



CAMELLIA SINENSIS: ITS POTENTIAL ROLE IN ORAL AND PERIODONTAL CONDITIONS

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ABSTRACT:

This article aims to review published literature on phytotherapeutic plant *Camellia sinensis* commonly known as green tea. The mechanisms that may underlie its action include: biological/immunological modulation, anti-inflammation, antimicrobial activity and wound healing promotion. Green tea therefore could have a potential role as an adjunct in treating periodontal disease.

KEYWORDS:

GREEN TEA, CATECHINS, ANTIOXIDANTS, PERIODONTAL DISEASE.

The tea plant, the bush *Camellia sinensis* is accepted to have originated in Tibet, northern India and western China. As indicated by old Chinese legend, tea was found by the Chinese ruler Shen-Nung in 2737 BC, when leaves from a wild tea shrubbery unintentionally fell into a pot of water that was bubbling. The beverage name gets from the Chinese Amoy tongue word "t'e," articulated "tay,"

Green tea is acquired by macerating and warm drying this flush, while dark tea is obtained by maturation of flush before warm drying.

PARTS OF GREEN TEA

The dynamic compounds in green tea are from a collection of polyphenols called catechins. Four

Catechins present in green tea are: epigallocatechin gallate (EGCG), Epicatechin gallate (ECg), epigallocatechin and epicatechin.

Green tea additionally contains tocopherols, carotenoids, ascorbic acid and minerals like magnesium, chromium, selenium and zinc. Green tea also contains caffeine (1)

Parts present in green tea which are considered extremely beneficial are catechins and amino acids L-theanine, diminish the effect of caffeine. At the point when green tea is prepared, its caffeine joins with catechins in the water, lessening the caffeine's action.

Favonoids for example, kaempferol, myricetin, and quercetin are increasingly significant in periodontal wellbeing.

Green tea also contains Gallic acid(GA) and other Phenolic acids, for example, chlorogenic acid and caffeic acid.(2)

CLASSIFICATION

Green teas are grouped into three noteworthy types due to the variation in manufacturing process.(3)

1. Non-fermented Variety: drying and steaming the new leaves which results in inactivation of the polyphenol oxidase
2. Semi- fermented oolong tea Variety: delivered by fractional fermentation of crisp leaves before drying.
3. Fermented red and black tea Variety (Pu-Erh): post harvest fermentation before drying and steaming.

CONSUMPTION OF GREEN TEA

Green tea may be consumed as beverage (4), as mouthwash and as chewing gum.

PROCESS AFFECTING CATECHIN CONTENT

1. Type of green tea (e.g., Blended, decaffeinated, instant).
2. Type of handling before drying.
3. Conditions of growth (soil, atmosphere, agricultural practices, manures).
4. Variation in geographical location of growth.(5)
5. Preparation of infusion (for example Amounts of the product used, brew time, temperature).

BIOLOGICAL ACTIONS OF GREEN TEA COMPONENTS

ANTI OXIDATIVE ACTION

Green tea polyphenols are responsible for its antioxidant

activity either directly by scavenging of reactive oxygen and nitrogen species.

Oxygen is released by the endoplasmic reticulum and mitochondria. This oxygen gets changed into hydrogen peroxide, which thus releases reactive oxygen species. These reactive oxygen species can prompt harm of DNA, RNA, oxidize proteins (compounds, histones), oxidize lipids and can likewise induce cellular suicide.

Green tea polyphenols alter the chelating progress of metal particles like copper and iron or by hindrance of oxidant chemicals. The above effect and action has also been enlisted in cancer prevention.(6,7)

CELL MEMBRANE MODULATION

This system might be affected by the impact of catechins, affecting the cell phospholipid palisade. EGCG has appeared to prompt apoptotic cell death and cell cycle capture in tumor cells.(8)

ANTIMICROBIAL ACTION

EGC, ECG and EGCG establish the most significant antibacterial agents on methicillin resistant *Staphylococcus aureus*, α -Hemolytic streptococcus and *Helicobacter pylori*.(9)

ANTICARIOGENIC ACTION

Catechins are observed to inhibit against *Streptococcus mutans* and *Streptococcus sobrinus* at a Minimum Inhibitory Concentration (MIC) extending between 50–1000 $\mu\text{g/ml}$.(10)

PERIODONTAL ACTIONS

EGCG averts methyl mercaptan, the fundamental chemical aetiology of halitosis. EGCG (is active at a concentration of 250–500 $\mu\text{g/ml}$) restrains development and adhesion of *Porphyromonas gingivalis* to buccal epithelial cells.(11)

Different authors have examined the inhibitory impact of catechin contained in green tea on periodontal pathogens, which may have a valuable impact on everyday consumption of green tea on periodontal wellbeing.

Green tea catechins hinder the development of *Prevotella intermedia*, *Prevotella nigrescens* and *P. gingivalis*, and also affects the latter's adherence on to human buccal epithelial cells.

Green tea catechin demonstrated a bactericidal impact against black pigmented, Gram-negative anaerobic rods, *Prevotella* species and *Porphyromonas gingivalis*. Mechanical treatment along with adjunctive use of green tea catechin via a slow release system has been used in effectively improving the periodontal status.

Alveolar bone resorption is a hallmark of periodontal disease, predominantly carried out by multinucleated osteoclast cells or a network of metalloproteinases (MMPs). EGCG inhibits osteoclast arrangement and bone marrow cells, and it initiates apoptotic cell death of

osteoclast-like multinucleated cells thus highlighting the role of green tea in the counteractive action of bone resorption.(12)

CONSEQUENCES FOR DIFFERENT PERIODONTAL PATHOGENS

Green tea catechins repress enzymatic activity of *P. gingivalis*, in a way similar Chlorhexidine, Doxycycline, and non-antimicrobial synthetically derived Tetracycline subsidiaries. EGCG hinders protein tyrosine phosphatase movement in *P. intermedia*. It likewise has bactericidal action against an assortment of microorganisms like *Helicobacter pylori*.(4)

IMPACT ON HALITOSIS

Tea polyphenols have been appeared to have antimicrobial and a deodorizing anti-halitosis effect, analysts researched whether green tea powder decreases Volatile Sulphur Compounds in mouth breath, and contrasted its efficacy to varied different agents that are professed to control halitosis and found it to be superior in its actions. (13)

CONTRAINDICATIONS

Patients undergoing Antibiotic therapy, Chemotherapy, Warfarin intake and Oral contraceptive use (14)

ASSOCIATED RISKS

- 1) Green tea is an intense gastric acid stimulant and increased intake results in stomach upset
- 2) Increases danger of bladder malignancy.
- 3) Tremor, heart palpitations, peevishness, dozing and restlessness in individuals with caffeine sensitivity.
- 4) Caffeine and catechin constituents of green tea may cause neural tube deformity in infants due to anti-folic acid activity. It is thereby a possible risk in pregnant ladies.
- 5) Excess consumption of green tea may increase the bleeding time.(14)

CONCLUSION

This review was carried out by selective research assessment so as to allay the possible role of green tea in the management of oral conditions specifically periodontal diseases.

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