



Benefits of Green Tea : A Review

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Abstract:

To determine the benefits of green tea in health and to do a review on benefits of green tea. Green tea has higher concentrations of catechins than in black tea. Catechin is a natural phenol and antioxidant, and is thought to be responsible for many of green tea's health benefits. It is found that weight gain was greatly reduced by diets supplemented with many of these green tea components, but particularly with the diet which combined caffeine and catechin. Green tea may actually help in the prevention of caries. Other benefits are increased thermogenesis (heat production), increased fat oxidation, increased glucose uptake in muscles, decreased fat content in liver, and increased fecal excretion of fats. This review is done to spread awareness among general population about the benefits of green tea.

INTRODUCTION:

Green Tea is one of the most popular beverages consumed worldwide. Tea, from the plant *Camellia sinensis*, is consumed in different parts of the world as green, black, or Oolong tea. Among all of these, the most significant effects on human health have been observed with the consumption of green tea (31). The health benefits of polyphenols found in green tea (GT), the unfermented leaves of the tea plant, *Camellia sinensis*, have been extensively investigated in the last fifteen years (20-26). It is estimated that about 2.5 million tons of tea leaves are produced each year throughout the world, with 20% produced as green tea (32). Green tea consumption has also been linked to the prevention of many types of cancer, including lung, colon, esophagus, mouth, stomach, small intestine, kidney, pancreas, and mammary glands [33]. Several epidemiological studies and clinical trials showed that green tea (and black and Oolong teas to a lesser extent) may reduce the risk of many chronic diseases [34]. The association between tea consumption, especially green tea, and human health has long been appreciated (1,2). The chemical composition of green tea is complex: proteins (15-20% dry weight), whose enzymes constitute an important fraction; amino acids (1-4% dry weight) such as theanine or 5-N-ethylglutamine, glutamic acid, tryptophan, glycine, serine, aspartic acid, tyrosine, valine, leucine, threonine, arginine, and lysine are also present. Carbohydrates (5-7% dry weight) such as cellulose, pectins, glucose, fructose, and sucrose; minerals and trace elements (5% dry weight) such as calcium, magnesium, chromium, manganese, iron, copper, zinc, molybdenum, selenium, sodium, phosphorus, cobalt, strontium, nickel, potassium, fluorine, and aluminum; Trace amounts of lipids (linoleic and α -linolenic acids), sterols (stigmasterol), vitamins (B, C, E), xanthic bases (caffeine, theophylline), pigments (chlorophyll, carotenoids), and volatile compounds (aldehydes, alcohols, esters, lactones, hydrocarbons) are also present. Due to the great importance of the mineral presence in tea, many studies have determined their tea leaves and their infusions [29]. Fresh leaves contain, on average, 3-4% of alkaloids known as methylxanthines, such as caffeine, theobromine, and theophylline [30]. In recent years, many scientific and

medical studies suggested that green tea possesses antiproliferative, antimutagenic, antioxidant, antibacterial, antiviral and chemopreventive effects (55).

GREEN TEA AS A MOUTH WASH:

India has a rich source of herbal plant products with medicinal value. Green tea can be used as adjuvant to oral hygiene maintenance with a goal on the prevalence of periodontal diseases due to its antibacterial and antioxidant properties. [3]

Dental plaque is the major etiologic agent for the initiation of gingivitis. [3] Gingival disease can progress to periodontitis which if left untreated may eventually compromise the entire periodontium. The most abundant components in green tea are phenols in particular, flavonoids such as the catechins. [4] Major catechins found in green tea are epicatechin gallate (ECG), epicatechin (EC), epigallocatechin (EGC), and EGC gallate (EGCG). Mouthwashes were equally effective in reducing plaque and gingival inflammation, considering the fact that the chemical formulations of commercially available mouth rinses are synthetic based, expensive, and have considerable side effects, which restricts their use.

EFFECT ON LIVER:

The liver is one of the key metabolic organ involved in the synthesis and degradation of key biological molecules such as carbohydrate, protein and lipids among others. In recent decades, we have also seen a growing disease burden from liver diseases such as hepatocellular carcinoma (HCC), fatty liver, and liver cirrhosis. Notably, primary hepatic malignancies of which HCC is the most prevalent is the third leading cause of cancer-related deaths and the sixth most common cancer worldwide (19). There are many reports on the reduction of liver disease with green tea consumption. Green tea intake is associated with decreased risk of HCC, fatty liver disease, hepatitis, liver cirrhosis and chronic disease. There is a significant protective effect of green tea drinking on liver diseases. Long-term consumption of tea catechins could be beneficial against high-fat diet-induced obesity and type II diabetes and could reduce the risk of coronary disease. (5)

EFFECT ON OBESITY:

Obesity and overweight are rapidly growing, recognized medical problem in developed countries and is a threat to the health of large number of populations. Obesity is a major factor in a number of diseases, including coronary heart diseases, hypertension, non-insulin-dependent diabetes, pulmonary dysfunction, osteoarthritis, and certain types of cancer.(51-53)Tea catechins, especially EGCG, appear to have anti obesity and antidiabetic effects .(5)The effects of tea on obesity and diabetes have received increasing attention. Tea catechins, especially EGCG, appear to have anti obesity and anti diabetic effects (6).Green tea is also seen as a natural herb that can enhance energy expenditure and fat oxidation and thereby induce weight loss (6,7). The effects of tea on obesity and diabetes have received increasing attention. Tea catechins, especially EGCG, appear to have antiobesity and antidiabetic effects (27)

EFFECT ON BREAST CANCER:

Breast cancer is a malignant proliferation of epithelial cell lining ,the ducts or lobules of the breast. Breast cancer is the most common cancer among women(54).green tea has increased attention for its health benefits, especially anti-cancer effects.(9).The preventive and therapeutic activities of green tea components on breast cancer found in animal studies. Substantial research has been conducted to uncover the mechanisms at cellular and molecular levels. Green Tea has shown anticarcinogenic effects against breast cancer in experimental studies (35)

EFFECT ON BLOODPRESSURE:

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.(10-12). Well-established evidence corroborates that obesity is one of the most important risk factors for the development of hypertension and increases the cardiovascular morbidity and mortality associated with hypertension.(36-38) In human subjects, on the other hand, while evidence from observational studies suggested a significant inverse relationship between GT intake and cardiovascular diseases,(39-41) systematic reviews or meta-analyses of randomised controlled trials (RCTs) reported an inconclusive effect of GT on BP.(42-44) Tea is one of the most commonly consumed beverages, in various amounts in different countries.(45-46)Green tea (GT) is rich in antioxidant polyphenols such as catechins and flavonols,(45,47)and the extract of tea has been shown to have a vasodilator effect,8–10 both of which lead to benefits on cardiovascular health.(48-50) .The physiological effect of GT on the risk factors for cardiovascular disease, including blood pressure (BP), is therefore promising and of interest.

EFFECT ON SKIN:

The in vitro and in vivo animal and human studies suggest that green tea polyphenols are photoprotective in nature, and can be used as pharmacological agents for the prevention of solar UVB light-induced skin disorders including photoaging, melanoma and nonmelanoma skin cancers after more clinical trials in humans.(13)

GREEN TEA AS AN ANTIOXIDANTS:

Green tea is a popular nutraceutical as an antioxidant. Antioxidants are compounds that protect cells against the damaging effects of reactive oxygen species, such as singlet oxygen, superoxide, peroxy radicals, hydroxyl radicals, and peroxynitrite. An imbalance between antioxidants and reactive oxygen species results in oxidative stress, leading to cellular damage (28).

Catechins are in vitro and in vivo strong antioxidants. In addition, its content of certain minerals and vitamins increases the antioxidant potential of green tea.(14)In vivo studies showed that green tea catechins increase total plasma antioxidant activity (15-16).

An imbalance between antioxidants and reactive oxygen species results in oxidative stress, leading to cellular damage (17). Catechins are hypothesized to help protect against these diseases by contributing, along with antioxidant vitamins (i.e., vitamins C and E) and enzymes (i.e., superoxide dismutase and catalase), to the total antioxidant defense system (18).

CONCLUSION:

Green Tea is one of the most popular beverages consumed worldwide. There are many health related beneficial effects of green tea such as prevention of liver cirrhosis,obesity,blood pressure and breast cancer.It also acts as a protective shield for skin.Due to its antibacterial and antioxidant property it is used as a mouth wash.It acts as a natural source and prevents the above mentioned health problems and it is cost efficient.Development of more specific and sensitive methods with more representative models along with the development of good predictive biomarkers will give a better understanding of how green tea interacts with endogenous systems and other exogenous factors.Development of biomarkers for green tea consumption will facilitate future research in this area.

ABBREVIATIONS:

EGCG-Epigallocatechin gallate
GT-Green tea
BP-Blood pressure
UVB-ultra violet B light

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