



# The Effectiveness of Use of Herbal Dental Paste on Gingivitis Marginalis in Peukan Bada District, Aceh Besar Regency

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## Abstract

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**BACKGROUND:** The most common periodontal disease in developing countries is gingivitis. Gingivitis is a dental and oral health problem with a reasonably high prevalence in society at all age groups. Gingivitis is characterized by inflammation and bleeding of the gums. One way to prevent bleeding gums is to use herbal toothpaste.

**AIM:** The aim of the study was to determine the effectiveness of using betel leaf herbal toothpaste against gingivitis marginalis in Rima Jeuneu Village, Peukan Bada District, Aceh Besar District.

**METHODS:** This study used analytical survey research with a cross-sectional design. The location for this research is Rima Jeuneu Village, District. This research was conducted from September to October 2021. Bivariate data analysis to determine the relationship between the independent variable (brushing teeth using betel herbal toothpaste) and the dependent variable (gingivitis marginalis) in this study used the Chi-square test.

**RESULTS:** The results of statistical analysis using the Chi-square test found that there was a significant relationship between brushing teeth using herbal betel toothpaste and gingivitis marginalis in the community (( $p = 0.000 < 0.05$ ). A survey reinforces that brushing teeth using herbal betel toothpaste has healthy gingival conditions (71.9%). The use of herbal betel toothpaste is effective in preventing gingivitis marginalis. Betel leaf toothpaste has an antibacterial effect against several types of bacteria, one of which is *Streptococcus mutans*.

**CONCLUSION:** There is a relationship between brushing teeth using herbal betel toothpaste with gingivitis marginalis in the people of Peukan Bada District, Aceh Besar District. Brushing teeth using betel herbal toothpaste is effective in reducing the level of gingivitis

## Introduction

General health and quality of life are strongly influenced by oral health and the prevalence of oral and dental diseases [1]. Oral health is an integral part of overall health and well-being, with poor oral health and untreated oral conditions harming the quality of life [2]. Preventable and treatable oral diseases remain widespread, especially in poor and underserved populations [3]. The burden of oral diseases such as dental caries, periodontal disease, tooth loss, and oral mucosal lesions is very high in developing and developed countries and is considered a significant public health problem globally [4]. It was recently reported that the total cost of treating dental diseases was \$544.41 billion worldwide in 2015 [5]. One of the most common conditions is periodontal disease, which affects about 20–50% of the global population [6].

Gingivitis is one of the most common periodontal diseases in developing countries. Gingivitis is a dental and oral health problem that has a reasonably high prevalence in the community in all age groups [7]. Gingivitis is characterized by inflammation and bleeding of the gums. Gingivitis rarely causes spontaneous

bleeding and is generally painless. Therefore, many patients do not recognize the disease and fail to seek attention [8]. The leading cause of gingivitis is plaque that forms on the surface of the teeth and gums. The high number of dental and oral diseases still occur in today's society is caused by poor hygiene factors. Several surveys have stated that dental and oral diseases affect 90% of Indonesian people, and about 86% suffer from gingivitis [9]. Riskesdas data in 2018 show the highest number of gingivitis diseases in Indonesia with an age range of 35–44 years, which is 8312 [10]. At present, efforts to prevent the occurrence of gingivitis are needed. These efforts can be made, among others, by brushing the teeth twice a day and choosing the right toothpaste.

The wrong choice of toothpaste can increase the risk of gingivitis. Betel leaf is a traditional ingredient that the community has widely used for a long time because it has a pharmacological effect [11]. Betel leaf is a traditional medicinal plant around us, known by the scientific name *Piper Betel L.* However, *P. betle* grown in other countries has been shown to have antimicrobial, gastroprotective, [13], [14] wound healing, hepatoprotective and antioxidant properties [12]. Based on the results of interviews with the people of Rima

Jeuneu Village, they often experience bleeding in their gums when brushing their teeth, the gums look reddish, and there is a change in the shape of the gum surface. The initial examination of 20 respondents showed that 12 respondents had marginal gingivitis with moderate criteria, while five had mild marginal gingivitis. Therefore, the purpose of knowing the relationship between brushing teeth using herbal betel toothpaste and gingivitis marginalis in Peukan Bada District, Aceh Besar District.

## Method

This type of research uses analytical survey research with a cross-sectional design. The population used in this study were people who used betel leaf herbal toothpaste in Rima Jeuneu Village, Peukan Bada District, Aceh Besar District. The sample of this study was 32 respondents who used betel leaf herbal toothpaste in Rima Jeuneu Village, Peukan Bada District, Aceh Besar District. This research was carried out from September to October 2021. The instruments used in this research are writing instruments, respondent identity sheets, questionnaires, gingivitis examination sheets, diagnostic tools (mouth mirror, tweezers, sonde), and flashlight. Primary data are data obtained directly with the respondent, namely from interviews and examination of the respondent's gingival health. Secondary data is obtained indirectly, namely from the Rima Jeuneu Village Head office, Peukan Bada District, Aceh Besar Regency, regarding the total number of Family Cards, population, and others. Bivariate data analysis to determine the relationship between the independent variable (brushing teeth using herbal betel toothpaste) and the dependent variable (gingivitis marginalis) in this study used the Chi-square test.

## Results

### Univariate analysis

The frequency distribution of respondents' gender in Rima Jeuneu Village, Peukan Bada District, Aceh Besar Regency is as follows:

Based on Table 1, it is known that the gender of the respondents is mainly in the female sex category, amounting to 17 respondents (53%). Most of the respondents were 30–35 years old, totaling 19 respondents (59%). The education level of the respondents was mainly in the higher education category, amounting to 27 respondents (84%). The gingivitis marginalis index gingivitis marginalis respondents mainly were in the healthy category, amounting to 23 respondents (72%).

**Table 1: Gender frequency distribution of the Rima Jeuneu Village Community, Peukan Bada District, Aceh Besar District**

Characteristics	Category	Frequency	%
Gender	Woman	17	53
	Man	15	47
	Total	32	100
Age	30–35 years	19	59
	36–40 years	9	28
	41–45 years	4	13
	Total	32	100
	Level of education	Basic education	3
	Middle education	2	6
	Higher education	27	84
	Total	32	100
Marginal gingivitis index	Healthy	23	72
	Mild Inflammation	6	19
	Moderate Inflammation	3	9
	Severe Inflammation	0	0
	Total	32	100

### Bivariate analysis

Based on the results of a bivariate analysis to determine the relationship between brushing teeth using herbal betel toothpaste and gingivitis marginalis. After all the results have been collected from the respondents, data analysis is carried out using a statistical analysis program. The analysis used in this research is the Chi-square test. This can be seen in the following Table 2.

**Table 2: Distribution of respondents based on the relationship between brushing teeth using betel herbal toothpaste and gingivitis marginalis**

Use betel herbal toothpaste	Marginal gingivitis								df	p		
	Healthy		Light		Currently		Heavy				Total	
	n	%	n	%	n	%	n	%			n	%
Good	23	71.9	0	0	0	0	0	0	23	72	2	0.000
Not good	0	0	6	18.8	3	9.4	0	0	9	28		
Total	23	72	6	19	3	9	0	0	32	100		

Based on the results from Table 2, it is known that the respondents who used betel herbal paste in the excellent category mostly had healthy gingival conditions, totaling 23 people (72%). The statistical analysis results with the Chi-square test obtained a significance value ( $p$ ) = 0.000 < 0.05, which is statistically significant between brushing teeth using betel herbal toothpaste and gingivitis marginalis in the people of Rima Jeuneu Village, Peukan Bada District, Aceh Besar District.

## Discussion

The use of herbal betel toothpaste for the people of Rima Jeuneu Village, Peukan Bada District is in a good category; this can be seen from the results of interviews with respondents. Many respondents stated that they strongly agree with brushing their teeth with betel herbal toothpaste. Betel herbal toothpaste effectively prevents swollen gums, overcomes lousy breath, preventing cavities, and others. Several studies have also shown that herbal mouthwashes such as Piper Sirih mouthwash can be used as adjuncts to various oral hygiene practices such as tooth brushing, flossing, have anti-inflammatory properties, and are not artificial

preservatives [15]. Use of toothpaste containing betel herb is suggested to be used as an alternative to reduce the prevalence of gingivitis. Betel leaf toothpaste has an antibacterial effect against several types of bacteria, one of which is *Streptococcus mutans* [16]. Betel leaf contains essential oil where the main component of the essential oil is phenol, and its derivative compound is chavicol which has bactericidal power five times stronger than phenol. Piper leaf was found to have anti-inflammatory, anti-allergic, wound healing, antiplatelet, antioxidant activity, including antibacterial and antifungal activity. The efficiency of mechanical tooth cleaning procedures. It has been claimed that chewing betel nut can strengthen teeth and gums and maintain oral hygiene [17], [18]. Chewing betel nut has been practiced for centuries [19]. The results showed a decrease in chronic marginal gingivitis disease by observing the gingival index [20]. Significant changes were found on the 21<sup>st</sup> day of using betel leaf extract toothpaste. Betel leaf extract toothpaste showed its effectiveness in lowering the gingival index. Toothpaste containing herbal betel leaf lowers gingivitis scores more than non-herbal kinds of toothpaste [21]. This decrease occurred because herbal toothpaste has advantages in the content of betel leaf extract, namely, essential oils. Essential oils are natural phenolic components that can act as powerful antiseptics. The performance of phenol has an antibacterial effect against several types of bacteria, and one of them is a bacterium that often resides in the oral cavity, namely *Streptococcus mutans*. The presence of phenol is a toxic compound, causing the protein's three-dimensional structure to be disturbed and open to a random structure. This causes the protein to be denatured and the biological activity to be damaged so that the growth of streptococci stops. The presence of phenol in the form of toxic compounds can cause the structure of the protein to be disturbed and open so that it becomes a random structure. This causes the protein content to be denatured and the biological activity to be damaged, thereby affecting the growth of the streptococcus bacteria to stop. This compound is bactericidal and inhibits the glycolysis process by cariogenic bacteria that produce glucans, reducing the formation of dental plaque.

## Conclusion

There is a significant relationship between brushing teeth using betel herbal toothpaste and marginal gingivitis ( $p = 0.000 < 0.05$ ). A survey reinforces that brushing teeth using herbal betel toothpaste have healthy gingival conditions (71.9%).

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