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Review Article

The Ash Gourd: Unlocking It's Health Benefits

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ABSTRACT

Ash gourd, also known as Benincasa hispida (Thunb.), is a vegetable that is utilized in numerous countries. Consumers are increasingly seeking vegetables to serve as more than just a source of nourishment, with a focus on functional and nutritionally active foods. Typically, every part of the ash gourd plant, such as the fruit peel, flower, seed, and leaves, is utilized. The fruit's biochemical properties exhibit antioxidant, anti-inflammatory, anti-angiogenic, detoxifying, and healing effects for treating different medical conditions. The critical minerals calcium, magnesium, iron, copper, zinc, and selenium are all included. The evaluation looks at the utilization of ash gourd for both culinary and healing purposes. The Ash Gourd, also known as Benincasa hispida, is a popular vegetable grown in many Asian countries. medicinal benefits that have not been fully utilized. Mainly cultivated in South Asia, specifically In India, China, and Japan, ash gourd is known for its nutritious content. Rich in necessary vitamins and minerals such as sodium and potassium, it provides a plethora of nutrients. benefits for one's health. This in-depth analysis looks at how ash gourd is used in the production of focusing on improving the nutritional content of plant-based drinks, particularly by enhancing their nutritional profile. addition of basil extract. The aromatic compounds of basil are well-known for their ability to enhance. The general nutritional characteristics of ash gourd, while also improving the flavor of ash gourd juice when mixed with lemon and sweetener. Additionally, this research seeks to delve further into the. nutritional content, health benefits, and chemical makeup of both ash gourd and Genovese basil, illuminating their inherent connection and possible shared benefits. This study aims to discover fresh opportunities for utilizing the health-enhancing benefits by conducting analysis. Features of ash gourd and basil drinks, paving the path for creative dietary approaches and medical uses. Ash gourd, also known as Benincasa hispida, and Genovese basil are both rich in phytochemicals and have high nutritional values

INTRODUCTION

The Cucurbitaceae family consists of numerous climbing vine species with spiraled tendrils.

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Vegetables in the gourd family have numerous health benefits. Ash gourd and bottle gourd are popular for their healing properties and are extensively utilized in traditional medicine out of all the different types of gourds. Ash gourd, also known as *Benincasa hispida*, is a circular trailing or climbing plant grown extensively throughout India.^[1] According to Ayurveda, it is suggested for the treatment of peptic ulcers, urinary tract infections, diabetes, epilepsy, and other nervous system disorders (Gill et al. 2010; Palamthodi and Lele 2014). Additionally, ash gourd has been shown to possess outstanding prebiotic properties according to Sreenivas and Lele (2013). According to Rahman et al. (2003), bottle gourd provides human health with the necessary amino acids and nutrients. In the past, this fruit has been utilized as a cardiogenic and overall tonic according to Deshpande et al. in 2008. Palamthodi and Lele (2014) have also documented the antioxidant, anti-inflammatory, anti-cancer, and diuretic properties of bottle gourd.^{[2][3]}



Preserving vegetable-based beverages presents a significant challenge. Because of the elevated pH levels in vegetable juices, they are highly susceptible to microbial contamination. Furthermore, ash gourd and bottle gourd also yield juices that are both colorless and flavorless. Therefore, it is perfect to mix these juices with certain tropical fruit juices of similar color.^[4] This will improve both the durability and visual appeal of the beverage. Additionally, multiple studies have demonstrated that mixing improves both the

taste and nutritional value of drinks (Curi et al. 2017). Hence, studying the traits of blended drinks and how to optimize them is crucial.^[5] Optimization is attainable by employing response surface methodology (RSM). RSM is a method that uses mathematical and statistical tools to empirically model the relationship between a response and various variables. In the past ten years, there has been a growing interest in the significance of dietary antioxidants for their role in preventing chronic illnesses such as cancer and heart disease. Additionally, multiple research projects indicate that incorporating fruits and vegetables into one's diet can lower the chances of developing illnesses linked to oxidative harm (Zheng et al. 2017). Phytonutrients like vitamins, carotenoids, and phenolic contents may protect the human body against damage caused by reactive oxygen and nitrogen species, which could explain this phenomenon.^[7] Incorporating fruits and vegetables into processed juices and beverages offers consumers additional choices. In addition, processing improves the economic value of produce because processed food products have a longer shelf-life than fresh fruits and vegetables (Pinho et al. 2014). Numerous recent discoveries suggest that vegetable juices contain high levels of antioxidants and other beneficial nutrients for health. Hence, it is advisable to consume juices daily as they are seen as a crucial component of a nutritious diet.^{[7][8]}

1. Origin of ash gourd :

Botanists cannot pinpoint the exact origin of ash gourd due to its long history, but they believe it likely originated in Japan, Indonesia, China, or Indo-Malaysia. Ash gourd has been used for millennia in all of these areas. Chinese texts from the 5th-6th century AD contain information about the medicinal properties of the gourd.^[9]

Sadhguru explains the folklore and applications of ash gourd in Indian culture. *adhguru* said that people have informed you that this vegetable is

very fortunate. When you construct a new house, you display it in front of your property. If you wish to perform a ceremony, it happens at your home. Conventionally, the custom was such that even if you were able to cultivate an ash gourd in your own home, you were forbidden from consuming it. You have to donate it to a Brahmin as dana. Giving it to a Brahmin will result in blessings for you in the future, while the Brahmin will receive immediate nourishment.^[10] A shudra was forbidden from consuming ash gourd. If a person of the shudra caste was caught eating an ash gourd, they would be put to death because it was believed that consuming this vegetable would make them more eloquent and intelligent. A shudra should be prohibited from consuming ash gourd. Today, you don't have any problems like that. Everyone has the freedom to select and consume whatever they desire.^[11] Historically, this vegetable has been utilized in various ways. When entering a newly constructed building, negative energies can sometimes become trapped, which is why it is hung in front of new homes. They recommended hanging an ash gourd as it generates positive energy that eliminates negativity. I believe it would be more advantageous to put into your body ^[12]

2. Appearance and taste :

As the ash gourd ripens, the fine hairs that cover it shed off. The vegetable's skin ranges from dark green to light grey in color. Mature gourds are covered in a distinctive white ash layer. The dusty covering of the melon gives it the other common name, "ash gourd."^[13] The shape of the gourd can vary, from round to elongated. Ash gourds have a mild taste similar to cucumbers. During warm weather, it can be mixed into salads, smoothies, or juices as it lacks a distinct flavor. In order to maintain the melon's raw energy boost on cooler days but decrease its natural cooling properties, we can choose to enhance the fruit with either honey or black pepper. Ash gourd fruits have a circular

shape, a waxy texture, a greyish color, and typically measure 8-12 cm in length and weigh 3-5 kg. Both Indian and Chinese cooking incorporate ash gourds into dishes like stews, salads, and curries. Ash gourds taste similar to cucumbers and can be easily combined with Indian spices.^[14]

3. Nutritional value. :

Winter melons contain a variety of nutrients such as vitamins and minerals. The sodium and saturated fat levels are both low. 100 grams of winter melon contain the following nutrients.

- Water – 96.1 g
- Energy – 13 Kcal
- Carbohydrates – 3 g
- Protein – 0.4 g
- Fiber – 2.9 g
- Calcium – 19 mg
- Vitamin C – 13 mg
- Magnesium – 10 mg
- Vitamin B2 – 1.3 mg.^[15]

Ash gourd also has lower quantities of iron, magnesium, phosphorus, copper, and manganese, in addition to several other B vitamins. However, these quantities usually do not go beyond 3% of the recommended daily values for nutrients.^[15]

Ash gourd also contains flavonoids and carotenes, along with vitamin C, which are antioxidants that may prevent cell damage and conditions such as type 2 diabetes and heart disease. It is believed that the primary factor responsible for the majority of ash gourd's reported benefits is its antioxidant content.^{[15] [16]}



4. Finding and choosing :

Ash gourd is grown extensively in India, Bangladesh, Southern China, and various other regions of Southeast Asia. In regions outside of Asia, even though your nearby supermarket may not carry ash gourd, you can typically find it at Chinese markets, Indian markets, or international farmers' markets in most cities.^[17] When picking out an ash gourd, go for one that is free of any bruises or dents. The melon should be dense for its size, and is similar in size, shape, and color to a watermelon, but with a distinct white, ash-covered exterior.^[17] This powder is safe to consume, but it turns adhesive when in contact with moisture. The surface must be washed before cutting the melon. The inside must have a clear and uniform texture in white color. An uncut ash gourd can be stored for a month or longer in a cool, dry storage place.^[18]

5. Benefits of ash gourd :

Controls type 2 Diabetes

Winter melons are a good choice for individuals with Diabetes and those seeking weight loss due to their low calorie content. Studies suggest that winter melons can help individuals with type 2 Diabetes mellitus in reducing their blood glucose levels.^[19] Frequent consumption of vegetables from the Cucurbitaceae family can help manage type 2 Diabetes as they are rich in healthy fibers, carotenes (pro-vitamin A), potassium, and vitamin C. Regular consumption of winter melons by individuals with Diabetes mellitus could reduce their blood glucose levels.^[20]

Enhances the body's natural defense system.

Ash gourd is a powerful immune booster because it contains vitamin C, which helps in the production of white blood cells. It also includes a significant amount of zinc, which is another important element for the immune system.^[21]

Healthy for the heart

Ash gourd has very little cholesterol content. It is essential for heart health to incorporate this

vegetable into the diet on a regular basis. Cooking ash gourd by boiling is the most beneficial method for promoting heart health. The consumption of ash gourd can reduce cholesterol levels in the body, thus preventing heart diseases as it is rich in dietary fiber.^{[21][22]}

Helps heal ulcers

A peptic ulcer is a condition that results in the breaking of the tissue lining of the stomach or intestine. Ash gourds might help in the prevention of peptic ulcers by getting rid of free radicals. It aids in decreasing the stomach's volume and acidity. Self-treatment should always be avoided as it may lead to significant adverse effects.^[23]

Helps cleanse the kidneys

The ash gourd, which is high in water content, effectively lowers body heat and helps maintain the health of the liver and kidneys. It also assists with dysuria, constipation, urinary tract infections (UTI), removal of kidney stones, regulation of renal processes, and promoting smooth bowel and bladder movements.^[24]



Disorder of the eye

Antioxidants found in winter melon help reduce oxidative stress in the retina. As individuals get older, the levels of vitamin C in their eye lenses may decrease, potentially impacting their vision. Eating fresh winter melons could potentially

increase the levels of vitamin C in the lens. Lack of riboflavin can cause night blindness and can also be found in winter melons. Having enough riboflavin can help prevent the condition.^[25]

Most eyesight problems are primarily caused by a lack of riboflavin, also known as vitamin B2. Winter melon contains a high amount of Vitamin B2. Just one serving gives us 11% of the nutrients we need each day. Increasing consumption of winter melon can effectively reduce the likelihood of developing eye disorders. The additional antioxidants help decrease macular degeneration and oxidative stress in the retina.^{[25][26]}

Boosts energy

Vitamin B2 is crucial for the metabolism of the body because it helps the conversion of food into usable energy^[27]. The abundance of vitamin B2 in winter melon plays a key role in maintaining one's health and hormone levels essential for optimal functioning.

Influence on depression

Hundreds of millions of individuals experience depression, which is a prevalent mental disorder. Ash gourd inhibits the MAO-a enzyme, aiding in the management of depression. The enzyme monoamine oxidase (MOA) regulates appetite, emotions, sleeping patterns and mood. The ash gourd might elevate dopamine, serotonin, and norepinephrine levels, and reduce GABA levels. Ash gourd can assist with depression in this manner.^{[27][29]}

Enhances cognitive ability

The iron content in winter melon makes it an excellent choice for enhancing blood circulation. Iron plays a crucial role in the creation of red blood cells. Hence, the intake of iron will lead to enhanced oxygenated blood circulation.^[28] The ash gourd, also known as winter melon, enhances memory, focus, and concentration, while also preventing anemia and promoting good blood circulation in the brain. This aids in enhancing a person's cognitive abilities.^[29]

Speeds up the process of losing weight.

The winter melon is frequently commended as a successful tool for weight loss due to its high fiber content and low number of calories. Eating ash gourd makes you feel full, which decreases the craving for snacks and overeating.^[30] The blend of essential nutrients and minerals present in ash gourd helps increase weight loss by supporting muscle growth and speeding up metabolism.^[31]

Skin and hair applications

Winter melons provide beneficial antioxidants and vitamin C, which are perfect for skin health. Topical application of Vitamin C can help in managing and supporting photoaging-induced alterations.^[32] Ash gourd has the ability to effectively address hyperpigmentation. The antioxidants in winter melons protect the skin from oxidative stress. Ascorbic acid is the most common antioxidant and active form of vitamin C in the skin. Vitamin C possesses qualities that can brighten the skin. Many hair strands are nourished by the abundance of vitamins and minerals found in ash gourd. When applied in gel form, it goes deep into the layers of the scalp to shield follicles, maintaining hair thickness and strength. Using ash gourd is a great option for achieving lengthy and sturdy hair.^{[33][34]}

6. Ash gourd benefits in Ayurveda :

Ash gourd plays a significant role in Ayurveda. As per In Ayurveda, *B. hispida* is recognized by the name Kushmanda and possesses certain properties.^[35] Utilized in either torn or immature state. The plant consists of flowers. Foliage, bark, underground parts, branches and produce.^[36] Kushmanda provides numerous opportunities. advantages such as:

- Antioxidant activity
- Anti-inflammatory analgesic activity
- Antimicrobial activity
- Antipyretic
- Anti-convulsion activity
- Antiulcer activity



- Antidepressant activity
- Anorectic activity
- Histamine activity

It can also be utilized for cooking in vegetables, salad, crisps and candies. Available in juice, paste, powder, and various other forms. In various forms, it is utilized for piles, internal bleeding, anemia, and cough and cardiovascular conditions. Kushmanda consumption has benefits for both treatment and prevention purposes. [36][37]

Juicing is the most ideal method to consume ash gourd as it enables you to intake a larger amount of the fruit, despite there being various other consumption methods available. Here are several advantages to consuming ash gourd juice before eating: [37]

Improved Digestive System: Ash gourds contain a lot of fiber, which can aid in the development of beneficial bacteria. This can also aid in reducing constipation, bloating, and stomach cramps. [38]

Assists in Alleviating Acidity: Ash gourd's alkaline nature aids in balancing stomach acidity, easing indigestion, heartburn, and bloating when consumed as juice on a regular basis. [38]

Enhances Lung Function: Ash gourd is believed to possess qualities that help with coughing up phlegm. This indicates that it can assist in eliminating any additional phlegm or mucous production from your respiratory system. It may also be advantageous for allergies.

Boosts Energy Levels: The vitamin B3 found in ash gourds assists in boosting energy levels, making it advantageous for individuals dealing with anemia or physical weakness. Regularly consuming ash gourds is very effective in treating stomach ulcers as it helps in safeguarding the stomach lining, thus assisting in the prevention and treatment of peptic ulcers. Anticoagulant Characteristics: Individuals who frequently take blood thinning medication such as aspirin may find it advantageous to include ash gourd in their

diet to regulate excessive bleeding. It can also aid in the prevention of nose bleeds [39].

Cooling Impact on the Body: Similar to cucumbers, ash gourds contain a lot of water. Therefore, drinking ash gourd juice in the summer can help avoid dehydration. Furthermore, it is also claimed to enhance mental acuity, leading to increased alertness. [39][40]

Helps with dandruff: It aids in treating surface scalp conditions such as dandruff. Boiling ash gourd seeds with coconut oil can possibly relieve symptoms such as itchiness or dryness. [41]

Combatting Jaundice: Ash gourds possess cucurbitacins that support liver functions and enhance immunity. [42] Additionally, the immune system is further enhanced by the presence of Vitamin C in the leaves. It is believed that consuming a mixture of crushed leaves and coriander seeds twice daily can be beneficial in treating jaundice according to Ayurvedic tradition. [43]

Supports the health of joints: Ash gourds contain calcium, magnesium, and phosphorus, which aid in strengthening bones and improving flexibility in joints. The juice also possesses anti-inflammatory properties that aid in relieving joint pain and inflammation. [43]

May help with food poisoning: Ash gourd juice may be beneficial for food poisoning by replenishing electrolyte levels when consumed. If your symptoms worsen instead of improving over time, seek medical assistance. [41][42]

7. Neuroprotective properties :

Properties that protect the nervous system
Effects that prevent convulsions. The extract of methanol from the fruit (0.2-1 gram per kilogram, given orally, demonstrated anticonvulsant activity that varied based on the dosage [44].

in the compounds pentylenetetrazole, strychnine, and picrotoxin, and maximum modeling of epileptic seizures [98]. Conversely, the outer layer of the fruit The methanolic extract showed a



proportional effect based on the dosage (0.25-1.5 g/kg). The pentylene tetrazol-induced convulsion was inhibited by the anticonvulsant effect. In mice models, as stated in reference 62. Seed extract in 250 and adhering to ethanol 500 mg/kg, oral administration, demonstrated anticonvulsant effects that varied based on dosage. impact on the anticonvulsant effects in Swiss albino mice^{[44][45]}

8. Fruit development and biometric characteristics :

Ash gourd is an annual plant, also known as *B. cerifera* according to Sew et al. (2010). Maturing as a trailing vine extending up to 80 cm long. The lone yellow blooms number 8. Measuring 10 cm wide and having separate sexes. Leaves that are hairy have a heart-shaped appearance at the bottom and are usually having lobes arranged like fingers on a hand (Pandey et al., 2007). Circular or elongated fruit can grow as large as 40 centimeters long and typically coated with a white, chalky wax that discourages microbes^[46] and contribute to the gourd's long lifespan. Ripe fruit is a shade of green, consisting of white seeds that are flat and approximately 1 cm in length (Haque et al., 2008). The flavor is lacking. Balmy, moist weather with the ideal temperature range between 24 and 30 degrees Celsius, and a soil pH level. A pH range of 6.0–7.5 is necessary for growth according to Zaman (2006). The fruit takes on various forms. Different choices in color and various sizes are available. The typical weight of fruit can range between 0.5 and 3 kg, with a length of 18–35 cm, width of 15–33 cm, and circumference of 30–37 cm. Harvesting typically begins between 90 and 100 days^{[45][46]}. The process is finished approximately 140-160 days after planting. Ripe fruit is picked, once the powdery or waxy layer on the top vanishes. The typical output ranges from 25 to 30 tonnes/ha (according to Dewan et al., 2014). Typically, the eatable part of fully-grown gourds consists of approximately 96.3% water (Total soluble Solids) 3.5°Brix, 0.12% acidity, and

0.5% of minerals are present in the substance according to Parmeshwar (2015) and Shinde et al. (2016). The mineral trend continues to rise. The sequence of nutrients in gourd fruit is as follows: Na>Ca>Fe>Zn>K>Mn with varying levels. 268.00 ± 0.02 is greater than 99.40 ± 0.1, which is greater than 3.20 ± 0.02, which is greater than 1.30 ± 0.01, which is greater than 1.10 ± 0.05, which is equal to 1.10 ± 0.01 milligrams per kilogram.^[47]
^[48]

9. Phytochemistry of ash gourd :

Phenolic and flavonoid compounds are involved in the bioavailability of ash gourd, and the availability of nutrients in the body (Table 3). Many plant-based substances contain a large variety of phenolic compounds. Food displays a variety of chemical properties and a wide range of structural diversity.^{[48][49]} development and can be separated and recognized using water-based mixtures of acetone, ethanol, methanol, and ethyl acetate has been studied (Dai and Umper, 2010). Tripathi and colleagues (2013). Ash gourd contains a large quantity of dietary fiber and lipids, resulting in polyphenols from food having an effect on each other fiber and sugar, increasing their bioavailability (Palamthodi et al., 2019). Dietary fibers found in ash gourd demonstrate outstanding prebiotic properties (Sreenivas et al.,). Lele (2013) stated. The biologically significant bioactive and medicinal substances The treatment of can be done using phenolics, sterols, and glycosides found in ash gourd. seizures, gastric ulcers, and various other nervous ailments. The ability of ash gourd to act as an antacid Aids in regulating body pH and neutralizing acidity from certain foods.^[48] Ash gourd's Curcubitin B has anti-inflammatory and cytotoxic properties. The city's identity remains unchanged. The active components alnusenol and multiflorenol found in ash gourd are triterpenes. Substances that prevent the release of histamine (Grubben and Denton, 2004). The presence of anti-nutrients like oxalates,

phytates, and tannins is noteworthy. Chernobyl is causing mineral availability issues. A diet high in oxalates can heighten the likelihood of calcium absorption, it has been linked to kidney stones were discussed by Gul and Monga in 2014. A recommended range of 4-9 mg/100 g of phytates for safety. Oxalates may not prevent mineral absorption in the body when ingested and is more secure when incorporating plant products with other types of food. [47][48]

CONCLUSION

The intention of this Mini-review was to inform the public with scientific facts and raise awareness within society about the topic. Comprehensive characteristics and benefits of a nutraceutical plant known as Ash gourd. [49] The purpose of this review article was to clarify any misunderstandings about the plant and inform the society about its significance and benefits with accurate information and pieces of information. It serves various purposes and acts significantly as an anti-ulcer, effects of an antidepressant, anti-inflammatory, and antibacterial properties majorly suppresses addiction to opioids or morphine immediately indicates outcomes from the central nervous system and its extract from fruits provides protection for the stomach. It is additionally utilized as a Ayurvedic medicine offers significant health advantages. It does well in loamy and sandy soils that are well-drained and warm. Moderate regions and can withstand frost. It has developed in the beds of rivers. It needs regular irrigation to grow, [49][50] causing grooves or furrows. time of year. In Ayurveda, fruits are utilized for treating ailments such as epilepsy, pulmonary conditions, respiratory issues, bronchial asthma, hacking cough, and inability to urinate. The current study assesses the historical applications. examined the most recent pharmacological studies conducted in living organisms and in laboratory settings showed the molecular processes that demonstrated confirmed

traditional medicinal uses. Nevertheless, [49] a constraining factor. One aspect lacking in this paper is the absence of human clinical trials. projects. In the upcoming time, their participation is essential for finishing the pharmaceutical project. Exploring the ecological characteristics and creating a path for novel advancements. forms of medication derived from natural substances. established healing benefits. [50] Advancements in control standards. Playing cards will be required for upcoming pharmacological research as well. Contain *B. hispida*. In our job, phyto-individuals are related. Only high levels are used to classify chemical compounds. High performance liquid chromatography (HPLC) technology. 10th edition. The antioxidant properties of this represent its protective aspect. plant that has only been studied in laboratory settings [50][51], without any field research. do not assure similar results in live animal testing. types of models. In future research, the availability and pharmaceutical characteristics will also be examined. Pharmacokinetics, mode of action, and evaluation of effectiveness. connection between the specific and separated pure plant chemicals. calories should be examined in order to gain a better understanding of the information provided functions in living organisms. [51][52].

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