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EFFECT OF BOTANICALS ON FLUDIOXONIL RESISTANT *PENICILLIUM EXPANSUM* CAUSING BLUE MOLD OF PEAR

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ABSTRACT

Pear (*Pyrus communis* L.) is an important fruit in India and in abroad and infested by *Penicillium expansum* Link. and developed blue mould disease. It is much severed and its management is equally significant to increase the commercial production of pear and maintain its quality. In the sense of management using twenty four medicinal plant extracts were tested for the controlling of blue mould caused by fludioxonil resistant in *Penicillium expansum* individually and in mixture with fludioxonil *in vitro* and *in vivo.* Twelve medicinal plants were more effective individually and in mixture with fludioxonil. Nineteen plant extracts were least effective for the control of blue mould *in vitro* and *in vivo*. The percentage control efficacy (PCE) was calculated and increased up to 80.00% and 89.00% *in vitro* and *in vivo* respectively.

KEYWORDS: Pear, *Penicillium expansum,* fludioxonil, plant extracts.

INTRODUCTION

Blue mold of pear (*Pyrus communis* L.) caused by *Penicillium expansum* Link. is one of the most serious disease. Fludioxonil is strongly recommended for the management of blue mold of pear during post harvest condition. Fungicides resistance cases have been found in India[4-5,3,1] However, use of plant extract has also recommended for the management of various plant pathogens.[2,6] The present paper reports the effect of *Eucalyptus globulous, Azadirachta indica, Chrysanthamum indicum, Zingiber officinalis, Sesamum indicum, Catharanthus roseus* etc. in the management of blue mold of pear caused by *Penicillium expansum* resistant to fludioxonil. Aqueous extracts of twenty four medicinal plants were tested for the control of blue mold caused by fludioxonil resistant in *Penicillium expansum*. Individually and in combination with fludioxonil both *in vitro* and *in vivo.*

MATERIALS AND METHODS

The medicinal plants (*Eucalyptus globulous, Terminalia bellerica, Terminalia chebula, Azadirachta indica, Polyalthia longifolia, Catharanthus roseus, Chrysanthemum indicum, Emblica officinalis, Annona reticulata, Annona squamosa, Tinospora cordifolia, Aloe vera, Asparagus recemosus, Zingiber officinalis, Withania sominifera, Curcuma long, Adhatoda vasica, Vitex negundo and Ocimum sanctum*) were collected from K.V. Pendharkar college campus and Kalyan- Dombivli area, Dist- Thane. The leaves of above plants were collected and clean with running tap water and sterilized distilled water. The fresh 100gms leaves were crushed and homogenized. The leaf extracts were expressed in the four layered of muslin cloths with 100 ml sterile distilled water (SDW) and sterilized in autoclave at 15 lbs. The sterile leaf extracts were mixed with PDA medium with equal quantity and pour in the Petri plates. This was considered as 100% extract. The method used for testing fungi toxic properties of plant extract was food poisoned technique.[6] Similarly, fludioxonil concentration was also adjusted along with the leaf extracts to see the combine effect. Plates were inoculated with resistant mutant (Pe-EMS-10) and incubated at 27±2°C. Percentage Control Efficacy (PCE) was determined after 10 days. The healthy fruits of pear were dipped in 24 medicinal plant extracts individually and in mixture with fludioxonil. The fruits were inoculated with the (Pe-EMS-10) and wrapped with tissue paper and incubated for 15 days at 27±2ºC temperature and PCE was determined.

RESULTS AND DISCUSSIONS

Twenty four medicinal plant extracts were used in the management of *Penicillium expansum in vitro* and *in vivo.* It was observed that individually the plant extracts of *Eucalyptus globulus* (63.04), *Azadirachta indica* (62.52), *Sesamum indicum* (61.20), *Chrysanthemum indium* (60.39) and followed by other plant extracts. In mixture with fludioxonil certain plant extracts viz. *Azadirachta indica* (80.00), *Eucalyptus globulus* (70.72), *Sesamum indicum* (68.27), *Chrysanthemum indium* (68.23), and *Zingiber officilalis* (68.13) followed by certain other plants. Thus, *Catharanthus roseus,* and *Oscimum sanctum,* extracts when used alone showed PCE ranging from 59.36-58.29 % and least effective plant extract *Aloe vera, Withania sominifera, Allium cepa and Phyllanthus emblica* (28.55-34.12%). When the plants extracts were mixed with fludioxonil PCE against *P. expansum* was increased. Aqueous extracts of twenty four medicinal plants were effective in control the blue mould of pear caused by *Penicillium expansum* on agar plates. Individually the medicinal plant extract *Eucalyptus globulous* showed highest PCE (74.50%) while *Aloe vera* plant extract showed

lowest PCE (42.55%), followed by W*ithania sominifera, Vitex negundo, Alliums cepa, Phyllanthus emblica, Tinospora cordifolia, Adhatoda vasica, Allium sativum* and *Annona reticulata* showed PCE (55.36-47.42%). While the other medicinal plants *Asparagus recemosus, Annona squamosa, Eugenia jambolana, Terminalia bellerica, Curcuma longa, Plumbago zeylanicum, Terminalia bellerica, Polyalthtia longifolia, Oscimum sanctum, Zingiber officinalis, Chrysanthamum idicum* and *Catharanthus roseus, Azadirachta indica, Sesamum indicum* showed PCE ranging between (58.25-74.30%). When the fludioxonil was used along with the extracts of these medicinal plants, there was further increased in PCE. The highest PCE 89.00% was recorded due to the combination of fludioxonil with extract of *Azadirachta indica*, followed by other plants which showed values of PCE more than 62.33% (Table 1). Patil and Pawar (2009) reported similar trends in inhibitory effect of plant extracts on spore germination of *Puccinia erianthii* Padwik, Khan and Kuehnii. Pradeep kumar singh *et al.*, (2010) used plant leaf extracts and bioagent for ecofriendly management of wilt of pigeon pea caused by *Fusarium udum*.

CONCLUSION

Use of excess amount of fungicides is hazards to fruit crops for the management of various diseases. In this scene we tried to use biopesticides for the management of blue mould disease. In combination with fungicides the disease control, but no hazards to fruit. Farmer use different plant extracts individually and in mixture with little amount of fungicides for fruit diseases.

Table 1: PCE of fludioxonil individually and in mixture with medicinal plant extracts against resistant strain of *Penicillium expansum in vitro* and *in vivo.*

Sr. No.	Plant Extracts	*In vitro* PCE		*In vivo* PCE	
		Idv.	Mix.	Idv.	Mix.
01	*Eucalyptus globulous Labill.*	63.04	70.72	74.50	87.62
02	*Azadirachta indica A.Juss.*	62.52	80.00	73.50	89.00
03	*Chrysanthamum idicum L.*	60.39	68.23	72.29	85.23
04	*Zingiber officinalis Rosc.*	59.62	68.23	71.62	85.23
05	*Sesamum indicum L.*	61.20	68.27	74.30	86.27
06	*Catharanthus roseus L.*	59.36	67.99	72.36	84.99
07	*Oscimum sanctum L.*	58.29	68.23	70.29	85.23
08	*Polyalthtia longifolia Benth.*	54.35	62.62	66.35	79.62
09	*Curcuma longa L.*	52.20	66.35	62.20	86.35
10	*Plumbago zeylanicum L.*	52.00	64.89	65.00	81.89
11	*Terminalia bellerica Roxb.*	51.32	68.33	65.32	84.33
12	*Terminalia chebula Retz.*	50.20	59.23	62.20	76.23

13	*Eugenia jambolana Lam.*	49.20	60.42	61.20	75.42
14	*Asparagus recemosus L.*	45.25	59.72	58.25	76.72
15	*Annona squamosa L.*	45.32	64.22	59.32	82.22
16	*Annona reticulata L.*	41.36	60.29	55.36	78.29
17	*Tinospora cordifolia Mers.*	38.27	51.74	53.27	69.74
18	*Vitex negundo L.*	38.00	50.01	51.00	65.01
19	*Adhatoda vasica Nees.*	35.33	49.22	53.33	66.22
20	*Allium sativum L.*	34.32	64.43	55.32	80.43
21	*Phyllanthus emblica Gaertn.*	34.12	66.18	52.12	83.18
22	*Allium cepa L.*	35.12	58.33	51.12	78.33
23	*Withania sominifera L.*	32.42	49.20	47.42	68.20
24	*Aloe vera L.*	28.55	44.33	42.55	62.33
25	Fludioxonil (870µg/ml)	53.56	---	82.56	---
	S.E ±	4.82	2.16	1.842	193.5
	CD at 0.01	11.399	5.177	4.356	3.773
	at 0.05	9.789	4.393	3.714	3.236

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