niger* isolates to carbendazim was studied by food poisoning technique [1]. The principle involved in this technique is to “poison” the nutrient medium with a fungitoxicant and then allowing a test fungus to grow on such medium Isolates of *Aspergillus niger* were inoculated at the centre of plates. The plates in triplicates were inoculated and colony diameter measured at different incubation period. Minimum inhibitory concentration (MIC) and was determined.

Pathogenicity Test

Ber fruits 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 mutants sensitive or resistance to Carbendazim. Percentage control efficacy (PCE) was calculated (Cohen, 1989) in order to study the effect of carbendazim alone and combination with plant extract.

Percentage control efficacy (PCE) was calculated by using following Formula

$$PCE = 100(1 - \frac{X}{Y})$$

Where X = Diameter of the colony on the plates containing Carbendazim / PDA on fruits.

Y = Diameter of the colony absolute control plates / PDA on fruits.

RESULTS

Altogether 18 plants were selected for this study. 10 gm leaves of plant were homogenised with 10 ml of sterile distilled water. The juice was expressed in 4 layered masculine cloths. The healthy fruits of Zizyphus were dipped in the extract for 5 minutes individually and in combination with Carbendazim. The fruits were inoculated with carbendazim resistant mutant by pin Prick method. 20 fruit for each treatment were wrapped with moist tissue paper and incubated for ten days. Untreated fruits were consider to be control and on the basis of PDI, PCE (percentage control efficacy) was calculated according to formula [2].

$$PCE = 100(1 - \frac{X}{Y})$$

X = PDI of the carbendazim or carbendazim with plant extracts

Y = PDI of the absolute control fruits.

Result is shown in Table 1 and Fig 1. It was observed that individually all the plant extract showed PCE on the Zizyphus fruits. This PCE higher (More than 50%) due to *Azadirachta indica*, *Calotropis*, *Procera*, *Terminalia Chebula*, *Curcuma longa*, *Zinziber officinale* and *withenia somnifera*. Other plant extracts showed PCE 42.1 to 59.6. It appeared that addition of Carbendazim in the extracts increased the PCE in all the cases. This increase was found to be higher in the extract of *Annona squamosa*, *Capsicum annum*, *Vitis nigunda*, and *Allium Cepa* (PCE increased more than 10 fold) in other cases this increase was 1-8 folds (Table 1).

DISCUSSION

Now-a-days integrated management of various crop diseases has been suggested [3-5] in the present investigation aqueous extracts of 18 plants were studied in order to manage Carbendazim resistant mutaut an *Aspergillus niger* on the fruits. Here extracts of *Azadirachta indica*, *Terminalia sp*, *Curcuma longa*, *Zinziber officinale* and *withenia somnifera*. Were highly effective for controlling fruit rot even used individually. But used of extract in Combination with Carbendazim increased. Control efficacy more than 10 fold. There are many reports indicating that plant extract are usefull in management of verious crop diseases [7-10] Active metabolized in the extracts of the plant might be responsible to control *Aspergillus niger* on Zizyphus fruits (Table No .2.) [11] Use of plant extract in disease management of different crop diseases have been worked out [5, 12 and 13] same example are given.

Table 1 Percentage control efficacy (PCE) of carbendazim individually and in mixture with other medicinal plant against resistant strain (AN EMS-9) of *Aspergillus niger* on fruits of Ber

Sr. No.	Medicinal Plant (100%)	PCE	
		Individual	In Mixture with Carbendazim
1	<i>Azadirachta indica</i> A. Juss.	63.5	69.6 (6)
2	<i>Culotropis procera</i> L.	71.07	75.35 (4)
3	<i>Terminalia chebula</i> Retz	63.2	66.07 (4)
4	<i>Curcuma longa</i> L.	60.3	66.7 (6)
5	<i>Ociumum sanctum</i> L.	59.6	60.3 (1)
6	<i>Zingiber officinale</i> Rose	61.07	66.4 (5)
7	<i>Annona squamosa</i> L.	56.7	67.1 (1)
8	<i>Capsicum annum</i> L.	56.4	66.7 (10)
9	<i>Withania somnifra</i> Dunal	60.3	66.0 (6)

10	<i>Vitex nigundo</i> L.	56.07	66.4 (10)
11	<i>Phyllanthus emblica</i> Gaertn	56.4	63.9 (7)
12	<i>Aloe barbedensis</i> Mill	51.4	50.7
13	<i>Allium sativum</i> L.	51.7	53.9 (2)
14	<i>Tridax procubens</i> L.	52.8	56.4 (4)
15	<i>Adhatoda vasica</i> Nees	48.2	55.3 (7)
16	<i>Eucalyptus globules</i> Labill	51.7	56.4 (5)
17	<i>Mentha arvensis</i> L.	44.6	52.8 (8)
18	<i>Allium cepa</i> L.	42.1	52.1 (10)
19	Carbendazim alone	55.3	--

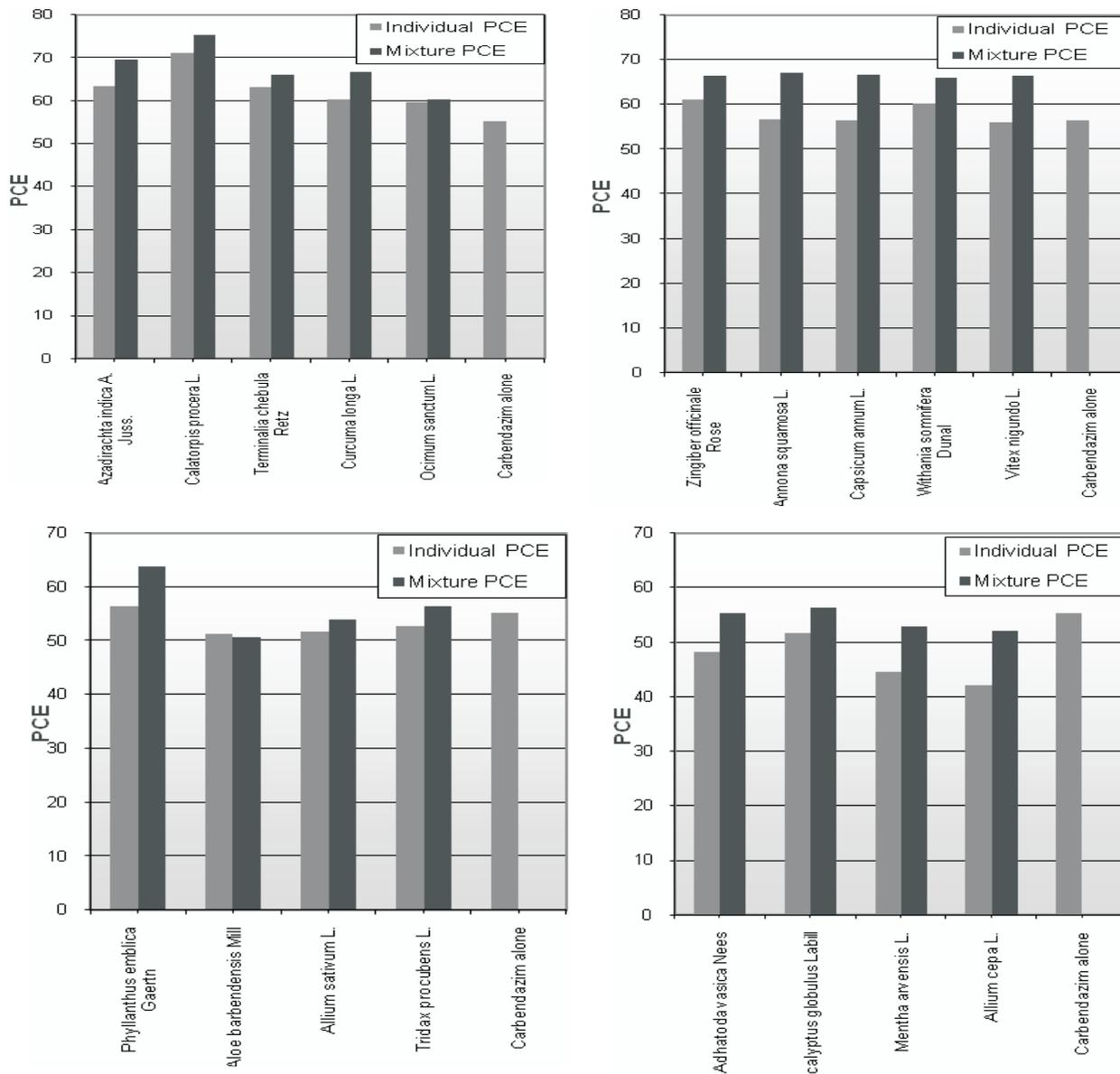


Figure 1 Percentage control efficacy (PCE) of carbendazim in combination with medicinal plant extract against *Aspergillus niger* resistant to carbendazim on agar plates

Table 2 Metabolites of various medicinal Plants

Medicinal plant	Metabolites
<i>Azadirachta indica</i>	Azadirectin
<i>Terminalia chebula</i>	Tannin,Gallicacid,Elagicacid,Phyllembilin,EthylgallateGlyllol, Glucose
<i>Curcuma longa</i>	Curcutnin,Cesmethoxy curcuminBisdesmethoxy curcumin
<i>Oscimum sanctum</i>	EugenolMethyleugenol
<i>Zingiber officinale</i>	Zingerols like shogablsZingiberene,Zingerone
<i>Capsicum annum</i>	Capsaicin Capsanthin
<i>Witheria somnifera</i>	Withaferin Withferine AAnaferine
<i>Phyllanthus imblica</i>	Phyllembilin
<i>Aloe barbendensis</i>	Aloesin,Barbatoin
<i>Allium sativum</i>	AllicinAlliin
<i>Adathoda vasica</i>	Vasicine Vasicinone
<i>Ecalyptus globules</i>	Cincole,Camphene
<i>Mentha arvensis</i>	Methol,PulegoneMenthofuran

Table 3 Pathogen controlled by medicinal plant extracts

Pathogens	Medicinal Plant	Reference
<i>Alternaria tenuis</i>	<i>Punica granatum</i>	Bambode and Shukla (1973, 1974)
<i>Curvularia lunata</i>	<i>Plumbago zeylanica</i>	Bambode and Shukla (1973, 1974)
<i>Helminthosporium speciferum</i>	<i>Plumbago zeylanica</i>	Bambode and Shukla (1973, 1974)
<i>Rhizoctonia bataticola</i>	<i>Plumbago zeylanica</i>	Bambode and Shukla (1973, 1974)
<i>Fusarium moniliforme</i>	<i>Plumbago zeylanica</i>	Bambode and Shukla (1973, 1974)
<i>Aspergillus flavus</i>	Curcuma oil	Banerjee and Nigam (1976)
<i>Aspergillus niger</i>	Curcuma oil	Banerjee and Nigam (1976)
<i>Aspergillus flavus</i>	Paragerm (an aromatic oil)	Banerjee and Nigam (1976)
<i>Candia abicans</i>	Paragerm (an aromatic oil)	Banerjee and Nigam (1976)
<i>Fusarium spp.</i>	Garlic bulb	Upadhaya <i>et. al.</i> , (1980)
<i>Aspergillus flavus</i>	<i>Ocimum adscendens</i>	Asthana <i>et. al.</i> , (1986)
<i>Aspergillus flavus</i>	<i>Cinnamonum tamala</i>	Misra and Batra (1987)
<i>Aspergillus parasiticus</i>	<i>Cinnamonum tamala</i>	Misra and Batra (1987)
Foliar disease of groundnut	<i>Azadirachta sp.</i> <i>Lausonia,</i> <i>Tridax procumbens,</i> <i>Pongamia sp.</i>	Ghewande (1989)
<i>Sclerotium sp.</i>	Black pepper	Garcia and Laws (1990)

REFERENCES

- [1]. Nene, V.L. and P.N. Thapliyal (1982). Fungicides in plant disease control Oxford and IBH Publi. Co. Pvt. Ltd. New Delhi, PP.212-349.
- [2]. Cohen, E. (1989). Evaluation of tenpropimorph and futriatol for control of sour rot, blue mold and green mold lemon fruit .plant . Dis.73:807-809.
- [3]. Dubey, R.C. (1991). Fungicidal effect of essential oil of three higher plant on sclerotia of *Macrophomina Phaseolina*. Ind. Phytopath, (2) : 241-244.
- [4]. Mukherjee, P.S., S.K. Nandi and B. Nandi (1992). Antifungal activity of some essential oils against storage fungi, *J. Myco. Path Res.*, 30: 121-125.
- [5]. Murugesan, K., G. Diraviam and K. Mahalaxmi (1944). Antifungal activity of Neem oil against two soil borne diseases plant pathogenic fungi. *Geobios (Jodhpur)*, 21(3): 173-176.
- [6]. Ghewande, M.P. (1989). Management of foliar diseases of ground nut (*Arachis hypogaea*) Using plant extracts. *Ind. J. Agric Sci.*, 59(2): 133-134.
- [7]. Bastos and C. Novais (1992). Inhibition of mycelia growth and spore germination of *Crinipellis Perniciosa* and *Phytophthora Palmivora* by garlic bulb extracts. *Fitopatol. Bras.*, 17(4): 545-559.
- [8]. Bisht, S.S. and Kamal (1994). Garlic extract an effective treatment for the control of storage rot of apple. *Prop. Nat. Acad. Sci. India Sec. D.*, 64(2): 233-234.
- [9]. Biswas, S.S., N.K. Das, S.M.H. Quadri and B. Saratchandra (1995). Evaluating different plant extract against three major diseases of mulberry. *Ind. Phytopathol.*, 48(3): 342-346.
- [10]. Kareppa, B.M. and S.K. Sangai (1996). Compatibility between extract of *Glossocardia bosvalle* and carbendazim in the management of some seed borne pathogens of Jowar. *Nature and Biosphere*, 1(1): 31-34.
- [11]. Kokate C.K., Purohit, A.P. and S.B. Gokhale (2002). *Pharmacognosy*, Niarali Prakashan, Pune.
- [12]. Shirshikar, S.P., and D.N. Kadam (1992). Efficacy of Neem leaf extract against foliar disease of ground nut. In: *Ind. J. Phytopathol. Suppl.*, 45: 122.
- [13]. Mukherjee, P.S., S.K. Nandi and B. Nandi (1992b). Antifungal activity of some essential oils against storage fungi. *J. Mycopathol. Res.*, 30(2): 121-125.

Correspondence to Author : Purnima Sable, Assistant Professor, Department of Botany S.M.B.S.T. College Sangamner