

PHYTOCHEMICAL SCREENING AND ANTI MICROBIAL STUDIES OF *HEMIDESMUS*  
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**ABSTRACT:** Many forms of alternative medicines were available for those who cannot be helped by conventional medicine. Ayurvedha and Herbal medicine were two important forms of alternative medicine that was widely available in India. This work was mainly concerned with the identification of the therapeutic properties of *Hemidesmus indicus*. The ethanolic extract of hemidesmus indicus root was used for its anti oxidant and antimicrobial activity. Hemidesmus indicus root extract has very well anti oxidant and anti microbial activity. The ethanolic extract of Hemidesmus indicus was checked for anti microbial activity against pathogenic bacteria such as *staphylococcus aures*, *pseudomonas aeruginosa* and *fungi Aspergillus niger*.

**Key words:** Hemidesmus indicus, Antioxidant activity, anti microbial activity, phytochemical screening.

**INTRODUCTION**

*Hemidesmus indicus* commonly known as Indian Sarsaparilla, belonging to the family Asclepiadaceae, is a slender laticiferous, twining, sometimes prostrate or semi erect shrub, occurring over the greater part of India. Roots are woody and aromatic; stems numerous, slender, terete, thickened at the nodes; leaves opposite, short-petioled, very variable, elliptic-oblong to linear-lanceolate often variegated with white above, sometimes silvery white and pubescent beneath, flowers are greenish outside, purplish inside, crowded in subsessile axillary cymes; follicles are slender, four inches long, cylindrical, sometimes curved, divaricate; seeds numerous, black, flattened, with a silvery white coma. This is a common medicinal plant widely used in Indian Systems of Medicine (Anonymous, 1997) and also an official drug in Indian Pharmacopoeia (Anonymous, 1996) and British Pharmacopoeia (Anonymous, 2003). Various market samples are available in the name, identified as *H. indicus*, *Decalepis hamiltoni* and *Cryptokpis buchanani* belonging to the family Asclepiadaceae; *Lechnocarpa frutescens* and *Vallisneria spiralis* of the family Apocyanaceae. Apart from this *H. indicus* exists with two variants namely var. *indicus* and var. *pubescens*, which are not given much emphasis. Hence the review was carried out to enumerate the benefits of *H. indicus* (Anonymous (1986, 1997), Mukherjee, 1980). The roots are used as antipyretic, anti-diarrhoeal, astringent, blood purifier, diaphoretic, diuretic, refrigerant and tonic (Anonymous, 1986, 1997; Nadkarni, 1989). Roots are useful in biliousness, blood diseases, dysentery, diarrhoea, respiratory disorders, skin diseases, syphilis, fever, leprosy, leucoderma, leucorrhoea, itching, bronchitis, asthma, eye diseases, epileptic fits in children, kidney and urinary disorders, loss of appetite, burning sensation and rheumatism (Mukherjee, 1953; Chandra et al 1995; Anonymous, 1986; Nadkarni, 1989). Root bark is used to cure dyspepsia, loss of appetite, nutritional disorders, fever, skin diseases, ulcer, syphilis, rheumatism and leucorrhoea (Nadkarni, 1989). Stem of *H. indicus* is used as diaphoretic, diuretic, laxative and in treating brain, liver and kidney diseases, syphilis, sleet, urinary discharges, uterine complaints, leucoderma, cough and asthma (Bhandary et al 1995).

## MATERIAL AND METHODS

### Collection of Plant Materials

The fresh and healthy roots of *Hemidesmus indicus* were collected. The plant specimens were identified in Department of Biotechnology, Sri krishnadevaraya University, Anantapuram.

### Preparation of Root Extract of *Hemidesmus indicus*

The extraction of roots of *Hemidesmus indicus* was carried out using known standard procedures. The roots were dried in shade and powdered in a mechanical grinder. The powder (10.0 g) was initially defatted with ethyl alcohol by using a Soxhlet extractor for 72 hours at a temperature not exceeding the boiling point of the solvent. The extracts were filtered using Whatman filter paper (No.1) while hot, concentrated in vacuum under reduced pressure using rotary flask evaporator, and dried in a desiccator. The ethyl alcoholic root extract yields a dark reddish residue weighing 4.50 g (45.0% w/w). This crude extracts of ethylalcohol was used for further investigation for potential of antimicrobial properties.

### Preliminary Phytochemical Screening

The root extracts were subjected to preliminary phytochemical testing to detect for the presence of different chemical groups of compounds. Air-dried and root powder was screened for the presence of saponins, tannins, alkaloids, flavonoids, triterpenoids, steroids, glycosides, anthraquinones, coumarin, saponins, gum, mucilage, carbohydrates, reducing sugars, starch, protein, and amino acids.

### Test Microorganisms and Growth Media

*Staphylococcus aureus* (MTCC 3160), *Pseudomonas aeruginosa* (MTCC 1688) and fungal strain *Aspergillus niger* (MTCC 1785) were chosen based on their clinical and pharmacological importance. The bacterial strains obtained from Department of Microbiology, Osmania University, were used for evaluating antimicrobial activity. The bacterial and fungal stock cultures were incubated for 24 hours at 37°C on nutrient agar and potato dextrose agar (PDA) medium, respectively, following refrigeration storage at 4°C. The bacterial strains were grown in Mueller-Hinton agar (MHA) plates at 37°C (the bacteria were grown in the nutrient broth at 37°C and maintained on nutrient agar slants at 4°C), whereas the fungi were grown in Sabouraud dextrose agar and PDA media, respectively, at 28°C. The stock cultures were maintained at 4°C.

### Antimicrobial Activity

Whatman No: 1 filter paper discs of 6mm diameter are prepared and autoclaved by keeping in a clean and dry Petri plate. The filter paper discs were soaked in plant extracts for 6 hours are taken as test material. After 6 hours the discs were shade dried. The concentrations of root extracts per disc are accounted for 0.1 grams/1ml. Subsequently they are carefully transferred to spread on cultured Petri plates. Filter paper discs immersed in ethanol, benzene, distilled water are prepared and used as control.

### Testing of antimicrobial activity:

To test the antimicrobial activity on agar plates, LB agar medium was prepared using the ingredients mentioned above. The medium was sterilized at 121°C for 30 min's. The agar test plates were prepared by pouring about 15ml of the medium into 10cm Petri dishes under aseptic condition and left undisturbed for 2hrs to solidify the medium. 1ml of inoculum (containing suspension) of *P.aeruginosa* and *Sta.aureus* was poured to the respective plates separately containing solidified agar media. Six replicates were maintained. The prepared sterile whatman no :1 filter paper discs of 6mm diameter were impregnated with the extracts and shaken thoroughly and this test plates incubated for a period of 48 hrs in BOD at 37°C for the development of inhibitory zones and the average of 2 independent readings for each organism in different extracts were recorded. The control Petri plates and also maintained above respective cultures

### Measuring the diameter of inhibition zone:

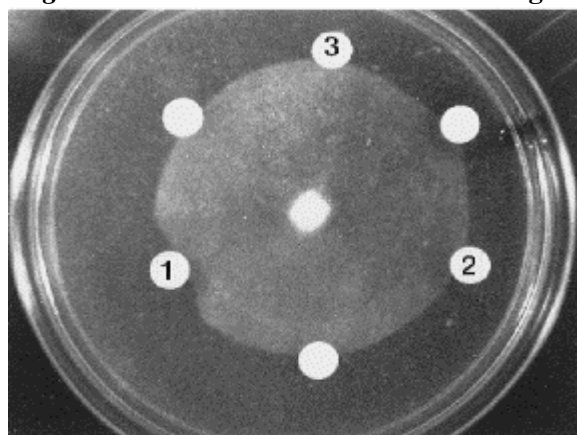
The inhibition zones were lead after 1 day at 37°C for bacteria. The diameter of the inhibition zone was measured and recorded with the aid of plastic ruler. 7 paper discs placed in 1 Petri plate.

## RESULTS AND DISCUSSION

It was found that ethyl alcoholic extracts of *Hemidesmus indicus* roots contained tannins, flavonoids, saponins, triterpenoids, steroids, glycosides, anthraquinones, reducing sugars, carbohydrates, proteins, and amino acids.

### Antimicrobial activity

Ethanol extract of *Hemidesmus indicus* root

Fig 1: *Pseudomonas aeruginosa*Fig 2: *Staphylococcus aureus*Fig 3: *Aspergillus niger*Table 1: Inhibitory activities of Root extract of *Hemidesmus indicus* on microorganisms

Plants	Zone of inhibition (MIC)		
	<i>Pseudomonas aeruginosa</i> (-ve) (mm)	<i>Staphylococcus aureus</i> (+ve) (mm)	<i>Aspergillus niger</i> (mm)
<i>Hemidesmus indicus</i>	3.4	2.3	0.8

## PHYTOCHEMICAL SCREENING OF PLANT LEAVES IN DIFFERENT EXTRACTS

Table 2: *Hemidesmus indicus* phyto chemical Screening

S.No	Secondary metabolites	Hexane	Ethyl acetate	Ethanollic	Aqueous
1	Steroids	++	+	+	+
2	Triterpenes	-	++	+	-
3	Saponins	++	-	-	++
4	Tri terpinoidal saponins	-	-	-	+
5	Alkaloids	+	++	++	+
6	Carbohydrates	-	-	+	-
7	Flavonoids	+	++	+	+
8	Tannins	++	-	++	+
9	Glycosides	+	+	+	+
10	Polyphenols	+	++	+	++

**CONCLUSION**

In the present study it was found that *Hemidesmus indicus* root extract has an excellent antimicrobial activity. The pathogenic bacteria like *Pseudomonas aeruginosa*, *Staphylococcus aureus* and fungus *Aspergillus niger* were inhibited in presence of the root extracts of *Hemidesmus indicus* ethanolic extract. Therefore the future studies should be aimed to exploit this plant to be used as one of the best medicinal plant is controlling pathogenic bacteria.

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ISSN : 0976-4550

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