
AN ANALYSIS OF HEALTH BENEFITS OF GREEN TEA

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ABSTRACT

Green tea has presented to deliver health advantages meant for no. of illnesses, containing several kinds of, heartcancer, & liver disease. Green tea's catechin content, especially (-)-epigallocatechin-3-gallate, is responsible for many of its health benefits. underlying processes of green tea catechins & ir biological effects have studied in vitro & in animals. Green tea catechins have used in human trials to treat metabolic syndrome, which includes obesity, type 2 diabetes, & cardiovascular risk factors. Long-term intake of tea catechins might protect against obesity & type 2 diabetes caused by a high-fat diet, along with lower risk of coronary heart disease. Green tea's pharmacological & clinical effects should be monitored, & its mechanisms of action should be elucidated, in accordance with international st&ards.

KEYWORDS: *Antioxidative, Catechin, Green Tea, Health, Obesity.*

1. INTRODUCTION

Green tea's anti-inflammatory, antiarthritic, antimicrobial, antiarogenic, antioxidative, antibacterial, neuroprotective, & cholesterol-lowering consequences have all studied recently, as have anti-inflammatory, antiarthritic, antibacterial, antiangiogenic, antioxidative, antiviral, neuroprotective, & cholesterol-lowering impacts of secluded green tea components. However, including green tea into one's diet might result in additional severe health issues(1).

Green tea's health-promoting properties are ascribed mostly to its polyphenol content, specifically flavanols & flavonols, which are about 30% of fresh leaf dry load. Green tea's most abundant catechin, (-)-epigallocatechin-3-gallate (EGCG), has recently credited with several of aforementioned positive benefits. Green tea extracted are more persistent than pure epigallocatechin gallate, one of primary elements of green tea, due to inclusion of or antioxidant components in extract. Herbal medicines are complex combinations of various substances that frequently work synergistically to achieve ir full rapeutic impact. In contrast to Western pharmaceuticals, however, only a few herbal treatments have thoroughly studied & ir effectiveness proven in controlled clinical studies. effectiveness, action mechanisms, & side effects of green tea & its catechins in in vitro, in vivo, & ex vivo systems are highlighted in this review paper(2).

Green tea:

Tea is among most popular beverages on globe. Tea is manufactured from *Camellia sinensis* plant & is consumed in various parts of world as green, black, or Oolong tea. Green tea use, on or h&, has had most significant influence on human health of any beverages. Green tea was initially imported from India to Japan in 17th century. Every year, 2.5 million tonnes of tea leaves are produced worldwide, with green tea accounting for 20% of total output. Green tea is mostly consumed in Asia, along with parts of North Africa, United States, & Europe. It has long established that re is a correlation between tea consumption, specifically green tea utilisation, &

human health. Green tea & black tea are viewed unequally during manufacturing process [3]. To avoid fermentation & provide a dry, stable beverage, green tea is brewed by heating newly gared leaves. Enzymes that break down colour pigments in leaves are eliminated during steaming process, allowing tea to keep its green colour throughout rolling & drying processes.. Natural polyphenols' health-promoting qualities are preserved via se mechanisms. Green tea polyphenol components (catechins) are dimerized to produce a range of aflavins when it ferments to Oolong & finally black tea. As a result, se teas might have distinct biological actions(3).

Green tea composition:

However, these compounds are highly improbable to be beneficial as traditional anti-infective agents for treatment of severe chronic infections except if specific chemical adjustments to catechin configuration are made, resulting in substantial advancements in both antibacterial efficacy & in vivo stability. Green tea is manufactured from *Camellia sinensis* plant, which is a member of acae family.. Tea has used as a beverage in form of a decoction since ancient times. It was utilized to help body cleanse. This piqued interest of many experts who wanted to learn more about green tea & its medicinal qualities. One of m is its antimicrobial activity, which aids in treatment of a variety of illnesses.. Many research have evaluated amounts of minerals in tea leaves & infusions due to significance of mineral content in tea. Caffeine, obromine, & ophylline are among methylxanthines present in 3-4 percent of fresh leaves. re are phenolic acids present, such as gallic acids, along with a particular amino acid, anine. (4).

Overconsumption of tea (black or green) has harmful consequences owing to three major factors: caffeine concentration, aluminum content, & impact of tea polyphenols on iron bioavailability. Patients with cardiac issues or severe cardiovascular difficulties should avoid drinking green tea. Caffeine might induce an increase in heart rhythm in pregnant & breast-feeding women, refore y should limit mselves to 1 or 2 cups each day.. Green tea contains four forms of catechins: epicatechin, epigallocatechin, epicatechin-3-gallate, & EGCG. amount of catechins in original tea leaves differs owing to variation in diversity, origin, & growing conditions; amount of catechins in original tea leaves varies due to variations in variety, origin, & growing conditions. Because catechins cannot be entirely removed from leaves during manufacturing of fresh green tea, proportion obtained varies from absolute values determined during full leaf extraction.. Furrmore, catechins are very unstable, & ir quantity & quality might be altered throughout course of an experiment. As a result, comparing ingested dosages in animal research is impossible due to fact that catechin measurement before to delivery is often unknown(5).

Health benefits of green tea in humans & animals:

In animal tests, green tea catechins were found to provide some protection against degenerative diseases. Green tea has found in studies to exhibit antiproliferative & hypolipidemic characteristics in hepatoma-treated s rats, along with avoidance of hepatotoxicity & as a post-initiation breast cancer preventive agent.. In immunodysfunction induced by transplanted tumors or carcinogen rapy, green tea catechins might serve as antitumorigenic agents & immunological modulators. Green tea, its extract, & its separated components have shown to be helpful in reducing oxidative stress & neurological issues.Green tea has related to prevention of cancers of lung, colon, esophagus, mouth, stomach, small intestine, kidney, pancreas, & mammary gl&s. Green tea (& to a lesser degree black & Oolong teas) has shown in many epidemiological studies & clinical trials to decrease risk of a variety of chronic illnesses. presence of high levels of polyphenols, which are powerful antioxidants, is thought to be responsible for this beneficial impact. Green tea, in particular, might decrease blood pressure, lowering risk of stroke & coronary heart disease. Green tea has shown in animal tests to protect against development of coronary heart disease by lowering blood glucose levels & body weight. All of se findings, however, are based on populations of middle-aged animals, not elderly, whose nutritional

condition is more negatively affected by age-related biological & social variables.

Tea components have anticarcinogenic antioxidant, antimutagenic, & properties, suggesting that y might protect people from cancer caused by environmental toxins. Sano et al. found that green tea leaves inhibited tert-butyl hydroperoxide-induced lipid peroxidation, & that oral treatment of main tea polyphenol EGCG had a comparable antioxidant effect on kidney. active oxygen technique was used to evaluate antioxidative efficacy of crude catechin powder & specific catechins. Crude catechins were much more efficient than dl-tocopherol at reducing production of peroxides. Shim et al. investigated chemopreventive impact of green tea in cigarette smokers & discovered that it might reduce frequency of sister chromatid exchange. Green tea's ability to cure any kind of diarrhea or typhoid has recognized in Asia since ancient times. Helicobacter pylori infection is inhibited by catechins in green tea. Green tea has shown to have antiviral properties against influenza virus, particularly in its early stages, along with Herpes simplex virus. Furrmore, Weber et al. discovered that green tea catechins suppress adenovirus infection in vitro.

Hirasawa & Takada investigated antifungal efficacy of green tea catechins against *Candida albicans* in people, along with convenience of combining catechins with lower dosages of antimycotics, which might assist to prevent antimycotic side effects. Green tea intake has linked to improved bone mineral density, & it has discovered as an independent factor in reducing incidence of hip fractures; this impact was shown to be independent of smoking status, hormone replacement treatment, coffee consumption, & tea with milk. Green tea extracts & GTPs had a favorable impact on proliferation & activity of bone cells, according to Park et al. proliferation of hepatic stellate cells is linked to development of liver fibrosis in chronic liver disorders, & EGCG has shown to decrease this cell growth. Green tea improves immune system function by protecting it from oxidants & radicals. GTPs have shown to protect against Parkinson's, Alzheimer's, & or neurodegenerative disorders in recent research. GTP neuroprotectant action has shown in cell cultures & animal models, including protection of neurotoxin-induced cell damage. Green tea is said to be beneficial for bug stings because of its anti-inflammatory properties & ability to halt bleeding. Some research has shown an inverse relationship between green tea intake & likelihood of kidney stones forming. Green tea functioned as an antioxidant defense mechanism for lens in an experimental cataractogenesis system. Green tea, according to Skrzydlewska et al., has a positive impact on alcohol intoxication. Green tea is now utilized in production of a range of meals, medicinal preparations, dentifrices, & cosmetics, in addition to all of se stated characteristics, which have aided in identification of green tea as a functional food by certain authors.

In experimental investigations, tea has found to have anticarcinogenic properties against breast cancer. However, epidemiologic data linking tea to breast cancer prevention has mixed. Between 2004 & 2005, a case-control study was performed in sourn China. incidence cases were 1009 female patients with histologically proven breast cancer aged 20 to 87 years, & age-matched controls were 1009 healthy women r&only recruited from breast disease clinics. Face-to-face interviews utilizing a validated & accurate questionnaire were used to gar data on tea intake duration, frequency, amount, preparation, & type, along with diet & lifestyle. Green tea consumers were more likely than non-tea drinkers to live in cities, have a higher level of education, & eat more coffee, alcohol, soy, vegetables, & fruits. Green tea intake was linked to a lower risk of breast cancer after controlling for known & possible confounding variables. time of drinking green tea, number of cups drank, & number of fresh batches produced each day all had similar dose-response correlations.

Hsu et al. looked examined effects of catechins supplementation on hemodialysis-induced reactive oxygen species, arosclerosis risk factors, & proinflammatory cytokines. Healthy individuals & hemodialysis patients had ir pharmacokinetics of a single oral dosage of catechins compared. During a hemodialysis session, authors evaluated antioxidant effects of three different

dosages of oral catechins (0, 455, & 910 mg) with those of oral vitamin C (500 mg). Catechin supplementation was shown to be more efficient than placebo or vitamin C in reducing hemodialysis-enhanced plasma hypochlorous acid activity in patients. There was no significant difference in decrease of plasma hypochlorous acid activity between treatments with 455 & 910 mg catechins. Catechins suppressed proinflammatory cytokine expression, which was boosted by hemodialysis.

Effects on absorption of metal ions:

Tea catechins have shown to influence iron absorption, especially in those who are at risk of iron insufficiency, but its effect on other ions are unknown. Its use over time has little effect on apparent copper absorption, but it reduces zinc absorption & increases manganese absorption. Catechin consumption, on or off, has no effect on plasma concentration of these ions. Since flavonoids interrelate with numerous metal ions, green tea catechins have ability to alter ion absorption & metabolism.

Effects on drug-metabolizing enzymes:

Green tea consumption enhances UDP-glucuronosyl transferase activity in rats, & catechins are processed by drug-metabolizing enzymes in different organs following absorption. Thus, it is hypothesized that enhanced glucuronidation due to UDP-glucuronosyl transferase activation contributes to green tea's anticarcinogenic action by accelerating conversion of chemical carcinogens into inactive metabolites that are easily eliminated. Green tea catechin metabolism was studied in conjunction with 2-amino-3-methylimidazo[4,5-f]quinoline (IQ). IQ is a precarcinogen that was first discovered in a fried beef extract. In rats, cytochrome P450 is initial step in IQ biotransformation, followed by conjugation to a sulfate & a glucuronide conjugate. Green tea alters rat IQ metabolism by boosting production of IQ glucuronides, which are subsequently eliminated in urine. Furthermore, green tea catechins might protect against malignancies caused by polycyclic aromatic hydrocarbons by inhibiting its cytochrome P450 metabolism, although impact of green tea on cytochrome P450 enzymes varies depending on form. Green tea intake enhances cytochrome P450 1A1 & 1A2 activities in normal rats, but not 2B1 & 2E1 activities. However, drawing inferences regarding a protective effect of green tea against carcinogens based only on regulation of this metabolic pathway is problematic.

Adverse effects of green tea:

Although green tea proposes numerous fitness welfares, effects of green tea & its components might be helpful to point, but greater dosages might have unknown side effects. Furthermore, effect of green tea catechins might not same in every person. Green tea extract's EGCG is cytotoxic, & greater intake of green tea might cause acute cytotoxicity in liver cells, body's primary metabolic organ. Another research discovered that drinking more green tea causes oxidative DNA damage in pancreas & liver of hamsters. Yun et al. discovered that in pancreatic cells in vivo, EGCG functions as a pro-oxidant rather than an antioxidant. As a result, a high green tea consumption might be harmful to diabetic animals' ability to manage hyperglycemia. Green tea extract caused thyroid enlargement (goiter) in normal rats when given at a high dosage (5 percent of diet for 13 weeks). Thyroid hormone plasma concentrations were altered as a result of this high-level study. In humans, however, even a very high dietary quantity of green tea is improbable to produce severe side effects.

Overconsumption of tea (black or green) has harmful consequences owing to three major factors: caffeine concentration, aluminum content, & impact of tea polyphenols on iron bioavailability. Patients with cardiac issues or severe cardiovascular difficulties should avoid drinking green tea. Caffeine might induce an increase in heart rhythm in pregnant & breast-feeding women, before should limit selves to 1 or 2 cups each day. Due to caffeine's diuretic effects, it's essential to avoid

drinking green tea & taking some medications at same time. Tea plants have shown in certain tests to be capable of accumulating significant amounts of aluminum. Because aluminum might accumulate in body, resulting in neurological disorders, this is an essential consideration for patients with renal failure. It is thus vital to limit consumption of foods containing higher level of this metal. Similarly, green tea catechins might be having fondness for, green tea&iron mixtures might reduce iron bioavailability from diet significantly.

2. LITERATURE REVIEW

Reygaert W discussed antimicrobial possibilities of green tea in which he discussed how Green tea is widespread beverage, particularly in Asian nations, though it is gaining appeal all around world. Green tea, which is developed from leaves of *Camellia sinensis* plant, has long researched for its health advantages. Researchers have just lately started to investigate possibilities of utilizing green tea in antimicrobial treatment & infection prevention. Catechins, which are present in tea, have showed promise in terms of having antibacterial characteristics. Studies on antimicrobial attributes of green tea showed that it has potential to be used for both prevention & treatment. To complete picture of green tea's antimicrobial capabilities, fur data on studies conducted with human intake throughout course of illnesses, along with research on incidence of infections in populations that drink regular quantities of green tea, will be required(6).

Chen P et al. discussed Green tea & prostate cancer risk in which they discussed how Chemoprevention for PCa has become a viable idea in recent years. Many phytochemical-rich meals, in particular, have proposed to reduce cancer risk. Green tea is one of se foods that has shown to be helpful in prevention of different malignancies. Clinical studies & earlier meta-analyses on link among green tea intake & incidence of PCa, however, have shown mixed results. goal of this research is to investigate dose-response relationship amidconsumption of green tea & PCa risk, along with protective impact of green tea catechins on PCa risk(7).

Shimizu M et al. discussed possible mechanisms of green tea & its ingredients against cancer in which y explained how no. of clinical, epidemiological, , & experimental studies shown that drinking green tea has anti-cancer properties. In Accordance to results from laboratory cell culture research, a variety of mechanisms behind anti-cancer benefits of green tea catechins. Antioxidant activity, cell cycle regulation, suppression of receptor tyrosine kinase pathway, immune system modulation, & epigenetic amendment control are all examples of se processes. findings of se studies are discussed in this review to offer additional vision in effect of green tea administration on malignancies that have seen so far in this area of study(8).

Martini N discussed Green Tea in which he discussed how Green tea is an unfermented tea made from *Camellia sinensis* leaves. Green tea has more polyphenols (flavonoids & catechins) than oolong or black tea due to little processing needed. Catechins, along with caffeine, are thought to have a function in energy metabolism, which proponents say leads to weight reduction(9).

3. DISCUSSION

Most microbiological diseases might be prevented or cured using a-sinensis (green tea). Catechins have a diversity of antibacterial properties, although not all include capacity to produce bactericidal or bacteriostatic effects, & a few of m are showing early great potential of modifying host-pathogen interactions. However, these compounds are highly improbable to be beneficial as traditional anti-infective agents for treatment of severe chronic infections except if specific chemical adjustments to catechin configuration are made, resulting in substantial advancements in both antibacterial efficacy & in vivo stability. Green tea is manufactured from *Camellia sinensis* plant, which is a member of acae family.. Tea has used as a beverage in form of a decoction since ancient times. It was utilized to help body cleanse. This piqued interest of many experts who wanted to learn more about green tea & its medicinal qualities. One of m is its antimicrobial

activity, which aids in treatment of a variety of illnesses. As a result, emphasis of this review is on green tea's antibacterial properties. This contains information on history of green tea, pharmacognostic studies, chemical components, & function & mechanism of Catechin, primary chemical constituent, in treatment of antimicrobial infections & or illnesses. Finally, potential of green tea for future study along with medication development has considered.

4. CONCLUSION

Green tea has shown to provide health benefits in laboratory tests. Because human clinical data is currently limited, further study is needed to determine true amount of fitness welfares, safe range of tea intake with these welfares, & mechanism of action. A greater knowledge of how green tea interrelates with endogenous system & or external variables will come through —expansion of more precise & sensitive techniques with more representative models, along with creation of excellent prediction biomarkers. Well-designed observational epidemiological research & intervention trials are required to draw definitive findings on green tea's protective impact. Future study in this field will be aided by development of biomarkers for green tea intake along with molecular markers for its biological effects.

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