Anti-plaque efficacy of a novel Moringa oleifera dentifrice

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ABSTRACT

Objectives: The use of herbal dentifrices has grown exponentially over the years. They are categorically referred to as ethnomedicines. Various agents have been tried with contradicting findings based on phytopharmacological analysis. Miswak is one agent which has been used over the years. A novel *Moringa Oleifera* based dentifrice has given promising results in terms of its cytotoxicity, biocompatibility, and as a potent anti-inflammatory agent.Therefore, the present study aims to compare the efficacy of two commercially available Miswak and Moringa based herbal dentifrices on the reduction of plaque and gingivitis scores.

Materials and Methods: This randomized clinical cross-over study included 20 subjects with mild to moderate gingivitis. The study was conducted over a total examination period of 20 days with a wash-out period of 2 weeks between the use of both the toothpastes. The Plaque index and Gingival index of the study subjects were recorded at the designated time intervals throughout the study period.

Statistical Analysis: The data collected was entered on Microsoft Excel, and statistical analysis using SPSS software (SPSS version 28, Armonk, NY, IBM Corp, USA) was done. The statistical test used was the Wilcoxon sign rank test.Moreover, the P<=0.05 was considered significant.

Results: The results showed that the reduction in mean gingival index scores from baseline to day 3 was more statistically significant in Moringa based dentifrice. Similarly, the plaque index scores showed statistically significant reduction following the use of Moringa based dentifrice when compared to Miswak dentifrice. This study reveals that Moringa dentifrice is a safe and effective agent in reducing plaque accumulation and treating gingival inflammation.

Conclusion: The current study aims to provide an insight into the possible role of Moringa dentifrice as a possible adjunctive oral hygiene aid

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MATERIALS TEXT

The Moringa toothpaste (*Complete Essential Dental Care, USA*)

Miswak toothpaste (*Dabur Miswak, India*)

1 Antiplaue efficacy of moringa

Abstract

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Materials and methods

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4 Methodology

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The study was approved by the institutional ethical committee (ABSM/E/56/2020) and was conducted in accordance with the Helsinki declaration of 1975, as revised in 2013. The study was also registered in ClinicalTrials.gov (NCT04830176) and with protocol ID D-F-19-03-04. This cross-over randomized clinical study was performed using two different toothpastes; Toothpaste 1: Miswak *(Dabur, India)* toothpaste containing Miswak extract and essential oils ; Toothpaste 2: Moringa toothpaste (*Complete Essential Dental Care, USA*) containing predominantly moringa extracts, with traces of white oak bark, sage oil, banana peel extract, menthol and myrrh oil.

Patient selection:

The sample size was calculated using the online Raosoft tool. The margin of error was at 5%, the confidence level at 95%. Based on this, a sample size of 20 was calculated.Systemically healthy subjects with Gingival Index scores from 1 to 2 (Loe and Silness 1963) were included in the study. Patients with periodontitis (according to the AAP 2017 classification) , patients having smoking or tobacco chewing habits, patients under any form of medication in the previous 3 months and those who used any herbal dentifrice in the past 3 months were excluded from the study.

Study design:

The study was designed as a randomised clinical cross-over study with a total examination period of 20 days. The same examiner evaluated the subjects at all recall visits. All the subjects underwent an oral examination on day 0 (baseline) of the study.

The subjects were detailed about the need for clinical examination for research purposes, and written consent was obtained. The participants were blinded after they were assigned to the respective study groups and randomization of the subjects were done by drawing lots. The participants received a dentifrice with the labels removed and coded with an alphabet. At the initial visit, the Plaque Index (Silness and Loe 1964) and Gingival Index (Loe and Silness1963) were recorded (Baseline). Fone's toothbrushing technique was demonstrated to all the subjects for standardization of the brushing technique. Subjects were then instructed to use Miswak toothpaste (*Dabur Miswak, India*) for three days twice a day. After 72 hours, the evaluation of plaque and gingival scores were repeated. To mitigate the risk of a "carry-over effect", a wash out period was scheduled for a period of 2 weeks. And this is one of the reasons to design the duration of the study for a period of 20 days. A frequent recommendation for the wash-out period is to be at least 5 times the half-life of the treatment[17]. Subjects were then asked to use their regular dentifrice for the following two weeks. This was done to provide a wash-out interval after the use of toothpaste 1. The subjects were then recalled and evaluated for plaque and gingival scores (Baseline of toothpaste 2). The Moringa toothpaste (*Complete Essential Dental Care, USA*) was then given for the next three days to be used twice a day. After 72 hours of use of Toothpaste 2, plaque and gingival indices were assessed once again. This was followed by Phase 1 therapy for the study subjects and they were placed on maintenance therapy.

Statistical analysis

The data collected was entered on Microsoft Excel, and statistical analysis using SPSS software (SPSS version 28, Armonk, NY, IBM Corp, USA) was done. The statistical test was checked for normality of data distribution and since it was not homogenous, a non-parametric, Wilcoxon sign rank test was used. Moreover, the P<=0.05 was considered significant.

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