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A review on watermelon (*Citrullus lanatus*) medicinal seeds

Gupta Alka, Singh Anamika and Prasad Ranu

Abstract

Herbal products are globally important because of their low side effect, affordability, accessibility. Water melon is a famous fruit in indigenous system of folk medicine and also known to contain bioactive compounds such as triterpenes, sterols, vitamin, cucurbitacin and mineral. Fruit is used in cooling, strengthening, aphrodisiac and blood purifier. *Citrullus lanatus* seeds are highly nutritious; they contain good amount of protein, fat, vitamins and minerals the seeds are used to prepare snakes, mix into flour and used for sauces. The seeds are used to treatment of urinary tract infection, bed wetting, dropsy and renal stones. This review is an attempt to provide information of its nutritional value, pharmacological activities of *Citrullus lanatus* for further research.

Keywords: *Citrullus lanatus*, pharmacological activity, triterpenes, folk medicine, indigenous system

Introduction

Watermelon (*Citrullus lanatus*) a fruit crop, is herbaceous creeping plant belong to the family *cucurbitaceae*. It is mainly propagated by seeds and thrives best in warm areas. It is a tropical plant and requires a lot of sunshine and high temperature of over 25°C for optimum growth. Watermelon thrives best in a drained fertile soil of fairly acidic nature. It can be grown along the coastal areas of Ghana, the forest zone and especially along river beds in the Northern Savannah areas [1].

Citrullus lanatus (water melon) produces a fruit that is about 93% water, hence the name “water” melon. The “melon” part came from the fact that the fruit is large and round and has a sweet, pulpy flesh. The scientific name of the watermelon is derived from both Greek and Latin roots. The *Citrullus* part comes from a Greek word “citrus” which is a reference to the fruit. The *lanatus* part is Latin, and has the meaning of being wooly, referring to the small hairs on the stems and leaves of the plant [2].

Watermelon can be used as fresh salad, dessert, snack, and for decorations. Drinks can also be made from the juice. The sugar content and sweetness are the critical factors in determining the quality of many watermelon varieties. It is known to be low in calories but highly nutritious and thirst quenching [3].

Botanical Description [4]

Kingdom: Plantae
Order: Cucurbitales
Family: Cucurbitaceae
Genus: *Citrullus*
Species: *C. lanatus*
Botanical Name: *Citrullus lanatus*

Indian local name [5]

Sanskrit- Kharabuja, Bengali- Tormuj, Hindi- Tarbooz, Gujrati- Indark, Marati- Kadu vrindavana Urdu- Tarbooz, Panjabi- tarabuuj, Tamil- palam, Telugu- puchakaya

Plant discription

Watermelon is a annual herb. It is largely cultivated in India and another warm country. It is lying on ground with long steam (up to 10 m and 32.8ft), curly tendrils and large hairy leaves. Leaves are rough on both side with 3-5 lobe. The plant is monoecious male and female both flower found in same plant with hairy and long flower stalk. The fruit in wild form is 1.5-20 cm in diameter mated, greenish, subglobose, dark green with 50 mm long fruit stalk. The pulp may be yellow or green (wild form) and dark red (cultivar). The seeds are inn yellow to dull brown or black and rarely white, ovate, flattened 9-12×5-7mm [6, 7, 8].

Nutritional values

The fruit *Citrullus lanatus* carried 92% water by weight and about 6% sugar. It is a very good source of vitamin A, B & C which is necessary for energy production. *Citrullus lanatus* carry about 6% sugar and 92% water by weight. It is a good source of vitamin C. Composition of dried seed without shell per 100 g include protein 28.3g, fat 47.4 g, water 5.1g, energy 2340kJ (557kcal), carbohydrate 15.3 g, Calcium 54 mg, Phosphorous 755 mg, iron 7.3 mg, thiamin 0.19 mg, riboflavin 0.15 mg, niacin 3.55 mg and folate 58 µg. The seed oil reported to carry oleic, palmitic, stearic acid and glycosides of linoleic [9]. Medicinal plants are good source of antioxidants, vitamin and mineral. They can be use to develop different type of food products like cookies to increase their nutritional values, which helpful to fulfill nutritional requirement and combat with various degenerative disease [10].

Table 2: proximate contents of watermelon seed [11]

S. No	Parameters	Values
1	Moisture	6.4%
2	Fat	47.1%
3	Protein	68.4%
4	Fiber	1.2%
5	Ash	2.6%
6	Carbohydrates	25.1%

Use of water melon seeds in traditional way

Watermelon has been cultivated in Sourthen African with other crops like sorghum and maize since pre colonial times. The leaves and young fruits are used as green vegetable and fruit flesh cooked with maize meal as porridge. For cooking purpose and for storing berries the vacuous fruit can be used as container. Pulp and seeds are used to prepare different dishes [12].

The flat brown seeds have a nice nutty taste and have a good food value then the flesh. They are rich source of vitamin C, mineral and fat. They can be eaten as such or in roasted form and can be used in flour mix. In a study it is shown that the seeds pulp are used as a thickener into soups. The fermented seeds are used to produced a sweetener which is locally known as “ogiri” or they are boiled with leaves wrap to make another sweetener called “igbãlo” [13]. The seeds of *Citrullus lanatus* seeds are used for their oil and also use in the cosmetic and pharmaceutical industry is increasing. For their high protein and fat content seeds are also used in the improvement of infant nutrition [14].

Bioactivity of *Citrullus lanatus*

Anti-inflammatory activity

A study In-vivo and in-vitro for anti-inflammatory activity of *Citrullus lanatus* seed oil (CLSO). In-Vivo anti-inflammatory activity the oil was screened by carrageenan- induced pawedema in rat model and by human red blood cell membrane stabilization in-vitro anti-inflammtory activity. Comparison of oil potency was done with standard diclofenac (10MG/kg). The significant reduction of edema shown by the oil in carrageenan induced rat paw edema model maximum at 3 hr (percentage reduction in paw volume 44.44%, 55.56% and 63.11% for CLSO (50 mg/kg), CLSO (100 mg/kg) and diclofenec (10mg/kg) respectably and CLSO at concentration of 100, 250, and 500 mcg/ml showed 42.35%, 68.48% and 78.50% protection of HRBC in hypotonic solution respectably [15].

Table 1: Phytoconstituents of *Citrullus lanatus*

Part	Constituents
Seeds	Lycopene, beta-carotene, xanthophylls, phenolics, vitamin C [16]
	Protein-globulin, albumin, glutelin. [17]
	Flavonoids, vitamin C, thiamine, riboflavin, polyphenolic compounds [18]
	Terpene, steroid, flvonoid. [19]
	Glycoprotein-vicilin [20]
Seed oil	2-dodecyclobutanon, 2-tetradcylcyclobutanon, cellulose radicals [21]
	Crude protein, carbohydrate, amino acids- arginine, isoleucine,leucine. Mineral composition- Na, Ca, Mg [22]
	Total lipid content- oils- polyunsaturated fatty acids- oleic, lenoleic fatty acid [23]
	High amount of higher fat acids- palmitic acid, stearic acid, linoleic acid.Higher amount is limoleic acid. Poor in linolenic acid [24]
	Saturated fatty acid. Unsaturated fatty acid- tocotrienols [25]

Anti-ulcer- activity

The study about ulcerogenic property has done by crude methanolic extract of watermelon seeds dissimilar ulcer models pyloric ligation (PL, 4h ligation) and in water immersion (WS 25 oc for 3h) stress induced ulcer model in albino Wistar rats. The *Citrullus lantus* shows to decrease the gastric volume (53.55%), free acidity (57.02%) and total acidity (36.53%) in case of pyloric ligation model. The methanolic seeds extract shows to exhibited a dose related antiulcer activity with maximum activity at 800mg/kg [26].

Anti- microbial activity

A research demonstrate for antimicrobial activity of chlorofarmic, hexane and ethanolic extracts of leaves, fruits, stem and seeds from *Citrullus lanatus* var. Citroides (CL) against bacteria (Escherichia coli, Staphylococcus aureus, Pseudomonas aureginosa, Bacillus subtilis and Proteus vulgaris) and fungi (Aspergillus nigar and Candida albican). Antimicrobial CL was tested by using cup-plate and disc diffusion method. The result of study shows that the chloroform extract of fruit shows the highest antibacterial activity. It showed antibacterial activity against s. aureus: 36mm, B. subtilis: 38mm, E.coli:37mm, P. valgaris: 23mm, P. aeruginosa: 19mm. The highest anti fumgal activity shown by ethanolic extract of the fruit pulp and stem on C.albica (41 m). A nigar was very sensitive to the chloroform extract of the seed (37 mm) and the ethanolic extract of the leaves (37 mm) [27]. It is also reported in studied about the antibacterial activity of *Citrullus lanatus* seed extract. They found that seed extracts against the selected bacteria indicate that extracts obtained by cold maceration, Soxhlet extraction, as well as using chloroform and methanol have potential as antibacterial agents especially against *Staphylococcus* sp. and *P. aeruginosa* [28].

Anti-oxidant activity

Antioxidant activity of *Citrullus lanatus* of chloroform, ethyl acetate and methanol extract in their study. DPPH method was used for antioxidant activity of all chloroform, ethyl acetate and methanol extracts. The maximum antioxidant potential shown by methanolic extract of *Citrullus lantus* (MECL) seeds [29].

Hepatoprotective activity

The hepatoprotective effect was carried out by *Citrullus*

lanatus seeds in carbon tetrachloride induced hepatotoxicity in rats through estimated serum hepatic enzyme levels and hisopathological study of liver tissues. *Citrullus lanatus* seed oil; CLSO (125 mg), and CLSO (250mg) were used to deliver orally in rats for 10 days and compared with standard silymarin (100 mg/kg) orally. The result shown ALT, AST, and ALP level significantly decrease in serum in treated groups which were increased due to CCl₄ induced liver damage are comparable with standard drug. Histopathological study of liver tissue reveals the hepatoprotective activity of *Citrullus lanatus* seed oil^[30].

Conclusion

This study showed that water melon seeds are a good source of many nutrients like vitamin, minerals which are essential for our body weight and is also a good source of water which can leave cooling effect in our body. Watermelon seeds have been used for its pharmacological activities like antibacterial, antifungal, antimicrobial, antiulcer and anti-inflammatory values since centuries. These watermelon seeds can provide medicinal, economic and health benefit if they consumed freshly or utilized in food products. But there is limited literature on the nutritional and antioxidant properties of watermelon seeds and there is wide scope of investigation.

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