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***Research article***

# EFFECT OF DIFFERENT ORGANIC AMENDMENTS ON *Fusarium oxysporum* f.sp *ciceri* CAUSING CHICK PEA WILT

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**ABSTRACT:** Chickpea (*Cicer arietinum* L.) is one of the most important legumes grown in Asia. Though the area under this crop is more, the average yield per hectare is low because of several biotic and abiotic factors. Among them, the wilt caused by *Fusarium oxysporum* f.sp. *ciceri* is most destructive seed and soil borne disease. (Haware *et al.*, 1986) which threatens successful cultivation of chickpea and causes severe losses in chickpea growing areas. (Grewal *et al.*,1974b and Singh *et al.*,1977.) The organic amendments *viz.*, saw dust, ground nut cake, FYM, soybean cake, cotton cake were used in three concentrations 0.1%, 0.2%, 0.3% . The highest per cent growth of inhibition was observed in soybean cake 0.3% (32.96%), followed by groundnut cake 0.3% (29.63%). The lowest per cent growth inhibition was observed in saw dust 0.1% (06.47%).
**Key words:** *Cicer arietinum*, wilt, *Fusarium oxysporum* f. sp. *ciceri*, Organic amendments, Saw dust, Ground nut cake, FYM, Soybean cake, Cotton cake.

## INTRODUCTION

Chickpea (*Cicer arietinum* L.) is the world's third most important pulse crop, after dry beans (*Phaseolus vulgaris* L.) and dry peas (*Pisum sativum* L.) (Vishwadhar and Gurha, 1998). Although, chickpea is predominantly consumed as a pulse, dry chickpea is also used in preparing a variety of snack foods, sweets and condiments and green fresh chickpeas are commonly consumed as a vegetable. *Fusarium* wilt caused by *Fusarium oxysporium* Schlecht and Emend Synd. And Hans. is one of the major soil / seed borne disease of chickpea (*C. arietinum* L.). At national level the yield losses encountered due to wilt may vary between five to ten per cent (Singh and Dahiya, 1973). The pathogen is both seed and soil borne; facultative saprophyte and can survive in soil up to six years in the absence of susceptible host (Haware et al. 1978 and 1986). Considering the nature of damage and survival ability of the fungus, use of resistant varieties is the only economical and practical solution. Most of the resistant varieties have been found to be susceptible after some years because of breakdown in their resistance and evolution of variability in the pathogen. The pathogen with high saprophytic ability can survive in soil for a pretty long period during which it may have to go through different environmental stresses and biological competition which may lead to the existence of physiologic races. Thus there is considerable potential of augmenting the yield of chickpea by minimizing the losses inflicted by the biotic factors such as wilt. Keeping in view the importance of disease, socio-economic status of the crop and the inadequate research work carried out on the disease. The present investigations were undertaken to formulate promising disease management strategies with following objectives, management of chickpea wilt by Organic amendments.

## MATERIAL AND METHODS

The following materials were used during the present investigations:

**Organic soil amendments**

Various oilseed cakes were obtained from the local market, Akola viz., Saw dust, ground nut cake, soybean cake, cotton cake Groundnut cake and FYM

## Methods

### *In vitro* assay of Organic amendments against *Fusarium oxysporum* f. sp *ciceri*

The effect of five Organic amendments was evaluated *in vitro* against *Fusarium oxysporum* f.sp *ciceri* by employing "Poison Food Technique". The requisite amount of each organic amendment was added to an autoclaved potato dextrose agar to obtain the desired concentrations. The same medium without the organic amendments served as control. The medium was poured into 90mm petriplates in 3 replicates and after solidification, each plate was inoculated with a 6mm mycelial disc of test fungus. The inoculated petriplates were incubated for 7 days at $27\pm2^0$C. After incubation, radial growth was measured. Per cent inhibition in growth was calculated from the mean diameter after the days when petriplates in control were fully covered with mycelial growth of pathogen as per following formula.

Per cent inhibition $= C - T/C \times 100$

Where

C=Growth of test fungus in control in mm.

T=Growth of test fungus in treatment in mm.

## RESULT AND DISCUSSION

The data presented in Table1 showed that highest per cent growth of inhibition was observed in soybean cake 0.3% (32.96%), followed by groundnut cake 0.3% (29.63%). The lowest per cent growth inhibition was observed in saw dust 0.1% (06.47%).

**Table 1: Efficacy of organic amendments on growth of *Fusarium oxysporum* f.sp. *ciceri.***

| Treatments | Organic amendment/ Conc | Mean colony diameter(mm) | | | Per cent growth inhibition | | |
|---|---|---|---|---|---|---|---|
| | | 0.1% | 0.2% | 0.3% | 0.1% | 0.2% | 0.3% |
| $T_1$ | Saw dust | 84.17 | 79.50 | 74.83 | 06.47 | 11.66 | 16.85 |
| $T_2$ | Groundnut cake | 73.00 | 70.00 | 63.33 | 18.88 | 22.22 | 29.63 |
| $T_3$ | FYM | 69.67 | 64.00 | 63.67 | 22.58 | 28.88 | 29.25 |
| $T_4$ | Soybean cake | 72.50 | 67.83 | 60.33 | 19.44 | 25.18 | 32.96 |
| $T_5$ | Cotton cake | 77.67 | 74.00 | 69.83 | 13.70 | 17.77 | 22.41 |
| $T_6$ | Control | | 90.00 | | 0 | 0 | 0 |
| 'F test | Sig. | | Sig. | Sig. | | | |
| SE(m)± | 0.33 | | 0.30 | 0.40 | | | |
| CD (P=0.01) | 1.51 | | 1.35 | 1.80 | | | |

The similar finding were observed by Raj and Singh (1996) observed in pot culture that the oilcakes of neem, mustard, mahuva, coconut, linseed and sesamum at various concentrations 0.25, 0.5, 1.0 and 2.0% against radial growth of *Fusarium*. Neem, mustard and mahuva oil cakes were found most effective in reducing fungal growth. The neem cake was found most effective in controlling wilt incidence. Padmodaya and Reddy (1999) studied the effect of six organic amendments namely neem cake, pongamia cake, pongamia fresh and dry leaves, Eucalyptus dry leaves and FYM against seedling disease of tomato caused by *Fusarium. oxysporum*. f.sp. *lycopersici* at three concentrations and two incubation period of decomposition, in pot culture under green house condition. Mathur *et al*. (2006) conducted field trails during *Rabi* season from 2001-2004 for management of wilt disease, induced by *Fusarium schlecht* on fenugreek through soil amendment with three oil cakes *viz.*, mustard, sesamum and cotton with vermicompost and FYM under inoculated condition. Mustard and sesamum oil cakes with vermicompost were found significantly superior in reducing the disease incidence. Ha and Huang (2007) in greenhouse evaluated 10 organic materials for control of asparagus bean wilt caused by *Fusarium oxysporum* f.sp. *tracheiphilum*.

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