



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Review Article

Review on Cucumis Sativus

Pranav Sanap*, Meghana Rayjade, Saurabh Khairnar, Dhiraj Maind, Omkar Phopse

Matoshri Institute of pharmacy

ARTICLE INFO

Published: 12 Dec. 2024

Keywords:

Cucumis sativus;
Cucurbitaceae;
Pharmacological activity;
Phytoconstituents.

DOI:

10.5281/zenodo.14405353

ABSTRACT

Plants are basic source of food and energy. Cucumis sativus Linn. (Cucumber) which is consumed in different ways like sweet, vegetable and salads. Medicinal plants have been used for centuries, and numerous cultures still rely on plants for their primary health care needs. Cucumis sativus Linn. (Cucumber) is a vegetable climber, species belongs to family Cucurbitaceae This species has a wide range of medicinal and biological applications thanks to its richness in carbohydrate, proteins, minerals (calcium, iron, magnesium, phosphorus, potassium, zinc) and secondary metabolites like alkaloids, tannins, flavonoids, saponins, and phenolic compounds. Cucumis sativus Linn. (Cucumber) belongs to curcurbaticeae family possess antibacterial, antimicrobial, antifungal characteristics and showed activities like antioxidant, phytochemical and hypoglycemic activity. All the information's were collect from the published research paper on Cucumis sativus Linn. (Cucumber) as for the sake of future research on it.

INTRODUCTION

A plant which has active constituents of medicinal properties and is used to treat disease in different systems of medicine or traditionally used for the treatment of disease is considered as medicinal plant. Plants have been used as medicines from the ancient time. Medicinal plants are widely and successfully used on every continent. In Asia, the practice of herbal medicine is extremely well established and documented. As a result, most of the medicinal plants that have international

recognition come from this region. Plants, plant parts and plant products served as the materials for the preparation of medicine and these medicinal plants and plant parts constitute an important natural wealth of a country^[1]. Cucumis sativus L. (Cucumber), it commercially cultivated as a vegetable crop. It is native to India, found wild in the Himalayas from Kumaun to Sikkim . A wide range of medicinal plant parts are used as raw drugs as they posses varied medicinal properties thus herbal drugs constitute a major part in all

***Corresponding Author:** Pranav Sanap

Address: Matoshri Institute of pharmacy

Email ✉: sanappranav1702@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



traditional systems of medicines. Plants above all other agents have been used for medicine from time immemorial because they have fitted the immediate personal need are easily accessible and inexpensive. The traditional systems of medicine specifically in Ayurveda, the leaves, fruits, and seeds of *C. sativus* have been widely used for various skin problems. include Puffy eyes, sunburn and the plant extract or paste believed to promote cooling, healing, soothing, emollient, lenitive, anti-itching effect to irritated skin, and have extended cosmetic effects. The fruits are used as hemostatic, diuretic, and tonic. It is also used as add-on therapy in other physiological conditions like in pitta, hyperdipsia, fever, insomnia, cephalgia, bronchitis, jaundice, hemorrhages, strangury, and general debility. Further, numerous literatures revealed its anthelmintic, anti-diabetic antiulcer, moisturizing, and antimicrobial activity of the fruit extracts in different doses. The

cucumber plant is generally a vine with large leaves and curling tendrils (Fig. 1). The cucumber plant may have more than five or six main stems from which the tendrils branches. The leaves arranged alternately on the vines in this plant. The flowers of the cucumber plants are yellow and about four centimeter in diameter. The fruits of the cucumber plant is a curved cylinder shaped rounded at both ends (Fig. 2). The length of the fruits of the cucumber measures about sixty centimeters and ten centimeters in diameter. The cucumber plants are annual plants; they survive only one growing season. China is the largest cucumber producer in the world and India ranks second in the production of cucumber. Cucumber contains up to 90-95 percentages of water. It also contains silicon, potassium, sulphur, vitamins, sodium and acid creating materials which are helpful to make maintain the human blood alkalinity.



Scientific classification

Scientific classification	
Kingdom:	Plantae
Clade:	Tracheophytes
Clade:	Angiosperms
Clade:	Eudicots
Clade:	Rosids
Order:	Cucurbitales
Family:	Cucurbitaceae
Genus:	<i>Cucumis</i>
Species:	<i>C. sativus</i>
Binomial name	
<i>Cucumis sativus</i> L.	

Plant Description

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 varieties (of up to 50 cm long). The most popular variety is the long smooth salad cucumber which has a smooth, dark-green skin. It's 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 (*Cucumis anguria*), 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. They have been known to cure some headaches, bleeding, dizziness, and pale skin. Cucumber juice contains a substance, which promotes blood circulation of the skin. It is for this reason that it is widely used in cosmetics. Plants are used medicinally in different countries and are source of potent and powerful drugs . Over the centuries, the use of medicinal herbs has become an important part of daily life despite the progress in modern medical and pharmaceutical research . A wide range of medicinal plant parts are used as raw drugs as they possess varied medicinal properties thus herbal drugs constitute a major part in all traditional systems of medicines. Plants above all other agents have been used for medicine from time immemorial because they have fitted the immediate personal need are easily accessible and inexpensive. Most plant used in treatment of digestion, diarrhoea, constipation, toothache, flu, hepatitis, skin infection, diabetics. Cucurbitaceae is a plant family, also known as gourd family,

which includes crops like cucumbers, squashes, luffas and melons. Cucurbits form an important and a big group of vegetables crops cultivated extensively in the subtropical and tropics countries. The family consists of about 118 genera and 825 species. Plants of this family have many medicinal and nutritional benefits. Cucumber (*Cucumis sativa* L) is one of the monoecious annual crops in the Cucurbitaceae family.

Flowering and pollination

A few cultivars of cucumber are parthenocarpic, the blossoms of which create seedless fruit without pollination, which degrades the eating quality of these cultivar. In the United States, these are usually grown in greenhouses, where bees are excluded. In Europe, they are grown outdoors in some regions, where bees are likewise excluded. Most cucumber cultivars, however, are seeded and require pollination. For this purpose, thousands of honey beehives are annually carried to cucumber fields just before bloom. Cucumbers may also be pollinated via bumblebees and several other bee species. Most cucumbers that require pollination are self incompatible, thus requiring the pollen of another plant in order to form seeds and fruit. Some self-compatible cultivars exist that are related to the 'Lemon' cultivar. Symptoms of inadequate pollination include fruit abortion and misshapen fruit. Partially-pollinated flowers may develop fruit that are green and develop normally near the stem end, but are pale yellow and withered at the blossom end . Traditional cultivars produce male blossoms first, then female, in about equivalent numbers. Newer gynoecious hybrid cultivars produce almost all female blossoms. They may have a pollenizer cultivar interplanted, and the number of beehives per unit area is increased, but temperature changes induce male flowers even on these plants, which may be sufficient for pollination to occur. nutrition, Aroma, and Taste



trans, cis-2,6-Nonadienal, or *cucumber aldehyde*, is a component of the distinctive aroma of cucumbers. In a 100-gram (3+ 1 /2-ounce) reference serving, raw cucumber (with peel) is 95% water, 4% carbohydrates, 1% protein, and contains negligible fat. Cucumber provides 67 kilojoules (16 kilocalories) of food energy, and supplies low content of micronutrients, as it is notable only for vitamin K at 16% of the Daily Value (table). Depending on variety, cucumbers may have a mild melon aroma and flavor, in part resulting from unsaturated aldehydes, such as (E,Z)-nona- 2,6-dienal, and the *cis*- and *trans*-isomers of 2- nonenal . The slightly bitter taste of cucumber rind results from cucurbitacins. In 2009, an international team of researchers announced they had sequenced the *cucumis genom* .

Vernacular Names:

Unani Tibbi: Khiyaar, Khira

English: Cucumber

Ayurvedic: Trapusha, Traapusha, Trapushi, Tiktakarkatika

Siddha/Tamil : Vellarikkai 9, Kakrikai 6

Folk: Khira

Sanskrit: Ervaru, Karhati 6

Bengali: Phuti (ripe), Karcha (unripe) 6

Hindi: Tuti

Telgu: Pedda dosari 6, Dosakaya 7

Kannada: Mullu savte, Santekayi 10

Bombay: Kakri, Kankari

Burma: Thagwa, Thakhwathee

Dutch: Konkommer

French: Concomber, Concombrecommuni

German: Gurke, Kunkummer

Greek: Sikys

Indo-china: Bi bai, Dua chuot, Dua gang, Hoang qua, Ho qua

Portugese: Pepineiro, Pepino

Russian: Oguret

Swedish: Gurca

Italian: Cedriuolo, Cetriolo, Cetriuolo

How cucumber rejuvenates your skin ?

In your gut, cucumbers deliver inflammation fighting vitamin C and caffeic acid, and when applied to your face, these same nutrients can provide a positive effect for rejuvenating your complexion. Cucumber is 96 percent water Trusted Source, making it a hydrating addition to DIY skin treatments as well as being generally safe for sensitive skin due to its lack of harsh, potentially irritating ingredients . The cucumber belongs to the gourd family, which also includes pumpkin, squash, and zucchini. Cucumbers are known for being crunchy and cool, but they're also great for your complexion and are a well-known superfood for the skin.They've been used in skincare for decades to address common skin concerns like hydration, aging, and inflammation. Let's take a look at the top cucumber benefits for skin. Packed With Skin-Lovin' Nutrient Cucumbers contain plenty of vitamins and nutrients that give them the upperhand when it comes to skincare. Vitamins play a key role in overall health but they're particularly effective in supporting skin health when applied topically. Cucumbers are loaded with antioxidants, which are molecules that help fight oxidative damage caused by free radicals. Fruits and vegetables in general are rich in antioxidants but cucumbers in particular contain vitamin C, caffeic acid, and folic acid. Vitamin C, often linked to citrus fruits like oranges and grapefruits, is an antioxidant that clarifies and brightens skin. Caffeic acid and folic acid help increase collagen production and defend against signs of premature aging. Collagen production typically declines over time, which is why it's beneficial to incorporate ingredients like caffeic acid and folic acid into your daily skincare routine.

● **Hydrate Skin**

Keeping your skin hydrated helps improve elasticity and firmness. Lack of hydration can cause a visible difference in your skin in that it may look dry and flaky, and be more prone to fine



lines and wrinkles. Maintain a healthy, glowing complexion by replenishing your skin with hydrating ingredients like cucumber. Similar to aloe vera, cucumbers contain polysaccharides, which help the skin attract and retain moisture. Cucumbers also consist mostly of water; they're 96% water, to be exact. This high water content is a key benefit of cucumbers in that it allows them to provide superior hydration to the skin. Despite having such high water content, cucumbers won't be able to keep your skin properly hydrated on their own. Follow tips on how to hydrate your skin.

● Soothe Inflammation

Cucumbers have soothing and cooling effects on the skin, making them particularly beneficial for those with sensitive or irritated skin, although they're suitable for all skin types. They also have anti-inflammatory properties in that they help reduce swelling and morning puffiness.

● Alleviate Sunburn

Spend a little too much time in the sun? Or maybe you forgot to reapply your sunscreen? Aloe vera is popular for alleviating sunburn, but cucumber also does the trick. It can soothe mildly burnt or damaged skin and help alleviate sunburn due to its cooling properties.

● Great for Acne-Prone Skin

Cucumbers are a mild astringent, meaning that they tauten and tighten pores, help regulate oil production, as well as reduce the appearance of pore size. Excess oil and large, clogged pores often contribute to breakouts so if you have oily or acne-prone skin, cucumber will be your skin's new BFF.

Traditional use

Cucumber (*Cucumis sativus* L.) has anti-acne activity in traditional use. The part taken is fresh fruit. The way of preparation is the ingredients are sliced thinly across. The way to use it is by placing it and rubbing it on the face with acne. Let it dry. After dry, rinse with warm water. Use caution on a sensitive face. Cucumber (*Cucumis sativus* L.) can also be used as a traditional medicine to lower

blood pressure. The part used is fresh fruit. The method of making is by taking two cucumbers; then, they are washed and shredded. The grated results are squeezed and filtered. How to use it is by drinking it at a dose of 2 to 3 times a day. Cucumber (*Cucumis sativus* L.) can be used to prevent diabetes. Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin produced by the pancreas. Using cucumbers is to take two fresh cucumbers (150-200 grams), wash them and then shred them. The grated results are squeezed and filtered, then drink immediately; do 2-3 times a day.

Pharmacological activity

Antioxidant activity

Cucumber (*Cucumis sativus* L.) has several pharmacological activities, including antioxidant activity from methanol extract of cucumber leaves. The number of phenolic compounds in the cucumber leaf methanol extract was 262.31 mg / g equivalent to gallic acid and 267.2 mg / g equivalent to ascorbic acid. The cucumber DPPH test showed an IC₅₀ value of 13.06 µg / mL, while the ascorbic acid comparison showed an IC₅₀ value of 13.17 µg / mL. Another study tested the antioxidant power by using cucumber juice in rabbit test animals injected subcutaneously with amoxicillin. This experiment used fifteen rabbits of the same sex, divided into three groups of 5 rabbits, each used for the study. Group A - 5 control rabbits, group B - 5 rabbits were given a subcutaneous injection of amoxicillin 30 mg/kg body weight every 24 hours for seven days followed by supplementation of 30 mL raw cucumber fruit juice for 14 days, and group C - 5 rabbits were given amoxicillin injection subcutaneous 30 mg/kg body weight every 24 hours and supplementation of raw cucumber juice for 14 days simultaneously. Plasma Malondialdehyde (MDA), Catalase (CAT),



Superoxide dismutase (SOD), and Glutathione peroxidase (GPx) were determined in rabbits biochemically by spectrophotometry and fluorometry. The results obtained showed a significant increase in plasma Malondialdehyde (MDA) values and a significant decrease in Catalase (CAT), Superoxide dismutase (SOD), and plasma Glutathione peroxidase (GPx) when rabbits were given 30 mg/kg BW subcutaneous injection of amoxicillin. However, this significant biochemical change was reversed in rabbits when supplemented with 30 mL raw cucumber fruit juice. Cucumber (*Cucumis sativus* L.) has antioxidant effects. This test was carried out in vitro using cucumber water extract at 250 and 500 µg / ml. Free radical scavenging compared to ascorbic acid, BHA (Butylated hydroxyl anisole). Cucumber fruit extracts showed maximum antioxidant effect at 500 µg / ml each. The presence of flavonoids and tannins in the extract, as evidenced by phytochemical screening, suggests that these compounds are responsible for the free radical scavenging effect.

Anticancer activity

Cancer is a disease in which body tissue cells' growth is abnormal, fast, and uncontrolled. Cucumber (*Cucumis sativus* L.) has many pharmacological activities, including anticancer activity. The anticancer potential of the cucumber plant (*Cucumis sativus* L.) was determined by in vitro culture. Methanol and acetone extracts were used to analyze cytotoxicity against Michigan Cancer Foundation-7 cancer cell line (MCF) and cervical cancer cell line (HeLa) by testing using a multi-tie tamper (MTT). The results showed that the methanol extract of cucumber had cytotoxicity activity against the Michigan Cancer Foundation-7 (MCF) and cervical cancer (HeLa) cancer cell lines with IC₅₀ values of 15.6 ± 1.3 µg / mL and 28.2 ± 1 µg / mL. Acetone extract has an IC₅₀ value above 50 µg / mL, so it is unable to inhibit Michigan Cancer Foundation-7 (MCF) and

cervical cancer (HeLa) cells. This study explains that cucumber has pharmacological activity as an anticancer in liver cancer. The part used is the cucumber flower. The isolated compound from the ethyl acetate fraction of cucumber flower was tested for its anticancer activity against HePG2 liver cancer cells at concentrations of 1000µg / mL, 500 µg / mL, 250 µg / mL, 125 µg / mL, and 62.5 µg / mL showed the results of % CTC₅₀ Cytotoxicity 82.15 µg / mL, 73.06 µg / mL, 69.74 µg / mL, 56.21 µg / mL and 49.83 µg / mL against the HePG2 cell line of human liver cancer by MTT assay (Figure 4). While the value of CTC₅₀ against liver cancer cells HePG2 cells. was 103.7 µg / mL.

Anti-inflammatory activity

Cucumber (*Cucumis sativus* L.) has anti-inflammatory activity. Cucumber leaf methanol extract (MCS) was studied using mice at two different doses, namely 150 and 250 mg/kg body weight. The effect was compared with standard indomethacin (10 mg/kg body weight). This study showed the highest anti-inflammatory activity at a dose of 250 mg/kg. In the formalin test, extracts at both doses (150 and 250 mg/kg body weight) significantly prevented the increase in leg edema volume. Cucumber leaf methanol extract (MCS) significantly reduced inflammation by 57.35% (150 mg / kg body weight) and 72.06% (250 mg / kg body weight) compared to the standard drug indomethacin (79.41%).

Analgetic activity

Cucumber (*Cucumis sativus* L.) has pharmacological activity as an analgesic. Analgesic testing on cucumber methanol extract was carried out on mice with the writhing method, given a 250 mg/kg and 500 mg/kg body weight. This study showed that cucumber methanol extract was able to inhibit pain by 54.72% and 55.66%, compared to the administration of Na-diclofenac (76.41%). Another study tested cucumber's juicy fruit extract against analgesic activity and free



radical scavenging. The extract was subjected to in vitro assay for analgesic activity at a dose of 500 mg/kg. This analgesic effect is compared with sodium-diclofenac (50 mg/kg). Cucumber fruit extract shows a maximum analgesic effect of 500 mg/kg. The presence of flavonoids and tannins in the extract, as evidenced by the initial phytochemical screening, indicated that these compounds were responsible for the analgesic effect.

Antidiarrheal activity

Cucumber has antidiarrheal activity. The antidiarrheal effect test was carried out on mice using methanol extract of cucumber leaves. The extract was given to mice as much as 500 mg/kg of body weight orally. The mice were induced with castor oil first. This study indicated that the methanol extract of cucumber leaves had a fecal inhibitory activity of 62.5%. The comparison of loperamide with a dose of 3 mg/kg body weight showed an inhibitory value of 100%. It suggests that cucumber has the potential to be antidiarrheal.

REFERENCES

1. Kessler RC, Eisenberg DM, et al, "Annals of Internal Medicines"2001, 135(4): 262-8
2. Kirkbride JH. Biosystematics monograph of the genus Cucumis (Cucurbitaceae): botanical identification of cucumbers and melons. North Carolina: Parkway Publishers, Inc.; 1993.
3. P.K. Mukherjee. Quality control of herbal drugs an approach to evaluation of botanical. Business Horizon Pharmaceutical Publishers,; 13, 2008.
4. Anonymous. Ayurvedic pharmacopoeia of India. New Delhi: The Controller of Publication (NISCOM); 2001.
5. Patri G, Silano V, Anton R. Plants in cosmetics. Strasbourg: Council of Europe Publishing; 2002.
6. A. Khan, A. Mishra. Biological and Medicinal Applications on Cucumis sativus Linn. De Gruyter Academic Publishing, May 27, 2021, J Complement Integr Med 2022; 19(4): 843–854
7. Pushpa Karna Mallick, Tribhuvan University, Department of Botany, Evaluating Potential Importance of Cucumber (Cucumis sativus L. - Cucurbitaceae) international Journal of Applied Sciences and Biotechnology 2022.
8. Kirtikar KR and Basu BD: Indian medicinal plants International Book Distributors, Dehradun, Edition 2, Vol II, 200
9. Putri T. Tangkis diabetes dan racun dalam tubuh dengan mentimun. Yogyakarta. Laksana. 2019.
10. Nasrin F, Bulbul IJ, Aktar F, Rashid MA. Anti-inflammatory and antioxidant activities of Cucumis sativus leaves. Bangladesh Pharmaceutical Journal. 2015 Jul 26;18(2):169-173.
11. Olaniyan MF, Afolabi T. Scavenging antioxidative bioactivities of cucumber (Cucumis sativus) fruit juice in rabbits overdosed with amoxicillin. Biomedical and Biotechnology Research Journal (BBRJ). 2018 Oct 1;2(4):276-280.
12. Kumar D, Kumar S, Singh J, Vashistha BD, Singh N. Free radical scavenging and analgesic activities of Cucumis sativus L. fruit extract. Journal of Young Pharmacists. 2010 Oct 1;2(4):365-368.
13. Dalimartha S. Ramuan tradisional untuk pengobatan kanker. PT Penebar Swadaya. Jakarta. 2003.
14. Tuama AA, Mohammed AA. Phytochemical screening and in vitro antibacterial and anticancer activities of the aqueous extract of Cucumis sativus. Saudi journal of biological sciences. 2019 Mar 1;26(3):600-604.
15. Muruganantham N, Solomon S, Senthamilselvi MM. Anticancer activity of Cucumissativus (Cucumber) flowers against Human Liver Cancer. International Journal of



- Pharmaceutical and Clinical Research.
2016;8(1):39-41
16. Nasrin F, Bulbul IJ, Aktar F, Rashid MA. Anti-inflammatory and antioxidant activities of *Cucumis sativus* leaves. *Bangladesh Pharmaceutical Journal*. 2015 Jul 26;18(2):169-173.
 17. Akter A, Begh MZ, Islam F, Afroz T, Hossain MS, Faysal M, Rahman MM. Phytochemical Screening and Evaluation of Thrombolytic, Analgesic and Antidiarrhoeal Activity of the Leaves of *Cucumis sativus* Linn. (Cucurbitaceae) of Methanolic Extracts. *Journal of Pharmaceutical Sciences and Research*. 2020 Mar 1;12(3):448-451.
 18. Akter A, Begh MZ, Islam F, Afroz T, Hossain MS, Faysal M, Rahman MM. Phytochemical Screening and Evaluation of Thrombolytic, Analgesic and Antidiarrhoeal Activity of the Leaves of *Cucumis sativus* Linn. (Cucurbitaceae) of Methanolic Extracts. *Journal of Pharmaceutical Sciences and Research*. 2020 Mar 1;12(3):448-451.
 19. Jayshree R. Aate, Dr. Satish Kosalge, Shivani V. Kodape and Madhuri Khaire. Semisolid formulation of Cucumber and Almond-A Review. *International Journal of Advanced Research in Biological Sciences* ISSN: 2348-8069.

HOW TO CITE: Pranav Sanap*, Meghana Rayjade, Saurabh Khairnar, Dhiraj Maind, Omkar Phopse, Review on *Cucumis Sativus*, *Int. J. of Pharm. Sci.*, 2024, Vol 2, Issue 12, 1522-1529. <https://doi.org/10.5281/zenodo.14405353>

