



## REVIEW OF DIFFERENT VARIETIES OF GARDENIA AS POTENTIAL SOURCE OF NADIHINGU

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### ABSTRACT

Ayurvedic herbs offer a treasure trove of natural remedies for promoting health and well being. *Nadihingu* is one among them commonly known as 'Cumbi Gum' or '*dikamali*', holds significant importance in traditional medicine systems. It emerges as a valuable botanical resource with promising medicinal properties and therapeutic applications. *Nadihingu* a plant known for its *Heeng* (*Ferula foetida*) like medicinal properties including its ability to act as carminative, anthelmintic, diaphoretic and analgesic, similar to *Heeng* it is believed to be beneficial for treating stomach issues, flatulence and for cleansing and healing ulcers and wounds. Among the different varieties of *Gardenia* such as *Gardenia gummifera*, *Gardenia campanulata*, *Gardenia jasminoides*, *Gardenia latifolia*, *Gardenia lucida*, *Gardenia turgida*, some varieties yield *Heeng* like resin. The properties of the resin secreted by different varieties of *Gardenia* are almost same but *Gardenia gummifera* is considered to be the best source of *Nadihingu* and is the official source as per API. This article discusses different varieties of *Gardenia* as potential alternate source of *Nadihingu*.

**KEYWORDS:** *Dikamali*, *Nadihingu*, *Gardenia gummifera* and other *Gardenia* species, Cumbi Gum.

### INTRODUCTION

*Nadihingu* shares same properties and actions as of *Heeng* (*Ferula foetida*) for which it has been used as a substitute in traditional medicine since ancient times. The useful part of the drug is the resin extracted from aerial parts. The leaf buds and the young shoots of *Nadihingu* yield a resinous exudation known in commerce as *Dikamali* or Cumbi Gum.<sup>[1]</sup> *Gardenia gummifera* is official source plant of *Nadihingu*.<sup>[2]</sup> Its resinous exudate is yellow in color and found on incisions of young branches and breaking points of leaves. The resin is secreted freely or naturally in the form of tears. The exudate smells strongly similar to *asafoetida* and exhibits similar properties and actions hence the name *Nadihingu*.

Since most of the population in developing countries are dependent on herbal drugs for their primary health care and also due to increasing demand of these natural herbs, medicinal plant are under threat of unavailability. So these herbs are being adulterated due to which faith of the public in herbal drugs is declining. This literary study aims to review different potential source plants of

*Nadihingu*. So that we may find different alternate sources of *Nadihingu* which have the same therapeutic properties as *Nadihingu*.

### HISTORICAL BACKGROUND

The historical background of *Nadihingu* is rooted in the traditional medicinal systems of India, particularly *Ayurveda*. *Hingushivatika*, *Hingupatri*, *Vanshpatri*, *Venuptri* are common synonym of *Nadihingu* in *Nighantus*. *Nadihingu* is mentioned in *Charaka Samhita Chikitsasthana* in *Unmada* and *Apasmara Chikitsa Adhaya* under the name of *Hingupatri*<sup>[3]</sup> & *Hingushivatika*.<sup>[4]</sup> *Chakrapanidutta* considers both *Hingushivatika* & *Hingupatri* as *Vanshpatri*. In *Sushrut Samhita Acharaya* has mentioned *Nadihingu* as *Venupatrika* in *Kalpasthan*, *Aanpanrakshakalpa Adhaya*. In *Ashtang Sangreh Sutrasthana*, in *Aanrakshavidhi Adhaya* *Nadihingu* is mentioned with the name of *Venupatrika*.

S.No.	Nighantu & its Time Period	Varga / Gana	Synonym	Therapeutic uses
1.	<i>Paryayaratnamala</i> (9 <sup>th</sup> Cent. A.D.)		<i>Hinguparni, Venupatri, Nadihingu, Shivatika</i>	
2.	<i>Madanadi Nighantu</i> (10 <sup>th</sup> Cent. A.D.)	<i>Chaturthgana</i>	<i>Hingupatri, Prithvika, Vashpika, Prithula, Prithu, Karvi, Dirghika, Kumbhi, Nadihingushivatika</i>	<i>Krimiroga, Hridroga, Vatakapha Shamaka, Rujahara, Ruchikara, Gulmanashaka</i>
3.	<i>Dhanvantari Nighantu</i> (10-13 <sup>th</sup> Cent. A.D.)	<i>Satpushpadi Varga</i>	<i>Palasha, Jantuka, Ramathi, Vanshpatri, Venupatri, Pinda, Hingushivatika</i>	<i>Vishtambh, Vibandhhara, Aamdoshaghana, Deepana</i>
4.	<i>Nighantushesha</i> (12 <sup>th</sup> Cent. A.D.)	<i>Gulmakanda</i>	<i>Hingupatri, Prithu, Prithvi, Dirghika, Varipatrika, Jantuka, Ramathi, Vanshpatri, Pinda, Shivatika, Karvi, Kabri, Tanvi, Vashpika</i>	
5.	<i>Sodhala Nighantu</i> (12 <sup>th</sup> Cent. A.D.)	<i>Satpushpadi Varga</i>	<i>Hingupatri, Kabri, Prithvika, Prithula, Prithu, Vashpika, Dirghika, Tanvi, Bilvika, Nyaspatrika, Nadihingu, Palasha, Jantuka, Ramathi, Vanshpatri, Pindhingu, Shivatika</i>	
6.	<i>Madanpala Nighantu</i> (1374 Cent. A.D.)	<i>Sunthyadi Varga</i>	<i>Describe Hingupatridvae Pratham Hingupatri- Hingupatri, Prithustanvi, Prithvika, Charupatrika, Vashpika, Karvi, Tanvi, Bilvika, Dirghika Dvitya Hingupatri- Venupatri, Hingushivatika, Jantuka, Ramathi, Pinda, Hinguphala</i>	<i>Hridyarooga, Bastiroga, Vibandh, Arsha, Kapha, Gulma, Vata Nashak</i>
7.	<i>Kaiyadeva Nighantu</i> (1425 Cent. A.D.)	<i>Aushadhi Varga</i>	<i>Hingupatri, Venupatri, Karvi, Vashpika, Prithu, Prithvika, Prithula, Ramathi, Charupatrika, Kabri, Barbri, Tanvi, Nadihingu, Shivatika</i>	<i>Aampachana, Vataroga, Arsha, Hridroga, Bastiroga, Gulma, Pliharogahara, Jantughana, Vibandhhara, Aruchinashak, Medoroga, Visha &amp; Kaphanashak</i>
8.	<i>Bhavaprakasha Nighantu</i> (16 <sup>th</sup> Cent. A.D.)	<i>Guduchyadi Varga</i>	<i>Vanshpatri, Venupatri, Pinda, Hingushivatika, Hingupatri</i>	
9.	<i>Raja Nighantu</i> (17 <sup>th</sup> Cent. A.D.)	<i>Piptyadi Varga</i>	<i>Palashakhya, Jantuka, Ramathi, Vanshpatri, Pindahva, Suveerya, Hingunadika</i>	<i>Kaphavatashamak, Vishtavibandhhara, Anahahara</i>
10.	<i>Nighanturatnakar</i> (18 <sup>th</sup> Cent. A.D.)		<i>Nadihingu</i>	<i>Kaphavatashamak, Malastambh Nashak, Manamohaamnashak</i>

**PLANT PROFILE OF GARDENIA GUMMIFERA****L.f. (Syn. *G. arborea*) – THE OFFICIAL SOURCE****Botanical Name:-** *Gardenia gummifera* L.f.**Family:-** Rubiaceae**Vernacular Names**Sanskrit:- *Nadihingu, Pindava*Hindi, Bengali, Marathi:- *Dikamali*Gujrati:- *Kamarri, dikamali*Tel.: *Manchi bikki, Cittamata, Tella-manga***Taxonomical Classification<sup>[5]</sup>****Kingdom** –Plantae**Division** – Angiospermae**Class** – Dicotyledoneae**Order** – Gentianales**Family** – Rubiaceae**Genus** – *Gardenia***Species** – *gummifera***Description<sup>[6]</sup>**

A small tree or shrub about 1.8 m. high, glabrous, buds resinous, bark brownish.

**Leaves** - Sessile, 4.5-7 by 2-2.5 cm., elliptic-oblong or obovate-oblong, obtuse or subacute, glabrous, shining, base obtuse, acute, or sometimes cordate; main nerves 12-18 pairs; stipules connate truncate or mucronate.

**Flowers** – Large, subsessile, 1-3 together. Calyx 1 cm. long, densely pubescent; teeth triangular, Corolla 5 lobed, at first white soon changing to yellow; tube pubescent outside, 3.2-3.8 cm. long; lobes oblong, obtuse, 2.5-3.2 by 1.3-1.6 cm.

**Fruit** - 2.5-3.8 cm. long, oblong or ellipsoid, with numerous longitudinal elevated lines and with a stout beak, smooth; pericarp thin; placentae 4-5.

**Wood:** The wood of *G. gummifera* is yellowish white in colour somewhat lustrous with smooth feel. It is hard, heavy straight and even textured.

**Chemical Composition:** It contains resin 89.9%, volatile oil 0.1% and colouring matter gardenin along with plant impurities 10.0%.<sup>[7]</sup>

### Resin<sup>[8]</sup>

The leaf buds and the young shoots of *G. gummifera* yield a resinous exudation known in commerce as *Dikamali* or Cumbi Gum. The resin is secreted freely in the form of tears. The shoots and buds are broken off with the tears of resin attached and marketed either in this form or after agglutination into cakes or irregular masses. The resin is transparent, greenish yellow with a sharp pungent taste and a peculiar offensive odour. Resin mainly exudes from branches (lesion of incision) and broken points of leaves. It also yields a colouring matter gardenin which can be obtained (yield upto 1.4%) by digesting the resin with hot alcohol.

The resin has the following characteristics:

M.P. : 45-50<sup>0</sup>  
 Acid val. : 87.1  
 Iod. val. : 80.8  
 Sap. val. : 172.3

**Solubility<sup>[9]</sup>:** Insoluble in water and slightly soluble in most of the organic solvents; dissolves in strong acids, turning brown to reddish brown, as it gets charred.

### Identification test<sup>[10]</sup>

- 0.1g of the droplets of the gum when treated with 1ml conc. hydrochloric acid gradually turns brownish. It dissolves slightly on keeping and the solution becomes yellow.
- 0.1g of the droplets of the gum on treatment with 1ml conc. nitric acid turns red with evolution of effervescence. The solution turns reddish brown on keeping and the gum gradually dissolves in it.
- 0.1g of the droplets of the gum on treatment with 1 ml conc. sulphuric acid gradually dissolves in it turning the solution reddish brown.

**Flowering and fruiting time<sup>[11]</sup>:** Plant flowers and fruits during the period from March to August. Flowers appear in April when plant becomes leafless and fruiting begins in June-August.

**Distribution:** It occurs in hilly regions, Maharashtra, Central India (Madhya Pradesh), Southern India, Bihar and Bangladesh (Chittagong).

### PHARMACODYNAMICS

**Rasa:-** *Katu, Tikta*

**Guna:-** *Laghu, Ruksha, Tikshna*

**Virya:-** *Ushna*

**Vipaka:-** *Katu*

**Doshakarma:-** *Kaphavatashamaka*

### ACTIONS AND USES<sup>[12]</sup>

**Karma (Actions):** *Vatanulomana, Rochana, Dipana, Pachana, Krimighana, Kaphanihsaraka, Svasahara, Slesmaputihara, Kusthaghana, Svedajanana, Jvaraghana, Visamajvaraghana, Lekhana, Hridayaroga, Plihavridhihara, Vranaropana, Vedanasthapana.*

**Prayog (Therapeutic Uses):** *Aruchi, Agnimandya, Ajirna, Adhmana, Gulma, Arsha, Udara- sula, Krimiroga (Gandupadakrimi), Hrididourbalya, Jvara, Visamajvara, Plihavidhi, Jirnakasa, Svasa, Hikka, Charmaroga, Medoroga, Vrana, Dantasula, Vedanayukta Vikara, Vishtavibandha.*

- *Nadihingu* being chiefly carminative (*Vatanulomana*), appetiser (*Dipana*), digestive (*Pachana*), antispasmodic, anthelmintic (*Krimighana*) and diaphoretic, it is useful in various ailments related with these pharmacological actions. Because of these properties, *Charaka* has mentioned it in *Grahni Chikitsa*. In case of worms it is especially given in round worms.
- The resin is given to children in nervous disorders. Also in diarrhoea due to dentition and rubbed on gums to allay irritation.
- The drug is suggested to be useful in chronic cough, hiccough, asthma as it is good expectorant.
- Also found useful in skin diseases, splenic enlargement, malarial fever, obesity and heart weakness.
- Externally the resin is recommended for ulcers, piles, toothache and joints. A decoction or infusion of resin (*Nadihingu kwatha*) is suggested to be used in fevers.
- In dyspepsia attended with flatulence, the resin has been frequently used with advan- tage.
- Externally it acts as an antiseptic and stimulant. The resin is extensively employed in veterinary medicine to keep away flees from sores, for destroying maggots in wound and sheep waste. *Nadihingu* resin (*Niryasa*) is also applied to cleanse foul ulcers on account of its action as *Vraṇavisodhana* (cleansing ulcers).

### RECENT RESEARCHES<sup>[13,14]</sup>

Recent experimental studies have established its antimicrobial, anthelmintic, anticancer, cardio-protective, antiatherogenic, cholesterol lowering, carminative, antifatulent and purgative proper- ties of resin, supporting its traditional uses in herbal medicine.

**OTHER VARIETIES OF GARDENIA<sup>[15]</sup>****Resin yielding varieties**

**1. *Gardenia campanulata* Roxb.:** A large spiny shrub or a small tree found in the North-Eastern parts of India. Leaves elliptic ovate or oblanceolate; flowers dimorphic, campanulate; fruits ellipsoid or sub-globose, obscurely 5-ridged, fleshy.

Fruits are used as cathartic and anthelmintic. The resin exuded by the plant is given in corpu- lence and enlarged spleen.

The active principle is a saponin, CH<sub>3</sub>O<sub>10</sub>. The root is slightly astringent contains 2.4% tannin.

**2. *Gardenia lucida* Roxb.:** A handsome shrub or small tree resembling *G. gummifera*, but with darker bark and longer, distinctly stalked leaves, found in Central India and Deccan Peninsula and commonly cultivated in gardens. Flowers large, white changing to yellow, fragrant; fruit oval or sub-globose (1-1.5. in. long) with thin crustaceous endocarp.

*Dikamali* or Cumbi Gum collected from this species is identical with that from *G. gummifera* and finds the same uses.

**Non resin yielding other varieties**

**1. *Gardenia jasminoides* (also called *Gandhraj* or *Cape Jasmine* or *Indra Kamal*):** A variable evergreen shrub or a small tree native of China and Japan, commonly cultivated in Indian gardens. Leaves large, elliptic-ovate, thick, shining, occasionally variegated; flowers solitary, yellowish white, highly fragrant; fruit ovoid, orange coloured, fleshy, ribbed. Now a hybrid variety is also cultivated in gardens. It bears big white Jasmine like flowers but almost no odour.

The plant is considered antispasmodic, antiperiodic, cathartic and anthelmintic. It is used exter- nally as antiseptic. The root is used in dyspepsia and nervous disorders. It is rubbed into a paste with water and applied to the top of head for headache. The leaves are reported to contain mannitol during winter but not in summer. The fruits are emetic, diuretic and stimulant. They are used in jaundice and in kidney and lung troubles. They contain pectin, chlorogenin, tannin and a red amorphous colouring matter, apparently identical with crocin obtained from saffron.

**2. *Gardenia latifolia*:** A small deciduous ornamental tree with low bushy crown and grey bark peeling off in flakes, found throughout the greater part of India, mostly in dry forests. Stem 12-14 ft. high, 2-4 ft. in girth; leaves large, broadly ovate and usually crowded at the ends of branches; flowers solitary, yellowish, fragrant; fruit globose, 1-2 in. diam., pubescent, edible.

The timber is used as a substitute for boxwood. It is used for making combs and turnery articles. It is also used for engraving, light furniture, camp beds, tobacco jars,

shuttles, mallet heads, toys, mathematical instruments, egg cups, etc.

**3. *Gardenia turgida* Roxb.:** A small deciduous spiny tree with light grey or whitish smooth bark occurring throughout the greater part of India in dry open deciduous forests, ascending to an altitude of 4,000 ft. in the outer Himalayas. Leaves elliptic-obovate, crowded at the ends of branches; flowers large, white; fruit sub-globose, greyish green with a thick, rather hard pericarp and a woody endocarp contain numerous angular seeds. The wood is pale creamy to brownish white in colour with no distinct heartwood. It is somewhat lustrous with smooth feel, hard, heavy, straight-grained, fine and even-textured. A preparation from the roots of the tree is used by the Santals as a remedy for indigestion in children. Crushed roots form lather with water, which is applied to the head by Mundas in headache. The fruits are used in affections of the mammary glands. The tree yields a yellow gum with a pleasant odour, almost completely soluble in water. The gum exudes from cuts made on the upper part of stem.

Thus *Gardenia campanulata* found in North Eastern parts of India and *Gardenia lucida* found in Central India and Decan Peninsula are potential alternate source of *Nadihingu*. Though different parts of *G. jasminoides* also have good medicinal properties. *G. latifolia* and *G. turgida* are of less medicinal use.

**DISCUSSION**

*Gardenia gummifera* is official source plant of *Nadihingu*. In *Ayurveda Nadihingu* is described in some classical treatise & in various *Nighantu* with different synonyms which create some controversy. Controversial drugs or *Sandigdha Dravyas* is term used for medicinal plants having controversial botanical sources due to polynomial nomenclature system of *Sanskrit*, nonavailability of plants and parallel evolved knowledge eg. *Vanshpatri* as told by *Chakrapanidutta* in his commentary and *Vanshpatri* as a synonym in various *Nighantu* creates controversy. *Gardenia gummifera* yields resin similar to *Heeng* but its leaves don't resemble *Vansh(Bamboo)*. It is quite possible that it may be a different variety of *Gardenia*. Whereas, *G. lucida* (*syn. G. resinifera*) has longer stalked leaves so can be considered for *Vanshpatri*. One more variety of *G. campanulata* also has elliptic-ovate or oblanceolate leaves. This variety can also be considered as *Vanshpatri*. *G. lucida* is found in Central India, Deccan Peninsula (The Deccan is a large plateau and region of India located between the Western Ghats and the Eastern Ghats. It covers the modern day Indian States of Maharashtra, Telangana and Karnataka) and *G. campanulata* is found in North Eastern parts of India. Both these varieties of *Gardenia* - *G. campanulata*, *G. lucida* also exude resin having the same therapeutic properties as resin of *Gardenia gummifera*. Other varieties of *Gardenia* also have medicinal properties but they do not yield resin eg. roots of *G. jasminoides* are

used to treat various diseases like dyspepsia, nervous disorders, headache, leaves in poultices, fruits for emetic, diuretic, jaundice, kidney & respiratory disorders. It can be used as an antispasmodic, cathartic and anthelmintic. *G. latifolia* does not have any therapeutic properties, only its timber is used for making combs and turnery articles, wooden furniture etc. *G. turgida* has some therapeutic properties as its roots are used for indigestion, headache.

### CONCLUSION

*Ayurveda*, a traditional system of medicine relies heavily on herbal medicines. However, many of the plants used in *Ayurvedic* practices are now endangered due to overharvesting, habitat loss and environmental changes. This situation poses a significant threat to both biodiversity and the future of *Ayurvedic* medicine. In the modern era, most of the population in developing countries are dependent on herbal drugs for treating various diseases. Now a days, due to increasing demand of these natural herbs they are under threat of unavailability. These herbs are being adulterated due to which quality of herbal drugs is deteriorating and leading to various health hazards. In case of exudates, the yield of resin per plant remains still more less. To overcome this problem we have to find out alternate sources for the official drug. This will help to conserve the natural sources. As per the present review study other species of *Gardenia* (*G. campanulata*, *G. lucida*) which yield similar resin should be considered for sourcing Cumbi Gum.

### FUTURE SCOPE

Despite their recognized value, there is considerable potential for further research to fully understand and harness the medicinal properties of these plants. The diverse therapeutic potential of *Gardenia* species in *Ayurveda* presents a vast field for future research. By focusing on phytochemical profiling, pharmacological studies, clinical trials, sustainable cultivation, traditional knowledge documentation, comparative studies, formulation development and genomic research, researchers can unlock new dimensions of these valuable plants. Such research efforts will not only validate traditional uses but also contribute to the development of new and effective *Ayurvedic* treatments ensuring that the benefits of *Gardenia* are fully realized and preserved for future generations.

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