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Phytopharmacological and toxicological overview of *hemidesmus indicus*

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Abstract

Ayurveda an ancient healing system, is a system of understanding human health that has been termed as the "Mother of All Healings. It helps preventing disease, diagnosis, and treatment through the use of a unique, personal method that is based on an evaluation of each patient's constitution. Researchers from all over the world isolated various photochemicals from herbs and recreated their effects with compound pharmaceuticals. In this review we focused about phytopharmacology of *Hemidesmus indicus* such as analgesic, antiinflammatory, antipyretic, antiarthritic, antioxidant, antiacne, antipsychotic, anti-diarrhoeal, wound healing, antiulcer, larvicidal, antivenom, antihyperlipaemic, antimicrobial, anti-carcinogenic activities.

Keywords: Ayurveda, phytopharmacology, *Hemidesmus indicus*, anti-inflammatory.

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Introduction

Ayurveda an ancient healing system, is a system of understanding human health that has been termed as the "Mother of All Healings. It helps preventing disease, diagnosis, and treatment through the use of a unique, personal method that is based on an evaluation of each patient's constitution. Traditional knowledge is connected to all medical systems around the world, either directly or indirectly. The use of these chemical medications caused a decrease in the usage of herbal medicines during the 19th century. Researchers from all over the world isolated various photochemicals from herbs and recreated their effects with compound pharmaceuticals [1]. Medicinal plants are an essential component of a nation's natural resources because they play a key role in delivering primary healthcare to the people in rural areas, operate as therapeutic agents, and

serve as vital raw materials for the production of traditional medicines. Even as ethnopharmacology primarily focuses on the presence or absence of evidence for specific therapeutic responses through the use of herbal remedies, the chemical constituent of the plants or plant extract that is responsible for the pharmacological, ethnopharmacology is heavily dependent on interaction between researchers and indigenous communities who passed on the traditional knowledge over generation [11]. It has been estimated that around 35000 to 70000 variety of plant species has been used for the production of cosmetics, medicines, and nutraceuticals. *Hemidesmus indicus* is one such plant with a wide range of uses for making baked goods, soft drinks, cosmetics, perfumes, and other traditional treatments. The plant was first placed under the family Asclepiadaceae and then transferred to Periplocaceae on basis of the pollinial characteristics and finally, it has been added to the family Apocynaceae on basis of phylogenetic reclassification [2]. *Hemidesmus indicus* possesses following activities analgesic, antiinflammatory, antipyretic, antiarthritic, antioxidant, antiacne, antipsychotic, anti-diarrhoeal, wound healing,

antiulcer, larvicidal, antivenom, antihyperlipaemic, antimicrobial, anti-carcinogenic etc. Indian sarsaparilla, scientifically known as *Hemidesmus indicus* Linn. R.Br., is a well-known medication from the Ayurvedic Pharmacopeia of India. It is well known for its Raktashodaka (blood purifying) and Deepana (appetizing) benefits. Plants such as orange peel, berries, carrots, and others are rich sources of flavonoids. *Hemidesmus indicus*, also known as nannari, is one such medication that is high in polyphenols and flavonoids, which are well known for their anti-oxidant action [4].



Fig-1: *Hemidesmus indicus* plant

Chemical constituent:

It also contains Saponins, coumarins, alkaloids and tannins. Various bioactive phytochemicals such as 2-hydroxy-4-methoxybenzoic acid (HMBA), 2,2-hydroxy-4-methoxybenzaldehyde (MBALD), 4-hydroxy-3-methoxybenzaldehyde (vanillin), 2,3-hydroxy-4-methoxybenzaldehyde (isovanillin), lupeol acetate, nerolidol, dihydrocarvyl acetate, Ciscaryophyllene, isocaryophyllene type of mono and sesquiterpenes, β -selinene, dodecanoic acid, hexadecanoic acid, hexatriacontane, lupeol octacosanoate, β amyrin acetate, α amyrin, β amyrin, β sitosterol, hindicusine and di-O-acetylhindicusine and β -amyrinpalmitate [5].

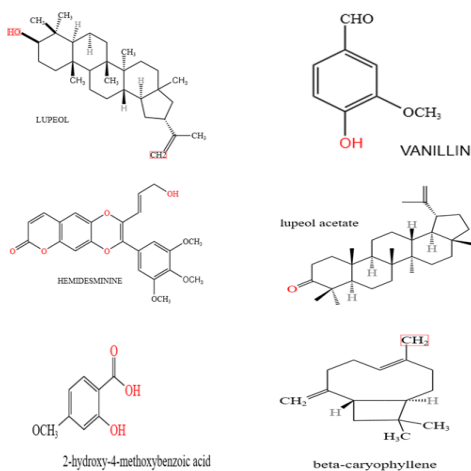


Fig-2

Pharmacology actions

Wound healing activity

A clinical study was conducted in 30 patients of chronic wounds of either sex, the patients were kept on observation depending upon the progress of epithelialization on complete cure it was reported that *Hemidesmus indicus* R.Br. root extract as applied in paste form to wounds, showed wound healing activity [6].

Anti-arthritic activity

Hydroalcoholic extract and ethyl acetate fraction of *Hemidesmus indicus* R.Br. showed significantly higher anti-arthritic activity than chloroform and residual fraction. Histopathological analysis demonstrated that both of hydroalcoholic extract and its ethyl acetate fraction had comparable anti-arthritic activity with methotrexates [7].

Cytotoxic activity: Anticancer activity of *Hemidesmus indicus* R.Br. is performed by variety of cellular assays and flow cytometry, as well as a phytochemical screening on different leukemic cell lines. Study demonstrated that *Hemidesmus indicus* R.Br. modulated many components of intracellular signaling pathways involved in cell viability and proliferation and altered the protein expression, eventually leading to tumor cell death, mediated by a loss of mitochondrial transmembrane potential and increased Bax/Bcl2 ratio [8].

Anti-inflammatory activity

Rats' paw volumes were actually smaller ($P < 0.05$) compared to the control group. The extracts appear to have anti-inflammatory and based on these findings 10.

Antiscorpion Venom Activity

The results of this study will undoubtedly shed light on the effectiveness of herbs and herbal compounds against scorpion envenomation as an alternative or supporting treatment, subject to further studies. This is because anti-scorpion antiserum is currently unavailable in India [12].

Antioxidant and antithrombotic activity

The release of lipoprotein lipase enzyme was greatly increased and the plasma recalcification time was significantly delayed in rabbits after intravenous treatment of this extract (5 mg/kg body weight). Similar to commercial heparin, the extract also prevented ADP-induced platelet aggregation in vitro [13].

Ethnopharmacology

Due to the numerous biological activities associated to *Hemidesmus indicus* notably the roots, traditional medicine is widely practised in diverse regions of the Indian subcontinent. It has historically been used to

treat a variety of conditions, including cancer, diabetes, diabetes-related urinary illnesses, dyspnea, menorrhagia, oligospermia, anorexia, fever, stomach colic, and discomfort, as well as pyrosis, leprosy, dysentery, diarrhoea, and cough. The plant is used in Ayurveda to treat psoriasis, topical wounds, low body weight, fever, stress, and bone loss. Additionally, Ayurvedic literature describes its use as an anti-inflammatory, anti-spasmodic, memory-improving, and anti-atherogenic substance⁹. A compilation of the ethnomedicinal uses of *H. indicus* is represented by the plant, which is also used in the traditional formulation Bala Taila Parisheka, which is used to treat wounds. The uses are shown in terms of the plant's parts, state or country of use, dialect titles, and diseases treated, mode(s) of preparation, and method(s) of administration [9].

Conclusion

In India, *Hemidesmus.indicus* is frequently encountered. According to studies, it contains Saponins, coumarins, alkaloids and tannins, Flavonoids as chemical constituents, and it has anti-inflammatory, antibacterial, otoprotective, anti-oxidant, anti-atherogenic, and anti-carcinogenic properties. However, there isn't much evidence to support this plant's potential as an anti-diabetic, anti-fertility, anti-leprotic, etc. Therefore, more research may be done to support this plant's potential. Since the plant is now an endangered species, more effort can be put into improving the agricultural and climatic conditions in order to grow it.

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