

Health Benefits of Camellia Sinensis (Green tea)

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Abstract:

Tea is the most commonly consumed beverage in the world after water and the fourth most commonly consumed beverage in the United States. There is some helpful signal for the use of green tea in cancer prevention. Many studies suggest an inverse relationship between green tea intake and the risk of variety of cancer.

Small clinical studies have found that green tea may also be helpful in losing and dealing weight and lowering cholesterol. Epidemiologic evidence suggests that green tea may prevent stroke and Cardiovascular disease.

Green tea has been larger to health benefits. The major components of concentration are the polyphenols which are responsible for the antioxidant and other health benefits of green tea. The major polyphenols of green tea are flavonoids.

Green tea contains polyphenols which helps to fighting cancer. Green tea possess anti-oxidant that helps in reducing acne and also fight skin infection. Green tea has vitamin E and vitamin B2 present it which helps in maintaining skin health.

Keyword: Green tea ,Cancer ,Beverage ,Health

Introduction:

Tea, derived from *Camellia sinensis* L. is one of the most broadly paid beverages in the world. Tea can be classified into three main types, depending on the level of oxidation, as green tea, oolong (transliterated from two words meaning “black” and “dragon” in English) tea and black tea. Green tea is an ever-green plant that grows primarily in hot and sensible region of Asia which mainly include China, India, Sri Lanka and Japan. It is also cultivated in several African and South-American countries. The *sinensis* plant strain is originated from China. This strain produces green, white, black and oolong teas. On the contrary, the *assamica* plant strain primarily is live in a region of the Assam region in Northern India. Due to huge yields of this specific strain, it is the favored plant grown in India, Sri Lanka and some African countries.



Green tea is a small shrub that can expand up to 30 feet high, but is normally trimmed to 2–5 feet when cultivated for its leaves. The leaves are naturally dark green and silky with notched edges and are 2–5 cm broad and 4–15 cm long. The flowers are white and contain bright yellow stamens. These blooms appear individually or as groups. The fruits have hard green shells with round, brown-colored seeds. These seeds can be used to produce tea oil. Typically, flowering is prevented during cultivation by collecting the leaves. The immature, light-green leaves are preferably harvested for tea production. Mature leaves are deeper green in colour than the young leaves. Different leaf ages produce varying tea qualities as their chemical compositions are different. Typically, the buds (tips) and the first two to three leaves are harvested by hand pick for processing. These basic types of tea have different quality characteristics, including appearance, perfume, taste, and colour. The manufacturing process of tea is designed to either prevent, or permit tea polyphenolic compounds to be oxidized by naturally occurring polyphenol oxidase in the tea leaves. Green tea is produced by inactivating the heat sensitive enzyme polyphenol oxidase in the fresh leaves by either applying heat or steam, which prevents the enzymatic oxidation of catechins, the most rich flavonoid compounds present in green tea extracts. (1) At the moment tea is the second most popular beverage in the world (after water). The detailed analysis of green tea is relevant in the terms of preventive effect on metastasis of , breast cancer prevention of inflammation, thrombosis (as the reasons of primary heart attacks

and cardiovascular diseases) preventive effect on atherosclerosis and positive effect on decreasing cholesterol concentration in the blood positive effect of it's antimutagenic and properties, antioxidant activities. (2)



The first green tea was exported from India to Japan during the 17th century Green tea initiates from china . Starting in China, the green tea trend has expanded worldwide to become the second most consumed drink after water. The assamica plant strain primarily is inhabitant to the Assam region in Northern India According to legend, tea was discovered accidentally by either a man named Shien Non or the Emperor Shen Nung. Either way, green tea soon became popular among wealthy Chinese nobles Green tea is made from the fresh leaves of Camellia sinensis, which are processed rapidly by means of steam to prevent fermentation . Green tea has many oral health benefits. It has Intellectual function and positive effect on bone density, caries, Periodontal diseases and diabetes .(3)

History :

Camellia species spread in more than 90 species from Nepal To Taiwan and Japan in the East Asia. Among these species, 'Tea' is the most widely distributed one. Green tea is widely Popular in East Asia (particularly in China and Japan), Whereas, black tea is the preferred tea in the West. The use Of tea leaves probably first originated more than 3,000 years Ago, in the southwest area of China and initially was used by People only for munching and eating, in just the same way that Coffee was first used .The origin place of tea plant was Estimated to be around Chinese Yunnan district by Sealy (1958), but it is not confirmed yet. A wild type of the variety Assamica in C. sinensis was discovered in India at 1835 and Thereafter also in Thailand and Burma (3)



• Chemical Composition

The chemical composition of tea leaves has been well recognized. The main constituents of tea leaves are polyphenol. The fresh tea leaves contain caffeine (approximately 3.5% of the total dry weight), theobromine (0.15–0.2%), theophylline (0.02–0.04%) and other methylxanthines, lignin (6.5%), organic acids (1.5%), chlorophyll (0.5%) and other pigments, thiamine (4%) and free amino acids (1–5.5%), and frequent flavour compounds (Graham, 1992). In addition, a wide variety of other components exists, including flavones, phenolic acids, carbohydrates, alkaloids, minerals, vitamins and enzymes. Tea also contains flavonols, mainly quercetin, kaempferol, myricetin, and their glycosides. The most satisfactory effects of green tea are attributed to the green tea polyphenols, mainly the catechins, which make up, 25–35% of the dry weight of green tea leaves. (1)

The individual chemical components of green tea have a basically different effect on particular types of cancer. Available data indicate that ascorbic acid, arginine, proline, lysine and EGCG were reported to have a positive effect on tumor growth reduction. (4)

Sr.No.	Constituents	% Composition of Green Tea
1.	Caffeine	3.5%
2.	Theobromine	0.15-0.2%
3.	Theophylline	0.02-0.04%
4.	Lignin	6.5%
5.	Organic Acid	1.5%
6.	Chlorophyll	0.5%
7.	Thiamine	4%
8.	Free Amino Acid	1-5.5%
9.	Catechin	25-35%

Chemical composition of green tea

Amino acids

L-theanine
Tyrosine
Tryptophan
Threonine 5-N-ethylglutamine
Glutamic acid
Serine
Glycine
Valine
Leucine
Aspartic acid
Lysine
Arginine

Trace elements

Magnesium
Chromium Manganese
Calcium
Copper
Zinc
Iron
Selenium
Sodium cobalt
Nickel

Carbohydrates

Glucose
Cellulose
Sucrose

Lipids

Linoleic acid
 α -linolenic acid

Phenolic acids

Gallic acid

Volatile compounds

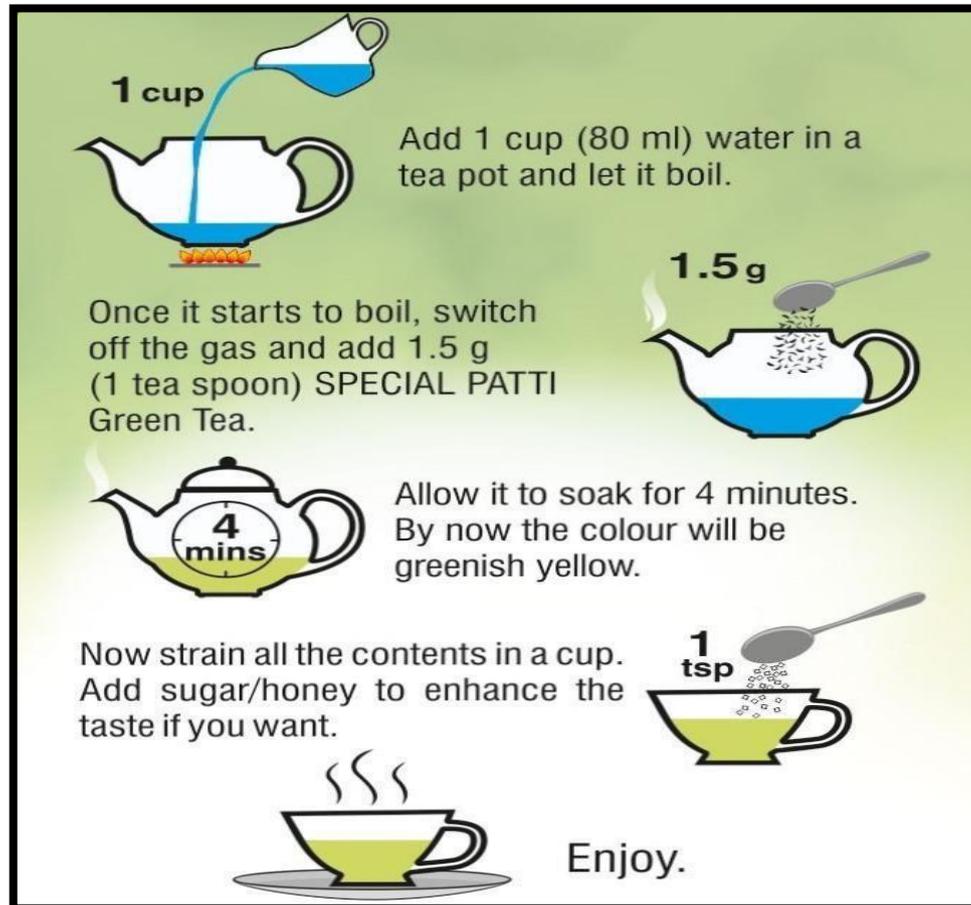
Alcohols
Esters
Hydrocarbons
Aldehydes

Vitamins

Vitamin A
Vitamin B2
Vitamin B3
Vitamin C
Vitamin E
Vitamin K

- **Preparation of Green tea :**

Strong green tea was freshly prepared on each occasion by adding 500 ml of boiling distilled water to 20 g of dry tea leaves purchased from local shop; the tea was permitted to infuse for 10 minutes and filtered, and the final volume ad400 ml with distilled water. The FRAP value of a small aliquot of each tea infusio drunk, was measured within three hours of preparation.(5)



Morphology of green tea:

C. sinensis, a member of the theaceae family is an evergreen stamen tree or shrub that attains a height of 10 - 15 m in the wild and 0.6 - 1.5 m when cultivated. The leaves are light green, short followed, leatherlike, alternate, , notch margin, or young lower, varying in length from 5 - 30 cm and about 4 cm width. Mature leaves are bright green coloured, smooth and tough while young leaves are youthful. Flowers are white fragrant, 2.5 - 4 cm in diameter, found in solitary or in clusters of two or four. Flowers bear numerous stamens with yellow anther and produce brownish red capsules. Fruit is a compressed, smooth, rounded trigonous three celled capsule, seed solitary in each, size of a small nut. (6)

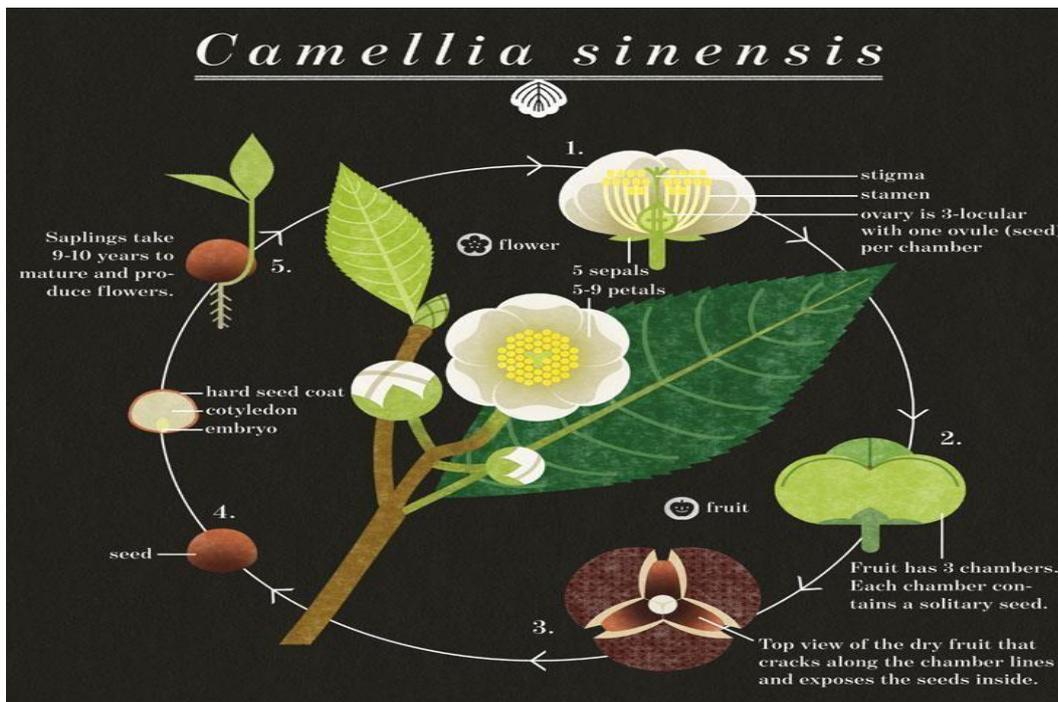
Family : Theaceae

Scientific Name : *Camellia sinensis* (L.) Kuntze.

Common name : Tea

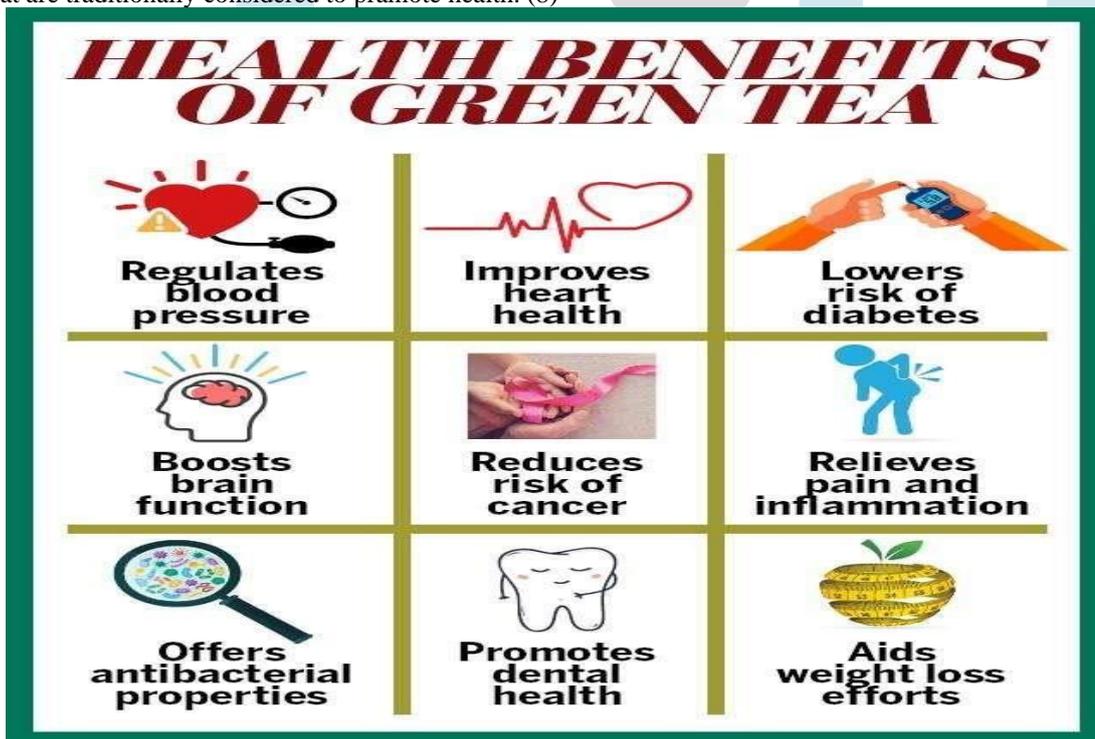
Myanmar name : Laphet

Flowering period : August to November(7)



• **Health Benefits of Green Tea :**

In 2011 a Panel of scientists published a report on Green tea’s claimed health effects at the request of the European Commission. The content of flavonoid and Catechins in a cup of Green tea is higher than that in the some volume of other food and drink items that are traditionally considered to promote health. (8)



1 . Regulate blood pressure :

The effect of Green tea including antioxidation and Vasodilation on BP has been investigated in large quantities Of observational studies and trials for decades. Meta-Analyses based on observational studies indicated the Significant inverse relationship between GT and Cardiovascular diseases including stroke, myocardial Infarction and coronary artery disease.

Daily consumption of 5-6 cups of green tea could result in reductions in systolic blood pressure, total cholesterol, and LDL cholesterol. Green tea should not be suggested as a substitute for current management of patients with established hypertension or dyslipidaemia. Green tea appears to be well tolerated, but consumption in high doses may be associated with adverse effect (10)

Ex : γ -Aminobutyric acid (GABA): γ -Aminobutyric acid (GABA) is known to be involved in the regulation of blood pressure by modulating the neurotransmitter release in the central and peripheral sympathetic nervous systems. [30]

Green tea helps prevent high blood pressure. Drinking green tea helps keep your blood pressure down by repressing angiotensin, which leads to high blood pressure. (11)

2. lowers risk of Diabetes:

Green tea compounds may impact Glucose metabolism by several mechanisms, such as Inhibition of carbohydrate digestion and Glucose Absorption in the intestine, stimulation of insulin secretion From the pancreatic B cells, modulation of glucose release From liver, activation of insulin receptors (enhancing Insulin binding) and glucose uptake in the insulin Sensitive tissues, and modulation of hepatic glucose output. (12) Ex : Epigallocatechin gallate : Plants containing flavonoids are used to treat diabetes in Indian medicine and the green tea flavonoid, epigallocatechin gallate (EGCG), is reported to have glucose-lowering effects . (31)

Green tea improves lipid and Glucose metabolism prevents sharp increase in blood sugar level and balances your metabolism rate (13)

- **Reduce risk of Cancer:** 3

breast cancer :

Green tea has increased attention for its health benefits, especially anti-cancer effects.(9).The preventive and beneficial activities of green tea components on breast cancer found in animal studies. Significant research has been conducted to reveal the mechanisms at cellular and molecular levels. Green Tea has shown anticarcinogenic effects against breast cancer in experimental studies. (9) E.g.: Tamoxifen (28)

Green tea significantly increases mammary tumor dormancy and decreases Tumor weight and metastases in dimethylbenzanthracene treated rats. (15) green tea had a potentially preventive effect on breast cancer in a Japanese population, especially among females drinking more than 10 cups a day. Since then, the association between green tea consumption and breast cancer risk has been widely examined. To date, three meta- few analyses have been published on the association between green tea and breast cancer risk and return., (16)

- **Bladder cancer:**

A few studies have examined the relationship between bladder cancer and green tea consumption. In one study that compared people with and without bladder cancer researchers found that women who drank black tea and powdered green tea were less likely to develop bladder cancer.(17) Ex : -Epigallocatechin-3-gallate (29)

- **Lungs cancer:**

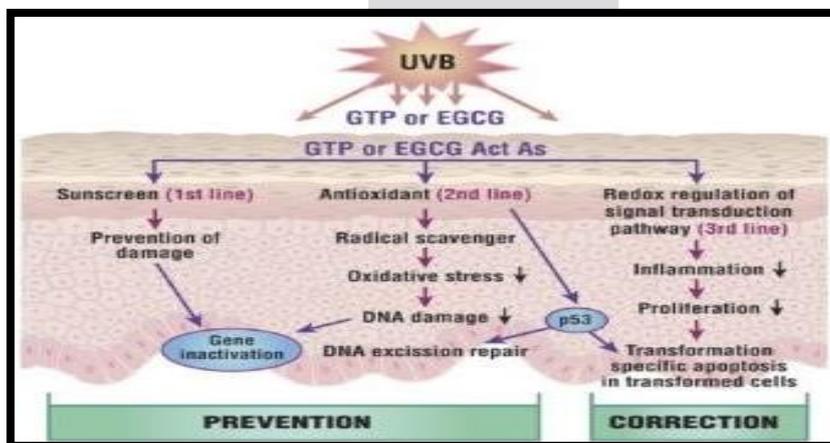
Consumption of green tea was found to be associated with a reduced risk of lung cancer among nonsmokers.32 Treatment of human lung cancer cell line A549 cells with EGCG significantly inhibited the expression levels of hnRNP B1 mRNA and the elevated levels of hnRNP B1 protein,both of which are elevated in cancer cells. Furthermore, EGCG inhibited the promoter activity of hnRNP A2/B1 gene Ex-pression, preventing lung cancer.(17)

- **Skin cancer:**

Studies suggest that EGCG and green tea polyphenols have anti-inflammatory and anticancer properties that may help prevent the onset and growth of skin tumors.Topical application of EGCG may prevent UV-B–induced immuno suppression and precancerous cell changes after UV-B (17)

- **Green tea used in the skin care products:**

Green tea, the second-most popular beverage next to water was found to be beneficial to the skin when applied topically. There have been more than 150 reports offering vivo and in vitro studies on the effects of green Tea on the skin . The early focus of these studies Was chemoprevention of chemical carcinogenesis OR photocarcinogenesis in rodents. It was found That green tea extracts or an individual green tea Polyphenol , especially (-)-epigallocatechin-3-gallate , inhibited two-stage Chemical carcinogenesis (eg, induced by 7,12-di-Methylbenz(a)anthracene [DMBA] and 12-Otetra-Decanoylphorbol 13-acetate [TPA]), and Photocarcinogenesis .In addition. (18)



Amazing Benefits Of Green Tea For Skin:

Drinking green tea is good for your overall health but applying it on your face is even better. Struggling with swollen eyes and dark circles? Put green tea bags around your eyes. Want to improve your skin's health instantly? Put on a green tea sheet mask! Made from the lightly steamed fresh leaves of the Camellia Sinensis plant, green tea is rich in antioxidants and nutrients, – and used for skin care in a variety of ways. It is one of the active ingredients found in many cosmetics and skincare products, thanks to its multiple benefits on the skin. Read on to find out exactly what those benefits are, how green tea works, and the various ways to include it into your routine.

1. Reduces skin inflammation

Green tea contains a huge number of polyphenols called Catechins. The presence of catechins in green tea help reduce irritation, redness, swelling and itching caused by Psoriasis, Dermatitis, and Rosacea or any other medical condition. Using green tea products on your skin can also help calm minor cuts, sunburn, etc.

2. Treats acne

The antioxidant, anti-inflammatory, and antimicrobial properties in green tea make it an effective acne treatment. The polyphenols in green tea can fight against infection by damaging bacterial membranes, which in turn help control acne. When applied to the skin, green tea also reduces blackheads, whiteheads and covers the way for calm and clear skin.

3. Clears clogged pores

Clogged pores are the result of dead skin cells getting surrounded in your skin. Pores are the little opening in the skin that release unwanted oil and sweat. When your pores are clogged, it can result in blackheads, whiteheads, and acne, which are some of the most common skin problems. Green tea is an effective treatment that helps to clear your pores and get rid of acne, blackheads and breakouts without any side effects.

4. Fights premature ageing

The active ingredients in green tea are great soldiers at fighting premature ageing. Free radical damage is one of the leading causes of premature ageing and green tea contains substances that eliminate free radicals. It also revives dying skin cells and maintains the elasticity of the skin. Green tea is one of the best ingredients to firm skin, prevent wrinkles and provide powerful nourishment and hydration.



(20)

5. Hydrates the skin

Green tea contains vitamin E that is known for its ability to nourish and hydrate the skin. It not only moisturises the skin, but also brightens and repairs it. This ingredient helps to reverse sun damage and fades dark spots, pimple spots, and other skin irritations caused by environmental attackers.

6. Controls oil

People having oily skin tend to produce excess sebum, which results in breakouts. Green tea consists of biomolecules that mix with amino acids in the body. These molecules regulate sebum production and not only remove excess oil from the skin's surface but also minimise oil production in skin cells. (19)

Green tea used in the hair oil:

- Hair oil are used for dressing and nourishing the hair.
- This preparation is generally used to increase the growth of hair and to make them healthy

Hair oil should have following properties:

- They should give luster to the hair.
- Retain them soft and flowing.
- Refresh their growth.
- Keep the brain cool.
- Should not be sticky. (21)

Root of green tea and it's potential benefits for healthy hair. Due to its rich antioxidant content, green tea and it's extract are preventing hair loss and improving hair health. (22)

GREEN TEA HAIR OIL



GREEN TEA OIL

With its antioxidant properties, it can help to mitigate hair loss and even promote hair growth. Specifically, green tea Oil has DHT-blockers, which are called "5-alpha-reductase". Basically, this helps to block DHT which is one of the main causes of extensive hair loss that can lead to baldness. Besides its antioxidants, it also contains anti-inflammatory properties which helps to keep your scalp healthy and infection-free, thus making it much healthier for hair growth. The vitamin B or panthenol in green tea also aids in split ends management, softening the hair and strengthening the hair roots. As such, all these will serve to facilitate healthier and stronger hair, while making your hair shinier.

Green tea used in mouth wash:

- Magalahaesetal found that mouth rising with green tea extracts (0.61%) protect from corrosion and scrape similar to chlorhexidine extracts (0.06%)
- In addition one weak of mouth wash with green tea (1.6g of green tea in 40 ml water 3 times a day) was able to reduce the salivary level of Cariogenic pathogens such as Streptococcus mutant and Lactobacilli
- In an study it cause reduction in acid production and impaired ph decrease by mechanism inhibiting the enzyme lactate dehydrogenase that leads to the formation of lactic acid from Pyruvate
- Green tea polyphenols significantly blocked the adhesion of oral bacteria in glycoprotein Later in a model that stimulated defensive saliva. (23)



Green tea used in the weight loss :

Green tea has a long history of many uses, one of which is helping overweight people to lose weight and to maintain weight loss. Believed to be able to increase a person's energy output, green tea weight loss preparations are extracts of green tea that contain a higher concentration of ingredients (catechins and caffeine) than the typical green tea beverage prepared from a tea bag and boiling water.(24)

Suggestion for body-weight management using caffeine and green tea has been shown in several studies as well as by meta-analysis [30,35]. Caffeine stimulates thermogenesis by inhibiting the phosphodiesterase-induced degradation of cAMP, and catechins in green tea through inhibition of catechol O-methyl-transferase (COMT), an enzyme that degrades norepinephrine (NE). Moreover, tea catechins have anti-angiogenic effects which may prevent . (25, 26)



Increasing the metabolic rate

- Burning more calories
- Reducing the appetite
- Improve physical appearance
- Losing excess weight
- Lower down the risk of obesity

One of green tea's compounds is caffeine. Although a cup of green tea holds much less caffeine than a cup of coffee, it still contains enough to have a slight effect.(27)

- **Conclusion:**

Researches and Studies have helped that green tea fall in the category of medicinal beverage that not only enhance the physical well being but also strengthen mental abilities. Taste of green tea is good and wonderful beverage for the body. It prevent many diseases. Green tea comprises of caffeine and L-theanine that blend together to stimulate our brain functionally. It's proven fact that green tea reduce the risk of cancer and heart attack. Green tea passes good amount of antioxidant, anti-inflammatory components that helps in reducing cell damage and enhancing the natural glow of your skin.

Green tea having various uses. It is second most consumed beverage in India after water. Green tea is used in the skin care product. It is very important constituent in the skin care product. Catechin is main constituents of green tea that used in the skin care product. Green tea having many health related benefits like it is used in the treatment of cancer, various type of cancer. So, the green tea having wound healing properties.

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