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### The Effect of Giving Probiotic Drinks on Reducing Halitosis

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#### ABSTRACT

**Background.** Halitosis is a condition in which an unpleasant odor caused by oral microbes comes out of a person's mouth during exhalation, which makes other people feel uncomfortable. Probiotics seek to maintain the homeostasis of bacteria in the gastrointestinal tract to suppress the proliferation of pathogenic bacteria. This study aims to evaluate the potential of probiotics against halitosis as assessed by the levels of volatile sulfur compounds (VSCs). **Methods:** The design of this study is an experimental study with a pre-post test approach. A total of 30 research subjects with criteria aged 20-28 years with complaints of halitosis seek treatment at the dental and oral polyclinic of Siti Hajar Hospital. Research subjects were asked to rinse their mouth with one of the commercial probiotic drinks already circulating in the market, where previously the levels of volatile sulfur compounds (VSCs) and after rinsing the probiotic drink, the levels of VSCs were measured again. Data analysis was carried out with the help of SPSS version 21 software. A univariate data analysis was carried out to obtain an overview of the distribution of degrees and levels of Volatile, Sulfur Compounds (VSCs) before, and after giving drinks probiotics. **Results:** The provision of probiotic drinks is sufficient to provide a significant qualitative change effect where there is a change in the degree of halitosis of the research subjects. After consuming probiotics, there was an improvement in the degree of halitosis of the research subjects, whereas there were no more subjects with severe halitosis. **Conclusion:** Consumption of probiotic drinks can reduce the levels of VSCs in the oral cavity, which indicates the ability of probiotics to reduce halitosis.

#### 1. Introduction

Dental and oral health is the main door to achieving optimal health. Oral health is not only limited to neat and clean teeth but also free from oral diseases such as halitosis. Healthy oral health can enable a person to communicate well without reducing the quality of life.<sup>1,2</sup> Halitosis can also be called feter ex ore, feter oris, or oral malodor which is a condition in which an unpleasant odor caused by oral microbes comes out of a person's mouth during exhalation, which makes other people feel uncomfortable.<sup>3,4</sup>

About 90% of cases of halitosis are caused by poor

oral hygiene. This is often the reason for patients to go to the dentist. In the United States, halitosis is the third most for visits to the dentist, with a frequency only below caries and periodontal disease. Halitosis is not a disease, but rather a symptom that will cause a disease or disorder that is not realized and the cause must be sought.<sup>5,6</sup> Studies show that the prevalence of halitosis 22 % to 50%. Another study of 4817 people in France, found 22% of correspondents have halitosis. Another study showed that 23% of subjects had halitosis. This is evidenced by the discovery of an average of 75 ppb

(parts per billion) of Volatile Sulfur Compounds (VSCs) in the breath that comes out of the mouth for 1 day.<sup>7-9</sup>

Various methods are used to eliminate halitosis, including gargling with mouthwash, brushing teeth, disinfectants, tongue scrapers, and antibiotics. The use of probiotics is also believed to be beneficial in reducing halitosis. Probiotics initiate several mechanisms, including alteration of flora composition and immunomodulation. Probiotic products are generally made with strains of *Lactobacillus*, *Bifidobacterium*, *Propionibacterium*, or *Streptococcus salivarius sub sp*, and *Thermophilus bacteria*.<sup>10,11</sup> Probiotics seek to maintain the homeostasis of bacteria in the gastrointestinal tract to suppress the proliferation of pathogenic bacteria. This study aims to evaluate the potential of probiotics against halitosis as assessed by the levels of volatile sulfur compounds (VSCs).

## 2. Methods

The design of this study is an experimental study with a pre-post test approach. A total of 30 research subjects with criteria aged 20-28 years with complaints of halitosis who seek treatment at the dental and oral polyclinic of Siti Hajar Hospital from January 1-31 2022, were included in this study. Research subjects were asked to rinse their mouth with one of the commercial probiotic drinks already circulating in the market, where previously the levels of volatile sulfur compounds (VSCs) and after rinsing the probiotic drink, the levels of VSCs were measured again. Before being given a probiotic drink, the sample was first measured for VSC levels with Breathron II for 45 seconds. Furthermore, the subjects were instructed to

rinse their mouth with 10 ml of 3 X 1 probiotic drink (1 pack) for 30 seconds every morning, afternoon, evening after brushing their teeth. After gargling, the patient was instructed to rinse with water. Subjects were instructed to do this for 1 week. On the 7th day, it was checked again, to see the level of VSC gas. During the study, subjects were prohibited from smoking, eating jengkol, and various foods that cause a sharp odor that affects VSCs gas.

Data analysis was carried out with the help of SPSS version 21 software. Univariate data analysis was carried out to obtain an overview of the distribution of the degree and level of volatiles, sulfur compounds (VSCs) before, and after giving probiotic drinks. Furthermore, the data were analyzed using a paired t test to analyze the difference in the average levels of volatile, sulfur compounds (VSCs) before and after rinsing probiotic drinks.

## 3. Results

Figure 1 shows that the administration of probiotic drinks is sufficient to give a significant qualitative change effect where there is a change in the degree of halitosis of the research subjects. Before consuming probiotic drinks, there were 10 respondents or almost a third of the total respondents with severe halitosis. After consuming probiotics, there was an improvement in the degree of halitosis of the research subjects, whereas there were no more subjects with severe halitosis. Normal VSCs levels are less than 100 ppb, are 101-250 ppb, moderate VSC levels 251-600 ppb and a heavy VSC content of more than 600 ppb.

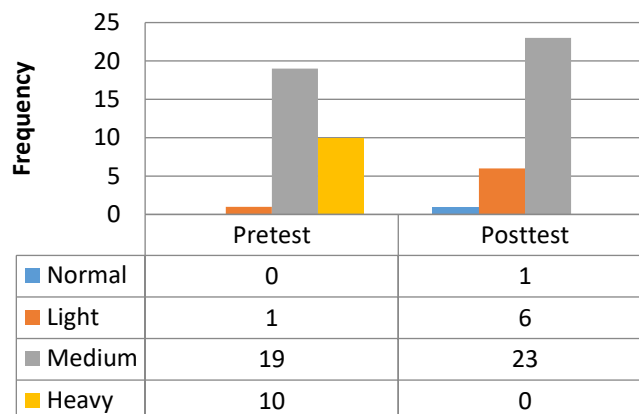


Figure 1. Degrees of halitosis pretest and posttest

Table 1. Comparison of volatile sulfur compounds (VSCs) levels before and after consumption

Treatment	VSCs levels	P
	$\bar{X} \pm SD$	
Before	514.67±148.57	0.000*
After	370.23±130.04	

\*paired-T test, p<0.05.

Table 1 shows the comparison of the average VSCs levels of the research subjects before and after being given probiotic drink consumption. The mean levels of VSCs showed a significant decrease after consuming probiotic drinks compared to before consuming probiotic drinks. Table 1 is in line with Figure 1 which shows the degree of improvement of halitosis.

#### 4. Discussion

Halitosis is one of the dental and oral health problems that is often used as a reason for patients to go to the dentist. Generally, halitosis is caused by the activity of some residual bacteria mainly caused by *Fusobacterium nucleatum*, *Porphyromonas gingivalis*, *P. intermedia*, and *Treponema denticola*, as well as epithelial cells found in the oral cavity, and produce volatile sulfur compounds (VSCs). Three amino acids can produce volatile sulfur compounds (VSC), namely cysteine to produce hydrogen sulfide (H<sub>2</sub>S), methionine to produce methyl mercaptan (CH<sub>3</sub>SH), and cystine to produce dimethyl sulfide (CH<sub>3</sub>SCH<sub>3</sub>). Halitosis conditions occur due to hydrogen sulfide (H<sub>2</sub>S) levels of more than 1.5 ηg/10ml, methyl mercaptan (CH<sub>3</sub>SH) more than 0.5 ηg/10ml, and dimethyl (CH<sub>3</sub>SCH<sub>3</sub>) more than 0.2 ηg/10ml. The characteristics of this gas are like rotten cabbage, where one of the halitosis therapies that can be done is using a mouth rinse. Mouth rinses generally contain chlorhexidine which can kill pathogenic bacteria that produce VSCs. However, long-term use of chlorhexidine causes various problems and disorders of the oral tissues. Chlorhexidine irritates the oral mucosa, when used long-term and disrupts the homeostasis of the normal flora in the oral cavity.<sup>12-16</sup>

Probiotics are live microorganisms that are safe for human consumption and insufficient quantities so that they have a beneficial effect on human health. Probiotics are available in a variety of products,

including lozenge tablets, yogurt, cheese, rinse solution capsule liquid, a yogurt drink. The main microorganisms found in probiotics are *Lactobacillus* sp. *Lactobacillus* sp is the main bacterium that plays a role in maintaining the homeostasis of the normal flora in the gastrointestinal tract. The presence of *Lactobacillus* sp can suppress the proliferation of pathogenic bacteria in the oral cavity and gastrointestinal tract. The ability of probiotics to suppress the proliferation of various pathogenic bacteria causes a decrease in VSCs which are a by-product of various activities and metabolism of pathogenic bacteria.<sup>17-20</sup>

#### 5. Conclusion

Consumption of probiotic drinks can reduce the levels of VSCs in the oral cavity, which indicates the ability of probiotics to reduce halitosis.

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