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Pharmacognostical Study of Benincasa hispida from Ayurveda and Botanical View

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Abstract

Benincasa hispida, commonly known as winter melon, ash gourd, or white gourd, is a versatile plant with significant culinary, medicinal, and nutritional value. A member of the **Cucurbitaceae** family, this vine plant flourishes in tropical and subtropical climates, producing large, oblong fruits characterized by a waxy white exterior. Widely utilized in Asian cuisine, it serves as a key ingredient in soups, curries, and beverages. Beyond its culinary use, *Benincasa hispida* holds a prominent place in traditional herbal medicine, owing to its cooling, diuretic, and health-enhancing properties. This article delves into the plant's morphology, nutritional composition, cultivation methods, and diverse applications, underscoring its importance as a sustainable resource in food systems and natural healthcare.

Keywords- *Benincasa hispida, Kushmanda, Petha, Ashguard,*

Introduction :

Nature offers a wealth of plants that seamlessly blend culinary, medicinal, and nutritional benefits, and *Benincasa hispida*—commonly known as winter melon, ash gourd, or white gourd—is a shining example. As a member of the ***Cucurbitaceae*** family, this vine thrives in tropical and subtropical climates, producing distinctive oblong fruits with a waxy white exterior. Celebrated for its versatility, *Benincasa hispida* has been a staple in Asian cuisine, where it enhances soups, curries, and beverages with its unique flavor and texture. Beyond the kitchen, this remarkable plant has earned recognition in traditional medicine for its cooling, diuretic, and restorative properties. This article explores the multifaceted nature of *Benincasa hispida*, including its plant characteristics, nutritional profile, cultivation techniques, and diverse uses, highlighting its vital role as a sustainable and valuable resource in both food systems and natural healthcare. The Drug is mentioned for its *Medya* property. It is used in preparations like *Kushmandavleha*, *Kushmanda ghrita* and common to south Indian Kitchen. Along with nutritional values it lays its role in medicinal property as well as in custom rituals. A wide description is available in Vedas, *Samhita*, *Nighantu*, and other classical text, that gives morphological, *pharacognstical*, *therapeutical*, detail of the drug.

Aim: To evaluate the literature available on *Kushmand- Benincasa hispida*

Methodology: All classical text, *Phamacognosy* text and recent research articles were studied.

Discussion:

1.Kushamand :*Paka Kushmand* was selected for the study, as it has *laghu guna*.

A] *Sahityiksamiksha* :

***i. Vaidik* literature :**In Vedic literature very few references was observed regarding *Kushmanda*. *Kushmanda* is used instead of animal in *yadnya* for sacrifice (*Kullukbhatta Tika*). In Vishnu-dharma-sutra it is described as *Shaka Vishesh* (*Vi.Dh.Su*. 79.17)

ii. *Samhita* Literature:

a. *Charaka Samhita*

Sr. No	*Refrence* for	*Sthan*	*Shlok*	Page No
1	*Kushmand* described in *Supyashaak*	Sutra *sthan*	27/102	399
2	*Guna* karma of *kushmand* are described- *Madhur, Amla, Laghu, Sarvadoshhar*	Sutra *sthan*	27/113	400

b. *Sushruta Samhita*

Sr. No	*Refrence* For	*Sthan*	*Shlok*	Page No
1	*Kushmanddescribed* in *Madhur varga*	Sutra *sthan*	**42/18**	**158**
2	*Guna* of *Kushmand* are described- rasa-*madhur, virya- Shita, Vipak-Madhur,Abhishyandi , Mootral*	Sutra *sthan*	**45/120**	**179**
3	*Guna* of *kushmand* are described- *unriped* fruit- *Pittaghna, Shukral, Riped* fruit- *Laghu, ushna, Mootral, agnidipak* etc	Sutra *sthan*	46/213	202
4	Shape of *vikrit garbha* resembles to *kushmand*	*Shaari rsthan*	2/53	18
5	Use of *sneh* of *kushmand* in *mootravrodh*	*Chikits asthan*	31/5	133

c. *Ashtang Hridya*

Sr.No	*Refrence* for	*Sthan*	*Shlok*	Page No
1	*Guna* of *kushmand* are described- *Madhur*-rasa & *paka*, guru, *vattapittahar*	Sutra *sthan*	6/85-87	52
2	contain in *kushmand rasayan paak*	Sutra *sthan*	3/113	391
3	contain in yoga used in *Arsh*	Sutra *sthan*	8/21	430
4	contain in *kushmand ghrit* used in *Apasmaar*	Uttar *sthan*	7/28	624

1. ***Madhurvalli phal*** - Synonym for *Kushmand* and other fruit of climber used in *Sushrut samhita* [1]
2. ***Karkaruk***- Synonym for *Kushmand*- according to *dalhan* it is *karkati* or near to *kushmand* or melon or unripe melon (*chark samhita* 19/33).

iii. *Nighantu* Literature :

Sr.No	Title	Description	Description	Description	Description	Description	Description	Description
1	**Nighantu**	Dhanvantri Nighantu[2]	Shodhal [3]	Madanpal[4]	Rajnighantu[5]	Kaiydev Nighantu[6]	Bhavprakash[7]	Priya Nighantu[8]
2	**Gana**	Guduchyadi Varga	Guduchyadi	Shakvarga	Pipplyadi Varga	Aushadhi Varga-phala Shaka	Shaka Varga	Pippalyadi Varga
3	**Guna**	--	Guru(Pakwa-Laghu), Virya-Sheeta, Rasa-Madhur,	Guru(Pakwa-Laghu), Virya-Sheeta, Rasa-Madhur,	Rasa-Madhur; Virya-sheeta, Pitta-Har	Rasa-Madhur, Vipaka-Madhur, Virya-Sheeta, Ruksha, Guru, kshaar	Rasa-Madhur, Virya-Sheeta, Vipaka-Madhur, Laghu	Virya-Sheeta, Rasa-Madhura
4	**Karma**	Vatapittahar, Vrishya, Hridya, Bastishudhikar	Medya, Abhishyandi, Vata-pittahar	Brihan, Kaphakar, Pittahar, Dipan, Basti shodhan, Retorogahar, Vrishya	Mootraghathar, Pramhahar, Ashmarichedan, Trish-Aratihar, Balya	Kapha-Vata-pittahar, Hridya, Vrishya, Bastishodhan, Brihan, Pathya	Brihan, Balya, Pittahar,	Medya, Vrishya, Pittahar, Brihan, mootral
5	**Specification**	Shreshtha in valliphala				Pakwa Kushmand-Laghu, Ushna, Skshaar, Madhur, pathya, Sarvadoshahar.	Apakva-Guru, Pakwa-Laghu	Used in Kshatkshya, Visarpa

B] Classification

I. *Samhita*

Sr. No	*Samhita*	Classification
1	***Charak Samhita***[9]	*Supyashaak*
2	***Sushrut Samhita***[10]	*Madhur varga, Shaakvarga*
3	***AshtangHridya***[11]	*Valliphal*

II. *Nighantu*

Sr.no	*Nighantu*	Classification
1	*Dhanvantari*	*Guduchyadi Varga*
2	*Madanpal*	*Shaakvarga*
3	Raj *Nighantu*	*Pipplyadi Varga*
4	*Kaiydev*	*Aushadhivarga- Phalshaak*
5	*Bhavprakash*	*Shaakvarga*
6	*Priyanighantu*	*Pipplyadi arga*

III] Botanical

Kingdom	***Plantae* – Plants**
Subkingdom	*Tracheobionata*- Vascular plants
Superdivision	*Spermatophyta*- seed plants
Division	*Magnoliophyta*- Flowering Plant
Class	*Magnliopsida- Dicotyledons*
Subclass	*Dilleniidae*
Order	*Cucurbitels*
Family	*Cucurbitaceae*- Cucumber Family
Genus	*Benincasa Savi- benincasa P*
Species	*Bennincasa hispida* (Tunb.) *Cogn. Waxgourd*

C] *Paryayi naam* and *Nirukti* and Vernacular names

I. *Paryayi Naam*[12]

i. Sanskrit *(24) - Brihatphala, Ghrinavasa, Gramyakarkati, Karkaru, Karkotika, Kumbhanda, Kumbhaphala, Kunjaphala, Kushmanda, Kushmandaka, Kushmandi, Kushpandaha, Kusmanda, Kusmandaka, Kusmandika, Nagapushpaphala, Pitapushpa, Pushpaphala, Shikhivardhaka, Timisha, Valliphalah*

ii. **English** - Ash Pumpkin, Wax Gourd

iii. ***Hindi*** - *Bhujailu, Gol-Kaddu, Golkaddu, Kadu, Khola, Kondha, Kudimah, Kumra, Petha, Phuthia, Raksa*

iv. ***Kannada*** – *Bilay*

v. ***Malayalam*** – *Cumbulam*

vi. ***Marathi*** – *Kohala*

vii. ***Tamil*** – *Alattuppucanikkoti*

viii. ***Telugu*** - *Boarda Goomoodoo*

ix. ***Tibetan*** - *Ku-Sma-Nda-Ka*

x. **Urdu** - *Paitha, Petha*

xi. Synonyms In *Samhita*

Sr. No	Synonyms	*Charaka Samhita*	*Sushruta Samhita*	*Ashtang Hridya*
1	*Kushmand*	+	+	+
2	*Madhurvalli phala*	-	+	-
3	*Karkaruk*	+	-	-

xii. Synonyms in *Nighantu*

Sr.No	Synonyms	Bha	RN	KN	MN	DN	PN
1	*Kushmandaki*	-	+	+	+	+	-
2	*Sthirphala*	-	-	+	-	-	-
3	*Pitaka*	-	-	+	-	+	-
4	*Somaka*	-	-	+	-	-	-
5	*Amruta*	-	-	+	-	-	-
6	*Mahaphala*	-	-	+	-	-	-
7	*Pushpaphala*	+	-	+	+	-	+
8	*Kumbhari*	-	-	+	-	-	-
9	*Somgushtika*	-	-	+	-	+	-
10	*Pitapushpa*	+	-	-	-	-	+
11	*Brihatphala*	+	-	-	-	+	+
12	*Valliphala*	-	-	-	-	-	+
13	*Kumbhaphala*	-	+	-	-	+	-
14	*Sthirphala*	-	-	-	-	+	-
15	*Kushmandi*	+	+	-	-	+	-
16	*Karkaruphala*	-	-	-	+	-	-
17	*Phandi*	-	-	-	+	-	-
18	*Rajkarkati*	-	-	-	+	-	-
19	Karkotika	-	+	-	-	-	-
20	Suphala	-	+	-	-	-	-
21	Nagapushpaphala	-	+	-	-	-	-
22	Muni	-	+	-	-	-	-
23	Kushmand	+	+	+	+	+	+

II. *Nirukti*[13] :

- ***Pushpaphala***:-Fruit carry the ruminant of flowers
- ***Peetapushpa***:-Flowers are yellow *coloured*
- ***Brihatphala***:-Fruits are big in size-
- ***Sthiraphala***:-Fruits are hard
- ***Valliphalottama***:-Fruits is considered best among *cucurbitaceae* family
- ***Kushmanda***:-Seeds does not *prosses ushnata-*
- ***Kumbaphala*:**-Fruits are like pitcher

Somasrishta:-Fruits are watery-

D]Morphology (Macroscopic and Microscopic) [14]

I. Macroscopic :

Cucurbitaceae[15]

Herbs or *undershrubs* usually climbing. Leaves alternate, *petiolate*, frequently *cordate*, simple, or *palmately* or *pedately* divided. Tendrils when present lateral, solitary, simple or divided, spirally twisted. Flowers *monoecious* or *dioecious*, yellow or white, solitary *paniculate orracemose*. Calyx-tube *adnate* to the *overy*; limb rotate, *campanulate* or tubular, 5- (rarely 3-6) lobed, imbricate. Petals as many as the calyx- lobes inserted on the limb of the calyx, free or rarely *gamopetalous*, sometime, lobed or *fimbriate*, *valvate* or *involute* in *buud*. Stamens inserted at mouth, or about the middle or at the base of *he* calyx tube, *usally* 3 (rarely 5); anthers free, cohering or confluent into a *capitulum*, one usually 1-celled, the other two celled, the cells flexuous or *conduplicate* extrorsely dehiscent, the connective sometimes, produced beyond, the cell. *Overy* inferior, or rarely free, at *apexonly*, usually,

3-capellary, ovules *usally* many, horizontal, rarely few and pendulous, style 1 with large stigmas, *placente usally* 3, edges of the *carpellary* leaves being often turned in so far that the *overy* is spuriously 3-celled. Fruit usually a fleshy berry, indehiscent or dehiscing by valves, or by a *circumscissile* lid. Seeds numerous, often packed in pulp or *fibre*.

Benincasa[16]

A large trailing or climbing gourd, softly hairy; tendrils 2-fid. Leaves *cordate*, *reniform* orbicular, more or less deeply 5-lobed; petiole without glands. Flowers large, yellow, *monoecious*, all solitary without bracts. Male: Calyx-tube *campanulate*; lobes 5, leaf *likeserrate*. Petals 5, nearly, separate *obvate*. Stamens 3, inserted near the mouth of the tube; anthers exert, free, one 1-celeld, two 2-celled, cells sigmoid. Female: calyx and corolla *asin* the male. Ovary oblong, *densly* hairy, style thick with 3 *flexuose* stigmas; ovules numerous, horizontal; *placentae* 3. Fruit large, fleshy, oblong pubescent, indehiscent, seeds many oblong compressed margined.

Benincasa hispida[17]

Stems stout, angular, *hispd*. Leaves 11.5 cm. *diam*, hispid beneath; petiole 7.5-10 cm, male peduncle 7.5-10 cm; female peduncle shorter. Calyx-teeth when young often narrow and scarcely serrate. Filaments angular, hispid at the base, fruit 30-45 cm, long, broadly *cylindric*, not ribbed, hairy, ultimately covered with a waxy bloom.

Drug occurs in deformed, compressed, cut pieces of various sizes; *epicarp* cream *coloured* with light yellowish to brownish *mesocarp*; taste, slightly acidic.

II. Microscopic[18]**:**

Mature fruit shows *cuticularised epicarp* consisting of single layered, *squarish* or slightly tangentially elongated cells of epidermis, outer tangential walls of epidermis thickened and *cuticularised*; a few epidermal cells divide *periclinally* and become 2 or 3 layered; *mesocarp* has a *heterogenous* structure consisting of multilayered hypodermis composed of tangentially elongated, thin-walled, *parenchymatous* cells; immediately within this is a zone of thick-walled, multilayered, lignified *sclereids* with the outer one to three layers thicker than the inner 2 to 6 or more layers; beneath this zone, *thinwalled* tangentially elongated, *parenchymatous* cells present, their size gradually increasing from those at periphery to those inside of *mesocarp*, the latter becoming circular having conspicuous intercellular spaces; vascular bundles poorly developed, *bicollateral*, found scattered throughout *mesocarp*.

E] *Guna* karma

a. *Guna*

Sr. No	***Guna***		***Charaka Samhita***	***Sushruta Samhita***	***Ashtang Hridya***
1	*Rasa*	*Madhura*	*+(Amla)*	+	+
2	*Guna*	*Laghu*	+	+	
3	*Virya*	*Sheeta*	-	*+(pakwa-Ushna)*	
4	*Vipaka*	*Madhur*	+	+	+
5	*Prabhava*	*Vatapitta Har*	*Sarvadoshhar*	*Abishyandi, Agnidipak,*	+

Sr. No	Guna		Bha	RN	KN	DN	MN	PN
1	Rasa	Madhura	+	+	+	+	+	+
2	Guna		Laghu	-	Guru, Ruksha	-	Guru, Pakva-Laghu	
3	Virya	Sheeta	+	+	+	+	+	+
4	Vipaka	Madhura	+	+	+	+	+	+
5	Prabhav		Pittahar	Pittahar	Tridoshhar	-	-	-
					Mootral			

b. Karma:

Sr. No	Karma	Bha	RN	KN	MN	DN	PN
1	Vatapittahar	+	-	+	+	+	+
2	Shukravardhak	-	-	+	+	-	-
3	Kaphavardhak	+	-	+	+	-	-
4	Brihan	+	-	-	+	-	+
5	Vrishya	+	+	+	-	+	+
6	Mootral	-	+	-	-	-	+
7	Medya	-	-	-	-	-	+
8	Ksatkshya har	-	-	-	-	-	+
9	Gulmahar	-	-	-	-	-	+
10	Hridya	-	-	+	-	+	-
11	Arochakhar	-	+	-	-	-	-
12	Pramehahar	-	+	-	-	-	-
13	Trisha/Aratihar	-	+	-	-	-	-
14	Kricchaashmarichedan	-	-	-	-	-	-
15	Balya	-	-	-	+	-	-
16	Bastishodhak	+	-	-	+	+	-
17	Mansik roga har	+	-	-	-	-	-

c. Nutritional Benefits :

Benincasa hispida is a low-calorie, nutrient-rich vegetable that offers a range of health benefits. It primarily consists of water (around 96%) and is an excellent source of dietary fiber, vitamins, and minerals. Below is a breakdown of its typical nutritional composition per 100 grams of fresh winter melon:

Nutrient	Amount (per 100 g)	Health Benefits
Calories	13 kcal	Low-calorie content makes it ideal for weight management.
Water	~96 g	Helps in hydration and supports detoxification.
Carbohydrates	3 g	Provides a small energy boost with minimal sugar.
Protein	0.4 g	Contributes to overall protein intake.
Fat	0.2 g	Negligible fat content makes it heart-friendly.
Dietary Fiber	0.6 g	Aids in digestion, prevents constipation, and promotes gut health.
Vitamin C	13 mg (15% DV)	Boosts immunity, promotes skin health, and acts as an antioxidant.
Vitamin B-complex	Trace amounts	Supports energy metabolism and nervous system function.
Potassium	150 mg (4% DV)	Helps regulate blood pressure and maintain heart health.
Calcium	19 mg (2% DV)	Supports bone health and muscle function.
Phosphorus	12 mg	Essential for bone strength and energy production.
Iron	0.4 mg (2% DV)	Assists in oxygen transport and prevents anemia.
Magnesium	10 mg	Supports muscle relaxation and overall metabolism.

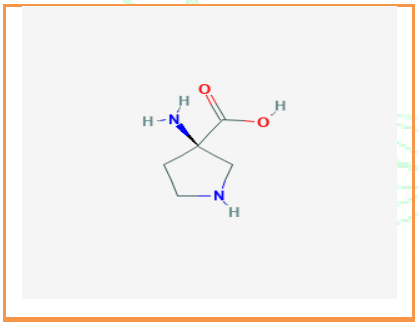
Key Health Benefits:

1. **Weight Management:** The high water content and low calorie count make it an excellent choice for weight loss.
2. **Hydration and Detoxification:** Its rich water content helps maintain hydration and supports kidney function for *detox*.
3. **Digestive Health:** The fiber aids in smooth digestion and promotes gut health.
4. **Blood Pressure Regulation:** Potassium helps maintain electrolyte balance and supports heart health.
5. **Immunity Booster:** Its vitamin C content strengthens the immune system and combats oxidative stress.

d. Pharmacological activity of *Kushmand* :

Kushamand shows following pharmacological activity- Anti-Ulcer, Anti-*angiogenic* Effect, *Gastroprotective* / Anti-Ulcer / Antioxidant, Bronchodilator Effect, *Opioid* Withdrawal Benefit, Antipyretic, Anti-diarrheal, Antioxidant / Alzheimer's disease, Anorectic / Potential Anti-Obesity Benefit.

F] Chemical constituents :



***Pic* : *Cucurbitine* structure**

G] *kalpa :*

Sr. No	***Kalpa***	***Roga dhikar***	***Anupan***	**Ref**
1	*Kushmandaa vleha*	*Raktapitta*	*Koshna Jala*	*Sha.S.M* 8/22-28
2	*Kushmandak Ghrita*	*Apasmar*	*Koshna jal*	Bhai.R.25\34
3	*KushmandKhanda*	*Raktapitta, Kshya*	*Jala*	Bhai.R13/95-101
4	*Kushmandgud kaliyan*	*Grahani*	Water	Bhi.R8/147-156

Conclusion :

In summary, *Benincasa hispida*, or winter melon, stands out as a remarkable plant that bridges the gap between culinary tradition, nutritional well-being, and medicinal value. Its adaptability to tropical and subtropical climates, combined with its diverse applications in food and traditional remedies, underscores its importance as a sustainable resource. From enriching diets with its mild flavor and essential nutrients to offering therapeutic benefits through its cooling and diuretic properties, *Benincasa hispida* continues to play a vital role in both cultural and health practices. As the demand for natural and sustainable solutions grows, this versatile plant remains an invaluable asset to food systems and natural healthcare, warranting further exploration and appreciation.

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