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Citronella oil and Palmarosa oil effective against Colletotrichum capsici (Syd.) Butler and Bisby.

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Abstract: Natural pesticides based on plant-essential oils may represent alternative crop protectant whose time has come. Essential oils, obtained by steam distillation of plant foliage, and even the foliage itself of certain aromatic plants. The present laboratory study was undertaken to determine the comparative efficacy of different oils at various concentrations to protect against *Colletotrichum capsici* .The results indicated that citronella oil and palmarosa oil @ 0.05and 0.1 % complete control of fruit rot pathogen followed by TNAU Neem oil @ (3%) and also compatible with bacterial antagonists.

Key words : Citronella oil, Palmarosa oil and Compatibility

I. INTRODUCTION

Chilli (*Capsicum annuum* L.) is indispensable spice cum condiment in Indian cuisine. It is one of the important spices and export-oriented crop. India being the land of spices, the major share among the spices consumed per head in India is contributed by dried chilli. India being the land of spices Indian chilli is exported to over 90 countries Among the fungal diseases fruit rot and die back caused by *Colletotrichum capsici* (Syd.) Butler and Bisby is the most important disease. Over the crop is grown the estimated loss due to this disease ranged from 8 to 32 per cent in different parts of India (Chowdhury, 1957 and Datar *et al.*, 1990) If the weather conditions are suitable the disease may cause even 12 to 25 per cent loss in the crop (Kannan *et al.*, 1998). The present investigations were carried out to study the comparative efficacy of different oils for safe against chilli fruit disease in lab and pot culture conditions..

3.RESEARCH METHODOLOGY

Ten oils viz., Citronella, Coconut, Castor, Illupai, Karanj, Neem, Palmarosa oil, Sesamum oil, Sunflower oil and TNAU Neem oils. Were procured from local market for their study. The plant oil likes Palmarosa oil (0.1), Pungam oil (3%), Neem oil, (3%) TNAU Neem oil 60 EC (3%) Illuppai oil (3%) and Citronella oil (0.1%) Coconut (3%) Castor (3%) Sesamum oil (3%) Sunflower oil (3%) were used in the study the respective concentration oil after Emulsifying with teepol at one ml per liter mixed with potato dextrose agar medium (PDA) and thoroughly mixed just before plating so as to get the specified concentration of the plant oils, Twenty ml of the mixture was immediately plated in to a sterilized petridish gently swirled and allowed to solidify. Seven-day-old ten mm culture disc of the pathogen was placed into the center of the medium. All these were carried out under aseptic conditions. The plates were incubated at room temperature (28 ± 2°C) for seven days, The PDA medium without incorporating the plant oil served as the control. Three replications were maintained for each treatment. The radial growth of the mycelium was measured. The results were expressed as per cent growth inhibition over the control.

3.1COMPATIBILITY OF PLANT OILS WITH BACTERIAL ANTAGONIST -PAPER DISC ASSAY

King's "B" medium seeded with *P. fluorescens* and nutrient agar medium seeded with *B. subtilis* was poured separately in petridishes, paper disc of ten mm diameter was dipped in the respective plant oils *viz*., neem oil (3%), TNAU neem oil 60 (3%), palmarosa oils (0.1%), illuppai oil (3%) pungam oil (3%) and citronella oil (0.1%) were air dried and these placed in each petridish on the surface of the medium this plates were incubated at room temperature (28 ± 2 °C). The filter paper disc immersed in sterile water served as control. The inhibition zone around paper disc was reported after 72 hr.

The methodology section outline the plan and method that how the study is conducted. This includes Universe of the study, sample

IV. RESULTS AND DISCUSSION

4.1. Table 1. *In vitro* assay of plant oils against *C. capsici*

S. No.	Plant oils	Mycelial growth (cm)	Per cent growth inhibition over control*
1	Palmarosa oil (0.1 %)	0.00	100.00
2	Palmarosa oil (0.05 %)	0.00	100.00
3	Citronella oil (0.1 %)	0.00	100.00
4	Citronella oil (0.05 %)	0.00	100.00
5	Pungam oil (3 %)	5.40	38.60
6	Neem oil (3 %)	7.20	18.18
7	TNAU neem oil 60 EC(3 %)	4.80	45.45
8	Illuppai oil (3 %)	6.70	25.18
9	Coconut (3%)	9.00	0.00
10	Castor (3%)	9.00	0.00
11	Sesamum oil (3%)	9.00	0.00
12	Sunflower oil (3%)	9.00	0.00
9	Control	8.80	
	CD (P = 0.05)	**0.146**	

* Mean of three replications

Among the ten different oils tested in the laboratory against *C.capsici*. Palmorosa oil and Citronella oil 0.05 and 0.1 per cent concentrations cent per cent inhibitions of mycelial growth of the pathogen over the control followed by 45.45 per cent inhibition of mycelial growth over control in TNAU Neem oil 60 EC (3%). The least amount of inhibition showed in pungam oil (3%) which recorded 18.18 per cent inhibition but in coconut sesamum and sunflower oils are not effective against pathogen. (Table 1) Babu (1994) stated that palmarosa oil (0.3 %) was effective against *Alternaria solani* causing tomato leaf blight. The fungal activity of palmarosa oil against *Aspergillus niger, A. flavus, Fusarium oxysporium* and *Penicillium* sp. was reported by Gangrade *et al.* (1991)

Table 2. Compatibility of plant oils with bacterial antagonists

Tr. No.	Treatment	Diameter of inhibition zone (cm)	
		P. fluorescens	*B. subtilis*
1	Palmarosaoil (0.1 %)	1.20	2.40
2	TNAU neem oil (3 %)	0.00	0.00
3	Neem oil (3 %)	0.00	0.00
4	Citronella oil (0.1 %)	0.00	0.90
5	Illupai oil (3 %)	1.40	1.40
6	Pungam oil (3 %)	1.56	1.30
7	Control	0.00	0.00
	CD (P= 0.05)	**0.11**	**0.12**

The compatibility of *P.fluorescens* (Pf) was tested the effective plant oils neem oil (3%), TNAU neem oil 60 (3%), palmarosa oils (0.1%), illuppai oil (3%) pungam oil (3%) and citronella oil (0.1%) it was found that *P. fluorescens* (Pf1) was compatible with neem oil (3%), TNAU neem oil (3%) and Citronella oil (0.1%) which had no inhibition. Where as palmorosa oil (0.1%), illupai oil (3%) and Pungam oil (3%) which recorded the inhibition zone of 1.20,1.40,1.56 cm respectively. The experimental results revealed that incompatible of palmorosa oil (0.1%), illupai oil (3%) and Pungam oil (3%). (Table2)

The bacterial antagonists *B. subtilis* was found to be compatible with neem oil , TNAU neem oil at 3 per cent concentration. The palmarosa oil (0.1%) illupai oil (3%) Pungam oil (3%). And citronella oil (0.1%) recorde the inhibition zone of 2,40, 1.40, 1.30and 0.90 cm respectively confirming to its compatibility *In vitro* evaluation of baterial antagonists *P. fluorescens*, and *B. subtilis* were compatible with neem oil, TNAU neem oil 3 per cent concentration levels also *P. fluorescens* was compatible with citronella oil 0.1 per cent. Rajappan *et al.* (1997) suggested that neem oil (3%) 80 EC + *P. fluorescens*, neem oil 80 EC + *B. subtilis*, TNAU neem oil + pungam oil 60 EC + *B. subtilis* and neem oil + *P. fluorescens* were compatible with each other

Commercial success with these products based on well-known chemistry will likely provide an impetus for the development and commercialization of future pesticides based on more exotic essential oils with even greater potency (Shaaya and Kostjukovsky, 1998). The antifungal principles and phytotoxic properties of a large number of essential oil have not been thoroughly studied although a large array of essential oils are reported to posses strong fungus inhibitory properties. The positive results obtained with citronella oil and palmarosa oil do establish in principle that they may be included in pathologists armamentarium for plant disease control.

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