BIOSCIENCES BIOTECHNOLOGY RESEARCH ASIA, December 2011. Vol. **8**(2), p. 821-824

Cytotoxic Activity of Lantana Extract against Wood Destroying Agencies

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(Received: September 01, 2011; Accepted: October 04, 2011)

Antifungal activity of *Lantana camara* was investigated against fungal culture obtained from *Mangifera indica, Manilkara zapota and Ficus carica etc. Lantana leaves, fruits and flowers* alkaloids were extracted by conventional method using ethanol and methanol .Ethanol extract of leaves exhibited prominent inhibitory effect as compared to fruits and flowers while negligible in methanol. Enhanced inhibitory effect was observed when studied in combination with drug discs. Except Ketoconazole(30 mcg/disc) other drugs Clotrimazole(10mcg/disc), Nystatin (100 units/disc) Ampicillin (10mcg/disc), Itraconazole(30mcg/disc) exhibited maximum inhibitory activity. Ethanol extract can help to generate the possible formulations to prevent wood from fungal infection. Thus, preliminary screening of phytochemicals were estimated values are 0.41% carbohydrate, 33% in fruits and 50% in flowers and flavanoid content was 11.2% in leaves, 0.90% in fruits and 0.89% in flowers.

Key words: Cytotoxic activity, Anti-fungal activity, Waste land weed, Lantana camara, Wood destroying agencies.

Lantana camara Linn. (*Verbenaceae*) is a waste land weed[1-2], native to tropical America and introduced as an obnoxious weed, ornamental and hedge plant in India . The plant is known to be toxic to grazing animals which on ingestion of the leaves develop hepato-toxicity and photosensitisation[3] . The essential oils of *Lantana camara* revealed wide spectrum antibacterial and anti-fungal activity. Leaves of *Lantana camara* have been used as a bechic, anti-tumoral, antibacterial and anti-hypertensive agent and the root used for the treatment of malaria rheumatism and skin rashes. Several tri-terpenoids, napthaquinones, flavanoids, alkaloids and glycosides, isolated from *Lantana* are known to exert biological activities including cytotoxic and anticancer properties. The growth of *Bacillus megatarium, Staphylococcus aureus and klebsilla* etc biological activity is inhibited by *Lantana camara* along with fungal growth[4] .Plant extract has been used traditionally to treat a number of infectious diseases including those caused by bacteria, fungi, protozoa and viruses. A number of reports are available in vitro and in vivo efficacy of plant extract against plant and human pathogens causing fungal infections[5]. However, there is no attention towards the potential of *Lantana* against the *Mangifera indica*, *Manilkara zapota* and

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Ficus carica wood destroying agencies. Therefore the present study will help to investigate the efficacy of the plant against wood destroying fungi in laboratory.

MATERIAL AND METHODS

Chemicals

Glucose, Maltose, agar, dextrin obtained from Hi-Media, Drug disc of Clotrimazole, Itraconazole, Ketoconazole and ampicillin were obtained from Hi-Media. Distilled water used throughout the study.

Antibiotics discs

Ketoconazole (30mcg/disc), Clotrimazole (10mcg/disc), Nystatin (100 units/disc) Ampicillin (10mcg/disc), Itraconazole (30mcg/disc) impregnated discs were tested against the fungal strains by following Hi-Media Discs instructions.

Plant material and extract preparation

The leaves, fruits and flowers of *Lantana* were collected in the months of September to December 2010 from the campus of B.N. Bandodkar College of Science, Thane(w)-1 India. Plants were identified and authenticated by a botanist in the Department of Botany. The detached plant leaves ,fruits and flowers were subjected to aerial drying for fifteen days and were successively extracted with organic solvents based on order of polarity using soxhlet apparatus. These extracts were subsequently concentrated under reduced pressure to get their corresponding residues. Extracts of leaves, fruits and flowers (100mg/ml) were used to get the respective drug concentration(5mg/well).

Extraction and estimation of phytochemicals

Total protein contents was determined by Lowry method using casein as standard.[6] Total carbohydrate contents was estimated by phenol sulphuric acid method[7] using standard glucose. The total saponin froth and tannins percentage were measured by Kapoor L.D. et. al. method[8]. The total flavonoid content was determined by spectrophotometric method measuring $AlCl_3$-complex from extract. Triterpenes was measured colorimetric method[9] and alkaloids precipitated by Goswami et.al.[10]using Dragendroff's reagent and mayer reagent.

Preparation of fungal culture

Fungus grown on *Mangifera indica*, *Ficus carica* and *Manilkara zapota* was collected during the month of February and March 2010. Sterile saline suspensions of these fungal cultures were grown on selective media malt extract agar. Malt extract agar is used for cultivating, isolating and enumerating yeast and molds. To obtain pure culture fungus suspension was inoculated on malt agar slants and incubated for 7 days at room temperature to obtain maximum fungal growth. This fungus was grown on media at 28°C was maintained with periodic sub-culturing at 4°C.

Agar diffusion method

The anti-fungal activity of the ethanol/ methanol extract of *Lantana camara* leaves, fruits and flowers were evaluated by agar diffusion method[11]. The cultures inoculated on the agar slant were used for the assay. Sterile cotton swab was dipped into the suspension and streaked on to the agar plate evenly. Each extract (500µL) were spot inoculated onto the agar and one section without any extract was treated as control. The plates were incubated at room temperature for 7 days.

Drug sensitivity

For sensitivity test of fungi towards the drugs was screened by following the drug-disc method Pattnaik et.al[12]. Fungal broth cultures (106 cells/ml) were inoculated on Malt extract agar plates by using sterile cotton swabs. The drug discs were incubated in triplicates on to swabbed Malt extract agar plates to obtain average readings. The plates were incubated at room temperature for 14 hrs. The clear zones around each disc were measured by disc measuring scale prescribed by Hi-Media, Mumbai. The zone of inhibition produced by anti-biotic discs were measured and compared with Bayer and Kirby Chart.

RESULTS AND DICUSSION

Chemical composition of the *Lantana camara* and its essential oils are reported to be influenced by genetic, geographical, and seasonal factors as well as the developmental stages of it. Preliminary screening of phytochemical are correlated with antifungal activity of *Mangifera indica*, *Manilkara zapota* and *Ficus carica*. The phytochemical compositions of *Lantana camara* leaves, fruit and flowers are presented in Table 1. Organic solvent extracts showed various pattern of fungus inhibition based on their polarity when

compared with aqueous extract. The extract exerted compatible inhibitory potential at the concentration 100µg/ml against fungal activity. Ethanol extract of aerial parts showed 0.40 g% protein but the carbohydrates found distinctly higher in flowers and leaves than fruits. Anti-fungal activity of ethanol extract showed higher activity suggestive of better solvent over methanol. (Table2) Leaves extract indicates maximum inhibitory effect as compared to fruits and flowers extract. Drug induced anti-fungal activity is given in table 3. The results are being interpreted as 5 mm-15 mm as resistant,15-25 mm as moderately sensitive and beyond 25 mm zones of inhibitions are regarded as very sensitive. Larger inhibition zones was observed in presence of Clotrimazole, Nystatin, Ampicillin, Itraconazole which might be due to synergistic effect with the antibiotics. Based on the above mentioned interpretation, all the three source of fungi are resistant towards Ketoconazole as compared to other drugs i.e Clotrimazole, Nystatin, Ampicillin, Itraconazole. The study also supports the ethnomedical data provided in an earlier study. The cytotoxic activity may be due to the presence of toxic chemical constituents from this plant. This investigation gives knowledge against effective sensitivity test of new compounds.

Table 1. Protein and carbohydrate content by calculation from the standard graph

Sample	Protein (g%	Carbohydrate (g%)	Saponin (g%)	Tannins (g%)	Triterpenes (g%)	Alkaloids (g%)	Flavanoids (g%)
Leaves	0.04	0.41	0.22	0.17	0.22	0.34	11.2
Fruit	0.04	33	0.20	0.08	0.09	0.28	0.90
Flower	0.4	50	0.07	0.08	0.03	0.32	0.89

Table 2. Average diameter of growth inhibition on zone (in mm) of solvent extract of different aerial parts of *Lantana camara*

Extract	Inhibition on *Mangifera* indica	Inhibition on *Ficus* carica	Inhibition on *Manilkar* a zapota
Ethanol extract			
Leaves	++	++	++
Fruit	+	+	+
Flower	-	+	+
Methanol extract			
Leaves	++	++	+
Fruit	-	+	+
Flower	+	+	+

Indication: + : Minimum inhibition,++ : average inhibition, +++: maximum inhibition, - : no inhibition.

Table 3. Average diameter of growth inhibition on zone (in mm) of solvent extract of different aerial parts of *Lantana camara* in presence of drugs

Source	Ketoconazole 30 mcg/disc	Clotrimazole 10 mcg/ disc	Nystatin 100 units/disc	Ampicillin (10 mcg/disc.)	Itraconazole (30 mcg/disc)
Mangifera indica	10 ± 0.6 mm	12 ± 0.5 mm	15 ± 0.6 mm	25 ± 0.6 mm	18 ± 0.6 mm
Ficus carica	10 ± 0.4 mm	15 ± 0.3 mm	14 ± 0.5 mm	20 ± 0.7 mm	16 ± 0.6 mm
Manilkara zapota	10 ± 0.9 mm	16 ± 0.6 mm	16 ± 0.7 mm	18 ± 0.9 mm	18 ± 0.5 mm

In conclusion, the result presented in this report indicated that the ethanol extract efficiently exhibited anti-fungal activity. However, further studies with respect to structural elucidation of the active compounds by spectroscopic analysis and correlation with phytochemicals need to be considered.

ACKNOWLEDGEMENTS

One of the authors would like to greatly acknowledge University of Mumbai for providing financial assistance through the grant for minor research project no: 61/2009-10.

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