CHAPTER I

PRELIMINARY

A. Background

Beauty is often judged as a person's quality standard, especially for women. Facial skin without acne, and rosy, is often used as a benchmark for women achieving beauty. Women want their skin condition to remain healthy and youthful. Although as women get older, the aging process on the skin will occur and be natural. Skin aging can occur quickly due to certain factors called premature skin aging. Premature aging can cause dullness in the skin, the appearance of dark spots, wrinkles and dryness, and reduced skin elasticity.[1] Premature aging, especially on the skin, can occur by several factors, one of which is exposure to free radicals.

Free radicals are molecules that have one or more unpaired electrons in their outer orbit and have very labile and reactive properties.[2] Free radicals can damage skin collagen, fibers, and the dermis matrix so that the skin becomes dry, wrinkled, flaky, and can even cause premature aging.[3] Such free radical compounds can come from air pollution, exposure to sunlight (UV radiation), X-rays, pesticides, or smoke. The activity of these free radical compounds can minimize by using antioxidants that can counteract or prevent oxidation reactions from

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[1] Latiffany Azizza, "Pengaruh Proporsi Madu, Ketan Hitam (*Oryza sativa Var. Glutinosa*) Dan Ekstrak Jeruk Nipis (*Citrus aurantifolia Swigle*) Terhadap Sifat Fisik Masker Wajah Tradisional," *e Journal* 9, no. 4 (2020): 59–64.

[2] Supiani Rahayu, Rissa Laila Vifta, and Jatmiko Susilo, "Uji Aktivitas Antioksidan Ekstrak Etanol Bunga Telang (*Clitoria ternatea L.*) Dari Kabupaten Lombok Utara Dan Wonosobo Menggunakan Metode FRAP," *Journal of Research in Pharmacy* 1, no. 2 (2021): 1–9.

[3] Merly Jayanti, Ade Maria Ulfa, and Angga Saputra Yasir, "The Formulation and Physical Evaluation Tests of Ethanol in Telang Flower (*Clitoria ternatea L.*) Extract Losio Form as Antioxidant," *Biomedical Journal of Indonesia* 7, no. 3 (2021): 488–495.

free radicals. Antioxidants can be found inside the body (endogenous) and outside the body (exogenous). When the human body is exposed to excess free radicals exposure, the body will need more antioxidants found in exogenous antioxidants.[4]

Exogenous antioxidants can obtain through various sources, such as synthetic antioxidants (Vitamin E or vitamin C) or natural antioxidants from plants. These compounds enter the body through food, supplements, medicines, or cosmetic treatment preparations. Antioxidants can protect the body against damage caused by reactive oxygen compounds, inhibiting degenerative diseases, one of which is premature aging.[5]

The efforts to slow down aging can do by consuming vitamins C, D, and E, and can also use cosmetic treatments. Skincare products have now become a trend for teenagers, especially a girls, and are also classified as many and very easy to do. According to the regulation of the Minister of Health of the Republic of Indonesia No. 26 of 2018 states that cosmetics are ingredients or preparations intended to be used on the outside of the human body (epidermis, hair, nails, lips, and external genital organs) or teeth and oral mucosa especially to clean, perfume, change the appearance and/or improve body odor or protect or maintain the body in good condition.[6]

One of the skincare that is often used by the public is a facial wash. Facial wash preparations are facial cleansers in the form of soap to clean dead skin cells, dirt, oil, and cosmetics on the face.[7] The

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[4] Disa Andriani and Lusi Murtisiwi, "Penetapan Kadar Fenolik Total Ekstrak Etanol Bunga Telang (*Clitoria ternatea L.*) Dengan Spektrofotometri UV VIS," *Cendekia Journal of Pharmacy* 2, no. 1 (2018): 32–38.

[5] Andriani and Murtisiwi, "Penetapan Kadar Fenolik Total Ekstrak Etanol Bunga Telang (*Clitoria ternatea L.*) Dengan Spektrofotometri UV VIS."

[6] Menteri Kesehatan Republik Indonesia, *Peraturan Menteri Kesehatan RI No. 26 Tentang Pelayanan Perizinan Berusaha Terintegrasi Secara Elektronik Sektor Kesehatan*, 2018.

[7] Nia Yuniarsih et al., "Formulasi Dan Evaluasi Sifat Fisik Facial Wash Gel Ekstrak Kulit Buah Naga Merah (*Hylocereus polyrhizus*) Dengan Gelling Agent Carbopol," *Pharma Xplore* 5, no. 2 (2020): 57–67.

selection of facial wash for care products should be selective because mistakes in choosing facial care products can cause damage to the skin of the face. Using facial wash with chemicals as active substances can sometimes cause problems or damage to facial skin, such as stinging, reddish rashes, acne, and blackheads.[8] Meanwhile, facial washes with natural ingredients are rarely found in the market.

Nowadays, the term back to nature is known as a person's lifestyle to return to utilizing and maintaining natural wealth as much as possible. This trend makes the use of herbal medicines or herbal ingredients cosmetics increasingly in demand by the public. Using plants as cosmetic ingredients has advantages, such as containing natural ingredients that are safe to use, minor side effects, and more economical. These natural materials can come from plants or animals Allah SWT has created. As Allah SWT has said in surah Thaha verse 53, which reads:

الَّذِي جَعَلَ لَكُمُ الْأَرْضَ مَهْدًا وَسَلَكَ لَكُمْ فِيهَا سُبُلًا وَأَنْزَلَ مِنَ السَّمَاءِ مَاءً فَأَخْرَجْنَا بِهِ أَزْوَاجًا مِنْ نَبَاتٍ شَتَّى

"Who has made for you the earth a stretch and Who has made for you the earth the roads and brought down from the sky rain waters. So We grow with rain water it is various plants."

This verse explains that the variety of plants on this earth is proof of the truth of Allah Almighty. He created these plants for the benefit of other living beings, especially humans, for the source of daily needs. This variety of plants is a gift of Allah SWT because it contains substances that are beneficial to human health.[9]

One of the plants that can be used in medicine and cosmetics is the butterfly pea flower (*Clitoria ternatea L.*). The content of compounds

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[8] Dwi Restu Herawati, Aldi Budi Riyanta, and Rizki Febriyanti, "Formulasi Dan Uji Sifat Fisik Sediaan Gel Facial Wash Dari Ekstrak Lobak (*Raphanus sativus L*) Dan Bengkuang (*Pachyrizus erosus*)," *E-journal Politeknik Tegal* (2020): 1–9.

[9] Quraish Shihab, *Tafsir Al-Misbah* (Jakarta: Lentera Hati, 2003).

in butterfly pea flowers includes anthocyanins, kaemferol, quercetin, myricetin, taxaxaerol, malvidin-3ß-glucoside, and ß-sitosterol. Butterfly pea flowers have antioxidants, anti-inflammatory, anti-cancer properties, and can lower lipid levels in the blood. [10] Based on Rahayu's research, ethanol extract of butterfly pea flower obtained from the North of Lombok and Wonosobo districts has an IC50 value of 4.19 ppm from North of Lombok and 3.08 ppm from Wonosobo. Hence, it has the potential to have potent antioxidant activity.[11] Based on Marpaung's research, butterfly pea flower extract effectively protects skin cells from oxidative pressure induced by hydrogen peroxide and ultraviolet rays and can be used as a cosmetic to slow down wrinkled skin.[12]

Butterfly pea flower extract also has antibacterial activity. According to some studies, butterfly pea flower extract has many anti-microorganism activities. Mahmad's research shows that ethanol extract from butterfly pea flowers can inhibit the growth of bacteria *Bacillus subtilis, Staphylococcus aureus, and Escherichia coli*.[13] Previous research by Hidayah showed that ethanol extract from butterfly pea flower and ethanol extract from soursop leaf is potent against *S. aureus* and *S. epidermidis*. The combination of 40% butterfly pea flower extract and 60% soursop leaves showed an inhibitory diameter of 17.6 mm in *S. aureus* and 16.8 mm in *S. epidermidis*.[14]

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[10] Muhammad Dzakwan, "Formulasi Micellar Based Water Ekstrak Bunga Telang," *Jurnal Ilmiah Farmasi* 9, no. 2 (2020): 61–67.

[11] Rahayu, Vifta, and Susilo, "Uji Aktivitas Antioksidan Ekstrak Etanol Bunga Telang (*Clitoria ternatea L.*) Dari Kabupaten Lombok Utara Dan Wonosobo Menggunakan Metode FRAP."

[12] Abdullah Muzi Marpaung, "Tinjauan Manfaat Bunga Telang (*Clitoria ternatea L.*) Bagi Kesehatan Manusia," *Journal of Functional Food and Nutraceutical* 1, no. 2 (2020): 47–69.

[13] Noraini Mahmad and R M Taha, "Anthocyanin as Potential Source for Antimicrobial Activity in *Clitoria ternatea L* . And *Dioscorea alata L* .," *Pigment & Resin Technology* (2018).

[14] Suci Nur Hidayah, "Uji Aktivitas Antibakteri Kombinasi Ekstrak Etanol Bunga Telang (*Clitoria ternatea L.*) Dan Ekstrak Etanol Daun Sirsak (*Annona muricata L.*) Terhadap *Staphylococcus aureus* Dan *Staphylococcus epidermis*" (Universitas Sebelas Maret Surakarta, 2015).

In this study, butterfly pea flowers will formulate into facial wash dosage forms in the form of gel to facilitate its use. Facial wash gel preparations use additional ingredients, carbopol, as a gelling agent. Carbopol is a hydrophilic gel, easily dispersed in water and with a minor concentration, can serve as a gel base, showing sufficient viscosity at pH 6-8.[15]

Based on the background above, this study will formulate facial wash preparations of butterfly pea flower extract (*Clitoria ternatea L.*), evaluation of physicochemical characteristics, and perform stability tests on the preparation. The formulation of facial wash preparations in this study was made with variations in carbopol concentrations of 1%, 1.5%, and 2%.

B. Problem Formulation

Based on the background above, this research was conducted to find out the following:

1. What does the characteristics of the formula facial wash of butterfly pea flower extract (*Clitoria ternatea L.*) with a variation concentration in carbopol 940?
2. How does the concentration of carbopol affect the physicochemical characteristics and stability of the facial wash gel preparation?
3. What is the concentration of carbopol that can produce the best facial wash formula following the Indonesian National Standard of 1996?

C. Research Purposes

Based on the formulation of the problem above, the objectives of this study are:

1. It knows the characteristics of the formula facial wash of butterfly pea

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[15] Nurul Bayti, Aris Purwanto, and Herda Ariyani, "Formulasi Dan Uji Sifat Fisik Sediaan Kosmetik Facial Wash Gel Dari Ekstrak Daun Kelor (*Moringa oleifera Lamk*) Dengan Variasi Konsentrasi Carbopol," *Journal of Current Pharmaceutical Sciences* 5, no. 1 (2021): 464–470.

flower extract (*Clitoria ternatea L.*) with a variation concentration in carbopol 940.

2. It knows the effect of carbopol concentration on the physicochemical characteristics and stability of facial wash gel preparations.
3. It knows the concentration of carbopol that can produce facial wash following the Indonesian National Standard of 1996.1996.

D. Benefits of Research

1. Theoretical Benefits

The results of this research are expected to increase knowledge among the public. In addition, it is expected to provide scientific information for further research on utilizing butterfly pea flowers (*Clitoria ternatea L.*) and variations in carbopol concentrations in facial wash preparations.

2. Practical Benefits

The study's results are expected to be used as a reference in developing pharmaceutical preparations in the cosmetic industry by utilizing butterfly pea flowers and using variations in carbopol concentrations in a facial wash preparation.

E. Authenticity of Research

The authenticity of this study is based on several studies, as follows:

Table 1 Authenticity of Research

Research Title	Research Methods	Variable	Result	Research Differences
Formulasi Dan Evaluasi Sifat Fisik *Facial Wash* Gel Ekstrak Kulit Buah Naga Merah	Experimental	**Dependent:** Facial wash formulations **Independent:** Dragon fruit	The characteristics of the dragon fruit skin extract gel facial wash are the best formula	**Independent:** Butterfly pea flower extract, Carbopol variety

(*Hylocereus polyrhizus*) Dengan Gelling Agent Carbopol[16]		peel extract, Carbopol variations	1 with a carbopol concentration of 1% and have the appropriate physical properties, pH, foam power, and viscosity.	
Pengaruh Basis Carbopol Terhadap Formulasi Sediaan Gel dari Ekstrak Daun Katuk (*Sauropus androgynus (L) Merr*)[17]	Experimental	**Dependent:** Gel variations **Independent:** Carbopol, Katuk leaf extract	The results of the evaluation of the physical properties of the gel preparation showed that the formulation with a 2% variation of carbopol had the best evaluation.	**Dependent:** Facial wash preparations **Independent:** Butterfly pea flower extract, Carbopol variety
Formulasi Gel *Facial Wash* Ekstrak Daun Hantap (*Sterculia coccinea Var. Jack*) dan Uji Aktivitasnya sebagai Antioksidan[18]	Experimental	**Dependent:** Facial wash formula, antioxidant test **Independent:** Hantap leaf extract	Hantap leaf extract is a facial wash gel that meets the preparation characteristics and has a relatively strong antioxidant activity with an IC50 value of 62,085 in formula 2.	**Dependent:** Facial wash formula **Independent:** Butterfly pea flower extract, Carbopol variety

[16] Yuniarsih et al., "Formulasi Dan Evaluasi Sifat Fisik Facial Wash Gel Ekstrak Kulit Buah Naga Merah (*Hylocereus polyrhizus*) Dengan Gelling Agent Carbopol."

[17] Sheila Meitania Utami and Qisthy Laurany, "Pengaruh Basis Carbopol Terhadap Formulasi Sediaan Gel Dari Ekstrak Daun Katuk" (2019): 1–12.

[18] Sri Bunga Astuti, Tresna Lestari, and Vera Nurviana, "Formulasi Gel Facial Wash Ekstrak Daun Hantap (*Sterculia coccinea Var. Jack*) Dan Uji Aktivitasnya Sebagai Antioksidan," *Prosiding Seminar Nasional Diseminasi Penelitian* 1 (2021): 244–256.

The Formulation and Physical Evaluation Tests of Ethanol in Telang Flower (*Clitoria ternatea L.*) Extract Losio Form as Antioxidant[19]	Experimental	**Dependent:** Lotion preparations, Antioxidant test **Independent:** Butterfly pea flower extract	Butterfly pea flower extract can to formulated into lotion preparations that meet the requirements of physical evaluation tests at an extract concentration of 0.1% and have potent antioxidant activity.	**Dependent:** Facial wash formula **Independent:** Butterfly pea flower extract, Carbopol variety

[19] Jayanti, Ulfa, andnYasir, ''The Formulation and Physical Evaluation Tests of Ethanol in Telang Flower (*Clitoria ternatea L.*) Extract Losio Form as Antioxidant''.