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A Review: Green Tea as a Magical Herbs

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Abstract

Green tea originated in **China**, but its production and manufacture has spread to other countries in *East Asia*. Tea has a stimulating effect in human primarily by its *Caffeine* contents. Tea is the most consumed drink in the world after water. Green Tea is a “Non-fermented” tea and contains more catechins, than black tea or oolong tea. Catechins are in-vitro & in-vivo strong anti-oxidants. Green Tea is an important dietary source. The health benefits of green tea for a wide variety of conditions, including distinct types of cancer, Heart Disease & Liver Disease were reported. Green tea is manufactured from the leaves of the Plant *Camellia Sinensis* and belonging to the Family Theaceae and is used most popularly as beverage all over the world. India is one of the largest tea- producing, exporting and consuming country. Many of the beneficial effects of green tea are related to the activities of (-) – epigallocatechin gallate (EGCG), a major component of green tea catechins.

Key Words- Green tea , *Camellia Sinensis* , Caffeine , Health Benefits.

Introduction

Recent Studies have shown that the health benefits from green tea including the prevention of Cancer , Weight loss, Type 2 Diabetes and Cardiovascular diseases [1]. The anti- angiogenic, anti-arthritic , anti- inflammatory, anti- viral, neuroprotective and cholesterol- lowering effects of green tea are under investigation [2,8]. The first green tea was exported from India to Japan during the 17th century. *Camellia Sinensis* have two varieties of principal – *Camellia Sinensis Sinensis* & *Camellia Sinensis Assamica* [5].



There are three main varieties of tea –Green , Black & Oolong Tea the different between these teas are their processing process. Green tea widely used in all over the world mostly in India, China, Japan and Thailand. In China and India green tea is mostly used for preventing and treating the disease like Cancer, Alzheimer's , Type 2 Diabetes, Stimulating brain , Diuretics and many more health benefits [3,4]. In Green Tea Caffeine is present and it stimulates wakefulness, decrease the sensation of fatigue and has a diuretic effect. Green Tea is made from Un-oxidized leaves and is one of the less time consuming and processed type of tea. [7] Green tea is made from the fresh leaves of *C. Sinensis* which are processed rapidly by means of steam to prevent fermentation [6].

Biological source – Leaves and Buds of *Camellia Sinensis*.

Botanical Classification

Kingdom – Plantae -Plants

Sub kingdom - Tracheobionta -Vascular plants

Super division - Spermatophyta –Seed plants

Division - Magnoliophyta-flowering plants

Class - Magnoliopsida-dicotyledons

Subclass - Dilleniidae

Order - Theales

Family -Theaceae - tea family

Genus -Ceamellia L. –camellia

Species -Cemellia sinensis(L.) Kunze–Tea

History & Origin

The origination of green tea started from the country China tracing all way back to 2737 B.C. Country of origin is China & Region of origin is East Asia. The discovery of tea occurred by an Accident when the Chinese Emperor Shennong by mistake drank a glass of Water that had a Dead tea leaf boiled in it, which have a high flavor and taste. The highly- flavored green tea eventually travelled west in 19th century by Europeans [9]. Tea consumption has its legendary origins in china during the reign of Emperor Shennong. In Historical culture green tea as far as 3000 Years ago when fresh tea leaves were collected and eaten by the people because of good experience of tea ,they were also grown in all over the Southeast Asia. [10] More than 90 Species of Camellia are spread in Nepal to Taiwan & Japan in the East Asia. [5] Commercial tea plantations were first established under British Rule, Tea is grown mainly in Sub-tropics and in the Mountainous areas of tropics between latitudes 41`N & 16`S [11].

Types of Teas

1. **Green Tea-** It is most popular tea globally is un-oxidized and has less caffeine than black tea. Green tea are rich in pharmaceutical effect of body.
2. **Black Tea-** Black tea is one of the most popular tea flavors and is fully oxidized. They are also wilted, sometimes crushed. It is used approximately 72% of the total world.
3. **White Tea-** The leaves are simply left to wither and dry on their own, which gives then a very delicate naturally sweet, and well- rounded flavor. It has very little caffeine.
4. **Oolong Tea-** Oolong tea is semi-oxidized and picked later in the season than green tea. They are also wilted, bruised.
5. **Red or Roobios Tea-** It is fully oxidized. It's some what similar to hibiscus, but adds earthy tones to its tartness.
6. **Puer Tea-** All puer tea comes from the Southwest region of Yunnan, China. There are two types of puer: Sheng Puer & Shu Puer [8,10,15-18] .

Green Tea Composition

The chemical composition of green tea varies with climatic condition, soil properties, genetic strain, plucking season position of the leaf, processing & storage [11]. Green Tea contain polyphenols, which include flavonoids, flavandiols, flavanols & phenolic acid: these compounds may account for up to 30% of the dry weight [13]. The catechins comprise 80- 90% og the flavonoids and around 40% of the water – soluble solids in green tea. Green tea contain more catechins than the other tea, mainly because of the way it is processed after harvesting [1].

The four main catechins found in green tea are (-) -epicatechin {EC}, (-)-epigallocatechin {EGC}, (-) -epicatechin-3-gallate {ECG} and (-) -epigallocatechin-3-gallate {EGCG}. The most abundant carechin is EGCG (~60%), and the next most abundant is EGC (~20%), then ECG (~14%) & EC (6%). Cetechin have pH value 4-6 and is the most stable in solution form [6, 12]. The chemical composition of Green Tea is complex protein (15- 20% dry weight), whose enzymes constitute an important fraction; Amino acids (1-4% dry weight), such as teanine or 5-N- ethyllgutamine, glutamic acid, tryptophan, serine, tyrosine, valine, leucine, arginine, aspartic acid,

glycine, threonine, lysine; Lipids as linoleic & alpha- linolenic acids; Carbohydrates (5-7% dry weight) such as cellulose, pectins, glucose, fructose, sucrose; Xanthic bases such as caffeine & theophylline; Sterols (Stigmasterol); Vitamins (B,C,E); Volatile compounds as aldehydes, alcohols, esters, lactones, hydrocarbons, etc; Minerals & trace elements (5% dry weight) such as Ca, Mg, Cr, Mn, Fe, Cu, Zn, Mo, Se, Na, P, Co, Sr, Ni, K, F & Al [13,14].

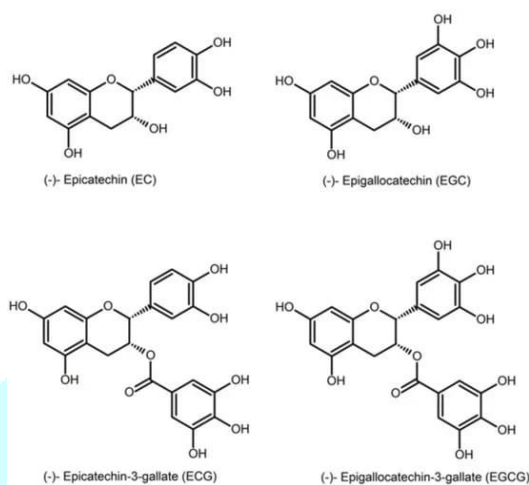


Fig- Different types of Catechins.

Health Benefits

Here's a list of green tea's amazing benefits—benefits that you may not have been aware of—

1. **Cancer**—Several population based on the studies have shown that green helps protect against cancer. Researchers also believe that polyphenols help kill cancerous cell and stop their progression. Although not all studies gave positive result about green tea inhibiting or preventing growth of cancer cell [3,11,24]
 - A. **Breast Cancer**— Breast cancer is the most common cancer among women. EGCG, the primary polyphenol in green tea, may reduce the risk of breast cancer. Green Tea appears to inhibit the growth of cancer [3, 20].
 - B. **Ovarian Cancer**— Green tea induced apoptosis and could potentiate the effects of cisplatin, a chemotherapeutic agent. In human observation studies, significant association between green tea intake and both decreased ovarian cancer occurrence & better prognosis were reported [3].
 - C. **Lung Cancer**— A compound found in green tea may trigger a cycle that kills cancer cell. A study of over 500 Taiwanese people suggests that at least one cup of green tea per day may lower the risk of lung cancer, particularly for Smokers [3, 27].
 - D. **Skin Cancer**—Record has shown that green tea can protect against both UVA & UVB radiation-induced skin cancer in mice. Green tea either consumed or applied directly to the skin has helped prevent UV- triggered skin cancer by absorbing UV damage and scavenging free radical. A recent study concluded that tea's polyphenols may reduce your skin cancer risk significantly if you drink 4 to 6 freshly brewed cups a day [3, 26].
 - E. **Stomach Cancer**— It has been hypothesized to have a protective effect against the development of gastric cancer, the second leading cause of death from cancer throughout the world [3].

2. **Weight Loss**-The Caffeine present in green tea acts as a stimulant that has been shown to aid fat burning & improve exercise performance in various studies. The massive range of anti-oxidants known as catechins helps burn fat and boost metabolism that is key to lose weight. Drinking 2 to 3 cups of green tea in one day is sufficient for supplementing weight loss recommendation [21, 24].
3. **Anti-diabetic Effect**- The Hypoglycemic effect of green tea is mainly due to its abundant polyphenols, especially catechins, which play a beneficial role in improving the glucose metabolism of DM, in which EGCG is the predominant anti diabetic active ingredient. Green tea consumption is associated with decreased fasting glucose level and A1C levels, which are measurement of diabetes health. At least 6 cups of green tea should be taken to the diabetic patient in one day [7,24].
4. **Oral Health**- Regularly drinking green tea can protect against cavities, gum disease and bad breath. The study indicated that green tea may reduce oral bacteria which in turn, can promote the health of teeth and gums. Green tea may well be a treat for the taste buds. Green tea controls bacteria and lowers the acidity of saliva and dental plaque, it may be a useful tool in preventing cavities [2, 12, 14].
5. **Brain Boosting**- Green tea extract increases the brain's effective connectivity, meaning the causal influence that one brain area exerts over other. Green tea is an excellent source of anti-oxidants and it helps improve immunity and brain function. It contains compounds that can help stimulate neurotransmitters to improve memory recall. These teas can help boost energy and alertness, thus promoting better overall brain health [25].

Side Effects & Risk

Green tea extracts have been reported to cause liver and kidney problems in rare cases. Drinking green tea is possibly unsafe when consumed for a long time or in high doses (more than 8 cups per day). Drinking large amounts of green tea might cause side effects due to presence of caffeine content.

1. Anemia Iron Deficiency
2. Anxiety disorders.
3. Bleeding disorders.
4. Glaucoma.
5. Stomach Problem.
6. Problem of Sleeping.
7. Vomiting.
8. Dizziness and Convulsions.
9. Liver Disease.
10. Bone Health.
11. Risk in Pregnancy & Child use.

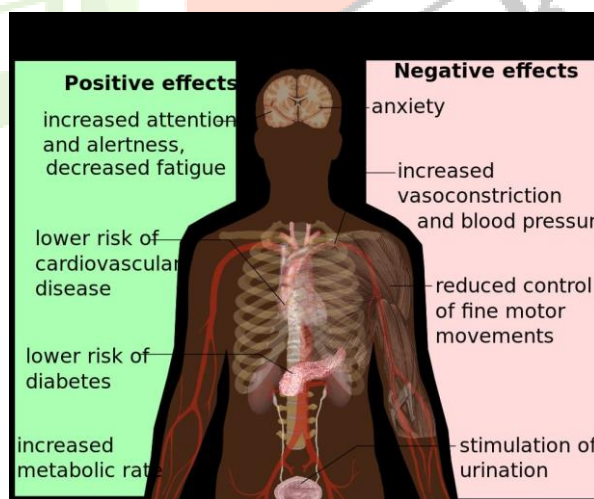


Fig.- Side effects due to over take of caffeine.

Conclusion

The potential of green tea as a preventive measure in several metabolic diseases has led to its use as a Nutraceutical. Although green tea may enhance mental alertness due to its caffeine content, there is only weak, inconclusive evidence that regular consumption of green tea affects the risk of cancer or cardiovascular disease, lower blood pressure. Green tea enhances mental alertness because of caffeine content.

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