CHAPTER I
INTRODUCTION

1.1 Background

The kin is the flexible and elastic outer layer of the human body, which has the function of protecting the body from sun exposure.[1] Therefore, using cosmetics plays a crucial role in maintaining skin healthy. Cosmetics basically aim to uphold personal hygiene, enhance attractiveness, and protect the skin from environmental factors. One way to protect the skin from environmental factors is the use of cosmetics formulated with natural and environmentally friendly ingredients.[2]

One of the environmental factors that can damage the skin is ultraviolet (UV) radiation. While Sunlight is essential for the survival of all living organism, such as a source of energy and contributing to skin and bone health, but excessive exposure can lead erythema and sunburn and increased risk of skin cancer. Therefore, it is necessary to protect the skin to reduce the damage caused by UV radiation.[3] Sunscreen is a topical preparation that is useful as a skin protector by means of a physical blocker that blocks ultraviolet light from penetrating the skin layer by reflecting ultraviolet light. The preparation is made in one of the modified forms to protect the skin from UV exposure, namely sunscreen facemist.[4]

Facemist is a type of skincare in the form of a spray that is easy to apply and has many benefits. One of these benefits is facemist can moisturize, refresh, and

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[1] Asti Vebriyanti Asjur et al., "Formulation and Test of Antioxidant Activity of Face Mist Preparation of Green Apple Peel Ethanol Extract (Pyrus Malus L.) With the dpph method: formulation and antioxidant activity face mist preparation ethanol extract green apple peel (pyrus malus l.) with dpph methods," Journal of Science and Health 5, no. 3 (May 31, 2023): 297–305.

[2] Ahmad Ardiansyah, "Characteristics of Face Mist with Formulation Treatment" 11, No. 4 (2023).

[3] Achmad Ridho Fauzan, "Characterization and Formulation of Suncreen Spray Lotion Preparation of N-Hexane Extract of Tomato Fruit (Solanum Lycopersicum) and Determination of Spf Value in In-Vitro" 3, No. 1 : 1–2..

[4] Titi Agni Hutahaen and Romadhiyana Kisno Saputri, "Formulation and Antioxidant Test Of Face Spray of Star Fruit Extract (Averrhoa Bilimbi L.): Formulation And Antioxidant Test Of Face Spray Of Star Fruit (Averrhoa Bilimbi L.) Fruit Extract," Medical Science: Scientific Journal of Pharmacy 7, No. 3 (July 21, 2022): 439–48.

hydrate the facial skin layer. The constituent ingredients of this facemist preparation are the types of ingredients that have a rich content of antioxidants. Antioxidants have benefits as a prevention of premature aging, combagting dry skin or moisturize the skin, protecting against free radicals, and protecting the skin from cell damage due to UV radiation. One of the plants that has a rich content of antioxidants is betel nut *(Areca catechu L.)*.[5] Facemist itself has advantages when compared to other preparations, in addition to practical storage and use, facemist also has the advantage of convenient to carry, making it easiy to apply anytime and anywhere.[6]

The Betel nut plant (*Arecha catechu L.)* is a type of plant that has fruit and seeds that are often used as cosmetic and food ingredients. The compounds found in the betel nut *(Areca catechu L.)* includes alkaloids, flavonoids, tannins, and saponins. The flavonoid compounds in betel nut have antioxidant activity, which help protect the skin from the harmful effects of UV exposure.[7] This plant is one of the blessings granted by Allah SWT. to humans who must be utilized as well as possible. As mentioned in Surah An-Nahl verse 11:

ينبت لكم به الزرع والزيتون والنخيل والأعناب ومن كل الثمرات إن في ذلك لآية لقوم يتفكرون {النحل:11}

"With it (rainwater) He grows for you tamam-plants, zaitu, dates, grapes, and all kinds of fruits. Indeed, in such things are signs of Allah's greatness for those who understand" (QS. An-Nahl: 11).[8]

Based on the above background provided , the researcher aims to develop a formulation regarding facemist preparations using a combination of vegetable glycerine as a humectant. Humectants are substances that possess the ability to

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[5] Ardiansyah, "Characteristics of Face Mist with Formulation Treatment."

[6] La Sakka And Hasma Hasma, "Face Mist Formulation From Yellow Pumpkin (Cucurbita Moschata) Extract As An Antioxidant," Indonesian Journal Of Pharmaceutical Education 3, No. 1 (February 25, 2023).

[7] Wida Ningsih and Afdhil Arel, "Formulation and Activity Test of Liquid Bath Soap from Betel Seed Extract (Areca Catechu L) and Against Staphylococcus aureus Bacteria," Menara Ilmu 16, No. 1 (July 14, 2022).

[8] Lilik Erliani and Cucu Sobiroh, "A Comparative Study of MUI Fatwa No: Kep-018/MUI/I/1989 and Law Number 33 of 2014 concerning Halal Product Guarantee Provisions," Falah: Journal of Sharia Law and Economics 2, no. 2 (July 2, 2022): 15–28.

attract and retain moisture, humectants can also helping to hydrate the skin, prevent dryness, and make the skin feel softer and smoother. Vegetable *glycerine* was selected as a humectant because it has a rapid hydration effect. In this study, a combination method was used because it has great advantages, especially in enchancing skin hydration. The combination of vegetable glycerine, the skin hydration process will be more optimal because both ingredients have a good way of working in locking skin moisture.[9]

1.2 Problem Formulation

The problem formulation underlying this research is as follows:

1. What are the quality evaluation results of betel nut *(Areca catechu L.)* extract facemist preparation with a combination of vegetable glycerine as a humectant?
2. Which formula produces the best betel nut seed *(Areca catechu L.)* extract facemist with vegetable glycerine as a humectant?
3. Which formula has the highest SPF level of betel nut seed *(Areca catechu L.)* extract facemist preparation with vegetable glycerine combination?

1.3 Research Objectives

The objectives of this research are as follows:

1. Knowing the quality evaluation results of betel nut (Arecha catechu L.) extract facemist preparations with a combination of vegetable glycerine as a humectant.
2. Knowing the best formula that produces betel nut *(Areca catechu L.)* extract facemist preparations with a combination of vegetable glycerine as a humectant.
3. Knowing the formula of betel nut *(Areca catechu L.)* extract facemist preparation with a combination of vegetable glycerine as a humectant that has the highest SPF level.

1.4 Research Benefits

1. **Benefits of theory**

[9] Betsy Yosia Nadeak and I Made Birawan, "The Selection Of Moisturizer For Treatment Of Atopic Dermatitis" 5, No. 1 (2022).

The results of this study can be used as reference material for further research on testing betel nut ethanol extract *(Areca catechu L.)*, especially in the preparation of betel nut extract facemist *(Areca catechu L.)* with a combination of vegetable glycerine as a humectant.

2. **Practical benefits**

The results of this study are expected to provide practical benefits, especially in the pharmaceutical industry of cosmetic preparations by processing betel nut *(Arecha catechu L.)* extract combined with vegetable glycerine as a humectant to develop facemist preparations.

1.5 Originality of Research

Table 1 Originality of Research

Research Title	Research Methods	Variables	Results	Research Differences
Formulation analysis and physical stability test of facemist containing 70% ethanol extract of cucumber fruit (Cucumis sativus L.) as antioxidant. [10]	Experimental	Dependent: Antioxidant activity Independent: 70% ethanol extract of cucumber fruit (Cucumis sativus L.)	Extracts and Facemist Preparations F1, F2 and F3 all contain antioxidant activity and of the three formulas, formula III was 20% which was very high in antioxidant content.	**Dependent :** Concentration of betel nut seed extract, in facemist formulation **Independent**: Combination of vegetable glycerine as humectant
Formulation of facemist preparation from pumpkin *(Cucurbita*	Experimental	Dependent : Antioxidant activity Independent**:**	The preparation of Facemist Ethanol Extract of Yellow Pumpkin Fruit	**Dependent:** Concentration of betel nut seed extract, in

[10] Anggriani Rumanasen, "Formulation and Physical Stability Test of Face Mist Containing 70% Ethanol Extract of Cucumber Fruit (Cucumis Sativus L.) As an Antioxidant," 1945.

Research Title	Research Methods	Variables	Results	Research Differences
moschata) fruit extract as antioxidant [11]		Pumpkin fruit extract (Cucurbita moschata)	(Cucurbita moschata) was evaluated including Organoleptic Test, pH, Spreadability Test, and Dry Time Test. The best dosage formula of the three formulas was F2 because it meets the requirements of SNI standards that are safe and good for use on the skin.	facemist formulation **Independent :** Combination of vegetable glycerine as humectant.
Tomato Fruit (Licopersicon Esculentum Mill) Sunscreen Lotion Spray Test	Experimental	Dependent: SPF Test Independent**:** Tomato Fruit (Licopersicon esculentum Mill)	Moringa leaf extract face spray formulation has antibacterial effectiveness against Staphylococus epidermidis bacteria. The most effective concentration of face spray	**Dependent:** Concentration of betel nut seed extract, in facemist formulation. **Independent:** Combination of vegetable glycerine as humectant.

[11] Sakka And Hasma, "Face Mist Formulation From Yellow Pumpkin (Cucurbita Moschata) Extract As An Antioxidant."

Research Title	Research Methods	Variables	Results	Research Differences
			formulation against Staphylococus epidermidis bacteria is 50% concentration with a zone of inhibition of 15.6mm.	
Formulation and Determination of SPF (Sun Protection Factor) Gel Spray Preparation of Ethanol Extract of Rosella Flower (Hibiscus sabdariffa L.)[12]	Experimental	Dependent : Determination of SPF value Independent: Ethanol Extract of Rosella Flower (Hibiscus sabdariffa L.)	The results of this study indicate that the SPF (Sun protection factor) gel spray preparation of ethanol extract of rosella flowers (Hibiscus Sabdariffa L.) meets the physical stability requirements of the preparation including organoleptic test, pH, homogeneity, adhesive spreadability,	**Dependent**: Concentration of betel nut seed extract, in facemist formulation. **Independent:** Combination of vegetable glycerine as humectant.

[12] Endah Agus Prihandini, Nur Hatidjah Awaliyah Halid, and Ari Tjahyadi Rafiuddin, "Formulation and Determination of SPF (Sun Protection Factor) Value of Gel Spray Preparation of Ethanol Extract of Rosella Flower (Hibiscus sabdariffa L.)," Journal of Pharmacia Mandala Waluya 2, no. 5 (October 30, 2023): 251–63.

Research Title	Research Methods	Variables	Results	Research Differences
			and viscosity in the 10, 15 and 20% concentration formulas. Gel spray SPF ethanol extract of rosella flower (Hibiscus Sabdariffa.L) has an SPF value in the 10% SPF concentration formula which is 2.953 in the moderate category, at a concentration of 15% 3.125 in the moderate category, at a concentration of 20% 5.026 in the strong category.	