

# CHAPTER I

## INTRODUCTION

### 1.1 Background

The skin is important in maintaining balance and protecting the body from various pathogenic microorganisms. Skin infections are one of the common problems that are widely found in countries with tropical climate such as Indonesia<sup>1</sup>. Indonesia has a tropical climate that causes excessive sweat production. Climate change and temperature in Indonesia cause problems for skin health, one of which is prickly heat<sup>2</sup>. According to the Ministry of Health, in 2023, prickly heat in medical language is known as miliaria. Prickly heat is a skin disorder caused by a blockage in the sweat glands or echrine<sup>3</sup>.

The World Health Organization (2008) reports that every year there are 80% of people with prickly heat<sup>4</sup>. Prickly heat is caused by the onset of rashes and inflammation due to blockages in the sweat glands caused by the bacterium *Staphylococcus epidermidis* with the formation of its biofilm. This bacteria produces Extracellular Polysaccharide Substance (EPS) a sticky compound when mixed with sweat and dead skin cells. This is what sweat does not come out and causes the formation of small inflamed spots and triggers a rash<sup>5</sup>. If miliaria is not treated correctly it can result in secondary infections. Symptoms that may arise are the formation of red bumps (papules), rashes and itching in the area that experiences prickly heat<sup>6</sup>.

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<sup>1</sup> Ika Reski Fitriani and Siska Nuryanti, "Antibacterial Activity of Ethanol Extract of Chinese Ketepeng Leaves (Cassia Alata L.) Against Several Bacteria That Cause Skin Infections," *Makassar Natural Product Journal* 1, no. 4 (2023): 22, <https://journal.farmasi.umi.ac.id/index.php/mnpj>.

<sup>2</sup> Britya Maulidka Intar Luvilla, Widyawati, and Desy Armalina, "The Relationship between Mother's Knowledge and Behavior with the Incidence of Prickly Heat in Infants and Toddlers," *Diponegoro Medical Journal* 8, no. 3 (2019): 937–46.

<sup>3</sup> Ministry of Health of the Republic of Indonesia, "Causes of Sweat," Ministry of Health, Directorate General of Health Services, 2023, [https://yankes.kemkes.go.id/view\\_artikel/2964/penyebab-biang-keringat#](https://yankes.kemkes.go.id/view_artikel/2964/penyebab-biang-keringat#).

<sup>4</sup> Luvilla, Widyawati, and Armalina, "The Relationship between Mother's Knowledge and Behavior and the Incidence of Prickly Heat in Infants and Toddlers."

<sup>5</sup> Filkri Ardiansyah and Wizar Putri Mellaratna, "Miliaria," *Journal of Health and Nutrition Sciences (JIG)* 2, no. 1 (2024): 505–7, <https://doi.org/10.1016/B978-0-7020-6912-3.00154-3>.

<sup>6</sup> Ardiansyah and Mellaratna.

One of the preparations to overcome miliaria is sprinkled powder. This powder usually contains diphenhydramine as an antihistamine, contains methylparaben as a preservative and triclosan as an antibacterial. However, the use of these antibacterials has side effects, namely skin irritation, hormonal disorders and can cause bacterial resistance<sup>7</sup>. Therefore, it can be replaced by using herbal ingredients, namely kersen leaves.

The use of medicines from natural ingredients in Indonesia is increasing because it is considered to have fewer side effects and a more affordable price than drugs from chemicals. Parts of plants that can be used as ingredients for treatment are fruits, leaves, stems, flowers and roots<sup>8</sup>. The Prophet said:

لِكُلِّ دَاءٍ دَوَاءٌ، فَإِذَا أُصِيبَ دَوَاءُ الدَّاءِ بَرَأَ بِإِذْنِ اللَّهِ

*"All diseases have a cure. If the medicine is by the disease, the disease will be cured with the permission of Allah"* (H.R. Muslim)

Kersen Plant (*Muntingia calabura L.*) It contains several bioactive compounds, namely flavonoids, saponins, triterpenes, steroids and tannins which have the potential as antibacterial, antioxidant, antimicrobial and antifungal<sup>9</sup>. Flavonoids, tannins and saponins present in kersen leaves have benefits as an antibacterials agent. Its mechanism of action involves denaturing cell proteins in the structure of the bacterial cell wall. This leads to cell lysis by increasing cell membrane permeability, denatureizing proteins and inhibiting the synthesis of bacterial nucleic acid components<sup>10</sup>.

The formulation of powder preparations sprinkled with ethanol extract from kersen leaves has the potential to protect microorganisms that cause skin problems.

<sup>7</sup> Fatridha Yansen and Vilma Humaira, "Quality Test of Solid Soap Preparations from Aloe Vera Extract," *PIONEER'S HEALTH JOURNAL* 9, no. 2 (2022): 82–88, <https://doi.org/10.33653/jkp.v9i2.883>.

<sup>8</sup> Topgati Hanif Bamasri, "Kersen Muntingia Calabura Leaves as Antibacterial," *Journal of Professional Nurse Research* 3, no. 2 (2021): 231–36, <https://doi.org/10.37287/jppp.v3i2.396>.

<sup>9</sup> Solikah Ana Estikomah, Andi Sri Suriati Amal, and Sri Fathiyah Safaatsih, "Inhibition Test Against Staphylococcus aureus Bacteria, Staphylococcus epidermidis, Propionibacterium acnes Spray Gel Ethanol Extract of Kersen Leaves (*Muntingia Calabura L.*) Karbopol 940," *Pharmaceutical Journal of Islamic Pharmacy* 5, no. 1 (2021): 36, <https://doi.org/10.21111/pharmasipha.v5i1.5705>.

<sup>10</sup> Bamasri, "Kersen Muntingia Calabura Leaves as Antibacterial."

The powder as its advantages, namely it has a fragrant scent, is relatively cheap, suitable for all skin types and is easy to use for both children and adults<sup>11</sup>.

## 1.2 Problem Statement

The problem statements in this research are as follows:

1. What are the results of the physical quality tests of the loose powder preparation with cherry leaf extract (*Muntingia calabura* L.)?
2. Does the loose powder with cherry leaf extract have inhibitory activity against *Staphylococcus epidermidis* bacteria?

## 1.3 Research Objectives

The objectives of this research are as follows:

1. To determine the results of the physical quality tests of the loose powder preparation with cherry leaf extract (*Muntingia calabura* L.).
2. To evaluate the inhibitory activity of the loose powder with cherry leaf extract against *Staphylococcus epidermidis* bacteria.

## 1.4 Benefits of the Research

### 1. Theoretical Benefits

This research can provide a basis for the development of alternative herbal medicines, especially powdered preparations that can be used to overcome skin itching problems

### 2. Practical Benefits

The results of this study produce a powder preparation that is expected to relieve skin itching problems is also a practical and easy-to-use form of preparation in daily skin care.

## 1.5 Originality of Research

Research on powder preparations has been carried out by several researchers as seen in table 1.

Table 1 Originality of the Research

Research Title	Research Methods	Variable	Result	Research Differences
Physical Stability Test of Powder	Experimental	<b>Depend on:</b>	Ethanol extract of cipluka leaves has compounds that have the potential to be	<b>Independent:</b> Kersen Leaf Ethanol Extract

<sup>11</sup> Adelia Putri et al., "Formulation and Evaluation of Betel Leaf Powder Preparation (Piper Betle)," *Angewandte Chemie International Edition*, 6(11), 951–952. 2 (2019).

Preparation Sprinkled with Ethanol Extract of Ciplukan Leaves (Physalis angulata L.) As an Anti-Fungi <sup>12</sup>		Physical Stability of Sprinkled Powder Supplies	antifungal and can be formulated into powder preparations, where the FII formula is preferred	
		<b>Independent:</b> Ethanol Extract of Ciplukan Leaves		
Powder Formulation of Sowing Extract of Teki Grass Rhizome (Cyperus rotundus L.) As an Antiseptic <sup>13</sup>	Laboratory experiments m	<b>Depend on:</b> Physical quality of powder preparations  <b>Independent:</b> Rhizome extract of teki grass	Ethanol extract of teki grass rhizome (Cyperus rotundus L.) can be formulated into sowing powder and meets the requirements of sowing powder and it is found that the F3 formula has the best antiseptic power compared to others.	<b>Independent:</b> Kersen Leaf Ethanol Extract
Formulation and Evaluation of Betel Leaf Powder Preparation (Piper betle) <sup>14</sup>	Laboratory Experimental	<b>Depend on:</b> Physical quality of powder preparations  <b>Independent:</b> Betel Leaf Extract (Piper betle)	Betel leaf extract can be formulated into powder preparations and betel leaf powder preparations that are made to meet the standards according to the pH of human skin, namely pH 4.5-6.5	<b>Independent:</b> Kersen Leaf Ethanol Extract

<sup>12</sup> Sulfiyana H. Ambo Lau and Herman Herman, "Formulation and Physical Stability Test of Powder Preparation Sprinkled with Ethanol Extract of Ciplukan Leaves (Physalis angulata L.) As an anti-fungi in Tammatto Village, Bulukumba Regency," *Sandi Husada Health Scientific Journal* 12, no. 2 (2020): 1117–26, <https://doi.org/10.35816/jiskh.v12i2.472>.

<sup>13</sup> Farida Rahim, "Formulation of Powder for Sowing Grass Extract (Cyperus Rotundus L.) As an Antiseptic," *Journal of Applied Science and Technology* 12, no. 1 (2018): 1, <https://doi.org/10.22216/jit.2018.v12i1.2640>.

<sup>14</sup> Putri et al., "Formulation and Evaluation of Betel Leaf Powder Preparation (Piper Betle)."