

# ANTIHELMINTIC ACTIVITY OF HYDROALCOHOLIC EXTRACT OF AERVA LANATA LEAVES

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**ABSTRACT:** Medicinal plants are alternative medicines for the treatment of various diseases due to their assumed acceptability, effectiveness, affordability, safety, and low cost. The study aims to evaluate the anthelmintic activity of aerva lanata leaves. In conclusion, hydroalcoholic extracts of aerva lanata leaf shows in cause helminthes infection aerva lanata leaf shows more significant anthelmintic action over broad-spectrum albendazole. So, in case of unspecified infections, this multi-potent plant extract combination is beneficial and nontoxic as compared to synthetic medicines. Further isolation and characterization of phytoconstituents and in-vivo evaluations are needed to explore these extracts as phytomedicines against pathogenic microorganisms.

**Keywords:** aerva lanata, anthelmintic activity, medicinal plants.

## I. INTRODUCTION

Herbs and medicinal plants are the first medicine, which is a universal phenomenon<sup>1</sup>. Traditional medicine is an important source development of chemotherapeutic agents. The Indian flora offers a variety of plants that have medicinal properties. These plants can be exploited to find effective alternatives to synthetic drugs. In developing countries, synthetic drugs are not only expensive and inadequate for the treatment of diseases, but these drugs are cures with adulterations and have many side effects<sup>2</sup>.

Medicinal plants are alternative medicines for the treatment of various diseases due to their assumed acceptability, effectiveness, affordability, safety, and low cost. Recent days there is increased consumption of herbal formulations by people because of the strong belief that these products are natural and safe for the treatment of ailments<sup>3</sup>.

The medicinal plants selected for the present study is Aerva lanata exhibit the various therapeutic activities are reported. Aerva lanata is a traditional medicine which holds to cure a various disorder such as "helminthic, diabetes, inflammation, skin diseases, kidney stones, headache, cough, cholera, dysentery and diarrhea". Aerva lanata is extensively utilized by progressive scientific techniques which is reported to possess activities such as "diuresis<sup>17</sup>, urolithiasis<sup>18</sup>, anti-inflammatory<sup>19</sup>, antimicrobial<sup>20</sup>, anti-diabetic<sup>21</sup>, nephroprotective<sup>22</sup> hepatoprotective<sup>23,24</sup>, anthelmintic<sup>25</sup> and antidiarrheal<sup>26</sup>". Hence, in tune with this effort, the present study is to screening the anthelmintic effect of the Aerva lanata in order to understand the nature of the principle component responsible for its medicinal properties.

### **Anthelmintic Activity**

Helminthiasis is a disease caused by worms such as pinworm, roundworms or tapeworms. Typically, the worms reside in the gastrointestinal tract but may also burrow into the liver and other organs. Infected people excrete helminth eggs in their faces, which contaminate the soil in areas with inadequate sanitation<sup>27</sup>. Other people can then be infected by ingesting eggs or larvae in contaminated food or through penetration of the skin by infective larvae in the soil (hookworms). Parasitic diseases cause severe morbidity and mortality. Filariasis (a cause of elephantiasis), Onchocerciasis (river blindness), and schistosomiasis important parasitic diseases of human beings<sup>28</sup>. As per WHO only synthetic drugs are frequently used in the treatment of helminth infestations in human beings but these synthetic drugs are out of reach of millions of people and have a lot of side effects. In view of this, an attempt has been made to study the anthelmintic activity of herbal drugs.

The revival of interest in herbal therapy recently has been witnessed in many countries and use of herbal drugs are increased because of their potency and low toxicity. Nowadays in the modern advanced stage scientific method of evaluation uses phytochemical investigation to isolate the components present, and

pharmacological and microbiological screening for their therapeutic efficacy have tended to rational usage of medicinal plants. According to the literature, the different parts of the *Aerva lanata* i.e., leaf, root, seed, stem, and whole plant have been used for various medicinal purposes like analgesic, anti-inflammatory, wound healing, antioxidant, antibacterial, stomachache, hypertension, anti-diabetic. In this direction, our effort was devoted in identifying preliminary Phytoconstituents of *Aerva lanata* and investigating the comparative In vitro anthelmintic activities of hydroalcoholic extract of *Aerva lanata*.

## II. MATERIALS AND METHODS

### Collection and Authentication of Plant Material

The leaves of *Aerva lanata* were collected from in and around the region of Ranga Reddy Dist, Telangana. The plant materials were identified and authenticated by Dr. Madhavan Chetty., Asst.Prof, Department of Botany, Venkateswara University, Tirupathi. A voucher specimen was submitted and deposited in the Department of pharmacology in our College.



Fig.1. Dried form of Aerva Lanata



Fig.2. Extracted product from the plant

### Preparation of Plant Extracts

The Freshly collected leaves of *Aerva lanata* were shade-dried at room temperature. The dried plant materials were subjected to size reduction to a coarse powder by using dry grinder and passed through sieve no. 40 was used for extraction.



Fig.3. Preparation of leaf extracts using soxhlet apparatus

### Hydroalcoholic extraction

Powdered material of *Aerva lanata* (100gm) was extracted by cold maceration with 1000 ml of hydro alcoholic (8:2) for 48 hrs. The extract was filtered by Whatman no.1 filter and the filtrate was evaporated under reduced pressure using rotatory vacuum evaporator until all solvent was removed to give a dark colored molten extract. The percentage yield of the hydroalcoholic extract *Aerva lanata* was 8.06 % w/w. The extract was stored in airtight

containers in refrigerator maintained below 10°C until further use.

#### Preliminary Phytochemical Screening<sup>25</sup>

The hydroalcoholic extracts of *Aerva lanata* leaf was subjected to following preliminary phytochemical screening for the presence or absence of phytoconstituents by the following methods.

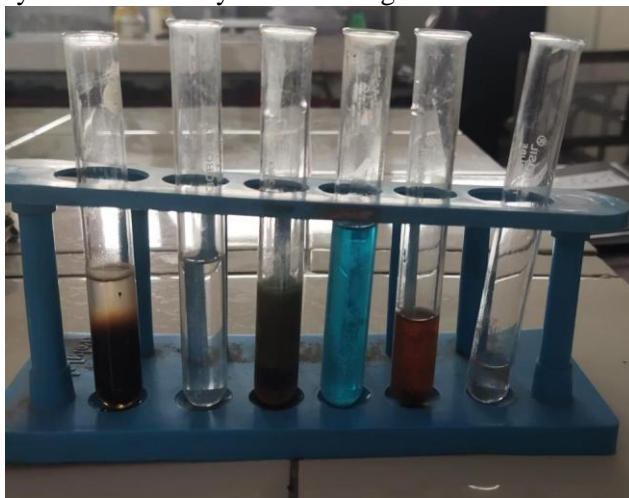


Fig.4. Testing of Preliminary Phytochemical present in the plant extract

### III. ANTHELMINTIC ACTIVITY

#### Experimental worms

Anthelmintic activity was carried out in Indian adult earthworms (*Pheretima posthuma*) due to its anatomical resemblance with the intestinal roundworm's parasites of human beings. They were collected from moist soil and washed with normal saline to remove all fecal matters.

#### Procedure

##### Administration of albendazole

Albendazole (20mg/ml) was prepared by using 1% w/v of Carboxy Methyl Cellulose as a suspending agent as administered as per method of extract. Used as a standard for anthelmintic activity.

##### Administration of extract

The suspension of hydroalcoholic extract of *Aerva lanata* leaf at different concentration (10, 20, 50 mg/ml) were prepared by using 0.5 w/v of CMC as a suspending agent and the final volume was made up to 20 ml for the respective concentration. Albendazole was used as standard. Groups of approximately equal size (5-6 cm), weight 0.32-0.50 gm worms consisting of three individual earthworms individually in each group were released into in each 20 mL of desired concentration of drug and extracts in the petridish.

#### Experimental Design

Group I : Normal saline (0.9% NaCl)

Group II : Albendazole (20 mg/ml)

Group III : HAMA (10 mg/ml)

Group IV : HAMA (20mg/ml)

Group V : HAMA (50mg/ml)

The mean time for paralysis was noted when no movement of any sort could be observed, except when the worm was shaken vigorously; The time death of the worm (min) was recorded after ascertaining that worms neither moved when shaken nor when given external stimuli.

#### Statistical analysis

Data were presented as mean  $\pm$  standard error mean (SEM) and were analyzed by One-way analysis of variance (ANOVA) (SPSS for Windows, version 18.0). The values were considered significantly different at  $p < 0.05$ .

### IV. RESULTS

#### Preliminary Phytochemical screening of hydroalcoholic extract of *Aerva lanata* leaf

In this study hydroalcoholic extracts of the plant were subjected to phytochemical screening and the results are represented in Table-1. flavonoids, glycosides, tannins, steroids, saponins, phenolics, terpenoids, and alkaloids the plant extracts.

Table 1 Qualitative determination of the phytochemicals present in the hydroalcoholic extracts of *A. lanata* leaf.

Phytochemicals	Hydroalcoholic extracts
Flavonoids	–
Alkaloids	–
Phenolic compounds	+
Tannins	–
Steroids	–
Saponins	+
Terpenoids	–
Glucosides	–

+:This phytochemical is present in the extracts; –:This phytochemical is absent in the extracts.

### 6.1 In-Vitro Anthelmintic activity of hydroalcoholic extracts of *Aerva lanata*

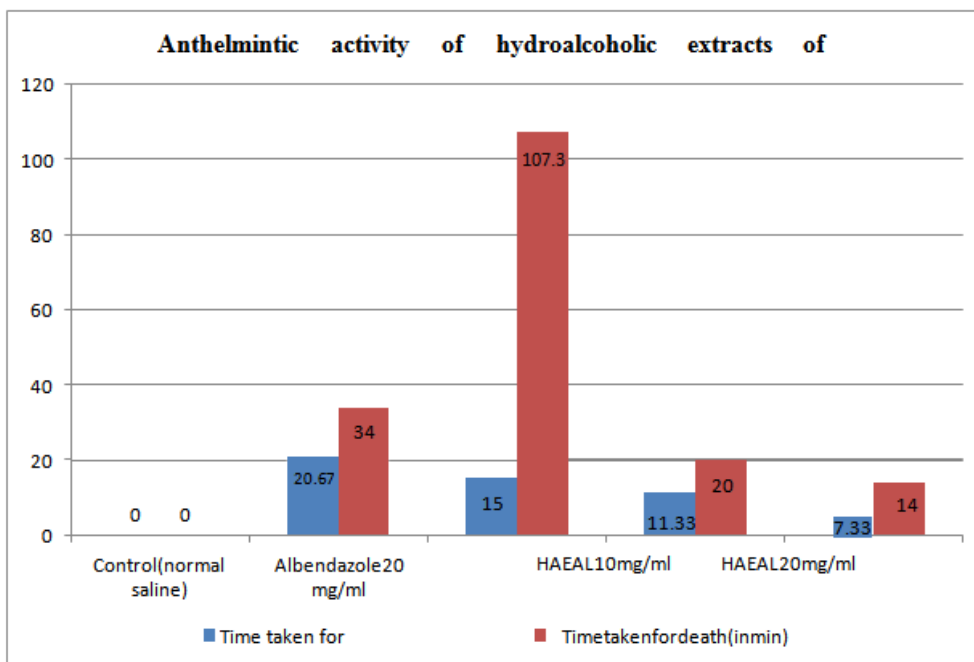
The hydroalcoholic extract of *Aerva lanata* leaf was subjected to anthelmintic activity and compared with the standard drug Albendazole(Table2).The extracts possess significant ant helmintic activity at the concentration of 10, 20, and 50 mg/ml in a dose-dependent manner.50mg/ml of hydroalcoholic extract caused paralysis of at 7.33±1.45min and death at 14.00±2.31 min. While albendazole as a positive control caused time of paralysis of 20.67± 1.76 min and death time 32.0 ± 3.21min. From the study, it was also clear that the time for paralysis and death decreases. There fore the results demonstrate that the combination plant extract to posses the effective anthelmintic activity and thus may be used as an anthelmintic.

Table2:In-vitro Anthelmintic activity of hydroalcoholic extracts of *Aerva lanata*

Treatment Group	Concentration (mg/ml)	Time taken for paralysis (in minutes)	Time taken for death (in minutes)
Control (normal saline)	-	-	-
Albendazole	20	20.67 ± 1.76	34.00 ± 2.89
HAEAL	10	15.00 ± 1.15	107.33 ± 3.71
HAEAL	20	11.33 ± 1.45*	20.00 ± 3.46**
HAEAL	50	7.33 ± 1.45**	14.00 ± 2.31***

Symbol represents statistical significance: \*P<0.05,\*\*P<0.01,\*\*\*P<0.001

Fig.5:In-Vitro Anthelmintic activity of hydroalcoholic extracts of *Aerva lanata*



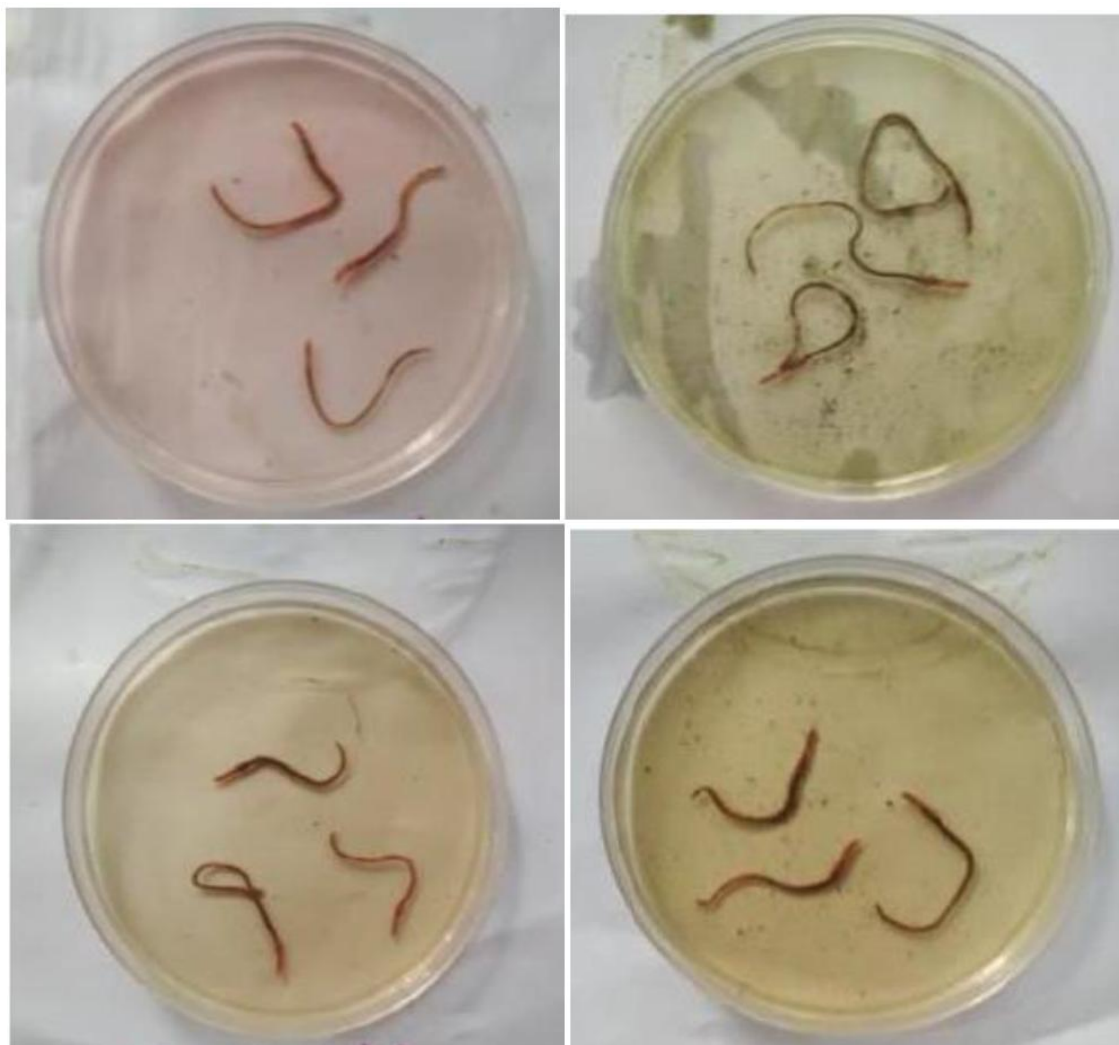


Fig.6: Anthelmintic activity of hydroalcoholic extracts of *Aerva lanata* leaf

#### IV. DISCUSSION

The therapeutic potential and other pharmacological actions of phytomedicines are due to their therapeutically active constituents such as tannins, alkaloids, and several other aromatic compounds or the secondary metabolites of plants. So the preliminary phytochemical analysis revealed the pronounced importance of exploring the composition of secondary metabolites and active constituents in crude drugs. In the present study, preliminary phytochemical screening of hydroalcoholic extracts of *Aerva lanata* leaf showed significant indication about the presence of metabolites like alkaloids, saponins, tannins, amino acids, flavonoids, terpenoids, carbohydrates, glycosides and gum mucilage. The result of the present study also supplements the folkloric usage of these studied plants which possess several known and unknown bioactive compounds with bioactivity.

Helminthiasis, the condition resulting from worm infestation is one of the major prevalent diseases in the world, particularly in tropical countries. The best alternative over modern synthetic drugs is plant-derived medicine. Many investigators submitted their work on the similar aspect and their reports support this investigation revealing that plants are potent anthelmintic agents<sup>35</sup>. It was observed from the study that, the hydroalcoholic extracts of *Martynia annua* L and *Pentane ma indicum* plant demonstrated anthelmintic activity. Concentration of extracts (10, 20, 50 mg/ml) and standard drug albendazole (20 mg/ml) were used in this study. The test samples of *Aerva lanata* leaf all concentrations exhibited significant dose-dependent anthelmintic activity in earthworms in comparison to that of the standard of albendazole. Best action obtained in 50mg/ml of HAEAL ( $14 \pm 2.31$ min) The findings of this test results revealed that, the extract exhibited not only paralysis but also death of earth worms

and the calculated

time for paralysis and death of earthworms were inversely proportional to the plant extract concentration. Previous study data reported that the presence of phenols, tannins, alkaloids, and terpenoids may be responsible for exhibiting anthelmintic activity. Therefore, albendazole is a cellular integrity tubulin inhibitor type of broad-spectrum anthelmintic activity. Likely, test samples possessing this type of inhibition were performed, mechanism was not properly further study requires to define the mechanism of these plant extracts. The HAEAL exhibited a more significant activity than the standard treated group.

## VI. CONCLUSION

In conclusion, hydroalcoholic extracts of *Aerva lanata* leaf shows in cause helminthes infection *Aerva lanata* leaf shows more significant anthelmintic action over broad-spectrum albendazole. So in case of unspecified infections, this multipotent plant extracts combination is much beneficial and nontoxic as compared to synthetic medicines. Further isolation and characterization of phytoconstituents and In-vivo evaluations are needed to explore this extracts as phytomedicines against pathogenic microorganisms.

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