The efficacy of toothpaste containing kayu sugi (miswak) on dental plaque accumulation

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ABSTRACT

Introduction: Salvadora persica known as kayu sugi has been used for centuries as a natural toothbrush. Many research suggests that it contains a number of medically beneficial properties including abrasives, antiseptics, astringent, detergent, enzyme inhibitors and fluoride. Objective: to assess the efficacy of toothpaste containing Kayu sugi on dental plaque accumulation. **Method:** a total of 30 subjects took part, male student of Institute Technology of Bandung, age ranged between 18 and 26 years. Plaque was measured using plaque index from Turesky Gilmore & Glickman Index Modification of Quiqley & Hein at baseline (day 0). day 1. day 3, and day 7. Commercial toothpaste containing Kayu sugi (miswak) and non-Kayu sugi used as control in this pre and post test design, single blind study. **Results:** After analysed using the pair t-test, data showed that mean plaque index of participants using toothpaste containing Kayu sugi and non-Kayu sugi from baseline to day 7 were 1.70/1.19 and 1.61/1.44, respectively ($p<0.05$). Mean plaque index reduction of participants using toothpaste containing Kayu sugi and non-Kayu sugi fom base line to day 7 were 0.39 and 0.25, respectively ($p = 0.00$). the efficacy of toothpaste containing kayu sugi (miswak) on dental plaque accumulation both toothpastes were able to reduce plaque, but toothpaste containing Kayu sugi more effective in reducing plaque accumulation

Key words: toothpaste Kayu sugi, plaque index

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INTRODUCTION

The World Health Organization (WHO) defines traditional medicine as "the health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral-based medicines, spiritual therapy, manual technique and exercises, applied singularly or in combination to treat, diagnose and prevent illness or maintain well being". Various oral hygiene tools have been performed since thousand years ago. This has been verified by excavations done all over the world, in which toothpicks, chew sticks, tree twigs. linen strips, birds feathers, animal bones and porcupine quills were recovered. Originated from plants are tasty

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twigs and although primitive they represented a transitional step towards the modern toothbrush. It has been stated that about seventeen plants could be enumerated as natural sources oral hygiene devices. One of them is *kayu sugi*, scientifically known as Salvadora persica.[1]

In most Muslim countries, a popular form of oral self-care is the use of tree twigs such as miswak. Miswak is obtained froma plant called Salvadora Persica that grows in the Middle East,and used as a toothbrush to clean the teeth and surrounding gingival structures. Miswak roots, branches and bark grow in many diameters and lengths; however, 12–15 cm lengths are recommended for easy grasp and manipulation. Thick sticks are difficult to chew and fray; a 1 cm diameter frays well and allows the stick to transmit the pressure of cleaning without breaking or tissue injury.[2]

The miswak contains a number of medically beneficial properties including abrasives, antiseptics, astringent, detergent, enzyme inhibitors and fluoride. It can be recommended as an important and effective tool for maintenance of good oral and dental health. Due to various medicinal properties miswak has a very wide potential for use in dentistry. In addition to a better gum health, preventing tooth decay and eliminating toothache, it is also said to prevent further progression in decay that has already set in. Furthermore, it is claimed to create fragrance in the mouth, eliminate bad breath, improve the sense of taste and cause the teeth to glow and shine.[3]

Kayu sugi toothpaste is now available in markets as an alternative in controlling plaque accumulation in order to preserve good oral hygiene.[4] The aim of this study was to assess the efficacy of toothpaste containing *kayu sugi* on dental plaque compared to the non *kayu sugi* tooth paste.

METHODS

This study was approved by Health Research Ethics Committee of Faculty of Medicine Universitas Padjadjaran Bandung, Indonesia. The number of the ethical clearance letter is 94/FKUP-RSHS/KEPK/VI/2010. Thirty subjects were Malaysian Pharmacy students of Institute Technology, Bandung, aged between 18 and 26 years enrolled in this single blind, pre and post test study. The subjects were systemically healthy, does not use fixed or removable orthodontic appliances or removable prostheses, no periodontal disease, no caries or cervical restorations. Subjects were divided into test (Colgate *Kayu sugi*) and control group (Pepsodent). At baseline, after day 1, day 3 and day 7, subjects were scored for plaque after disclosure with disclosing solution by index using Turesky Gilmore & Glickman Index Modification of Quiqley & Hein (1970).[5]

The criteria for scoring plaque as follows: 0 = No plaque present; 1 = Separate flecks of plaque more than 1 mm at the cervical region of the tooth; 2 = Thin continuous band of plaque more than 1 mm at the cervical margin; 3 = Band of plaque thicker than 1 mm but covering less than one third of the crown; 4 = Plaque covering two thirds or more of the crown; All plaque scoring was performed by the same clinician who was blinded to the procedure performed. Collected data were analyzed with pair-t test.

Study subject were divided into two groups, each group consisting of 15 students. Group 1 and group 2 both received different types of toothpastes. Study subjects were then instructed to brush their teeth at home with the given tooth paste and tooth brush. Technique used to brush teeth is according to each individual's method, frequency of twice daily, which is morning after breakfast and night before bed time for duration of two minutes each time.

RESULT

All subjects completed this study. The data in Table 1 show the overall mean plaque index at baseline, day 1, day 3 and day 7 with toothpaste containing Kayu sugi and non-*kayu sugi*. From baseline until day 3, no significance difference between toothpaste containing Kayu sugi and non-*kayu sugi*, and there was significance difference on day 7 (P=0.01).

Table 2 shows the reduction of mean plaque index from baseline to day 1, day 3, and day 7 comparing between toothpaste containing Kayu sugi and without Kayu sugi. There was sigificant reduction of plaque index starting from baseline to the 3rd day (p=0.030) and 7th day (P

Table 1. Mean plaque index at baseline, day 1, day 3, and day 7 using toothpaste containing kayu sugi and non-kayu sugi

Toothpaste	n	Baseline (SD)	Day 1 (SD)	Day 3 (SD)	Day 7 (SD)
Kayu sugi	15	1.70(0.42)	1.56(0.43)	1.41(0.42)	1.19(0.43)
Nonkayu Sugi	15	1.61(0.32)	1.57(0.32)	1.41(0.40)	1.44(0.45)
P-value		0.85	0.71	0.54	0.01*

***significant at α = 5%**

Table 2. Mean plaque index reduction from Baseline (BL) to Day 1. Day 3 and Day 7 with toothpaste containing Kayu sugi and Non-Kayu sugi

Toothpaste	BL-Day I (SD)	BL-Day 3 (SD)	BL-Day 7 (SD)
Non-Kayu sugi	0.03 (0.06)	0.13(0.26)	0.25(0.38)
P-value	0.078	0.030*	0.000*
Kayu sugi	0.12(0.16)	0.20(0.16)	0.39(0.16)
P-value	0.08	0.70	0.00*

=0.00) for toothpaste containing Kayu sugi, while for toothpaste without Kayu sugi siwificant reduction of plaque index was only the 7th day (P=0.00).

DISCUSSION

The finding of this present study showed that both toothpaste containing Kayu sugi and without Kayu sugi may reduce plaque accumulation. The amount of plaque reduced was significantly difference between these two toothpastes. Toothpaste containing Kayu sugi may prevent more plaque accumulation than without Kayu sugi. Previous study conducted by Rattenberg et al. (2006), suggested similar result that there was reduction in plaque formation when treated with *kayu sugi* toothpaste.[6] Koensoermardijah (2001), also suggested that the Kayu sugi has a good antibacterial property based on microbiological assay,[7] like study by Nordin, found that the potentials of Salvadora persica are not only based on its mechanical properties but also depends on its biological properties such as antibacterial, antifungal and antiplaque that will help in preventing dental problems such as dental plaque, dental caries, periodontal diseases and gingivitis.[8]

The study conducted in India by Sridar showed reduction in plaque accumulation in subjects treated with Kayu sugi essential oil containing gel.[9] Researchers have discovered quite a number of naturally occurring qualities in Kayu sugi tree, including thai it contain a natural chlorine which whiten and removes tartar and satins, also contain Tannic acid and Vitamin C beneficial for healthy gums and Sulfur which help to keep the mouth clean. All these properties Nere found in Kayu sugi toothpaste, are excellent in a high degree of efficiency in plaque removal to maintain good oral hygiene in adults.[10,11]

CONCLUSION

It is concluded that both toothpastes were able to reduce plaque, but toothpaste containing Kayu sugi more effective in reducing plaque. This herbal product could be used as an alternative for people interested in natural product.

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