
A REVIEW ON HEALTH BENEFITS OF GREEN TEA CONSUMPTION

Gloria Christal

*Assistant professor, Department of Forensic Science,
School of Sciences, B-II, Jain (Deemed to be University), Bangalore-560027, India.
Email Id: gloria.christal@jainuniversity.ac.in*

Abstract

*One of the most popular drinks worldwide is green tea that is made from the leaves of the *Camellia sinensis* plant. Scientists have been researching this plant for possible health benefits over the last 30 years or so. Analysis has shown that catechins are the key components of green tea that are correlated with medical benefits. (-)-epicatechin (EC), (-)-epicatechin-3-gallate (ECG), (-)-epigallocatechin (EGC), and (-)-epigallocatechin-3-gallate are the four major catechins contained in green tea (EGCG). Of all four, the greatest amount of EGCG is present, and so it was used in most of the analysis. The health effects of green tea include the following: anticarcinogenic, anti-inflammatory, antimicrobial, antioxidant, and cardiovascular and oral health benefits. Analysis has been performed utilizing numerous animal models and lines of cells and is now gradually being carried out in humans. This kind of analysis would allow one to better understand the clear advantages of green tea. This analysis would concentrate mainly on studies undertaken to examine the health effects of green tea using human subjects.*

Keywords: *Cardiovascular Disease (CVD), Benefits, Catechins, Green, Health, Tea.*

I. INTRODUCTION

Tea is a famous drink global. Cultivation of tea vegetation is economically crucial in many nations, and the tea plant, *Camellia sinensis*, is thought to be grown in as many as 30 nations. *Camellia sinensis* grows nice in positive tropical and subtropical regions. There are 4 principal sorts of tea made out of this identical plant, relying on how the tea leaves are processed. These teas are white, inexperienced, Oolong, and black tea. White tea is created from very young leaves and buds that have now not but became green, and the most effective processing is drying. Green tea is produced from mature leaves with minimum processing (only drying). Oolong tea is constituted of in part fermented mature leaves, and black tea is constructed from fully fermented mature leaves. Green tea, which makes up around 20% of tea manufacturing international, is ate up most usually in China, Korea, and Japan. Oolong tea is ate up most in China and Taiwan. Black tea (around 78% of tea manufacturing) is by and large fed on within the US and the United Kingdom. Black tea contains up to three times the quantity of caffeine as inexperienced tea [1].

The components of green tea which can be the most relevant medically are the polyphenols, with the flavonoids being the most critical. The maximum pertinent flavonoids are the catechins, which make up 80%–90% of the flavonoids, and approximately forty% of the water-

soluble solids in inexperienced tea. The amount of catechins in the tea may be affected by which leaves are harvested, how the leaves are processed, and how the tea is ready [2]. In addition, wherein the leaves are grown (geographically) and the developing conditions have an effect on catechin amounts. Polyphenols are quickly oxidized after harvesting due to the enzyme polyphenol oxidase. To save you lack of the polyphenols, green tea leaves are heated swiftly (maximum commonly by means of steaming or pan frying) to inactivate polyphenol oxidase. Black tea leaves are dried, then rolled and overwhelmed, which promotes oxidation. Therefore, black tea has some distance fewer lively catechins than green tea. Inexperienced tea includes 4 foremost catechins: (-)-epicatechin (EC), (-)-epigallocatechin (EGC), (-)-epicatechin-three-gallate (ECG), and (-)-epigallocatechin-3-gallate (EGCG). The most abundant of these in green tea is EGCG, which represents around fifty nine% of total catechins. The subsequent most plentiful is EGC (around 19%), then ECG (round 14%), and EC (round 6%) [3].

The health advantages of green tea depend upon its bioavailability after intake. In the frame, the components in inexperienced tea may additionally undergo metabolic processing along with glucuronidation, methylation, and sulfation, which produces lively metabolites. The catechins and their metabolites may be detected in blood plasma, urine, and various tissues. Research on bioavailability are regularly carried out gathering specimens at timed periods (after ingestion). Diverse research had been conducted the usage of generally prepared inexperienced tea liquids, ingested inexperienced tea extract (overall catechins), or ingestion of specific catechins. These research have shown that ECG and EGCG, and metabolites of EC and EGC may be detected and measured in blood plasma. In urine, handiest metabolites of EC and EGC can be detected. Height concentrations of additives in blood plasma usually arise approximately 2 h after ingestion. Top concentrations of components in urine commonly occur among 4 and 6 h after ingestion. Sure studies have been conducted using various concentrations of catechins, and commonly display that the bioavailability of these materials is in proportion to the amount ingested. It has been suggested that ranges of EC and ECG detected are too low to be of any therapeutic price, so most research considers only EGC and EGCG.

Over the past 15–20 years, some of different studies studies had been conducted to determine what fitness blessings can be attributed to consumption of green tea and its extracts. This studies has shown that inexperienced tea has a spread of ability fitness blessings. These benefits consist of anticarcinogenic, anti-inflammatory, antimicrobial, and antioxidant properties, and benefits in cardiovascular disease and oral health. While lots of this studies has been performed in vitro, and a sizeable amount of the studies finished in vivo, the usage of animal fashions, this paper will attention mainly on research conducted with human subjects (plus pertinent data from the opposite varieties of research) [4].

II. ANTICARCINOGENIC PROPERTIES OF GREEN TEA

Most cancers is presently a first-rate source of morbidity and mortality worldwide. Billions of dollars in studies monies had been poured into most cancers research during the last 50 plus years, and yet we do no longer seem to be any in the direction of honestly curing it. In addition, pretty often the chemotherapies do as a lot, if now not greater damage to the patient because the disease. Because most cancers appears in so many different paperwork in multiple parts of the frame, it's been hard to determine the mechanisms that cause the ailment. In spite of what we now understand about most cancers hazard elements, there are still many folks that reputedly have not one of the hazard elements, and yet succumb to a swiftly aggressive form

[5]. Encouraging people to reflect on consideration on how a healthy lifestyle can save you sickness is truly a step within the right path, and it would be most useful to perceive substances that would be beneficial in prevention and remedy. The main issue of green tea that has been studied in most cancers studies is egcg. There are numerous most cancers related mechanisms attributed to egcg. Those consist of: inhibition of angiogenesis, dna hypermethylation, nf- κ b, telomerase pastime, and tumor cellular proliferation and metastasis; induction of tumor suppressor genes; and advertising of tumor cellular apoptosis. Inhibition of angiogenesis is usually recommended to arise through a decrease in rna and peptide ranges of vascular endothelial growth element (vegf), and by disrupting the dimerization of vegf with the vascular endothelial increase issue receptor 2 (vefr2). Another cautioned way in which inexperienced tea catechins can also normally inhibit carcinogenesis is through increasing ranges of glutathione s-transferase pi (gst-pi), which catalyzes cleansing reactions that inhibit carcinogen-brought on DNA harm [6].

Cardiovascular Disease Health Benefits

Cardiovascular ailment (CVD) is a complex ailment concerning multiple elements. Amongst those elements are infection, oxidative stress, platelet aggregation, and lipid metabolism. A number of those factors also are concerned in other sickness procedures, however may be discussed in this paper below CVD. There were a number of research over time assessing green tea intake in admire to CVD hazard. Studies from Japan that blanketed nearly 50,000 human beings determined a decreased mortality fee due to CVD based totally on consumption of various numbers of cups in keeping with day. One observe confirmed a 28% decrease in CVD demise among folks that consumed \leq three cups and people who ate up \geq 10 cups. The alternative take a look at confirmed a 14% decrease in CVD mortality between folks who consumed $<$ 1 cup and those who consumed \leq 5 cups. Other research in Japan the usage of a inexperienced tea extract determined that, after 12 weeks, the topics had reductions in body fat (10%), blood pressure (6.5%), and coffee-density lipoprotein (LDL) levels (2.6%), suggesting reduced threat of CVD. After months, diabetic sufferers additionally had decreased fasting blood glucose stages (from a hundred thirty five to 128.8 mg/dl), and hemoglobin A1c (HBA1c) tiers (from 6.2% to 6.0%).

A massive meta-evaluation of 17 studies from over 30 years, such as facts from Europe, the United Kingdom, and the U.S., determined that growing consumption of green tea by three cups according to day reduced the chance of myocardial infarction (MI) dying through 11%. Another examine confirmed a reduced threat of mortality in sufferers who had an acute MI and a history of everyday green tea intake for at the least a 12 months previous to the MI. Participants who did no longer drink inexperienced tea had a 14% charge of loss of life because of the MI; participants who drank up to fourteen cups in line with week had an 11% charge of MI dying; and members who drank greater than 14 cups per week had a ten% charge of MI death. An interesting look at in sufferers with CVD showed that intake of EGCG resulted in a fast improvement of vascular endothelial characteristic [7]. Participants who ingested a preliminary dose of 300 mg of EGCG had an improved brachial artery flow-mediated dilation from 7.1% to 8.6% after 2 h. Any other latest have a look at determined that accelerated intake of nutritional flavonoids was associated with a reduced threat of CVD. The members had been divided into three organizations based totally on common each day intake of flavonoids. The first tertile ate up 89 mg/day, the second tertile fed on 251 mg/day, and the 1/3 tertile fed on 532 mg/day. The variety of deaths due to CVD in the first tertile was 8.6%; inside the 2d tertile, 6.4%; and in the 1/3 tertile, 5.0% [8].

Antimicrobial Properties

A big amount of research has been finished assessing the antimicrobial scope of green tea catechins. Organisms stricken by inexperienced tea include a massive wide variety of Gram-fine and Gram-bad cardio bacteria, anaerobic microorganism, viruses, fungi, and at the least one parasite. The various antimicrobial mechanisms that have been attributed to inexperienced tea are: damage to the bacterial mobile membrane, inhibition of bacterial fatty acid synthesis, inhibition of different enzymes (e.g., protein tyrosine kinase, cysteine proteinases, DNA gyrase, ATP synthase), and inhibition of efflux pump pastime.

Not handiest do green tea catechins exhibit direct outcomes on microorganisms, but in addition they show activities associated with the prevention of infection. Research the use of mice and ferrets showed that consumption of green tea may want to inhibit transmission of micro-organism and viruses; and studies with human beings confirmed that intake of green tea resulted in fewer fever illnesses, fewer ailments with bloodless or influenza symptoms, and less real infections with influenza a or b [9].

Oral Health Benefits

Throughout the direction of the numerous studies completed using green tea catechin consumption, it changed into noticed that the research topics seemed to have advanced oral health after intake. Studies was then launched to focus on the results of inexperienced tea on oral fitness. Of the overall approaches in which green tea consumption allows oral health are due to its anti-inflammatory residences, and antimicrobial interest towards mouth plant life together with streptococcus mutants. The antimicrobial interest may also be responsible for the development observed as to horrific breath. The two foremost kinds of consequences on oral health are a decrease in periodontist and dental caries [10].

III. CONCLUSIONS

Green tea catechins have proved to be very versatile in imparting health benefits. Which means there are potential health advantages for all of us in the consumption of inexperienced tea. Even slight amounts of intake (consuming 1–2 cups of tea in line with day) may additionally have blessings. It is a superb element that it's miles the second maximum famous beverage worldwide, as the differences in fitness in a global without green tea is probably huge. There may be luckily a wide sort of research being finished the use of inexperienced tea catechins, and we're beginning to see many research completed the usage of human subjects, as it is extraordinarily crucial that we are in a position to expose the direct advantages to humans. The expansive repertoire of inexperienced tea interest in health is crucial, mainly to the ones individuals who live in which scientific help isn't always usually available or inexpensive.

IV. REFERENCES

- [1] W. Reygaert, “An Update on the Health Benefits of Green Tea,” *Beverages*, 2017, doi: 10.3390/beverages3010006.
- [2] V. R. Sinija and H. N. Mishra, “Green tea: Health benefits,” *Journal of Nutritional and Environmental Medicine*. 2008, doi: 10.1080/13590840802518785.
- [3] S. M. Chacko, P. T. Thambi, R. Kuttan, and I. Nishigaki, “Beneficial effects of green tea: A literature review,” *Chinese Medicine*. 2010, doi: 10.1186/1749-8546-5-13.

-
- [4] N. T. Zaveri, "Green tea and its polyphenolic catechins: Medicinal uses in cancer and noncancer applications," 2006, doi: 10.1016/j.lfs.2005.12.006.
- [5] Y. Kuroda and Y. Hara, "Antimutagenic and anticarcinogenic activity of tea polyphenols," *Mutat. Res. - Rev. Mutat. Res.*, 1999, doi: 10.1016/S1383-5742(98)00019-2.
- [6] P. Namita, R. Mukesh, and K. J. Vijay, "Camellia sinensis (green tea): A review," *Global Journal of Pharmacology*. 2012.
- [7] S. Wolfram, "Effects of green tea and egcg on cardiovascular and metabolic health," *J. Am. Coll. Nutr.*, 2007, doi: 10.1080/07315724.2007.10719626.
- [8] C. Schneider and T. Segre, "Green tea: Potential health benefits," *American Family Physician*. 2009.
- [9] P. W. Taylor, J. M. T. Hamilton-Miller, and P. D. Stapleton, "Antimicrobial properties of green tea catechins," *Food Sci. Technol. Bull. Funct. Foods*, 2005, doi: 10.1616/1476-2137.14184.
- [10] N. Khan and H. Mukhtar, "Tea polyphenols for health promotion," *Life Sciences*. 2007, doi: 10.1016/j.lfs.2007.06.011.