



## Review Article

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## A COMPREHENSIVE REVIEW OF KSHAVAKA: AN IMPORTANT MEDICINAL PLANT OF AYURVEDA

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## ABSTRACT

Kshavaka is an important medicinal herb which has been used in Ayurveda. This herb having immense therapeutic uses such as an effective shirovirechnopaga drug, krimihara (vermifuge) drug etc. Leaves of Kshavaka are bitter, pungent, carminative and minute seeds are sneeze inducer. In Ayurvedic system of medicine it has been used for the treatment of nasa-roga (nasal disorders), udara-roga (abdominal disorders), kushtha roga (skin disorders) etc. It also showed anti-angiogenic activity, anti-arthritis and anti-inflammatory activity. This review showed that *Centipeda minima* having potential to treat different diseases of their respective systems. A lot of work is required to explore this herb for proper identification, documentation and to find out useful compounds.

**Keywords:** *Centipeda minima*, Kshavaka, Shirovirechana, Nasopharyngeal tumor, Nasya

## INTRODUCTION

Kshavaka is an important Ayurvedic herb. It belongs to family Asteraceae or Compositae. This family is one of the largest angiosperm families. This family consists of more than 1620 genera and 23600 species of herbs, shrubs and trees distributed throughout the world.<sup>1</sup> Botanical source of this herb is *Centipeda minima* (L.) A. Braun and Asch.<sup>2</sup> It is mentioned under “shirovirechanopaga mahakashaya”<sup>3</sup> by Charaka and it is an effective Shirovirechanopaga drug (Adjuvant in Errhines). It is also described under Katuskandha<sup>4</sup> by Charaka. Sushruta attributed Krimihara (vermifuge) property to it and included the drug under Surasadigana.<sup>5</sup> Usage of this group are kaphanashaka, kriminashka (vermifuge), pratishyaya (nasal catarrh) etc. In uttara tantra of Sushruta Samhita, it is mentioned under Atisarapratishedha for the treatment of Grahani (colitis)<sup>6</sup>. In the same text it is also indicated for the treatment of visuchika (dysentery).<sup>7</sup> Vagbhata introduced kshavaka under “haritaka varga” and properties and actions of the dravya of this varga are ruksha, tikshna, ushna virya (hot potency), kriminashaka, agnideepana (stimulant of digestive fire), ruchikara<sup>8</sup> etc. In Bhavaprakasha nighantu it is placed under Guduchyadi varga. *Centipeda minima* has been used in traditional medicines in India, China and Australia. In India, *Centipeda minima* is used for ozaena (nostril ulcer), headaches, malaria, haemorrhoids, conjunctivities and also used as sternutatory (sneeze inducer).<sup>9</sup>

It is an annual plant and flowering and fruiting of this herb arises in November and April.<sup>10</sup> This shirovirechnopaga drug has the ability to expel out dosha accumulated in sinuses and relieve the symptoms like headache, cough, cold, nasal congestion. This herb is used for the treatment of rhinitis, sinusitis, nasopharyngeal tumour, asthma, cold, joint pains, scabies, leucoderma etc.<sup>11</sup> The active constituents of *Centipeda minima* are Cis-chrysanthenol- $\beta$ -D-glucopyranoside, brevilin-A, arnicolide C, arnicolide D. *Centipeda minima* has also been mentioned for the treatment of skin disease, indigestion, toothache, against worm infestation and

gout. Plant grows throughout India in moist places. *C. orbicularis* is used medicinally in China, the Philippine islands and New South Wales.<sup>12</sup> In Australia four species of *Centipeda* are found e.g. *Centipeda minima*, *C. cunninghamii*, *C. racemosa* and *C. thespidioides*. But the most widespread species is *Centipeda minima*.<sup>9</sup>

## Taxonomical classification

Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Asterales
Family	Asteraceae
Genus	<i>Centipeda</i> Lour.
Species	<i>Centipeda minima</i> (L.) A. Braun and Asch. <sup>13</sup>

## Habitat and Ecology

*Centipeda minima* is an annual herb, found in wide range of habitats, including growing in wet places, marshy banks, sometimes found submerged in shallow water and rice fields. Also found all over waste grounds and roadsides, growing in terrestrial area and freshwater areas.<sup>14</sup>

## Vernacular names

Hindi: Nagdowana, Nakkchikni, Pachittie, Chikkani  
Sanskrit: Kshavaka, Chikkani, Chikkika, Tikshna, Ghrandukhda  
Bengali: Mechitta, Nakkchikni, Mecheta, Hachuti, Hanchuti, Mechitt  
Marathi: Nakashikani, Nakasinkani  
Gujrati: Chikkani, Naakchinkani  
Malyalam: Naak shinkani<sup>11-15-16</sup>

### Geographical distribution

Indian distribution: Kerala, Orissa, Andhra Pradesh, Tamil Nadu, Karnataka, Gujarat

*Centipeda minima* is native to Amur, Andaman Is., China North-Central, China South-Central, China Southeast, East Himalaya, Fiji, Hainan, India, Inner Mongolia, Japan, Jawa, Khabarovsk, Korea, Laos, Malaya, Manchuria, Myanmar, Nansei-shoto, Nepal, New Caledonia, New Guinea, New South Wales, Northern Territory, Pakistan, Philippines, Primorye, Qinghai, Queensland, Samoa, Society Is., South Australia, Sri Lanka, Taiwan, Tasmania, Thailand, Tibet, Tonga, Victoria, Vietnam, Western Australia, Xinjiang

*C. minima* is introduced into Belgium, Liberia, Madagascar, Mauritius, Réunion (see plate n.1)<sup>17-18</sup>

### Botanical description

It is an annual, prostrate or sub-erect, slender, leafy herb up to 10-20 cm high usually with a mixture of white cottony and coarser multicellular hairs. Branches are many and spreading from root.

**Leaves** are sessile oblong-obovate to spatulate, glabrescent to moderately cottony, margins with a few, coarse teeth.

**Inflorescence** of sessile- sub sessile discoid, solitary heads of 0.25-0.5 cm diam. In volucre bracts are 2-seriate and ovate-spatulate. Receptacle is naked. Outer florets are female and cylindrical with 4-lobed corolla.

Female **corollas** 0.2-0.4 mm. Bisexual florets 8-14, often purplish. Achenes narrowly cuneate, 0.6-1 mm, tipped with persistent style, angles 4 or 5, with short, ascending bristles, continued virtually to truncate apex; faces often each with a line of sessile glands.<sup>15,19</sup>

### Synonyms

- *Centipeda orbicularis* Lour.
- *Artemisia minima* L.
- *Artemisia orbicularis* (Lour.) Roxb.
- *Artemisia sternutatoria* Roxb.
- *Centipeda minima* var. lanuginosa (DC.) Domin
- *Centipeda minima* var. minima
- *Centipeda minima* susp. Macrocephala N.G.Walsh
- *Centipeda minima* subsp. Minima
- *Centipeda minuta* (Less.) C.B.Clarke
- *Centipeda minuta* (G. Forst.) Benth.
- *Centipeda orbicularis* var. lanuginosa (DC.) F.M.Bailey
- *Centipeda orbicularis* var. minuta (G.Forst.) F.M.Bailey
- *Centipeda orbicularis* var. orbicularis
- *Cotula minuta* G. Forst.
- *Cotula minima* (L.) Willd.
- *Cotula sternutatoria* (Roxb.) Wall. Ex DC.
- *Dichrocephala minima* (L.) Bojer
- *Grangea minima* (L.) Dum.Cours.
- *Grangea minuta* (G. Forst.) Poir.
- *Myriogyne minuta* (G. Forst.) Less.
- *Myriogyne minuta* var. minuta
- *Sphaeromorphaea centipede* DC.
- *Sphaeromorphaea russeliana* var. glabrata DC.<sup>2,20</sup>

### Chemical constituents

The major chemical constituents in ethanolic extracts were glycosides, phenolic and poly phenolic acids and sesquiterpene lactone.<sup>27</sup> The isolated compounds were cis-chrysanthenol-O-beta-D-glucopyranoside, methy 3,5-dicaffeoylquinic acid, 3,5-di-O-caffeoyl quinic acid, tricic, 2-amino-4-methyl-pentanoic acid, 2-amino-3-phenyl-propionic acid, 4-amino-4-carboxychroman-2-one, brevilin-A, arnicolide C and arnicolide D.<sup>28</sup>

Table 1: Synonyms in nighantu (various synonyms of Kshavaka)

Synonyms	Shodhal nighantu <sup>21</sup>	Madanpal nighantu <sup>22</sup>	Kaiydev nighantu <sup>23</sup>	Bhavprakash nighantu <sup>24</sup>	Raj nighantu <sup>25</sup>	Nighantu adarsh <sup>26</sup>
Chikkika		+	+	+		+
Chikkpatra			+			
Nasasanvedan			+			
Kashavk		+	+		+	+
Kshurak			+		+	
Tikshan			+		+	
Kshuran			+			
Utejan			+			
Kshudhabhijanan			+			
Rajkshavak			+			
Kshudvibodhan			+			
Chikkani				+		+
Shutkryam	+					
Vamni	+					
Rukshna	+					
Kaphnashini	+					
Krur		+			+	
Rajodvejan					+	
Bhutdravi					+	
Bhutankush					+	

Table 2: Properties and therapeutic uses

	Rasa (Taste)	Guna (Property)	Virya (potency)	Vipaka (Post digestion)	Dosha Karma	Prayogik Karma (Therapeutic uses)
Shodhal nighantu	-	-	-	-	-	-
Madanpal nighantu	-	-	-	-	-	Kushtha (skin diseases), Krimi (vermifuge)
Kaiydev nighantu	Katu	Laghu, Tikshna	Ushna	Katu	Pittkrita, Vaat-kaphapaha	Kushtha, Krimi, Agnikrit, Raktvikaara (blood disorders), Ruchya, Netraroga (eye diseases)
Bhavprakasha nighantu	Katu	Tikshna	Ushna	-	Pittkrita, Vaat-kaphapaha	Kushtha, Krimi, vahnikrita, vaatrakta (gout), Ruchya
Raj nighantu	Katu, kashay	Tikshna gandha	Ushna	-	Kapha-vaata nashak	Bhutdosha, Grahnidoshnashaka (colitis)
Nighantu Aadarsh	Katu	Tikshna	Ushna	-	Pittkara, Vaat-kaphanashak	Kushtha (skin diseases), Krimi (vermifuge), Vaatrakta (gout), Agnideepana <sup>21-26</sup>

### Pharmacological activities

#### Anti-angiogenic activity

The ethanolic extract of *Centipeda minima* and sesquiterpene lactones (SLs; compounds 1-15) isolated from the SFE (superficial fluid extraction) oil were evaluated for their anti-angiogenic effect. Among all active compounds, 6-O-angeloylenolin is a major component of SFE oil, possessed the strongest effect by reducing vessel formation in zebra fish embryos etc.<sup>29</sup>

#### Anti proliferative activity

Volatile oils extracted from *Centipeda minima* were investigated for their anti proliferative effects on the human nasopharyngeal cancer CNE cells. Recent researches have focused on its anti-NPC activities, leading to the isolation of few sesquiterpene lactone against NPC cells.<sup>30</sup>

#### Anti-inflammatory and anti-arthritis activity

Adjuvant Induced Chronic Arthritis: There was a significant reduction in threat paw oedema after treated with isolated fractions of *Centipeda minima*. It showed anti-arthritis activity. The chemicals extracted from *Centipeda minima* containing poly phenols and flavonoids compound and these organic substances impart important role in anti-inflammatory and anti-arthritis activity.<sup>31</sup>

### Classical uses

#### Charaka samhita

Jawara (fever)

- Agruvadi taila: kshavaka is the constituent of Agruvadi taila in jawara chikitsa for the purpose of sheetjwara prashmanarth. Shiro-roga (diseases of head)
- Twagadi taila and pradhman churna: kshavak is one of the constituents of twagadi taila and it is effective in shiro-roga if used in nasya form.
- All these constituents of this taila in powdered form are also indicated for pradhman nasya.

Kushtha roga (skin diseases)

- Kanakshiri taila: kshavak is one of the ingredients of kanakshiri taila. The massage with this tail eliminates Mandal kushtha and also destroy krimi and kandu.<sup>32-34</sup>

#### Sushruta samhita

Pravahika (dysentery)

- The paste prepared from shunthi and kshavaka, after processing it with ghee and oil if used it cures the disease pravahika.

Visuchika (Gastroenteritis)

- If an equal quantity of powdered Krishna, ajmoda and kshavaka is taken with ushnodak or kanji, it cures visuchika.<sup>6-7</sup>

#### Ashtanga-sangrah

Kasa (cough)

- Ashoka seed, kshavaka, vayavidanga, rasanjana, padmakh, bidd namak are processed with ghrita or the churna of these dravya taken with ghrita
- Drink goat milk as an anupana after taking drugs in these two forms cures kasa roga.<sup>35</sup>

Krimijanya shiroroga

- Process oil with the powder of sarala, devadaru, katphala, sarshapa, apamarga, kshavaka etc. and use this oil in the form of nasya, it will kill and expels out the worms.
- After expulsion of worms, the nasya should be taken with the oil (sarshapa oil/hingota oil/pilu oil) which is processed with aja mutra (goat urine) and kalka of dravya e.g. tejovati, putika karanja, bimbi, surasa, naktmala, vidanga, haritaki, sarshapa etc.<sup>36</sup>

Pratishyaya (nasal catarrh)

- Nasya of kshavaka churna and saindhava with ghrita or with oil should be given on the maturity of vataja pratishyaya.
- On the maturity of kaphaja pratishyaya nasya of kshavaka, vidanga and saidhava should be given.
- [Nasya After Vaman karma (emetic process)]

- After doing vamana karma the nasya should be given with sarshap oil and piluj oil cooked with leaves of nirgundi, shigru, phanijjaka, arjaka, kshavaka etc.
- Nasya of oil which is processed with laksha, vidanga, pippali, lavanga, kshavaka, nisha etc. should also be given after vaman karma.<sup>37</sup>

#### Ashtanga-hridayam

##### Kasa (cough)

- Ghrita processed with ashoka beeja, nakchikkni, vayvidanga, rasaunt, padmakh and viddnamak if taken with goat milk, cures kasaroga.<sup>35</sup>

#### Ethnobotanical studies

- Plant is used in epilepsy, epididymitis and hydrocele (Jain and Tarafder, 1970)
- *C. minima* is used as antipyretic and analgesic (Tiwari and Padhye, 1993)
- Used in toothache (Badoni 1990)
- In ophthalmia and cold (Das 1995)<sup>11</sup>

#### Other therapeutic uses

- Herb is used for the treatment of rhinitis, sinusitis, nasopharyngeal tumour, asthma, cold. It is applied as poultice to cheeks to cure toothache.
- The leaves are bitter, pungent and expectorant, emetic and carminative. They are used for treatment of lumbago, paralysis, joint pains, leucoderma and scabies. .

- Powdered leaves and minute seeds induce sneezing and are made into a snuff to relieve nasal congestion.
- Seeds are reputed vermifuge.
- Infusion is effective for ophthalmia. This is also used as antiseptic.
- This herb is also used in Chinese traditional medicine for the treatment of malaria and amoebiasis.<sup>11,36</sup>

#### Controversy

- In market sample of U.P. especially in Mathura Rox is been *Artemisia sternuatoria* sold under the name of nakchikkni belongs to family compositae.
- Some people considered Bhutkeshi i.e. *Clerodendrum glaucum* as nakchikkni which belongs to family Verbenaceae.<sup>37</sup>

#### CONCLUSION

Present literary study shows that Kshavaka is a potential herb having immense therapeutic properties. The effectiveness of this plant has been demonstrated on various diseases like sinusitis, ophthalmia, leucoderma, scabies etc. A detailed and systematic study is required for identification, documentation of plant which may promote cultivation, conservation of this medicinal plant. *Centipeda minima* is a source of medicinally active compounds and has manifold pharmacological effects; hence this drug encourages researcher to explore more therapeutic uses for benefits of human beings.

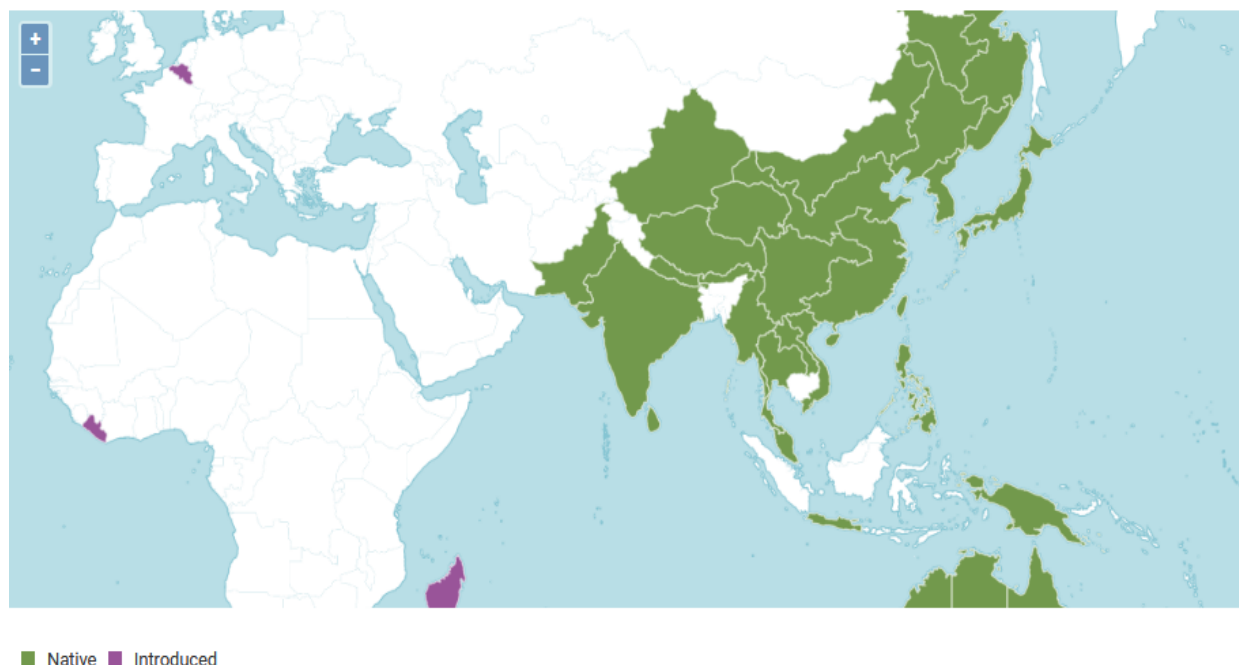


Plate 1: Map showing distribution of the *Centipeda minima*



Figure 1



Figure 2

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