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Invigorating Efficacy of *Cucumis Sativas* for Healthcare & Radiance

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Abstract

Cucumber (*Cucumis sativas*) is one of the very low calorie veggies; provide just 15 calories/ 100 g. It contains no saturated fats or cholesterol. Cucumber peel is a good source of dietary fiber that helps reduce constipation, and offer some protection against colon cancers by eliminating toxic compounds from the gut. It's found that the caffeic acid found in *Cucumis sativas* helps to prevent water retention and when applied topically, helps reduce puffy and swollen eyes. It is a very good source of K (- a heart friendly electrolyte helps bring a reduction in total blood pressure and heart rates by countering effects of Na), an important intracellular electrolyte. 100 g of cucumber provides 147 mg of K but only 2 mg of Na. Cucumbers contains unique anti-oxidants in moderate ratios such as β -carotene and α -carotene, vitamin-C, vitamin-A, *zea-xanthin* and *lutein*. These compounds help act as protective scavengers against oxygen-derived free radicals and ROS that play a role in aging and various disease processes. Their total antioxidant strength, measured in terms of ORAC value, is 214 μ mol TE/100 g. Cucumbers have mild diuretic property. Surprisingly cucumber has high amount of vitamin K (17 μ g of this vitamin/ 100 g). Specific phytonutrients provided by cucumbers include Flavonoids viz. apigenin, a luteolin, a quercetin; a kaempferol, Lignans viz. pinoresinol, lariciresinol, secoisolariciresinol, Triterpenes viz. cucurbitacin A; cucurbitacin B; cucurbitacin C, cucurbitacin D. These three types of phytonutrients found in cucumbers provide us with valuable antioxidant, anti-inflammatory, and anti-cancer benefits. We used to think that cucumber is too "cooling" for the bones. On the contrary, cucumber really helps counter inflammation in joints by removing the uric acid crystallization. Cucumber accomplishes this task by inhibiting activity of pro-inflammatory enzymes like COX-2, and by preventing overproduction of nitric oxide in situations where it could increase the likelihood of excessive inflammation. Research on the anti-cancer benefits of cucumber is still in its preliminary stage and has been restricted thus far to lab and animal studies. Interestingly, however, many pharmaceutical companies are actively studying one group of compounds found in cucumber called cucurbitacins in the hope that their research may lead to development of new anti-cancer drugs.

Keywords: Silica, Lignans, Ascorbic acid, Caffeic acid, ORAC, ROS, Vitamins & Minerals, Fibres, Diuretic, Antioxidants, COX2, Flavonoids, Terpenes

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1. Introduction

Ever wonder how to beat the scorching summer heat. Just remember your humble crunchy cucumber. Nonetheless, this wonderful low calorie veggie indeed confers numerous health benefits. Cucumber (*Cucumis sativus*) is a veggie that belongs to the gourd family, *Cucurbitaceae*. The veggie is one of the oldest cultivated crops and believed to be originating in the northern plains of Indian subcontinent. cucumber, It is a tender annual with a rough, succulent, trailing stem and hairy leaves with 3 to 5 pointed lobes; the stem bears branched tendrils by which the plant can be trained to supports(Fig. 1). In general, the fruit features dark-green skin, crispy moisture rich flesh, and small edible seeds (Fig.11) concentrated at its core.



Fig. 1 Cucumbers on Vines

As in other squash members, cucumbers too are best-harvested young, tender and just short of reaching maturity, at the stage when they taste sweet, have crunchy texture, and unique flavor. If left uninterrupted, the fruit continues to grow in size, its skin becomes tougher and turns yellow, and seeds become hard and inedible. Fresh cucumbers are available throughout the season and can be eaten raw as is or in veggie salads or juicing. Today, cucumbers are the fourth most widely grown veggie crop in the world – after tomatoes, onions and cabbage. They're grown worldwide in temperate regions. There are two types of cucumbers: slicing cucumbers (Fig. 2 & 3) and pickling cucumbers (Fig. 4). The pickling varieties tend to be smaller, thicker, and have bumpy skin with black-dotted spines. Cucumber also contains many vitamins (Table 2) and minerals that make them a healthy choice for cooking and snacking. Cucumber has an impressive amount of water (~96%) that is naturally distilled, which makes it superior to ordinary water. It's skin contains a high percentage of vitamin A, so shouldn't be peeled off. The cucumber contains alkaline-forming minerals and an excellent source of vitamin C and A (antioxidants), folate, Mn, Mb, K, Na, K, silica silica, S and lesser amounts of vitamin B complex.

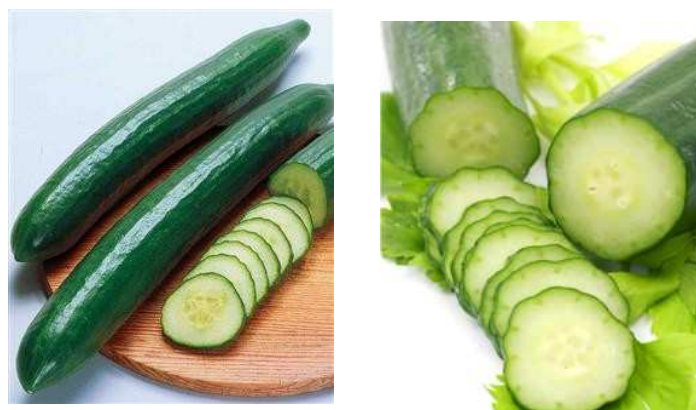


Fig. 2 & 3 Slicing Cucumbers

Most people are unaware of the immense health benefits of cucumber and would avoid eating cucumber where possible. Fresh cucumber may taste "bland" to some but its thirst-quenching and cooling properties are refreshing. When is consumed with fried and barbequed foods, it acts as an antioxidant. The excellent source of silica

contributes to the proper construction of connective tissues in our body as in the bones, muscles, cartilage, ligaments and tendons.



Fig. 4 Pickling Cucumber

In China, it's not believed that cucumbers are too "cooling" not suitable for people with rheumatism. But we know now cucumber can help counter uric acids that are causing inflammation in joints. When cucumber is consumed, it does its cleansing function at the joints, thus stirring up as it eliminates the uric acid. This means it also help other inflamed conditions like arthritis, asthma and gout. Cucumber is a native plant of India and other tropical regions; it is used as a popular fresh vegetable in a variety of salads and sandwiches and is a mainstay of many of today's lunches. Whether it's cucumber wedges tossed in a garden salad, slices on a sandwich, or used as an appetizer for parties, the cucumber is a nutritious and healthful pick. Cucumber is an important health food. It provides a very healthy juice beneficial for increasing the flow of urine. For rheumatic conditions, it complements the effects of celery and carrot juice. Its juice is a soothing skin lotion. In fact, it is the best skin lotion. The peel, like lemon peel, is good to be used on the hands most especially after it's been in a strong detergent or in a very hot water. It is very useful to treat tired eyes and remove the eye bags under your eyes by placing a slice of cucumber over closed eyes. It also helps lung, stomach and chest problems, gout, and tapeworm. Fresh cucumber juice is good to reduce heartburn or sooth stomach acid, also for those suffering from gastritis or ulcer. As cucumber and the skin share the same level of hydrogen, it becomes easier for cucumber to mask all the problem areas. It helps in soothing and softening your skin which can get you relaxed in no time. With so many useful ingredients in cucumber it can help you in treating so many skin problems. It has become part of daily beauty product into face packs, facials, juice and many other things which can affect your skin. Due to its cooling effect it can be termed as a magic wand for all your skin problems.

Therapeutic Significance

Cucumbers have mild diuretic property, which perhaps attributed to their free-water, and Kand low Na content. This helps in checking weight gain and high blood pressure. They surprisingly have a high amount of vitamin K, provides ~ 17 μg of this vitamin/ 100 g. Vitamin-K has been found to have a potential role in bone strength by promoting osteotrophic (bone mass building) activity (Table 2). It also has established role in the treatment of Alzheimer's disease patients by limiting neuronal damage in their brain. Cucumber contains larciresinol, pinioresinol, and secoisolarciresinol – 3 lignans that have a strong history of research in connection with reduced risk of several cancer types, including breast cancer, prostate cancer, uterine cancer, and ovarian cancer. The high water content and dietary fiber in cucumber are very effective in driving away the toxins from the digestive system and hence aid digestion. Daily consumption of cucumber can be regarded as a remedy for chronic constipation.

Cucumber is one of the few vegetables that not only taste yummy, but also work wonders for your skin. The fruit has frequently made its way to the list of hot favorites among beauty lovers. It is an absolute essential for any kind of home beauty treatment. The soothing effect of cucumber never fails to pep up sagging spirit and even slumped skin. It is a surprising beauty secret for the skin, with its hydrating, nourishing and astringent properties. Cucumbers have the same pH level as your skin, a fact that helps refurbish your skin's protective and natural acid mantle. Just slice the cucumber and apply it straight onto your skin to soothe and soften it, or mix it with other kitchen ingredients for that lovely toning. Result: soft, smooth, cool, glowing skin! After a long day, just try treating your skin to the benefits of cucumber and see your face flush with radiance. Scared of dark, haggard eyes! Cucumber may just bail you out of your woes. When it comes to treating under eye dark circles, most people often take to expensive eye creams, but with little results. Cucumber is one of the best known home remedies for dealing with those much dreaded beauty woes. The antioxidants and silica present in cucumber help to lighten the dark skin and rejuvenate tired, dull looking skin. So, before you head for that under-eye cream the next time, give cucumber a shot! Puffy eyes never make for a pretty sight! In fact, they can make you look tired and older than your age. Late

night outings, long hours of staring at your computer, allergies, high salt intake or even stress can cause your eyes to puff up. One easy way to battle them comprises of the use of cucumber slices. Cucumbers contain ascorbic acid, which helps to decrease water retention and reduce puffiness.. Just squeeze out cucumber juice, dab it all over your face, and see the freckles disappear overtime. Cucumber is known to whiten, brighten and even tighten your skin. So stop scouring market shelves for radiant creams and switch on to this fruit. Cucumber juice is rich in silica, which is known to enhance complexion and add glow to your skin. You are an outdoor buff and love to spend your time outside! Well, spending long hours out in the sun exposes you to the risk of sunburns. Sun burnt skin makes for an ugly sight and if left untreated, can pose a serious threat in the future. Attend to it with cucumber. It has cooling effects that soothe the skin and rejuvenate it as well. Cucumber makes for an excellent skin toner as well. Just mix it with a few drops of lemon, honey, or aloe vera and apply on your skin. It will help open pores, leaving your skin supple and radiant.

Cucumber is an excellent source of silica which is known to help promotes joint health by strengthening the connective tissues. Cucumber is a best ingredient for gout pain relief. When mixed with carrot juice, they can relieve gout and arthritis pain by lowering the uric acid levels. This veggie contains a hormone needed by the cells of the pancreas for producing insulin. Researchers found that some compound called sterols in cucumber may help reduce cholesterol levels. Cucumber contains Si and S and thus a regular intake of cucumber can help promote healthy hair growth. For best results, mix cucumber juice with the juices of carrot, lettuce or spinach. The water content of cucumber acts as a diuretic. It encourages the elimination of waste products from the body through urination. Regular intake of cucumber helps to dissolve bladder or kidney stones. Due to its low calorie and high water content, cucumber is an ideal diet for people who looking for weight loss.

Fresh Cucumber Juice for Renaissance

Cucumber juice contains a lot of K, Mg and fiber which are very helpful for regulating blood pressure. This makes cucumber especially good for treating both low BP & high BP . Cucumber juice is also beneficial for people with teeth and gums problems, especially in cases of pyorrhea. The cucumber juice has been found to be beneficial for the diabetic patients. Cucumber juice (Fig. 5 & 6) is diuretic, encouraging waste removal through urination. This also aids in dissolution in kidney stones. The temperature regulating properties in cucumber juice makes it a suitable drink when one falls sick due to fever. When there is sunburn, rubbing cucumber juice on affected area provides cooling and heating effects. It supplies the necessary electrolytes and restores hydration of the body cells, thus reducing water retention. During dry and hot weather, drinking a glass of cucumber + celery juice (Fig. 8) magnificently helps to normalize body temperature.



Figure. 5 & 6 Refreshing Cucumber Juice

Digestive disorders, such as heartburn, gastritis, and even ulcers, can be cured by the daily consumption of fresh cucumber juice. Drink it mixed with lemon, carrot, lettuce/ or spinach juice. Some people wake up in the morning with puffy eyes, probably due to too much water retention in the body (or having cried to sleep). The alkalinity of the minerals in cucumber juice effectively helps in regulating the body's blood pH, neutralizing acidity. The juice is also soothing for the treatment of gastric and duodenal ulcers. Like celery, this colorless drink can help regulate BP because of its minerals and traces of Na.

Since cucumbers are 96% water they make the perfect juice veggie. They hydrate skin with valuable nutrients. When applied externally, the astringent properties in cucumbers draw out dirt and cleanse the pores and reduce puffiness around the eyes. They are very high in silica which gives you strong hair, nails and skin. The K in celery juice helps to regulate body fluid and stimulate urine production, making it an important help to rid the body of

excess fluid. Often after few days of drinking celery juice your face and neck look slimmer and you lose bloat.

Ginger has antiseptic properties and keeps the skin clear and blemish free. Apples are loaded with β -carotene and apple peels are particularly rich in polyphenols which offer antioxidant and anti-inflammatory protection to slow aging of skin. Put all these together with some lemon and you have a great edible tonic to nourish skin and hair from the inside out (Fig.7)



Fig. 7 Apple, Celery mixed Cucumber Juice

Gastronomic & Healthcare Usage

Cucumber also contains many vitamins and minerals that make them a healthy choice for cooking and snacking. To reduce the puffiness, lie down and put 2 slices (Fig. 8) of cucumber on the eyes lids for a good 10 minutes. The high amount of vitamin C and antioxidants in cucumber makes it an important ingredient in many beauty creams for treating eczema, psoriasis, acne, etc. The photochemicals present in cucumber help kills the bacteria in your mouth which are responsible for bad breath.



Figure 8. Sliced Cucumber aided Veggies

To get rid of bad breath, press a slice of cucumber in between your mouth with your tongue for at least 30 seconds. The high silica content in cucumber also helps prevent splitting and spoiling of nails of the fingers and toes. Cucumber has 96% water content that is more nutritious than regular water, which helps in keeping the body hydrated and regulating body temperature. It also helps in flushing out the toxins from the body.

So here I get u this humble Cucumber in a chutney form (Fig.9). Oh never heard of it. Well don't be doubtful to try it out as its yummy and very very easy....when you are bored of eating only one type of chutney, coconut chutney then this can be a nice variation. It is fresh and refreshing and very easy to make. You will just need a very few ingredients from your kitchen and it will be ready in no time. It can be served with dosa's, Idli's or just as an accompaniment. So go ahead and try out this nice and new recipe of this chutney - *What do we need:-* 2 Cucumber, peeled and cut in squares; 1 tsp Mustard seeds (rai/sarson); 1 tsp Split black gram (dhuli udad dal); 1 tsp Bengal gram (chana dal); 10-12 Curry leaves (kadipatta); 2-3 Kashmiri dry red chillies; 2 tbsp Groundnuts; ½ tsp Asafoetida (hing); 1 tsp Turmeric (haldi); A small ball of tamarind (imli); Oil for tempering; Salt to taste - *How do we do it:-* 1 In a pan heat 1 tbsp Oil. When the oil is hot enough add the mustard seeds and wait till they crackle;

Now add in the udad and chana dal and fry; Put in the curry leaves and red chillies and sauté; Add in the asafoetida, turmeric powder and the groundnuts and sauté; Now add the cubed cucumber and sauté for 2-5 minutes; Remove aside and keep till it becomes cool; Grind the cucumber in a mixer adding salt to taste and the tamarind. You don't have to make it into a fine paste. Let it be coarse; Do not add any water as cucumber has water in it; Remove and serve with dosa's, idli's or anything you like.



Fig. 9 Spiced Luscious Cucumber Chutney

The high water content and the presence of certain vitamins and minerals make cucumber an essential part of skin care. Facial masks containing cucumber juice (Fig. 10) can be used for skin tightening. Ascorbic acid and caffeic acid present in cucumbers can bring down the water retention rate which in turn diminishes the puffiness and swelling under the eyes. Cucumber skin also can bring relief to the skin caused by sunburn or windburn. Cucumber is a good source of dietary fiber and this fiber massage in the teeth and gums. Cucumbers have mild diuretic property, which perhaps attributed to their free-water, and K and low Na content. This helps in checking weight gain and high BP. They surprisingly have a high amount of vitamin K, provides about 17 μg of this vitamin/ 100 g. Vitamin-K has been found to have a potential role in bone strength by promoting osteotrophic (bone mass building) activity. It also has established role in the treatment of Alzheimer's disease patients by limiting neuronal damage in their brain.



Fig. 10 Cucumber Juice for Facial Mask

Cucumber is a good source of dietary fiber and this fiber massage in the teeth and gums. Digestive disorders, such as heartburn, gastritis, and even ulcers, can be cured by the daily consumption of fresh cucumber juice. The high water content and dietary fiber in cucumber are very effective in driving away the toxins from the digestive system and hence aid digestion. Daily consumption of cucumber can be regarded as a remedy for chronic constipation. Cucumber is an excellent source of silica which is known to help promotes joint health by strengthening the connective tissues. When mixed with carrot juice, they can relieve gout and arthritis pain by lowering the uric acid levels. This veggie contains a hormone needed by the cells of the pancreas for producing insulin. It has been found that some compounds called sterols in cucumber may help reduce cholesterol levels. Cucumber contains Si and S and thus a regular intake of cucumber can help promote healthy hair growth. For best results, mix cucumber juice with the juices of carrot, lettuce or spinach. Due to its low calorie and high water content, cucumber is an ideal diet for people who looking for weight loss.



Fig. 11 Edible Seeds in Sliced Cucumber

Superlative Researched Gains

Cucumbers have not received as much press as other veggies in terms of health benefits, but this widely cultivated food provides us with a unique combination of nutrients. At the top of the phytonutrient list for cucumbers are its cucurbitacins, lignans, and flavonoids. These three types of phytonutrients found in cucumbers provide us with valuable antioxidant, anti-inflammatory, and anti-cancer benefits. Specific phytonutrients provided by cucumbers include Flavonoids viz. apigenin; a luteolin; a quercetin; a kaempferol; Lignans viz. pinorelinol; lariciresinol; secoisolariciresinol; Triterpenes viz. cucurbitacin A; cucurbitacin B; cucurbitacin C; cucurbitacin D. Cucumbers are a valuable source of conventional antioxidant nutrients including vitamin C, beta-carotene, and Mn. In addition, cucumbers contain numerous flavonoid antioxidants, including quercetin, apigenin, luteolin, and kaempferol.

Table 1. Nutritive value/100 g of raw *Cucumis sativus*

Constituent	Quantity	RDA (%)
Energy	15 Kcal	<1%
Carbohydrates	3.63 g	3%
Protein	0.65 g	1%
Total Fat	0.11 g	0.5%
Cholesterol	0 mg	0%
Dietary Fiber	0.5 g	1%

In animal studies, fresh extracts from cucumber have been shown to provide specific antioxidant benefits, including increased scavenging of free radicals and increased overall antioxidant capacity. Fresh cucumber extracts have also been shown to reduce unwanted inflammation in animal studies. Cucumber accomplishes this task by inhibiting activity of pro-inflammatory enzymes like COX-2, and by preventing overproduction of nitric oxide in situations where it could increase the likelihood of excessive inflammation. Research on the anti-cancer benefits of cucumber is still in its preliminary stage and has been restricted thus far to lab and animal studies. Interestingly, however, many pharmaceutical companies are actively studying one group of compounds found in cucumber—called cucurbitacins—in the hope that their research may lead to development of new anti-cancer drugs. Cucurbitacins belong to a large family of phytonutrients called triterpenes. Cucurbitacins A, B, C, D and E have all been identified within fresh cucumber. Researchers have determined that several different signaling pathways (for example, the JAK-STAT and MAPK pathways) required for cancer cell development and cancer cell survival can be blocked by activity of cucurbitacins.

Table 2. Vitamins Existing in *Cucumis sativus*

Vitamin	Quantity	RDA Value (%)
Folates	7 µg	2%
Niacin	0.098 mg	<1%
Pantothenic acid	0.259 mg	5%
Pyridoxine	0.040 mg	3%
Riboflavin	0.033 mg	3%
Thiamin	0.027 mg	2%
Vitamin A	105 IU	3.5%
Vitamin C	2.8 mg	4.5%
Vitamin E	0.03 mg	0%
Vitamin K	16.4 µg	13.6%

Eventually, we expect to see human studies that confirm the anti-cancer benefits of cucumbers when consumed in a normal, everyday meal plan. A second group of cucumber phytonutrients known to provide anti-cancer benefits are its lignans. The lignans pinorelinol, lariciresinol, and secoisolariciresinol have all been identified within cucumber. Interestingly, the role of these plant lignans in cancer protection involves the role of bacteria in our digestive tract. When we consume plant lignans like those found in cucumber, bacteria in our digestive tract take hold of these lignans and convert them into enterolignans like enterodiol and enterolactone. Enterolignans have the ability to bind onto estrogen receptors and can have both pro-estrogenic and anti-estrogenic effects. Reduced risk of estrogen-related cancers, including cancers of the breast, ovary, uterus, and prostate has been associated with intake of dietary lignans from plant foods like cucumber.

Abbreviation

Reactive Oxygen Species (ROS); Oxygen Radical Absorbance Capacity (ORAC); Cyclo-Oxygenase 2 (COX-2); Janus Kinase (JAK); Signal Transducer and Activator of Transcription (STAT); Mitogen Activated Protein Kinase (MAPK); Recommended Daily Allowance (RDA); Blood Pressure (BP)

3. Conclusion

Cucumber, being a wonderful low calorie veggie, with more nutrients to offer than just water, is a great veggie choice for the Paleo Diet, especially when aiming for weight loss. It is one of the very low calorie veggies; provide just 15 calories /100 g. It contains no saturated fats or cholesterol. Cucumber peel is a good source of dietary fiber that helps reduce constipation, and offer some protection against colon cancers by eliminating toxic compounds from the gut. It is a very good source of K, an important intracellular electrolyte. 100 g of cucumber provides 147 mg of K but only 2 mg of Na. K is a heart friendly electrolyte helps bring a reduction in total blood pressure and heart rates by countering effects of Na. Cucumbers contains unique anti-oxidants in moderate ratios such as β -carotene and α -carotene, vitamin-C, vitamin-A, zeaxanthin and lutein. Cucumbers have mild diuretic property, which perhaps attributed to their free-water, and K and low Na content. This helps in checking weight gain and high blood pressure. They surprisingly have a high amount of vitamin K, provides about 17 μ g of this vitamin/ 100 g. Vitamin-K has been found to have a potential role in bone strength by promoting osteotrophic (bone mass building) activity. A, B1, B6, C & D, Folate, Calcium, Mg, and K, when mixed with carrot juice, they can relieve gout and arthritis pain by lowering the uric acid levels. Cucumber contains lariciresinol, pinoresinol, and secoisolariciresinol 3 lignans that have a strong history of research in connection with reduced risk of several cancer types, including breast cancer, prostate cancer, uterine cancer, and ovarian cancer(restricted thus far to lab and animal studies). We expect to see human studies that confirm the anti-cancer benefits of cucumbers in the everyday diet.

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