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MANAGEMENT OF LINSEED WILT BY CERTAIN ESSENTIAL OILS

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Received : 8.8.15; **Accepted** : 7.9.15**ABSTRACT**

The essential oils of ten Angiosperm plants species including herbs, shrubs and tree; extracted by Clevenger Hydrodistillation method. Three different concentrations of oil (250 mg/ml, 500 mg/ml and 1000 mg/ml) were screened for linseed wilt pathogen (*Fusarium oxysporum* f. sp. *lini*). All were effective in inhibiting the growth of the pathogen *in vitro*. As the concentration of oils increased the inhibition percentage increased more or less proportionately. *Azadirachta indica* and *Cymbopogon jwarancusa* essential oils at 1000mg/ml controlled the fungal growth to cent percent level. *Hyptis suaveolense*, *Majorana hortensis* and *Nepeta hindostana* checked growth of pathogen more than 90% while other five viz. *Eucalyptis citriodora*, *Mentha piperita*, *Murraya Koenigii*, *Ocimum basilicum* and *Vetiveria zizaniodes* exhibited 77-85% check on the fungus. All the oils may be utilized to control the wilt disease as eco-friendly effective measure.

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KEY WORDS : Essential oil, Inhibition, Linseed wilt.

Introduction

Linseed is an important oilseed crop in India popular among farmers due to its technical grade vegetable oil and medicinal uses. Fibre yielding property from its stalk is an added advantage of this crop. Linseed is purely a 'rabi' crop. It is often grown on marginal and submarginal rainfed soils as sole or in mixture with others. There has been a traditional belief that linseed grown on the same soil for several years makes the soil so called 'linseed sick'.

The experimental finding have proved the falsity of this old belief and it has been shown that the strains of seed used, the climatic and seasonal conditions are of more importance for incidence of wilt and not soil being 'linseed sick'. The crop suffers severly from *Fusarium oxysporum* f. sp. *lini*⁶. The present investigation was undertaken to find out antifungal property of essential oils against the above wilt pathogen.

Materials and Methods

The leaves and roots were collected from locally available aromatic plants viz. *Azadirachta indica*, *Cymbopogon jwarancusa*, *Eucalyptus citriodora*, *Hyptis suaveolens*, *Mentha piperita*, *Majorana hortensis*, *Murraya koenigii*, *Nepeta hindostana*, *Ocimum basilicum* and roots of *Vetiveria zizanioides*; these fresh leaves/roots were put to hydrodistillation using Clevenger's apparatus¹. The essential oil recovered from the above leaves/roots were collected in air tight presterilized glass bottles. This essential oil (w/v) was used to prepare 1000, 500 and 250 mg/ml concentration in P.D.A. medium.

Medium amended with essential oil according to food poisoned technique⁴ was sterilized at 15 lbs/psi pressure for 20 min. This was poured in presterilized petridishes and was allowed to solidify for 12 hrs. Each plate was then inoculated with 5mm disc of mycelial culture taken from periphery of 7 days old culture of *F. oxysporum*

f. sp. *lini* growing on P.D.A. medium. Inoculated petridishes were incubated at $25 \pm 1^\circ\text{C}$ in a BOD incubator. Colony diameter (two diagonals) was measured after 7 days of incubation. Proper control were maintained using plain distilled water instead of essential oils. Each experiment was replicated thrice. Percent mycelial inhibition was calculated as per formula³:-

$$\text{Percent mycelial inhibition} = \frac{dc - dt}{dc} \times 100$$

Where dc = Mean colony diameter of control set,
dt = Mean colony diameter of treatment set.

Result and Discussion

All the essential oils experimented against the wilt causing fungus (*Fusarium oxysporum* f. sp. *lini*) inhibited its growth at all concentrations used. As the concentration of oil increased, its antifungal

property also enhanced.

Azadirachta indica and *Cymbopogon jwarancusa* essential oils at 1000mg/ml controlled the fungal growth to the extent of 100 percent. *Hyptis suaveolens*, *Majorana hortensis* and *Nepeta hindostana* checked growth of pathogen 99.2, 91.0 and 92 % respectively at the same concentration. Other five viz. *Eucalyptis citriodora*, *Mentha piperita*, *Murraya Koenigii*, *Ocimum basilicum* and *vetiveria zizanioides* showed antifungal property in the range of 77-85%.

Essential oils from *Mentha piperita*, *M. spicata* and *Ocimum sanctum* were effective to control apple fruit rot caused by *Penicillium expansum*⁷. *Ocimum sanctum* essential oil was found effective against *Rhizoctonia solani* and *Fusarium oxysporum*⁵ *Vetiveria zizanioides* essential oil was also reported to check the lentil wilt fungus⁸. Antifungal activity of extract from bitter apicort Kernel press cake was found to check the growth of *fusarium* sp. *Sclerotium* sp. and *macrophormina* sp⁶.

TABLE-1: Percent inhibition of *F. oxysporum* f. sp. *lini* in different concentrations of essential oils of different Angiospermic species evaluated by food poisoned technique⁴ in vitro.

S. No.	Name of the plants	Plants Parts used for extracts	Percent inhibition of colony of <i>Fusarium oxysporum</i> f. sp. <i>lini</i> at different concentration (mg/ml)		
			250mg/ml	500mg/ml	1000mg/ml
1.	<i>Azadirachta indica</i>	leaves	80.00	96.90	100
2.	<i>Cymbopogon jwarancusa</i>	Leaves	82.24	97.73	100
3.	<i>Eucalyptus citriodora</i>	Leaves	34.0	56.0	77.0
4.	<i>Hyptis suaveolens</i>	Leaves	73.6	82.9	99.2
5.	<i>Majorana hortensis</i>	Leaves	55.91	78.12	91.0
6.	<i>Mentha piperita</i>	Leaves	34.00	56.00	79.00
7.	<i>Murraya koenigii</i>	Leaves	33.11	55.01	78.2
8.	<i>Napeta hindostana</i>	Leaves	54.81	77.91	92.0
9.	<i>Ocimum basilicum</i>	Leaves	37.00	58.00	78.00
10.	<i>Vetiveria zizanioides</i>	Roots	38.0	63.0	85.00

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