Original Research Article

J. Funct. Mater. Biomol. 8(2) (2024) pp 833 – 838

SACRED HEART RESEARCH PUBLICATIONS

Journal of Functional Materials and Biomolecules

Journal homepage: www.shcpub.edu.in

ISSN: 2456-9429

A BRIEF REVIEW ON NUTRITIOUS PROPERTIES AND HEALTH BENEFITS OF *CUCUMIS SATIVUS*

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Received on 1 September 2024, accepted on 2 November 2024,
Published online on December 2024

Abstract

Cucumis sativus is plant which is widely grown throughout the world. Around the world, people mostly eat cucumbers as raw fruit. Ayurveda describes the many medical benefits of the cucumber plant. According to Ayurveda, it can be used as a moisturiser, emollient, dermatitis, burns, swollen eyes, burning sensations, and skin whitening. In China and India, children's dysentery is treated with raw, ripe fruit. Cucumber plant is also effective anthelmintic. Frontal headaches and insomnia are treated with seed oil. Plant activities are mostly caused by flavonoids, glycosides, and tannins. This article mainly focuses on the pharmacology, different chemical components, traditional usage, and nutritional features of cucumbers.

Keywords: *Cucumis sativus,* Ayurveda, Nutritional features and Pharmacology.

1 Introduction

Cucurbits are vegetable crops, belonging to the family *Cucurbitaceae*, which primarily comprised species consumed as food worldwide. Cucurbits are an excellent fruit in nature having composition of all the essential constituents required for good health of humans. But still this family is not considered much important medicinally and taken as vegetables and salads for daily consumption also because of its availability at low cost [1]. The Table 1 and Fig. 1 shows the *Cucumis sativus* and its parts as below,

2. *Binomial name : Cucumis sativus L*

Scientific classification	
Kingdom	*Plantae*
Clade	*Tracheophytes*
Clade	*Angiosperms*
Clade	*Eudicots*
Clade	*Rosids*
Order	*Cucurbitales*
Family	*Cucurbitaceae*
Genus	*Cucumis*
Species	*Cucumis sativus L*

Table 1: Scientific classification of *Cucumis sativus*

3. Habital and Description

Cucumbers (*Cucumis sativus*) are botanically categorized as berries, which are available in many different sizes shapes and colours. They range from thick, stubby little fruits (10 - 12 cm long) to Dutch greenhouse varieties (of up to 50 cm long). The most popular variety is the long smooth salad cucumber which has a smooth, dark-green skin. Its little brother, the "gherkin" is actually a cucumber that has been harvested when little and pickled in brine. The true gherkin is a different species which is primarily grown in the West Indies. Cucumber may not contain a lot of food value, but they make up this lack of nutrients with a wide variety of healthy substances [2]. Cucumbers (*Cucumis sativus*) are botanically categorized as berries, which are available in many different sizes shapes and colors. They range from thick, stubby little fruits (10 - 12 cm long) to Dutch greenhouse

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varieties (of up to 50 cm long). The most popular variety is the long smooth salad cucumber which has a smooth, dark-green skin.

Its little brother, the "gherkin" is actually a cucumber that has been harvested when little and pickled in brine. The true gherkin is a different species, which is primarily grown in the West Indies. Cucumber may not contain a lot of food value, but they make up this lack of nutrients with a wide variety of healthy substances. They were already used in ancient times to dissolve stones caused by uric acid. Their cleansing effect on the intestines, kidneys, lung and skins was also known. People suffering from stomach or liver diseases also benefit from the consumption of cucumbers [3].

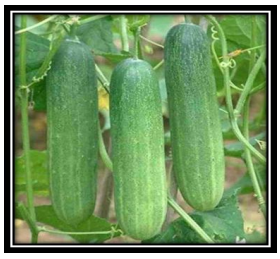
4. Cultivation and Collection

4.1. Soil requirements

Soil should be medium textured, neither too light and sandy, nor too heavy. The plants will grow rapidly in sandy soil but, unless irrigation is provided, they will dry up during the midsummer months. A heavy, wet soil, on the other hand, interferes with proper root development and leads to fungus and disease problems. Heavy soils also tend to produce later crops [4]. Nutrient requirements:

Whole plant

Leaf



Fruit

Peel

Cucumbers are heavy users of organic materials and produce better and more heavily when organically fed. A balanced fertilizer should be used if the soil is deficient in the necessary elements.

Leaf powder

Fig. 1: *Cucumis sativus* and its parts

This should include a minimum of 5 percent nitrogen and about 20 percent of such organic materials as ground-up cottonseed, dried blood, dehydrated manures, and bone and fish meal [5].

4.2. Planting

Cucumbers may be planted any time in May after danger of frost is past. About the middle of the month is best. Before plowing the field, scatter plenty of seasoned manure, aged at least four months so as not to burn the tender plants. This manure will serve two purposes in the soil: one, feeding the plants; two, helping retain moisture during the hot spells and keeping the soil porous. Adequate moisture in the soil at all times spells the difference between weak, unproductive plants, and green, robust ones. Plant the seed just one inch below the surface to prevent damp rot in case of heavy rains. Most cucumber rows are planted six to seven feet apart running from east to west for maximum sun [6].

5. Plants Parts used for *Cucumis sativus*

The parts which are traditionally used of these *Cucumis sativus* Plants are leaves, flowers, seeds, fruits, and bark. These parts contain some active ingredient which is responsible for giving particular pharmacological activity. It is used in traditional medicine for the treatment of various ailments [7].

The Fruit of the plant is an astringent and is used in the treatment of laxative, anthelmintic and antipyretic; useful in hepatitis, bronchitis, asthma, dyspepsia, piles, diarrhoea, coughs hoarseness of voice, eye diseases and scorpion-sting; used as a hair tonic. Decoction of the green fruit is used for cough. Pulp of the fruit is useful in

dysentericdiarrhoea, dropsy, piles and leprosy. Half ripe fruit is used as purgative. Kernel of the fruit is narcotic. Fruits are used in menstrual disorder in Khagrachari. Seed oil is used in rheumatism. Gum of the bark is demulcent and purgative. The triterpenoid present in the fruits possess significant antimicrobial activity. Kernel oil has purgative action and its prolonged use was well tolerated in mice [8].

6. Phytochemical composition of *Cucumis sativus*

Every plant contains several Phytoconstituents in its different parts showing various pharmacological activities and toxicities, like wise *Cucumis sativus*. It also was showing many pharmacological activities due to the presence of medicinally active compounds. Cucumber fruit is composed mostly of water; more than 96% of edible unpeeled fruit is water [9]. Other constituents of *Cucumis sativus,* according to one source, are vitamins, minerals, amino acids, phytosterols, phenolic acids, fatty acids, and curcurbitacin. According to another source, traces of essential oil, amino acids, pectins, starch, sugars, vitamin C, and curcurbitacin are found in cucumbers. Glycosides, steroids, flavonoids, carbohydrates, triterpenoid, and tannins were identified in an aqueous extract of the cucumber fruit [10]. Phytochemicals are non-nutritive chemical components that exist naturally in plants or they are the chemicals that are produced in plants.

Leaves, flowers, seeds, fruits, and bark of cucumber are rich in many phytoconstituents, which are biologically active and produce specific pharmacological effects [11].Glycosides, alkaloids, phenols, terpenoids, steroids, tannins, saponins, carotenoids, resins, and flavonoids are some of the chemical components found in the cucumber fruit. Phytochemicals including phenols, glycosides, carbohydrates, flavonoids, tannins, and terpenoids were found in the ethanolic extract of cucumber seeds [12].

8. Nutritional Composition of *Cucumis sativus*

Plants are beneficial for human health as they are commonly rich in nutritional contents e.g., vitamins, minerals, and antioxidants. In the human diet, cucumber is a significant source of vitamins and minerals. Cucumber is one of the most demanded cucurbits due to its health advantages and nutritious qualities [13]. Cucumbers have been considered as fruits and can be utilized as food due to the presence of high nutritional content. Cucumber fruit generally contains carbohydrates (2.2%), lipids (0.1%), proteins (0.6%) and water (95%) [14].

The edible component of raw cucumber contains 2.16 gram of carbohydrates per 100 gram, including starch (0.08 g), fructose (0.75 gram), glucose (0.63 gram), total sugars (1.38 gram), and total dietary fiber (0.7 gram).

Each 100 g of the edible portion of raw cucumber contains saturated fatty acids (0.013g), zeaxanthin, lutein (16 µg), beta-cryptoxanthin (18 µg), alpha-carotene (8 µg), beta-carotene (31 µg), betaine (0.1 mg), choline (5.7 mg), vitamin A (72 IU), vitamin A (4 µg RAE), alpha-tocopherol (0.03 mg), vitamin K (72 mg), γ-tocopherol (0.02 mg), folate (14 µg), vitamin B-6 (0.051 mg), pantothenic acid (0.240 mg), niacin (0.037 mg), riboflavin (0.025 mg), thiamin (0.031 mg), vitamin C (3.2 mg), selenium (0.1 mg) and fluorine (1.3 mg) [15].

9. Traditional Uses of *Cucumis sativus*

Fruits are laxative, astringent, anthelmintic and antipyretic; useful in hepatitis, bronchitis, asthma, dyspepsia, piles, diarrhoea, coughs hoarseness of voice, eye diseases and scorpion-sting; used as a hair tonic. Decoction of the green fruit is used for cough. Pulp of the fruit is useful in dysenteric-diarrhoea, dropsy, piles and leprosy [16]. Half ripe fruit is used as purgative. Kernel of the fruit is narcotic. Fruits are used in menstrual disorder in Khagrachari. Seed oil is used in rheumatism. Gum of the bark is demulcent and purgative. The triterpenoid present in the fruits possess significant antimicrobial activity. Kernel oil has purgative action and its prolonged use was well tolerated in mice [17].

10. Cosmetics Uses of *Cucumis sativus*

There are several advantages of using cucumbers for skin care and natural beauty; some important skin effects of cucumbers. Cucumber is a great cosmetic for the skin to maintain its smoothness and whitening [18].

Cucumber juice clarifies complexions from the skin and naturally lightens it, leaving a soft, refreshed, and glowing look. Cucumbers are used by women to provide cooling relief to their eyes throughout the summer months due to their high nutritional content and remarkable cooling property. A high amount of vitamin K in cucumber helps to minimize cutaneous manifestations such as puffiness (eye bags) and dark shadows. Cucumber slices put up many benefits to the eyes and their surrounding tissues through their hydrating effects [19].

11. Industrial Uses of *Cucumis sativus*

Medicinal plants are the richest bio resource of drugs for traditional systems of medicine, modern medicines, nutraceuticals, food supplements, folk medicines, pharmaceutical intermediates and chemical entities for synthetic drugs. The first step in the value addition of medicinal bio resources is the production of herbal drug preparations, using a variety of methods from simple traditional technologies to advanced extraction techniques [20].

12. Medicinal Uses of *Cucumis sativus*

Plants are common and traditional sources of a lot of medicines. At least 25% of all current medications are thought to be derived from medicinal plants, either directly or indirectly. This is primarily accomplished by combining modern technology with conventional knowledge. In addition to being used as food, *C. sativus* is also employed in traditional medicine, healthcare, and cosmetology [21].

Cucumber displays antioxidant, anti-diabetic, and lipid-lowering effects. It decreases swelling and has a calming effect on skin irritations. Moreover, cucumber can induce relaxation and decrease suntan pain. The fruit is cooling, hemostatic, and beneficial in conditions like myopia and heat stroke. Moreover, the body is cooled by the effect of the seeds. Traditional medical practices utilize cucumber for the management of numerous body illnesses [22].

Cucumber is employed in a number of therapies and shows a number of therapeutic qualities, including antioxidant capacity, antibacterial activity, and glycemic lowering capacity.. Its phytochemicals provide good hydration and are effective in treating eczema, hypertension, atherosclerosis, cancer, and other ailments [23].

Numerous pharmacological and natural substances in cucumber have been suggested for reducing diabetes-related problems. It is a trustworthy meal for reducing carbonyl stress and oxidative stress, especially in diabetes conditions, and shows a protective effect against the development of such conditions. Diabetes mellitus is a rapidly growing illness that represents an important social problem and significantly affects lifestyle and physical fitness [24].

It may cause heart failure, kidney failure, and nerve damage and has become a major cause of morbidity and mortality risk. Additionally, cucumber juice is fantastic for the hair, and nails [25]. Due to prolonged sun exposure, the skin produces free radicals, which cause oxidative stress, accelerating the aging process and harming biological molecules and cell membranes [26]. The elasticity of connective tissue is due to hyaluronic acid and elastin, and it decreases noticeably with aging. For healthy cartilages, ligaments, connective tissues and other things, sulfur is a good nutrient and is abundant in cucumbers [27].

Furthermore, it is reasonable to credit cucumbers' modest diuretic capability to lower sodium contents and free water. Cucumber also helps to prevent blood pressure and weight gain [28].

Additionally, it is effective for Alzheimer's disease by reducing brain damage to their neurons. *C. sativus* has long been used in the spa world and for topical skin problem/disease treatments. The fruit's polysaccharides and flavonoids have significant antioxidant effects, cancer prevention properties, and anti-inflammatory properties [29].

For those with high and low blood pressure, cucumber is a good option due to its high potassium level (50-80 mg/100 g). According to pharmacological studies, cucumbers show thrombolytic, anti-inflammatory,

analgesic, antifungal, antibacterial, antidiarrheal, antihepatotoxic, antioxidant, anticancer, and antidiabetic properties [30].

Conclusion

Cucumber is a well-known food with well-established medicinal uses in Ayurveda. Although compounds with a variety of structures have been mentioned, much more research is needed to determine their biological activity and potential uses, as well as their pharmacodynamics, kinetics, and therapeutic utility in treating a range of illnesses. Clinical trials must also be conducted to verify the compounds' active effects in humans.

Acknowledgements

We would like to show our gratitude to the principal and management of Sacred Heart College, Tirupattur, Tamil Nadu, India, for supporting their research paper published.

Conflict of Interest: Nil

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