

# CHAPTER I

## INTRODUCTION

### 1.1 Background

Indonesia is a country with a tropical climate that has high temperatures throughout the year with abundant sunlight, humidity and also high temperatures. This exposure when exposed to the skin, can disrupt the skin water balance leading to reduced skin moisture. The main function of the skin is to protect the body from harmful exposure and help the body in controlling body temperature, preventing dehydration, and as a sense of touch. Common problems experienced by humans due to exposure to harmful exposure are dry, cracked, scaly skin, and can cause irritation<sup>1</sup>.

The most common skin problem is dry skin, especially among people living in tropical climates. Many people do not realize the effects of dry skin because they think it is not important.<sup>2</sup> The causes of skin problems is due to exposure to harmful substances such as UV rays, chemicals and the surrounding environment. Human skin is constantly exposed and interacts with the environment, such as ultraviolet rays, air humidity and temperature because the skin is one of the outermost parts of the body which can cause dry skin. Signs of dry skin include dull skin, lackluster skin scaly and wrinkled. Dry skin can cause other skin problems because the skin's defenses are weakened if not addressed<sup>3</sup>.

There are many ways people, especially teenagers, can prevent skin problems with natural treatments and the use of cosmetics which can be expensive.<sup>4</sup> Among various cosmetics, moisturizer is the most important cosmetic for hydrating the skin because it can form artificial skin barrier to soften dry or rough skin layers and can

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<sup>1</sup> Christian Tricaesario and Retno Indar Widayati, "Effectiveness of 4% Almond Oil Cream on Skin Moisture Levels," *Diponegoro Medical Journal* 5, no. 4 (2016): 599–610.

<sup>2</sup> Riska Purnamasari, "Formulation of Pure Coconut Oil Gel Preparation or VCO (Virgin Coconut Oil) Used as Facial Moisturizer," *Luwu Raya Health Journal* 6, no. 2 (2020).

<sup>3</sup> Shafira Rizkiah, Sari Defi Okzelia, and Agung Sofyan Efendi, "Formulation and Evaluation of Gel from Watermelon White Peel Extract (*citrullus lanatus*) as Skin Moisturizer," *Sabdariffarma Journal* 9, no. 2 (2021): 33–46.

<sup>4</sup> Sri Wahdaningsih, Erna Prawita Setyowati, and Subagus Wahyuono, "Free Radical Scavenging Activity of Fern Stems (*Alsophila glauca* j.Sm)," *Traditional Medicine Magazine* 16, no. 3 (2011): 156–60.

reduce water evaporation from the skin until the water content in the skin is sufficient to reduce signs of chronic skin disorders or eczema.<sup>5</sup>

Skin care can be done by utilizing natural ingredients such as bidara leaves. Bidara leaves contain flavonoids that can maintain skin moisture, thus preventing dry skin. Flavonoid content includes polar compounds because the presence of hydroxyl groups, therefore flavonoids soluble in polar solvents such as ethanol.<sup>6</sup> Flavonoids in bidara leaves has the potential as antioxidants. Bidara leaves (*Ziziphus mauritiana* L.) are plants with the potential for natural antioxidant activity because their flavonoid content as antioxidants, anti-inflammatory, antimicrobial, antifungal and tumor-inhibiting effects.<sup>7</sup> Antioxidants can prevent premature aging process which is marked by thinning, wrinkles and dry skin. Dry skin has low water levels disrupting the water balance in the skin, which causes the skin's moisture to decrease and become dry.<sup>8</sup>

Topical gel preparations are of interest to the public for moisturizing the skin because they slow down the process of dry skin. Semi-solid preparations such as gels are commonly used because they are clear, translucent, and made by mixing extracts (active substances) with a suitable base because they can carry active substances well.<sup>9</sup> The water base contained in the gel has the ability to moisturize, providing a cooling effect to the skin so it is good for use in hot weather.<sup>10</sup> According to SNI16-4399-1996, the standard for a good skin moisturizer gel based on pH quality requirements is 4,5 – 6,5. If it is too acidic, it can cause irritation,

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<sup>5</sup> Jannatul Firdausi, "Physical quality test of gel from pineapple juice (ananas comusus (L.) Merr) as a skin moisturizer," *Attamru Scientific Journal of Pharmacy* 2, no. 1 (November 19, 2021): 20–26, <https://doi.org/10.31102/attamru.v2i1.1265>.

<sup>6</sup> Pramita Yuli Pratiwi et al., "Antioxidant Activity of Ethanol Extract of Suruhan Herb (*Peperomia pellucida* (L.) HBK) with DPPH (2,2-Diphenyl-1-Picrylhydrazyl) Method," *University Research Colloquium*, 2021.

<sup>7</sup> Trie Yuni Elfasyari, Lita Riastienanda Putri, and Sawitri Wulandari. Formulation and evaluation of antioxidant gel of bidara leaf extract (*ziziphus mauritiana*). *PHARMACY: Indonesian pharmaceutical journal* 2. No.2 (December 2, 2019).

<sup>8</sup> Mera Riska, Syarifah Nadia, and Nilsya Febrika Zebua, "Formulation and Determination of Total Flavonoid Content of Ethanol Extract Gel of Celery Leaves (*Apium graveolens* L.) as a Moisturizer," *Forte Journal* 4, no. 1 (January 31, 2024): 20–29, <https://doi.org/10.51771/fj.v4i1.685>.

<sup>9</sup> Siti Saharah Abdullah, Jumasni Adnan, and Zalzabila. Effect of triethanolamine on bidara leaf gel formulation (*ziziphus mauritiana*) with hydroxyethyl cellulose base. *Pelamonia pharmaceutical journal*.

<sup>10</sup> Roby Setyawan et al., "Formulation, Evaluation and Physical Stability Test of Antioxidant Gel Preparation of Tali Putri Extract (*Cassytha filiformis* L)," *Bencoolen Journal of Pharmacy* 3, no. 1 (2023).

while if the pH is too alkaline, it will cause dry skin. Gel has better potential for topical preparations than ointments, because the gel texture is easily absorbed and is not sticky on the skin.<sup>11</sup>.

Based on the above research, this research aims to develop a formulation of bidara leaf extract gel preparation as a solution for skin problems, specifically dry skin because by providing a moisturizing effect. This gel preparation provides convenience because it can be applied to the skin and provides a cooling effect when applied, and is effective in providing moisture to teenagers who have dry skin problems.

### **1.2 The formulation of the problem in this study is**

1. What are the results of the physical evaluation of the bidara leaf extract gel preparation (*Ziziphus mauritiana*)?
2. How effective is the moisture content of the bidara leaf extract gel preparation (*Ziziphus mauritiana*)?

### **1.3 Research purposes**

The objectives of this research are:

1. To find out the results of the physical evaluation of bidara leaf extract gel preparations (*Ziziphus mauritiana*).
2. To determine the effectiveness of moisture from bidara leaf extract gel preparation (*Ziziphus mauritiana*).

### **1.4 Benefits of research**

#### **1. Theoretical benefits**

The results of this study can increase scientific knowledge and be used as a reference material for further research on gel preparations from the active ingredient of ethanol extract of bidara leaves (*Ziziphus mauritiana*) as a moisturizing agent.

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<sup>11</sup> Mohammad Zaky, Nita Rusdiana, and Ayunda Darmawati, "Formulation and Physical Evaluation of Antioxidant Gel Preparation of 70% Ethanol Extract of Starfruit Leaves (*averrhoa bilimbi* L.) Using the DPPH Method," *Jurnal Farmagazine* 8, no. 2 (August 30, 2021): 26, <https://doi.org/10.47653/farm.v8i2.556>.

## 2. Practical benefits

The results of this study are expected to provide information to other researchers and the cosmetic industry regarding the moisturizer gel from ethanol extract of bidara leaves (*Ziziphus mauritiana*). It can produce a moisturizer product with a gel base that has effectiveness as a moisturizing agent.

### 1.5 Originality of Research

The results of the research on bidara leaves have been performed by several researchers as shown in table 1 below.

**Table1.** Research Authenticity

Research Title	Research methods	Variable	Results	Research Differences
Preparation of bidara leaf extract gel ( <i>Ziziphus mauritiana</i> ) with variations of HPMC gel base <sup>12</sup> .	Experimental	<b>Dependents:</b> HPMC <b>Independent:</b> Gel preparation, bidara leaf extract.	Ethanol extract of bidara leaves can be formulated in the form of gel preparations. The results of the physical stability of bidara leaf extract gel preparations using HPMC gel bases with concentrations of 0.5%, 1% and 3% indicate that the preparation can form a good gel and meet the requirements.	<b>Dependents:</b> Bidara leaf extract, gel formulation. <b>Independent:</b> <i>Moisturizer</i> , physical evaluation, and moisturizing agents.
Formulation of peel off gel mask preparation from bidara leaf extract ( <i>Ziziphus</i>	Laboratory Experimental	<b>Dependents:</b> Bidara leaf extract with a concentration of 1%, 3%, 5%. <b>Independent:</b>	The peel off gel mask preparations produced are all homogeneous and stable, have a pH between 6.3-5-7 and this formulation does not irritate the skin.	<b>Dependents:</b> Bidara leaf extract and gel preparation. <b>Independent:</b> <i>Moisturizer</i> , physical

<sup>12</sup>Trie Yuni Elfasyari, Lita Riastienanda Putri, and Sawitri Wulandari. Formulation and evaluation of antioxidant gel of bidara leaf extract (*ziziphus mauritiana*). PHARMACY: Indonesian pharmaceutical journal 2. No.2(December 2, 2019).

Research Title	Research methods	Variable	Results	Research Differences
spina-christi L.) <sup>13</sup> .		Peel off gel preparation formulation		evaluation, and moisturizing agents.
Formulation and determination of total flavonoid content of celery leaf (Apium graveolens L.) ethanol extract gel as a skin moisturizer <sup>14</sup> .	Laboratory experiments	<b>Dependents:</b> Ethanol extract of celery leaves, determination of flavonoid content  <b>Independent:</b> Gel preparation, moisturizer	Formulation 3 of 3 formulations has the highest moisture percentage of 44.94%. Formulation 3 has the highest flavonoid content of 999.9858 mgQE/g. in the formulation indicates the ability of the preparation to moisturize the skin from natural ingredients.	<b>Dependents:</b> Bidara leaf extract and gel preparation.  <b>Independent:</b> Moisturizer, physical evaluation, and moisturizing agents.

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<sup>13</sup> Hanifah Solin, "Formulation of Peel Off Gel Mask Preparation from Bidara Leaf Extract (*ziziphus mauritiana*)," 2019.

<sup>14</sup> Riska, Nadia, and Febrika Zebua, "Formulation and Determination of Total Flavonoid Content of Ethanol Extract Gel of Celery Leaves (*Apium graveolens* L.) as a Moisturizer. *fote journal* 4, No1(2024)"