



Evaluation of some Organic extracts in *In vitro* to control *Fusarium solani* causing Chilli Wilt

M.G YELMAME*¹, B.P. MEHTA², A.J.DESHMUKH³ AND V.A.PATIL⁴

Department of Plant Pathology NMCA, NAU., Navsari, India.

*corresponding author mahesh_yelmame@yahoo.co.in

ABSTRACT

Investigation on wilt (*F. solani*) of chilli (*C.frutescens* L.) under south Gujarat conditions was carried out in Dept, of Plant Pathology Lab., N. M. College of Agriculture, NAU, Navsari in 2004 to find out suitable management strategies. It is difficult to control *F. solani* as it is having soil inhabiting nature. This led to trials on the use of organics to control the pathogen. The extracts of different organics of neem cake, mustard cake, FYM, groundnut cake, poultry manure, press mud, castor cake and coconut cake were tested against *F. solani* by poisoned food technique in *in vitro*. Least growth of the pathogen was recorded in the extracts of neem cake showing excellent inhibitory effect *i.e* 59.8 % against *F. solani*. Next best in order of merit was mustard cake (52.61 %) followed by FYM (49.40 %), groundnut cake (44.80 %), poultry manure (42.29 %), and least by other cakes.

KEYWORDS

Chilli, *Fusarium solani*, organic extract, Wilt.

INTRODUCTION

Chilli (*Capsicum frutescens* L.) is one of the most important vegetable crop grown in India for the value of its fruits in making spice and condiments. India is one of the major chilli growing countries, producing 9.21 lakh tonnes of ripe dry chillies with an area of 8.92 lakh hectares¹. In Gujarat, the area under chilli crop is about 27,110 hectares with an annual production of about 24,570 metric tonnes of red dry chillies². The area is mostly distributed in Anand, Kheda, Himmatnagar, Surat, Navsari and Valsad districts. In south Gujarat the crop is grown in an area of 2200 hectares mainly for green chillies during post rainy

seasons. Chilli is attacked by several fungal diseases. During the survey, chilli crop was found severely affected by wilt at Navsari and surrounding villages. It was also found at vegetable research farm. Looking to the seriousness of the disease present investigation was undertaken to manage the disease by use of organics due to soil borne nature of the pathogen.

MATERIALS AND METHODS

The aqueous extracts of different organic materials viz., neem cake, mustard cake, FYM, groundnut cake, poultry manure, press mud, castor cake and coconut cake were prepared by suspending 30 g of each organic material in 150 ml



Evaluation of some Organic extracts in *In vitro* to control *Fusarium solani* causing Chilli Wilt

sterile distilled water in flask and left for 25 days. The flasks were shaken on alternate day for thorough mixing and dissolution of the content. After 25 days, the flasks were thoroughly shaken and content were filtered through double layered muslin cloth and autoclaved at 1.2 kg cm⁻² pressure for 20 minutes. The sterile extracts were used for testing their inhibitory effect on *F. solani* *in vitro* by poisoned food technique³. The autoclaved extracts were individually added in previously sterilized melted and cooled potato dextrose agar medium @ 10 per cent v/v at the time of pouring in Petri plates and mixed thoroughly. All the plates were incubated at room temperature at (27 + 2°C) after placing the 5 mm disc of actively growing 10 days old pure culture of *F. solani*. Four repetitions were kept for each treatment. Medium without organic extract served as control.

The radial growth of the test organism and pathogen was measured after 10 days and the per cent inhibition was calculated as per the following formulae suggested⁴.

$$\% \text{ Growth Inhibition} = \frac{C-T}{C} \times 100$$

Where,

C = Growth of pathogen in control after incubation

T = Growth of pathogen in treatment after incubation

RESULTS AND DISCUSSION

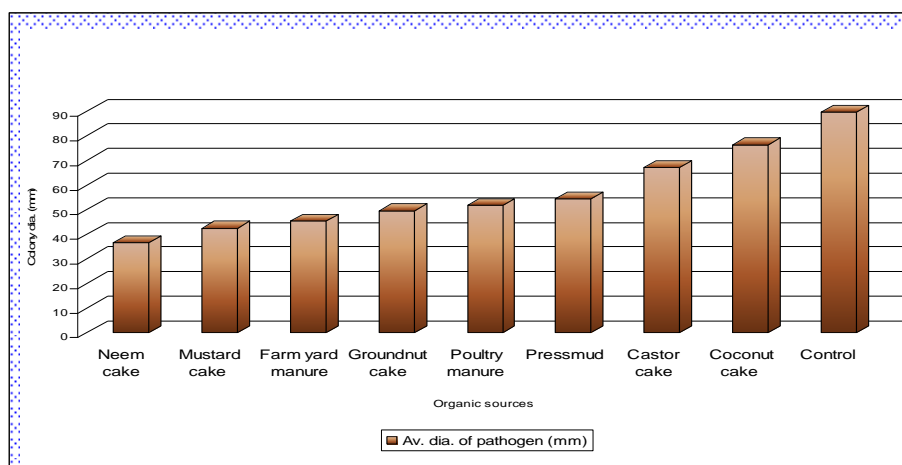
The results presented in (Table-1 & Fig-1) indicated that out of eight organic sources tested, all showed significantly more inhibitory effect against the fungus. Among all the organic sources, significantly lower growth was revealed in the extract of neem cake (36.56 mm). Next best in order of merit was mustard cake (42.50 mm) followed by FYM (45.38 mm), groundnut cake (49.50 mm), poultry manure (51.75 mm), press mud (54.44 mm), castor cake (67.25 mm) and coconut cake (76.44 mm).

Maximum inhibition of the growth of *F. solani* was recorded in neem cake (59.23%). Next best in the order of merit was mustard cake (52.61%) followed by FYM (49.40%), groundnut cake (44.80%), poultry manure (42.29%), press mud (39.30%), castor cake (25.01%) and coconut cake (14.77%). Neem cake, mustard cake, saw dust and groundnut cake for *F. solani*⁵; Neem cake for *F. solani*⁶; Mustard cake and groundnut cake for *F. oxysporum* f.sp. *lycopersici*⁷; FYM and neem cake for *F. oxysporum* f.sp. *lycopersici*.⁸ were reported very effective by earlier workers.

Evaluation of some Organic extracts in *In vitro* to control *Fusarium solani* causing Chilli Wilt

Table 1.
Effect of various organic sources on the growth of *F. solani* in vitro

Sr. No.	Organic sources	Av. dia. of pathogen (mm)	Growth inhibition (%)
1.	Neem cake	36.56	59.23
2.	Mustard cake	42.50	52.61
3.	Farm yard manure	45.38	49.40
4.	Groundnut cake	49.50	44.80
5.	Poultry manure	51.75	42.29
6.	Press mud	54.44	39.30
7.	Castor cake	67.25	25.01
8.	Coconut cake	76.44	14.77
9.	Control	89.69	-
	S.Em. \pm	0.39	
	C.D. at 5%	1.14	
	C.V. %	1.38	



Graph 1. Effect of various organic extracts on the growth of *F. solani* in vitro.

CONCLUSION

Neem cake and mustard cake proved superior and inhibited the growth of *F. solani* in vitro. Hence it can be recommended after rigorous testing in the field against the pathogen for management of wilt of chilli.



Evaluation of some Organic extracts in *In vitro* to control *Fusarium solani* causing Chilli Wilt

ACKNOWLEDGEMENT

The authors express their gratitude to Director of research, Dean P.G. Studies, Navsari Agric. University, Navsari-Gujarat for providing necessary facilities during the present investigations.

REFERENCES

1. Anonymous (2000). Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, 2000.
2. Anonymous (2004). Directorate of Horticulture, Gujarat State, Gandhinagar.
3. Grover, R.K. and Moore, D. (1962) Toximetric studies of fungicides against the brown rot organisms, *Sclerotium fruiticola* S. *laxa*. *Phytopath.*, **52**: 876-880.
4. Asalmol, M. N., Sen, B. and Awasthi, J. (1990). Role of temperature and pH in antagonism of *Aspergillus niger* and *Trichoderma viride* against *Fusarium solani*. *Proc. All India Phytopath. Soc.*, (Western Zone). On Bio-control of plant pathogen, pp. 11-13.
5. Chakrabarti, S. K. and Sen, B. (1991). Suppression of *Fusarium* wilt of muskmelon by organic soil amendments. *Indian Phytopath.*, **44**(4) :476-479.
6. Srivastava, A. K. and Singh, R. B. (1991). Use of organic amendment against *Fusarium solani* and *Meloidogyne incognita* on *Phaseolus vulgaris*. *New Agriculturist*, **2** (1): 63-64.
7. Raj, H. and Kapoor, I. J. (1996). Effect of oil cake amendment of soil on tomato wilt caused by *F. oxysporum* f. sp. *lycopersici*. *Indian Phytopath.*, **49** (4): 355-361.
8. Padmodaya, B. and Reddy, H. R. (1999). Effect of organic amendments on seedling disease of tomato caused by *Fusarium oxysporum* f. sp. *lycopersici*. *J. Mycol. Pl. pathol.* **29**(1):38-41.