

**RESEARCH ARTICLE****PHARMACOLOGY****IN-VITRO ANTHELMINTIC ACTIVITY OF SOLANAM PUBESCENS AND GYMNOSPORA EMERGINATA LEAVE****UMA VASIREDDY, HEMAMALINI. K\*, VAMSHI. G, HARINATH. K, VISHNU VARDHAN. E, NAGARJUN GOUD. A, RAGHU. H AND SHARATH GOUD. T.**

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**ABSTRACT**

Southern Eastern ghats in hill region of Tirupathi is inhabited by several tribes and they are using several plants or plant based preparations for the treatment of various ailments in their traditional system of medicine. During our course of studies on ethnomedicine of this region, the plant being used as anthelmintic is solanam pubescens and gymnosporia emerginata. These plants has a wide reputation among natives of being curative for intestinal –worm infections in the form of aqueous extract. Based on this, an attempt has been made to evaluate the anthelmintic potential of this plant.

The methanolic extract of solanam pubescens and gymnosporia emerginata leaves was investigated for anthelmintic activity using earthworms phertima posthuma. Various concentrations (10 – 35 mg /ml) of plant extract were tested in bioassay. Piperazine citrate (10mg/ml) was used as reference standard drug whereas distilled water as control. Determination of paralysis time and death time of the worms were recorded. Extract exhibited significant anthelmintic activity at highest concentration of 50 mg/ml. the result shows that methanolic extract possess vermifugal activity and found to be effective as an anthelmintic.



## KEY WORDS

Anthelmintic, southern eastern ghats hills, ethnomedicine, solanam pubescens and gymnosporia emerginata, vermicial.

## INTRODUCTION

Helminth infections are among the widest spread infections in humans, distressing a huge population of the world. Although the majority of infections due to helminthes are generally restricted to tropical regions and cause enormous hazard to health and contribute to the prevalence of undernourishment, anaemia, eosinophilia and pneumonia<sup>1</sup>. Parasitic diseases cause ruthless morbidity affecting principally population in endemic areas<sup>2</sup>. The gastro intestinal helminthes becomes resistant to currently available anthelmintic drugs therefore there is a foremost problem in treatment of helminthes diseases<sup>3</sup>. Hence there is an increasing demand towards natural anthelmintics.

Solanam pubescens belong to the family solanaceae commonly called as pajarito which is a shrub and gymnosporia emerginata belong to the family celastraceae which is a woody shrub. The two different plants were collected form seshachalam hill ranges of Eastern Ghats of Chittoor district. This region is inhabited by several tribes and they are using several plants based preparations for the treatment of various ailments in their traditional system of medicine. During our course of studies on ethanomedicine of this region, the plant being used as anthelmintic in leaves of solanam pubescens and gymnosporia emerginata. These have a wide reputation among natives of being curative for intestinal worm infections. This plant is being used by the tribal of seshachalam hills as an anthelmintic in the form of extracts, prepared by soaking powered material in water for 10 to 12 hrs. This extracts is taken orally once a day for 3 days to treat intestinal worm infections.

Based on this, an attempt as been made to evaluate the anthelmintic potential of Solanam pubescens and Gymnosporia emerginata<sup>4</sup>.

## MATERIALS AND METHODS

### *Plants materials:*

The leaves of Solanam pubescens and Gymnosporia emerginata was procured from seshachalam hills region (triupathi) in September 2010. The plant and the plant material were identified and authenticated in department of botany, S.V. Univerisity by Dr. K. Madhavachetty and voucher herbarium specimens was deposited in the department of pharmacognosy of our college. The plant material was dried in under shade, pulverized, passes through sieve number 40 and stored in air tight container and used for further extraction<sup>5</sup>.

### *Preparation of extract:*

The leaves of Solanam pubescens and Gymnosporia emerginata were first defatted with petroleum ether and then extracted with methanol which is further evaporated to dryness to obtain methanolic extract. Extract was subjected to qualitative chemical investigation of phytoconstituents such as alkaloids, flavonoids, tannins, carbohydrates, proteins, vitamins, coumarin etc.

### *Phytochemical study:*

Preliminary phytochemical screening was performed. The presence of phytoconstituents such as alkaloids, alkaloids, flavonoids, tannins, carbohydrates, steroids and resins were confirmed<sup>6</sup>.

**Biological study:**

Healthy adult indian earthworms (*phertima posthuma*) due to its anatomical and physiological resemblance with the intestinal round worm parasites of human beings were used in the present study<sup>7-9</sup>. All the earthworms and round worms were approximately equal size. They were collected from local place, washed and kept in water.

**Drugs:**

The methanolic extracts of *Solanam pubescens* and *Gymnosporia emerginata* was tested in various doses in each group. Normal saline water was used as control. Piperizine citrate and albendazole were used as standard drugs for comparative study with methanolic extracts.

**Experimental method :**

The method of Nargund<sup>10</sup> was followed for screening of anthelmintic activity. Anthelmintic activity was evaluated on adult Indian earthworm, (*phertima posthuma*). The worms were divided into nine groups (5 each). The first group (I) served as normal control which received saline water only. The second (II) and third (III) groups received the standard drugs piperizine citrate and albendazole at a dose level 10mg/ml. Groups (IV-IX) received doses of methanolic extracts of 10mg/ml, 15mg/ml, 20mg/ml, 25mg/ml, 30mg/ml and 35 mg/ml respectively. Observations were made for the time taken to cause paralysis and death

of individual worms for two hr. Paralysis was confirmed when the worms did not review even in normal saline water. Death was concluded when the worms lost their motility followed by fading away of their body colours.

**Statistical analysis:**

The data on biological studies were reported as mean  $\pm$  SD (n = 5). For determining the statistical significance, S.E.M and analysis of variance (ANOVA) at 5 % level significance was employed. P values <0.05 were considered significant<sup>11</sup>.

**RESULTS**

The methanolic extracts of *Solanam pubescens* produced a significant anthelmintic activity in dose dependent manner as shown in Table :1 when compared to and *Gymnosporia emerginata*. Normal saline water was used as control. The activity shown by methanolic extracts is considerable importance. All data were found to be statistically significant at 5 % level of significancy (P<0.05) when subjected to one way ANOVA. The extent of activity shown by the crude extracts was found to be dose dependent and same effect as that of 10mg/ml of piperazine citrate was seen in 20-35 mg/ml of methanolic extract, and same effect as that of 10 mg .ml of albendazole was seen in 25-35 mg/ml of methanolic extract.

**Table1**  
**Anthelmintic activity of methanolic extracts of *Solanum pubescens* and *Gymnosporia emerginata***

Group	Treatment	Dose mg/ml	Solanum pubescens		Gymnosporia emerginata	
			Time taken for paralysis (min) (X±S.D)	Time taken for death (Min) (X±S.D)	Time taken for paralysis (min) (X±S.D)	Time taken for death (Min) (X±S.D)
I	Control (Normal saline water)	---	---	---	---	---
II	Standard I (Piperzine citrate)	10	27.3 ± 0.31	45.5 ± 0.82	27.3 ± 0.31	45.5 ± 0.82
III	Standard II (albendazole)	10	25.4 ± 0.63	38.6 ± 0.63	25.4 ± 0.63	38.6 ± 0.63
IV	Methanolic extract	10	35.2 ± 0.52	53.4 ± 0.89	89.3 ± 0.4	120.21 ± 0.6
V	Methanolic extract	15	32.6 ± 0.01	49.6 ± 0.75	72 ± 0.3	108.98 ± 0.1
VI	Methanolic extract	20	27.4 ± 0.31	41.3 ± 0.09	65 ± 0.14	72 ± 0.44
VII	Methanolic extract	25	25.0 ± 0.45	33.2 ± 0.66	64.73 ± 0.8	95.65 ± 0.1
VIII	Methanolic extract	30	23.2 ± 0.63	29.0 ± 0.82	43 ± 0.21	66 ± 0.11
IX	Methanolic extract	35	21.3 ± 0.89	26.3 ± 0.52	23 ± 0.9	33 ± 0.45

## DISCUSSION

The anthelmintic activity of the methanolic extract was comparable with that of standard drugs. Albendazole and piperazine citrate are used as anthelmintic drugs, but these drugs show unwanted effects like gastrointestinal disturbance, urticaria, and bronchospasm, and some patients experienced dizziness, paraesthesias, vertigo, and incoordination. These drugs are also contraindicated in pregnant women and to those with compromised renal and hepatic function.

If we formulate anthelmintic drugs from *Solanum pubescens* leaves, probably this will show no unwanted effects, because the herbal

formulations generally are safe, natural, and have little or no side effects and raw material for formulation is easily available with low cost. More work is needed to identify the main active principle which is responsible for anthelmintic activity.

In order to access the mechanism of action of the extract, its effect was tested on worms (*Phertima posthuma*). Anthelmintic drugs like albendazole and piperazine citrate act by reversibly inhibiting neuromuscular transmission in the worm, probably by acting like GABA, the inhibitory neurotransmitter or GABA-gated chloride channels in nematode muscle, that causes relaxation and depresses responsiveness to contractile action of Ach.



Flaccid paralysis of the worms followed by death occurs<sup>12,13</sup>. The fact that the extract of *Solanum pubescens* also shows paralysis in worms followed by death suggest that it may act like albendazole.

It could be concluded that the methanolic extract of leaves of *Solanum*

*pubescens* is having anthelmintic activity, compared to the other plants and standard drugs which is a significant result. Further studies are required to identify the actual chemical constituents that are present in the plants which are responsible for anthelmintic activity.

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