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EFFICACY ON INTEGRATED MANAGEMENT OF GARLIC (*ALLIUM SATIVUM* L.) DISEASES USING PLANT EXTRACT COMBINATION WITH BORDEAUX MIXTURE



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ABSTRACT

Saprophytic pathogen was found on various varieties of Garlic hence the isolates of saprophytic pathogen were tested against Bordeaux mixture, integrated disease management of diseases have been emphasized now a day's hence plant extracts alone and in combination Bordeaux mixture, were used for management of Garlic bulbs caused by resistant mutant as Saprophytic pathogen Altogether 10 plant were selected for this study .it was observed that individually all the plant extract showed PCE on the Garlic bulbs. This PCE was higher due to It was found that Justicia adhatoda (76.46%), Alternanthera sessilis(73.29%) and Annona reticulate (60.32%) showed the more percent of disease control efficacy against Colletotrichum *circinance, Bauhinia racemosa (78.16%) control efficacy against* Alternaria porri, *Ipomoea fistulosa (73.16%) showed the more*

percent of disease control efficacy against Aspergillus niger, *Phyllanthus amarus (75.56%) efficacy against Aspergillus flavus, Caesalpinia bonduc and Cassia obtusifolia showed the less percent of disease control efficacy against selected fungi*. *The combination of plant extracts and fungicide gives strong ability of controlling against pathogenic fungi like* Alternaria porri, Aspergillus niger, *Aspergillus flavus,* Colletotrichum *circinance, Fusarium oxysporum and* Penicillium *corymbiferum more than 92%.*

KEYWORDS

Saprophytic pathogen, Plant extracts, Bordeaux mixture, Garlic bulb rot.

RESEARCH PAPER

INTRODUCTION

Garlic (*Allium sativum* L.) is a most important bulb crop grown under irrigated conditions in india. Garlic (*Allium sativum* Linn) belongs to the family Amaryllidacae is the second most important bulb crop after onion. Garlic can be a very easy to grow herb in the garden, However it is also prone to several diseases. Garlic bulbs are associated and infected by number of fungal pathogens in fields as well as in storage (Chantrasnit and Panichyakarn, 1986) Theses includes, but are not limited to Basal rot (*Fusarium culmorum*), Downy mildew(*Peronospora destructor*), Botrytis rot(*Botrytis porri*) and *Penicillium* decay(*Penicillium hirsutum*). Most of the major garlic diseases are soil born, so proper site assessment and yearly rotations are crucial in maintaining a healthy garden of garlic. Efuntoye MO (2004). Fungi associated with herbal drug plants during storage. From garlic *Aspergillous flavus, A. fumigates, Aspergillius niger, Penicillium italicum, Penicillium digitatum. From onion A. fumigates, A. niger, P. digitatum, P. italicumetc isolated. Aspergillus, Rhizopus, Fusarium* produced 100% infection to their hosts (Nazir Ahmed, Mukhtar Ahmed et.al 1991). The bulbs in particular are affected by association of number of fungal pathogens both in fields and storages like *Alternaria porri Aspergillus niger Fusarium oxysporum,, Stemphylium botryosum, Cladosporium alli, Colletotrichum circinance, Macrophomina phaseolina, Botrytis alli, Helminthosporium alli, Penicillium corymbiferum, Aspergillus flavus, Rhizopus stolonifer, Curvularia lunata, Chaetomium globosum* and Sterile hyphae. Diseases such as *Botrytis* neck rot, *Penicillium* and surface molds such as *Embellisia* Skin Blotch and *Aspergillus* are common in curing areas with variable moisture, such as barns and sheds. Fungi demonstrated to be susceptible to garlic in lab tests include the genera *Microsporum, Epidermophyton, Trichophyton, Rhodotorula, Torulopsis, Trichosporon, Cryptococcus neoformans,* and *Candida,* including *Candida albicans*. It is reported that garlic is more effective against pathogenic yeasts than nystatin, especially *Candida albicans*.

MATERIALS AND METHODS

Saprophytic pathogen was collected and isolated from contaminated garlic bulbs. Shirshikar, S.P., and D.N.Kadam (1992) Efficacy of Neem leaf extract against foliar disease of grown nut. It was purified by single spore isolation technique (Riker and Riker, 1936) and maintained on PDA

slants. Lokesha S., Kumar V. and Shete H. S. (1986). Effects of Plant extracts on the growth and sporulation of *Aspergillus flavus*. Quadri S. M. H., Srivastava J. K., Bhonde S. R., Pandey U. B. and Bhagechandani P. M. (1982). Fungicidal bioassays against some important pathogen of onion. Grinstein (1992)A, Elad Y, Temkin GN, Rivan Y, Frankel H. Reduced volume application of fungicides for the control of onion rots. K.Raju, M.K. Naik. Effect of Pre-harvest spray of fungicides and botanicals on storage diseases on onion.

Antifungal activities of different medicinal plant extracts were studied in vitro by poison food technique (Nene2000) (*Annona reticulata (Rampha)l, Justicia adhatoda* (*Adulsa), Caesalpinia bonduc Sagargoata, Bauhinia racemosa* (*Apata), Ipomoea fistulosa (Baesharam), Phyllanthus amarus (Bhuiawala), Butea monosperma (Palas), Celosia argentea (Kombada), Cassia obtusifolia (Takala), Alternanthera sessilis* (*Chimutkata) and Argemone mexicana (Piwaladhotra))*. 20 gm fresh leaves and 20 ml of distilled water (w/v) was taken while extraction. The extracted material was then filtered through muslin cloth. The volume of extracted sap was made up to 50 ml by distilled water. The medium was then sterilized 15 lbs. 20 minutes. The sterilized medium 20 ml was poured in three plates equally. The petriplates containing leaf extracts were inoculated with loop holder of 10 days old fungal culture and incubated for ten days. Petriplates with PDA medium acted as control. The petriplates were observed on third day for inhibition of growth of saprophytic pathogen.

Table No. 01: Percentage of disease control efficacy of plant extract against saprophytic Pathogenic fungi

Plant extracts	***Alternaria porri***	***Aspergillus niger***	***Aspergillus flavus***	***Colletotrichum circinance***	***Penicillium corymbiferum***	***Fusarium oxysporum***
Annona reticulata (Rampha)	39.89	49.49	55.50	60.32	48.80	47.00
Justicia adhatoda (Adulsa)	67.12	74.25	32.80	76.46	62.15	71.25
Caesalpinia bonduc (Sagargoata)	37.84	35.84	32.80	36.80	37.84	39.84
Bauhinia racemosa (Apata)	78.16	77.16	16.67	57.56	58.16	70.16
Ipomoea fistulosa (Baesharam)	72.26	73.26	71.25	61.25	69.26	72.26
Phyllanthus amarus (Bhuiawala)	67.10	61.10	75.56	66.97	67.10	58.10
Butea monosperma (Palas)	27.00	29.00	56.97	26.12	27.00	39.00
Cassia obtusifolia (Takala)	28.45	18.35	45.29	27.12	24.56	28.35
Alternanthera sessilis (Chimutkata)	52.63	55.63	37.80	73.29	72.63	45.63
Argemone Mexicana (Piwaladhotra)	38.15	48.15	25.12	37.80	38.15	58.15

*Percent control efficacy

Percentage of disease control efficacy of plant extract against saprophytic Pathogenic fungi

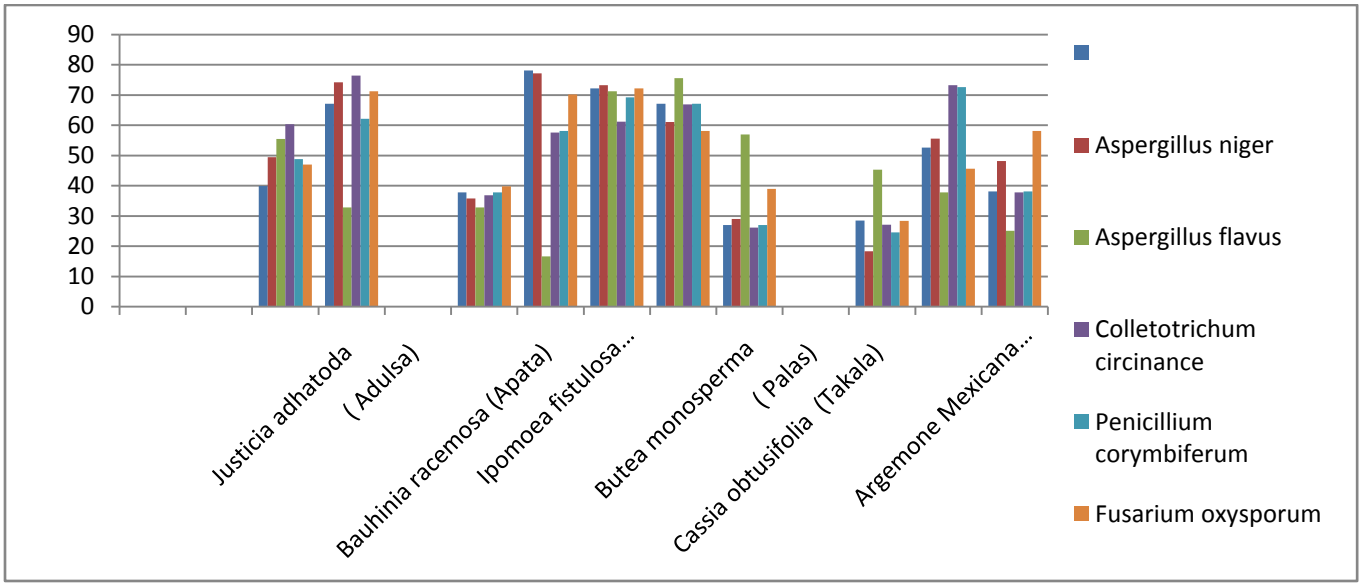


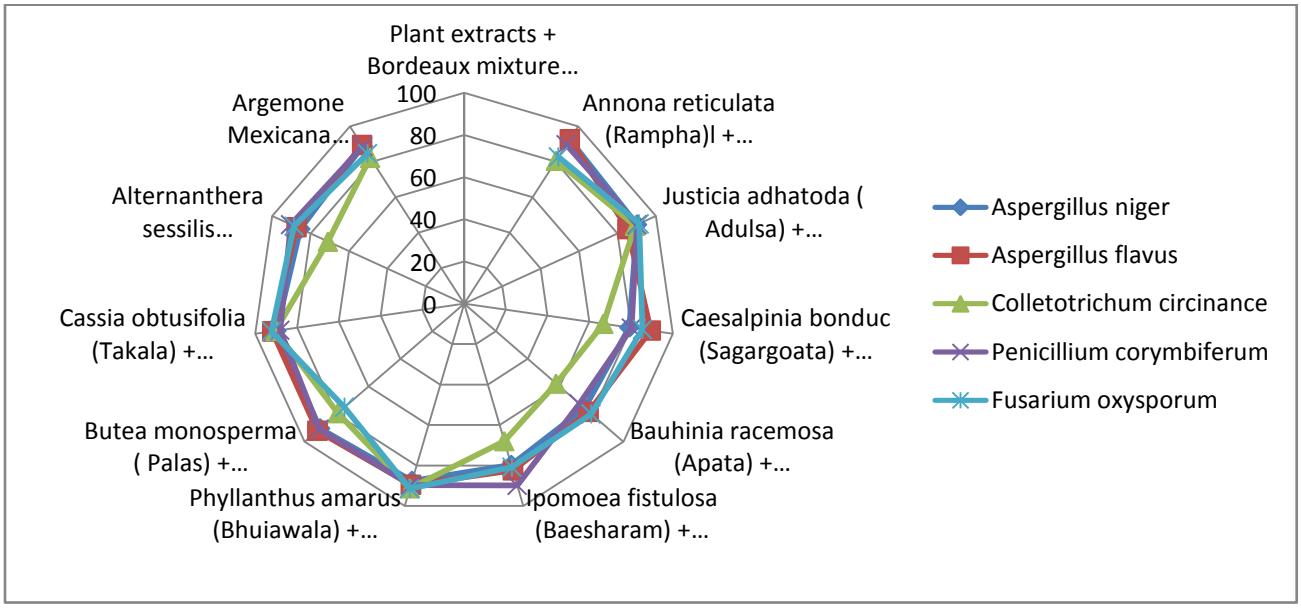
Table No. 02: Percentage efficacy of Plant extract + Bordeaux mixture against saprophytic Pathogenic fungi

Plant extracts + Bordeaux mixture	***Alternaria porri***	***Aspergillus niger***	***Aspergillus flavus***	***Colletotrichum circinance***	***Penicillium corymbiferum***	***Fusarium oxysporum***
Annona reticulata (Rampha)l + Bordeaux mixture	82.71	92.71	92.71	80.67	89.71	82.71
Justicia adhatoda (Adulsa) + Bordeaux mixture	91.26	90.26	85.26	89.23	89.25	90.20
Caesalpinia bonduc (Sagargoata) + Bordeaux mixture	85.47	79.31	89.42	66.80	80.31	85.47
Bauhinia racemosa (Apata) + Bordeaux mixture	79.78	75.78	78.26	57.80	72.38	79.78
Ipomoea fistulosa (Baesharam) + Bordeaux	80.73	79.73	82.34	67.90	89.73	80.73

mixture						
Phyllanthus amarus (*Bhuiawala)* + Bordeaux mixture	91.32	87.57	89.45	91.22	89.52	91.32
Butea monosperma (*Palas)* + Bordeaux mixture	74.88	90.33	92.00	79.22	90.78	74.88
Cassia obtusifolia (Takala) + Bordeaux mixture	92.90	89.90	91.90	90.33	88.10	92.10
Alternanthera sessilis (*Chimutkata)* + Bordeaux mixture	88.96	85.36	87.36	70.95	90.36	88.56
Argemone Mexicana (Piwaladhotra)+Bordeaux mixture	81.90	88.90	89.50	82.33	88.70	84.60

*Percent control efficacy

Percentage efficacy of Plant extract + Bordeaux mixture against Saprophytic Pathogenic fungi



RESULT AND DISCUSSION

The application of ten different plant extracts were applied against six selected fungi *viz. Alternaria porri, Aspergillus niger, Aspergillus flavus, Colletotrichum circinance, Fusarium oxysporum* and *Penicillium corymbiferum* the results were summarized in Table No. 01.

It was found that *Justicia adhatoda (*76.46%), *Alternanthera sessilis(73.29%)* and *Annona reticulate* (60.32%) showed the more percent of disease control efficacy against *Colletotrichum circinance, Bauhinia racemosa (*78.16%) control efficacy against *Alternaria porri, Ipomoea fistulosa (73.16%)* showed the more percent of disease control efficacy against *Aspergillus niger, Phyllanthus amarus (75.56%)* efficacy against *Aspergillus flavus, Caesalpinia bonduc and Cassia obtusifolia* showed the less percent of disease control efficacy against *selected fungi.*

In order to study effect of application of ten different plant extracts with fungicide Bordeaux mixture were applied against five selected fungi *viz. Alternaria porri, Aspergillus niger, Aspergillus flavus, Colletotrichum circinance, Fusarium oxysporum* and *Penicillium corymbiferum.* Different crude extracts were prepared and used at 100% level with fungicide Bordex mixture and results were summarized in Table No. 02.

It was found that percent control efficacy of plant extract mixed with fungicide Bordeaux mixture with selected fungi and the plant extracts like *Annona reticulata* (*Rampha)* + Bordeaux mixture, *Justicia adhatoda* (*Adulsa)* + Bordeaux mixture, *Caesalpinia bonduc (Sagargoata)* + Bordeaux mixture, *Bauhinia racemosa* (*Apata)* + Bordeaux mixture, *Ipomoea fistulosa (Baesharam)* + Bordeaux mixture, *Phyllanthus amarus* (*Bhuiawala)* + Bordeaux mixture, *Butea monosperma* (*Palas)* + Bordeaux mixture, *Cassia obtusifolia (Takala)* + Bordeaux mixture, *Alternanthera sessilis* (*Chimutkata)* + Bordeaux mixture and *Argemone Mexicana (Piwaladhotra)*+Bordeaux mixture this combination gives strong ability of controlling against pathogenic fungi like *Alternaria porri, Aspergillus niger, Aspergillus flavus, Colletotrichum circinance, Fusarium oxysporum* and *Penicillium corymbiferum more than 92%.*

REFERENCES

Shirshikar, S.P., and D. N. Kadam (1992) Efficacy of Neem leaf extract against foliar disease of grown nut In: Ind : Phytopathol. Suppl., 45: 122.

Efuntoye MO (2004). Fungi associated with herbal drug plants during storage. Mycopathologia 136: 115-118.

Nene Y. L. and Thapliyal P. N. (2000). Poisoned Food Technique. Fungicide in plant diseases comtrol, 3rd Edn.,Oxford and IBH Publishing Company, New Delhi. Pp.531-533.

Riker J. and Riker R. S. (1936). Introduction to Research in Plant Diseases. John Swift Co., New York.

Lokesha S., Kumar V. and Shete H. S. (1986). Effects of Plant extracts on the growth and sporulation of Aspergillus flavus. J. Plant Res. 1(1-2):79-94.

Quadri S. M. H., Srivastava J. K., Bhonde S. R., Pandey U. B. and Bhagechandani P. M. (1982). Fungicidal bioassays against some important pathogen of onion. Pesticides. 16:11-16.

Chantarasnit A. and Phanichyakarn V. (1986), Microorganisms causing deterioration of garlic, *Natural history bulletin of the Siam society*, 34(2**),** 95-104

Nazir Ahmed, Mukhtar Ahmed et.al (1991).From garlic *Aspergillous flavus, A. fumigates, Aspergillius niger, Penicillium italicum, Penicillium digitatum*. From onion *A. fumigates, A. niger, P. digitatum , P. italicumetc* isolated. *Aspergillus, Rhizopus, Fusarium* produced 100% infection to their hosts APS press. St. Paul, Minn. 1995; pp. 26-27.

Grinstein A, Elad Y, Temkin GN, Rivan Y, Frankel H. Reduced volume application of fungicides for the control of onion rots. Phytoparasitica 1992; 20: 293-300.

K. Raju, M.K. Naik. Effect of Pre-harvest spray of fungicides and botanicals on storage diseases on onion. Indian Phyto-Pathology. Vol.59, No.2, 133-141, 2006. http://www.researchgate.net/publication/267216383.

