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CONTROL OF FRUIT ROT OF CHILLI CAUSED BY *COLLETOTRICHUM CAPSICI AND FUSARIUM EQUISETI* WITH HOMOEOPATHIC DRUGS

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In vitro and *in vivo* studies were conducted for testing fungicidal properties of some homoeopathic drugs against *Colletotrichum capsici* and *Fusarium equiseti,* the casual organisms of chilli fruit rot. On the basis of these results Psorinum 30, Cina 6 and Cina 30 appeared to be protectants whereas Lachesis 30 and Psorinum 200 as therapeutants.

Keywords: *Chilli; Colletotrichum capsici; Control; Fusarium equiseti;* Homoeopathic drugs.

Introduction

A variety of pesticides are being currently employed in protecting plants from phytopathogens but majority of them have been found to cause toxicity and pollution. In view of this, search for safe alternatives has become very urgent. Recently, possibilities are being explored in homoeopathic drugs. A number of reports indicated that they posses antiviral[1-2] and antifungal[3-8] properties. The present paper incorporates the findings of *in vitro* and *in vivo* evaluation of certain homoeopathic drugs against *Colletotrichum capsici* and *Fusarium equiseti,* the causal agents of chilli fruit rot.

Materials and Methods

In vitro test : Drugs used in the investigation were Apis mellifica, Cina, Cocculus, Lachesis, Psorinum and Sepia each with 6, 30, 200 and 1000 potency. Fungitoxicity of the drugs were determined in terms of their inhibitory effects on the mycelial growth. Both pathogens, *C.capsici* and *F.equiseti* were isolaed from diseased chilli fruits and maintained on potato dextrose agar slants. For screening the *in vitro* efficacy of drugs, one drop of each drug was mixed with 30 ml sterilized PDA medium and poured into petriplates. A 6 mm disc of inoculum cut from the margin of a 7 day old colony of the pathogen was placed in the centre of petriplates and incubated for a week at 28±1° C. Petriplates containing 30 ml medium and a drop of alcohol served as control. All treatments were triplicated. Radial mycelial rowth was measured and percentage inhibition over control was calculated.

In vivo Test :- The drugs used in *in vitro* screening were employed to scan their efficacy in checking the fruit rot of chilli. For this purpose both pre and post inoculation treatments were given to the fruit. For post inoculation treatment, fruits were first disinfected with 0.01% mercuric chloride and washed repeatedly in sterilized distilled water and then injured with sterilized needle. Thereafter, fruits were inoculated with a 4 mm inoculum disc cut

from the margins of a freshly grown colony of the test pathogen. After 24 hours, they were immersed for 30 minutes in solution of different drug potencies. For pre-inoculation treatments, the injured fruits were dipped in each drug solution prior to inoculation. In the control set, the inoculated fruits were dipped in sterilized distilled water instead of the drug. Such treated fruits were then incubated in humid glass chambers at 28±1^0 C. In all cases three replicates were taken. After an incubation period of 7 days the fruits were removed from the chambers and % rot developed was determined.

Results and Discussion

All the 6 drugs tested against the mycelial growth of *C.capsici* and *F. equiseti* were, in general, inhibitory to varying extents (Table 1). Apis 6, 1000, cocculus 6, 200 and cina 6 in case of *C.capsici* and Lachesis 6 and Psorinum 6 in case of *F.equiseti* were found to be more effective fungitoxic drugs exhibiting more than 60% inhibition over control. Complete inhibition of mycelial growth however, could not be achieved with any of the drug potencies. The table further reveals that most of the drug potencies have shown a differential action with regard to their fungitoxic abilities on the two pathogens.

As to their *in vivo* activity (Fig. 1 and 2) all the drugs have more or less shown rot retarding effects. It is evident that Psorinum 30, cina 6 and 30 proved most successful as fruit treated with these drugs excaped *F.equiseti* caused infections completely. Whereas complete prevention of chilli rot caused by *C.ccpsici* could only be achieved with cina 6. Cina 6 was, however found to be the only drug that prevented rot development in both cases. Next in order of effectivity were Lachesis 30, Psorinum 200, Sepia 30, Cina 200 and 1000 in case of *C. capsici* and Lachesis 6, 30, Psorinum 6, Cocculus 30, 200 cina 200 and 1000 in case of *F.equiseti,* as these could bring down rotting to lessthan 10%.

Out of the 24 potencies tested, Lachesis 30 and Psorinum 30 could completely cure the chilli rot caused by *C.capsici* whereas *F.equiseti* caused chilli rot found complete control only under Psorinum 1000. However, curative power of lachesis 6, 1000, Psorinum 200, 1000 and cina in case of *C.capcisi* and lachesis 6, Psorinum 200 and Cocculus 1000 in case of *F.equiseti* markedly reduced rot development to less than 10%.

Table 1. Efficacy of homoeopathic drugs on radial mycelial growth of *C. capsici* and *F. equiseti* in terms of percent inhibition over control (average of three replicates)

Potency	APIS		LACHESIS		PSORINUM		SEPIA		COCCULUS		CINA	
	C	*F*	*C*	*F*	*C*	*F*	*C*	*F*	*C*	*F*	*C*	*F*
6	62.96	31.11	38.38	63.61	29.83	60.00	31.90	41.11	60.08	23.24	64.92	37.22
30	59.37	24.44	36.01	52.50	42.28	55.55	27.06	43.61	48.35	46.30	57.61	22.50
200	56.79	34.27	41.16	44.44	44.65	45.00	29.01	46.66	61.32	24.66	57.71	24.50
1000	67.18	40.55	44.65	54.44	42.27	53.61	32.61	55.55	49.07	28.05	55.86	29.72

C-*C. capsici;* F —*F. equiseti*

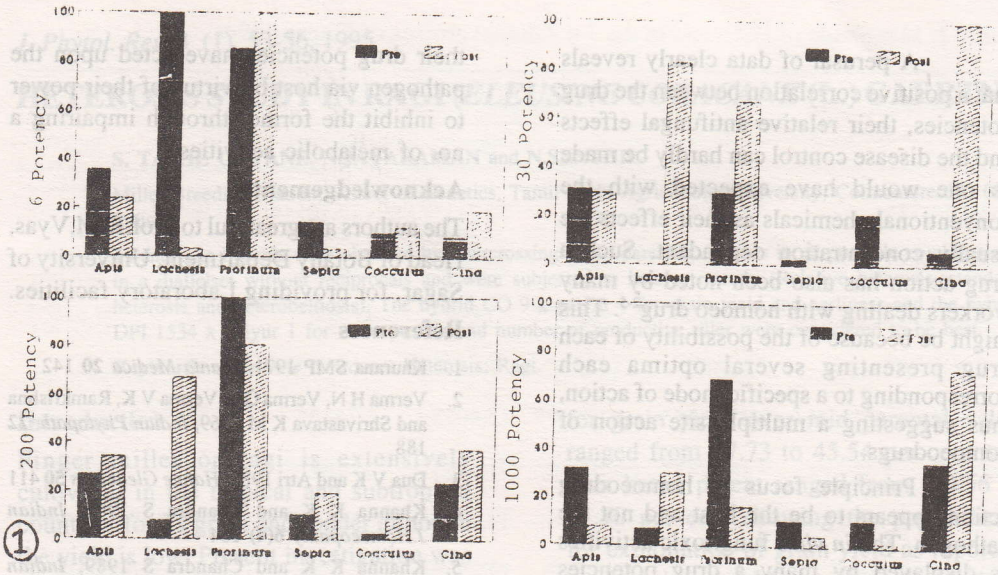

Fig.1 Efficacy of various Homoeopathic drugs in checking chilli fruit rot caused by *C. capsici*

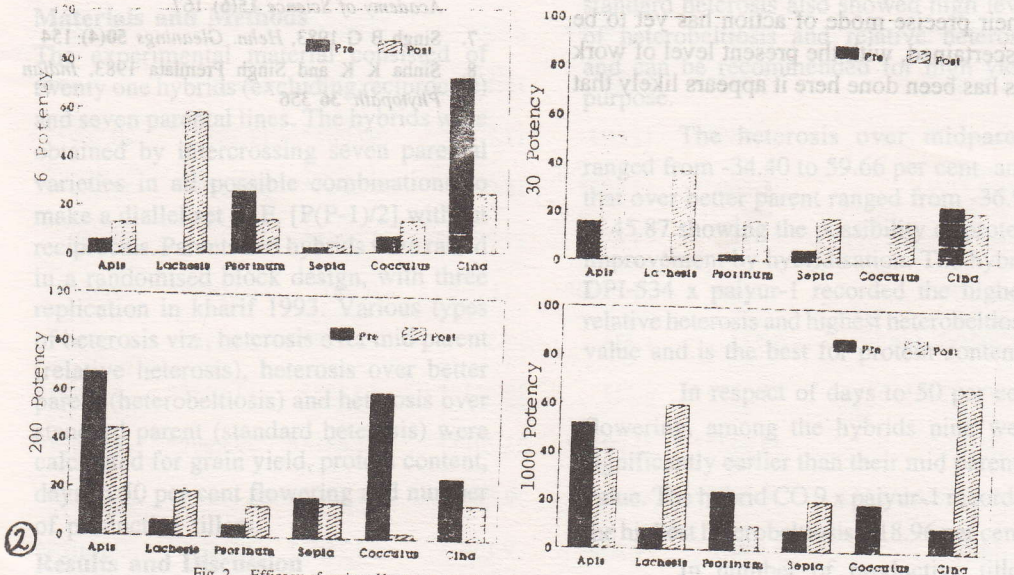

Fig. 2. Efficacy of various Homoeopathic drugs in checking chilli fruit rot caused by *F. equiseti*.

A perusal of data clearly reveals that a positive correlation between the drug potencies, their relative antifungal effects and the disease control can hardly be made as one would have expected with the conventional chemicals as their effects are usually concentration dependent. Such a drug action has also been noted by many workers dealing with homoeo drug[2-5]. This might be because of the possibility of each drug presenting several optima each corresponding to a specific mode of action, thus suggesting a multiple site action of homoeodrugs.

Principle focus of homoeodrug action appears to be the host and not the pathogen. The *in vitro* fungitoxic activities as displayed by many a drug potencies have generally been found to be greatly modified in the infection court. Althoug, their precise mode of action has yet to be ascertained, with the present level of work as has been done here it appears likely that their drug potencies have acted upon the pathogen via host by virtue of their power to inhibit the former through impairing a no. of metabolic activities.

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