

Evaluation of Plant Extracts for the Control of *Pestalotiopsis* Blight in *Jatropha curcas*

L. TIPPESHI, A. RAJESH GAVAL, C. NAGARAJIAH AND L. VENKATESH

*University of Agricultural Sciences, GKVK
 Bangalore 560065, India*

Abstract

Jatropha curcas, an important bio-diesel crop is infected by many diseases. *Pestalotiopsis* blight is becoming severe now-a-days resulting in were found as most destructive in both nurseries and plantations causing economic losses. Among 11 common plant extracts tested by employing food poisoning technique under laboratory revealed, 10% leaf extract of *Lantana camara* ranked first in maximum mycelial growth suppression up to 89% which was followed by 5%. Fresh leaf extract of *Prosopis juliflora* (5—10%) stood second in its effectiveness.

Key words : Bi-odiesel, Leaf blight and plant extracts.

Jatropha curcas, L; belonging to the family Euphorbiaceae, is a multipurpose, drought resistant large shrub or small tree. It is a large soft wooded deciduous shrub, hardy, quick growing crop which can be established easily without much care. It grows in a number of climatic zones in tropical and subtropical regions of the world and can be grown in areas of low rain full (600 mm per year) and in problematic sites (1). It is cultivated mainly for production of seeds for bio-diesel purpose. Forceful cultivation of this crop has resulted in the occurrence of many diseases. Due to commercialization through extensive nursery and plantation networks diseases and pests become a bottle neck. Among the diseases leaf blight caused by *Pestalotiopsis versicolor* cause huge loss through premature defoliation, flower and fruit drop. Looking to seriousness of problem, investigation on laboratory evaluations of different fungicides and plant extracts was under taken to plan for effective field management trial.

Methods

In the laboratory level management studies, evaluation of different plant extracts was done against *P. versicolor* causing leaf blight for effective planning of on-farm evaluation trials. A poisoned food technique described by Nene and Thapliyal (2) was employed.

In Vitro Efficacy of Plant Extracts

This study was carried out to evaluate the fresh leaf extract of different plant species (*Eucalyptus teriticornis*, *Vitex nigundo*, *Chromoeana odoratum*, *Lantana camara*, *Prosopis juliflora*, *Jatropha curcas*, *Azardirachta indica*, *Pongamia pinnata*, *Argemone maxicane* and *Glyricdia sepium*) for the possible presence of fungi-toxicant properties against *Pestalotiopsis versicolor*. These were tested at 5 and 10% concentrations. Each of the concentrations was replicated thrice and the experiment laid out was in factorial completely randomized design.

The leaves as specified above were collected in polythene bags from the nearer forest areas and brought to laboratory and fresh extracts were prepared for carrying out *in vitro* efficacy test. For the preparation, fresh leaves were washed with distilled water, 25 grams of leaf material was added to 50 ml sterilized distilled water and crushed by using mixer grinder. Then, the extract was filtered through Whatman no.1 filter paper and the filtrate thus obtained was treated as 50% solution (1 : 2). To obtain concentration of 5 and 10 per cent, 10 and 20 ml of extracts respectively were added to separate conical flasks of 250 ml containing 100 ml of sterilized PDA. The poisoned media thus prepared was poured to petriplates under aseptic condition. PDA without plant extract was maintained as check.

Table 1. *In vitro* efficacy of different plant extracts on radial growth of *Pestalotiopsis versicolor* causing leaf blight in *Jatropha curcas*. * Figures in the parentheses indicate transformed arcsine values.

Treatment detail	Per cent inhibition Concentration (%)		Mean inhibition (%)
	5	10	
T ₁ Control	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
T ₂ Fresh leaf extract of <i>Eucalyptus</i> <i>teriticornis</i>	16.72 (24.12)	22.12 (27.97)	19.43 (26.13)
T ₃ Fresh leaf extract of <i>Vitex nigundo</i>	5.98 (14.06)	19.93 (26.49)	12.96 (21.05)
T ₄ Fresh leaf extract of <i>Chromoleana</i> <i>odoratum</i>	13.69 (21.64)	12.62 (20.79)	13.15 (21.13)
T ₅ Fresh leaf extract of <i>Lantana camera</i>	87.37 (69.12)	89.15 (70.63)	88.26 (69.82)
T ₆ Fresh leaf extract of <i>Prosopis</i> <i>juliflora</i>	56.91 (48.97)	64.02 (53.13)	60.46 (51.00)
T ₇ Fresh leaf extract of <i>Jatropha curcas</i>	14.04 (21.97)	13.55 (21.56)	13.79 (21.72)
T ₈ Fresh leaf extract of <i>Azadirachta</i> <i>indica</i>	27.06 (31.31)	32.63 (34.82)	29.64 (32.96)
T ₉ Fresh leaf extract of <i>Pongamia</i> <i>pinnata</i>	55.86 (48.33)	58.57 (49.89)	57.21 (49.14)
T ₁₀ Fresh leaf extract of <i>Argemone</i> <i>maxicana</i>	26.25 (30.79)	38.95 (38.59)	32.55 (34.76)
T ₁₁ Fresh leaf extract of <i>Glyricidia</i> <i>sepium</i>	21.37 (27.49)	21.69 (27.69)	21.53 (27.63)
Mean treatment effect	29.56 (32.90)	33.93 (35.61)	
	SEm ± CD at 1%		
Concentration	0.44	1.62	
Treatment	1.04	3.82	
Concentration × Treatment	1.48	4.89	

Results and Discussion

Evaluation of Plant Extracts

It is evident that there was significant difference among plant extracts, concentrations and interactions at both 5 and 10 % with respect to mycelial growth inhibition (Tables 1 and 2). Among ten plant extracts

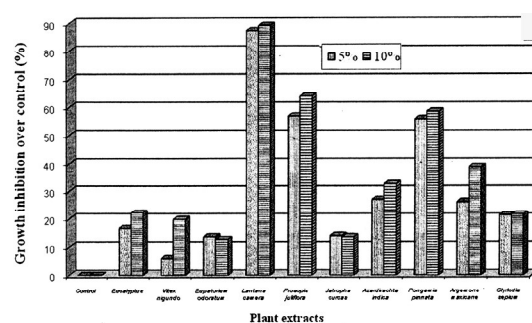


Figure 1. *In vitro* evaluation of plant extracts against *Pestalotiopsis versicolor*.

(5 and 10%). Fresh leaf extract of *Lantana camera* expressed maximum growth inhibition (87.37 and 89.15%) followed by fresh leaf extract of *Prosopis juliflora*, 55.86 and 58.57% and Fresh leaf extract of *Pongamia pinnata*; 55.86 and 58.57% at 5 and 10% concentrations, respectively. Least inhibition was observed in fresh leaf extract of *Vitex nigundo*; 5.98 and 19.93% at 5 and 10% concentrations, respectively. Presence of alkaloids, phenols and some fungi toxic substances like lantanine might have contributed for inhibition of fungal growth. The present findings receive support from claim of Mamatha and Ravikumar (3) who have recorded the effectiveness of leaf extract on *Lantana camera* in inhibiting the *Fusarium solani* a leaf blight causing pathogen of *Terminalia catappa*. Even the effectiveness of fresh leaf extract of *Prosopis juliflora* (10%) in the growth inhibition of *Colletotrichum gleosporoides* and a causal agent of leaf spot and twig blight of neem have been highlighted (4).

References

1. Punia M. S., R. S. Kureel and A. Pandey. 2006. Status and potential of tree borne oilseeds in biofuel production of India. *Ind. J. Agrofor.* 8 : 80—86.
2. Nene Y. L. and P. N. Thapliyal. 1993. Inhibition of plant pathogens by higher plant substances. *J. Sci. and Indust. Res. (India)*. 26 : 289—299.
3. Mamatha T. and V. Ravikumar. 2004. Evaluation of fungicides and plant extracts against *Fusarium solani* leaf blight in *Terminalia catappa*, *J. Mycol. Pl. Path.* 34 : 306—307.
4. Balachandra H. C. 2003. *Studies on leaf spot and twig blight of Neem (Azadirachta indica A. Juss)*. M. Sc. thesis, Univ. Agric. Sci. Dharwad, India.