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Research Article

# ANTHELMINTIC ACTIVITIES OF ANTIGONON *LEPTOPUS* HOOK AND *MUSSAENDA ERYTHROPHYLLA* LAM

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**ABSTRACT**

Extracts from Antigonon *leptopus* HOOK (polygonaceae) roots & rhizomes are well known in India as garden creeper, commonly called as Picchibatani (Telugu), Mexican creeper (English), and roots of *Mussaenda erythrophylla* LAM (Rubiaceae) commonly known as mussenda (telugu), nagavalli (Sanskrit) and red flag bush (English) when tested *in vitro* anthelmintic activity on the earthworms (Pheretima posthuma) for both plants separately, showed potent. The results indicated that the ethyl acetate and methanol extracts of Antigonon *leptopus* significantly exhibited paralysis in doses (10, 20, 40 & 80mg/ml) and also caused death of worms especially at higher concentration of 80mg/ml as compared to standard drug. The ethyl acetate and methanol extracts of *Mussaenda erythrophylla* significantly exhibited paralysis in doses (10, 20, 40 & 80mg/ml) and also caused death of worms especially at higher concentration of 80mg/ml as compared to standard drug (piperazine hydrate). Methanolic extract of Antigonon *leptopus* was more active than its ethyl acetate extract ($p<0.001$), while ethyl acetate extract of *Mussaenda erythrophylla* was also more potent than the methanol extract. Further studies are in process to isolate the active principles responsible for the activity.

**Keywords**: Antigonon *leptopus, Mussaenda erythrophylla*, Anthelmintic activity.

## INTRODUCTION

Helminthic infections are now being recognized as cause of much chronic ill health and sluggishness amongst the tropical people. More than half of the population in the world suffers from worm infection of one or the other.

Antigonon *leptopus* Hook (polygonaceae) are well known in India as garden creeper, picchibatani in Telugu. A. *leptopus* is a tender perennial vine can easily grow to 30-40 ft. in length. The coral vine has attractive green heart shaped leaves[1, 2]. The coral vine is found in Indian ocean and coastal areas. Previously isolated compounds 2-anthocyanins, Pelargonin, Malvin quercetin, rhamnetin and quercetin-3-o-β-D-glucopyranoside[3].

*Mussaenda erythrophylla* (Rubiaceae) is native to western tropical Africa, occasionally seen in gardens and parks as ornamental plant in India and is commonly known as mussenda (telugu), nagavalli (Sanskrit) and red flag bush (English)[4]. It is a perennial, evergreen shrub. A number of triterpenoids and glycosides were reported. mussaendosides A-C, M and N with cyclolanostene type aglycone[5, 6] and aureusidin[7] , iridoid glycosides[8].

Very recently the methanol extract of *A. leptopus* was found to possess Antithrombin activity [9], Antidiabetic[10] and Consumed as food[11] reported. The M. *erythrophylla* roots are useful for cough, jaundice and when chewed acts as an appetizer. The pharmacological activities reported from *Mussaenda* species were diuretic, antiphlogistic, antipyretic and effective in laryngopharyngitis, acute gastroenteritis and dysentery and also anti-fertility activity[12].

## MATERIALS AND METHODS

### Plant material collection

Antigonon *leptopus* roots & rhizomes were collected from the Andhra University campus area, Visakhapatnam in the month of November 2006 and authenticated by the taxonomist, Dept of Botany Andhra University and the specimen voucher no. AUCP/BGR/2006/A52 was preserved in the Department.

The roots of *Mussaenda erythrophylla* was collected from Lawsons Bay colony, Visakhapatnam, in the month of November 2007, specimen voucher no. AUCP/BGR/2007/M64 was preserved in the Department. The authentification of both the plants was done by prof. M. Venkaiah, Dept. of Botany, Andhra University, Visakhapatnam, Andhra Pradesh, India.

### Tested material

Ethyl acetate (2.75%) and methanol (3.90%) extract from A. *leptopus* roots & rhizomes, ethyl acetate (3.50%) and methanol (4.25%) extract from roots M. *erythrophylla*.

### Studied activity

Anthelmintic activity was evaluated for both A. *leptopus* and M. *erythrophylla* separately. The activity was tested according to method discussed in detail by Kailasaraj and Kurupa[13]. Pheretima posthuma (Earthworm obtained from Horticulture Department) of nearly equal size (9+1cm) were selected for present study due to its anatomical and physiological resemblance with round worm parasites of human beings[14, 15].

**Table 1: Effects of A. *leptopus* roots & rhizomes extracts on earthworm**

| Concentration (mg/ml) | Paralysis time (min) | Death time (min) | Paralysis time (min) | Death time (min) |
|---|---|---|---|---|
| | Ethyl acetate extract | | Methanol extract | |
| 10 | 242±1.08 | 358±6.04 | 190±1.90 | 238±4.62 |
| 20 | 178±2.55 | 230±3.02 | 133±5.56 | 186±6.20 |
| 40 | 115±6.05 | 196±4.11 | 95±8.32 | 120±1.44 |
| 80 | 54±2.92 | 118±11.00 | 48±7.03 | 90±1.65 |
| | **Piperazine hydrate** | | | |
| | **Paralysis time** | | | |
| 20 | 22±2.00 | …… | …… | 80±8.24 |

Each value represents mean ±SEM (N=3).

$P<0.001$ significantly different compared with reference compound, piperazine hydrate, student's *t*-test.

Six earthworms of nearly equal size were placed in each Petri dish at room temperature. The time taken to complete paralysis and death were recorded. The mean paralysis time and mean leathal time for each sample were recorded.

**Statistical analysis**

The results were analyzed for statistical significance using one-way ANOVA followed by student t-test. Difference at P<0.001 was considered significant.

**RESULTS AND CONCLUSION**

Ethyl acetate and methanolic extracts of A. *leptopus* roots & rhizomes (Table 1) and the ethyl acetate and methanolic extracts from roots of M. *erythrophylla* (Table 2) showed concentration-dependent anthelmintic activity against earthworms. A. *leptopus* showed significant effects (p<0.001) at the tested concentrations (10-20mg/ml) as determined by the paralysis time and death time (Table 1). The methanol extract was more effective in causing death of worms at all concentrations than ethyl acetate extract at 99.98% significant level.

M. *erythrophylla* ethyl acetate extract was more effective at lower concentrations in causing paralysis and death of earthworms than methanol extract (p,0.001,Table 2). At concentrations of 80mg/ml and 100mg/ml, ethyl acetate and methanol extracts of M. *erythrophylla* were equipotent (p,0.001) only in paralyzing the worms, while the ethyl acetate extract was significantly more potent than the methanol extract in the death time. Reported in Table 2. The results indicated that the ethyl acetate and methanol extracts of Antigonon *leptopus* significantly exhibited paralysis in doses (10, 20, 40 & 80mg/ml) and also caused death of worms especially at higher concentration of 80mg/ml as compared to standard drug. The ethyl acetate and methanol extracts of *Mussaenda erythrophylla* significantly exhibited paralysis in doses (10, 20, 40 & 80mg/ml) and also caused death of worms especially at higher concentration of 80mg/ml as compared to standard drug (piperazine hydrate). Methanolic extract of Antigonon *leptopus* was more active than its ethyl acetate extract (p<0.001), while ethyl acetate extract of *Mussaenda erythrophylla* was also more potent than the methanol extract. Further studies are in process to isolate the active principles responsible for the activity.

**Table 2: Effects of *M. erythrophylla* root extracts on earthworm**

| Concentrations (mg/ml) | Paralysis time (min) | Death time (min) | Paralysis time (min) | Death time (min) |
|---|---|---|---|---|
| | Ethyl acetate extract | | Methanol extract | |
| 10 | 146±4.16 | 234±5.29 | 205±3.17 | 310±2.40 |
| 20 | 124±3.00 | 186±9.32 | 158±2.96 | 273±8.11 |
| 40 | 98±2.98 | 125±1.00 | 112±5.83 | 200±6.35 |
| 80 | 44±7.87 | 93±8.40 | 70±6.16 | 128±5.22 |
| | **Piperazine hydrate** | | | |
| | **Paralysis time** | | | |
| 20 | 22±2.00 | …… | …… | 80±8.24 |

Each value represents mean ±SEM (N=3).

P<0.001 significantly different compared with reference compound, piperazine hydrate, student's *t*-test.

Nevertheless, activities of extracts of the two plants investigated on the earthworms were lower than that of the reference compound, piperazine hydrate. This report is the first documentation on the anthelmintic activity of A. *leptopus* and M. erythrophylla. It may be worthwhile to test the compounds previously isolated from these two plants for anthelmintic activity.

**REFERENCES**

1. Ram P. Rastogi and Mehrotra, BN., Compendium of Indian Medicinal Plants, CDRI and NISC, New Delhi, 1998; p. 52.
2. Swarbrick, TJ., and Hart, R., Environmental Weeds of Christmas Island (Ind. Ocean) and Their Management, Plant Protection Quaterly, 16(2), 2000; 54-57.
3. Tiwari, PK and Minocha, KP. Vijana Parishad Anusandhan Patrika, 1980; 23(4), 305-7.
4. Singh, V., Pande, PC, Jain DK., A text book of botany Angiosperms, Ist edition, 2000.
5. Xu JP, XURS, LUO Z, Dong Jy, Acta chim sinica, 1991; 49, 621.
6. Xu JP, XU RS, LUO Z,Dong JY, HU HM, Mussaendosides M and N, new saponins from *Mussaenda* pubescens, J. nat prod, 1992; 55(8), 1121-1128.
7. Jefferey, B, Horborne , Girija AR, Maheshwari Devi H, lakshmi KM, Anthochlor pigments from the petals of *Mussaenda* hirsutissima and zinnia linearis, Phytochemistry, 1983; 22, 2741-2742.
8. Yoshio Takeda, Hioshi Nishimura, Hiroyuki Inouye, Two new iridoid glycosides from *Mussaenda*parniflora, *Mussaenda* shikokiana,Phytochemistry,1977; 16,1401-1404.
9. Chistokhodova, N., Nguyen, C., Calvin, T., Kachirskaia, I., Cunningham, G and Howard Miles, D., J. Ethanopharmacology, 2002; 18, 277-280.
10. Cheryl A Lans. *J. Ethnobiology and Ethnomedicine*; 2006; 2:45.
11. Mulabagal Vanisree, Ruby L Alexander-Lindo. *et al*. Food Chemistry; 2008; 106(2): 487-492.
12. LIU XJ, Liang GJ, CaiX , Chao Q, Chu YH , Bao YM, Long XH, Wang GQ, Acta acad med, 1986; 13,273.
13. Kailashraj, R., Krupa, A., Indian J. Pharm. 1962; 74, 64.
14. G. W. Thorn, R. D. Adams, E. Baunwald, K. J. Isselbacher, R. G. Petersdorf., "Harrison's Principle of Internal Medicine", Mc-Graw Hill Co., New York, 1977; p.1088
15. Z. Vigar., "Atlas of Medical Parasitology" P. G. Publishing House, Singapore. 1984 p.216.