

CHAPTER I

INTRODUCTION

1.1 Research Background

Skin is the outermost part of the body that functions as a body protector. The skin protects the body from exposure to foreign objects or sunlight. Based on its functions, it can trigger several skin problems including acne, dull skin, wrinkles and premature aging.¹ One of the most common skin problems is acne, affecting approximately 85% of adolescents and adults. Several factors contribute to the development of acne, including genetic predisposition, hormonal fluctuations, diet, skin condition, psychological stress, environmental factors such as weather, bacterial infections, cosmetics, and exposure to certain chemicals. Acne on the skin can be caused by the bacteria *Propionibacterium acnes*, *Staphylococcus aureus*, and *Staphylococcus epidermidis*. *Staphylococcus epidermidis* is a gram - positive bacteria that can cause acne. If the acne is touched with dirty hands, the inflammation will spread, causing fatty acids and hardened skin oil to enlarge.²

Apart from microorganisms, acne can also be affected by a lack of hygiene. Islam teaches its people to maintain cleanliness. In QS. At-Taubah [108] verse:

لَا تَقُمْ فِيهِ أَبَدًا لَّمَسْجِدٌ أُسِّسَ عَلَى التَّقْوَىٰ مِنْ أَوَّلِ يَوْمٍ أَحَقُّ أَنْ تَقُومَ فِيهِ فِيهِ رِجَالٌ يُحِبُّونَ أَنْ يَتَطَهَّرُوا وَاللَّهُ يُحِبُّ الْمُطَهَّرِينَ

" Do not ever pray in it. A mosque founded on righteousness from the first day is more worthy for you to pray in. In it are men who love to purify themselves; and Allah loves those who purify themselves." ³

The conclusion of the above verse is that maintaining cleanliness and health of the body is the responsibility of humans personally towards themselves. These efforts can be realized by maintaining the cleanliness of the body and skin,

¹ Noor Mahfuzah Febriana, Hayatus Sa'adah, and Aris Purwanto, "Formulation and antibacterial activity test on peel-off gel mask of Limpasu (*Baccaurea lanceolata*) fruit extract against *Staphylococcus epidermidis*" 14, no. 2 (2023).

² Triffit Imasari and Ficka Emasari, "Deteksi bakteri *Staphylococcus* sp. penyebab jerawat dengan tingkat pengetahuan perawatan wajah pada siswa kelas XI di SMK Negeri 1 Pagerwojo," *Jurnal Sintesis: Penelitian Sains, Terapan dan Analisisnya* 2, no. 2 (August 4, 2022): 58–65, <https://doi.org/10.56399/jst.v2i2.20>.

³ Asriyah Asriyah, "Perkembangan Makna Kata Mahid dalam QS. al-Baqarah [2] Ayat 222: Analisis Semiotika Charles Sanders Peirce," *Diwan : Jurnal Bahasa dan Sastra Arab* 3, no. 1 (July 19, 2017): 36, <https://doi.org/10.24252/diwan.v3i1.2911>.

especially facial skin. One way to clean facial skin to use a mask preparation that can remove dead cells and dirt that is attached. Peel-off gel mask preparations can be used to clean facial skin, especially to treat acne.

Acne treatment focuses on correcting follicular abnormalities, reducing excess sebum production, minimizing the colonization of *Staphylococcus epidermidis*—a bacterium responsible for acne—and alleviating skin inflammation. Pharmacological therapy used to reduce the colonization of acne causing bacteria is by using antibacterial substances such as gentamicin or clindamycin. The use of these chemical drugs from natural ingredients or from herbal plants can be used as an alternative choice to overcome acne problems caused by these bacteria.⁴

One plant that has antibacterial activity is the *Areca catechu L.* or areca nut plant. Areca nut is the fruit of the areca nut tree, which mostly grows in the Pacific, South and Southeast Asia, and parts of East Africa. The plant is known as areca nut. Compounds including isoguvocine, choline, alkaloids, arc olein, ascaïnide, arcoline and guanine have been found in areca nut extracts. The fruit of this plant contains cate-chin alpha and the seeds contain arcodin, arcatin, beta-sitosterol, tannins about 15%, fatty acids about 14%, a little sucrose, mannan and galactan. The tannins in areca nut have antibacterial and antifungal properties. The seeds contain four minerals, including arcadin, arcoline, govacine dan guavacolin, of which arcoline and guavacolin are the main components. One of the uses of areca nut (*Areca catechu L.*) seeds is to prevent the growth of acne causing bacteria and can be used as a face mask.

One of the utilization of *areca nut* (*Areca catechu L.*) to inhibit the growth of bacteria that cause acne can be made in a mask preparation.⁵ One of the cosmetic preparations that is practically used to treat acne as well as antibacterial is a *peel-off* gel mask preparation. *Peel-off* gel mask products are easier to use and convenient. A *peel-off* gel mask is a cosmetic in the form of a gel that dries easily

⁴ Shendi Suryana, Yen Yen Ade Nuraeni, and Tina Rostinawati, “Aktivitas Antibakteri Ekstrak Etanol Dari Lima Tanaman Terhadap Bakteri *Staphylococcus Epidermidis* Dengan Metode Mikrodilusi M7 – A6CLSI,” *Indonesian Journal of Pharmaceutical Science and Technology* 4, no. 1 (April 13, 2017): 1, <https://doi.org/10.15416/ijpst.v4i1.8982>.

⁵ Neda Jam et al., “Evaluation of Antibacterial Activity of Aqueous, Ethanolic and Methanolic Extracts of Areca Nut Fruit on Selected Bacteria,” ed. Abadi Kahsu Gebre, *BioMed Research International* 2021 (April 16, 2021): 1–8, <https://doi.org/10.1155/2021/6663399>.

after a short period of application, and forms an elastic transparent film that is easy to peel-off.⁶

One of the polymers used as a base for peel-off gels is polyvinyl alcohol (PVA) and Carbopol. PVA exhibits adhesive properties and forms a film upon drying, a phenomenon known as the peel-off effect.⁷ Carbopol has hydrophilic properties, easily dispersed in water with a small concentration and produces a good gel base. So that the combination of using PVA and carbopol is very good to be used to form a film layer on peel-off gel mask preparations.

The peel-off gel mask dosage form is very suitable for treating acne-related skin issues because the contact between the ingredients and the skin will be longer so that it will be more effective to use. Based on the above problems it is necessary to conduct research on the antibacterial activity test of areca nut methanol extract against acne-causing bacteria *Staphylococcus epidermidis* in the preparation of peel-off gel masks. So it is hoped that methanol extract of areca nut can be used as an alternative to overcome acne problems on the skin.

1.2 Research Question

1. What is the quality evaluation of areca nut (*Areca catechu* L) methanol extract peel-off gel mask preparation?
2. What the concentration of methanol extract of areca nut (*Areca catechu* L) peel-off gel mask preparation is most effective in inhibiting the growth of *Staphylococcus epidermidis*?

1.3 Research Objectives

Based on the problem formulation above, this research aims to:

1. Knowing the quality evaluation of peel-off gel mask preparation of methanol extract of areca nut (*Areca catechu* L).

⁶ Een Samsul, Jumain Jumain, and Santi Sinala, "Formulasi Masker Gel Peel Off Ekstrak Kulit Buah Langsung (*Lansium domesticum* L) dengan Variasi PVA (Polivinil Alkohol)," *Jurnal Mandala Pharmacon Indonesia* 8, no. 2 (December 27, 2022): 151–64, <https://doi.org/10.35311/jmpi.v8i2.203>.

⁷ Ika Avrilina Haryono, Noval Noval, and Bayu Nugraha, "Formulasi Buah Tampoi (*Baccaurea macrocarpa*) dalam Sediaan Masker Gel sebagai Antiaging," *Jurnal Surya Medika* 6, no. 2 (February 15, 2021): 102–10, <https://doi.org/10.33084/jsm.v6i2.2126>.

2. Knowing the concentration of *areca* nut (*Areca catechu* L) methanol extract in *peel-off* gel mask preparation that are most effective in inhibiting the growth of *Staphylococcus epidermidis*.

1.4 Research Uses

1. Academic Uses

The result of this study are expected to add to the repertoire of science and serve as reference for further research, especially regarding the preparation of *peel-off* gel masks containing methanol extract of areca nut for acne treatment.

2. Practical Uses

The results of this study can provide valuable insight, especially regarding the preparation of *peel-off* gel masks with methanol extract of areca nut which can inhibit *Staphylococcus epidermidis* bacteria that cause acne.

1.5 Authenticity of Research

Table 1. Originality of research

Research Title	Research methods	Variable	Result	Research Differences
<i>propionibacterium acnes</i> antibacterial activity of ethanol extract of areca nut (<i>Areca catechu</i> L.) in anti acne cream. ⁸	Experimental	Independent: Variation of concentration of areca nut ethanol extract Dependen : Anti-acne cream preparation	Ethanol extract of areca nuts has great inhibition activity on <i>Propionibacterium acnes</i> bacteria at 3% concentration with an inhibition zone area of 11,00 mm.	Dependents : Evaluation of <i>peel-off</i> gel mask preparations and antibacterial activity of <i>Staphylococcus epidermidis</i> Independents : Formulation of areca nut ethanol ekstrak <i>peel-off</i> gel mask
Effectiveness test and stability test of <i>peel-off</i> gel mask formulation of	Experimental	Dependents : Effectiveness and physical	10% concentration of yaki areca nut shell extract has good effectiveness	Dependents : Evaluation of <i>peel-off</i> gel

⁸ Farid Salahudin and Heru Agus Cahyanto, "Aktivitas antibakteri *Propionibacterium acnes* dan formulasi ekstrak etanol biji pinang (*Areca catechu*, L) dalam krim anti jerawat (Antibacterial activity of *Propionibacterium acnes* and formulation of *Areca catechu* ethanolic extract in anti-acne cream)," *Jurnal Riset Industri Hasil Hutan* 12, no. 1 (August 30, 2020): 21, <https://doi.org/10.24111/jrihh.v12i1.5424>.

Research Title	Research methods	Variable	Result	Research Differences
methanol extract of yaki areca nut seed husk. ⁹		stability of <i>peel-off</i> gel masks. Independent : Variation in concentration of methanol extract of yaki areca nut seeds.	and stability in <i>peel-off</i> gel mask preparation during storage.	mask preparation and activity test on <i>Staphylococcus epidermidis</i> bacteria Independent : Areca nut methanol extract



⁹ Dwi Setianingsih and Marta Halim, "Effectiveness test and stability test formulation of peel-off gel mask of methanol extract yaki betel nut skin" 5 (n.d.).