



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Developedment Of Sustainable Eye Mask Using *Aloe Vera And Mentha*

S.Pradeepa¹, Asmitha.P.V² M.Sc.,

1. Student, Department of Costume Design and Fashion, Dr. N. G. P. Arts and Science College,
Coimbatore.

2. Assistant Professor of Costume Design and Fashion, Dr. N. G. P. Arts and Science College,
Coimbatore.

ABSTRACT:

In today's world people spending more time on screen so the screen light causes stress, dark circles, eye puffiness, etc. so to reduce that problem I have developed a reusable product (eye mask) using bamboo fabric, bamboo fabric has anti-bacterial properties so it will not cause any harmfulness to our eye. In this I have infused some natural ingredients like aloe vera (gel), neem(extract), which has cooling and hydrating properties.

Aloe vera gel keeps our eye hydrated and mint extract will reduce the dark circle and eye puffiness. By mixing these 2 ingredients we will get a gel. this gel will give refreshing appearance to our eye. To preserve this eye gel, I have added a preservative called purenso select Eco which prevents the gel from microbial growth we can refrigerate the gel and reuse it. This undergoes various types of testing like (skin irritation, liquid holding capacity, shelf life, softness, strength).

This product is environmentally friendly compared to disposable products this reusable product provides durability and long-term use. This mask is lightweight, soft and comfortable to wear. It has high quality solution for modern lifestyle challenges and maintaining an eco-friendly perspective. Eye mask has a therapeutic solution of blocking the light and gives hydration.

This reusable mask work as ability of absorbing and retaining cooling temperature

Key words: Mint extract, Aleo vera gel, bamboo fabric, cooling effect, reusable

INTRODUCTION

The screen usage has unavoidable these days, for all type of age group people if we give strain to eyes it leads to dark circles, puffiness, wrinkles. for giving some relaxation and reducing the dark circles we can use the eye mask with natural ingredients in it. The bamboo fabric is the outer layer of the mask which is soft, breathable, naturally it has a cooling property and the eye gel will be infused in sheet which we can store it in a cooling place before using it, we can reuse the eye mask whenever we want.

The aloe vera is known for moisturizing, anti-inflammatory and healing properties it is rich in minerals, vitamins and amino acids, this gel has the skincare benefits, its lightweight texture used as the base for the gel, mint extract has anti-fatigue properties enhance the ability of the mask, the mint has cooling effect it will stimulate the circulation .For making eye gel the aloe vera consist of 70-80%, which gives deep hydration, and it's a base ingredient. Mint extract has 10-15% of cooling sensation it will give freshness to our eyes, the final step of making gel is adding the preservative (Purenso select preservative Eco), this preservative is skin friendly, it helps to prevent microbial growth and it will extend the shelf life of the gel. The demand for natural plant-based products is more in industrial textiles, the consumers become more conscious about the ingredients that are used in their daily using products. so, this product will be suitable for the customers choices, it gives the non-toxic and ecofriendly solutions that supports both the personal care and environmental sustainability.

OBJECTIVES

- To provide relief from eye strain caused by screen time, reading or other activities.
- To promote relaxation by utilizing the soothing effects of cooling gel around the eyes
- To stimulate the circulation around the eyes which can aid in reducing dark circle and puffiness.
- To offer a cost-effective solution for eye care compare to most expensive treatments.

METHODOLOGY**FLOW CHART**

MATERIAL SELECTION

I have purchased Bamboo fabric for eye mask which is an highly eco-friendly, soft, and breathable material for 1 meter with the GSM of 140.98(g/sqm). Using that 1 meter of cloth I have done the two samples.



FIG:1 BAMBOO FABRIC

PRE-TREATMENT PROCESS

In pre- treatment process. The desizing and bleaching is done. In desizing the starch is removed from the fabric; in bleaching the natural colour is removed and fabric is changed into white colour

Process of desizing:

1. Heat the 3litres of water for about 60-70°C
2. Add 10-15ml of soap solution into the water
3. soak the bamboo fabric and keep it in the bath tub for 30-45 min stir continuously maintain the same temperature
4. After finishing rinse, the fabric in the warm water, the dirt and starch will be removed
5. let the fabric dry for few hours.

Process of bleaching:

1. Heat the 3 Liters of water add 1g of baking soda
2. Heat the solution for 80-90°C and put the desized fabric into it.
3. Maintain this temperature and keep the fabric in the bath tub for 30-45min stir gently to even the bleach
4. After bleaching rinse, the fabric in cold water and dry it.

PATTERN MAKING

I have drawn the pattern in the pattern making sheet with the measurements of the eye, fold the pattern sheet in half make the measurement for width is 8 inches in half it is 4 inches then height of the mask is 3.5 inches.

Procedure:

1. Put the pattern sheet in the on fold.
2. Mark the width 4 inches on the top and bottom for width in folded sheet horizontally
3. For height mark 1.75 inches on both sides of g-height.
4. join the points and make it as a square.
5. Draw the shape of the half mask inside it draw the curve on the on fold of the mask and cut it.
6. For the second layer of the fabric draw the same as the first layer but there is no on fold for this layer because of keeping the keep gel pouch

For elastic band:

1. Mark the width of the eye mask band the length is 15 inches, if we stitch it with the elastic, it becomes short. Mark it for top and the bottom.
2. The length of the band is 3 inches. Mark it for both the sides.
3. Join the point as the rectangle.
4. cut the pattern form the pattern sheet.

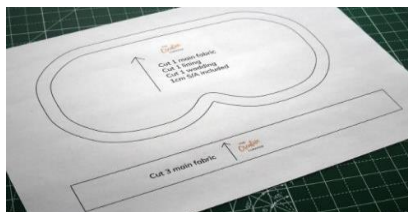


FIG:2 PATTERN FOR EYE MASK

FABRIC CUTTING AND STITCHING ACCORDING TO THE DESIGN

1. Trace the pattern on the bamboo fabric in the on fold cut the 2 layers the arrange them in the order and pin the fabric.
2. Sew the first layer of the fabric and the second layer is stitched in half for keeping the silicon pouch.
3. Trace the same pattern on the silicon sheet. Then trace the elastic band's pattern and cut it.
stitch the elastic on both sides in the corner of the eye mask.



PLATE:3 CUTTING FABRIC

GEL MAKING

In a beaker combine aloe vera extract (90ml), glycerine(3ml), and mint extract(10ml). place the beaker in a hot water bath heat gently while stirring until temperature for 15min, remove the beaker from the heat. Allow the mixture to cool down for 40°C add purensa preservative mix it thoroughly and add gel in silicon sheet.



PLATE:4 EYE GEL

GEL INFUSING

The gel is infused in the silicone pouch by using the syringe and sealed the pouch using the fire.

So, the gel will not be leaked from the pouch. We can refrigerate before using it.



PLATE:5 GEL INFUSED POUCH

FINISHING

After sealing the pouch, the product is ready, checked the product if there is any leakage.



PLATE:8 FIISHED PRODUCT

TESTING AND EVALUATION

SKIN IRRITATION TEST

The Irritation Skin Test is a crucial process to ensure an eye mask does not cause any skin reactions due to its aloe vera and mint extract ingredients, made from bamboo fabric. The test involves placing a gel-treated fabric strip on the skin for a specified duration, observing for discomfort, redness, itching, or irritation. If no reaction occurs, further adjustments may be made.

PATCH TEST

The Patch Test is a dermatological test that assesses the mask's suitability for sensitive skin. It tests whether the bamboo material or herbal gel induces hypersensitivity or allergies. This test confirms the mask's hypoallergenicity, making it safe for use on various skin types, especially those with allergies or skin disorders like eczema.

ANTIMICROBIAL TEST

The Antimicrobial Test is a crucial test for mask resistance against bacterial and fungal growth. It assesses the mask's effectiveness in preventing infection and odor, particularly for repeated use, by comparing the growth rate of bacteria and fungi to the mask's natural antibacterial properties, such as bamboo fabric and aloe vera and mint extracts.

GSM-WEIGHT TEST

The GSM Test measures material weight and thickness, affecting strength, durability, and comfort. Bamboo fabric for masks should be balanced for ventilation and support. Higher GSM results in more dense material, while lower GSM is lighter but may sacrifice airiness. Manufacturers determine best-in-class weight, comfort, and strength specifications.

SOFTNESS TEST

The Softness Test is a touch test to assess the fabric's softness on the skin, ensuring the eye mask remains comfortable and not irritating over time. Human sensory tests and mechanical tests, such as friction tests, are used to measure the fabric's smoothness, ensuring a pleasant experience for the wearer.

HERBAL PRESENCE

The Herbal Presence Test is a qualitative test that confirms the presence of aloe vera and mint extracts in a mask, ensuring its effectiveness in hydration, soothing, and cooling effects. It also confirms the extracts' degradation and duration of use, ensuring the mask maintains its positive effects.

PH VALUE TEST

The pH Value Test ensures the mask's skin-friendly nature by testing the neutral or slightly acidic pH levels of the bamboo fabric and gel infused. Deviation from this range can cause skin irritation, dryness, or barrier breakage.

COOLING AND SMOOTHENING EFFECT

The Smoothing and Cooling Effect Test evaluates a mask's ability to create a long-lasting cooling and smoothing effect, incorporating mint and aloe vera. User tests and thermal imaging technology measure the cooling effect duration, indicating extended relaxation and relief for skincare and wellness purposes.

AIR PERMEABILITY TEST

The Test for Air Permeability ensures a mask's breathability and noncloistered nature, ensuring it remains fresh, light, and comfortable for long hours. Bamboo fabric, with infused gel, ensures breathability, ensuring the mask remains well-ventilated and not restrictive.

BLEND TEST

The Blend Test is a process used to determine the percentage and proportion of fibers in bamboo fabric, ensuring quality and uniformity. It uses chemical, microscopic, and burning tests to analyze fiber structures and determine fiber content. If the blending ratio is not within the desired composition, adjustments may be made to ensure fabric integrity and performance.

PACKAGING AND FINAL RESULT:

The packing stage is the last step in the manufacturing process, the eye mask will be packed securely without any damage.

RESULT AND DISCUSSION

SKIN IRRITATION TEST

The developed sample with aloe vera and mint extract does not have any irritation and itching detected. Compared to market sample in which itching is found. Therefore, the developed sample passes the test.

PATCH TEST

The developed sample with aloe vera and mint extract does not have any skin inflammation, whereas the market sample also does not have any skin inflammation. Therefore, both the developed sample and market sample passes the test.

ANTIMICROBIAL TEST

The developed sample with aloe vera and mint extract have no bacterial activities found. But in case of market sample few bacterial activities are found. Concluding it the developed sample passes the test. The total viable count found in developed sample is 55(100cfu/ml at 22°C) and in market sample it is 135 (100cfu/ml at 22°C).

GSM-WEIGHT(G/SQMT) TEST

The GSM of bamboo fabric in developed sample has 140.98(g/sqmt) whereas the fabric of the market sample has less GSM compared to the developed eye mask. So, the developed sample has higher GSM compared to the market sample.

SOFTNESS TEST

Since eye is the sensitive part of the face harsh fabrics can cause irritation in this test it's revealed that the developed sample with bamboo fabric is very soft feel cellulosic than the market sample which feels slightly hard as the final test reveals that the developed sample passes the test.

HERBAL PRESENCE TEST

Since the project is labelled as sustainable eye mask the cooling gel is made out of aloe vera gel and mint extract it has high herbal present compared to the market sample where no herbal presence is found only chemical silica gel is present. Therefore, the developed sample have high herbal presence thereby passing the test.

PH VALUE TEST

The value of the developed sample is 6.9 which is a base value whereas the market sample is with the PH value of 7.8 which is slightly acidic. Therefore, the developed sample with aloe vera gel and mint extract passes the test.

COOLING AND SMOOTHENING EFFECT TEST

The cooling and smoothening effect in developed sample with aloe vera gel and mint extract outside /inside difference of 3°C found which gives the cooling effect by comparing it with market sample outside/inside difference of 0°C found which gives a hot effect. Therefore, the developed sample passes the test.

AIR PERMEABILITY TEST

The developed sample with bamboo fabric is 95(cm³/cm²/sec) whereas in market sample it is 55(cm³/cm²/sec) this concludes that the developed sample is more air permeable than the market sample hence developed sample passes the test.

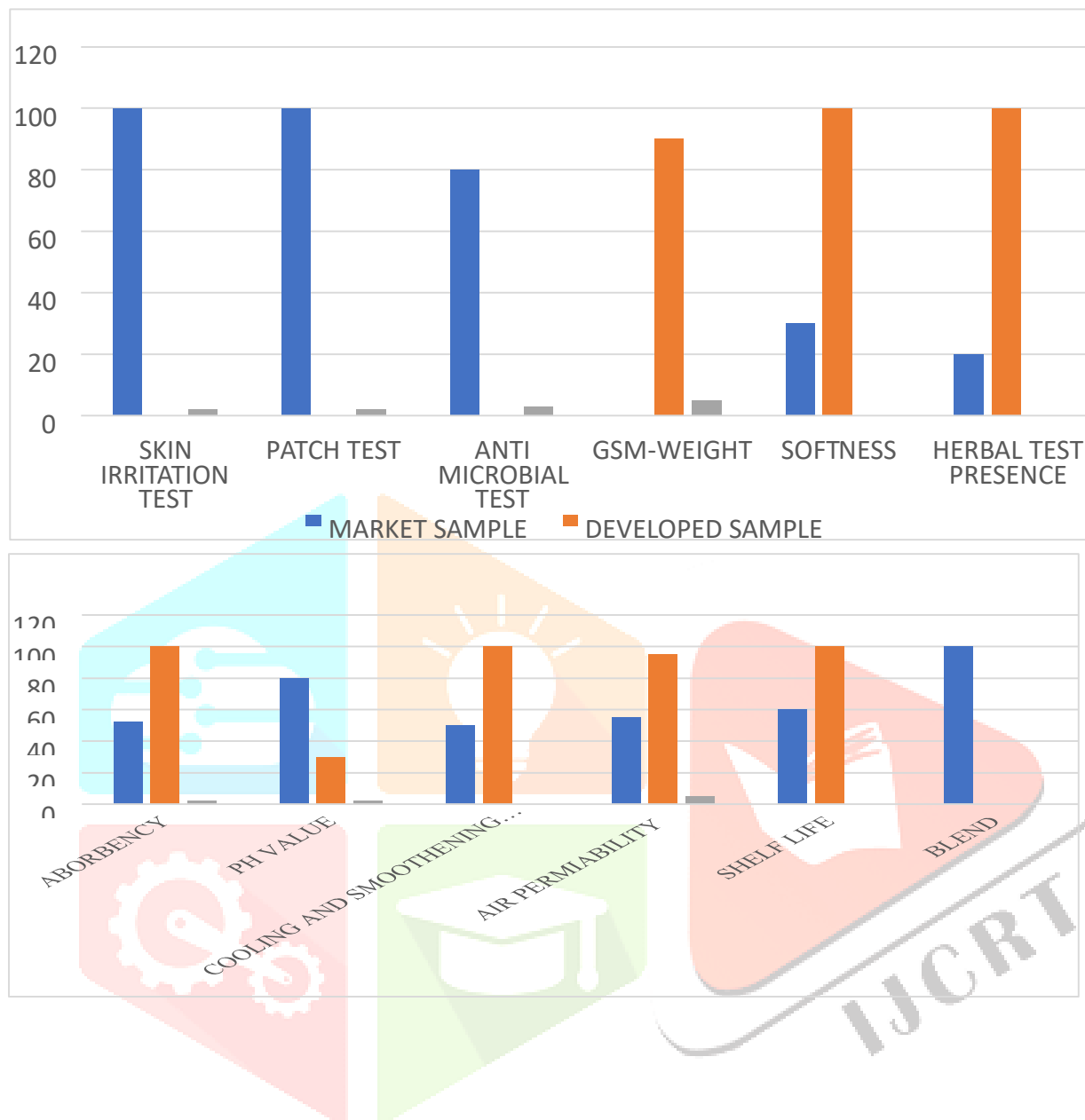
SELF-LIFE TEST

Shelf-life test of developed with aloe vera gel with mint extract is approximately 3 years, whereas the self-life of market sample is nearly 2 years. Therefore, the developed sample has passed the test.

BLEND TEST

The eye mask of developed sample with aloe vera gel and mint extract is made out of bamboo fabric with no other blend found comparing it with the market sample the eye mask fabric is a blend of polyester and cotton. hence using bamboo fabric is more natural than the market sample's polyester blend cotton. Therefore, the developed eye mask passes the test.

BAR DIAGRAM



SUMMARY AND CONCLUSION

An eye mask with aloe vera and Mentha formulation is a skin-friendly, eco-friendly product made from bamboo fiber. The mask is hypoallergenic, antimicrobial, and soft, providing relief from eye strain, puffiness, and redness. It undergoes various testing to ensure its quality, including patch tests, skin irritation, antimicrobial tests, GSM tests, softness tests, herbal presence tests, absorbency tests, pH value tests, cooling and smoothing effect tests, air permeability tests, self-life tests, and blending testing. The mask's hydrating, cooling, and antimicrobial properties support green consumerism and self-care, making it an eco-friendly solution for skin care and eye relaxation. This innovative product represents a breakthrough in the textile innovation and wellbeing sector, combining scientific innovations with natural resources to create a high-quality, functional, and ecologically sustainable product.

The eye mask combines ancient herbal medicine with high-tech textile technology, featuring aloe vera and mint for therapeutic benefits and holistic health benefits. Made from a bamboo fiber matrix, it's eco-friendly, comfortable, and suitable for sensitive skin. This innovative product demonstrates the potential of green textiles in dermatological well-being and environmental sustainability, demonstrating the potential of green products in the textile sector.

BIBLIOGRAPHY

- Akinlabi, E.T., Anane-Fenin, K., Akwada, D.R. (2017). Regeneration, Cultivation, and Sustenance of Bamboo. In: Bamboo. Springer, Cham.
- An Ha Truong, Thi My Anh Le. Overview of bamboo biomass for energy production. 2014. {halshs-01100209}
- Bin Hasnadi, M. S., & A Razak, A. H. (2022). Evaluation of Peppermint Based Menthol as a Cooling Agent for Development of Hydrogel Cooling Patch. *Progress in Engineering Application and Technology*, 3(1), 20-27.
- BOUDREAU, M. D., & BELAND, F. A. (2006). An Evaluation of the Biological and Toxicological Properties of *Aloe Barbadensis* (Miller), Aloe Vera. *Journal of Environmental Science and Health, Part C*, 24(1), 103–154.
- Cabrera LF, de Lima RMC, Santana CDC, Rodríguez (2020) Influence of coupling agent in mechanical, physical and thermal properties of polypropylene/bamboo fiber composites: under natural outdoor aging. *Polymers* 12:929
- 6.. Dada, M., Popoola, P. Aloe vera hydrogel for supercooling applications: a review. *Discov Mater* 4, 10 (2024).
- Hu, M., Wang, C., Lu, C., Anuar, N. I. S., Yousfani, S. H. S., Jing, M., ... Zuo, H. (2019). Investigation on the Classified Extraction of the Bamboo Fiber and Its Properties. *Journal of Natural Fibers*, 17(12), 1798–1808.
- N. Kaur, S. Saxena, H. Gaur and P. Goyal, "A review on bamboo fiber composites and its applications," 2017 International Conference on Infocom Technologies and Unmanned Systems (Trends and Future Directions) (ICTUS), Dubai, United Arab Emirates, 2017, pp. 843-849, doi: 10.1109/ICTUS.2017.8286123. keywords: {Natural Fibers; Bamboo Fibers; Composites; Alkaline Treatment},
- Khan AW, Kotta S, Ansari SH, Sharma RK, Kumar A, Ali J. Formulation development, optimization and evaluation of aloe vera gel for wound healing. *Pharmacogn Mag*. 2013 Oct;9(Suppl 1):S6-S10. doi: 10.4103/0973-1296.117849. PMID: 24143047; PMCID: PMC3798142.
- Luana Licata, Leonardo Briganti, Daniele Peluso, Livia Perfetto, Marta Iannuccelli, Eugenia Galeota, Francesca Sacco, Anita Palma, Aurelio Pio Nardoza, Elena Santonico, Luisa Castagnoli, Gianni Cesareni, MINT, the molecular interaction database: 2012 update, *Nucleic Acids Research*, Volume 40, Issue D1, 1 January 2012, Pages D857–D861.
- Mangaiyarkarasi, S. P.; Manigandan, T.1.; Elumalai, M.2; Cholan, Priyanka K.; Kaur, Roopam Pal2. Benefits of Aloe vera in dentistry. *Journal of Pharmacy and Bioallied Sciences* 7(Suppl 1):p S255-S259, April 2015. | DOI: 10.4103/0975-7406.155943
- Matossian, C., Song, X., Chopra, I., Sainski-Nguyen, A., & Ogundele, A. (2020). The Prevalence and Incidence of Dry Eye Disease Among Patients Using Continuous Positive Airway Pressure or Other Nasal Mask Therapy Devices to Treat Sleep Apnea. *Clinical Ophthalmology*, 14, 3371–3379.
- Mishra, R., Behera, B. K., & Pada Pal, B. (2011). Novelty of bamboo fabric. *The Journal of The Textile Institute*, 103(3), 320–329.
- Sevara, Almatatova Zebo Xudayberdiyevana G'aniyeva. "MEDICINAL PROPERTIES OF THE MINT PLANT." *Confrencea* 5.05 (2023): 331-334.

ANNEXURE



PLATE:9 EYE COOLING MASK

