CHAPTER 1
INTRODUCTION

1.1 Research Background

Bacterial infections are some of the most common health problems in the world[1]. This disease begins with the presence of bacteria, fungi, viruses or parasites in the human body then multiply themselves uncontrollably and cause disease. Bacterial infections that often occur due to lack of attention to personal and environmental hygiene are skin infections. One of the bacteria that cause infections is *Staphylococcus epidermidis*. This bacteria can cause several diseases such as acne, skin infections, and urinary tract infections[2].

Staphylococcus epidermidis belongs to gram-positive bacteria. These bacteria are facultative anaerobes, which can live with or without oxygen[3]. *Staphylococcus epidermidis* naturally lives on human skin as normal flora. However, when the body's immunity is weak, these bacteria can cause bacterial infections. Infections due to contamination with *Staphylococcus epidermidis* often occur in postoperative wounds so that these bacteria can multiply freely in the human body[4].

Topical treatment of skin infections can use ointments, gels, lotions, or soaps. The active antibacterial ingredients of topical preparations can directly absorb and work to treat the skin infected with bacteria[5]. . In general, soap is a pharmaceutical product that is used daily to clean dirt on the skin. However, soap can also be used

[1] Vina Juliana Anggraeni et al., *"Aktivitas Antibakteri Ekstrak Mikroalga Thalassiosira Sp Terhadap Bakteri Staphylococcus aureus, Staphylococcus epidermidis Dan Propionibacterium acne*," Jurnal Kimia Riset 4, No. 1 (2019): 62–73.

[2] Randa Wulaisfan Dan Hasnawati Hasnawati, *"Uji Daya Hambat Ekstrak Daun Sukun (Artocarpus altilis) Terhadap Pertumbuhan Bakteri Staphylococcus epidermidis,*" Warta Farmasi 6, No. 1 (2017): 90–99.

[3] Hanna Berliana Aviany Dan Sri Pujiyanto, *"Analisis Efektivitas Probiotik Di Dalam Produk Kecantikan Sebagai Antibakteri Terhadap Bakteri Staphylococcus epidermidis,"* Berkala Bioteknologi 3, No. 2 (2020).

[4] Fernanda Desmak Pertiwi, Firman Rezaldi, Dan Ranny Puspitasari, *"Aktivitas Antibakteri Ekstrak Etanol Bunga Telang (Clitoria ternatea L.) Terhadap Bakteri Staphylococcus epidermidis*," Jurnal Ilmiah Biosaintropis (Bioscience-Tropic) 7, No. 2 (2022): 57–68.

[5] Rahmi Muthmainnah, Dwiarso Rubiyanto, Dan Tatang Shabur Julianto, *"Formulasi Sabun Cair Berbahan Aktif Minyak Kemangi Sebagai Antibakteri Dan Pengujian Terhadap Staphylococcus aureus,"* Indonesian Journal of Chemical Research, (2014), 44–50.

as a remedy for skin infections caused by bacteria and fungi. This type of soap is called antiseptic soap which has an active antibacterial content[6].

The use of synthetic antibacterial ingredients in soap can eliminate normal skin flora which then causes skin irritation if used for a long period of time. Therefore, alternative natural antibacterial ingredients are needed to replace synthetic antibacterials which are expected to have fewer side effects and prevent other health problems in their use[7]. One of the natural ingredients that has potential as an antibacterial is the saga plant (*Abrus precatorius L*). This plant is widely used by the community as a traditional medicine for coughs, mouth ulcers, and sore throats. In the leaves of saga there are flavonoid, saponin, and alkaloid compounds that act as antibacterial agents[8]. Previous research has proven that toothpaste preparations of saga leaf extract (*Abrus precatorius L*) can inhibit gram-positive bacteria, namely *Streptococcus mutans*[9].

The discussion of health problems turns out to have a connection with Islamic teachings, namely the emergence of bacterial infections can be influenced by poor hygiene factors. In Islam, cleanliness is an important thing and is one of the conditions for the acceptance of worship. Many discussions about cleanliness are listed in the Qur'an and hadith. One of the surah in the Qur'an that discusses cleanliness is surah At-Taubah verse 108:

لَا تَقُمْ فِيْهِ اَبَدًاۗ لَمَسْجِدٌ اُسِّسَ عَلَى التَّقْوٰى مِنْ اَوَّلِ يَوْمٍ اَحَقُّ اَنْ تَقُوْمَ فِيْهِۗ فِيْهِ رِجَال

يُّحِبُّوْنَ اَنْ يَّتَطَهَّرُوْاۗ وَاللّٰهُ يُحِبُّ الْمُطَّهِّرِيْنَ

Meaning of the verse:

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[6] Diajeng Camila, Ade Maria Ulfa, Dan Vida Elsyana, *"Formulasi Dan Uji Antibakteri Sediaan Sabun Cair Antiseptik Ekstrak Etanol Bunga Telang (Clitoria ternatea L) Terhadap Staphylococcus aureus*," Jurnal Ilmu Kedokteran dan Kesehatan 9, no. 2 (2022): 710-720.

[7] Ibid.

[8] *Misrahanum Misrahanum, Cut Intan Annisa Puteri, Dan Cut Yulvizar, "Activity Test Of Abrus Precatorius L. Leaf Extract Against Clinical Streptococcus Pneumonia Growth,"* Jurnal Natural 17, No. 1 (2017): 58–63.

[9] Oktariani Pramiastuti, Desi Sri Rejeki, Dan Siti Lailatul Karimah, "Aktivitas Antibakteri Pasta Gigi Ekstrak Daun Saga *(Abrus Precatorius Linn.)* Pada *Sterptococcus Mutans*," Bhamada: Jurnal Ilmu Dan Teknologi Kesehatan (E-Journal) 11, No. 1 (2020): 10.

You should not worship in that mosque forever; indeed, the mosque that was founded on piety (Quba Mosque) from the first day is more worthy of your prayers. In that mosque there are those who cleanse themselves. Verily Allah loves those who are clean.

This verse explains that Allah SWT loves people who maintain mental and physical cleanliness, and loves people who purify themselves. Humans must be responsible for personal hygiene and environmental cleanliness. Cleanliness also has a big role in the health aspect which, if not maintained properly, can lead to dangerous diseases[10].

Many studies have utilized saga leaves as active ingredients for preparations such as toothpaste, gel and ointment. However, research related to antibacterial testing of solid soap of ethanol extract of saga leaves (*Abrus precatorius L*) against *Staphylococcus epidermidis* bacteria has never been done. It is expected from this study to get results that solid soap of ethanol extract of saga leaves (*Abrus precatorius L)* can be used as an herbal alternative as a treatment for bacterial infections.

1.2 Research Problems

The problem formulations in this study are:

1. How to evaluate the physical quality of solid soap preparations of ethanol extract of saga leaves (*Abrus precatorius L*) ?
2. What is the antibacterial activity of solid soap of ethanol extract of saga leaves (*Abrus precatorius L*) in inhibiting *Staphylococcus epidermidis* bacteria?

1.3 Research Objectives

The objectives of this study are:

1. To determine the physical quality of solid soap preparations of saga leaf extract (*Abrus precatorius L*)

[10]Aldi Prastiya *et al., "Implementasi ayat Al-Qur'an dan Hadits tentang Kebersihan Melalui Program 'Cintai Tubuhku' di RA Kusuma Mulia Muslimat NU 1 Purwoasri Desa Bulu, Kecamatan Purwoasri, Kabupaten Kediri,*" Kerigan: Jurnal Pengabdian Masyarakat 1, no. 1 (2023): 37–61.

2. Knowing the antibacterial activity of solid soap of ethanol extract of saga leaves *(Abrus precatorius L)* in inhibiting *Staphylococcus epidermidis* bacteria.

1.4 Research Benefits

1. Theoritical Benefits

The results of this study can be used as reference material for the development of further research on the antibacterial content of saga leaves *(Abrus precatorius L)* against bacteria that cause *Staphylococcus epidermidis* infection.

2. Practical Benefits

The results of this study are expected to add to the repertoire of science, and add insight to readers, especially researchers regarding the use of saga leaf plants *(Abrus precatorius L)* as an alternative natural treatment for bacterial infections of *Staphylococcus epidermidis* and as a consideration and input for drug industry manufacturers in the formulation of antibacterial solid soap preparations from natural ingredients.

1.5 Authenticity Research

The following previous research can be used as a comparison for this research:

Table 1. Authenticity Research

Research Title	Research Methods	Variable	Result	Reserach Differences
Antibacterial Test of Saga Leaf Ethanol Extract *(Abrus precatorius L)* against *Streptococcus mutans* ATCC 31987 and *Staphylococcus aureus* ATCC 25923PK/5 Bacteria [11].	Experimental	Dependents: antibacterial activity of *Streptococcus mutans* and *Staphylococcus aureus* bacteria Independents: Variation of ethanol extract of saga leaves *(Abrus precatorius L)*	The results of the study showed that ethanol extract of saga leaves (*Abrus precatorius L.*) can inhibit the activity *Streptococcus mutans* and *Staphylococcus aureus* bacteria. The inhibition of 10% extract concentration was 18.02 mm on *Streptococcus mutans* bacteria and 11,16 mm on *Staphylococcus aureus* bacteria.	Dependents: Evaluation of physical quality of solid soap preparations and antibacterial activity of *Staphylococcus epidermidis* Independents: Variation of ethanol extract of saga leaves (*Abrus precatorius L*) in solid soap formulation.

[11] Siti Khoirun Nisak *et al*., *"Uji Antibakteri Ekstrak Etanol Daun Saga (Abrus precatorius L.) Terhadap Bakteri Streptococcus mutans ATCC 31987 dan Staphylococcus aureus ATCC 25923PK/5*," Prosiding Seminar Nasional Kesehatan 1 (2021): 2031–37.

Research Title	Research Methods	Variable	Result	Reserach Differences
Antibacterial Activity Test of Solid Soap of Breadfruit Leaf Extract *(Artocarpus altilis (Parkins.)* Fosberg) Against *Staphylococcus aureus* and *Escherichia coli* bacteria[12].	Experimental	Dependents: Antibacterial activity of *Staphylococcus aureus* and *Escherichia coli.* Independents: Variation of breadfruit leaf extract concentration in each liquid soap formulation.	Breadfruit leaves can be used as antibacterial active ingredients in solid soap formulations with the greatest inhibition against *Staphylococcus aureus* with the largest result of 11.38 mm which is included in the moderate category and the inhibition of *Escherichia coli* bacteria of 15.53 mm which is included in the strong category.	Dependents: Evaluation of physical quality of solid soap preparations and antibacterial activity of *Staphylococcus epidermidis* Independents: Variation of ethanol extract of saga leaves (*Abrus precatorius L*) in solid soap formulation.
Uji Daya Hambat Ekstrak Etanol Bawang Dayak (*Eleutherine bulbosa* (Mill.) Urb.) Terhadap Bakteri *Staphylococcus epidermidis*[13]	Experimental	Dependents: Aktivitas antibakteri *Stpahylococcus epidermidis* Independents: Ekstrak etanol bawang dayak.	Hasil penelitian menunjukkan ekstrak etanol Bawang Dayak dapat menghambat pertumbuhan bakteri *Staphylococcus epidermidis.* Penghambatan bakteri disebabkan adanya senyawa flavonoid, alkaloid, glikosida, fenol, tanin, saponin, dan katekol pada Bawang Dayak. Daya hambat terbesar yaitu 18,4 mm diperoleh pada konsentrasi ekstrak 15%.	Dependents: Evaluation of physical quality of solid soap preparations and antibacterial activity of *Staphylococcus epidermidis* Independents: Variation of ethanol extract of saga leaves (*Abrus precatorius L*) in solid soap formulation.

[12] Meita Ita Ayuditiawati *et al*., *"Uji aktivitas antibakteri sabun padat ekstrak daun sukun (Artocarpus altilis (Parkins.) Fosberg) terhadap bakteri Staphylococcus aureus dan Escherichia coli,"* Praeparandi: Jurnal Farmasi dan Sains 5, No. 1 (2021): 28–43.

[13] Susi Novaryatiin, Anggun Meilani Pratiwi, dan Syahrida Dian Ardhany, *"Uji Daya Hambat Ekstrak Etanol Bawang Dayak (Eleutherine bulbosa (Mill.) Urb.) Terhadap Bakteri Staphylococcus epidermidis: The Inhibitory Test Of Bawang Dayak (Eleutherine bulbosa (Mill.) Urb.) Against Staphylococcus epidermidis,*" Anterior jurnal 18, no. 1 (2018): 92–97.