

CHAPTER I

INTRODUCTION

1.1 Background

The skin is one of the largest organs of the body and contains various types of bacteria, germs, fungi, viruses and also includes organisms that are harmless but can also be potential pathogens that can cause itching. According to the research by Hidayati et al., (2019) the itching appears due to bacterial infection on the surface of the skin. The bacteria produce enzymes that react directly to skin nerve cells, which causes itching.¹ Mochamad et al., (2017) noted that the eczema or skin irritation occurs around 20% in children and 10% in adults.²

Skin infections are generally caused by *Staphylococcus aureus* bacteria accompanied by increased sebum production on surfaces with hair such as the scalp, hand skin, chest skin, and so on.³ *Staphylococcus aureus* is a bacteria that commonly resides on the surface of the skin. It is found on skin that has been exposed to dry, heated or cold air for too long. *Staphylococcus aureus* bacteria are found on the skin surface as normal flora, especially around the folds of the skin, nose, mouth, genitals and around the anus. This bacterium causes skin infections, usually in the form of a reddish rash accompanied by itching on the skin surface.⁴

Allah SWT often tempts His servants with various diseases and conditions that have an impact on the body, such as skin irritation. As the outside layer of the body, the skin is susceptible to bacterial infections, germs, and various environmental factors such as hot weather, long-term exposure to sunshine, skin moisture, and air pollution. These factors can cause skin inflammation and other health problems.⁵ Allah SWT says in the Qur'an, that Allah has given temptation to

¹ Afif Nurul Hidayati et al., "Infeksi Bakteri di Kulit" (Airlangga University Press, 2019).

² Mochamad Iqbal Hassarief Putra et al., "Faktor Risiko Methicillin Resistant *Staphylococcus aureus* pada Pasien Infeksi Kulit dan Jaringan Lunak di Ruang Rawat Inap," *Jurnal Penyakit Dalam Indonesia* 1, no. 1 (January 25, 2017): 3, <https://doi.org/10.7454/jpdi.v1i1.32>.

³ Wizar Putri Mellaratna and Indri Yustati Ritonga, "Furunkel Folikulitis Et Tinea Corporis," *Jurnal Anestesi* 1, no. 4 (Oktober 2023): 33–39.

⁴ Muh Rifky Mapallawa and Zulfiyah Surdam, "Uji Efektivitas Ekstrak Rumpun Laut (*Gracilaria* sp.) terhadap Bakteri *Staphylococcus aureus*," *Fakumi Medical Journal* 2, no. 1 (2022).

⁵ Sonny J. R. Kalangi, "Histofisiologi Kulit," *JURNAL BIOMEDIK (JBM)* 5, no. 3 (April 16, 2014).

Prophet Ayub AS by afflicting him with a skin disease for years in Surah Al-Anbiyaa' verse 83 which reads:

وَأَيُّوبَ إِذْ نَادَىٰ رَبَّهُ ۖ أَنِّي مَسَّنِيَ الضُّرُّ وَأَنْتَ أَرْحَمُ الرَّحِيمِينَ

And (remember the story of) Ayub, when he called out to his God: “O my God, indeed I have been afflicted with a disease, and You are the Most Merciful of all the Merciful”..” (Q.S. Al-Anbiyaa’ : 83)⁶

The skin disease suffered by Prophet Ayub AS was one of the conditions that made the skin injured and caused a very painful itching, which was a severe test from Allah SWT. However, he remained patient and believed that healing would come by the will of Allah SWT.⁷ Keeping our skin hygienic is important to prevent skin irritation in our daily lives. Like Prophet Job AS, who kept trusting and surrendering to Allah, we should regularly take care of our health, including skin hygiene, by using antiseptic soap properly. Keeping our skin hygienic is a way to be grateful for the health that Allah has given us and prevent irritation, infection, and other skin diseases.⁸

Bacterial infections on the skin can be prevented by using pharmaceutical preparations that can reduce the growth of microbes in the body. Body wash is the main alternative for many people to remove dirt or dust that sticks to the body after activities to protect the body from disease pathogens or infections. Soap is produced from the reaction of fatty acids and strong bases which then produce soap and glycerol.⁹ Most of the community is more interested in using liquid soap than solid

⁶ Surat Al-Anbiya' Ayat 83: Arab, Latin, Terjemah Dan Tafsir Lengkap | Quran NU Online,” accessed May 14, 2024.

⁷ Nurul Hasanah, Ahmad Andi Agung, and M Ikhsan Iskandar Putra, “Ad-Dakhil dalam Surah Al-Anbiya' Ayat 83-84 (Studi Kitab Tafsir Al-Khazin)” 3, no. 3 (2022).

⁸ Shakila Shakila et al., “Formulasi dan Evaluasi Sediaan Sabun Mandi Cair Ekstrak Kulit Buah Manggis (*Gracinia mangostana L.*) dan Uji Aktivitas terhadap Bakteri *Staphylococcus aureus*,” *Sinteza* 1, no. 2 (August 29, 2021): 41–51.

⁹ Faishal Arif Murtadho and Ade Sonya Suryandari, “Perancangan Reaktor Kontinyu Untuk Reaksi Saponifikasi Menggunakan Minyak Kelapa Sawit,” *DISTILAT: Jurnal Teknologi Separasi* 7, no. 2 (May 22, 2023): 237–45.

soap because it is easy to carry while traveling, easier to use, and more hygienic because it is stored in a tightly closed container.¹⁰

The packaging used for liquid soap will become inorganic waste that is very difficult to decompose back if it is just thrown away. The application of the 3R principle (Reduce, Reuse, Recycle) can be done to minimize community waste.¹¹ *Reduce* is to reduce the overall amount of waste by avoiding single-use items. Using refillable liquid soap will reduce the amount of plastic bottle waste. *Reuse* can be practiced to extend the useful life before going to the trash. *Recycle* is practiced to convert used items into other more useful objects such as the utilization of used plastic bottles into flower vases. Thus the use of liquid soap can be the main choice for the community.¹²

Soap in liquid form with natural components as active substances will be more attractive to the public because it has the advantage of being safer to use, easy to obtain, and of course environmentally friendly so it doesn't cause damage to natural resources.¹³ The utilization of natural materials that have great potential as antimicrobials can reduce the negative impact of chemical use. One of the Indonesian plants that has properties in the health sector is Clove.¹⁴

Clove with the Latin name *Eugenia Aromaticum* is an aromatic dried flower stalk with the main content of Eugenol which has antimicrobial activity.¹⁵ Dried clove leaves can be utilized by isolating the oil content using a steam distillation

¹⁰ Stefanie Amelia Dimpudus, Paulina V Y Yamlean, and Adithya Yudistira, "Formulasi Sediaan Sabun Cair Antiseptik Ekstrak Etanol," *PHARMACON* 6, no. 3 (2017).

¹¹ Gusman Simon et al., "Sosialisasi Kegiatan 3R Reduce Reuse dan Recycle di TK Kupu Kupu Mungil Desa Mekarsari Kabupaten Bekasi," *Jurnal Pengabdian Sosial* 1, no. 6 (April 11, 2024): 378–82.

¹² Junaidi Junaidi and Abdul Alimun Utama, "Analisis Pengelolaan Sampah Dengan Prinsip 3r (reduce, Reuse, Recycle) (studi Kasus Di Desa Mamak Kabupaten Sumbawa)," *JISIP (Jurnal Ilmu Sosial dan Pendidikan)* 7, no. 1 (January 20, 2023).

¹³ Endang Susilowati, Sri Retno Dwi Ariani, and Sri Mulyani, "Pelatihan Produksi dan Pengemasan Sabun Cair Herbal Antiseptik Alami bagi UKM Sabun Herbal di Kota Surakarta," *Jurnal Abdi Masyarakat Indonesia* 2, no. 6 (November 12, 2022): 1895–1902.

¹⁴ Widya Citra Lestari, "Efek Antibakteri Uap Minyak Atsiri Bunga Cengkeh (*syzygium Aromaticum* L.) Terhadap Pertumbuhan *Escherichia Coli* Dan *Staphylococcus Aureus* Dengan Metode Gaseous Contact" (Yogyakarta, Universitas Islam Indonesia, 2017).

¹⁵ Juvensius R. Andries, Paulina N. Gunawan, And Aurelia Supit, "Uji Efek Anti Bakteri Ekstrak Bunga Cengkeh Terhadap Bakteri *Streptococcus Mutans* Secara In Vitro," *e-GIGI* 2, no. 2 (July 23, 2014).

method to obtain clove leaf oil with eugenol content of $\pm 80\%$ which has properties such as antibacterial, antiseptic, anti-inflammatory, and antioxidant.¹⁶ Eugenol, which is the main constituent component of clove leaf oil, is commonly used in health aspects, which is to prevent the emergence of skin problems, especially skin infections due to bacteria.¹⁷ According to research by Fardan and Harimuti (2018), clove leaf essential oil with 74.8% eugenol concentration can inhibit the growth of *Staphylococcus aureus* bacteria with the resulting inhibition of 12.5mm which is included in the strong category.

Based on this background, this research was carried out with the title Formulation of Liquid Soap Preparations from Clove Leaf Oil Eugenol (*Eugenia aromaticum*) and *Staphylococcus aureus* Antibacterial Test.

1.2 Problem statement

The problem statement of the research is:

1. Does the eugenol clove leaf oil (*Eugenia aromaticum*) liquid soap preparation meets the standard of the preparation quality evaluation test which includes organoleptic test, pH test, foam height test, homogeneity test, viscosity test, and spreadability?
2. How is the effectiveness of eugenol clove leaf oil (*Eugenia aromaticum*) liquid soap on the growth of *Staphylococcus aureus* bacteria?
3. Which concentration of eugenol clove leaf oil in liquid soap has the best inhibition effectiveness against the growth of *Staphylococcus aureus*?

1.3 Research objectives

The objectives of this research are :

1. Knowing whether the eugenol clove leaf oil (*Eugenia aromaticum*) liquid soap preparation meets the standard of the preparation quality evaluation test which includes organoleptic test, pH test, foam height test, homogeneity test, viscosity test and spreadability test

¹⁶ Hendri Poernomo et al., "Efektivitas Minyak Cengkeh Dan Pulperyl® Dalam Menghambat Akumulasi Bakteri *Streptococcus Mutans* Secara in Vitro," *Interdental Jurnal Kedokteran Gigi (IJKG)* 14, no. 2 (December 18, 2018): 32–34.

¹⁷ Halima Wahyu Haryani and Nur Hidayat, "Pemurnian Eugenol Dari Minyak Daun Cengkeh Dengan Reaktan Asam Monoprotik. Kajian Jenis Dan Konsentrasi Asam," *Jurnal Industria* 3, no. 2 (2021): 83–92.

2. Knowing the effectiveness of eugenol clove leaf oil (*Eugenia aromaticum*) liquid soap on the growth of *Staphylococcus aureus* bacteria
3. Knowing the concentration of eugenol clove leaf oil in liquid soap has the best inhibition effectiveness against the growth of *Staphylococcus aureus*

1.4 Research benefits

1 Theoretical benefits

The research can provide information and add insight that the clove leaf oil Eugenol compound can inhibit the growth of *Staphylococcus aureus* bacteria.

2. Practical benefits

The results of this study are expected to be a very useful source of information for the community regarding the benefits of clove leaf oil as an antibacterial.

1.5 Research originality

There are several studies on the formulation of liquid soap preparations with herbal ingredients such as antibacterial *Staphylococcus aureus* as seen in Table 1 regarding the authenticity of research on the Preparation of Antibacterial Liquid Soap Clove Leaf Oil Eugenol (*Eugenia Aromaticum*).

Table 1. Authenticity of Research

Title of Research	Research Methods	Variable	Results	Research Differences
Efektivitas Hand Sanitizer Alami Ekstrak Daun Cengkeh (<i>Syzygium aromaticum</i> (L.) Merr.& L.M.Perry) terhadap Methicillin Resistant <i>Staphylococcus aureus</i> ¹⁸	Eksperimental laboratorium	Variable bebas : ekstrak daun cengkeh Variable terikat : Zona hambat terhadap bakteri <i>Staphylococcus aureus</i>	Hasil dari penelitian ini menunjukkan bahwa konsentrasi ekstrak daun cengkeh 10% memiliki daya hambat sebesar 12,55 mm yang termasuk dalam kategori kuat.	Pada penelitian sebelumnya menggunakan ekstrak daun cengkeh sebagai antibakteri <i>Staphylococcus aureus</i> Penelitian ini membahas uji daya hambat dengan menggunakan eugenol murni yang diambil dari minyak daun cengkeh terhadap bakteri

¹⁸ Putri Sabilla Aulia Najiah, Diana Hernawati, and Vita Meylani, "Efektivitas Hand Sanitizer Alami Ekstrak Daun Cengkeh (*Syzygium aromaticum* (L.) Merr. & L.M.Perry) terhadap Methicillin-Resistant *Staphylococcus aureus*," *Journal of Natural Sciences* 2, no. 3 (November 30, 2021): 85–94.

Title of Research	Research Methods	Variable	Results	Research Differences
<i>Staphylococcus aureus</i>				
Formulasi dan uji aktivitas antibakteri sediaan sabun cair ekstrak Bunga cengkeh (<i>Syzygium aromaticum</i> L.) dengan variasi konsentrasi Carbopol 940 terhadap bakteri <i>Staphylococcus aureus</i> ATCC 25923 ¹⁹	Eksperimental laboratorium	Variable bebas : sabun cair dengan ekstrak bunga cengkeh Variable terikat : zona hambat bakteri <i>Staphylococcus aureus</i>	Hasil dari penelitian ini menunjukkan bahwa konsentrasi Carbopol 0,5% dan ekstrak bunga cengkeh 10% memiliki daya hambat sebesar 16,7 mm yang termasuk dalam kategori kuat.	Penelitian sebelumnya menggunakan ekstrak bunga cengkeh sebagai antibakteri <i>Staphylococcus aureus</i> . Penelitian ini membahas uji daya hambat dengan menggunakan eugenol murni yang diambil dari minyak daun cengkeh terhadap bakteri <i>Staphylococcus aureus</i>
Uji Aktivitas Antibakteri Sediaan Sabun Cair Ekstrak Etanol Daun Cengkeh (<i>Syzygium aromaticum</i>) Terhadap Bakteri <i>Staphylococcus aureus</i> ²⁰	Eksperimental laboratorium	Variable bebas : ekstrak etanol daun cengkeh Variable terikat : Zona hambat terhadap bakteri <i>Staphylococcus aureus</i>	Hasil dari penelitian ini menunjukkan bahwa konsentrasi 4% memiliki daya hambat sebesar 10 mm yang termasuk dalam kategori sedang. Dapat disimpulkan bahwa peningkatan konsentrasi ekstrak etanol daun cengkeh berpengaruh terhadap diameter zona hambat <i>Staphylococcus aureus</i> .	Pada penelitian sebelumnya menggunakan ekstrak etanol daun cengkeh sebagai antibakteri <i>Staphylococcus aureus</i> . Penelitian ini membahas uji daya hambat dengan menggunakan eugenol murni yang diambil dari minyak daun cengkeh terhadap bakteri <i>Staphylococcus aureus</i>

¹⁹ Husnul Khatimah, Siti Aisiyah, and Destik Wulandari, "Formulasi dan Uji Aktivitas Antibakteri Sediaan Sabun Cair Ekstrak Bunga Cengkeh (*Syzygium aromaticum* L.) Dengan Variasi Konsentrasi Carbopol 940 Terhadap Bakteri *Staphylococcus aureus* ATCC 25923," *Organisms* 3, no. 1 (2023).

²⁰ Evander Roliand Lomboan, Paulina V.Y. Yamlean, and Elly J. Suoth, "Uji Aktivitas Antibakteri Sediaan Sabun Cair Ekstrak Etanol Daun Cengkeh (*Syzygium aromaticum*) Terhadap Bakteri *Staphylococcus aureus*," *Pharmacon* 10, no. 1 (February 24, 2021): 767.