March 2010 ISSN : 0974 - 7508 Volume 6 Issue 1

Trade Science Inc.

Natural Products

An Indian Journal

Short Communication

NPAIJ, 6(1), 2010 [74-76]

# Antimicrobial activity of methanolic extract from pod, root and bark of *Delonix regia* plant

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*Received: 30th January, 2010 ; Accepted: 9th February, 2010*

## ABSTRACT

This plant occurs all over the world having the following characteristics: Height 35-40 feet with regular outline like crown having fast growth rate, leaf arrangement is alternate and bippinate type with entire margine. Leaf shape is oblong and evergreen type of leaf. Flowers are orange red in colour and very showy. Fruits are elongated pod like about 12inches or more. Initially fruit covering is green is become dry, hard and turns brown. Bark of tree is vertical thick nothrons uniform. Root of this tree is not much deep with paste resistance. 

## KEYWORDS

Antibacterial activity;
Polarity;
*Delonix regia*;
Bark;
Pod.

## INTRODUCTION

Plant *delonix regia* belong to family fabacae is a plant occur in all over Asia. This plant occurs all over the world having the following characteristics: Height 35-40 feet with regular outline like crown having fast growth rate, leaf arrangement is alternate and bippinate type with entire margine. Leaf shape is oblong and evergreen type of leaf. Flowers are orange red in color and very showy. Fruits are elongated pod like about 12inches or more. Initially fruit covering is green is become dry, hard and turns brown. Bark of tree is vertical thick nothrons uniform. Root of this tree is not much deep with paste resistance.

To validate antiseptic property of plant material. The plant material is extracted and studied for antibacterial and antifungal activity.

## EXPERIMENTAL

### Plant material and preparation of extracts

### Preparatin of various extract of *Delonix regia* bark

Around 1kg of fresh shade dried bark was powdered and around 800gm were extracted by hot percolation method by soxhalate apparatus. With five liter of each pet-ether (40-60°C) chloroform, acetone and methanol successively. All the extracts finally reduced to dryness at 40degree c by rotary evaporator (Rotavapour Buchhi Switzerland).

The quantity of each extract after the extraction was pet. ether (15gm), chloroform (20gm), Acetone (12gm), Methanol (40gm), aqueous extract (28gm).

### Preparation of various extract of *Delonix regia* root

Around 1kg of fresh shade dried root was powdered and around 800gm were extracted by hot percolation method by soxhalate apparatus. With five liter of each pet-ether (40-60°C) chloroform, acetone and methanol successively. All the extracts finally reduced to dryness at 40degree c by rotary evaporator (Rotavapour Buchhi Switzerland).

Short Communication

**TABLE 1 : Antibacterial activity of methanolic extract from bark of *Delonix regia* plant**

| Bacterial | Extract ethanolic | Extract $CCl_4$ | Cefotax | Penicil | Tetrax |
|---|---|---|---|---|---|
| G (+) | In mm | In mm | In mm | In mm | In mm |
| Staphylococcus pidermidis | 9 | 8 | 10 | 10 | 10 |
| Staphylococcus oureus | 7 | 12 | 10 | 8 | 8 |
| Bacillus paludis | 10 | 7 | 10 | 11 | 9 |
| Bacillus subtilis | 7 | 6 | 11 | 10 | 9 |
| G (-) | In mm | In mm | In mm | In mm | In mm |
| Escherichia Coli | 3 | 2 | 4 | 3.5 | 5.5 |
| Pseudomonus aeruginosa | 4 | 2 | 4 | 3 | 3.5 |
| Shigella flaxinely | 3 | 4 | 4.5 | 3.5 | 4 |
| Enterobacter aero genes | 3 | 4 | 5 | 3 | 2. |

**TABLE 2 : Antifungal activity of methanolic extract from bark of *Delonix regia* plant**

| Fungus | Extract ethanolic | Extract $CCl_4$ | Cefotax | Penicil | Tetrax |
|---|---|---|---|---|---|
| Candida albicans | 5 | 6 | 7 | 5 | 4 |
| Aspergillus fumigatus | 6 | 8 | 5 | 6 | 4 |
| Aspergillus niger | 5 | 3 | 6 | 4 | 5 |

The quantity of each extract after the extraction was pet. Ether (7gm), chloroform (10gm), Acetone (6gm), Methanol (20gm), aqueous extracts (14gm).

## Preparation of various extracts of *Delonix regia* pods

Around 1kg of fresh shade dried pods was powdered and around 800gm were extracted by hot percolation method by soxhalate apparatus .With five liter of each pet-ether (40-60°C) chloroform, acetone and methanol successively. All the extracts finally reduced to dryness at 40degree c by rotary evaporator (Rotavapour Buchhi Switzerland).

The quantity of each extract after the extraction was pet.ether (20gm), chloroform (30gm), acetone (25gm), Methanol (60gm), aqueous extract (38gm).

## MICROORGANISMS

The test microorganism used for antimicrobial activity screening were & bacteria (2 gram +ve)-*Enterococcus faecalis, Staphylococcus onerous,* (2gram -ve) -*Klebsiallea pneumaniae, Escherichia coli,* and two fungi- *Candida albicans* and *Aspergillus fumigants*.

These organisms were identified a procured from

**TABLE 3 : Antibacterial activity of methanolic extract from root of *Delonix regia* plant**

| Bacteria | Extract ethanolic | Extract $CCl_4$ | Cefotax | Penicil | Tetrax |
|---|---|---|---|---|---|
| G (+) | In mm | In mm | In mm | In mm | In mm |
| Staphylococcus epidermidis | 12 | 11 | 10 | 10 | 10 |
| Staphylococcus oureus | 12 | 10 | 10 | 8 | 8 |
| Bacillus paludis | 10 | 9 | 10 | 11 | 9 |
| Bacillus subtilis | 12 | 5 | 11 | 10 | 9 |
| G (-) | In mm | In mm | In mm | In mm | In mm |
| Escherichia Coli | 8 | 9 | 4 | 3.5 | 5.5 |
| Pseudomonus aeruginosa | 10 | 9 | 4 | 3 | 3.5 |
| Shigella flaxinely | 11 | 9 | 4.5 | 3.5 | 4 |
| Enterobacter aero genes | 12 | 4 | 5 | 3 | 2 |

**TABLE 4 : Antifungal activity of methanolic extract from root of *Delonix regia* plant**

| Fungus | Extract ethanolic | Extract $CCl_4$ | Cefotax | Penicil | Tetrax |
|---|---|---|---|---|---|
| Candida albicans | 13 | 5 | 7 | 5 | 4 |
| Aspergillus fumigatus | 10 | 9 | 5 | 6 | 4 |
| Aspergillus niger | 11 | 8 | 6 | 4 | 5 |

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## Antimicrobial activity

The agar diffusion method[11] was used to evaluate the antimicrobial activity. Bacteria were cultured overnight at 37°C in Mueller Hinton 10µl Broth (MHB, Oxoid) and fungi at 28°C for 72h in Potato Dextrose Broth (PDB, Oxide) and used as inoculums. A final inoculums, using 100µl of suspension containing $10^8$ CFV/ml of bacteria $10^4$ spore/ml of fungi spread on Mueller Hinton Agar (MHA) and Potato Dextrose Agar (PDA) medium respectively.

The disc (6 mm in diameter) was impregnated with 10µl of 75µl/ml, 50µl/ml, 25µl/ml, 10µl/ml and 5µl/ml of each extracts and for each organism placed on seeded agar. Ciprofloxacin and Fluconazole (75µl/ml, 50µl/ml, 25µl/ml, 10µl/ml and 5µl/ml) were used as positive control bacteria and fungi respectively. The test plates were incubated at 37°C for 24h for bacteria and at 28°C for 72h for fungi depending on the incubation time required for a visible growth.

MIC values were also studied for microorganisms by turbidimetric method, which were determined as sensitive to the extracts in cup plate method. MIC was defined as the lowest concentration of extract that inhibit visible growth.

# Short Communication

**TABLE 5 : Antibacterial activity of methanolic extract from pod of *Delonix regia* plant**

| Bacteria | Extract ethanolic | Extract $CCl_4$ | Cefotax | Penicil | Tetrax |
|---|---|---|---|---|---|
| G (+) | In mm | In mm | In mm | In mm | In mm |
| Staphylococcus epidermidis | 12 | 9 | 10 | 10 | 10 |
| Staphylococcus oureus | 11 | 9 | 10 | 8 | 8 |
| Bacillus paludis | 12 | 6 | 10 | 11 | 9 |
| Bacillus subtilis | 7 | 6 | 11 | 10 | 9 |
| G (-) | In mm | In mm | In mm | In mm | In mm |
| Escherichia Coli | 10 | 5 | 4 | 3.5 | 5.5 |
| Pseudomonus aeruginosa | 9 | 6 | 4 | 3 | 3.5 |
| Shigella flaxinely | 9 | 5 | 4.5 | 3.5 | 4 |
| Enterobacter aero genes | 9 | 6 | 5 | 3 | 2. |

A comparison is shown between the antibiotic activities of the plant extract with reference antibiotics (Cefotax). Na-cefotaxime, (Penicil) benzyl penicillin sodium and (tetrac) tetracycline R=absence of inhibition even at the hihest concentration used (100µg/ml).

### Tested material

Methanolic extract was obtained after the degatting with petroleum ether (40°-60°) and $CHCl_3$.

### Studied activities

Antibacterial activity was studied using the MIC broth dilution method[8,9].

### Organism used

For the antibacterial activity standard bacterial strains, obtained from the Nikhil Analytical Laboratory, Sangli (Maharashtra).

## RESULT AND DISCUSSION

The results of Antimicrobial activity were done for all the five, pet ether, chloroform, acetone, and methanol and aqueous extracts. During antimicrobial study methanolic extracts showed maximum zone of inhibition against almost all organisms in cup plate method.

**TABLE 6 : Antifungal activity of methanolic extract from pod of *Delonix regia* plant**

| Fungus | Extract ethanolic | Extract $CCl_4$ | Cefotax | Penicil | Tetrax |
|---|---|---|---|---|---|
| Candida albicans | 10 | 9 | 7 | 5 | 4 |
| Aspergillus fumigatus | 9 | 6 | 5 | 6 | 4 |
| Aspergillus niger | 10 | 5 | 6 | 4 | 5 |

## CONCLUSION

The methanolic extract pods of delonix regia showed a good inhibition against all the bacterial Strains tested (MIC between 10&80µg/ml). The gram (+) bacteria were sensitive with gram (-) bacteria and some common fungi.

## ACKNOWLEDGEMENT

We are grateful to the Principal Dr.D.K.Mhaske, R.B.N.B.College, Shrirampur for inspiring us and providing laboratory facility. Nikhil analytical and research laboratory, Sangli (M.S.) India for their technical assistance.

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