

CHAPTER I

PRELIMINARY

A. Background

The mouth is the organ that frequently infected by many pathogens such as protozoa, viruses, bacteria, and fungi. In the oral cavity, a wide variety of normal flora inhabits parts of the oral cavity, such as the teeth and oral mucosa. The presence of normal flora in the oral cavity is not always beneficial. Under certain conditions, normal flora can cause diseases, such as dental caries that occurred by the wrong brushing time. Usually people brush their teeth when taking a morning shower and an afternoon bath, instead of after breakfast and before going to bed at night. In addition, high levels of dental caries can be associated with poor eating habits and behaviors of most people who like sweet snacks, so people are less concerned about maintaining oral hygiene.¹ Dental caries is usually caused by the bacterium *Streptococcus mutans*, which is the most dominant bacteria found in the oral cavity other than *Staphylococcus aureus*.² Apart from dental caries, another problem with teeth and mouth are mouth ulcer. Mouth ulcers usually caused by several factors, such as infection, food allergies, and stress. The leading cause of mouth ulcer is fungus *Candida albicans*.³

Oral health plays an essential role to conduct a healthy lifestyle. If oral hygiene is not properly considered, it will cause various diseases

¹ Mega Anugrah et al., "Hubungan Pola Makan Dan Kebiasaan Menyikat Gigi Dengan Kesehatan Gigi Dan Mulut (Karies) Di Indonesia," *Hubungan Pola Makan* (n.d.).

² Dessy Abdullah and Mutiara Anissa, 2014. Pengaruh Berkumur Larutan Madu Terhadap Ph Saliva Pada SDN Air Tawar Timur Kecamatan Padang Utara. *Jurnal Kesehatan Saintika Meditory*.

³ Pangalinan et al., "Uji Aktivitas Antijamur Ekstrak Etanol Kulit Batang Rambutan (*Nephelium Lappaceum* L.) Terhadap Jamur *Candida Albicans* Secara in Vitro," *Pharmakon : Jurnal Ilmiah Farmasi* 1, no. 1 (2011): 7–12.

in the oral cavity. Mouth ulcer and dental caries are most common consequences of poor oral hygiene.⁴ If left untreated, dental caries could causing gum disease, tooth decay, tooth loss, and bad breath. ⁵ While mouth ulcer, if left untreated, could causing oral cancer.⁶

One of treatments that can be done to reduce the number of bacteria and fungi is to gargle. Gargling can be done with mouth solution made from both natural and chemical ingredients. The natural ingredient that can be used for gargling is a honey solution because honey is safe for consumption and has very few side effects. Honey also have an impact on the health of the oral cavity, because the glucose contained in honey can be absorbed by the body and honey can inhibit the growth of bacteria.⁷ Honey is one of the ingredients that is widely used in Islamic medicine, which is based on the word of Allah in the Qur'an chapter An-Nahl verses 68-69, which reads:

وَأَوْحَىٰ رَبُّكَ إِلَى النَّحْلِ أَنِ اتَّخِذِي مِنَ الْجِبَالِ بُيُوتًا وَمِنَ الشَّجَرِ وَمِمَّا
يَعْرِشُونَ (٦٨) ثُمَّ كُلِّي مِنْ كُلِّ الثَّمَرَاتِ فَاسْلُكِي سُبُلَ رَبِّكِ ذُلًّا يَخْرُجُ
مِنْ بُطُونِهَا شَرَابٌ مُخْتَلِفٌ أَلْوَانُهُ فِيهِ شِفَاءٌ لِلنَّاسِ إِنَّ فِي ذَٰلِكَ لَآيَةً لِّقَوْمٍ
يَتَفَكَّرُونَ (٦٩)

'And your Lord revealed to the bees, "Make nests on hills, in trees,

⁴ Ratih Larasati, "Hubungan Kebersihan Mulut Dengan Penyakit Sistemik Dan Usia Harapan Hidup," *Skala Husada* 9, no. 1 (2012): 97–104.

⁵ Efrida Warganegara and Devi Restina, "Getah Jarak (*Jatropha Curcas* L .) Sebagai Penghambat Pertumbuhan Bakteri *Streptococcus Mutans* Pada Karies Gigi Jarak ' s Sap (*Jatropha Curcas* L .) as the Growth of *Streptococcus Mutans* Inhibitor in Dental Caries" (n.d.): 1–6.

⁶ MM Simatupang - Skripsi. Departemen Mikrobiologi Fakultas and Undefined 2009, "Candida Albicans Oleh Dr. Maria Magdalena Simatupang," *Academia.Edu* (2008), <https://www.academia.edu/download/31728838/09E01452.pdf>.

⁷ Annisa Fairus Syafira, Masyhudi, and Sinar Yani. 2019. Efektivitas Ekstrak Etanol Daun Beluntas *Pluchea Indica* (L.) Less Terhadap Bakteri Saliva Secara in Vitro. *Dental Journal* 6.

and in places made by humans,” then eat from every (sort of) fruit and follow the path of your Lord, which has been made easy for (to you). (An- Nahl : 68-69)'

The antibacterial properties of honey can treat infections due to wounds. Honey can also relieve a pain, improve blood circulation, and affect the healing process. There are four components of honey that have an antibacterial effects. First, is the sugar content that is relatively high, so it can inhibit the growth of bacteria. Second, the high acidity level of honey (pH 3.65) can decrease the growth and viability of bacteria. Third, the presence of hydrogen peroxide, can kill pathogenic microbials. Fourth, the presence of organic compounds that have antibacterial properties.⁸

The varieties of honey in Indonesia are very abundant such as manuka honey, acacia honey, eucalyptus honey, rubber honey, ax honey, Sumatran forest honey, and trigona honey. Trigona honey can be used to treat problems in the oral cavity, such as mouth ulcer, dental caries, and plaque for the presence of flavonoids, vitamins, enzymes, amino acids, organic acids, carotenoids, and aromatic substances.⁹

Based on the background that has been mentioned this research was aimed to know the effect of gargling using trigona honey solution on bacteria and fungi in dental caries and mouth ulcers, by knowing the optimal concentration of trigona honey solution, which has an optimal effect on reducing the number of bacteria and fungi in dental caries and mouth ulcers.

B. Formulation Of The Problem

The formulation of the problem in this study is as follows:

1. How does the effect of gargling using trigona honey solution on bacteria and fungi in dental caries and *Candida albicans* in thrush?

⁸ Yuliati, Uji Efektifitas Larutan Madu Sebagai Antibakteri Terhadap Pertumbuhan *Staphylococcus Aureus* dan *Pseudomonas Aeruginosae* Jakarta, 2017 Hal 7–15.

⁹ Emma sitah. 2020. Uji FTIR Dan Uji Fitokimia Dari Madu Trigona Spp Untuk Persiapan Suplemen Wanita Prakonsepsi,” *Jurnal Keperawatan Muhammadiyah*.

2. What is the best optimum concentration of the honey solution used for gargling which has the optimum effect on reducing the number of bacteria and fungi in dental caries and mouth ulcer?

C. Research Objectives

The aim of this research is :

1. Knowing the effect of gargling using trigona honey solution on bacteria and fungi in dental caries and mouth ulcer.
2. Knowing the best concentration of the trigona honey solution used for gargling, which has an optimal effect on reducing the number of bacteria and fungi in dental caries and mouth ulcer.

D. Research Benefits

1. Theoretical Benefits

The results of this study are expected to be beneficial developing on knowledge in the pharmaceutical field related to the use of traditional medicine as an alternative for reducing the number of bacteria in dental caries and mouth ulcer by utilizing trigona honey solution.

2. Practical Benefits

The results of this study are expected to be useful and this is theoretical benefits, for people who experience dental caries and mouth ulcer to use honey solution for treatment. The products of this research can be used as a safe mouthwash product by utilizing natural ingredients.

E. Authenticity of Research

Research on the use of honey on the bacterial profile in saliva has been carried out by several researchers, as shown in table 1 regarding the authenticity of this study.

Table 1 Research Authenticity

Research title	Research methods	Variable	Result	Renewal
Effect of Gargling Honey Solution on Gingivitis in Shiva Class VIII MTSN 3 Tasikmalaya City.	Quasy experiment design	Dependent : Shiva Class VIII MTSN 3 Tasikmalaya City Independent : Gargling Honey Solution	Gargling honey solution the effect of gargling honey solution on gingivitis with a decrease in the average raa-of mild criteria.	Dependent : Bacteria in dental caries and <i>Candida albicans</i> in mouth ulcer Independent : Gargle trigona honey solution
Differences in the Effectiveness of Gargling Honey Solution and Green Theory Solution on Reducing Plaque Index ¹⁰	pre-experimental with a research design of two groups pretest-posttest group.	Dependent: Decreased plaque index Independent: Gargle with a solution of honey and green tea solution	Gargling by honey solution and green solution are both effective in lowering plaque index and there is no meaningful difference between them.	Dependent: Bacteria in dental caries and <i>Candida albicans</i> in mouth ulcer Independent : Gargle trigona honey solution
Testing the Effectiveness of Honey Solution as an Antibacterial Against the Growth of <i>Staphylococcus aureus</i> and <i>Pseudomonas aeruginosae</i> Using the Disk Diffusion Method ¹¹	Experimental with disc diffusion method and well diffusion method	Dependent: A honey solution as an antibacterial Independent: Measure the zone of inhibition on agar media.	The antibacterial effectiveness of the honey solution is more effective against <i>Staphylococcus aureus</i> than against <i>Pseudomonas Leguminosae</i>	Dependent: Bacteria in dental caries and <i>Candida albicans</i> in mouth ulcer Independent : Gargling with trigona honey solution

¹⁰ Asih, Lendrawati, dan Didin. Pengaruh Berkumur Dengan Larutan Teh Hijau Dan Teh Hitam Terhadap PH Saliva. no 77. hal 1–12.

¹¹ Yuliati. 2017. Uji Efektivitas Larutan Madu Sebagai Antibakteri Terhadap Pertumbuhan *Staphylococcus Aureus* dan *Pseudomonas Aeruginosae*, Jakarta.

The Effect of Honey Solution with a Concentration of 15% on Decreasing Gingivitis Scores in Martapura 4 Junior High School Students. ¹²	Pseudo experimental design	Dependent: Honey Solution With a 15% Concentration Independent: Decreased Gingivitis Score	There is a significant effect of gargling honey solution with a concentration of 15% on reducing gingivitis scores in students of SMPN 4 Martapura.	Dependent: Bacteria in dental caries and Candida albicans in mouth ulcer Independent : Gargling with trigona honey solution
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¹² Siti Salamah, "Pengaruh Larutan Madu Dengan Konsentrasi 15% Terhadap Penurunan Skor Gingivitis Pada Siswa Sekolah Menengah Pertama Negeri 4 Martapura" 5, no. 2 (2014): 4–6.