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Phytochemical Screening of *Hemidesmus indicus* Leaf Extracts

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ABSTRACT

Hemidesmus indicus Linn commonly known as '*Anantmool*' belonging to the family Asclepiadaceae is highly valued plant for home garden and commercial cultivation. It is also known as "Indian Sarsaparilla". In the present investigation, leaves of *H. indicus* were extracted with four solvents viz. chloroform, methanol, ethanol and water. Phytochemical screening showed the presence of alkaloids, carbohydrates, protein, lipds, saponins, glycosides, resins, tannins, steroids and tannins in leaf extracts of solvents. The present study opens a window for future research on the chemical identification of these phytochemicals in leaves of *H. indicus.*

***Key words*:** *Hemidesmus indicus* Linn, Phytochemical, Bio-active compound. Leaf extracts

Hemidesmus indicus is a semi-erect shrub found throughout India from upper Gangetic plain eastwards to Assam and throughout central, western and southern India [1]. The name "Hemidesmus" is derived from Latin word "Hemidesmos" which means 'half bond'. It is so named in allusion to sub connate filaments at their base – joint pods and connected stamens. Word "indicus" stands for 'of India'. *Hemidesmus indicus* belongs to family Asclepiadaceae which is derived from word "Askleplos" – means 'God of Medicine' [2]. It's vernacular name "Anantmul" is a Sanskrit word which means 'endless root' [3]. It is also known as "Indian Sarsaparilla" *Hemidesmus indicus* is a slender, laticiferous twining shrub. Leaves are opposite, shortly petioled, elliptically oblong to linear lanceolate. Flowers are greenish outside but purplish inside. Seeds are black, flattened with a silvery white coma [4].

Hemidesmus indicus has good property of blood purification and bears potential for the treatment of ulcers, fever, loss of appetite, gastritis, menorrhagia, diarrhea, diabetes, Anti-arthritic and various phytoconstituents and antioxidant activity [5]. Extract of Hemidesmus indicus leaves is used for several activities like antifungal, antibacterial, antimicrobial, antioxidant and antiacne [6]. Phytochemicals are plant derived chemicals, beneficial to human health and having the capability of disease prevention [7]. Secondary metabolites from this plant are an important source of drugs since ancient times. Secondary metabolites of plants like alkaloids, tannins, flavonoids, saponins, glycosides etc. are of pivotal importance. Chemical evaluation of the plants for secondary metabolites includes qualitative, quantitative and biochemical tests. In the present investigation qualitative chemical tests are carried out for identification of various phytoconstituents.

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MATERIALS AND METHODS

Sample collection

The sample of *Hemidesmus indicus* in the present investigation was collected from study site Dindori district of Madhya Pradesh. The plant was identified from the existing literature at the same time material was compared with herbarium specimen sheet available in State Forest Research Institute, Jabalpur and/or Tropical Forest Research Institute, Jabalpur, Authentic plant material was preserved as Herbarium specimen. The specimen is deposited vide no. 17699 and 1770.

Solvent extract

The dried samples were ground into the fine powder using a blender. The powder was dissolved in different solvents like Chloroform, Methanol, Ethenol and Water. Extraction was carried out in Soxhlet apparatus. The extract was then distilled for individual samples separately with the solvents and the filtrate was collected and it was concentrated by evaporating the solvent to get final stock.

Phytochemical studies

Phytochemical screening was carried out using standard methods by [8-10]. The adopted methods are given in (Table 1).

Table 1 Methods of phytochemical tests

Phytochemical	Test	Positive observation
Protein	In -1 ml of extract + 0.2 ml of nitric acid.	White precipitate indicated presence of protein.
Amino acid	Take 0.5 gm extract add 0.25% ninhydrin reagent and boiled for few minute.	Formation of Blue color/ bluish black color indicate presence of amino acid.
Lipid	In 1 ml of plant extract, few drops of Sudan III were added.	Red colour indicated presence of lipid.
Carbohydrates	1 ml of extract was added to 1 ml of Benedict's reagent and heated for 5 min.	Formation of orange precipitate indicated the presence of carbohydrate.
Alkaloids	1 ml of extract + 1% HCland 6 drops of Mayer's reagent and few drops Dragendorff's reagent.	Orange precipitate indicated the presence of alkaloids.
Tannins	In 5 ml of extract was added few drops of 1 % lead acetate	A yellow precipitate indicate the presence of tannin.
Flavonoids	5 ml of dilute ammonia solution were added to a portion of filtrate of extract followed by addition of con. H_2SO_4	A yellow coloration is observed which confirmed the presence of flavnoids.
Saponins	5 ml of extract was added to 20 ml of distilled water and agitated in graduated cylinder for 15 min.	The formation of a layer of foam indicated the presence of saponin.
Sterols	In 0.5 ml of the extract, 2 ml of con. Sulphuric acid was added from the side of the test tube. The test tube was shaken for few minute.	The development of red colour in the chloroform layer indicated the presence of sterols.
Glycosides	5 ml of extract was treated with 2 ml of glacial acetic acid containing a drop of $FeCl_3$ solution. This was then underplayed with 1 ml con. H_2SO_4	a brown ring at the interface indicates a deoxy sugar characteristic of glycosides.
Resins	In a dry test tube 2 ml of acetic acid and 2 drops of sulphuric acid were added to 0.5 ml of plant extract.	A purple colour was obtained which changed to violet within 10 min this indicated the presence of resins.

RESULTS AND DISCUSSION

Leaf extracts of *Hemidesmus indicus* were prepared in various solvents viz. Chloroform, Methanol, Ethanol and Water. A number of phytochemical tests were performed using standardized methods and the results are presented in (Table 2). The qualitative phytochemical analysis of the extracts, prepared using Chloroform; Methanol, Ethanol and Water, were performed to identify the presence of different beneficial compounds in the studied samples. The above four types of extracts of leaf of *Hemidesmus indicus* showed the presence of phytoconstituents including primary metabolites viz. protein, amino acid, lipids and carbohydrates and in the secondary metabolites like alkaloids, tannins, flavonoids, saponins, sterols, glycosides and resins.

Table 2 Comparative analysis of presence of different compounds in chloroform, methanol, ethanol and water extracts of leaf of *Hemidesmus indicus*

Compounds	Chloroform	Methanol	Ethanol	Water
Protein	+	+	+	+
Amino acids	+	+	-	+
Lipids	-	+	+	+
Carbohydrate	-	+	+	+
Alkaloids	+	+	+	+
Tannins	+	+	+	+
Flavonoids	+	+	+	+
Saponins	-	+	+	+
Sterols	+	+	+	+
Glycoside	+	+	+	+
Resin	+	+	+	+

(+) - Indicates the presence of the phyto-constituent

(-) - Indicates the absence of the phyto- constituent

Chloroform extract of leaves showed the presence of primary metabolites like protein and amino acid while absence of Lipis and Carbohydrates, So also the presence of secondary metabolites viz. alkaloid, tannins, flavonoids, steroid, glycoside and resin while absence of saponin. Methanolic extract of leaf showed the presence of phyto-constituents including protein, amino acids, lipids, carbohydrates, alkaloids, tannins, flavonoids, saponin, sterols, glycoside, and resins. Ethanolic extract of leaf demonstrated the presence of all the phyto-constituents listed in (Table 2), except amino acids. Aqueous extract of leaf showed the presence of all phyto-constituents tested. The results of phytochemical analysis of *Hemidesmus indicus* (leaves) from different extracts are quite similar to the results obtained by [11].

CONCLUSION

The result of present investigation clearly indicates that the phytochemical screening of qualitative estimation of plant leaves, studied is rich source of medicinally active metabolites. Among the four solvents, the methanolic and Aqueous extract proved to be superior over other.

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