

A REVIEW ON PHARMACOLOGICAL ACTIVITY OF *HYDNOCARPUS WIGHTIANA*

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ABSTRACT

Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been derived from natural sources. This review article focuses to study about the pharmacological activity of *Hydnocarpus wightiana*. *Hydnocarpus wightiana* has been found to have antibacterial, antidiabetic activity, wound healing activity, antioxidant activity, hypolipidemic activity, anti-inflammatory activity and antineoplastic activity.

KEYWORDS: *Hydnocarpus wightiana*, pharmacological activity.

INTRODUCTION

India has a rich culture of medicinal herbs and spices, which includes about more than 2000 species and has a vast geographical area with potential abilities for Ayurvedic, Unani, Siddha traditional medicines but only very few have been studied chemically and pharmacologically for their potential medicinal value. The world health organization (WHO) defines traditional medicine as the “diverse health practices, approaches, knowledge and beliefs incorporating plant, animal, and or mineral based medicines, spiritual therapies, manual techniques and exercises applied singularly or in combination to maintain well-being, as well as to diagnose, treat or prevent illness.^[1] The goal of herbal drug research and development program is to discover single entity and multicomponent bioactive natural products that may serve as leads for the development of new pharmaceuticals which address unmet therapeutic needs.^[2]

Hydnocarpus is an Indo-Malaysian genus with 40 species and belongs to family Achariaceae.^[3,4] Out of these 5 species are available in India namely *A. alpina*, *H. kurzii*, *H. macrocarpa*, *H. pendulus* and *H. wightiana* and from these species 4 are reported from Kerala namely *H. alpina*, *H. macrocarpa*, *H. wightiana*, *H. pendulus*. *Hydnocarpus* grows extensively in the tropical forests of Western Ghats from Maharashtra to Kerala and is also found in the hilly regions of Tripura and Assam.^[5-8] It is cultivated in Nigeria, Uganda, Sri Lanka and few other South East Asian countries. These evergreen, deciduous trees grow up to 15m height, is distributed from sea level up to 2000m and bear fruits between the months of August and September. Seed oil has been widely used in Indian medicine and Chinese medicine for the treatment of leprosy.

Species of *Hydnocarpus*

About 40 species of *Hydnocarpus* are reported, some species are discussed below.

Hydnocarpus annamensis found in China, Laos, and Vietnam.

Hydnocarpus anthelminticus found in China.

Hydnocarpus cucurbitina, *Hydnocarpus scortechinii* endemic to peninsular Malaysia.

Hydnocarpus hainanensis found in China and Vietnam.

Hydnocarpus kurzii in India and Myanmar.

Hydnocarpus octandra and *venenata* in Sri Lanka.

Origin and geographic distribution

Hydnocarpus comprises about 40 species occurring in south western India, Sri Lanka, Myanmar, Indo-China, southern China, Thailand (7 species), Peninsular Malaysia (12), Sumatra (12), Java (2), Borneo (17), The Philippines (5) and Sulawesi (2). *Hydnocarpus kurzii*, *Hydnocarpus alcalae* and *Hydnocarpus anthelmintica* used to be cultivated, but with the advent of synthetic leprosy drugs in the 1960's, this cultivation has lost its importance.

Botanical description

Hydnocarpus is a deciduous, evergreen tree up to 10m tall. Bark is brownish fissured, blaze pinkish and branch lenticles are round, minutely velvet hairy. Leaves are simple, alternate, carried on 0.7-2.2cm long stalks, usually oblong to elliptic-oblong, tip long pointed, often falling off, base narrow, margin toothed papery, hairless. Midrib is raised above; secondary nerves 5-7 pairs. Flowers are borne in short cymes or solitary, in leaf axils. Petals are white. Berry is woody, round, 6-10 cm across usually brown tomentose, black when young; seeds numerous. Flowering takes place from January to April. Flowers are greenish white in color and grow

solitary or recemes. Fruits are ovoid, with a thick woody rind. Internally they contain 10-16 black seeds embedded in the fruit pulp.

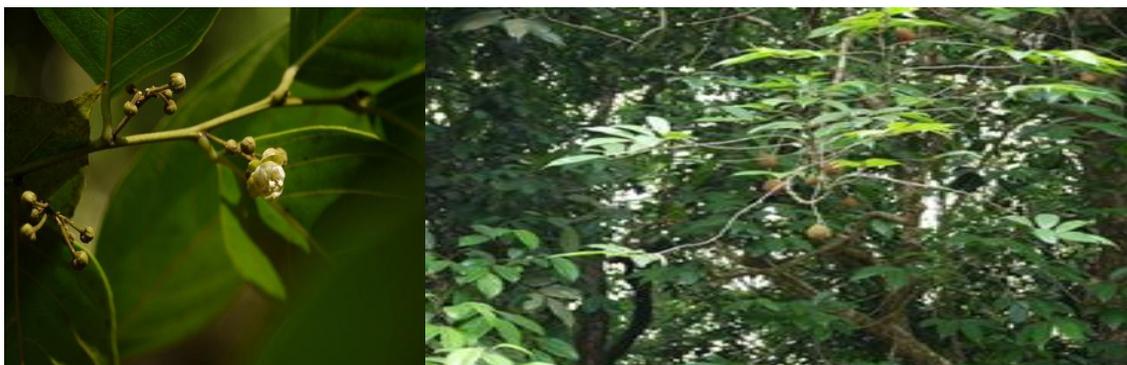


Figure 1: *Hydnocarpus wightiana*.

Constituents

Seeds and seed hulls- hydnocarpic acid, chaulmoogric acid and its homologues, gorlic acid, oleic acid, palmitic acid, anigenin, luteolin, chrysoctisol, hydnocarpin, isohydnocarpin and methoxy hydnocarpin.

Therapeutic uses

Distension of Abdomen due to obstruction to passage of urine and stools, piles ,sciatica, cervical lymphadenitis, abdominal lump, fever, itching, helminthiasis, leprosy, skin diseases, edema, metabolic disorder, disorders of blood, urticaria, ulcer.^[9]

Pharmacological activity

Wound healing activity

Oil of Hydnocarpus has been replaced by other chemotherapeutic agents having better mycobactericidal activity. However none of the currently used antileprosy drugs has been reported to have a positive effect in wound healing. Anecdotal reports claim that leprosy patients who have taken capsules containing Hydnocarpus oil orally have shown more rapid wound healing than those not receiving it. A pilot study was undertaken to determine the wound healing effect of Hydnocarpus oil in wound experimentally inflicted on male Wistar rats. The wound healing effect of Hydnocarpus oil was studied with reference to collagenation and strength of scar tissue. The result of this pilot study indicate that the Hydnocarpus oil, which also has anti-leprotic activity, could be useful adjunct in the healing of wounds and ulcers in leprosy patients.^[10]

Anti- diabetic activity

Oil of *Hydnocarpus wightiana* possesses strong anti-oxidant activity, α -glucosidase inhibitory activity. The ethanolic extract of seed hull of *Hydnocarpus* also showed anti-oxidant activity. To check the anti-diabetic activity, diabetes induced SD Rats were used and extracts were given to them and after 28 days glucose levels were checked and compared with first day of glucose levels. It showed better anti-diabetic activity.^[11]

Hypolipidemic, Anti-Inflammatory, Anti-Neoplastic Activity and Cytotoxicity

Flavanolignans isolated from *Hydnocarpus wightiana* seed namely hydnocarpin, isohydnocarpin demonstrated potent hypolipidemic activity in mice, lowering both serum cholesterol and triglyceride levels. Good anti-inflammatory and anti-neoplastic activity was demonstrated by hydnocarpin in mice in vivo. Cytotoxicity against the growth of murine and human tissue cultured cells was shown. All the compounds showed good activity against the growth of human KB nasopharynx, colon adenocarcinoma, and osteosarcoma.^[12]

Anti-oxidant activity

Antioxidant activity was assessed on the basis of DPPH free radical scavenging method. DPPH can trap other free radicals and therefore rate reduction of chemical reaction upon addition of DPPH is used as an indicator of radical nature of that reaction. The leaf extract showed better antioxidant activity.

Antibacterial activity

Antibacterial activity was studied by disc diffusion method. Nutrient agar medium was prepared, after solidification bacterial culture was inoculated by swabbing method and kept for incubation. After 24 hours zone of inhibition was measured. The extract showed good antibacterial activity with increase in the concentration of extract.^[13]

CONCLUSION

Hydnocarpus wightiana has been ethnomedicinally used as a therapeutic agent for a variety of diseases as illustrated in the article. The plant appears to have a broad spectrum of activity on several ailments. The various parts of the plant have been explored for antioxidant, antidiabetic, anticancer, antibacterial, anti-inflammatory activity, wound healing activity. It is reported to contain hydnocarpic acid, chaulmoogric acid, hydnocarpin, isohydnocarpin, flavanolignans which is responsible for the different biological activity. With regard to the development of quality herbal medicine the standardization of the extract,

phytopharmacology, isolation, characterisation and elucidation of mechanism of action of isolated compounds and clinical trials are needed. In the changing global scenario the interest the scientists towards plants with medicinal value is increasing substantially in the primary health care system both in the developed and developing countries. Therefore the information will help the scientists and researchers to screen the compounds responsible for different bioactivities, and to elucidate the molecular mechanism of action.

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