Chemistry Research Journal, 2022, 7(1):34-38

Available online www.chemrj.org

Review Article

ISSN: 2455-8990
CODEN(USA): CRJHA5

Therapeutic Effects of *Hemidesmus indicus*- An Overview

Dias Wilfred*, Rathore Renu

* Research Scholar, Faculty of Science, B N University, Udaipur, Rajasthan, 313002

Abstract From the time immemorial, herbal medicines have been used globally as curative agent for variety of ailments as they are having few or no side-effects. *Hemidesmus indicus* belongs to the family Asclepiadaceous and is commonly known as Indian sarsaparilla and East Indian sarsaparilla. It is distributed throughout the tropical and subtropical parts of India, especially in upper Gangetic plains, Bengal, Madhya Pradesh, and South India. This plant contains the following: Pregnane glycoside, Coumarinolignoids, β-amyrin acetate, α-amyrin, β-amyrin, Lupeol acetate, β-sitosterol, Hexadecanoic acid, Hexatriacontane, Lupeoloctasonate, etc. It is a perennial, slender, twining undershrub with woody and fragrant rootstock. *Hemidesmus indicus* possesses following activities analgesic, anti-inflammatory, antipyretic, antiarthritic, antioxidant, antiacne, antipsychotic, anti-diarrhoeal, wound healing, antiulcer, larvicidal, antivenom, antihyperlipaedaemic, antimicrobial, anti-carcinogenic etc. The aim of this review is to provide an overview of comprehensive account of the phytochemical investigation, therapeutic potential and pharmacological studies of the plant *Hemidesmus indicus*.

Keywords *Hemidesmus indicus*, herbal medicines, analgesic, Indian sarsaparilla, Anamtamul

Introduction

Herbal plants are being used globally since the time immemorial, either as a single drug or in combination to provide new remedies as they are having few or no side-effects. Herbal medicines are easily available and are cheaper than other medicines [1].

Hemidesmus indicus belongs to the family Asclepiadaceous and is commonly known as Indian sarsaparilla and East Indian sarsaparilla [2].

Root is the most useful part of *Hemidesmus indicus* which is having different pharmacological activities like antimicrobial, anti-enterobacterial, anti-acne, anti-oxidant, hepatoprotective, anti-inflammatory, etc [3].

Taxonomical Classification [4]

Kingdom	:	Plantae
Division	:	Magnoliophyta
Class	:	Magnoliopsida
Order	:	Gentianales
Family	:	Apocynaceae
Subfamily	:	Asclepiadoideae
Genus	:	*Hemidesmus*
Species	:	*Indicus*

Vernacular names [5]

Sanskrit	:	DhawalaShariva, Gopa, Gopakanya, Krushodari, Sfota, Shyama, Gopavalli, Lata, Aasfota, Chandana
English	:	Indian Sarsaparilla
Hindi	:	Salsa
Marathi	:	Anantvel, Uplasari, Maeenmool
Tamil	:	Nannari
Gujarati	:	Anantmul
Kannada	:	Anamtamul
Assam	:	Ananatmul
Bengali	:	Anantmul
Malayalam	:	Nannaari
Oriya	:	Suguddimalo
Persian	:	Ushba
Urdu	:	Salsa
Telugu	:	Sugandhi

Distribution

Hemidesmus indicus is distributed throughout the tropical and subtropical parts of India, especially in upper Gangetic plains, Bengal, Madhya Pradesh, and South India. It generally occurs on sub-ravine slopes, twining on shrubs and trees [6].

Morphology

Habit

H. indicus is a perennial, slender, twining undershrub with woody and fragrant rootstock [6].

Leaves

The leaves are simple, opposite, short-petioled, very variable, elliptic-oblong to linear-lanceolate, variegated, and white above and silvery-white pubescent beneath [7].

Flowers

Flowers are having greenish yellow to greenish purple colour outside and dull yellow to light purplish colour inside.
Calyx is deeply five lobed.
Corolla gamopetalous and about twice the calyx.
Stamens are five in number, inserted near base ofcorolla with a thick coronal scale [8].

Stem

The stem is numerous, slender, terete, thickened at the nodes and of a deep purple or purplish brown colour with the surface slightly ridged [9].

Root

Roots are woody and aromatic [10].

Phytochemical Constituents [11, 12]

Phytochemical constituents isolated from different parts of the plant are as below:

Roots:

- Pregnane glycoside: Hemindicusin
- Coumarinolignoids: Hemidesmin-1 and Hemidesmin-2
- β-amyrin acetate
- α-amyrin
- β-amyrin
- Lupeol acetate
- β-sitosterol

- Hexadecanoic acid
- Hexatriacontane
- Lupeoloctasonate
- Oil: crystalline matter, glucose, hemidesmol, hemidesterol, 2-hydroxy-4-methoxy benzaldehyde, resin acid, glucoside, α-amyrin triterpene, β-amyrin triterpene, and benzaldehyde

Stem:

- Glycosides: Indicine and Hemidine
- Pregnane glycoside: Hemidescine and Emidine
- Pregnaneoligo glycosides: demicunine and heminine.
- Desinine
- Indicusin
- Medidesmine
- Hemisine
- Demicine
- Steroidal compounds: Calogenin-3-o-β-D-digitoxopyranosteroid, desminine steroid, hemisine steroid
- Triterpenoids: 3-keto-lup-12-ene-21->28 olide triterpene, lup-12-ene-3- β –ol-acetate triterpene

Leaves:

- Coumarinolignoids: hemidesminine, hemidesmin-1, hemidesmin-2
- Flavonoids: hyperoside and rutin
- Tannins (2.5%)

Flowers:

- Flavanoid glycosides viz. Hyperoside, Isoquercetin and Rutin

Pharmacology

Anticarcinogenic activity

The roots decoction of the plant showed cytotoxic effect on HepG2 cells. The extract exhibited inhibition of the growth of tumour in the skin of mouse and hence it can be considered as a potent chemopreventive agent [13]. A decoction comprised of *Nigella sativa* seeds, *Hemidesmus indicus* root bark and *Smilax glabra* rhizome has potential to provide protection against chemically induced hepatocarcinigenesis [14].

Anti-inflammatory activity

In rats acute and subacute inflammation was induced by carrageenan, bradykinin, S-hydroxy tryptamine and when it was treated with ethyl acetate root extract of *Hemidesmus indicus* it exhibited its anti-inflammatory potential [15].

Analgesic activity

Significant inhibition of writhing response, decrease in licking response in acetic acid–induced writhing response and Eddy's hot plate method were observed in Swiss albino mice when treated at different doses with hydro-alcoholic extract of *Hemidesmus indicus* [16].

It was assumed that the analgesic effect of the extract may be due to either its action on the inhibition of the production of algogenic substances or the inhibition at the central level of the transmission of painful signals [17].

Anti-pyretic activity

The anti-pyretic (brewer's yeast induced pyrexia) effect was evaluated in Wistar albino rats which was measured as percent decrease in body temperature [18].

Antioxidant activity

The aqueous extract of whole plant of *Hemidesmus indicus* exhibited significant free radical scavenging activity which indicates that the plants extract has the potential source of antioxidants and thus could prevent many radical diseases [19].

Antimicrobial activity

Combination of aqueous root extract of *Hemidesmus indicus* along with barks of *Ficus bengalensis* and *Pterocarpus marspiumroxb* exhibited antimicrobial activity against *Staphylococcus aureus, Pseudomonas aeruginosa, Klebsiella pneumonia* [20].

In agar well diffusion test, methanolic and ethanolic root extract of *H. indicus* exhibited maximum zone of inhibition against *Escherichia coli* and *Vibrio cholera* [21].

Antiacne activity

The roots extract of *H. indicus* has strong inhibitory effect on *Propionibacterium acne* and *Staphylococcus epidermis* which are responsible for acne vulgaris [22].

Antivenom

The methanolic extract of *Hemidesmus indicus* has the potential to significantly neutralized lethality and haemorrhagic activity, defibrinogenation in albino rat and mouse [23].

Anti-ulcer activity

The alcoholic extract of *H. indicus* root showed significant reduction in ulcer index at different concentrations [24].

Antidiarrhoeal activity

Aqueous and ethanolic extract of roots of *H. indicus* significantly reduced the diarrheal effects in rats by decreasing faecal droppings, intestinal transit and intestinal fluid secretion [25].

Conclusion

From the time immemorial, herbal medicines have been used globally as curative agent for variety of ailments. Studies have revealed that *Hemidesmus indicus* possesses following activities analgesic, anti-inflammatory, antipyretic, antiarthritic, antioxidant, antiacne, antipsychotic, anti-diarrhoeal, wound healing, antiulcer, larvicidal, antivenom, antihyperlipidemic, antimicrobial, anti-carcinogenic etc. Further studies and higher efforts are required to identify the novel clinical properties of this plant and to identify and isolate the particular compound which responsible for the specific therapeutic activities.

References

[1]. Chatterjee S., et al., Hemidesmusindicus: A Rich Source of Herbal Medicine, Med Aromat Plants 2014, 3:4
[2]. Lalrinpuia, et al., Pharmacological and therapeutic profile of Anantamula (Hemidesmusindicus (l.) r. br.): A comprehensive review, International Journal of Ayurveda and Pharma Research, 2017;5(11):49-57.
[3]. https://www.globalherbalsupplies.com/hemidesmus_indicus.htm
[4]. https://www.bionity.com/en/encyclopedia/Hemidesmus+indicus.html
[5]. More D. B. and Mali P., A review article on species used as sariva in different regions of india: hemidesmusindicus, ichnocrpusfrutescens, decalepishamiltoni and cryptolepisbuchanani, Ayurlog: National Journal of Research in Ayurved Science, Volume 6, (4); 1-13.
[6]. https://vikaspedia.in/agriculture/crop-production/package-of-practices/medicinal-and-aromatic-plants/hemidesmus-indicus
[7]. https://en.wikipedia.org/wiki/Hemidesmus_indicus
[8]. http://www.herbsforever.com/herbs/anantamul.asp
[9]. http://www.pioneerherbs.com/hemidesmus_indicus.htm
[10]. Jagtap A.P. and Singh N.P., Periplocaceae. In: Botanical Survey of India, Fascicles of flora of India, 1999; 24: 301–304.
[11]. Sethi A., et al., Pregnane glycoside from Hemidesmus indicus. Indian J Heterocycl Chem. 2006; 16:191-192.
[12]. Austin A., A review on Indian Sarsaparilla, Hemidesmusindicus (L.) R. Br. J Biol Sci. 2008; 8(1):1-12.
[13]. Sultana S., et al., A. Modulation of biochemical parameters by Hemidesmusindicus in cumene hydroperoxide-induced murine skin: possible role in protection against free radicals-induced cutaneous oxidatve stress and tumor promotion, J Ethnopharmacol, 2003; 85:33–41.

[14]. Aneja V., et al., Phcog Rev.: Plant Review Phyto-pharmacology of Hemidesmusindicus, Pharmacognosy Reviews, 2008; 2(3), 143-150.
[15]. Lakshman K., et al., Anti-inflammatory and antipyretic activities of Hemidesmusindicus root extract, African Journal of Traditional complementary and Alternative Medicine, 2006; 3(1): 90 – 94.
[16]. Farook S.M., et al., Assessment of Analgesic, Anti-pyretic and Anti-inflammatory activity of Hydro-alcoholic fraction of Hemidesmusindicus root in experimental animals, Scholars Research Library, Der Pharmacia Lettre, 2011;3(1): 442-447.
[17]. Magaji MG, et al., J. Med. Plants Res. 2008; 2(2): 39-44.
[18]. Farook S.M., et al., Assessment of Analgesic, Anti-pyretic and Anti-inflammatory activity of Hydro-alcoholic fraction of Hemidesmusindicus root in experimental animals. Scholars Research Library, Der Pharmacia Lettre. 2011; 3(1): 442-447.
[19]. Satheesh K.D., et al., In-vitro antioxidant activities, total phenolics and flavonoid contents of whole plant of Hemidesmusindicus (linn.), Asian J Pharm Clin Res. 2013; 6(2):249-251.
[20]. Gayathri M., and Kannabiran K., Antimicrobial activity of Hemidesmusindicus, Ficusbengalensis and Pterocarpus marsupium roxb., Indian J Pharm Sci. 2009; 71(5): 578–581.
[21]. Ratha M., et al., A. Screening of phytochemical and antibacterial activity of Hemidesmusindicus (L.) and Vetiveriazizanoides (L.), Euro. J. Exp. Bio. 2012; 2 (2):363-368
[22]. Kumar G., et al., Antimicrobial effects of Indian medicinal plants against acne-inducing bacteria, Trop J Pharm Res, 2007; 6(2):717-723.
[23]. Alam, M.I. and A. Gomes, Viper venom-induced inflammation and inhibition of free radical formation by pure compound (2-hydroxy-4-methoxy benzoic acid) isolated and purified from Anantamul (Hemidesmusindicus R. Br. root extract. Toxicon, 36: 207-215.
[24]. Korrapati V., et al., Anti-ulcer activity of Hemidesmusindicus root extract on Indomethacin induced gastric ulcer in albino Wistar rats, Journal of Pharmacy Research, 2011; 4(2):391-392.
[25]. Shalini R., and Rajan S., Antidiarrhoeal activity of aqueous and alcoholic extracts of Hemidesmusindicus root, Int J Pharm PharmSci, 2015; 7(3): 403-406.