**Original Article**

Phytochemical Screening and Anthelmintic Activity of Methanolic Extract of Traditional Plant *Ruellia prostrata* 'Poir'

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***Abstract:***

***The aim of this present study is to identify some phytochemicals and anthelmintic activity of the traditional plant Ruellia prostrata Poir. This plant is commonly known as Buno potpoti and traditionally used in Indian subcontinent especially in Bangladesh. The leaf juice of this plant along with the stem bark and leaf of Strychnos nux-vomica and leaf of Andrographis paniculata used to prevent the hair falling. Solvent extraction method was applied for the extraction of this plant. Methanol was used as a solvent in the solvent extraction process. Phytochemicals that present in this plant was identified by qualitative analysis. Among all of the phytochemicals tannin, saponin, protein, cardiac glycoside, terpenoid, flavonoid and phenol has been identified by this present study. Anthelmintic activity of this plant was performed according to the method of Ghosh et al.(2005). The method was applied to the parasite Paramphistomum cervi (Trematoda) that had been found in the gut wall of cow in Bangladesh. One concentration of plant extracts was used against the standard drug Albendazole for carrying out the extract have anthelmintic property or not. The result has been shown that methanolic extract has some phytochemicals and anthelmintic activity. For this scenario this plant extract could be carried for further study and could have a lead compound for anthelmintic effect.***

***Keywords: Ruellia prostrata poir., Phytochemical screening, Qualitative analysis, Anthelmintic activity, Extraction method.***

### INTRODUCTION

*Ruellia prostrata* poir is a perennial herb.This plant is commonly known as bunopotpoti in Banngladesh. This plant also used traditionally in Indian subcontinent. *Ruellia prostrata* poir belongs to the genus of Ruellia. Some species of

genus Ruellia are used medicinally to treat gonorrhoea, syphilis, eye sores and in renal infections. Many members of the family Acanthaceae are used in blue and yellow dye manufacture (Samy, 2015). Each plant in the nature is unique not only to be a part of biodiversity but also for the certain medicinal value. Medicinal values of the different plant species is due to the presence of unique type of chemical compounds. There are variable in different plant species (Patel, 2019). Now a days, Traditional plant has a great interest for finding a lead compound.



***Fig. 1:*** *Ruellia prostrata* poir

Along with the stem bark leaf juice of this plant used to treat nux-vomica and with the leaf of *Andrographis paniculata* used to prevent the hair falling (Sarojini, 2011). Developing countries of different continent are now still depends on traditional medicinal plants.

Phytochemicals are secondary metabolites of plants and it has a great physiological value (Thirumurugan, 2010). Some drugs which are phytochemical such as caffeine, quinine,

morphine etc. are obtained from plant (Hidayathulla, 2011). Some phytochemicals such as alkaloid, glycosides, tannin, terpenoid also responsible for the anthelmintic activity (Suman, 2011).

Botanical, anthelmintic, antibacterials and insecticidal activity has been found adequately throughout the plants all over the world (Vasundhara, 2014). WHO suggested that two billion people are mostly prone to parasitic worm infection. A few drugs are used to treat helminthes in human reported by WHO (Pessoa, 2002). Chronic and impair type of disease mostly held by helminthic. Approximately they cause greater economic and social deprivation to human and animal than any other single group of parasite (Suman, 2011). Gastrointestinal nematodiasis is usually controlled by synthetic anthelmintic. Synthetic anthelmintic are resistance day by day (Ayyanar, 2005). From the extensive literature review it is confirmed that there is no adequate work is done upon the phytochemical screening and anthelmintic activity of this plant. For this reason the present study is taken on this account.The present work is done because traditional medicinal plant possess some phytochemical which are responsible anthelmintic activity.

1. **MATERIALS AND METHODS**

## *Extraction*

Clean and shade dry the whole plant. Blending and grinding properly. Then 200g of powdered sample is taken. Then the powdered sample moistened with 600ml methanol. After 15-20 days filtration the solution by Whatmann No.1 paper. Allow it to air dry, as the methanol is volatile, remain crude extract of the sample (Prabhavathi, 2016).

## *Phytochemica/ screening (Qualitative* analysis)

Standard protocols were used for carrying out qualitative analysis of methanolic extract to identify the presence of Cardiac glycosides, Flavonoids, Phenols, Saponins, Tannins, Terpenoids and Proteins.

**Saponin test:** Add 2ml of extract in 6ml of

distilled water and shaken vigorously. Presence of bubbles or persistent foam identifies the presence of saponins.

**Tannin test:** Small amount of 10% of alcoholic ferric chloride was added into 2ml of extract. Formation of brownish blue or black colour identifies the presence of tannins.

**Phenol test:** Add 2 ml of extract in 2 ml of 5% aqueous ferric chloride. Formation of blue colour identifies the presence of phenols.

**Protein test:** 1 ml of 40% sodium hydroxide was added into 2ml of extract and then added few drops of 1% copper sulphate. The formation of violet colour identifies the presence of peptide linkage molecules.

**Cardiac Glycoside test:** 0.5ml of glacial acetic acid was added into 1ml of extract and then added 3 drops of 1% aqueous ferric chloride solution. Formation of brown ring at the interface identifies the presence of cardiac glycosides.

**Terpenoid test:** 0.5 ml of chloroform was added into 1ml of extract and then added few drops of concentrated sulphuric acid. Formation of reddish brown precipitate identifies the presence of terpenoids.

**Flavonoid test:** Few drops of 20% sodium hydroxide were added into 2ml of extract, intense yellow colour is observed. Few drops of 70% dilute hydrochloric acid was added and observed the disappearance yellow colour. Formation and disappearance of yellow colour identifies the presence of flavonoids in the extract (Prabhavathi, 2016).

### Anthelmintic activity test

Anthelmintic activity test was conducted according to the methods of Ghosh et al.(2005).



***Fig. 2:*** *Paramphistomum cervi*

*Paramphistomum cervie* nematodes was collected ***3.2. Anthelmintic activity test*** from the gut wall of the cow in Bangladesh. Then 3.2.1. Methanolic Extract extract was dissolved into minimum amount of

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Concentration | Paralysis time(min) | Mean time(min) | SD | SEM | Deathsis time(min) | Mean time(min) | SD | SEM |
| S0mg/ml | 15 | 14.33 | 0.94 | 0.54 | 23 | 22.33 | 0.47 | 0.27 |
| 13 | 22 |
| 15 | 22 |

dimethyl sulphoxide and then volume was adjusted with phosphate buffer saline to attain the desire concentration. Three groups were

prepared control (phosphate buffer saline), reference standard albendazole and the extract. Time taken for paralysis and death was noted. When worms do not receive any sense even in normal saline then the paralysn time was counted. Death was occurred when the worms lose body sensation or colour in warm water at 50° C.

3.2.2. Reference standard (Albendazole)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Concentration | Paralysis timelminl | Mean timelminl | SD | SEM | Deathsis timelminl | Mean timelminl | SD | SEM |
| 50mg/ml |  | 5.67 | 0.47 | 0.27 | 10 | 11 |  | 0.57 |
|  | 12 |
|  | 11 |

3.2.3. Control

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Concentration | Paralysis time(min) | Mean time(min) | SD | SEM | Deathsis time(min) | Mean time(min) | SD | SEM |
| Saline |  |  |  |  |  |  |  |  |

**3.RESULTS**

# *1. Phytochemica/ screening:*

Above three

tables shows the

result of the

extract, standard and control.



|  |  |  |
| --- | --- | --- |
| Name | Observation | Inferences |
| Flavonoid | There is no intense yellow colour is observed after treated with 20% sodium hydroxide. | Absence |
| Tannin | Black colour is observed after the addition 10% alcoholic ferric chloride. | Present |
| Phenol | There is no presence of blue colour after the addition of 2ml of 5% aqueous ferric chloride. | Absence |
| Saponin | Persistent foam is present. | Present |
| Protein | Violet colour observed. | Present |
| Cardiac glycosides | Brown ring is formed at the interface. | Present |
| Terpenoid | Reddish brown precipitate is observed. | Present |

* Paralysis time (min)
* Death time (min)

25

.. 20

**:E**

**g** 15

-; 10

**E**

**j::** 5

0

*Standard (SOmg/ml} Extract (SOmg/ml} Control*

**Samples**

***Fig. 3:*** *Chart shows the paralysis time and death time taken for parasite at the same concentrationof standard, extract and control.*

1. **DISCUSSION**

It is revealed that the methanonlic extract of this plant expressed cardiac glycoside, saponin, tannin, terpenoid and protein. The time taken for the paralysis and death of the parasite is doubled in contrast with the standard. Plant extract with alkaloids, tannins, glycosides and flavonoids is prone to anthelmintic activity (Acharya, 2011). Anthelmintic activity of this methanolic extract is due to the presence of tannins and cardiac glycosides.Tannins are a polyphenolic compound.

The energy generation in helminths by uncoupling oxidative phosphorylation is provoked by some synthetic phenolic anthelmintics and causes death of the helminths. As the tannin is chemically polyphenolic compound then it may be follow this mechanism. Another mechanism may be of tannins that involve in this effect is that it can bind with the glycoprotein on the cuticle of the parasite and cause death (Sahoo, 2016). It would be possible that the extract will follow these mechanism and cause death for helminths.

### CONCLUSION

To determine the dose dependant anthelmintic activity and identify the actual phytochemical which is responsible for the anthelmintic effect should be conducted for further study. It should be applied on various parasites to evaluate the efficacy of extract.

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### REFERENCES

Acharya, S., Dash, G. K., Brahma, D. K., & Chhetree, R.

R. (2011). Preliminary phytochemical investigation and anthelmintic activity of *Acacia suma* (Roxb) barks. International research journal of pharmacy, 2(1), 136-141.

Ayyanar, M., & lgnacimuthu, S. (2005). Traditional knowledge of kanitribals in Kouthalai of Tirunelveli hills, Tamil Nadu, India. Journal of ethnopharmacology, 102(2), 246-255.

Ghosh, T., Maity, T. K., Bose, A., & Dash, G. K. (2005). Anthelmintic activity of *Bacopa monierri.* Indian J Nat Prod, 21(2), 16-19.

Hidayathulla, S., Chandra, K. K., & Chandrashekar, K.

R. (2011). Phytochemical evaluation and antibacterial activity of *Pterospermum diversifolium* Blume. International Journal of Pharmacy and Pharmaceutical Sciences, 3(2), 165-167.

Patel DK. (2019, 11th may). Plants as a Source of Medicine. Available from: [https://www.](http://www/) omicsonline.org.

Pessoa, L. M., Morais, S. M., Bevilaqua, C. M. L., & Luciano, J. H. S. (2002). Anthelmintic activity of essential oil of *Ocimum gratissimum* Linn. and eugenol against *Haemonchus contortus.* Veterinary parasitology, 109(1-2), 59-63.

Prabhavathi, R. M., Prasad, M. P., & Jayaramu, M. (2016). Studies on qualitative and quantitative phytochemical analysis of *Cissus quadrangularis.* Pelagia Res Libr Adv Appl Sci Res, 7(4), 11-7.

Sahoo, A., & Khan, F. (2016). Nutritional and biological control synergism against gastrointestinal nematodes in small ruminants. J Vet Sci Anim Husb, 4(1),104.

Samy, M. N., Sugimoto, S., Matsunami, K., Otsuka, H., & Kamel, M. S. (2015). Chemical constituents and biological activities of genus Ruellia. Int. J. Pharmacog, 2(6), 270-279.

Sarojini, N., Manjari, S. A., & Kanti, C. C. (2011). Phytochemical screening and anthelmintic activity study of *Saraca indica* leaves extracts. Int. Res.J.Pharm,2(5), 194-197.

Suman, A., Kumar, D. G., Kumar, B. D., Raj, C. R., & Matushree, V. B. (2011). Preliminary phytochemical investigation and anthelmintic activity of *Acacia suma* (Roxb) barks. Int Res J Phar, 2, 136-41.

Thirumurugan, K. (2010). Antimicrobial activity and phytochemical analysis of selected Indian folk medicinal plants. Steroids, 1, 7.

Vasundhara, M., Karthik, Y. P., Anjali, K. R., Chithra, C., Gupta, P., & Roopa, C. (2014). Absence of anthelmintic activity of hydroalcoholic leaf extracts of *Artabotry shexapeta/us* (Linn. f). Journal of Pharmaceutical Negative Results, 5(1), 1.