

MEDICINAL EFFICACY OF GREEN TEA: A MINI REVIEWProf. Ravinder Kumar^{*1}, Shruti Sharma² and Priyanshi Sood³¹Lecturer Pharmacology, College of Ayurvedic Pharmaceutical Sciences, Jogindernagar, H.P.²Lecturer Pharmaceutics, College of Ayurvedic Pharmaceutical Sciences, Jogindernagar, H.P.³B. Pharmacy (Ayurveda), VIII Semester, College of Ayurvedic Pharmaceutical Sciences, Jogindernagar, H.P.***Corresponding Author: Prof. Ravinder Kumar**

Lecturer Pharmacology, College of Ayurvedic Pharmaceutical Sciences, Jogindernagar, H.P.

Article Received on 28/04/2020

Article Revised on 18/05/2020

Article Accepted on 08/06/2020

ABSTRACT

Tea is among the world's most commonly consumed beverages and its constituents are known to possess medicinal efficacies. Since ancient times, regular tea consumption is considered as health-promoting habit. The most commonly consumed tea varieties are -green, black, and oolong; based on the amount of antioxidants present and the degree of fermentation. Tea is obtained from the leaves, buds, or delicate stems of the *Camellia sinensis* plant which belongs to the family Theaceae. Recently, the medicinal properties related with daily green tea intake have become well recognized. Green tea or Extract of Green Tea contains catechins that have antioxidant, antiangiogenesis and antiproliferative activities. Green Tea is loaded with more antioxidants than other kinds of tea. Tea contains caffeine, minerals and trace amounts of vitamins, amino acids and carbohydrates. The phytoconstituents present in Green tea stimulate central nervous system and improve overall health.

KEYWORDS: Green tea, Catechins, Epigallocatechin gallate (EGCG).**INTRODUCTION**

The main tea producers are China, India and Kenya. Tea is considered an effective remedy for the treatment of various disorders.^[1] Green tea has turn out to be the most popular drink owing to its scientifically proven medicinal efficacy on human health.^[2] Green tea is manufactured by immediately steaming or panning the freshly collected tea leaves in order to prevent oxidation of catechins by polyphenol oxidase. The steaming process prevents fermentation and preserves the green color as well as polyphenol content of the tea leaves.^[3] Research studies

on green tea have revealed its beneficial and health promoting effects. The chemical constituents of green tea especially catechins (epigallocatechin gallate) are believed to possess anticancer, anti diabetic, anti obesity, anti bacterial and anti viral effects.^[4] Green Tea consumption has been associated with little incidence of chronic pathologies. Tea has anti-inflammatory and antioxidant properties. Polyphenols present in green tea and black tea may have a protective effect against heart diseases and some cancers.^[5]

Components Of Green Tea^[6]

Sr. No.	Compound	Quantity
1.	Proteins	15-20% (Dry weight)
2.	Amino Acids	1-4% (Dry weight)
3.	Carbohydrates	5-7% (Dry weight)
4.	Minerals and Trace Elements	5% (Dry weight)

Chemical Constituents

Catechins, a group of polyphenols, are the active constituents present in green tea. Epicatechin gallate, epicatechin, epigallocatechin and epigallocatechin gallate are the main catechins found in green tea.^[2] Other constituents present in green tea are caffeine, flavonoids, phenolic acids, catechins, tryptophan, amino acids, glutamic acid, glycine, serine, tyrosine, Valine, Leucine, Arginine, Lysine, Cellulose, Pectins, Glucose, Fructose,

Sucrose and Trace Elements include Calcium, Magnesium, Chromium, Manganese, Iron, Copper, Zinc, Molybdenum, Sodium, etc.^[6]

Mechanism of Action

The oxygen released by endoplasmic reticulum and mitochondria gets converted into hydrogen peroxide, which therefore releases reactive oxygen species. These released species can further lead to oxidation of proteins,

lipids and can cause damage to DNA and RNA. Consumption of green tea inhibits the action of reactive oxygen and defend against these degenerative changes.^[2]

Medicinal uses of green tea

Anticancer Activity

Tea is beneficial to the health as it contains several health-promoting components, e.g., the catechins especially epigallo catechin gallate (EGCG). Studies revealed that EGCG inhibits the adhesion of cancer cells to endothelial cells.^[4]

Anti-Diabetic Activity

Studies reported that EGCG (epigallo catechin gallate) decrease the regulation of hepatic glucose production. EGCG mimics insulin. Like insulin, EGCG increases tyrosine phosphorylation of the insulin receptor and insulin receptor substrate-1.^[7]

Antioxidant Activity

Green tea possesses the antioxidant effect by protecting cells against the damaging effects of reactive oxygen species such as singlet oxygen, superoxide, peroxy radicals, hydroxyl radicals and peroxynitrite.^[6]

Antibacterial Activity

Chan et al revealed that hot water extracts of Green Tea exhibits antibacterial activity. All the extracts exhibited inhibitory effects on Gram-Positive but not on Gram-Negative bacteria. Green Tea showed no anti-bacterial activity against Gram-Negative bacterias: *E. coli*, *S. typhi* and *P. aeruginosa*. Green Tea extracts inhibited the growth of Gram-Positive *M. luteus*, *S. aureus*, *B. cereus*. Extracts of Green Tea have been accounted to be more efficient to inhibit the bacterial growth as compared to black tea.^[3]

Antihypertensive Activity

Green tea contains EGCG having an effective antihypertensive activity. EGCG leads to the rapid activation of endothelial nitric oxide synthase (eNOS) results in the induction of endothelial-dependent vasodilation by phosphatidylinositol-3-OH-kinase, PKA, and Akt –dependent eNOS activity.^[8]

Side effects of green tea

- Increased Bleeding Time.
- Risk of Bladder Cancer.
- Insomnia.
- Anxiety.
- Nausea.
- Headache.
- Diuresis.
- Tremor.^[9]

CONCLUSION

Green Tea is the important dietary factor in the prevention and treatment of various diseases such as Arthritis, Cancer, Obesity, Diabetes, Oral Health, etc.

Green Tea is relatively inexpensive and easy to obtain for most people. It has scientifically proven its health benefits on people worldwide. The present work advocates that EGCG, the chief catechin, is responsible for various medicinal effects and future strategies may be designed to include this constituent in various dosage forms which can be beneficial for human use. Green Tea has huge potential for use in antimicrobial therapy as well.

REFERENCES

1. Prasanth MI, Sivamaruthi BS, Chaiyavat C, Tencomnao T. A Review of the Role of Green Tea (*Camellia sinensis*) in Antiphotaging, Stress Resistance, Neuroprotection, and Autophagy. *Nutrients*, 2019; 11(2): 474.
2. Chatterjee A, Saluja M, Agarwal G, Alam M. Green tea: A boon for periodontal and general health. *Journal of Indian Society of Periodontology*, 2012; 16(2): 161-167.
3. Chan EWC, Soh Eu Ying, Tie PP, Law YP. Antioxidant and antibacterial properties of green, black and herbal teas of *Camellia sinensis*. *Pharmacognosy Research*, 2011; 3(4): 266-272.
4. Suzuki Y, Miyoshi N, Isemura M. Health-promoting effects of green tea. *Proceedings of the Japan Academy. Series B, Physical and Biological Sciences*, 2012; 88(3): 88-101. doi:10.2183/pjab.88.88.
5. Serafini M, Del Rio D, Yao DN, Bettuzzi S, Peluso I. Health Benefits of Tea. In: Benzie IFF, Wachtel-Galor S, eds. *Herbal Medicine: Biomolecular and Clinical Aspects*. 2nd ed. Boca Raton (FL): CRC Press/Taylor & Francis, 2011.
6. Chacko SM, Thambi PT, Kuttan R, Nishigaki I. Beneficial effects of green tea: A literature review. *Chinese Medicine*, 2010; 5(13): 1-9.
7. Bansal S, Syan N, Mathur P, Choudhary S. Pharmacological profile of green tea and its polyphenols: a review. *Medicinal Chemistry Research*, 2012; 21: 3347-3360.
8. Lorenz M, Wessler S, Follmann E, Michaelis W, Dusterhoft T, Baumann G, Stangl K, Stangel V. A Constituent of Green Tea, Epigallocatechin-3-gallate, Activates Endothelial Nitric Oxide Synthase by a Phosphatidylinositol-3-OH-kinase-, cAMP-dependent Protein Kinase-, and Akt-dependent Pathway and Leads to Endothelial-dependent Vasorelaxation. *The Journal of Biological Chemistry*, 2004; 279(7): 6190-6195.
9. Singhal K, Raj N, Gupta K, Singh S. Probable Benefits of green tea with genetic implications. *Journal of Oral & Maxillofacial Pathology*, 2017; 21: 107-114.