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Critical Review of Kushmanda (*Benincasa hispida*) – A Potent Herb

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ABSTRACT

Kushmanda viz. *Benincasa hispida* is a well-known plant in relation of its multipurpose use of different parts of the plant in ayurvedic literature. Unripe *kushmanda* is *pitta nashak*, half ripe is *kaphakarak*, while ripen is *laghu, ushna, kshar, deepan* and *bastishodhak*. Fruits are source of starch (2.0), protein, minerals, an alkaloid (cucurbitine), vitamin B, sugar, mineral like Calcium, Potassium, Zinc and other substances. Seeds yield a fixed oil, which possess anti helminthic properties. In ayurvedic literature, *Benicasa hispida* is *Medhya, Balya, Dahaprasamana, Trishnanigrahana, Nidrajanana, Ksayahara, Krmighna, Mutrajanana, Vrishya, Bastishodhak, Sonitasthapana, Brihana, Rasayan*. *Benincasa hispida* also possess anti nociceptive and anti-pyretic activity, nootropic activity, anti-Depressant activity, anti-ulcer activity and anticonvulsant activity.

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INTRODUCTION

The reference of *kushmanda* in Vedic literature is found as *kushmanda,* is used for animal in *Yagyana* for sacrifice. In *Brihatrayee*, application of *kushmanda* is mentioned in detail. Acharya Charaka has described *kushmanda* as *Aharadrvya* in the chapter '*Annapan vidhi 6 of Sutrasthana*[1]. Total 6 references are available in Sushruta Samhita. Acharya Sushruta has described *Kushmanda* in the class of *madhura rasa dravya* in the chapter *rasa – visheshavijnaniya* of Sutrasthana[2]. *Kushmanda* is described under *tailavarga*. Taila of this fruit is *madhur* in *rasa* and *vipaka*[3]. *Kushmanda* is again described under *Shakavarga*. Unripe *kushmanda* is *pitta nashak,* half ripe is *kaphakarak,* while ripen is *laghu, ushna, kshar, deepan* and *bastishodhak*[4]. *Kushmanda* sneha is indicated in *mutrsanga*[5].

In *Siddhabhaishjya Manimala*, *kushmandaswarasa* is quoted as hair bleaching agent or causes hair grey.

Botanical name : *Benincasa hispida*

Family : Cucurbitaceae

English name : Ash gourd, White gourd melon

Hindi name : Petha, Raksa

Synonyms: Pusyaphala, Brihatphala, Phalaraja, Mahaphala, Pushpaphala, Pitapushpa, Vrittaphala, Sukaphala, Gulaphala

Classification:

Bhavparkashnighantu –	*Shakavarga*
Dhanvantarinighantu -	*Guduchyadivarga*
Saligramnighantu -	*Sakavarga*
Raja nighantu -	*Mulakadivarga*
Nighantuadarsh -	*Kushmandadivarga*
Kaidevnighantu -	*Sakavarga*
Priyanighantu -	*Pippalyadivarga*
Sodhalanighantu -	*Guduchyadivarga*

Distribution and cultivation:

Plant grows in plains and hills to an altitude of 1,204 meters. It is commonly cultivated for producing fruits used as vegetable and edible fruits. It is generally cultivated over warm countries. It is in Europe and America since roman era. It is found in India, Ceylon and Burma. Though it grows all over India but most commonly found in Punjab and Uttar Pradesh. Seeds do propagation and cultivation of kushmand. In the plains cultivated plant, seeds are sown during the month of February. The fruits are ready in 3-6 month period.

Flowering and Fruiting Time:

Plant flowers and fruits are present during the month of June to October.

Description:

Annual branched trailing gourd climbing by means of tendrils, leaves large deiform to rounded, 10-25 cm diameter deeply cordate, 5-7 lobbed, shortly hispid beneath, margin sinuate flowers yellow, unisexual, male peduncle 7.5-10 cm long, female peduncle shorter, fruits fleshy, broadly cylindrical and 30-40 cm long, hairy when young waxy bloom when mature, seeds numerous and collapsed, yellowish white .

Ayurvedic Pharmacodynamics:

Rasa:	*Madhura*
Guna:	*Amaphala - Snigdha, guru*
	Pakwaphala -Laghu, Kshara
Virya :	*Amaphala -Sheeta*
	Pakwaphala -Alpasheeta
Vipaka:	*Amaphala -Katu*
	Pakwaphala -Madhura
Prabhava:	*Medhya*
Dosakarma:	*Vata shamana, Pitta shamana*
	Sarvadoshahara (Pakva ripe fruit)

Properties and Action:

Karma: *Medhya, Balya, Dahaprasamana, Trishnanigrahana, Nidrajanana, Ksayahara, Krmighna, Mutrajanana, Vrishya, Bastishodhak, Sonitasthapana, Brihana, Rasayana* [Table 1].

Therapeutic Indication:

Unmada-apasmaar [Bangasen 35, Bh.P.madya.23-17, Chakradatta, AH U.7-28]
Trishna-daha-jwara [RN Mulakadi Varga161]
Rajyakshma-kshya [Bangasena 47]
Madatyaya [S. S. Ut.47-45]
Raktapitta [Bha.P .Nighantu sakavarga 56]
Amla pitta-Parinamshuala [Bha. Pra. II 30/53-56,]
Mutraghata-Mutrakrichha-Ashmari-Bastishula [RN Mulakadi varga161, Bh. Asmarirogadhikara 37-52, Chakradatta, Vrindamadhav, Harita 3-29-5]
Prameha [RN Mulakadi Varga161]

Ash gourd is cooling, laxative, diuretic and anabolic. Ash gourd juice is wonderful medicine for hyperacidity, peptic ulcer and gastritis. Its seeds are richer in iron than any other seed and very high in phosphorus and calcium. It is a good source of vitamin A[6].

Constituents:

Pharmacological activity of constituents of *Benincasa hispida*[7] is elaborated in Table 2.

Pharmacological Action of Kushmanda:

Anticonvulsant activity-

Anticonvulsant activity evaluated using chemo-convulsive agents such as pentylenetetrazole, strychnine and picrotoxin, and maximal electro seizures (MES) model in mice at dose levels ranging from 0.2- 1 g/kg, IP. The extract at 0.2-0.6 g/kg significantly ($P<0.001$) inhibited the hind limb extension induced by MES and at 0.4 and 0.6 g/kg, the extract significantly ($P<0.01$) increased the latency of convulsion and death induced by pentylenetetrazole and strychnine.

However, even at 1 g/kg, the extract failed to protect the convulsion induced by picrotoxin. The fruit *B. hispida* possess potential anti-convulsant activity[8].

Effect on morphine dependence-

The fresh juice of *Benincasa hispida* fruit significantly prevented as well as suppressed jumping behavior & decreased the number of fecal dropping in morphine decent mice. Further studies are needed to evaluate potential usefulness in the management of morphine withdrawal[9].

Anti-ulcer activity -

The anti ulcerogenic activity of different extract of *Benincasa hispida* (fresh juice, residue fraction of centrifuged juice, alcoholic and petroleum ether extract) was studied in ulcer in rats and mice. The oral feeding of different doses of extract significantly reduced ulcer index produced by various ulcerogens. The anti ulcerogenic effect was dose dependent in stress induced models and *Benincasa hispida* probably has a CNS component in prevention of stress induced ulceration[10].

Also, methanolic extract of *Benincasa hispida* seeds possess free radical scavengering effect[11].

Effect on Bronchospasm-

Methanol extract of *Benincasa hispida* showed excellent protection in guinea pigs against histamine induced bronchospasm, even at a very low dose 50 mg/kg. However even at a higher dose level 400 mg/kg it did not offer significant protection against acetylcholine challenge[12].

Anti-Depressant activity-

Methanol exact of *Benincasa hispida* exhibited significant antidepressant activity in force swim test along with anxiolytic property of marble burring test whereas in social interaction test MEBH showed anxiogenic activity[13].

Nootropic activity-

Methanol extract of *Benincasa hispida* exhibited prominent nootropic effect and anti-amnesic effect in model of memory (spatial working memory and long term memory) and latency test respectively[14].

Anorectic activity-

The present study reveals for the first time a possible anorectic activity of *Benincasa hispida* , most probably mediated through the CNS without affecting the gastric emptying. However, further studies are required to find its potential as an anti-obesity agents[15].

Anti nociceptive and anti pyretic activity-

Anti-nociceptive and anti-pyretic activity of *Benincasa hispida* was also reported by others researchers. In an experimental study the ethanol extract of *Benincasa hispida* seed was used to study anti-nociceptive and anti-pyretic effects. Brewer's yeast (15%) was used to induce pyrexia in rats. The extract was non-lethal to the rats up to the dose of 5000 mg/kg b.w. At doses of 250 and 500 mg/kg b.w, the extract significantly ($P<0.05$) increased the anti-nociceptive effective in a dose dependent manner in rats. Similarly, at doses of 250 and 500 mg/kg b.w the extract significantly ($P<0.05$) decreased yeast induced pyrexia in rats. These results indicate that ethanolic extract of *Benincasa hispida* possesses potent anti-nociceptive and antipyretic effects and thus pharmacologically justifying its folkloric use in the management of fever and pain conditions[16].

Anti-Histaminic activity-

The methanol extract of wax gourd of *Benincasa hispida* was found to show inhibitory activity on histamine release from rat exudes cells induced by antigen antibody activity[17].

Parts Used: Fruits, seeds, seed oil

Dose:

Fruit	10-20 ml
Seed powder	3-6 g,

Seed oil 5-10 ml

Formulations:

Kushmanda khanda, *Kushmanda* ghrita, *kushmanda* gudakalyanaka, Khandamalaki, Kushmand rasayan, *Kushmanda* valeha, *Kushmanda*sav, Kushmand kshara, Kushmand taila, Kushmand sura, Kushmand vatak etc.

CONCLUSION

The multiple benefits of Kushmanda (*Benincasa hispida* **)** made it a true miracle of nature. It has several effects like antioxidant, antifibrinolytic, anti-inflammatory, hepatoprotective effects. A detailed and systematic study is required for identification, cataloguing and documentation of plants, which may provide a meaningful way for the promotion of the traditional knowledge of the herbal medicinal plants. In view of the nature of the plant, more research work can be done on humans so that a drug with multifarious effects will be available in the future.

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Table 1. Action of *Kushmanda*

References	Charaka Samhita	Sushrut Samhita	Astangha Sangarha	Astangha Hriday	Bhava Prakash Nighantu	D. N	K. N	R. N	Madanpal Nighantu	Sodhal Nighantu
Madhura Rasa	+	+	+	+	+					+
Vipaka Madhura			+	+	+					+
Virya-Sheet					+		+		+	+
Vatashaman	+	+	+	+	+	+			+	+
Pittashamana	+	+	+	+	+	+			+	+
Medhya rasayana				+	+					+
Unmdahara				+	+	+				
Apasmarahara				+	+	+				
Smritibhransh				+	+	+				
Medhya				+		+	+			
Vrishya					+		+		+	+

Table 2. Pharmacological activity of constituents of *Benincasa hispida*

Chemical from B. hispida Thumb. Cong.	***Pharmacological Activity***
Linoleic acid, Oleic acid, Palmitic acid and Stearic	5- Alpha reductase Inhibitor
Oxalic Acid	Acaricide Activity
Ascorbic Acid	Acidulant Activity
Beta carotene, MUFA, Niacin Oleic acid	Allergenic Activity
Oleic Acid	Alpha reductase Activity
Ascorbic acid Thiamin, Tryptophan	Analgesic Activity
Beta Carotene	Androgenic Activity
Ascorbic Acid	Anti AGE Activity
Linoleic acid, PUFA	Anti MS Activity
Linolec acid, oleic acid, plamitic acid	Antialopecic activity