

**A REVIEW ON *DECALEPIS HAMILTONII* WIGHT & ARN. - A THREATENED MEDICINAL PLANT****PRANAY KUMAR*¹, RAVIRAJA SHETTY. G¹, SOURAVI. K² AND RAJASEKHARAN. P.E²**

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ABSTRACT

Decalepis hemiltonii is an endemic and threatened medicinal plant known for its medicinal value. It is distributed in peninsular India and prefers to grow along rocky slopes and rock crevices. It has wide spread uses that include its common usage as a health drink. Apart from this, it has got antimicrobial, antidiabetic, antioxidant, anti-inflammatory, chemo protective, cytoprotective, insecticidal, neuroprotective and hepatoprotective properties. As far as its phytochemistry is concerned, it is found to contain 2-hydroxy-4-methoxy benzaldehyde (HMB) in abundant quantity which has been already widely studied for its role in medicinal properties. The review aims to provide sufficient baseline information for further research on this medicinal plant.

KEYWORDS: *Decalepis hemiltonii, experiment, antioxidant, antidiabetic, insecticidal*

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INTRODUCTION

Decalepis hamiltonii Wight & Arn. also known as swallow root, is a woody climber belonging to the family Asclepiadaceae. It is widely found in moist as well as dry deciduous forest of peninsular India¹. It is found growing between altitude of 300 and 1200m. It is seen

growing along rocky slopes and rock crevices in wild².

COMMON NAMES

There are several vernacular names of *D. hemiltonii* in different languages³.

Table 1
Vernacular names in different languages

Language	Common Name
Telugu	Neemamtheega Maredukommulu Maregugaddalu Barresugnadhi
Kannada	Magadiberu Makaliberu
Tamil	Mahalikizhangu Mavilingakilangu Peru nannari
Malayalam	Nannari
Sanskrit	Sariba Svetasariva
English	Swallow root

DISTRIBUTION

This plant is widely distributed across the southern states of India⁴.

Table 2
Distribution of *D. Hemiltonii*

State	Local place
Andhra Pradesh	Kurnool, Chittoor, Nellore, Prakasam, Rangareddy, Mahabubnagar, Rayalaseema, Anantpur, Cuddapah
Karnataka	Hassan, Mysore, Bellary, Tumkur, Kolar
Tamil Nadu	Chengalpattu, Coimbatore, Dharmapuri, Nilgiri, Kolli Hill
Kerala	Marayur, Chinnar, Idukki

DESCRIPTION

D. hamiltonii Wight & Arn. is a woody climber of perennial nature⁵. Vigorous branching with wide canopy. Immature leaf is light green in colour whereas mature leaf is green. Leaf texture is papery and leaf shape is elliptic. Both upper and lower leaf surfaces are smooth. Leaf apex shape is sub-acute whereas leaf base shape is acute. Leaf apex habit is recurved and leaf margin is wavy. Leaf venation is distinct and absence of leaf waxiness and pubescence. Petiole colour is green. Inflorescence is axillary and its found in clusters. Flower bud is globose and small. Pedicel colour is green. Fruit shape is oblong. Pericarp colour is green while mesocarp colour is light green.

PROPAGATION

It is commercially propagated by seeds but it can also be propagated vegetatively by means of stem cuttings. Before transplanting seedlings are raised in nursery. Seeds have very short viability hence storage life is very limited. Seed rate is 7.5 kg/hectare. Usually soil intermixed with stones is good for the production of long thick roots².

ECOLOGY

It is a dry deciduous plant and leaf fall takes place in winter. New foliage is seen in the month of January. Flowering takes place usually from February to April. Fruiting takes place during May to August⁵.

TRADITIONAL USES

D. hemiltonii is used for blood purification, wound healing, bronchial asthma, fever, intrinsic haemorrhage, kushtha, erysipelas, poisoning, paediatric rejuvenative and general vitaliser in Ayurveda, Siddha and Folk systems of medicines⁶. Chewing the roots and drinking Nannari (Herbal drink prepared from roots by Yanadi tribe) considered as good digestive aid and appetizer⁷. Due to the health promoting properties of its roots, pickles and juices prepared out of its roots and consumed⁸. In various food and pharmaceutical applications, it is used as preservative due to bacteriostatic properties of its volatile principle compound⁹. Also due to the similar aromatic properties, its roots are used as a substitute for *Hemidesmus indicus* in ayurvedic preparation of ancient Indian medicine⁴. They are also used to cure skin diseases, nutritious disorders¹⁰, epilepsy and central nervous system disorders¹¹. The roots are used as a flavouring principle¹², preservative¹³, demulcent, diaphoretic and diuretic. They are also used to treat diarrhoea and used as a bioinsecticide for stored food grains¹⁴. Moreover, they are commercially used as a substrate in vanillin flavouring for icecreams and other food items². In the local area of their existence or their natural habitats, *D. hemiltonii* needs utmost interest for their conservation. The plants are being uprooted for their aromatic roots. Hence, the population of this plant has decreased exponentially in the last few years in their natural habitat. Due to several medicinal and commercial uses the conservation of this very plant is of utmost importance.



Figure 1
***Decapalis hemilltoni* Wight & Arn**

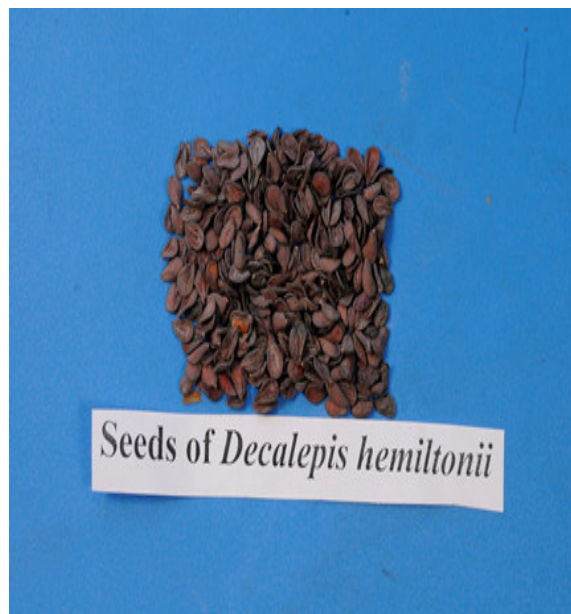


Figure 2
***D.hemiltoni* Seeds**



Figure 3
***D.hamilltoni* Fruits**

PHYTOCHEMISTRY

D. hamiltonii roots are known to contain abundant quantities of the compound 2-hydroxy-4-methoxy benzaldehyde (HMB). Apart from this, its volatile oil also contain benzaldehyde (0.017%), salicylaldehyde

(0.018%), methyl salicylate (0.044%), benzyl alcohol (0.016%), 2-phenylethyl alcohol (0.081%), ethyl salicylate (0.038%), p-anisaldehyde (0.01%) and vanillin (0.45%) in minute quantities¹⁵.

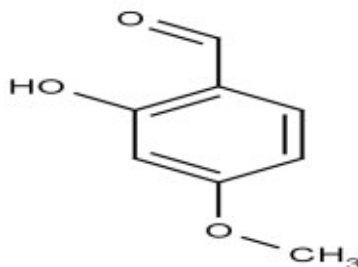


Figure 4
Structure of 2-hydroxy-4-methoxy benzaldehyde compound³.

PHARMACOLOGY ANTIDIABETIC ACTIVITY

Decalepis root extract (DRE) helped in reducing the risk of oxidative stress, prevention of DNA breakdown and ameliorated liver and diabetic situation in rats⁹. Manickam and Periyasamy (2012) reported an experiment on diabetic rats to know the antidiabetic effect of methanolic extract of *D. hamiltonii* root and concluded that antiglycemic agents having the potential of lowering blood glucose levels and hypolipidemic effect were found in the methanolic extract of *D. hamiltonii* root¹⁶.

ANTIBACTERIAL PROPERTY

D. hamiltonii root extract and its volatile fractions have not only been used as a flavourant and food preservative but also studied to be effective against several microbes in particular bacteria¹⁷. Chandar *et al.* (2013) reported an experiment to study the antibacterial activity of various extracts from roots of *D. hamiltonii* and concluded that as far as bacterial pathogens are concerned methanol and benzene extract of *Decalepis* root were found to be the most effective¹⁸. Devi and Latha (2012) performed antibacterial studies using root extracts of *D. hamiltonii* and

reported that all the extracts had antibacterial activity except aqueous extract¹⁹.

ANTIOXIDANT ACTIVITY

Srivastava *et al.* (2005) concluded that the root of *D. hemiltonii* is a natural source of antioxidant and hence reduces the oxidative stress level and beneficial for health. It was also concluded to contain several other antioxidant compounds²⁰. Srivastava *et al.* (2006) reported experiments to isolate ellagic acid from the aqueous extract of the *D. hamiltonii* roots and found that ellagic acid inhibited the oxidation of low density lipoprotein and hence performed free radical scavenging activity. The study also concluded that ellagic acid was a new found antioxidant compound in *D. hemiltonii* roots²¹. Nayaka *et al.* (2010) studied antioxidant activity of *D. hemiltonii* and reported that among the identified phenolics gallic, gentisic, protocatechuic and p-coumaric acids were the major contributors to antioxidant activity²².

ANTIFUNGAL ACTIVITY

Mohana and Raveesha (2007) evaluated antifungal properties of *D. hemiltonii* plant extract and found that this plant can be used to manage seed borne pathogenic fungi and in prevention of biodeterioration of grains and mycotoxin formation during storage²³.

ANTI-TYPHOID ACTIVITY

Kumuda *et al.* (2011) studied the anti typhoid properties of various root extracts of *D. hemiltonii* and concluded that extracts of petroleum ether and chloroform showed good activity against *Typhi* (ATCC 14028), *S. paratyphi A* and *S. paratyphi B*²⁴.

INSECTICIDAL ACTIVITY

Rajashekar *et al.* (2010) reported the insecticidal activity of the root extract of *D. Hamiltonii* and found that methanolic extracts did not have any adverse effects on the seed germination of the treated grains and also helped in protection against stored product pests²⁵.

ANTI-INFLAMMATORY ACTIVITY

Ashalatha *et al.* (2010) reported experiments to find out anti-inflammatory potential of *D. hemiltonii* and concluded that its root contains two major anti-inflammatory compounds

namely, Lupeol acetate and (2S)-5,7,4'-trihydroxy flavanone 4'-O- β -D-glucoside, which have already been studied for anti-inflammatory activity by down regulating TNF- α and IL-2 specific mRNA and up regulating the synthesis of mRNA of IL-10²⁶. Sengupta *et al.* (2013) undertook experimentation to find out the anti-inflammatory effect of the roots of *D. hemiltonii* and concluded that *D. hemiltonii* aids in blocking histamine and serotonin pathways thereby acting as an effective anti-inflammatory agent²⁷.

NEUROPROTECTIVE ACTIVITY

Srivastava and Shivanandappa (2009) and Jahromiet *al.* (2013) studied the neuroprotective effect of *D. hamiltonii* and attributed the neuroprotective activity of *D. hemiltonii* root aqueous extract to its antioxidant constituents^{28,29}.

HEPATOPROTECTIVE ACTIVITY

Antioxidant constituents of *D. hemiltonii* were attributed for their protective effect against CCl₄-induced acute hepatotoxicity³⁰. Devi and Latha (2012) studied the hepatoprotective activity of *D. hemiltonii* and concluded that methanolic extract of *D. hamiltonii* was able to eradicate hepatotoxicity induced by acetaminophen in rats³¹.

GASTROPROTECTIVE EFFECT

Naik *et al.* (2007) studied the gastroprotective effect of *D. Hemiltonii* and reported the antiulcer properties of *D. hemiltonii* root extract was due to proton pump inhibition, antioxidant effect and enhancement of gastric mucin response³².

CONCLUSION

This review is a collection of literature on the pharmacology of *D. hemiltonii*, which has become a part and parcel of traditional knowledge of medicine as well as modern drug industries. Many researchers have studied its phytochemistry and mode of action that attributed to a wide spectrum of pharmacological activities. Further research is needed to identify the various other active principles responsible for health promoting activities. Research in the area of ayurvedic formulations and lab to land technologies are

still awaited. Due to its over-exploitation and habitat destruction, this plant has become endangered in its natural habitat. Hence, there

is an urgent need to conserve this red listed endangered plant.

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