"Antifungal Potential of Natural Products against *Fusarium oxysporum*"

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The seed extracts of *Cuminum cyminum*, *Foeniculum vulgare* and *Trachysprmum ammi* were tested for their fungitoxicity against *Fusarium oxysporum.* The seed extracts of *C. cyminum* and *T. ammi* were found most effective which completely inhibit mycelial growth at 50% concentration but it was 75% for *F. vulgare.* The essential oils of *C. cyminum* and *T. ammi* were able to completely inhibit mycelial growth at 200 ul l^{-1} while it was 400 ul l^{-1} for *F. vulgare.* The minimum inhibitory concentration (MIC) of Bavistin, Captan and Thiram were 3000, 4000 and 2500 ul l^{-1} respectively. Thus essential oils were found more effective than seed extracts and fungicides tested.

Key words: Natural Products, seed extracts, essential oils, fungicidal action, *Fusarium oxysporum.*

INTRODUCTION

Synthetic chemicals are mostly used in the control of plant diseases, but due to their residual toxicity and non - biodegradable nature they are known to cause carcinogenicity, teratogenicity (Bajaj and Ghosh, 1975, Lingk, 1991) and pollute the environment, soil and ground water (Shashikant *et al.* 1989). Therefore, scientists are now looking for some alternatives for control of plant diseases. In search of better alternatives natural products are considered to be environmentally safe for control of plant diseases (Beye, 1978).

Large number of higher plants are known to possess fungi toxicity against spore germination and mycelial growth of phytopathogenic fungi (Singh *et al.* 1990, Pandey and Dubey, 1991). Among several metabolites of higher plants, the essential oils, have been reported to be highly effective against different plant pathogens (Pandey and Dubey, 1992). Due to volatility,

ephimeral nature and biodegradability, the flavour compounds of angiosperms will be advantageous if they are developed as fungicides (French, 1985). The following pages record the result of out *in vitro* evaluation of some seed extracts and essential oils against growth of wilt fungus *fusarium oxysporum* and comparison with some synthetic fungicides.

MATERIALS AND METHODS

The aqueous extract (1:2 w/v) of seeds of three plants viz. *Cuminum cyminum, Foeniculum vulgare* and *Trachyspermum ammi* were tested for their fungi toxicity by the poisoned food technique (Grover and Moore, 1962) against *Fusarium oxysporum.* Different concentrations 10, 20, 30, 40, 50, 60, 70, 80% were prepared by mixing PDA medium separately in Petri plates (Pandey and Pant, 1997). These Petri plates were inoculated with disc cut of 7 days old culture of *F. oxysporum* and incubated for 10 days at $25 \pm 2^{\circ}$c. Control set contains only 10 ml of PDA. The fungi toxicity was calculated following Kishore and Mishra (1991) and recorded in terms of percentage mycelial inhibition. Essential oils of the above mentioned plant's seed were extracted by hydro distillation through Clevenger's apparatus (Langenau, 1948) ad their toxicity tested separately at 100, 200, 300, 400 and 500 ul l^{-1} against *F. oxysporum* by usual poisoned food technique in Petri plates using PDA medium. These Petri plates were inoculated with disc cut of 7 days old culture and incubated for 10 days at $25 \pm 2^{\circ}$c. The fungicides Bavistin, Captan and Thiram were tested separately at 1000, 2000, 3000, 4000 and 5000 ul l^{-1} against *F. oxysporum* by poisoned food technique using PDA medium in Petri plates inoculating with disc cut of 7 days old culture. The observations were recorded and calculated following Kishore and Mishra, 1991.

RESULTS AND DISCUSSION

Different concentrations (10, 20, 30, 40, 50, 60, 70 and 80%) of seed extracts of *C. cyminum, F. vulgare* and *T. ammi* were taken to observe their effect on mycelial growth of *F. oxysporum. C. cyminum* and *T. ammi* were found more effective as they completely inhibit the growth at 50% while it was 75% concentration for *F. vulgare* (Fig. 1). Similarly the essential oils of *C. cyminum* and *T. ammi* were more effective in completely inhibit the mycelial growth at 200 ul l^{-1} while it was 400 ul l^{-1} for *F. vulgare* (Fig. 2). Among synthetic fungicides Bavistin, Captan and Thiram were completely inhibit the growth of test fungus at 3000, 4000 and 2500 ul l^{-1} respectably for the same purpose (Fig. 3).

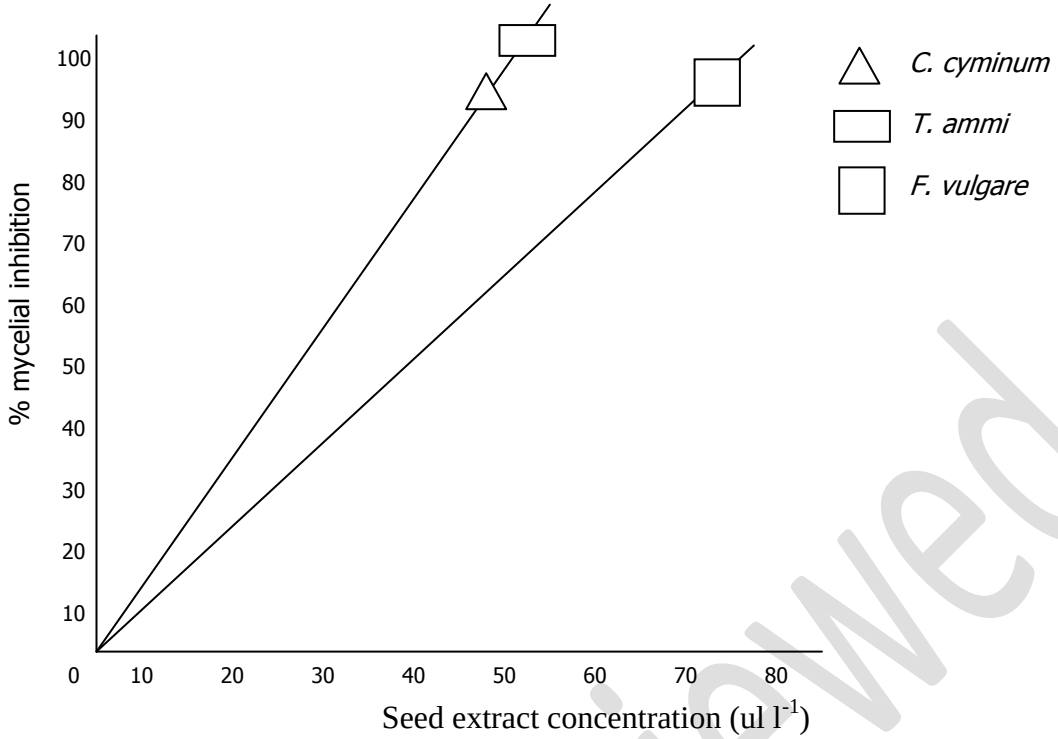


Fig 1. Effect of some seed extract on mycelial growth of *F. oxysporum*

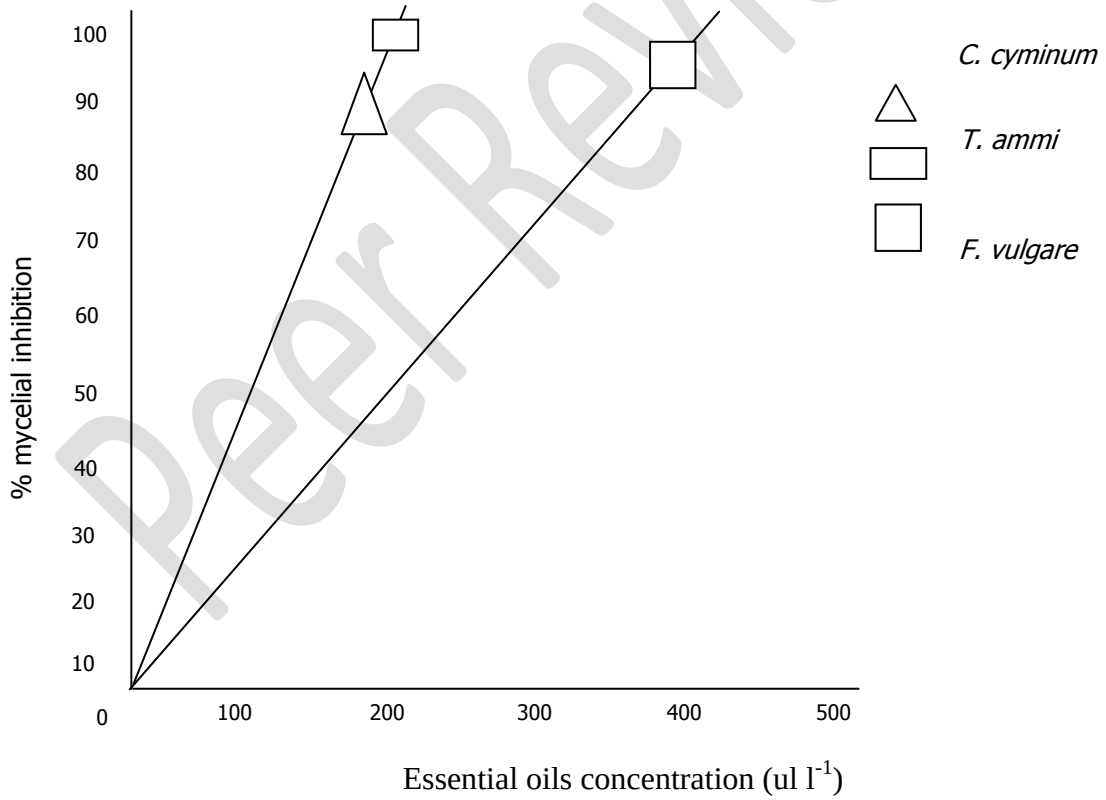
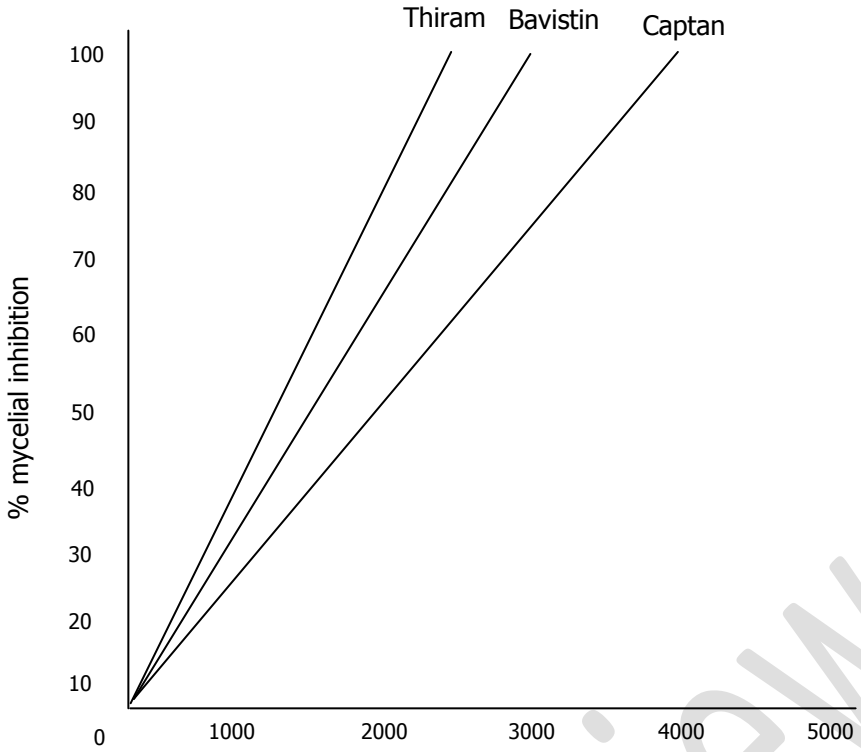


Fig 2. Effect of some essential oils on mycelial growth of

F. oxysporum



Fungicides concentration (ul l^{-1})

Fig 3. Effect of some fungicides on mycelial growth of *F. oxysporum*

It is thus clear that essential oils are far superior than crude extracts and synthetic fungicides, in completely inhibit the mycelial growth of the fungi.

This findings opens the possibility that both the crude extract as well as essential oils from *C. cyminum, F. vulgare* and *T. ammi* could be used for seed and soil treatment of control of soil borne diseases due to *F. oxysporum.* The essential oils are particularly note worthy because they are effective at very low concentrations.

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