



HerbClip™

Mariann Garner-Wizard
David Levine

Shari Henson
Heather S Oliff, PhD

Amy Keller, PhD
Risa Schulman, PhD

Executive Editor – Mark Blumenthal

Managing Editor – Lori Glenn

Consulting Editors – Dennis Awang, PhD, Thomas Brendler, Francis Brinker, ND, Mark Dreher,
Steven Foster, Risa Schulman, PhD

Assistant Editor – Tamarind Reaves

AMERICAN
BOTANICAL
COUNCIL

**File: ■ Green Tea (*Camellia sinensis*)
■ Oral Health**

HC 031233-450

Date: June 15, 2012

RE: Green Tea Shows Promise in Promoting Oral Health although More Studies Are Needed

Narotzki B, Reznick AZ, Aizenbud D, Levy Y. Green tea: a promising natural product in oral health. *Arch Oral Biol.* 2012 May;57(5):429-435.

Green tea (*Camellia sinensis*), an important source of polyphenol antioxidants, is the second most popular beverage worldwide. Recently, green tea has become more popular in the western world because of studies reporting its health potential as an antioxidant, antimutagenic, and anticarcinogenic, and its role in hypertension prevention, cardiovascular risk modification, ultraviolet radiation protection, weight management, and oral health improvement. These authors conducted a review by searching PubMed and Google Scholar to identify English-written articles about green tea and oral health.

The main polyphenols in green tea are catechins: epigallocatechin-3-gallate (EGCG, about 59% of total catechins); epigallocatechin (EGC, about 19%); epicatechin-3-gallate (ECG, about 13.6%); and epicatechin (EC, about 6.4%).¹ Green tea also contains antioxidants such as carotenoids, tocopherols, and vitamin C, and minerals that function as cofactors in antioxidant enzymes: zinc, selenium, and manganese.

Oral pathologies such as dental caries, periodontal diseases, and loss of teeth can affect a person's health. Dental caries can result from various causes related to nutrition and bacterial infections. Reports suggest that tea consumption may decrease dental caries in humans and laboratory animals. The authors cite four *in vivo* studies and one *in vitro* study. Most of those studies used green tea extract mouthwash. Two of the studies did have conflicting evidence of green tea's effect against *Streptococcus mutans*. According to the authors, one reason for this might be that green tea has indirect antibacterial activity through mediation of protective saliva components such as secretory immunoglobulins, lysozyme, lactoferrin, oral peroxidases, histatins, mucins, or others.

Halitosis can be caused by dental caries. Bacterial halitosis is caused mainly as a result of volatile sulphur compounds produced by the decay processes that are created by oral microorganisms. One cited study found that green tea powder abated the creation of those sulphur compounds and consequently, halitosis, for an hour.² Two other *in vitro* studies supported the reduction of sulphur compounds.

Green tea catechins have also been reported to reduce gingival oxidative stress. The articles identified in the review (one in vivo and one in vitro) suggest that oral cavity oxidative stress and inflammation caused by cigarette smoking may be reduced by green tea polyphenols.

Oral squamous cell carcinoma (SCC), the most common head and neck malignancy, is associated with high rates of morbidity and mortality. In the three studies in hamsters and rats, a decrease in the number and volume of oral tumors was seen with green tea polyphenols. In the three in vitro studies cited, green tea defended healthy cells from malignant transformation and locally exhibited the ability to induce apoptosis in oral cancer cells. A phase 2, randomized, placebo-controlled trial examined the effects of 12 weeks of green tea extract supplementation on the outcome of high-risk premalignant oral lesions in 28 participants and found that a high-dose green tea extract had significant clinical and histological outcomes, though they were not associated with long-term oral cancer development.³ On the other hand, an epidemiological study in a Japanese population drinking large amounts of green tea could not show a protective effect of green tea against oral cancer incidence, although a positive trend was observed among the women.⁴ "Despite the promising evidence on the benefits of green tea in preventing oral and other cancers in animal models and cell cultures, this potential benefit is not strong enough for a universal recommendation to drink green tea in order to prevent oral cancer," state the authors.

The authors conclude that a growing body of evidence suggests that green tea may reduce dental caries by repressing bacterial growth and inhibiting enzyme activity. However, they say, despite the reasoning linking green tea to a decrease in dental caries in humans, their review does not support "this promising topic."

Furthermore, the authors suggest that exposing certain virus species to green tea may interfere with viral activity in the oral cavity, but that additional in vitro studies are needed. Because green tea oxidizes odorant sulphur compounds that cause halitosis, some commercial oral hygiene products contain green tea extracts. "It is still premature to recommend such products to protect against halitosis since only [a] limited number of studies tested its in vitro and in vivo effects," write the authors. Again, the authors call for future clinical studies to determine whether green tea helps decrease cigarette-smoke-induced oral damage and chronic inflammation. They also suggest that more epidemiologic studies be conducted to further understand green tea's effects on oral cancers, noting that animal and cell culture results on such effects seem promising. Overall, more research is needed to advocate for green tea in preventing and treating specific oral morbidities.

—Shari Henson

References

¹McKay DL, Blumberg JB. The role of tea in human health: an update. *J Am Coll Nutr.* 2002;21(1):1-13.

²Lodhia P, Yaegaki K, Khakbaznejad A, et al. Effect of green tea on volatile sulfur compounds in mouth air. *J Nutr Sci Vitaminol (Tokyo).* 2008;54(1):89-94.

³Tsao AS, Liu D, Martin J, et al. Phase II randomized, placebo-controlled trial of green tea extract in patients with high-risk oral premalignant lesions. *Cancer Prev Res (Phila).* 2009;2(11):931-941.

⁴Ide R, Fujino Y, Hoshiyama Y, et al. A prospective study of green tea consumption and oral cancer incidence in Japan. *Ann Epidemiol.* 2007;17(10):821-826.

The American Botanical Council has chosen not to reprint the original article.

The American Botanical Council provides this review as an educational service. By providing this service, ABC does not warrant that the data is accurate and correct, nor does distribution of the article constitute any endorsement of the information contained or of the views of the authors.

ABC does not authorize the copying or use of the original articles. Reproduction of the reviews is allowed on a limited basis for students, colleagues, employees and/or members. Other uses and distribution require prior approval from ABC.