



# Use of Green Tea Mouthwash to Reduce Dental Plaque, Gingivitis and Halitosis: Review of the Literature

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## Abstract

**Study Background:** In the case of reducing dental plaque, a green tea mouthwash has been studied alone or combined with other natural agents. Aim: To evaluate the effect of green tea used as a mouthwash for reducing dental plaque, gingivitis and halitosis.

**Methods:** Cochrane database clinical trials published from 2010 to 2020 were reviewed. Studies that met the inclusion criteria were reviewed by 2 authors individually. A qualitative review of the data was performed.

**Results:** Eight studies were included in the systematic review. There was no difference between green tea alone against chlorhexidine. But there were better results when combining green tea with xylitol or *Salvadora persica* L. extract.

**Conclusion:** Green tea mouthwash may be a viable natural mouthwash and can give better results when combining with other agents.

**Keywords:** Green tea; *Camellia sinensis*; Mouthwash

## Introduction

Mouth rinses are extensively promoted in prevention of dental caries. The significance of mouth and teeth cleanliness has been recorded from the ancient days of civilization to the 21st century [1]. In recent years, antimicrobial properties of medicinal plants are being increasingly reported from different parts of the world [2]. People all around the world are turning towards use of natural extracts such as herbal products for both prophylaxis and treatment of different diseases. Generally, three types of tea including black tea, green tea and Oolong tea (a Chinese type of tea) are derived from a shrub named *Camellia sinensis*. Green tea has advantage to other types of tea because it is less influenced by the fermentation process and its compositions remain stable [3]. Considering this, there has been a growing interest in using herbal agents as green tea as mouthwash. Green tea have shown to have anti-inflammatory properties along antibacterial and other properties [4]. This effect could be mainly attributed to the antibacterial activities of green tea catechins and other components such as caffeic acid, quercetin, chlorogenic acid,

gallic acid, myricetin, kaempferol [5]. Green tea has been studied alone or combined with other natural herbs. This review has the objective to determine the effect of green tea as a natural mouthwash for reducing dental plaque, gingivitis and halitosis.

## Materials and Methods

The Cochrane databases were reviewed. Clinical trials published between the years 2016 to 2020 were reviewed. The key words used were: green tea, mouthwash. Studies that met the inclusion criteria (Randomized controlled trials, in vivo studies) were reviewed by 2 authors individually. (Studies that did not meet methodological quality were excluded). The studies that fulfilled the inclusion criteria were processed for the extraction of data. The data were as follows: the name of first author, year of publication, age of patients, length of study, intervention techniques and clinical results. A qualitative review of the data was performed.

## Results

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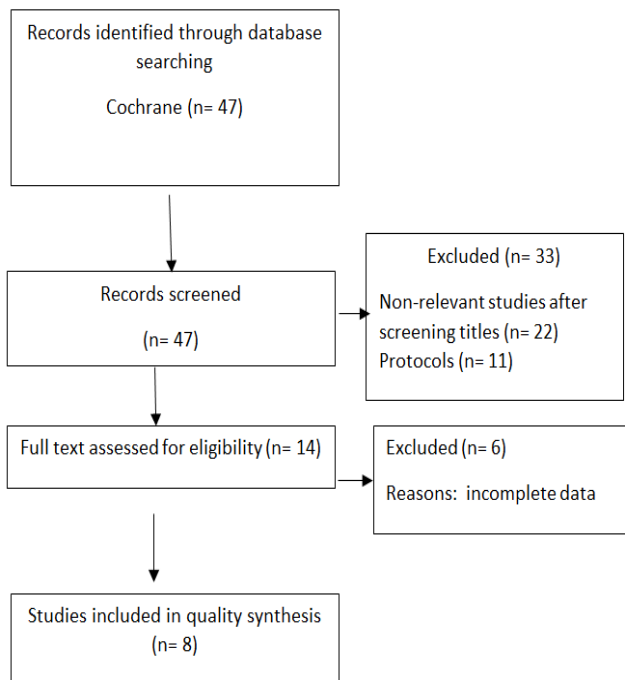
The flow diagram of study selection is shown in Figure 1. Of total of 47 studies identified through the search in the databases, 8 were included for the systematic review. There was no difference

between green tea alone against chlorhexidine. But there were better results when combining green tea with xylitol or *Salvadora persica* L. extract (Table 1).

**Table 1:** Green tea clinical trials study characteristics (n=8).

	First Author	Year of publication	Age of patients	Length of study	Intervention techniques	Clinical results
1	Rassameemasmaung S	2013	18 to 55	4 weeks	Intervention: The green tea. Placebo: was a hydroalcoholic brownie solution.	No differences between groups
2	Deshpande	2018	10 to 14	1 month	Intervention 1: green tea Intervention. 2: green tea plus ginger mouthrinse. Comparator: chlorhexidine	No differences between groups
3	Asawa	2017	18 to 25	1 month	Intervention1: Green Tea. Placebo: Chlorhexidine	No differences between groups
4	Hajiahmadi M	2019	6 to 12	2 weeks	Intervention 1: 5% "green tea". Intervention 2: 20% "green tea with xylitol".	"green tea with xylitol" mouthwash is significantly better on reducing salivary colonies
5	Abdulbaqi HR	2016	25 to 40	24 hours	Intervention 1: green tea and <i>Salvadora persica</i> L. Intervention 2: Chlorhexidine. Placebo: Distilled water	The test mouthwash significantly reduced plaque accumulation when compared with placebo and chlorhexidine mouthwashes.
6	Sarin S	2015	18 to 60	28 days	Intervention: green tea. Placebo: distilled water	There was a significant ( $p < 0.05$ ) reduction in mean GI and PI scores among the test group
7	Radafshar G	2017	18 to 40	4 weeks	Intervention1: Green Tea. Placebo: Chlorhexidine.	No differences between groups
8	Hegde RJ	2017	8 to 12	2 weeks	Intervention1: Chlorhexidine. Intervention 2: Green Tea. Placebo: combination mouth rinse	No differences between groups

**Figure 1:** Flow diagram of the study selection.



## Discussion

The results of this review show that green tea mouthwash can be considered as an alternative to chlorhexidine and combined with other agents can give better results [6-13].

This makes sense since green tea is reported to be very rich in fluoride and catechin, a bioactive component, which exerts an anti-cariogenic effect by inhibiting the proliferation of the streptococcal agent, interfering with the process of bacterial adhesion to tooth enamel and also by inhibiting glucosyltransferase [14].

Chlorhexidine and green tea mouthwashes found to be effective in reducing plaque index and it has been shown to be equally effective in gingivitis reduction [15]. Same as other study that concluded that the use of green tea and chlorhexidine mouthwashes has a similar effect on bacterial colonies in the pharynx [16].

The results from the meta-analysis indicated that there was no significant difference between chlorhexidine and green tea, either at endpoint or over time. In addition, there was little evidence of side effects with green tea mouthwash [17]. However, other study suggested found that green tea as a mouthwash is more effective compared to chlorhexidine mouthwash and is an appropriate



adjunctive measure in the treatment of chronic periodontitis [18]. On the other side other studies conclude that Chlorhexidine found to be superior to 5% green tea in reducing bacterial load in aerosol samples [19]. Even though only one database (Cochrane) was searched in this review, this database has the better quality in clinical trials so the results can be considered feasible.

## Conclusion

Green tea mouthwash may be a viable natural mouthwash and can give better results when combining with other agents..

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