ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at:www.ijdsir.com

Volume – 7, Issue – 1, January- 2024, Page No. :145 - 149

Evaluation of whitening toothpaste containing banana peel: An in vitro study

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Citation of this Article: Dr. Vrushali Ramdas Khobragade, Dr. Prashanth Yachrappa Vishwakarma, Dr. Arun Suresh Dodamani, Dr. Sulakshana Navindrabhau Raut, Dr. Shruti Rajendra Pundkar, Dr. Sheetal Sanjay Chavan, "Evaluation of whitening toothpaste containing banana peel: An in vitro study", IJDSIR- January - 2024, Volume –7, Issue - 1, P. No.145 – 149.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Aim: Aim of the present study was to assess an effectiveness of banana peel as a tooth whitening agent.

Materials and Methods: An in vitro study was conducted with twenty samples of premolars extracted for orthodontic purpose. Whitening toothpaste containing banana peel was prepared and applied on the samples twice a day over a period of 14 days. The samples were checked for shade both before and 14 days after with vitapan shade guide. Data collected and Statistical analysis for shade change was done by paired t-test.

Results: P value came to be statistically significant when paired t test applied with degree of freedom 19. (Significant at $P \leq 0.05$).

Conclusion: From the present study it was concluded that whitening toothpaste containing banana peel is effective in reduction of staining and helps in whitening of teeth.

Keywords: Banana Peel, Vitapan Shade Guide, Teeth Whitening.

Introduction

A shiny smile not only provides a healthy and attractive effect, but furthermore increases one's interest in oral hygiene care and health, permitting a person to have more social self-confidence. Dentist got a treasured privilege to create such beautiful smiles.[1]

"Esthetic dentistry almost always begins with teeth whitening'. Bleaching is the one most commonly performed teeth whitening procedures. Although it has been used on a large scale there are some known side effects of the procedures like tooth sensitivity and gingival irritation.[2] Patients undergoing bleaching therapy with 10% carbamide peroxide have shown increased tooth sensitivity. This effect has been reported nearly for all delivery systems and peroxide concentrations.[2,3]

We, the 'Human beings are nothing but the creations of nature. Everything we want for survival is provided naturally. Though natural remedies are well-known for its healthful, flavoring, and aromatic qualities for many years, the artificial merchandise of the trendy age surpassed their importance for a brief time. However, this blind confidence on synthetics is been diminished to the great extent, and people are returning to the naturals with the hope of safety and security. Hence, it is time to support them globally.[4]

Banana (Musa paradaisica), is grown worldwide and consumed as ripe fruit or used for cooking purposes. Peels form about 18-33% of the whole fruit and is just considered to be a waste product. With a view to exploiting banana peel as a source of valuable components, the nutritional composition, antioxidant components were determined.[5]

Because bananas are rich with magnesium and have high levels of potassium it is assumed to remove stains from teeth. Such home remedies are known to exist which states rubbing of a banana peel effectively can whiten the tooth. [6,7]

Hence author tried to assess the actual relationship between the banana peel and tooth whitening in the present study.

Aim

Aim of the present study was to assess an effectiveness of banana peel as a tooth whitening agent.

Materials and Methods

Materials

The materials included the following:

Twenty non–carious extracted premolars which were extracted for orthodontic reasons from patients aged 18-30 years were used. Teeth with cervical lesions were not used for the study. They were ultrasonically cleaned and mounted in dental plaster. The sample size was decided, based on data obtained from previous studies.[8]A vitapan classic shade guide has been used for shade matching.

Methods

This study was conducted between August 2018 and September 2018.

The present study consisted of 20 extracted premolars which were ultrasonically cleaned and whose roots were mounted in a dental plaster. The shade was taken with a Vitapan Classic shade guide by three examiners under normal daylight.

Preparation of Banana peel whitening Toothpaste

The whitening toothpaste has been prepared in the department of Dravyaguna Vigyan (department of pharmacology) at an Ayurveda College.

At first banana peels were desiccated in the bright sunlight. Powder was prepared with the help of a grinder and strained through filter paper. Then for 200 grams of powder we added 20 grams of baking soda, 50 ml glycerine, 20ml water and few drops of peppermint oil. All the ingredients were properly mixed and stored in a dark amber colored bottle at a room temperature.

All the teeth were brushed two times a day with whitening toothpaste made with the banana peel.

Vertical toothbrushing technique has been followed throughout the study. Manual toothbrush with soft bristles was used. Only a single examiner has performed brushing of the teeth.

This procedure was carried out for 15 days. The specimens were then cleaned in normal water, a new shade was taken after 15 days by the same three examiners.

Before the start of the study, the examiner were trained and calibrated at the Department of Public Health Dentistry. The calibration was done on 10 extracted tooth, which were not included in the present study.

All statistical procedures were performed using the Statistical Package for the Social Sciences 20.0 software (IBM, Armonk, NY, USA). Paired t-test was applied which was assessed at 5% level of significance, i.e., $P < 0.05$ was considered as statistically significant.

Results

For shade evaluation values of 16 tabs shade guide were arranged from the highest (B1) to the lowest (C4) values. Then tooth shade changes were calculated by the shift in the number of shade guide units that occurred toward the lighter end of the scale.[10]Shade matching has been assessed by three individuals under daylight.(Table No. 1) P value came to be statistically significant when paired t test applied with degree of freedom 19.(Table No. 2).

Table 1: Shade of teeth before and after treatment with whitening toothpaste expressed in numerical form

Sn.	Shade before treatment	Shade after treatment
1.	8	7
2.	10	8
3.	8	8
4.	5	5
5.	11	9
6.	14	14
7.	12	10
8.	10	10
9.	16	16
10.	10	9
11.	12	11
12.	14	14
13.	10	10
14.	7	6
15.	5	5
16.	16	16
17.	12	11
18.	10	8
19.	16	14
20.	5	5

Table 2: Paired Samples Test

	Paired Differences					T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 before - after	.75000	.85070	.19022	.35186	1.14814	3.943	19	.001

(Paired t test, *Significant at P≤0.05. SD: Standard deviation, SEM: Standard error of mean, df: degree of freedom)

Discussion

Toothpastes can be developed with different abrasive systems, based on their intended clinical application. This formulation probably affects their effectiveness and

safety and, therefore, needs correct understanding. In addition to banana peel, other ingredients added in the whitening toothpaste which includes baking soda, glycerine, water and peppermint oil.

Banana peel is known for whitening properties since ages.[5-7] Baking soda has an intrinsic low-abrasive character because of which it exhibits comparatively lower hardness to enamel and dentin.[10]Glycerine is added as humectants which retain moisture, prevent dehydration and provides sweetness. Water is added to form a paste with the ingredients.[11] Whereas peppermint oil is known for its flavoring properties and it also helps in increasing the shelf life of the toothpaste.[11,12]

Whitening dentifrice are simply obtained over the counter by shoppers. Studies have shown that the prolonged use of whitening toothpaste is related to risk of accrued enamel roughness and decreased enamel micro hardness that successively will increase the potential of dental caries risk.13-18

There are various natural Ayurvedic plants that have an excellent significance in dental medicine. Previous literature suggest that herbal/natural product for management of dental ailments has shown favorable results where some of these natural plants have been used for preparation of various toothpastes, mouthwashes etc.

The results of the present study have shown an improvement in the shades of the teeth after an application of whitening toothpaste. The results are in accordance with some other studies which used different different whitening agents.[8,19,20]As per the study conducted by Kalliath, et al. they compared result of tooth paste containing chemical and herbal ingredient on human enamel. In this 14-day in vitro study, the chemical whitening toothpaste showed better whitening of teeth than toothpaste containing ingredient of herbal origin, whereas the surface irregularities was increased on the surface of the enamel with chemical whitening toothpaste when compared with toothpaste containing ingredients of herbal origin.[8]

A variety of other herbal products offer whitening effect of teeth like Strawberries, Apples, Celery, Carrots and Sesame seeds, Pineapple, Orange, Papaya, Dairy products such as Milk, Cheese and Yogurt, Kiwifruit, Lemon extract and peel, Rock salt, Activated charcoal with their different mechanism of action.[8]

Though these results are promising, further clinical trials are necessary to establish an exact relationship between banana peel on whitening of the teeth with an appropriate sample size for a sufficient longer duration.

Conclusion

From the present study it was concluded that whitening toothpaste containing banana peel is effective in reduction of staining and helps in whitening of teeth.

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