IRJSE International Research Journal of Science & Engineering
Int. Res. J. of Science & Engineering, 2018; Special Issue A6 : 43-45
ISSN: 2322-0015
SJIF Impact Factor 6.68
UGC Approved Journal No. 63628
RESEARCH ARTICLE **OPEN ACCESS**

Antifungal activity of *C Alotropis gigantea* leaf extract against seed-borne pathogenic fungi

Pawar NT, Pawar BT and Sawant RJ

Research center in Botany, Shri Muktanand College, Gangapur, Dist. Aurangabad – 431 109.
E-mail: drbtpawar@gmail.com

Manuscript Details

Available online on http://www.irjse.in
ISSN: 2322-0015

Editor: Dr. Arvind Chavhan

Cite this article as:
Pawar NT, Pawar BT and Sawant R. Antifungal activity of C Alotropis gigantea leaf extract against seed-borne pathogenic fungi, *Int. Res. Journal of Science & Engineering*, 2018; Special Issue A5: 43-45.

ABSTRACT

Plant extracts are being used to control the diseases since last several years. *Calotropis gigantea* leaf extract are reported to exhibit antibacterial and antifungal activity in the literature. It was found to be effective against seed-borne pathogenic fungi. The *in-vitro* studies have been performed by using cup-plate method to examine the antifungal activity of *C. gigantea* leaf extract. It was screened against 5 seed-borne pathogenic fungi *viz. Alternaria alternata, Aspergillus niger, Curvularia lunata, Fusarium moniliforme* and *Trichoderma viride.* Out of them, antifungal activity of *C. gigantea* leaf extract against *C. lunata* was found maximum (Mean activity zone - 19.33 mm) followed by *A. alternata* (Mean activity zone - 17.67 mm); while minimum activity was observed against *A. niger* (Mean activity zone - 14.67 mm). *C. gigantea* leaf extract can possibly be exploited in the management of seed-borne pathogenic fungi to prevent biodeterioration of seeds in an eco-friendly way.

Key Words: Antifungal activity, *Calotropis gigantea,* leaf extract, Seed-Borne Pathogenic Fungi

INTRODUCTION

Fungal diseases are known to cause great damages all over the world. Different species of *Alternaria, Aspergillus, Ceratobasidium, Cercospora, Cochliobolus, Curvularia, Dreschslera, Fusarium, Gaeumannomyces, Microdochium, Penicillium, Pyricularia, Pythium, Rhizoctonia, Rhizopus, Sclerophthora, Trichoderma* and *Tricoconella* are most common associates of seeds all over the world, causing pre- and post-infections and considerable quality losses *viz.* seed abortion, seed rot, seed necrosis, reduction or elimination of germination capacity, seedling damage and their nutritive value have been reported [1-3]. Seed treatment is the safest and the cheapest way of control of seed-borne fungal diseases and to prevent biodeterioration of grains [4, 5].

Even though effective and efficient control of seed-borne fungi can be achieved by the use synthetic chemical fungicides, the same cannot be applied to grains for reasons of pesticide toxicity [6]. The toxic effect of synthetic chemicals can be overcome, only by persistent search for new and safer pesticides accompanied by wide use of pest control methods, which are eco-friendly and effective [7]. Green plants represent a reservoir of effective chemotherapeutants and can provide valuable sources of natural pesticides [8, 9]. Kareem *et al.,* [10] studied antimicrobial effect of ethanol, aqueous and chloroform extracts of leaf and latex of *C. procera* on six bacteria namely, *Escherichia coli, Staphylococcus aureus, Staphylococcus albus, Streptococcus pyogenes, Streptococcus pneumoniae* and three fungi: *A. niger, A. flavus, Microsporium boulardii and one yeast Candida albicans* were determined using agar well diffusion and paper disk methods. The results revealed that ethanol was the best extractive solvent for antimicrobial properties of leaf and latex of *C. procera.* The results therefore established a good support for the use of *C.procera* in traditional medicine.

METHODOLOGY

Fungal pathogens were isolated on PDA medium from different stored seeds. Identified fungal cultures were isolated and pure cultures of each fungi made separately on PDA slants. These pure cultures were used for further investigation.

a) Preparation of stem extracts: Leaves of *C. gigantea* were collected, thoroughly washed with tap water and then rinsed with sterile distilled water. Leaves weighing 20 gm were crushed in electric mixer grinder with 50 ml sterile distilled water. Then it was centrifuged for 20 min at –4°C at the 11000 rpm speed.

b) Cup Plate Method: 20 ml of PDA media was poured in sterilized petridishes (9 cm diameter) and allowed to solidify. Then pure cultures of fungi were streaked out in regular intervals on the media poured in petridishes. In the centre of the medium, a cup cavity of 8 mm diameter was made with sterilized No. 4 cork borer. This cup was filled with 0.1 ml of the seed extract [11]. The petridishes were incubated for 6 days at 30±2°C temperature and the observations were recorded as diameter of inhibitory zone in mm. Cup plate filled with sterile distilled water was used as control in all the experiments. All the experiments were in triplicate and mean has been considered in observation table.

RESULTS AND DISCUSSION

The antifungal activity of leaf extract of *C. gigantea* against 5 seed-borne fungi is presented in table 1 as zone of inhibition (in mm). It was observed from table 1 that antifungal activity of *C. gigantea* maximum antifungal activity was recorded against *C. lunata* (Mean activity zone - 19.33 mm) followed by *A. alternata* (Mean activity zone - 17.67 mm); while minimum activity was observed against *A. niger* (Mean activity zone - 14.67 mm). While good antifungal activity was also recorded against remaining two seed-borne fungi i.e. *F. moniliforme* and *T. viride* showing Mean activity zone as 16.67 mm and 16.33 respectively. Verma *et al.,* [12] reported pharmacological activity of *C. gigantea*. They reported that *C. gigantea* contain chemical constituents like cardenolides, flavonoids, terpenes, pregnanes and a nonprotein amino acid. The root bark contains α-amyrin, β-amyrin, taraxasterol and its ψ-isomer

Table 1: Antifungal activity of *C. gigantea* leaf extract against seed-borne fungi

Sr. No.	Name of the Fungi	Zone of Inhibition (in mm)			
		Exp. A	Exp. B	Exp. C	Mean
01	*Alternaria alternata*	17	20	16	17.67
02	*Aspergillus niger*	12	15	17	14.67
03	*Curvularia lunata*	18	19	21	19.33
04	*Fusarium moniliforme*	18	17	15	16.67
05	*Trichoderma viride*	15	17	17	16.33

taraxasteryl isovalerate, taraxasteryl acetate, gigantin, giganteol, isogiganteol, β-sitosterol and wax. Hence during the present investigation, *in-vitro* studies have been performed by using cup-plate method to examine the antifungal activity of *C. gigantea* leaf extract.

REFERENCES

1. Miller JD. Fungi and mycotoxins in grain implications for stored product. *Research. J. Stored Product Res*. **1995, 31**(1): 1–16.
2. Janardhana GR, Raveesha KA and Shetty HS. Modified atmosphere storage to prevent mould-induced nutritional loss in maize. *J. Sci. Food Agric.* **1998, 76**(4): 573–578.
3. Kavitha R, Umesha S and Shetty HS. Dose dependent impact of dominant seed-borne fungi on seed germination and seedling vigour of cotton seeds. *Seed Res*. **2005, 33**(2): 187–194.
4. Chandler J. Cost reduction in SIT programmes using exos-ect auto-dissemination as part of area wide integrated pest management. *Int. J. Pest Control,* **2005, 42**(2): 257–260.
5. Bagga PS and Sharma VK. Evaluation of fungicides as seedling treatment for controlling bakanae/foot-rot (*Fusarium moniliforme*) disease in basmati rice. *J. Mycol. Plant Pathol,* **2006, 59**: 305–308.
6. Harris CA, Renfrew MJ and Woolridge MW. Assessing the risk of pesticide residues to consumers: recent and future developments. Food Additiv. *Contam*, **2001, 18**(12): 1124–1129.
7. Mohana DC, Prasad P, Vijaykumar V and Koteshwara AR. Plant extract effect on Seed-borne pathogenic fungi from seeds of paddy grown in southern India. *Journal of plant Protection Research*, **2011, 51**(2): 101-106.
8. Balandrin MF, Klocke JA, Wurtele ES and Bollinger WH. Natural plant chemicals: Sources of Industrial and Medicinal materials, *Science,* **1985, 228**, 1154-1160.
9. Hostettmann K and Wolfender J. The search for Biological active secondary metabolites. *Pesticides Science,* **1997, 51**: 471-482.
10. Kareem SO, Akpan I and Ojo OP. Antimicrobial Activities of *Calotropis procera* on selected pathogenic microorganisms. African Journal of Biomedical Research, **2008, 11**: 105 – 110.
11. Pawar BT. Antifungal activity of flax seed extract against seed-borne pathogenic fungi. World Journal of Pharmacy and Pharmaceutical Sciences, **2016, 5**(11): 816-819.
12. Verma S, Gupta D and Sirivastava M. *Calotropis gigantea:* A Review on its pharmacological activity. World Journal of Pharmacy and Pharmaceutical Sciences, 2016, 5(11): 1586-1598.