



Review On Cucumis Sativus (Cucumber) With Pharmacological Activity.

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Abstract:

Cucumis sativus, commonly known as the cucumber, is a little, beautiful tree that is used for prayer. Blood sugar regulation, hydration, bone and gut health, cancer prevention, heart health, and wound healing were just a few of the many medical uses for the entire plant. Anthelmintic qualities were also used to treat diabetes. This review discusses the chemical components of C. sativus, biological activities of significant substances, pharmacological properties, plant description, traditional use, cucumber used in cosmetics, moisture content of cucumis sativus, and herbal cosmetics. It also emphasizes the need for additional research into the material that is currently available. C. sativus

Keywords:

cucumber (Cucumis sativus L.), and cucumber fruit-based moisturizers

Introduction:

A medicinal plant is one that contains active ingredients with therapeutic qualities and is used to treat illnesses in various medical systems or has long been used to treat illnesses. Since ancient times, plants have been utilized as remedies. On every continent, medicinal herbs are successfully and extensively used. Herbal medicine is a very well-established and documented practice in Asia. Consequently, the majority of internationally recognized medicinal plants originate from this area. Plants, their parts, and their products were used to make medicine; these medicinal plants and plant components are a significant source of a nation's natural wealth.[1].

The Cucurbitaceae family includes gourds, melons, and cucumbers (Cucumis sativus L.). Since ancient times, this plant has been employed as a prominent vegetable crop in traditional Indian medicine. These veggies have extremely few calories and a high water content [2].

Numerous phytochemicals, including tannins, cardiac glycosides, terpenoids, carbohydrates, resins, saponins, and phytosterols, are confirmed by the phytochemical study of these plants. Cucumber also contains additional phytochemicals, including phlorotannins, alkaloids, flavonoids, glycosides, and steroid terpenes. Additionally, a variety of pharmacological properties are demonstrated by cucumber plants, including cytotoxic, antibacterial, antifungal, antacid, carminative, hepatoprotective, hypoglycemia, and hypolipidemic effects [3].

Cucumber (*Cucumis sativus* L.) can be classified botanical as follows: [4]

Kingdom	Plantae
Sub-kingdom	Tracheobiota
Superdivision	Embryophyta
Division	Tracheophyte
Class	Magnoliopsida
Order	Cucurbit ales
Family	Cucurbitaceae
Genus	<i>Cucumis</i> L.
Species	<i>Cucumis sativus</i>



Fig no.1 *Cucumis sativus*

Plant Description:

Botanically classified as berries, cucumbers (*Cucumis sativus*) come in a wide variety of forms, sizes, and colors. They range from Dutch greenhouse types (up to 50cm long) to thick, stubby tiny fruits (10–12cm long). The tall, smooth salad cucumber, with its silky, dark-green skin, is the most often grown type. A cucumber that has been picked when young and pickled in brine is the "gherkin"—it's a little brother. *Cucumis anguria*, the real gherkin, is a distinct species that is mostly cultivated in the West Indies. Despite having little nutritional value, cucumbers compensate for this by containing a wide range of beneficial compounds.

They were already employed in antiquity to dissolve uric acid-induced stones. They were also known to have a purifying effect on the skin, kidneys, lungs, and intestines. Cucumber eating is especially beneficial for those with liver or stomach disorders. They have been used to treat pale complexion, headaches, bleeding, and lightness. There is something in cucumber juice that helps the skin's blood flow. It is frequently used in cosmetics because of this. Many nations employ plants as medicine, and they are the source of strong, effective medications (5).

A plant is deemed medicinal if it has active ingredients with therapeutic qualities and is utilized to cure illnesses in various medical systems or has long been used to do so. Since ancient times, plants have been utilized as remedies. On every continent, medicinal herbs are successfully and extensively used. Herbal medicine is a very well-established and documented practice in Asia. Consequently, the majority of internationally recognized medicinal plants originate from this area. Plants, their parts, and their products were used to make medicine; these medicinal plants and plant components are a significant source of a nation's natural wealth.[1]. Members of the Cucurbitaceae family include cucumbers (*Cucumis sativus* L.)

The plant family Cucurbitaceae, sometimes referred to as the gourd family, comprises melons, cucumbers, squash, and luffas. Cucurbits are a significant and large group of vegetable crops that are widely grown in tropical and subtropical regions. There are roughly 118 genera and 825 species in the family. This family of plants has numerous nutritional and therapeutic advantages. One of the monoecious annual crops in the Cucurbitaceae family is the cucumber (*Cucumis sativa* L) (6).

Bumblebees and a few other bee species can also pollinate cucumbers. The majority of pollination-dependent cucumbers are self-incompatible, meaning they need another plant's pollen to develop seeds and fruit. There are certain cultivars related to the 'Lemon' cultivar that are self compatible. Fruit abortion and malformed fruit are signs of insufficient pollination. Fruit that is green and develops normally near the stem end but pale yellow and wilted at the blossom end may be produced by partially pollinated flowers (7).

Conventional cultivars yield roughly equal numbers of male and female blooms. Nearly 80% of the flowers on more recent gynocious hybrid varieties are female. Even though they may have a pollenizer cultivar interplanted and more beehives per unit area, temperature fluctuations cause male flowers to appear on these plants, which may be enough to trigger pollination (8).



Fig no.2 *Cucumis sativus*

Conventional Usage :

In traditional usage, cucumber (*Cucumis sativus* L.) contains anti-acne properties. Fresh fruit is the portion that was taken. The ingredients are prepared by slicing them thinly across. It is applied to the acne-prone area of the face and rubbed there. Give it time to dry. Rinse with warm water after drying. On a delicate face, exercise cautious [9]. In traditional medicine, cucumbers (*Cucumis sativus* L.) are also used to decrease blood pressure. Fresh fruit is the component used. Two cucumbers are used in the process, which involves washing and shredding them. Squeezing and filtering are done on the grated results. The recommended dosage is two to three times per day [10].

Cucumis sativus L., or cucumber, has the potential to prevent diabetes. Diabetes is a chronic illness brought on by insufficient insulin production by the pancreas or by inefficient insulin utilization by the body. Cucumbers can be used by washing and shredding two fresh cucumbers (150–200 grams). Squeeze and filter the grated results, then drink right away—do this two to three times a day [11].

Using cucumber in cosmetics Natural resources were the foundation of the ancient medical systems' conceptions of cosmetic use and application [12]. Cucumber pulp has been used to cleanse skin for ages all over the world as a folk remedy and cosmetic. Cucumber fruits and seeds are used all around the world to make cosmetics that heal sunburn and wrinkles, among other skin issues. Cucumber pulp is mostly made up of water and ascorbic acid (vitamin C).

According to reports, the *C. sativus*-derived compounds used in this safety evaluation serve as skin-conditioning agents in cosmetics (13) a survey of the highest reported use conducted by the Personal Care Products Council (Council). The highest concentration of usage was identified in *C. sativus* (cucumber) fruit water, which was used at 3% in foundations. The second highest concentration of use was found in *C. sativus* (cucumber) fruit extract, which was used at up to 1% in face and neck products and eye lotions.

In certain instances, the VCRP received reports of use, but the Council survey did not receive any concentration of use data. For example, the VCRP data reported the use of *C. sativus* (cucumber) fruit and *C. sativus* (cucumber) juice, but the Council survey did not receive any concentration of use data.

In a different instance, the VCRP only listed one application for *C. sativus* (cucumber) fruit water; nevertheless, the industry survey shows that it is utilized at a rate of 3% in foundations, 0.05% in bath soaps and detergents, and in formulations for body and hand products. Presumably, at least one formulation in each of these categories contains *C. sativus* (cucumber) fruit water (14)

Products for moisturizing that contain cucumber fruits:



Figure 2:- Moisturizing cream containing Cucumber

Fig no .3 moisturizer cream containing cucumber

The annual climber *Cucumis sativus* can reach a height of two meters. The fruit can grow up to 60 cm in length and 10 cm in diameter. It is elongated and broadly cylindrical with tapering ends. The crisp texture and juiciness of cucumbers make them a popular salad element. But it lacks flavor, is really watery, and isn't very nourishing. It is frequently eaten raw in salads, fermented (pickles), or cooked as a vegetable. Cucumber seeds were a good source of crude fiber (2.0%), protein (33.8%), fat (45.2%), and carbohydrates (10.3%).



Fig. 4 C. sativus

Linoleic acid, C18:2 (61.6%), oleic acid, C18:1 (15.7%), stearic acid, C18:0 (11.1%), and palmitic acid, C16:0 (10.7%), are the four primary fatty acids found in seed oil.(8) The oil is a good table and cooking oil that can lower serum cholesterol and LDL levels and raise HDL, which may help prevent cardiovascular diseases.(15) The seeds had higher amounts of threonine, phenylalanine, histidine (which is vital for babies), and other necessary amino acids and tyrosine as opposed to soybeans and greater amounts of tyrosine, phenylalanine, leucine, valine, and isoleucine than casein. Numerous physiologically active, nonnutritive substances called phytochemicals, including alkaloids, flavonoids, tannins, phlobatannins, steroids, and saponins, are found in cucumbers (16).

Sr no	Phytochemicals	Values/100g(unit)	Phytochemicals	Values/100g(unit)
1.	Energy	15Kcal	Vitamin	----
2.	Water	95.23g	Vit.C, total ascorbic acid	2.8mg
3.	Total lipid	0.11g	Riboflavin	0.033mg
4.	Carbohydrate by difference	3.63g	Niacin	0.098mg
5.	Protein	0.65g	Thiamine	0.027mg
6.	Sugar	1.67g	Folate,DFE	7microgram
7.	Mineral	-----	Vit.B12	0.00microgram
8.	Calcium	16mg	Vit A,IV	105IV
9.	Magnesium	13mg	Vit.E	0.03mg
10	Phosphorus	24mg	VitD(D2+D3)	0.0microgram
11	Potassium	147mg	Vit.D	0IV
12	Sodium	2mg	Vit.k	16.4microgram

13	Zinc	0.20mg	-----	-----
14	Lipid	----	-----	-----
15	Fatty acids, total saturated	0.037g	Fatty acids	0.032g
16	Fatty acids, total mono saturated	0.005g	Cholesterol	0mg

Table No: 2 nutritional value of cucumis sativus

Cucumber cleanser:

Because of its cooling and calming properties for the skin, cucumber extract is frequently found in face cleansers. Cleanse, a vegan cleanser for all skin types, combines cucumber along with calming chamomile and detoxifying green tea. To remove the dirt, oil, and bacteria that have accumulated on your face over the day, remember to wash your face every night before bed (17).

Cucumber Moisturizer:

Using a moisturizer made with cucumber extract is another excellent method to incorporate cucumber into your beauty regimen. It can be found in body lotions to assist soften and soothe skin every day, as well as in cream and gel moisturizers. One of the worst things you can do to your skin is to skip the moisturizer, especially if it's oily or prone to acne. Lack of moisture and hydration causes the skin to produce more oil, which can clog pores and cause breakouts. Daily use of a moisturizer keeps your skin properly hydrated, which helps regulate oil production (18). Additionally, cucumbers revitalize skin, reverse skin tanning, decrease sunburns, heal open pores, fight cellulite, hydrate skin, lessen dark circles, and more.

The advantages of using herbal cosmetics least damaging to the skin or other body parts because it is natural. comparatively safer. Customers experience a greater placebo effect as a result of its usage in customs and culture.[19]

formulational flexibility. The population demonstrates the effects of ancient times. Availability is simple. Economic. It has no negative effects and aids in body cleansing and beautification. It returns bodily processes to normal. Its high vitamin and mineral content gives it exceptional nutritional value. It raises the body's energy level. It boosts the immune system without upsetting the body's natural equilibrium. Numerous phytoconstituents might be added (20)

Herbal cosmetics made from cucumbers include:

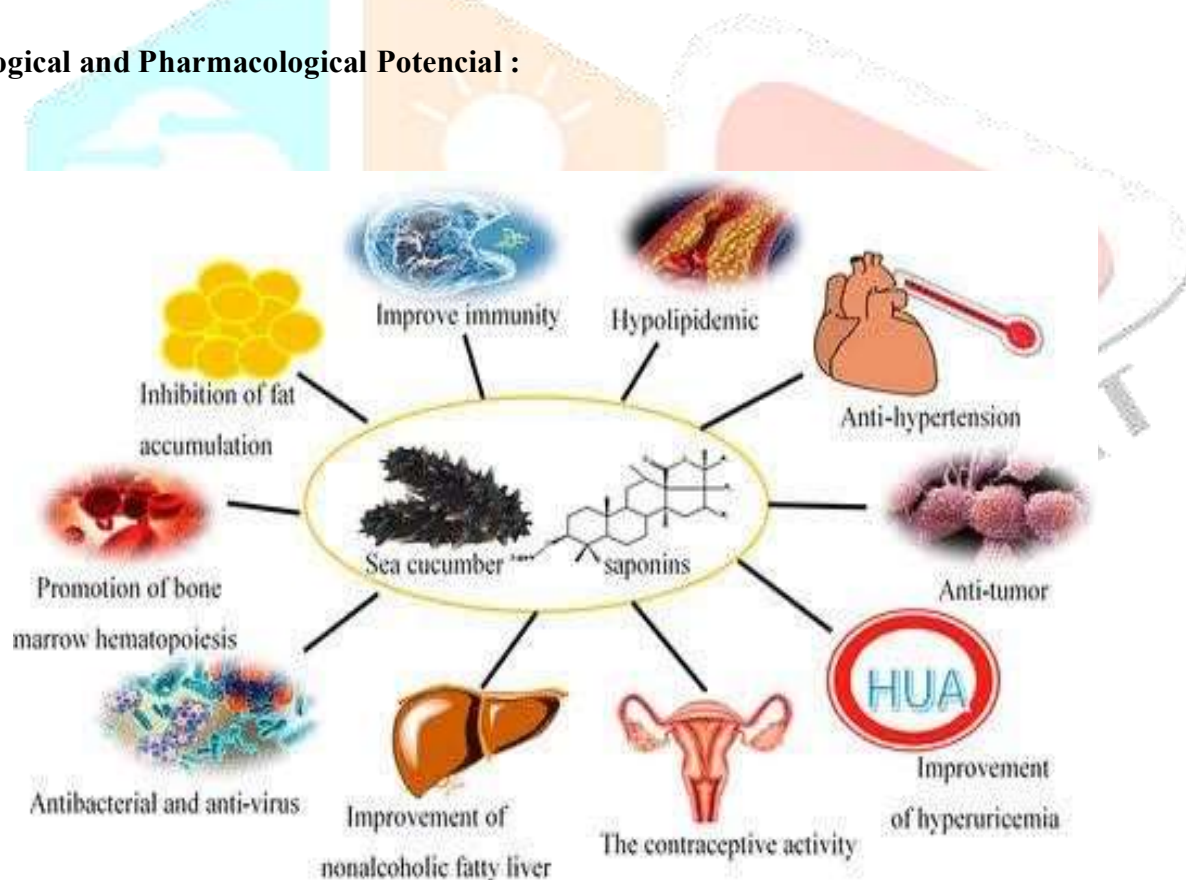
Roop's motto Indian-made cucumber herbal face wash is suitable for both men and women. Shree. Cosmetics made from herbs Cucumber face cream: A sort of face cream Shree Herbal Herbal cosmetics for coronation Manchanda Herbal Products PVT LTD offers a cucumber face cream. Because of its hydrating, calming, and antioxidant qualities, cucumber extract is a common ingredient in cosmetics. Another name for it is fruit extract from Cucumis sativus.



Fig. 5 C sativus cream

A natural substance that works well for all skin and hair types is cucumber extract. It can lessen puffiness and shield the skin from environmental damage. -repair aging skin. give off a cooling effect; nourish, stiffen, and fix The skin Vitamins, minerals, amino acids, and polysaccharides are abundant in cucumber extract. It smells of fresh cucumber and is clear to light green in color.(21)

Biological and Pharmacological Potencial :



Hepatoprotective activity :

The impact of *Cucumis sativus* against oxidative stress caused by cumene hydroperoxide was investigated by H. Heidari et al. The findings demonstrated that *Cucumis sativus* fruit extract's aqueous extract functions as a hepatoprotective and antioxidant agent against CHP-induced hepatotoxicity, indicating that the fruit extract's antioxidants and radical scavenging components can readily pass through cell membranes and handle the intracellular production of ROS. [21] The impact of *Cucumis sativus* against oxidative stress caused by cumene

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Antimicrobial action:

From the chloroform fraction of the crude methanol extract of cucumber (*Cucumis sativus*.) stems, three antimicrobial sphingolipids were isolated using bioassay guidance and identified as (2S,3S,4R,10E).2 hydroxytetra-cosanoylamino [(2'R) 2](1-O-β-Dglucopyranosyl-1,3,4-octadecanetriol-10-ene,2S,3S,4R,10E) Tetracosanoylamino-2-[(2'R)-2-hydroxy]-1,3,4octadecanetriol-10-ene (2) and soyacerebroside I (3) based on their spectroscopic studies and physicochemical characteristics. On test microorganisms, which included three bacterial and four fungal species, they were found to exhibit antifungal and antibacterial activity. Of them, molecule 1, a glycone with a relatively low polarity, demonstrated more potent antibacterial action than its counterpart, glycoside 2. The findings suggested that the primary antibacterial substances in the crude methanol extract of cucumber stems might be sphingolipids.[23]

one hour before to the croton oil and DMBA. The extract was applied one hour prior to the croton oil in Protocol 2. In Protocol 3, as soon as the croton oil dried, the extract was applied. 5.0 mg of cucumber extract and 0.2 ml of acetone were first "splashed on" each animal's back. But according to reports, this resulted in 60–80% death before tumor growth.[24]

Skin Sensitization/Irritation:

A modified occlusive human repeat insult patch test (HRIPT) was used to assess the irritation and sensitization potential of two formulations containing 0.00055% *Cucumis Sativus* (Cucumber) Fruit Extract. There was a 4-day challenge phase, a 10- to 24-day non-treatment interval, and a 21-day induction phase. In all trials, sodium laurel sulphate (SLS) served as the positive control and distilled water as the negative control. In the first trial, 101 participants were neatly applied a moisturizer containing 0.00055% *Cucumis Sativus* (Cucumber) Fruit Extract. Both the test substance and distilled water had standardized cumulative irritation scores of zero, while 0.5% SLS had a value of 2430. (There was no definition for the score system.) It was not anticipated that the formulation containing 0.00055% *Cucumis Sativus* (Cucumber) Fruit Extract would cause a considerable irritation to the skin, and it didn't cause sensitization.[25]

Activity for wound healing:

Patil et al were studied on pharmacological evaluation of wound healing potential Patil et al. conducted research on the pharmacological assessment of *Cucumis sativus*'s capacity to heal wounds. According to him, *Cucumis sativus* aqueous extracts are effective at healing wounds. The creation of herbal paste significantly ($P < 0.05$) improved wound contraction, maturation, and epithelialization.[26]

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Carminative and antacid activity:

Swapnil Sharma et al. conducted research using the fruit pulp of *C. sativa* aqueous extract, which demonstrated strong acid neutralization, resistance to pH changes, and good carminative potential. It has been demonstrated that the *C. sativa* extract has strong antacid and carminative properties.[28]

Analgesic action :

The fruit cucumber (*Cucumis sativus* L.) possesses analgesic properties. In order to examine the analgesic effects of cucumber methanol extract, mice using the writhing method were administered 250 mg/kg and 500 mg/kg bodyweight. In contrast to the administration of Na-diclofenac (76.41%), this study demonstrated that cucumber methanol extract was able to decrease pain by 54.72% and 55.66%. [29].

Activity of Laxatives :

Cucumis sativus L. fruit pulp extract in water has demonstrated a notable laxative effect. The fruit pulp extract's phytochemical screening revealed the presence of sterols, polyterpenes, flavonoids, tannins, and polyphenols. The aqueous fruit pulp extract of *Cucumis sativus* L. given orally shown substantial laxative effect and decreased loperamide-induced constipation in a research conducted on Wistar albino rats [30].

In summary:

Plants have served as a source of inspiration for new pharmaceutical molecules since ancient times. Since wild cucumbers can be found in India, it is thought that the cucumber (*Cucumis sativus* L.) originated in Asia. Nowadays, cucumbers are grown for commercial purposes. *Cucumis sativus* L. is a wonderful miracle of nature because of its many advantages. *Cucumis sativus* L. cucumber is the primary source of bio-active chemicals, which are intended for a variety of biological activities in humans, according to several studies on its various components. Antidiabetic, hepatoprotective, antifungal, antibacterial, free radical scavenging, analgesic, wound healing, cytotoxic, cosmetic, antiulcer, antioxidant, and laxative properties are all exhibited by the fruit and leaf extracts of *Cucumis sativus* L.

Research on plants with antidiabetic, antimicrobial, and anti-ulcer qualities is now being conducted on diverse plant parts, as obesity and diabetes mellitus are more prevalent in our culture. Since different varieties of cucumbers are available in different places of the world, a comparative investigation of their potential as a medicine must also be researched and recorded.

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