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Feasibility Of Bitter Melon Masks For Anti-Aging Facial Skin Care

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Abstract

This study aims to evaluate the feasibility of using bitter melon (Momordica charantia) mask as an anti-aging facial skin treatment through a quantitative research method with an experimental approach. This research is important because anti-aging skincare aims to prevent premature ageing, which is often caused by factors such as exposure to free radicals and oxidative stress. The feasibility of bitter melon masks was evaluated through a series of tests, including laboratory tests to measure flavonoid, phenolic, and collagen content, as well as organoleptic and hedonic tests to assess physical characteristics and user preferences. Data collection techniques involved observation, documentation, and the use of observation sheets. Laboratory test results showed that the bitter melon mask contained positive flavonoids, phenolic compounds, and collagen, which are known to be beneficial for skin health and ageing prevention. Meanwhile, the organoleptic and hedonic test results showed that the bitter melon mask had a smooth texture, distinctive bitter melon aroma, strong adhesion, and was quite liked by the panellists. Based on these findings, the bitter melon mask is considered suitable for use as an anti-aging facial skincare product.

Keywords: *Anti-aging, Bitter melon, Eligibility, Mask, Skin Care*

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1. Introduction

The facial skin is the most important part for both women and men. One of the most common facial conditions in the elderly is dry skin, which is accompanied by the aging process (Rosalina et al, 2023). Skin aging is characterized by the appearance of wrinkles, fine lines, loss of elasticity, and skin dryness (Darmawan, 2015). According to (Minerva et al, 2024), the factors influencing aging include repeated facial expressions, exposure to heat, sleeping positions, gravity, lifestyle habits such as smoking, pollution, and sun exposure, especially UV rays. Physiological changes in the skin of the elderly consist of barrier function disturbances, slowed epidermal cell turnover, reduced blood vessel networks around hair follicles and glands, decreased cell turnover function, immune response, chemical clearance, sensory perception, thermoregulation, and decreased production of sweat, sebum, and vitamin D (Sarbini et al., 2020) & (Anggowarsito, 2014).

Facial skin is a very important part of the body as it plays a major role in determining the appearance and self-confidence of both men and women. As we age, facial skin tends to undergo various changes that can affect its health and appearance. One of the most common changes is dry skin, which often comes with the ageing process. Skin ageing causes a reduction in the skin's ability to retain moisture, which leads to dry skin. In addition, the ageing process also reduces the production of sebum (the skin's natural oil) and slows down the turnover of skin cells, further aggravating the dryness of the facial skin. This condition not only impacts physical appearance, such as the appearance of wrinkles and fine lines, but can also affect one's self-confidence.

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From the explanation above, facial skin care measures are needed to prevent the aging process, one of which is using face masks. According to (Rosalina et al., 2024), face masks are cosmetic preparations used at the final stage of facial skin care. According to (Rosalina et al 2019), face masks have many benefits, including moisturizing, improving skin texture, rejuvenating the skin, tightening the skin, nourishing the skin, softening the skin, cleaning pores, and brightening the skin tone. Masks are cosmetic ingredients used at the end of facial or body skin care after cleansing from massage (Sari et al., 2020).

Therefore, the demand for effective anti-aging skin care products is increasing. One natural ingredient with potential in anti-aging skin care is bitter melon (Momordica charantia) (Minerva et al 2021). Bitter melon is known for its high content of nutrients and bioactive compounds, including vitamin C, vitamin E, polyphenols, flavonoids, and saponins (Wahyusi, 2020).

Bitter melon, or Momordica charantia, is known as a fruit that is rich in nutrients and various bioactive compounds, providing many health benefits. The vitamin C content in bitter melon acts as a powerful antioxidant, helps maintain healthy skin, boosts the immune system, and improves iron absorption from plant foods. Bitter melon also contains vitamin E, which protects the body's cells from free radical damage and supports cell membrane function. Polyphenols found in bitter melon have strong antioxidant properties, helping to fight free radicals, reduce inflammation, and potentially lower the risk of chronic diseases. Flavonoid compounds in bitter melon also contribute to reducing inflammation, supporting cardiovascular health, and have potential as anti-cancer agents. Additionally, the saponins in bitter melon are known for their ability to lower cholesterol levels, boost the immune system, and have antimicrobial and anti-cancer properties. With this combination of nutrients and bioactive compounds, bitter melon is a beneficial food for improving overall health and preventing various diseases.

These compounds are known to have strong antioxidant activity, which can help protect the skin from damage caused by free radicals and oxidative stress. Additionally, bitter melon has been reported to have anti-inflammatory properties and to boost collagen production, both of which are important for maintaining skin health and elasticity (Parawansah, 2022). The compounds in bitter melon are known to have strong antioxidant activity, which plays an important role in protecting the skin from free radical damage and oxidative stress. Free radicals and oxidative stress can cause premature ageing of the skin, such as the appearance of wrinkles, fine lines and loss of elasticity. With strong antioxidant activity, the compounds in bitter melon help counteract these negative impacts, keeping skin healthy and younger-looking. In addition, bitter melon is also reported to have anti-inflammatory properties, which help reduce inflammation in the skin. Chronic inflammation can damage skin tissue and accelerate the ageing process, so these anti-inflammatory properties play an important role in maintaining healthy skin. Not only that, bitter melon is also known to increase the production of collagen, a protein that is essential for maintaining skin strength and elasticity. By boosting collagen production, bitter melon helps maintain skin's suppleness, prevents sagging, and keeps skin firm and elastic.

2. Method

The research used a descriptive quantitative approach with an experimental design. The experimental study aimed to determine the feasibility of bitter melon face masks for anti-aging facial skin care based on texture, aroma, adhesion, and panelist preference. This research was conducted in the laboratory at Universitas Perintis Indonesia. The methods used included observation, documentation, and observation sheets. The research instrument was a questionnaire. The type of data analysis used was organoleptic testing with descriptive percentage analysis.

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Bitter Melon Face Masks

The process of making bitter melon face masks refers to the research by (Minerva et al 2021). It begins with weighing 1000 grams of bitter melon, then cleaning it thoroughly under running water to remove dirt and chemical residues. After washing, the bitter melon is cut into small pieces to speed up the drying process. The next step is to dry the bitter melon pieces at room temperature. Once the bitter melon is completely dry, the next step is grinding. The dried bitter melon pieces are ground using a blender until they become powder. This process is followed by sifting the bitter melon powder to separate any coarse particles, resulting in a fine powder ready for use. To make the mask, 50 grams of the fine bitter melon powder is mixed with distilled water (aquadest) as needed until the desired consistency is achieved. This mixture is then placed into a mask container.

Table 1. Ingredients for Making Masks

No	Ingredient	Use	Quantity
1	Bitter Melon	To be made into Bitter Melon Powder	100 grams
2	Distilled Water (Aquadest)	For mixing in the preparation of the bitter melon mask	As needed

Source: Data Processing

Laboratory Test

This test was conducted to evaluate the collagen and flavonoid content in the experimental bitter melon mask.

Organoleptic Test

The organoleptic tests in this study include texture, aroma, and adhesion, with a rating scale of 1-4.

Hedonic Test

Panelist preference for the bitter melon mask was assessed using a rating scale of 1-4, where the highest score (4) indicates very like, (3) like, (2) somewhat dislike, and (1) dislike.

3. Results and Discussion

Making Bitter Melon Face Masks

The process of making bitter melon face masks begins with weighing 1000 grams of bitter melon, which is known for its numerous skin health benefits, including antioxidant and anti-inflammatory properties. The weighed bitter melon is then thoroughly cleaned under running water to remove dirt and chemical residues. After washing, the bitter melon is cut into small pieces to speed up the drying process.

The next step is drying the bitter melon pieces. This process is conducted at room temperature, without direct sunlight exposure, to maintain the stability of the active compounds within. Drying the bitter melon until it is completely dry aims to remove the water content, making it easier to grind and extending the product's shelf life. Once the bitter melon is completely dry, the next step is grinding. The dried bitter melon pieces are ground using a blender until they become powder. This process is followed by sifting the bitter melon powder to separate any coarse particles, resulting in a fine powder that is ready for use.

To make the mask, 50 grams of the fine bitter melon powder is mixed with distilled water (aquadest) as needed until the desired consistency is achieved. This mixture is then placed into a mask container.

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Laboratory Test Results

Table 2. Laboratory Test Results

Test Method	Reagent	Positive Reaction	Test Result
Flavonoid	Mg powder + HCL	Formation of red/orange color	(+) positive
Phenolic	10% FeCL	Formation of blue color	(+) positive
Collagen	As, oxidant 1% + Mg + H2SO4	Formation of purple/blue ring	(+) positive

Source: Data Processing

Based on the table above, it can be concluded that the bitter melon mask powder sample contains flavonoids, phenolics, and collagen, showing positive results. The laboratory testing process used various specific chemical reagents to detect each of these compounds. The flavonoid content test used magnesium (Mg) powder and hydrochloric acid (HCl) as reagents, with a positive reaction indicated by a change in color to red or orange (Sriwijayanti et al., 2024). The phenolic content test used 10% ferric chloride (FeCl3) as a reagent, with a positive reaction indicated by the formation of a blue color (Rizqiana & Pambudi, 2021). For the collagen content test, a mixture of As, oxidant 1%, magnesium (Mg), and sulfuric acid (H2SO4) was used, with a positive reaction indicated by the formation of a purple or blue ring (Septiningsih et al., 2017).

Organoleptic Test Results

Table 3. Organoleptic Test Results for Texture

Score	Category	Frequency	Calculation	Presentation
1	Not smooth	0	(0/7) x 100	0%
2	Slightly smooth	3	(3/7) x 100	43%
3	Smooth	3	(3/7) x 100	43%
4	Very smooth	1	(1/7) x 100	14%

Source: Data Processing

Based on the table above, it can be concluded that 43% of the panelists stated that the texture of the bitter melon mask is slightly smooth, 43% stated that it is smooth, and 14% stated that it is very smooth. A smooth texture indicates that the mask particles were well-ground during the preparation process, including drying, grinding, and sieving. Masks with a smooth texture are also easier to mix with other ingredients, such as rose water, enhancing their flexibility in use.

Table 4. Organoleptic Test Results for Aroma

Score	Category	Frequency	Calculation	Presentation
1	No distinct bitter melon aroma	0	(0/7) x 100	0%
2	Slight bitter melon aroma	1	(1/7) x 100	14%
3	Fairly distinct bitter melon aroma	2	(2/7) x 100	28%
4	Very strong bitter melon aroma	4	(4/7) x 100	58%

Source: Data Processing

Based on the table above, it can be concluded that 14% of the panelists stated that the mask has a slight bitter melon aroma, 28% stated that it has a fairly distinct bitter melon aroma, and 58% stated that it has a very strong bitter melon aroma. This distinctive aroma comes from the natural components in bitter melon, which are preserved even through the drying and processing into a mask.

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Table 5. Organoleptic Test Results for Adhesion

Score	Category	Frequency	Calculation	Presentation
1	Not adhesive	0	(0/7) x 100	0%
2	Slightly adhesive	0	(0/7) x 100	0%
3	Adhesive	7	(7/7) x 100	100%
4	Very adhesive	0	(0/7) x 100	0%

Source: Data Processing

The bitter melon mask showed the highest rating for adhesion, indicating that it has good adherence to the skin. Good adhesion ensures that the mask can stay firmly on the face during the application period, allowing the active ingredients to penetrate and provide optimal benefits to the skin.

Hedonic Test Results

Table 6. Hedonic Test for Panelist Preference

Score	Category	Frequency	Calculation	Presentation
1	Dislike	0	(0/7) x 100	0%
2	Slightly like	0	(0/7) x 100	0%
3	Like	6	(6/7) x 100	86%
4	Very like	1	(1/7) x 100	14%

Source: Data Processing

The highest level of panelist preference for the bitter melon mask is "like." This indicates that the panelists have a positive response to the mask, although they do not significantly favor all aspects of it.

4. Conclusion

The feasibility of bitter melon mask for anti-aging treatment was tested through several parameters, with the following results: The texture of the mask was found to be smooth, providing comfort when used. The aroma of the mask is typical of bitter melon, which gives the product a distinctive character, and the adhesion is stated to be good, meaning that this mask can stick well to the skin. The hedonic test showed that the panellists quite liked this mask, indicating that the mask was well received by users. In addition, laboratory tests revealed that the bitter melon mask contains important compounds such as flavonoids, phenolics, and collagen. Flavonoids and phenolics are known for their powerful antioxidant properties, which can protect the skin from free radical damage and oxidative stress. While collagen plays an important role in maintaining skin elasticity and firmness. With these active compounds, bitter melon has great potential as a natural ingredient in anti-ageing facial skincare products, supporting skin protection and regeneration and helping to prevent premature signs of ageing.

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