A review on Kushmanda (Benincasa Hispida) with special reference to Visha Chikitsa

Dr. Vijitha Vijayan, Dr. Neethu P, Dr. Athulya CM and Dr. Arathi Rajesh

Abstract
Kushmanda or Benincasa hispida belonging to Cucurbitaceae family is a medicinal plant used in Ayurveda from ancient times to treat variety of disorders. It is cultivated throughout India in plains and hills. It is a common vegetable crop among Indian community and is well known for both its nutritional and medicinal properties. Even though it is mostly used mutravikaras and manasikavikaras, it has also got utility in visha chikitsa. Here an attempt is carried out to explore the vishaghna action of Kushmanda.

Keywords: Kushmanda, Visha Chikitsa, Ayurveda

Introduction
In Ayurvedic literature, information regarding benefits and properties of herbs are widely described. These medicinal plants are considered as a rich resource of ingredients which can be used in drug development. Apart from that, these plants play a critical role in the development of human cultures around the whole world. Moreover, some plants are considered as important source of nutrition and as a result of that they are recommended for their therapeutic values.

Kushmanda (Benincasa hispida) is an important medicinal plant which is well known for its medicinal as well as nutritional properties. Bhrat Trayi have described it under phalavarga and its usage is limited. It is mainly useful in Mutravikara and Apasmara. All the Nighantus quoted it extensively. Dhanvantari nighantu mentions it as best among valliphala. Kaiyadeva nighantu described the properties of unripen fruits, ripen fruits, juice, pulp and leaves separately.

Materials and Methods
This review has done with an intention to provide an overview on Pharmacological activities and vishaghna property of Kushmanda. The data were collected from Ayurvedic authentic texts, scientific journals and through electronic media.

Taxonomical Classification
Kingdom: Plantae
Clade: Angiosperms
Clade: Eudicots
Clade: Rosids
Order: Cucurbitales
Family: Cucurbitaceae
Subfamily: Cucurbitoideae
Tribe: Benincaseae
Genus: BenincasaSavi
Species: Benincasahispida

Vernacular Names
Sanskrit: Kushmanda
English: Ash gourd
Hindi: Petha
Kannada: Budhikumbula
Malayalam: kumbalam
Tamil: Pusanikkai
The effects of the aqueous extract of Benincasa hispida showed that it exhibited significant inhibition of inflammatory and analgesic activity. The antioxidant activity and total phenolic content of Benincasa hispida seeds extract were investigated using conventional Soxhlet extraction (CSE), and DPPH and ABTS scavenging activity tests. The ethanolic extract gave the highest total phenolic content (11.34±1.3 mg GAE/g) followed by ethyl acetate and n-hexane extract. Petroleum ether and methanolic extracts showed maximum inhibition in carrageenan-induced paw edema and cotton pellet induced granuloma in rat model. In carrageenan-induced paw edema model, petroleum ether and methanolic extracts showed maximum inhibition in inflammation (0.270 ± 0.063 and 0.307 ± 0.043 respectively) as compared to control group (1.27 ± 0.059) and standard valdecoxib (0.247 ± 0.033). In histamine-induced paw oedema, both extracts showed (62.86% and 54.84% respectively) inhibition as compared to control. The effects were comparable with that of standard drug cetrizine (95.24%). The major constituents of Benincasa hispida fruits were volatile oils, flavonoids, glycosides, saccharides, proteins, carotenes, vitamins, minerals, ß-sitosterin and uronic acid.

### Synonyms

**Table 1: Synonyms according to Nighantus**

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<tr>
<th>Sl.no.</th>
<th>Synonyms</th>
<th>B.P.</th>
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</table>

### Rasa Panchaka according to Nighantus

**Table 2: Rasa panchaka according to Nighantus**

<table>
<thead>
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<th>Rasa Panchaka</th>
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<td>Rasa</td>
<td>madhura, sakshara(vridha)</td>
<td>Madhura Sakshara (pakva)</td>
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<td>Guna</td>
<td>Guru Laghu(vridha)</td>
<td>Guru, Ruksha Laghu,ashna (Pakva)</td>
<td>Laghu, Ushna</td>
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<td>Virya</td>
<td>Seeta (bala)</td>
<td>Seeta Ushna (vridha)</td>
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<td>Madhura</td>
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<td>Dosh karma</td>
<td>Bali-pithahara Madhya-kaphakara Vridha</td>
<td>Vatapithahara Bali-pithahara Madhya- kaphapaha Vridha</td>
<td>Pithahara</td>
<td>Bala- pithahara Madhya-kaphapaha Pakva- tridoshabara</td>
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<td>Specific karma</td>
<td>Brihmanam, vrishyam, Vastisudhikaram</td>
<td>Hridya, Vrishya</td>
<td>Vrishya, balya</td>
<td>Vrishya, Hridya, Brihmana</td>
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<td>Rogaghnathaka</td>
<td>Manasikaroga</td>
<td>Jwara, ama, sopha, daha</td>
<td>Mutraghata, prameha, arochaka, ashmari</td>
<td>Mutraghata, ashmari, aruchi, unnada</td>
<td>Manasikaroga</td>
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</table>

### Chemical Constituents

The major constituents of Benincasa hispida fruits were volatile oils, flavonoids, glycosides, saccharides, proteins, carotenes, vitamins, minerals, ß-sitosterin and uronic acid.

### Morphology

- A large trailing gourd climbing by means of tendrils; hispid beneath
- Flowers yellow, unisexual, male peduncle 7.5-10cm long, female peduncle shorter
- Fruits broadly cylindrical, 30-45cm long, hairy throughout, ultimately covered with a waxy bloom.

### Pharmacological Activities

#### 1. Anti-oxidant activity

The antioxidant activity and total phenolic content (TPC) of Benincasa hispida seeds extract were investigated using conventional Soxhlet extraction (CSE), and DPPH and ABTS scavenging activity tests. The ethanolic extract gave the highest total phenolic content 11.34±1.3 mg GAE/g and antioxidant activity followed by ethyl acetate and n-hexane extract.

#### 2. Anti-inflammatory and analgesic activity

The preliminary investigations of aqueous extract of 0TBenincasa hispida showed that it 0Texhibited anti-inflammatory properties. Petroleum ether and methanolic extract of Benincasa hispida fruit, at the dose of 300 mg/kg BW, produced dose dependent and significant inhibition of carrageenan-induced paw edema, histamine induced paw edema and cotton pellet induced granuloma in rat model. In carrageenan-induced paw edema model, petroleum ether and methanolic extracts showed maximum inhibition in inflammation (0.270 ± 0.063 and 0.307 ± 0.043 respectively) as compared to control group (1.27 ± 0.059) and standard valdecoxib (0.247 ± 0.033). In histamine-induced paw oedema, both extracts showed (62.86% and 54.84% respectively) inhibition as compared to control. The effects were comparable with that of standard drug cetrizine (95.24%). Petroleum ether and methanolic extracts showed slight insignificant reduction in granuloma tissue formation in cotton pellet implanted rats.
3. Anti-microbial activity
The antibacterial activity of seed oil of B. hispida was tested against selected pathogens (gram positive, M. luteus, S. aureus and B. subtilis; and gram negative, E. coli, P. multocida and P. aeruginosa). Maximum mean zone of inhibition was observed against B. subtilis (16mm) and the minimum against Micrococcus luteus (11mm) P (39) P. However, the antibacterial activity of methanolic extract of Benincasahispida was studied against three gram positive bacteria Staphylococcus aureus, Staphylococcus epidermidis and Bacillus subtilis and three gram negative bacteria Escherichia coli, Pseudomonas aeruginosa and Klebsiella pneumonia, and the antifungal activity was studied against Candida albicans and Aspergillus niger. The methanolic extract of Benincasahispida showed no antibacterial activity, but it caused significant zone of inhibition against Candida albicans at the concentration of 30 mg/ml, while, it caused no inhibition against Aspergillus Nig [11].

1. Antipyretic activity- The ethanol extract of Kushmanda possess potent antipyretic effects and pharmacologically justifies its folklore use for fever and pain condition [12].

Agada Prayogas
Internal
1. Urine retention in Mandal viša- kashaya is prepared with stem of kushmanda and added with sookshma ela choorna –pana [13] –kashaya is prepared with stem of kushmanda and added with trikatu choorna [14].
2. To prevent gaping of wound caused by snake bite- kushmanda patra along with chandana, satavari, kumari swarasa, eranda patra and the parasite grown over kupili are added with water –dhara [15].
3. Mercury poisoning- kushmanda swarasa along with sita– pana [16] –krishmatulas, kushmanda, satapushpa, nagapushpa, lavanga and draksha are taken in equal quantity and made into choorna. To this gandhaka is added and mixed with milk. It is then kept in sunlight. This can be given for pana [16].
4. Krodavavisha- kushmandaphala is exposed directly to fire for few minutes, and swarasa is squeezed out from it. To this, sarkara is added and given for pana [17].
5. Raktasrava in Mandal viša- a kalka is prepared with kushmanda beejwa and lashuna and given for pana along with tandulodaka [18].
6. Dantarakta in Mandal viša- kushmandaphala is cut into pieces and cooked without adding salt-given for chewing [19].
7. Madyavisha– juice of kushmanda added with powder of sita, madhuka, trisugandha, nagapushpa, ajaij, Krishna and marica in equal quantity [20].
8. It is one among the phalavargas mentioned as pahya for persons afflicted with viša [21].

External
1. Sarpavisha-Kushmandapatra, pushpa and moola along with eshwaramooli, lakshmana, vaca and palandu – sarvanga lepa [22].
2. Thokkudhara- kushmanda is one among the ingredient in dharadrava. This dhara reduces burning sensation, swelling and feeling of extreme heat due to Mandal viša [23].

Discussion and Conclusion
Kushmanda is a medicinal plant which is well known for its medicinal as well as nutritional values. It is one of the most naturally energizing foods consumed by Indians. It is also an important ingredient in various Ayurvedic formulations. But its use in viša chikitsa is very much limited. Keraleeya vishagranthas have mentioned its utilities in sthavara and jangama višhas. Acharya Sushruta mentioned its use in madyavisha. Also, studies have proven its anti-inflammatory, analgesic, antimicrobial and antipyretic activity. Hence, we can conclude kushmanda as a promising drug in viša chikitsa.

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