Raw Silk-Infused Under-Eye Masks with Natural Extracts: A Synergistic Approach to Skin Rejuvenation

Mrs. S. Vijayalakshmi M.Sc,.MBA.,[1] R. Libika (B.Sc)[2]
[1]*Assistant Professor, Department of Costume Design and Fashion, Dr. N.G.P Arts and Science College, Coimbatore*
[2]*UG student, Department of Costume Design and Fashion, Dr. N.G.P Arts and Science College, Coimbatore*

Abstract- This study objects to create an under-eye mask with natural ingredients. The primary goals of this work is to create a natural and sustainable under-eye mask by exploring, material selection, extraction process, mask preparation. This study aims to produce an environmental friendly under-eye mask with the source *of raw silk fiber, Cucumis sativus extract, Aloe barbadensis miller gel, and Vitamin-E capsule* which has cooling and therapeutic effects on the eyes. These plant-derived ingredients not only nourish the skin but also address common issues such as puffiness, dark circles, and fine lines. As known, silk is a natural protein filament fiber with the amino acid structure that is the most similar to human skin, because silk fibers are formed by many nanofibers, which perform very well in both permeability and absorption. Sericin is high in active protein, and in the presence of hydrophilic side groups on the sericin chain, silk has a natural moisturizing effect which plays a vital role in cosmetic and skincare functions. The project involves a multi-faceted approach, including dermatological testing to ensure efficacy and safety.

Key words: Raw silk fiber, Cucumis sativus extract, aloe barbadensis miller gel, vitamin – E capsule.

1.INTRODUCTION

Raw silk fiber is a renewable resource that requires less water and less chemicals to make. It is soft, breathable, and can absorb water well, so it is a suitable skin care product. Its natural texture itself can keep a stable temperature when applied to the skin. Raw silk possesses unique characteristics such as antibacterial and biodegradable, with excellent moisture absorption and softness. These make it ideal for under-eye masks. Silk is capable of managing moisture, preventing the skin from drying out excessively while still permitting it to breathe. Its silky surface also reduces friction, which reduces irritation and is more comfortable.

Natural substances like Aloe Vera, which are applied to heal wounds and keep the skin moisturized, can be infused into raw silk fiber for improved skin care. Aloevera has more than 200 active constituents that help in repairing the skin, providing moisture, and calming redness. Research has confirmed that it is capable of reducing dark spots and enhancing the general health of the skin.

Using raw silk under-eye masks with Aloe Vera and plant extracts can help moisturize, give a cooling effect, and help make the skin healthier. The masks can soften the skin, de- puff the eyes, and give a calming effect, and hence, make them a convenient and new addition to the skincare routine.

3.OBJECTIVES

1.To make an under-eye mask with raw silk fiber, Aloe barbadensis miller gel, Cucumis sativus extract, and Vitamin E to hydrate, soothe, and rejuvenate the skin.
2. To investigate the way raw silk fibers, and especially their sericin content, hold water and have anti-aging ability. 3. To analyzing the effectiveness of Aloe barbadensis miller gel, cucumber extract, and Vitamin-E in reducing puffiness, dark circles, and fine lines.
4. To encourage eco-friendly skincare through encouraging the use of natural and biodegradable ingredients in product formulation.

4. REVIEW OF LITERATURE

4.1. Necessity of Under-Eye Care:

The skin under our eyes is much thinner than the rest of our face, which makes it prone to dark circles, puffiness, wrinkles, and dryness (Smith & Jones, 2021). Research shows that aging, sun exposure, lack of sleep, and stress can take a toll on the under-eye skin. (Brown et al., 2019). As a result, more people are turning to natural skincare ingredients known for their antioxidant, hydrating, and soothing benefits (Williams & Carter, 2018)

4.2. The Advantages of Aloe barbadensis miller gel in Under-Eye Treatment:

Aloe barbadensis miller gel (Aloe barbadensis) is widely applied in skin care due to its:

Aloe barbadensis miller gel is calming and hydrating due to the presence of polysaccharides. These retain moisture and remove dryness (Kumar et al., 2020).

Aloe barbadensis miller gel contains glycoproteins and salicylic acid that reduce inflammation and swelling (Choi & Kim, 2017).

Aloe barbadensis miller gel heals and rejuvenates the skin. It has been found to trigger collagen production, which stretches the skin and diminishes the fine lines (Liu et al., 2019).

4.3. Function of Cucumis sativus extract in Under-Eye Care:

Cucumber (Cucumis sativus) is also a very prevalent ingredient in eye care as it can cool, moisturize, and possess very good antioxidant levels (Williams & Carter, 2018). Research indicates:

High water content (96%) assists in keeping the skin hydrated (Patel & Mehta, 2022).

Cucumbers have flavonoids and tannins that reduces the puffiness and swelling (Gonzalez & Lee, 2021).

Caffeic acid and vitamin C present in cucumber helps to reduce the dark circles by inhibiting the formation of melanin (Zhang et al., 2020).

4.4. Vitamin E's role on Under-Eye Skin:

Vitamin E is a antioxidant. It helps repair and protect the skin (Johnson et al., 2021). Its benefits include:[1]

Arresting free radicals prevents early ageing and wrinkling (Brown et al., 2019).

Moisturiation and nourishment, preventing dryness and irritation (Kumar et al., 2020).

Improving skin barrier function, elasticity, and UV damage reduction (Choi & Kim, 2017).

5. METHODS/METHODOLOGY

5.1. Cleansing Raw Silk Fiber for Under-Eye Mask Development

FLOWCHART FOR CLEANSING SILK FIBER:

Pre-Rinsing

↓

Mild Detergent Wash

↓

Rinsing

↓

Final Rinse

↓

Air Drying

5.2. Materials Required

- Raw silk fibers (Mulberry)
- Lukewarm water
- Mild pH-neutral detergent
- Soft muslin cloth or strainer

5.3. Step-by-Step Process

5.3.1. Pre-Rinsing of Raw Silk Fiber

The raw silk fibers are cleansed in a bowl filled with lukewarm water. The fibers are gently washed for 5 minutes to remove dirt, or dust.

fig.no.1

5.3.2. Mild Detergent Wash

A mild pH-neutral detergent solution is prepared by adding a small quantity of detergent to lukewarm water. The silk fibers are submerged in this solution and gently cleansed for 10–15 minutes to remove the impurities without damaging the fiber. Excessive rubbing or twisting of the fibers should be avoided.

5.3.3. Rinsing with Clean Water

After washing, the fibers are transferred to a separate bowl of fresh lukewarm water. Multiple rinses are performed to ensure complete removal of detergent residues.

5.3.4. Drying Process

The cleaned silk fibers are carefully spread on a **soft muslin cloth** or **strainer** for drying process. Direct sunlight is avoided to prevent degradation of silk proteins. The fibers are left to air-dry completely before further processing.

5.4. Precautionary Measures

- Temperature Control: Water should remain lukewarm (not exceeding 40°C) to preserve the silk's protein value .
- Chemical Sensitivity: Harsh chemicals, bleach, and alkaline solutions are strictly avoided to maintain the fiber's natural properties.

5.4.1. EXTRACTION OF NATURAL INGREDIENTS FOR UNDER-EYE MASK DEVELOPMENT

FLOWCHART FOR EXTRACTION PROCESS

Formulation and development

[Ingredient selection]

↓

Preparation of extracts

[Aloevera and cucumber extracts]

↓

Mask solution preparation

[Infusion of ingredients and under eye mask]

↓

Application testing

[Patch testing]

5.5. FORMULATION DEVELOPMENT

a. Ingredient Selection:

- Raw silk fiber: Extract high quality and clear filaments from the cocoon.
- *Aloe barbadensis miller* Extract: Use pure *Aloe barbadensis miller* gel or a concentrated extract with proven hydrating and soothing properties.
- *Cucumber sativus* Extract: Utilize *cucumber sativus* powder or extract rich in antioxidants and vitamins.
- Vitamin E capsule: Select complementary ingredient based on desired effects.


fig.no.2


fig.no.3


fig.no.4


fig.no.5

5.6. PREPARATION OF EXTRACTS:

A. *Aloe barbadensis miller* Extract Preparation:

- Extract fresh *Aloe barbadensis miller* gel from leaves or use commercially available.


fig.no.6


fig.no.7


fig.no.8


fig.no.9

B. *cucumber sativus* Extract Preparation:

- Prepare *cucumber sativus* extract by either juicing fresh *cucumber sativus* or concentrating the juice mixed with a suitable solvent (e.g., distilled water).

fig.no.10 fig.no.11

fig.no.12

5.7. MASK SOLUTION PREPARATION

a. Formulation Mixing:

- Base Solution: Mix *Aloe barbadensis miller* extract with *cucumber sativus* extract in a suitable carrier solution, such as distilled water or a hydrating base.

fig.no.13

b. Silk Fabric Preparation:

- Cutting: Cut silk fabric into appropriate sizes for under eye masks.
- Infusion: Soak or dip the silk sheets into the prepared mask solution, ensuring full saturation.

fig.no.14

5.8.APPLICATION TESTING

a. Patch Testing:

- Conduct a patch test on a small area of skin to check for any adverse reactions or sensitivities.

6.RESULT AND DISCUSSIONS

6.1. ANTIBACTERIAL TEST

TEST ORGANISM : ESCHERICIA COLIFORM (8099)
STAPHYLOCOCCUS AUREUS (AATCC 6538)

REQ MINIMUM : 99.9 %

TEST MICROORGANISM	REDUCTION OF BACTERIA(%)
ESCHERICHIA COLIFORM	99.9 %
STAPHYLOCOCCUS AUREUS	99.9 %

fig.no.15

Antibacterial testing is done to find out how effectively a material or fabric inhibits bacterial development. This needs to be known for textiles to be applied in healthcare, personal care, and hygiene products like face masks, under-eye masks, and antimicrobial fabrics.

TEST RESULT:

This test result indicates the ability of a tested material or product to kill two particular bacteria:
E. coli (E. coli) (ATCC 8099)
Staphylococcus aureus (ATCC 6538)
+99.9% of these bacteria effectively. The minimum reduction needed for effectiveness is also 99.9%, i.e., the test satisfies the specified antibacterial requirement.

6.2.WATER ABSORBENCY TEST:

2. WATER ABSORBENCY: TEST METHOD: ISO 20158:2018

PARTICULARS	REPORT VALUE
WATER ABSORBENCY	DO NOT ABSORBED

fig.no.16

Water absorbency test is conducted to analyze the rate and amount by which a material or fabric is absorbed by water. The property medical is important for garments fabrics, devices, domestic textiles, and skin care items.

TEST RESULT:

The report states the **water absorbency test** was conducted using **ISO 20158:2018** standards. The result indicates that the material **"does not absorb water."**