Asian J Biol Life Sci., 2025; 14(3):636-640.
https://ajbls.com

Research Article

Phytochemical Screening and Anthelmintic Activity of Hydroalcoholic Extract of Leaves of *Sphaeranthus indicus*

Katta Vinith Reddy[1], Chikkudu Vinay[1], Yeluguri Vinay[1], Subiya Tahniyat[1], Mohd Azharuddin[2,*], Maram Chinnaeswaraiah[3]

[1]Department of Pharmacy, Anurag Pharmacy College, (Affiliated to JNTUH Hyderabad), Kodad, Telangana, INDIA.
[2]Department of Pharmacy Practice, Anurag Pharmacy College, (Affiliated to JNTUH Hyderabad), Kodad, Telangana, INDIA.
[3]Department of Pharmacognosy, Anurag Pharmacy College, (Affiliated to JNTUH Hyderabad), Kodad, Telangana, INDIA.

ABSTRACT

Background: The traditional uses form the basis of the evaluation and confirmation of the pharmacological properties of various plant species which makes the clinical claims extremely vital. Variably, medicinal plants have been a source of natural activity and phytochemical components, which is significant in the management of most human ailments. Due to its tremendous folk medicinal and traditional use, the *Sphaeranthus indicus* has been placed under greater scrutiny to gauge and certify its therapeutic possibilities and clinical permission. **Aim:** To Carry out Phytochemical Screening and Anti helminthic activity of hydroalcoholic extract of the plant. **Materials and Methods:** The *Sphaeranthus indicus* plant leaves were shade dried and coarsely powdered then sieved using mesh number 10 and resultant powder was subjected to hydroalcoholic extraction by maceration method. After the maceration process, the extract was filtered through quadruple-layered muslin cloth to separate the plant residue. The filtrate was then concentrated and was subsequently utilized for phytochemical screening, anthelmintic activity etc. **Results and Discussion:** Findings showed that the hydroalcoholic extract had considerable anthelmintic properties with the most potent effect being portrayed at the highest concentration.

Keywords: *Sphaeranthus indicus*, Anthelmintic Activity, Phytochemical Analysis, Hydroalcoholic Extract.

Correspondence:
Mr. Mohd Azharuddin
Assistant Professor, Department of Pharmacy Practice, Anurag Pharmacy College, (Affiliated to JNTUH Hyderabad), Kodad, Telangana, INDIA.
Email: azharclinicalrx@gmail.com

Received: 14-07-2025;
Revised: 05-09-2025;
Accepted: 25-11-2025.

INTRODUCTION

Before the development of synthetic drugs, man depended on the therapeutic properties of medicinal plants. Some individuals value plants because of the old belief that they were made to give humans food, medicine, and other advantages.[1] Medicinal herbs, which are traditionally medicine plants, have been in use since prehistory practices. Hundreds of chemical compounds produced by the plants are used to perform several purposes such as defence and safeguard against insects, diseases, and herbivorous mammals.[2]

Antioxidant protection is noticed at various levels. Other useful components of the medicinal plants are the ingredients of the functional foods. Therefore, the general awareness of the world of Ayurveda and the Indian herbals may hopefully be facilitated by the data on the evidence-base of the plants. This will bear good fruit in the next few years.[3,4]

The pharmaceutical industry has not been very eager to develop herbal medicines since the process of drug development involves the definition of quality, safety, efficacy and marketing plan, as well as the strict adherence to administrative procedures. On the same note, there has been little concern among medical practitioners about their use. The trend has presented economic problems in the low- and middle-income countries. This paper argues the advantages and the shortcomings of developing and commercializing plant-based drugs and the potential of the same in the future.[5]

There has been a steady rise in the collection of medicinal plants based on wild sources and an increase in the demand for wild harvested products has been observed especially in Europe, North America and Asia where wild harvested products are used annually increasing by about 8-15% in the last few decades.[6,7]

The native plant of the family Asteraceae, *Sphaeranthus indicus* represents a member of the genus Sphaeranthus that is an aromatic herb, spreading in nature, with glandular, pubescent stems and branches, and having purple or pink flowers. It has winged teeth and serrated alternate leaves. As part of inflorescence, the plant produces terminal, globular violet flower heads. It is generally

OPEN ACCESS
ScienScript

DOI: 10.5530/ajbls.20250023

Copyright Information :
Copyright Author (s) 2025 Distributed under Creative Commons CC-BY 4.0

Publishing Partner : ScienScript Digital. [www.sciencript.com.sg]

called East Indian globe thistle in English but is named in different ways in the different local languages e.g. Mundi or Gorkhmundi in Hindi, Bengali, Marathi, and Gujarati; Adakkamaniyan in Malayalam and Boddatarupa or Boddasoramu in Telugu.[8]

In Sanskrit the name of Mundi is referred to as something that destroys or defends. It is extolled in ancient Ayurvedic texts as one of the best medhyarasayana, an herb that increases intelligence and thinking ability. Multiple synonyms of reference in classical literature refer to it as Sravani, Tapodhana, Pavani, Bhiksu, Tikta, Sravana, and Sirsaka. There is also, in the literature, a greater amount of this plant, which is known as Vahamundi, having different names, as Lobhaniya and Chhinna Granthinika. Assessed as one of the powerful rejuvenator, Mundi is particularly effective in remedying disorders associated with Vata dosha and is predominantly used to remedy the ailments like mental exhaustion, epilepsy, and headaches as it is nervine.[9]

Sphaeranthus indicus Linn. has a respectable Stand in Ayurvedic system of medicine and *Sphaeranthus indicus* Linn. is traditionally being utilized in various disorders like epilepsy, problems of the mind, migraine, jaundice, liver disease, DM, leprosy, fever, chest pain, cough, digestive disorders, Hernia, piles, worm husbandry, indigestion and skin diseases. Its pharmacological effects described as Numerous scientific studies have substantiated the effects of hypotensive, anxiolytic, neuroleptic, hypolipidemic, immunomodulatory, an antioxidant, anti-inflammatory, bronchodilatory, antihyperglycemic and hepatoprotective effects. The phytochemical compounds identified in this plant include: sesquiterpene lactones, eudesmanolides, flavonoids and essential oils. The plant can be discussed in detail in terms of its morphology, chemical constituents, traditional use, and in terms of pharmacological activities, indicating its major therapeutic potential.[10]

MATERIALS AND METHODS

Assortment of Plant

The plant of *Sphaeranthus indicus* were assorted from Kodad regions of Suryapet Dist. T.S. The plant was shade-dried, pounded and kept in an air-tight container. The end product was a powder and this powder was extracted.

Extract Preparation

The shade-dried leaves of *Sphaeranthus indicus* (family: Asteraceae) were coarsely powdered and sieved using mesh number 10. An accurately weighed 150 g of the resulting powder was then subjected to HAE using the maceration method.

To preserve the sample-to-solvent ratio during extraction, the mixture was covered with aluminum foil to minimize solvent evaporation. After the maceration process, the extract was filtered through quadruple-layered muslin cloth to separate the plant residue. The filtrate was then concentrated, and the extract was evaluated for its percentage yield, color, and consistency. The final extract was subsequently utilized for preliminary phytochemical screening, quantitative analysis of phytoconstituents, and assessment of anthelmintic activity.

Screening of phytochemicals

To analyze the various chemical constituents of the extract,[11-14] qualitative phytochemical screening was done using the normal techniques after obtaining the extract.

Quantitative estimation of total flavonoids

To quantitatively determine the total flavonoid content in the hydroalcoholic extract of *Sphaeranthus indicus*, the following procedure was employed: A 250 mL beaker was used to combine 2.50 g of the plant extract with 50 mL of 80% aqueous methanol. The mixture was closed and was left to rest overnight. The process was repeated after decanting the supernatant two more times, all of which were done with an equal measure of ethanol used as the extraction reagent.

The pooled extracts were filtering on a Whatman No. 42 filter paper (125 mm). The obtained filtrate was placed in a crucible and dried on a water bath. The crucible was weighed again, after it was cooled completely in a desiccator. The percentage of flavonoid was then determined as given below:[12,13]

$$\% \text{ Flavonoids } = \frac{\text{Flavonoids weight}}{\text{Mass of sample}} \times 100$$

Evaluation of anthelmintic activity

The anthelmintic effect of the hydroalcoholic extract of *Sphaeranthus indicus* was tested based on the activity of the adult Indian earthworm (*Pheretima posthuma*) as the object of the experiment.[15] It conducted a bioassay by testing three varying concentrations of this extract, 10, 25 and 50 mg/mL in determining the duration of time to reach paralysis and the duration of time to reach death of the worms. The s1tandard drug of reference was the Piperazine citrate Syrup and normal saline being the control.

Earthworms were collected from moist soil, thoroughly washed with normal saline to remove any fecal matter, and grouped into four sets containing six worms each. The plant extract was initially mixed with a minimal amount of water, then diluted with saline to a final volume of 10 mL. The solutions of the test extract and standard drug were prepared accordingly and placed in separate Petri dishes, with each dish receiving a 10 mL treatment solution.

Each group of earthworms was exposed to one of the solutions: saline (control), Piperazine citrate Syrup (standard), or one of the three concentrations of *Sphaeranthus indicus* extract. The time to paralysis was recorded when the worms showed no movement even after vigorous shaking. Death was confirmed when the worms failed to respond to heat stimulation (immersion in

Table 1: Organoleptic results of extracts.

Properties	Hydro alcoholic extract
Colour	Brownish black
Odour	Characteristic
Consistency	Sticky
% Yield	5 g

water at 50°C) and exhibited a loss of motility accompanied by discoloration.

RESULTS

Organoleptic results of extract

The observation results of Hydro alcoholic extract of *Sphaeranthus indicus* leaves were given in Table 1.

Phytochemical screening

The preliminary studies on phytochemistry were investigated in accordance with the procedure talked about in chapter 2.2. The extract was tested for different phytoconstituents like proteins, steroids, saponins, tannins and phenolic compounds, flavonoids etc., using standard procedures and the results are as shown in Figure 1 and Table 2.

Phytochemicals quantification

The most important group of polyphenols to the human diet is the group of flavonoids usually found in plants. Consequently, the total amount of flavonoid of a hydroalcoholic extract of *Sphaeranthus indicus* leaves was calculated and summarised in Table 3.

In vitro Anthelmintic activity of *Sphaeranthus indicus*

Preliminary phytochemical analysis of the hydroalcoholic extract of *Sphaeranthus indicus* (SIHAE) confirmed the presence of various bioactive compounds, including tannins and phenols, flavonoids, saponins, and steroids (Table 2). The anthelmintic activity of SIHAE was found to be comparable to that of the standard drug, piperazine citrate. Notably, at a concentration of 25 mg/mL, the extract demonstrated significant anthelmintic efficacy, with paralysis and death times recorded at 23 min and 38 min, respectively-closely matching the effects observed with piperazine citrate at the same concentration. Furthermore, the extract exhibited a dose-dependent response in its anthelmintic action, as presented in (Table 4 and Figure 2).

Earthworms exhibit locomotion primarily through ciliary movement, aided by a mucilaginous outer layer composed of complex polysaccharides. This slimy coating facilitates smooth movement. However, damage to the mucopolysaccharide layer can compromise this outer surface, restricting mobility and potentially leading to paralysis. Such impairment may ultimately result in death due to the disruption of normal physiological functions.

Table 2: Phytochemical screening.

Chemical constituents	Hydro alcoholic extract
Carbohydrates	Absent
Proteins	++++
Amino acids	Absent
Tannins	++++
Glycosides	++++
Alkaloids	Absent
Flavonoids	+++
Steroids	++++
Saponins	+
Gum	Absent

Note: ++++ = Abundantly, ++= Moderately, + = Small amount present.

Anthelmintic agents typically act by either starving the worms or inducing paralysis. Since parasitic worms lack the ability to store energy reserves, they must feed continuously to sustain their metabolic processes. Therefore, any interruption in nutrient intake for even a short period (such as 24 hr) can lead to energy depletion and death. Similarly, if the worms are paralyzed, they lose their ability to maintain attachment within the host's gastrointestinal tract, which also results in their elimination.

Phytochemical analysis of the *Sphaeranthus indicus* hydroalcoholic extract revealed the presence of proteins, tannins, flavonoids, saponins, and steroids. Among these, tannins are believed to exert anthelmintic effects by disrupting energy metabolism, possibly through the uncoupling of oxidative phosphorylation. Additionally, tannins may enhance protein availability and absorption, thereby contributing to their biological activity against parasitic organisms.

This effect is attributed to the ability of tannins to form protein-tannin complexes in the rumen. These complexes remain stable under the neutral pH of the rumen but dissociate under the acidic conditions of the stomach, thereby releasing additional protein for absorption and metabolism in the small intestine of ruminant animals. Additionally, alkaloids may exert their effect by acting on the central nervous system, leading to paralysis in earthworms.

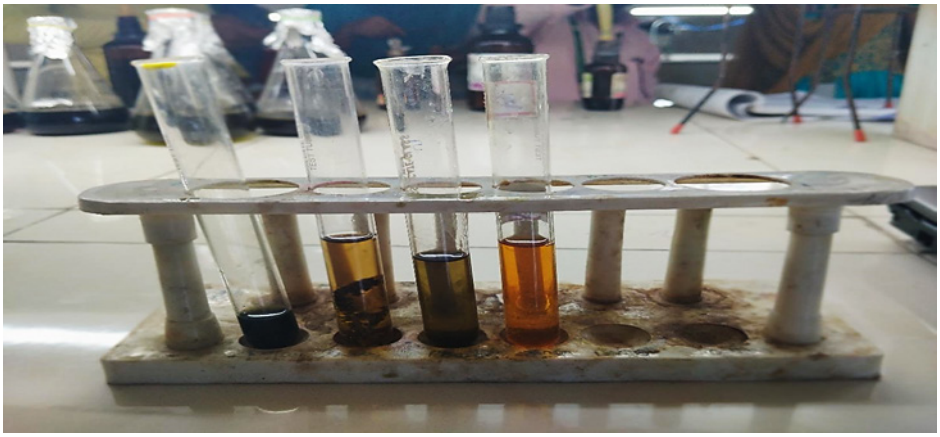

Figure 1: Phytochemical screening of *Sphaeranthus indicus*.

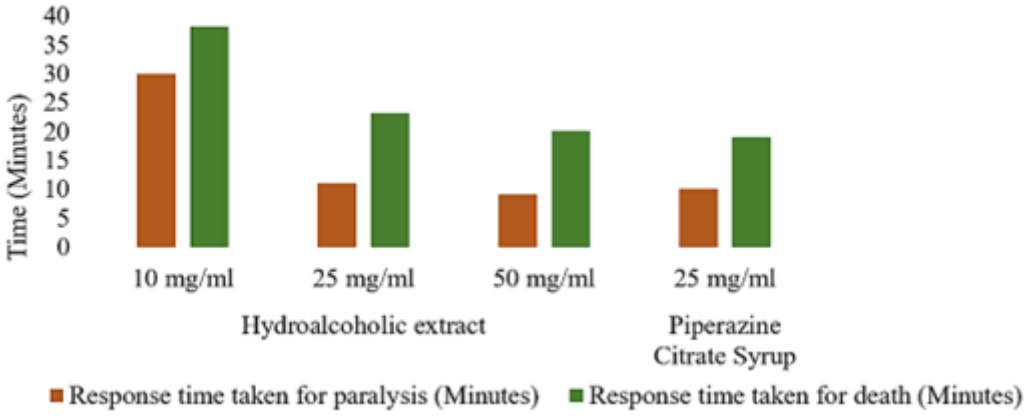

Figure 2: Graphical representation of *in vitro*-anthelmintic activity of SIHAE.

Table 3: Quantitative analysis of hydroalcoholic extract's flavonoids.

Phyto chemical	Weight of sample	Weight of dried extract	% yield
Flavonoids	5	1.98	39.6

Table 4: *In vitro* Anthelmintic activity of *Sphaeranthus indicus* extract.

Groups	Conc.(mg/mL)	Response Time taken for paralysis (min)	Time taken for death (min)
Normal control	-	-	-
Hydro alcoholic extract	10 mg/mL 25 mg/mL 50 mg/mL	30 min 11 min 09 min	38 min 23 min 20 min
Piperazine citrate Syrup	25 mg/mL	10 min	19 min

CONCLUSION

The following are the conclusions from the investigations.

- The Hydroalcoholic extract was prepared from leaves of *Sphaeranthus indicus* as per procedure.
- Based on the chemical constituents present in the extract, we had chosen hydroalcoholic extract for evaluation of anthelmintic activity.
- On the basis of this paper, it can be concluded that active components attributed to anthelmintic activity occur in the hydroalcoholic extract of *Sphaeranthus indicus*.

- Since, Phyto-constituents are also numerous, the plant has equally numerous medicinal properties.
- More research may be conducted on the plant to get to know more about the plant.
- Through the result, we discovered that hydroalcoholic extract are of high anthelmintic activity.
- Future research will also highlight isolation and identification of active components that cause anthelmintic effects of the extract of *Sphaeranthus indicus*.

ACKNOWLEDGEMENT

We sincerely thank the administration of Anurag Pharmacy College, Ananthagiri, Kodad for giving us this valuable opportunity.

ABBREVIATIONS

SIHAE: *Sphaeranthus indicus* Hydro Alcoholic Extract; **DM:** Diabetes Mellitus; **HAE:** Hydro Alcoholic Extract.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

SUMMARY

The hydroalcoholic extract of *Sphaeranthus indicus* leaves was selected for the study based on its chemical constituents. The findings suggest that this extract possesses notable anthelmintic activity, likely due to the presence of active phytochemicals. Given the wide range of phytoconstituents in the plant, it is believed to have multiple medicinal properties. The results highlight the potential of the hydroalcoholic extract in combating parasitic infections, and further research is recommended to isolate and identify the specific components responsible for this effect.

REFERENCES

1. Davidson-Hunt I. Ecological ethnobotany: stumbling toward new practices and paradigms.*MASA* J. 2000;16: 1-13.
2. Gershenzon J, Ullah C (January 2022). "Plants protect themselves from herbivores by optimizing the distribution of chemical defenses".*Proc Natl Acad Sci USA*. 119 (4). B ibcode:2022PNAS.11920277G. DOI:10.1073/pnas.2120277119. PMC 8794845. PMID 35084361.
3. Patwardhan, B., Warude, D., Pushpangadan, P., and Bhatt, N. Ayurveda and traditional knowledge systems: A global prospective. Current Science, 2005; 89(2): 289-98.
4. Mukherjee, P. K., and Wahile, A. Integrated approaches towards drug development from Ayurveda and other Indian system of medicines. Journal of Ethnopharmacology, 2006; 103(1): 25-35. https://doi.org/10.1016/j.jep.2005.09.024
5. Pandey, M. M., Rastogi, S., and Rawat, A. K. S. *Indian traditional Ayurvedic system of medicine and nutritional supplementation*. Evidence-Based Complementary and Alternative Medicine, 2013; Article ID 376327. https://doi.org/10.1155/2013/376327
6. Bentley R, editor.*Medicinal plants*. London: Domville-Fife Press; 2010; 23-46.
7. Semwal DP, Saradhi PP, Nautiyal BP, Bhatt AB. Current status, distribution and conservation of rare and endangered medicinal plants of Kedarnath Wildlife Sanctuary, Central Himalayas, India.*Curr Sci India*. 2007;92: 1733-8.
8. Kommu, Sudhakar and Chinna, M and Sandeep, Kathoju and Shiwathmika, Gopagani. Medicinal Flora on Anurag College Campus, Ananthagiri, Kodad, Suryapet Dist, Telangana State. 2022; 21: 2309-2319. 10.37896/YMER21.12/J1
9. Anup K. Chakraborty*1, Alka Singh1, Subhendu Mishra 1,2, *et al, Sphaeranthus indicus* Linn- A Phytopharmacological review, Asian Journal of Pharmaceutical Education and Research, ISSN: 2278 7496, 2017;(6).
10. Galani, Varsha and Patel, B and Rana, D. *Sphaeranthus indicus* Linn. A phytopharmacological review. International journal of Ayurveda research. 2010; 1: 247-53. 10.4103/0974-7788.76790.
11. K.R. Khandelwal *et al.* Practical Pharmacognosy techniques and experiments, Niraliprakashan 28th edition, 2017; 25.1-25.9.
12. A. Poongothai. Qualitative and quantitative phytochemical analysis of *Lantana camara* leaf extract. Journal of emerging technologies and innovative research. 2019; 6(12): 603-7.
13. Sudhakar Kommu, M. Chinna Eswaraiah, Shaik Nazeer, Pendyala Shirisha, Phytochemical Screening and Quantitative Determination of Phytochemicals in Hydro alcoholic extract of *Cleome gynandra* L. Whole plant, High Technology Letters, 2022;(28)8: 961-72.
14. Kokate, C.K.; Purohit, A.P; Gokhale, S.B. Pharmacognosy, 54th edition, Pune, Nirali Prakashan, 2017;A.22- A. 27.
15. Sudhakar Kommu M. Chinna Eswaraiah *et al.*, *In vitro* Anthelmintic Activity of *Tamilnadia uliginosa* Fruits, Research J. Pharm. and Tech. 2019: 12(1): 321323.

Cite this article: Reddy KV, Vinay C, Vinay Y, Tahniyat S, Azharuddin MOHD, Chinnaeswaraiah M. Phytochemical Screening and Anthelmintic Activity of Hydroalcoholic Extract of Leaves of *Sphaeranthus indicus*. Asian J Biol Life Sci. 2025;14(3):636-40.