Development of a Green Tea Incorporated Mouthwash

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Introduction

Green tea extracts with other sources of polyphenol constituents are increasingly recognized as being potentially important to medicinal benefits (Amarakoon, 2004). Extensive researches have verified that green tea contributes to the promotion of oral health but the oral health benefit of the green tea is less aware by the people (Narotzki *et al*, 2012). Since it has a higher potential to establish a new product line as an oral hygiene product, the aim of this study was to assess the possible protective properties of green tea on oral health while using it as main natural ingredient of an alcohol free fluoride mouthwash. A few studies have been conducted for the development of green tea base mouthwash in the world. This present study is aimed to developed green tea incorporated mouthwash by addition of clove oil and the peppermint to enhance the natural flavor of the mouthwash while increasing the oral health benefits.

Methodology

The main objective was to prepare a green tea incorporated mouthwash. Deionized water was boiled up to 80 ºC and poured in to the beakers with 1%, 2% and 3% (w/v) of green tea and the beakers were kept in a water bath of 80 ºC for 8 minutes. The green tea brew was allowed to cool at room temperature and 1 g of peppermint, 20 µl of clove oil were added and the sample was thoroughly mixed for 1 hour with a stirrer. These mixtures were filtered using 0.45 µm filter paper and prepared samples kept in transparent plastic bottles.

Sensory evaluation with 30 untrained panelists was carried out to select the best green tea, peppermint and clove oil incorporation quantity for the formulated mouthwash. Five point hedonic scale was used to evaluate samples for liquor taste (strength, bitterness), liquor color, smell, freshness after washing and the overall acceptability.

The pH value of the developed mouthwash was measured with electronic pH meter. Fluoride ion was determined by direct potentiometry with Thermo Orion 5 star ISC conductivity meter using fluoride ion selective electrode. Prepared green tea mouthwash, reference and control were tested for well diffusion assay using experimental microorganisms included *Candida albicans* and *Strephylococcs aureus* and the mean zone inhibition was measured (Awadalla *et al*, 2011). The prepared mouthwash was subjected to a storage study by observing color and the smell at two weeks intervals and the pH of the product also measured.

Results and Discussion

Table 1. Sensory evaluation results.

Sensory parameter	Estimated median value			P value
	1% green tea	2% green tea	3% green tea	
Taste	2.0	4.0	3.0	0.000
Colour	3.0	3.0	3.0	0.001
Smell	3.0	3.0	3.0	0.229
Freshness after washing	2.5	4.2	2.8	0.000
Overall acceptability	3.0	4.0	3.0	0.000

According to the responses of the sensory evaluators, there are significant differences between three treatments except for smell. P value for smell is greater than 0.05 and that for all other

parameters are less than 0.05. According to the above results given in the table 1, 2% incorporation of green powder is the best treatment level (Table 1).

Flouride content of the prepared green tea incorporated mouthwash was 4.0 mg/l (4ppm) and the pH of the developed mouthwash was 5.8 according to the electronic pH meter.

Reference mouthwash was having the highest area of inhibition followed by green tea incorporated mouthwash and it may be due to the presence of alcohol in the reference mouthwash. Green tea incorporated mouthwash had 8.25mm mean zone diameter for the *S. aureus* and 9.5 mm diameter for *C. albicans*. Reference mouthwash gave 8.75 and 10mm mean zone diameters for the tested oral microorganisms. The control, which was prepared with the other ingredient that incorporated to the green tea mouthwash, had also some effect against *S. aureus* and *C. albicans* for mean diameter of 2.5 and 2.75mm respectively. According to the storage study any defect was not observed during storage period of six weeks.

Conclusion

According to the results obtained, it can be concluded that the incorporation of 2% w/v green tea into a mouth wash is the best treatment level. This study also proved that the local application of green tea mouthwash has an ability to reduce main causative bacteria in both initial and secondary dental caries but further research is needed to find out the effect against various oral microorganisms that influence to the oral hygiene and it is important to carry out a clinical trial to find out the effect against varies problems associated with the oral cavity.

References

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