



A REVIEW ON “CUCUMIS MELO L” - AN IMPORTANT MEDICINAL PLANT

Nithya M.^{1*}, Revathi M.², Rangapriya M.³, Saritha B.⁴ and Uthayanithi S.⁴

^{1,2}Assistant Professor, Department of Pharmacology,

³Professor, Department of Pharmacy Practice,

⁴B.Pharm Final Year Students,

^{1,3,4}Excel College of Pharmacy, Komarapalayam, Namakkal -637303, Tamilnadu, India.

²JKK Munirajah Institute of Health Sciences College of Pharmacy T. N. Palayam, Gobichettipalayam, Erode – 638506, Tamilnadu, India.

***Corresponding Author: Nithya M.**

Assistant Professor, Department of Pharmacology, Excel College of Pharmacy, Komarapalayam, Namakkal -637303, Tamilnadu, India.

Article Received on 15/2/2023

Article Revised on 06/3/2023

Article Accepted on 26/3/2023

ABSTRACT

The Dicotyledonous Plant *Cucumis melo* L is a member of the Cucurbitaceae family. This plant is Persian (Iran) in origin. In Central Asia, muskmelons are native. The plant is frequently observed flourishing throughout Turkey, China, and India. *Cucumis melo* composed of many volatile compounds, biosynthetically derived from fatty acid, carotenoids, amino acid and terpenes. The Therapeutic benefits of Muskmelons include Antioxidant, Antimicrobial, Anti-inflammatory, Anti-ulcer, Anti-fertility, Anti-helminthic, Analgesic and Hepatoprotective qualities. Potassium, Calcium, Magnesium and Carotenoids are all present in muskmelons. Muskmelon fruit peel extracts are utilized in Ayurveda for their Anti-hypothyroidic and Anti-diabetic properties. The present review is an effort to give a look on An Important Medicinal Plant *Cucumis melo* L.

KEYWORDS: Dicotyledonous Plant, Carotenoids, Hepatoprotective, Anti-ulcer, Muskmelons and Anti-helminthic.

INTRODUCTION

Medicinal plants play an eminent role in the human health care. Even in the present time majority of the world population i.e. about 80% still relies on the medicines that are predominately based on the plant material. These plants have been used for medicine purposes since immemorial time, and have been in practice either for traditional medicine or ethno medicine practices worldwide. Many ancient cultures like Chinese still rely upon the traditional medicines for curing a variety of diseases. These traditional medicine practices includes the wider range of health care practices that includes folk or tribal's rituals as well as Chinese, Ayurveda, Korean, Siddha medicine, Japanese, Iranian medicine, Unani, ancient traditional African medicine.^[1] Muskmelon, or *Cucumis melo* L fruit, is a pubescent or trailing herb bearing palatable, polymorphous fruits. In the Traditional System of Medicine, it is used to treat a variety of illnesses. The annual, widely spreading and typically hairy vines. Although they can be trained on a trellis or other support, vines generally trail along the ground. Unisexual and yellow flowers are in bloom. The fruit of the cucumber melon is widely produced for use as a vegetable in many tropical nations. It occasionally naturally occurs in open scrub forests.^[2]

Plant profile

Toxonomy

- Kingdom - Plantae Plants
- Division - Magnoliophyta
- Class - Magnoliopsida
- Order – Cucurbitales
- Family - Cucurbitaceae
- Genus - Cucumis
- Species - *Cucumis melo* Linn

Vernacular names

- Tamil - Thumattikai
- English - Melon, Sweet Melon
- Kannada – Budame
- Sanskrit – Madhuphala
- Hindi - Kharbooza

Geographical distribution

- **Native range:** Iran, South Africa, India, Philippines, China and Australia.
- **Exotic range:** Pakistan, Japan, India, Srilanka, Saudi Arabia, Indonesia and Yemen.
- **Africa:** Angola, Ethiopia, Kenya, Mali, Nigeria and Senegals.

- **Pacific:** Fiji Island, Guam, Tonga, New Britain and Samoa.
- **USA:** California, New-York, Georgia, Arizona, Texas and Colorado.^[3-5]

Description

Leaf

The leaf of the musk melon is big, rough, and dark green. It has 5-7 lobes and a slightly heart-shaped, orbicular, ovate, or angled form. They are dentate and base cordate, and range in diameter from 5-8 cm. Simple tendrils are present on the 4–10 cm long petioles. Although cucumber leaves (left) have sharply pointed and toothed lobes, musk melon leaves are occasionally mistaken for them.

Fruit

Fruits vary in rind colour, size, and shape. The epidermis may be smooth, netted, ribbed, wrinkled, flesh-yellow, green, or pink in colour. Musk melon fruit has a gritty feel, is nearly spherical, and has a yellowish green

colour. The rind of an immature Musk melon is smooth, green, and may have shallow grooves.

Flowers

Musk melon flowers are yellow and have separate male and female flowers on the same plant. The female flower is easily identified by the small fruit (ovary) below the petals. The male flowers lack the fruit structure and fall off the plant after the pollen. Flowers are staminate, clustered, pistillate, solitary, hermaphrodite with 1-3 cm diameter. Calyx is 5-lobed, 6-8 cm long. Petals are free, round in shape, 2 cm long with 3 stamens.

Seed

The smooth seeds are elliptic and flattened, 0.5-1.2cm long x 0.2-0.7cm broad. They germinate epigeally. The seeds are rich in lipids, protein, and contain 24 fatty acids. *Cucumis melo* L. corresponding to about 10% of the total fruit weight. The seeds are rich in vitamin A and carotene which is great for eyes.^[6-12]



Leaf



Fruit



Flower



Seed

Fig. 1: Parts of *Cucumis melo* L.

Chemical composition

Volatile constituents such as Methyl acetate, Ethyl acetate, Ethanol, Ethyl butanol, Benzaldehyde, Benzyl acetate, Phenyl methyl acetate, Benzyl alcohol, Eugenol,

Terpenoids such as β - Pinene, 1, 8-Cineol, Limonene and p-Cymene.

Non volatile constituents such as β Carotenes, Flavonoids, Carbohydrates, Linoleic acid, α - Linolenic

acid, Glycolipids, Phospholipids, Amino acids and Phenolic glycosides.

Melon seeds contain moisture (7.16%), oil (30.65%), protein (27.41%), ash (4.83%), carbohydrate (29.96%), fibers and considerable amount of anti oxidant substance as phenolic compounds.^[13-14]

Traditional uses

Cucumis melo L act as purgative. It is used in dysuria, regulate the kidney functions, reduced blood pressure, anaemia, fever, cough, leprosy, diabetes, obesity, constipation and other abdominal disorders. The fruit is used as cooling agent, cleansing agent or moisturizer for skin.^[15]

Pharmacological actions

Anti-Alzheimer activity

Cucumis melo L has tasty, nutritious seed kernels. The goal of the study was to determine whether *Cucumis melo* L seed powder had anti-Alzheimer effects on mice. The study also measured the levels of acetylcholinesterase, blood cholesterol, and blood glucose. Extraction treatment greatly prevented the rats from experiencing memory problems brought on by scopolamine and diazepam. The results of the investigation demonstrated that the seed kernels had a memory-improving impact, as shown by changes in the parameters transfer latency, TSTQ, escape latency time, discrimination index, and step down latency. Moreover, the extract dramatically reduced acetyl cholinesterase activity, a marker for blood sugar and total cholesterol levels.^[16]

Gastro protective activity

The most prevalent GIT ailment in today's industrialised world is the peptic ulcer. One of the biggest problems in modern medicine is the prevention or treatment of peptic ulcers. The goal of the current investigation was to determine whether the aqueous extract of *Cucumis melo* L has any Gastroprotective properties using the pylorus ligated method. As revealed by decreased pepsin secretion, gastric juice volume, and acid production in pylorus-ligated rats, the outcome demonstrated strong anti-secretory action. The results, which supported the herb's traditional use in the treatment of peptic ulcers, showed that *Cucumis melo* L aqueous extract has strong antisecretory and Gastroprotective properties.^[17]

Anti-hyperglycemic Activity

Cucumis melo L. Leaf extract was investigated for its anti-hyperglycemic effects against streptozotocin induced hyperglycemia in rats. The results concluded that methanolic extract of *Cucumis melo* L. leaf have greater anti-hyperglycemic activity than aqueous extract in streptozotocin induced hyperglycemia model and when compared with Glibenclamide treated group. Therefore the study demonstrated that the methanolic extract of *Cucumis melo* L leaf having anti-hyperglycemic activity.^[18]

Diuretic activity

The diuretic effect of ethanolic seed extracts of *Macrotyloma uniflorum* and *Cucumis melo* L. in Albino rats were evaluated. Furosemide (5mg/kg) was used as a drug. The diuretic effect was evaluated by measuring the Urine volume, Sodium, Potassium, Chloride and Bicarbonate contents. A significant Diuretic effect was observed treated with extracts of *Macrotyloma uniflorum* and *Cucumis melo* L. individually in experimental animals compared to the control. However, extract of *Cucumis melo* L. showed more diuretic effect than standard. The results, therefore, explains the use of *Macrotyloma uniflorum* and *Cucumis melo* L. as a cure for renal diseases in traditional medical practice.^[19]

Antiulcer activity

Methanolic extract of *Cucumis melo* seeds showed antiulcer property. The method of its gastro protective effect may be recognized to decrease in vascular permeability, diminished lipid peroxidation, and scavenging of free radicals (ROS) along with strength of mucosal barrier. The presence of triterpenoids and sterols are responsible for these actions.^[20]

Anti-fertility activity

Cucumis melo L is a favorite plant of Bhat community which uses it for the regulation of fertility. Anti-atherosclerosis activity of *Cucumis melo* L. juice prevents atherosclerosis and liver steatosis. Active agent Adenosine isolated from aqueous melon extract inhibited human platelet aggregation induced by epinephrine, ADP, collagen, thrombin, sodium arachidonate, prostaglandin endo peroxide analogue U-46619 and PAF-acether. This activity of *Cucumis melo* L helps in the management of cardiovascular diseases.^[21]

Antimicrobial and Anthelmintic activity

The methanolic extracts and n-hexane of the seeds of *Cucumis melo* L has exposed excellent anthelmintic and antimicrobial activity. *C. melo* is also useful in the vermifuge.^[22]

Anticancer activity

Cucurbitacins, which are largely found in the Cucurbitaceae family of plants, are highly oxygenated tetracyclic-triterpenes. A naturally occurring anticancer (oncogenic) substance called cucurbitacin B was discovered in the stems of *Cucumis melo* L. The anticancer effect of cucurbitacin B in human leukaemia cells has been documented. In the leukaemia cell line K562, cucurbitacin B prevents the activation of the Raf/MEK/ERK and STAT3 pathways. Both cucurbitacin A and cucurbitacin E have potent anti-tumor properties.^[23]

Anticoagulant activity

The cephalin kaolin time (TCK) test and the Quick time (TQ) test have both been used to examine the anticoagulant potential of melon (*Cucumis melo*) rind powder (MRP) extracts. Three solvents (methanol,

acetone, and n-butanol) were used in the extraction process along with distilled water, all at an 80% concentration. The methanolic and acetonetic extracts displayed heparin-like anticoagulant action, according to the results, but the aqueous extract had no anticoagulant capacity. On the endogenous, exogenous, and common pathways of coagulation, the anticoagulant effect was seen, with a much more pronounced effect on the exogenous pathway than on the endogenous pathway. This pioneering work had demonstrated the anticoagulant properties of *Cucumis melo* rinds. The use of this byproduct in medicine could therefore help regulate and control haemorrhage and abnormalities of blood coagulation.^[24]

Anti-urolithiatic activity

The goal of the current study was to examine the in vivo anti-urolithiatic effects of *Cucumis melo* L peel and pulp extractives in a mouse model of nephrolithiasis. Peel and pulp extracts were made utilizing both hot and cold techniques. For 10 days, mice were exposed to ethylene glycol (0.75% V/V) IP to create a nephrolithiasis model. 400 g/g of extracts were given orally for 11 to 21 days. Serum values of BUN, uric acid, and creatinine were used as outcome measures.^[25]

Protect against hypothyroidism

To determine the pharmacological significance of *Cucumis melo* L fruit peel extracts with regard to the potential modulation of tissue lipid peroxidation (LPO), thyroid dysfunctions, and lipid and glucose metabolism, a study was conducted. Wistar albino male rats were given pre-standardized doses of *C. melo* of 200 mg/kg and 100 mg/kg for 10 days in a row. The changes in tissue LPO (heart, liver, and kidney) and the concentrations of serum triiodothyronine T3, thyroxine T4, insulin, glucose, alpha-amylase, and various lipids were then assessed. Test peel extract administration significantly boosted T3 and T4 levels while also lowering tissue LPO, indicating a possible thyroid-stimulating and antioxidative function.^[26]

CONCLUSION

Natural substances found in therapeutic herbs have made a significant contribution to the development of contemporary medications and can serve as an alternate source for the identification of innovative structures with improved safety and efficacy profiles. Since they have been thoroughly studied for their efficacy and are widely regarded as safe for use by humans, ethno botanical and traditional uses of natural substances, particularly those of plant origin, have gained a lot of attention in recent years. Having a wide variety of pharmacological actions, *Cucumis melo* L is commonly regarded as an herbal medicine panacea after a thorough review of the literature. These studies are quite encouraging and opine that more study of herbs is required.

REFERENCES

1. Saleem H, Farooq O, Review on Medicinal Plants with Reference to Anti-Hepatotoxicity Activity. *Gastroenterology & Hepatology*. Open Access, 2022; 13(3): 104–106.
2. Hafiz Muhammad Asif *et al.*, Medicinal Properties of *Cucumis melo* Linn. *Journal of Pharmacy and Pharmaceutical Sciences*, 2014; 2(1): 58-62.
3. Parrotta JA *et al.*, Healing plants of peninsular India. USA: CABI Publishing, 2001; 254- 255.
4. Prajapati ND, Purohit SS, Sharma AK, Kumar T. A handbook of medicinal plants. India, Agrobios, 2001; 176.
5. Biswas PK. Encyclopaedia of medicinal plants. New Delhi, Dominant publishers and distributors 2006; III: 584-585
6. <http://www.flowersofindia.net/catalog/slides/Melon.html>
7. Grubben, G.J.H. Plant Resources of Tropical Africa: Vegetables. Accessed on Google Books, 2004; 2.
8. De Melo *et al.*, Characterization of some nutritional constituents of melon (*C. melo* hybrid AF-522) seeds. *Food Chemistry*, 2000; 68(4): 411-414.
9. Sana *et al.*, Chemical composition and bioactive compounds of *Cucumis melo* L. seeds: Potential source for new trends of plant oils. *Process Safety and Environmental Protection*, 2011; 113: 68–77.
10. Rastogi RP *et al.*, Compendium of Indian Medicinal Plants. Lucknow, Central Drug Research, and New Delhi, Publication & Information Directorate, 1991; 228.
11. The wealth of India. Vol. II, New Delhi, National institute of science communication, Council of science & industrial research, 2001; 252-253.
12. Prajapati ND, Purohit SS, Sharma AK, Kumar T. A handbook of medicinal plants. India, Agrobios, 2001; 176.
13. Homatidou *et al.*, Determination of total volatile components of *Cucumis melo* L variety cantaloupensis. *Journal of Agricultural and Food Chemistry*, 1992; 40: 1385-1388.
14. Kourkoutas D *et al.*, Comparison of the volatile compositions and flavor properties of Cantaloupe, Galia and honey dew muskmelons. *Food Chemistry*, 2006; 97(1): 95-102.
15. Lim TK. Edible medicinal and non-medicinal plants *Cucumis melo*. Publisher springer Netherlands, 2010; 219-222.
16. Parle M *et al.*, Musk melon in the role of a memory melon, *Annals of Pharmacy and Pharmaceutical Science*, 2012; 3(1): 36-41.
17. Vasundra DV *et al.*, Gastroprotective and in vivo antioxidant effect of aqueous extract of *Cucumis melo*, *World Journal of Pharmaceutical Research*, 2013; 2(2): 365-374.
18. Babul eddy N *et al.*, Anti-Hyperglycemic Activity of *Cucumis melo* Leaf Extracts in Streptozotocin Induced Hyperglycemia in Rats. *International Journal of Pharmaceutical Research and Allied Sciences*, 2013; 2(4): 22-27.

19. Ravishankar K *et al.*, Evaluation of diuretic effect of ethanolic seed extracts of *Macrotyloma uniflorum* and *Cucumis melo* in rats. *International Journal of Pharmacy and Biological Sciences*, 2012; 3(3): 251-255
20. Gill NS *et al.*, Evaluation of antioxidant and anti-ulcer activity of traditionally consumed *Cucumis melo* seeds. *Journal of Pharmacology and Toxicology*, 2011; 6(1): 82-9.
21. Lal D *et al.*, Plants used by the Bhat community for regulating fertility. *Economic Botany*, 1980; 34(3): 273-275.
22. Debnath B *et al.*, Estimation of alkaloids and Phenolics of five edible cucurbitaceous plants and their antibacterial activity. *International Journal of Pharmacy and Pharmaceutical Sciences*, 2015; 7(12): 223-7.
23. Chan KT, Li K, Liu SL, Chu KH, Toh M, Xie WD. Cucurbitacin B inhibits STAT3 and the Raf/MEK/ERK pathway in leukemia cell line K562. *Cancer Letters*, 2010; 289(1): 46-52.
24. Benmeziane - Derradji F, Aoun S. Evaluation of the Anticoagulant Activities of *Cucumis melo* Rind Powder In Vitro: Preliminary Novel Findings. *Archives of Pharmacy Practice*, 2022; 13(2): 25-29.
25. S. Salika dulanjali *et al.*, Evaluation of In Vitro Anti-Urolithiatic Activity of Methanolic Extract of *Cucumis Melo* Seeds on Calcium Oxalate Crystals. *International Journal of Current Pharmaceutical Research*, 2018; 11(1): 18-20.
26. Parmar HS, Kar A. Protective role of *Mangifera indica*, *Cucumis melo* and *Citrullus vulgaris* peel extracts in chemically induced hypothyroidism. *Chemico-Biological Interactions*, 2009; 177(3): 254-258.