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Review Article

REVIEW OF THE PLANT *JALAPIPPALI* (*PHYLA NODIFLORA*) - AN UNDER EXPOSED PLANT

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ABSTRACT

Ayurved provide a strong base for utilization of a large number of plants in general healthcare as well as alleviation of diseases. *Jalapippali* which is identified as *Phyla nodiflora* L. Greene syn. *Lyppa nodiflora,* family *Verbinaceae*, is found in most of the states throughout India at riverbanks, along lakes and near fresh water bodies. *Jalapippali* has been explained in most of the *Nighantus* in Ayurved. **Aim:** the study aims to review the under exposed plant *Jalapippali* from available classical texts and modern sources to highlight its therapeutical importance. **Methods:** The study covers to summarize the literature in the available Ayurved classical texts while identifying the potential areas for further development of this herb for therapeutical uses in the field of Ayurveda. **Result:** Even though very fewer references are available in Ayurved-*Brihatrayee*, but during the *Nighantu* period most of the *Nighantus* have highlighted its therapeutical importance. The references are available even in the oldest *Nighantu- Dhanwantatari*, and many researchers suggest, the plant is rich in many important medicinal useful compounds. And the plant contains a variety of constituents such as triterpenoids, flavonoids, phenols, steroids, etc. The plant is having significant antimicrobial, anti-inflammatory, antidiuretic etc. activities. **Conclusion:** *Jalapippali* is one of the important plants. Especially the *Nighantus* have highlighted its importance. The recent studies suggest its pharmacological values. Hence further clinical studies should be carried out for its therapeutical values. And also, the *Jalapippali* mentioned in *Brihatrayees* has to be explored for its botanical identification so as to redefine its clinical importance.

INTRODUCTION

Medicinal plants are the wealth of mankind. India with its mega-biodiversity and knowledge of rich traditional medicine i.e., Ayurved provide a strong base for utilization of a large number of plants in general healthcare as well as alleviation of diseases. There are many drugs that are very useful in Ayurveda but little-known to the primary stakeholders. One of these known drugs is *Jala Pippali*, which is under-explored for protection, cultivation and sustainable utilization as an Ayurvedic drug at a commercial level.

Jalapippali which is identified as *Phyla nodiflora L. Greene* syn *Lyppa nodiflora,* family *Verbinaceae*[1], is found in most of the states throughout India at riverbanks, along lakes and near freshwater bodies.[2,3] *Jalapippali* has been explained in most of the *Nighantus* in Ayurved. No or very less references are available in the major texts of Ayurved-*Brihatrayee*. But during the *Nighantu* period most of the *Nighantus* have highlighted its therapeutical importance. The references are available even in the oldest *Nighantu- Dhanwantatari Nighantu. Dhanwantari Nighantu* it is explained as *Krimigna*[4,5]. It is *Tikta*, *Kashaya* in *Rasa*, *Kaphapitta nashaka*. It is indicated for *Swasa, Raktadosha, Vrun, Visha, Brama, Hridroga* and *Krimi*.[6,7] In the present study *Jalapippali* is review for its available references especially in Ayurved texts.

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MATERIALS AND METHODS

Literary review and therapeutic uses of *Jalapippali* were explored from classical texts viz. *Carakaa Samhita*, *Sushruta Samhita, Ashtanga Sangraha, Ashtanga Hridaya*, and *Nighantus* viz. *Raja nighantu, Dhanvantari nighantu, Bhaishajya Ratnavali* etc and articles published in various journals. And also, the botanical texts were reviewed.

RESULT

Table 1: Reference of *Jalapippali* in *Brihattrayee*

S.No.	Samhita	Reference	Context	Commentary
1	Charaka Samhita[8]	C. S.Su27/171	*Annapana vidhi adyaya Haritavarga*	*Chakrapanidatta Ayurved deepika*
2	Sushruta Samhita[9]	S.S.Su.38/18	*Dravya sangrahaneeya adyaya, Surasadigana*	*Nibhanda vyakya* by *Dalhana*
		S.S Chi. 4/32	*Vatavyadi chikista Kalyanaka lavana*	
3	Astanga sangraha[10]	A.S.Ut.10/22	*Apasmara pratisheda adyaya, Vrischikali varti*	*Shashilekha vyakya* by *Indukara*

Table 2: Classification of *Jalapippali* in *Nighantus*

S.No	***Nighantu***	***Varga***
1	*Dhanwantari nighantu[4,5]*	*Karaveeradi varga*
2	*Shodal Nighantu[11]*	*Karaveeradi varga*
3	*Madhava dravyaguna[18]*	*Vividhoushadi varga*
4	*Siddamantra nighantu[19]*	*Tridoshagna varga*
5	*Madanapal Nighantu[13]*	*Abhayadi varga*
6	*Raja Nighantu[6,14]*	*Shatahwadi varga*
7	*Kaiyadeva Nighantu[15]*	*Aushadhi varga*
8	*Bhava prakasha Nighantu[7,16]*	*Guduchyadi varga*
9	*Shaliigram Nighantu[17]*	*Guduchyadi varga*
10	*Adarsha Nighantu[20]*	*Nirgundyadi varga*

Table 3: Pharmacological Properties of *Jalapippali* in Nighantus

S.No.	Nighantu	Pharmacological Action
1	*Kaiyadeva nighantu[15]*	*Hridya, Chaksushya, Vatavardhak, Ruchikar, Agnivardhak, Daha, Vrana, Rakta-vikarnashaka*
2	*Bhava prakasha Nighantu[7,16]*	*Hridya, Chaksushya, Malasangrahi, Ruchikar, Agnivardhak, Daha, Vrana nashaka*
3	*Shaligram Nighantu[17]*	*Hridya, Chaksushya, Malarodhak, Ruchikar, Agnivardhak, Sukra janak, Daha, Vrana nashaka*
4	*Dhanwantari Nighantu[4,5]*	*Swasa, Rakta-vikar, Visa, Daha, Bhram, Murcha, Trishna nashaka Kriminashaka*
5	*Madana pala Nighantu[13]*	*Hridya, Chaksushya, Sukral, Sangrahi, Daha, Vrana nashaka*
6	*Raja Nighantu[6,14]*	*Mukha sodhaka, Vrana, Visa hara*
7	*Adarsha Nighantu[20]*	*Premeha nashaka, Mutra-vikar nahaka*
8	*Kalpadruma Nighantu[21]*	*Hridya, Chaksushya, Sukra-janak, Daha, Rakta-vikar nashaka*
9	*Madhava dravyaguna[18]*	*Kaphavatahara*
10	*Shodala Nighantu[11]*	*Hridya, Rochana, Deepana, Grahi (baddavit) Hikka, Kasa, Visha, Swasa, Parshwa ruk, Kriminashana*

a) Plant Description

- Latin name: *Phyla nodiflora* (L.) Green
  Syn. *Lippa nodiflora*
- Family: *Verbenaceae*
- Synonyms: *Lippia nodiflora* (L.) A. Rich

Distribution[23]

Jalapippali is found mostly in tropical and sub-tropical regions. Throughout India, it is found up to 900m usually in wet places along water resources, bunds of irrigation channels, canal edges and riverbank.

Vernacular Names[1,22]

Sanskrit: *Jalapippali, Toyavallari, Sharadi, Matyagandha*

Hindi*: Bakkan, Bhuiokra, Jalpipali, Panisigaa*

Kannada: *Nela-hippali*

Gujarati: *Ratavilo, Ratolia, Ratveliyo*

Malayalam: *Katu-tippali, Nirtippali, Podutalai (Siddha)*

Bengali: *Bakkan, Bhuiokra*

Marati: *Ratoliya, jalapippali*

Punjabi: *Bhuiokra, Mokna, Bukan*

English: Purple lippia, frog fruit

Telugu: *Bokkena*

Tamil: *Potuttali*

Habit [22,24]

It is a creeping prostate perennial herb, rooting at nodes.

Habitat [25,26]

It is found mostly in tropical and sub-tropical regions. Throughout India in wet places at water resources, along bunds of irrigation channels, canal edges and riverbanks and also ascending up to 900 m.

Root[23]

It is having tap root system. Root is cylindrical, 30 to 35cm in length and 0.2 to 0.5cm in diameter.

Color- Light brown to reddish brown in color

Taste- Tasteless

Stem[23]

Stem is herbaceous, around 2.5 to 5mm in diameter. It is woody at the base, rooting from its nodes, sub quadrangular, adpressed, strigose or hairy when young.

Fracture - Clear exposing hollow cavity at the center.

Taste- Slightly bitter when fresh but tasteless on drying.

Odour - Oily when fresh but odorless on drying.

Leaves[23,22]

Leaves are small (1.5-3 x 1-1.2cm), simple, opposite, obtuse, obovate, spathulate, cuneate at the base deeply and sharply serrate towards apex, sometimes nearly glabrous. Both surfaces are shiny, hairy with modified white strigose hairs, nerves and margins hairier.

Colour is deep green when fresh and pale white to light brown on drying. Odour is characteristically distinct like castor. Taste is astringent, bitter.

Flowers[22]

Flowers sessile, densely packed in long pedunculate axillary heads which are at first globose, afterwards elongated and becoming spicate and oblong in fruit.

Peduncles- 2.5 to 7.6cm long, usually from the axial of each pair of leaves.

Bracts- 0.25cm long, broadly elliptic or obovate with a somewhat cuneate base, mucronate, glabrous.

Calyx- 0.21cm long, membranous, deeply 2-lobed, compressed, mitre shaped, pubescent on the back with basifixed hairs, closely covering the fruit, the two acuminate lobes projecting beyond it.

Corolla - 0.25 to 0.32cm long, white or pale pink.

Fruit[22]

It is 0.25cm long, globose - oblong, dry, splitting into two 1-seeded plano convex glabrous pyrenes.

Pharmacological Uses

The plant is rich in many important medicinal useful compounds. The plant contains a variety of constituents such as triterpenoids, flavonoids, phenols, steroids, and many others. Among these flavonoids were the most commonly found. Nodifloretin, β-sitosterol glycoside and stigmasterol glycoside were found from the leaves of L. nodiflora[27]. Nodifloridin A and Nodifloridin B along with lactose, maltose, glucose, fructose, and xylose were isolated from the plant[28].

The plant shows many pharmacological activities. The ethanol extract showed significant antibacterial activity due to the presence of bio-active compounds when compared with petroleum- ether and aqueous extract.[29] The antibacterial activity against E. coli, P.aeruginosa, and Staphylococcus aureus was seen.[30] The antibacterial activity was seen in the essential oils of this plant.[31] The antibacterial activity was also shown by the methanolic extract of the seeds of phyla nodiflora.[32]

Anti-diuretic Activity- The diuretic potential of methanol and aqueous extracts of the aerial parts was assessed in albino rats using in-vivo Lipschitz test model. Both the extracts show significant diuretic activity.[33]

Anti-inflammatory and anti neoceptive activities of methanolic extract of *Lippia nodiflora Linn* was also seen.[34]

Ahmed et al. examined the methanolic extract of the leaves of *L. nodiflora* for antinociceptive activity in carragenin-induced paw edema in rats and anti-inflammatory activity against acetic acid induced writhing in white albino mice. Significant ($P<0.001$) anti-inflammatory and antinociceptive activities comparable to phenylbutazone and diclofenac sodium, respectively, were observed[36].

Antiurolithiatic activity- the ethanolic extract of *Phyla nodiflora Linn* had been evaluated against calculi producing Diet induced urolithiasis. Phyla was studied for its antiurolithiatic activity against most common type of renal stones i.e., calcium oxalate type, study clearly demonstrates the antiurolithiatic activity of *P. nodiflora*[35].

Shukla et al. assessed the methanol extract of *L. nodiflora* for total phenolic content, antioxidant and free radical scavenging activity. The study related the antioxidant activity of the extract to the presence of flavonoids [37].

DISCUSSION

***Vedas*:** References regarding the drug *Jalapippali* is not available in Vedas.

***Charaka Samhita*:** *Jalapippali* is mentioned in *Harita varga* in the *sutrastana* 27th chapter – *Annapanavidhi adyaya*; classification and regimen of food and beverages of *Charaka Samhita. Jalapippali* is having properties like *Teeksna*, *Ushna, Laghu* and *Rukshya*. And it is *Kapha vatahara*. *Chakrapani* while commenting on the *Jalapippali* mentioned that the plant having fruits like *Pippali* and is basically found near water resources.

***Sushruta Samhita*:** Direct references regarding *Jalapippali* are not available in *Sushruta Samhita*. According to *Dalhana*, commentator of *Sushruta Samhita* has mentioned in his *Nibhanda Vyakya* while commenting on *Surasadigana* drugs has quoted as *Prachibala* is identified with the synonyms *Matyakshi, Kakajangha, Nadipippali*. *Prachibala* is considered as *Kakajangha*, *Gandadurva* or *Jalapippali*.

In *Chikistastana* 4th chapter, *Vatavyadhi chikistadyaya*; in the contest of *Kalyanaka Lavana Gandira* is one of its ingredients and is indicated for *Vatavyadi, Gulma, Krimi* etc. On this context *Dalhana* commented that the *Gandira* is of two types. *Stalaja* and *Jalaja*. The one *Sthalaja Gandira* is mentioned in *Shakavarga* i.e., vegetables group and the other one *Jalaja Gandira* is *Jalapippali.*

***Astanga Sangraha*:** In *Uttaratantra adyaya* 10-*Apasmara chikistadyaya*, there is the reference regarding the plant *Sharadhi* in the contest of *Varti* preparation for *Apasmara chikista*. On this contest in the commentary *Shashilekha Vyakya* by *Indukara* on *Astanga Sangraha, Sharadi* is identified as *Jalapippali*. *In Astanga Hridaya, Madava Nidhana*, *Sharangadhara Samhita* the reference regarding *Jalapippali* is not available.

***Bhaishajya ratnavali*[12]:** In this, formulations of *Jala-pippali* are described. There are two formulations mentioned-

- *Kanchatadi kwath* (useful in *Atisar*)
- *Kanchatadi avaleha* (useful in *Ghrani roga*)

***Nighantus*:** Almost all the *Nighantus* have mentioned the plant *Jalapippali*, even the oldest *Nighantu Dhaanwantari Nighantu* also explains about the plant in its *Dravyavali* part - which is the earliest part of the *Nighantu*. *Nighantus* have highlighted its therapeutic values as uses in blood disorders, wounds, burning sensation, diarrhea, indigestion, asthma, bronchitis etc and is practiced by the most of the traditional systems of medicine for the same.

The recent studies suggest that *Jalapippali* is one of the important medicinal plants as it contains a variety of constituents such as triterpenoids, flavonoids, phenols, steroids, etc. The plant shows many pharmacological activities. It shows antioxidant and free radical scavenging activity. The plant is having significant antimicrobial, anti-inflammatory, anti-diuretic, anti-urolithiatic etc. activities.

CONCLUSION

The plant *L. nodiflora* is widespread all over the world, and has been extensively used for various ailments. Even though *Jalapippali* is very less mentioned in *Brihatrayees*, most of the *Nighantus* have highlighted the plant *Jalapippali* for its pharmacological properties. *Dhanwantari Nighantu* which among the oldest one of *Nighantu* mentions *Jalapippali* in *Ganadravyavali* which is the earlier part of *Nighantu*. There are many research works which suggests its pharmacological importance but very less supportive clinical studies. Hence *Jalapippali* is one of the important plant and further studies should be carried out for its therapeutical values. And also, the *Jalapippali* mentioned in *Brihatrayees* has to be explored for its botanical identification so as to redefine its clinical importance.

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