DEVELOPMENT OF HERBAL EYE PATCHES USING LICORICE AND SOLANUM TUBEROSUM FOR REMOVINHG DARK CIRCLE

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ABSTRACT

In the field of cosmetic medicine, infraorbital dark circles are a frequent and complex problem that arise from a number of variables, including basic face architecture, alterations in soft tissue, and skin-related problems. For the specific anatomic changes present, a personalised care plan can be devised, and a range of therapy options are available. Blue light, a high energy short wavelength light that can damage your eyes, sensitive cells in the retina, and optic nerve cells behind the eyeball, is what happens when you spend too much time staring at a phone, laptop, or television Long-term exposure of screens can lead to retinal damage, dry eyes, and eye fatigue. Additionally, it may result in early macular degeneration, nearsightedness, and a lack of focus flexibility. In addition to prolonged binge watching and using computers and mobile devices, eye strain can also result from high-concentration activities like scientific research and microbiology, minute detailing work like fine arts, diamond cutting, and watch repair, or exposure to pollutants, fumes, and gases. Eye strain is also caused during frying and cooking in the kitchen or driving on polluted roads. Herbal eye patches are innovative skincare products designed to rejuvenate and refresh the delicate skin around the eyes. These patches typically consist of a blend of natural herbs, extracts, and other botanical ingredients known for their soothing and revitalizing properties. The herbal infusion offers a comprehensive approach to eye care by attempting to lessen puffiness, dark circles, and indicators of exhaustion. Herbs like licorice and solanum tuberosum together may have anti-inflammatory properties that help relieve inflamed skin and give the look of younger skin. A chilling feeling frequently follows the application of these patches, adding to the entire experience and promoting relaxation. Herbal eye patches are a popular choice for people who want to incorporate botanical elements into their skincare routine and are looking for a mild yet efficient way to address common eye-related issues. This is due to its natural formulation. The core objectives of this project encompass the development of an herbal eye patches, that integrates sustainable, biodegradable materials while infusing the mask with organic herbs renowned for their relaxation-inducing qualities. This eye mask is bio-degradable and also it is an eco-friendly .They emphasize the reduction of waste across the product's lifecycle, from its production to its eventual disposal. This article aims to develop an eye mask using potato peel and almond gums cooling effect and it has medicinal and cooling property in Ayurvedic treatment.

KEYWORDS: *aesthetic medicine- sensitive cells- eye fatigue- dryness - retinal damage- flexibility- soothing - revitalizing properties- reduce puffiness- anti-inflammatory -sustainable-biodegradable and eco -friendly*

1.INTRODUCTION

Patches for under eyes are becoming a regular “must have” product among regular skin care products. There are so many patches out there and they all claim to do magic to the skin around your eyes. Eye patches can re-

hydrate dry under eye skin, reduce wrinkles, dark circles and puffiness. They are designed to regenerate and tone tired, stressed skin. A breakthrough in skincare, herbal eye patches enriched with the powerful combination of licorice and solanum tuberosum offer a targeted solution for effectively addressing dark circles. Harnessing the natural properties of licorice, known for its skin-brightening and anti-inflammatory qualities, these patches aim to visibly reduce discoloration around the eyes. The inclusion of solanum tuberosum, or potato extract, further enhances the formula by potentially aiding in skin tone balancing. Under eye patches are nothing but masks that are specifically designed for the delicate skin under the eyes. These patches are generally made out of hydrogel, however, there are patches that are also made from cloth, and bio-cellulose, amongst other skin-friendly materials. Together, these herbal ingredients work synergistically to provide a gentle yet potent remedy for the stubborn concern of dark circles, promising a revitalized and brighter under-eye area. Embrace the rejuvenating power of nature with these herbal eye patches, tailored to unveil a refreshed and more radiant look. With constant hustle, getting an eight-hour sleep at night is hardly possible. So it's likely to wake up having swollen, baggy eyes the next morning. But under-eye patches can effortlessly work their magic when you want to refresh your skin. It can address many concerns like dark circles, puffy eyes, fine lines and wrinkles around the eyes. Also called eye patches, they are specifically crafted to soothe sensitive areas under or around the eyes. Since their primary role is to relax the nerves beneath the eyes, they are carefully made of hydrogel, a skin-soothing ingredient. They are available in effective combinations, with each ingredient having its relevance in benefiting your skin. The present study aimed to development of eco-friendly herbal patches product .This research work is about eye mask which helps to reduce the dark circles and gives a cooling effect for the users.

OBJECTIVES

- To develop the eco-friendly eye patches using potato peel and licorice.
- To apply the potato peel extract and licorice extract on cotton pad for its medical and cooling properties for eye
- To develop the eye patches for reducing the dark circle.
- To reduce the redness, increase the moisturizer and give cooling effect.
- To evaluate effectiveness and cooling property of the developed in herbal eye patches.
- To develop the chemical free organic eye patches.

2.REVIEW OF LITERATURE

2.1EYE PATCH:

An eye patch is a piece of fabric or other material that you wear over your eye. It blocks vision in one eye and treats some vision problems with what is called occlusion therapy. Patches are also common to wear after eye procedures.

2.1.1TYPES OF EYE PATCH:

1. **HYDRA GEL EYE PATCH:**

Hydra gel Eye Patches are hydration sealing, under eye plumping patches. These patches are infused with peptides and plant extracts, that helps in reducing dark circles & under eye hollowness. You may feel a tingling sensation when you wear them on, that's the patch working on under-eye puffiness reduction.

2. **Cosmetic/Fashion Eye Patches:**

Decorative Patches: Worn for aesthetic purposes, these can be stylish and may have various designs.

Specialty Patches: Some are designed for specific occasions or themes. When using an eye patch, it's essential to follow proper hygiene practices to prevent any complications. If you have specific concerns, consulting with an eye care professional is advisable.

3. Cooling or Soothing Eye Patches:

Often infused with ingredients like aloe vera or cucumber extract to provide a cooling sensation and reduce puffiness.

4. Gold or Hydrogel Eye Patches:

Some patches contain gold particles or have a hydrogel base, which can have a luxurious feel and may contribute to improved skin elasticity.

5.Detoxifying Eye Patches:

Formulated with ingredients like charcoal or green tea extract to detoxify and refresh the eye area.Always read and follow the instructions provided with the cosmetic eye patches, and consider your skin type and specific concerns when choosing a product. It's recommended to do a patch test before regular use, especially if you have sensitive skin.

2.2.MEDICAL TEXTILE

Medical textiles or MedTech is one of the most important, continuously expanding and growing field in technical textiles. Medical Sciences has made an emerging multidisciplinary field with tremendous potential. Medical Textiles represent structures designed and accomplished for a medical application. The number of applications is diverse, ranging from a single thread suture to the complex composite structures for bone replacement and from the simple cleaning wipe to advanced barrier fabrics used in operating rooms. Medical textiles represent structures designed and accomplished for a medical application. The number of applications is diverse, ranging from a single thread suture to the complex composite structures for bone replacement and from the simple cleaning wipe to advanced barrier fabrics used in operating rooms. Textile materials and products, that have been engineered to meet particular needs, are suitable for any medical and surgical application where a combination of strength, flexibility and sometimes moisture and air permeability are required. The medical textile industries have diversified with new materials and innovative designs. Recently, application of textiles has started going beyond the usual wound care, incontinence pads, plasters etc., Latest innovation i.e., wide variety of woven, non-woven, knitted forms of textile increasingly finding their way into a variety of surgical procedures. As the healthcare industry is growing enormously in India, the demand for the Medical Textile is also on the rise. The Medical Textile or MedTech application area embraces all those technical textiles used in health and hygiene applications. Medical Textiles as A general term which describes a textile structure which has been designed and produced for use in any of a variety of medical applications, including implantable applications.

2.2.1Basic requirement of textile in medical field

- Conformance to technical specifications
- Sterile
- Anti-allergic
- Anti-bacterial
- Environment friendly
- Economical
- Elasticity
- Air permeability
- Good dimensional stability
- Biocompatible

2.2.2Advantages of textiles in medical field

- Cross infection is reduced
- Protection of care providers
- Cost effective
- Flexible, soft and comfortable

2.2.3Application of non -woven Materials

Non- woven materials are made without using the techniques of basic fabric construction i.e., weaving or knitting. They are made by using the technique of felting, bonding, braiding, etc. which are used in the medical and healthcare sectors. The advantage of using non-woven is because of its cost, hygienist, and less time

requirement. The adhesive bonded method of non- woven method is mainly used for the hospital; use and also in the manufacturing of sanitary napkins, diapers for both baby and adult which can be thrown away after use. Different natural fibers are used for sanitary napkins, to limit the incidence of cross-infection. The properties like comfort, absorbency, softness, lightweight is a must for construction of health care products, which can be fulfilled by using of low bulk density non-woven fabric.

2.3POTATO PEEL (*Solanum tuberosum*)

The potato is a starchy, tuberous crop from the perennial nightshade *Solanum tuberosum*. The peels contain an array of nutritionally beneficial compounds, which can be utilized in many ways, e.g., the peel extract, can be used as a natural antioxidant in foods. Moreover, the phenolic compounds are particularly beneficial in the treatment of certain chronic diseases, and also in the prevention of cancer. The potato's fiber, potassium, vitamin C and vitamin B-6 content, coupled with its lack of cholesterol, all support heart health. Varying amounts of potassium, iron, riboflavin, folate, and vitamins are found primarily in the thick periderm of the potato skin. The concentrations of some minerals were found to be greater in the skin than in the flesh of the tuber .Peels are the major by-product of potato processing industries, which represent a major waste disposal problem for the industry concerned. Up-grading of this by-product to value added products is therefore of interest to the potato industry. The peeling is accomplished by abrasive peeling, steam peeling or lye peeling, depending on the types of products to be processed. Abrasive peeling is used for chips, whereas steam peeling is used for frozen and dehydrated products. The use of lye peeling requires a neutralization step, after peeling. Potato skin is composed of suberized phellem cells, the outer component of the tuber periderm. The periderm tissue consists of two additional cell types: a single-cell meristematic layer, the phellogen (cork cambium) that produces the phellem cells and is localized underneath them; and a parenchyma-like phelloderm that is derived from inward cell divisions of the phellogen. The periderm is a tissue of secondary origin that replaces the epidermis when the latter is damaged.

2.3.1PHENOLIC COMPOUNDS

Phenolic compounds are heterogenous class of secondary metabolites which are classified as phenolic acids and flavonoids. The latter components represent a very large subclass, with approximately 9000 compounds. The major phenolic acids present were: gallic acid, caffeic acid, chlorogenic acid and protocatechuic acid. An experimental pro-oxidant system was used to induce lipid peroxidation in rat red blood cells (RBCs) and human RBC membranes. Potato peel was found to inhibit lipid peroxidation with similar effectiveness in both the systems (about 80–85% inhibition by PP at2.5 mg/ml). The following are the phenolic compounds present in the skin of potato. Phenolic compounds are the main class of natural antioxidants. Extracts of peels from several variety of potatoes were highly efficient in reducing lipid peroxidation both in fish oil and in oil-in water emulsions.

Chlorogenic acid is by far the most abundant phenolic component and constitutes up to 90% of the total phenolics. It has a Protective effect in neuroinflammatory conditions.

- Caffeic acid is an antioxidant in vitro. Caffeic acid also shows immunomodulatory and anti-inflammatory activity. Caffeic acid outperformed the other antioxidants, reducing aflatoxin production by more than 95% percent.
- Antibacterial activities of these compounds were found in high doses against Escherichia coli, Salmonella typhimurium and Bacillus cereus.
- Antioxidant activity was found in multiple systems such as superoxide scavenging ability.
- Quercetin, a flavonoid found in potato skin, possesses powerful anti-inflammatory properties and antioxidant capabilities that protect the body's cells from free radical damage.
- The hydroxycinnamic acids of potato peel also caused in vitro peroxidation of human low-density lipoprotein (LDL).
- Choline is a very important and versatile nutrient in potatoes that helps with sleep, muscle movement, learning and memory. Choline also helps to maintain the structure of cellular membranes, aids in the transmission of nerve impulses, assists in the absorption of fat and reduces chronic inflammation.
- The protein contained in potato skins which is known as patatin, can help in reducing blood pressure and shield the heart against possible disease.

2.3.2MISCELLANEOUS USES OF POTATO PEELS:

Potato peel used as a low-cost agro-industrial medium in production of both alpha-amylase and alkaline protease enzymes and several extracellular hydrolytic enzymes which produced high yield and high activity of the produced enzymes. Also, an industrially important polysaccharide ‘pullulan’, can be produced by enzymatic hydrolysis of potato processing wastes.

It was extensively used in different food industries, under solid-state controlled growth conditions and was successfully used in some applications.

• Potato peel is used in livestock and cattle feed, since the fibres are suitable for ruminants, and it also contains certain nutrients beneficial for the animal.
• The potato peels may be used as a replacer of wood fibre in paper making. This is a very cheap and efficient method of utilization.

2.4 Properties of Athimadhuram

- It has sweet flavor
- Anti-inflammatory
- Antispasmodic
- Acts as a laxative
- Contains a chemical called Glycyrrhizin
- Rejuvenator
- antioxidant
- Carries phytoestrogenic quality and
- Immune booster

2.4.1Benefits of Athimadhuram

1. Cures acidity and indigestion

Licorice root has been used for centuries to treat various ailments that involves digestive tract, as it helps to protect the stomach lining.

2. Treatment of chronic cough and cold.

Stomach pain and headache can be reduced with consumption of athimadhuram as well.

3. Relieves stress and fights depression

Glycyrrhizin present in athimadhuram can fight against depression and anxiety. It can refresh your mind quickly. Drink athimadhuram tea thrice a day to fight against depression.

4. Menstruation

Athimadhuram cures cramps and pains during menstruation in women. Have a warm cup of this tea once in the morning to get good relief.

5. Menopause

Symptoms of menopause can be cured with the help of athimadhuram as this amazing herb is antioxidant and carries phytoestrogenic quality. The hormonal imbalance during menopause period can be cured with estrogens present in this medicinal herb

6. Constipation and indigestion

Athimadhuram roots can also work on the condition of constipation. Regular consumption of athimadhuram tea for 1 week can work as a laxative and solve the problem of constipation.

7.Arthritis

Ayurveda medicines use athimadhuram in the treatment of arthritis and other joint pains.

8. Pain Reliever

Anti-inflammatory properties of athimadhuram can reduce the pain effectively. Increased immunity power can lessen the joint pain and muscles pain.

9. Eye Care

Athimadhuram extracts are useful for treating eye problems. Those who are suffering from blurred vision or less vision are advised to consume athimadhuram to get benefits.

10. Respiratory problems

The tea of athimadhuram is recommended for the patients of asthma and other respiratory problems. Itching in throat, sore throat or other types of throat pain can be cured with the help of athimadhuram.

11. Body metabolism

It can be regulated by consuming athimadhuram root extracts. It can reduce bad cholesterol from body and can support bile acid flow in body.

12. Skin care

Use athimadhuram for skin diseases. The powder of dried athimadhuram roots can be used for many skin diseases like psoriasis, itching, eczema and dermatitis. Rashes also can be cured with this powder or lotion. You can also use athimadhuram for beauty aspects, athimadhuram face pack is the best treatment for oily skin people.

13. Hair care

Regular use of athimadhuram for hair can activate the hair scalps and induce the hair growth. You can also use athimadhuram for gray hair problems.

14. Fights diabetes

This amazing root can reduce blood glucose level in blood and thus useful in treating diabetes.

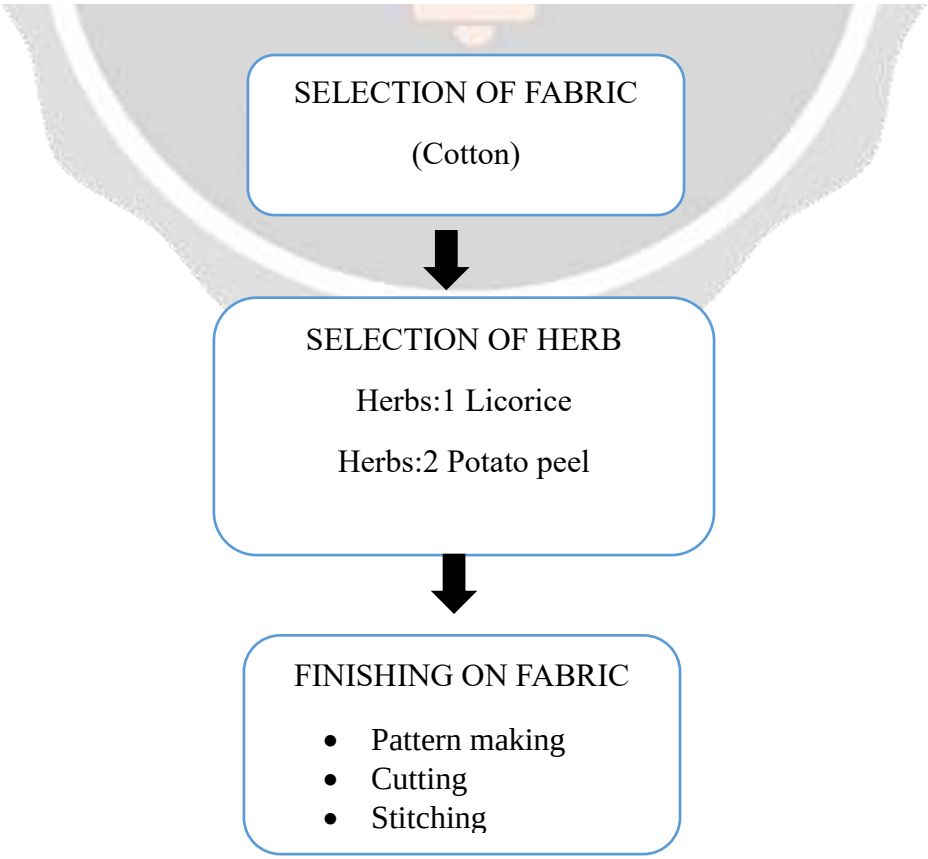
15. Weight loss

athimadhuram tea is beneficial in reducing weight also.

16. Kids

As this herb is very sweet in taste, it can be given to kids to cure cough and cold. Kids can get quick relief by consuming extracts of athimadhuram roots.

3.METHODOLOGY



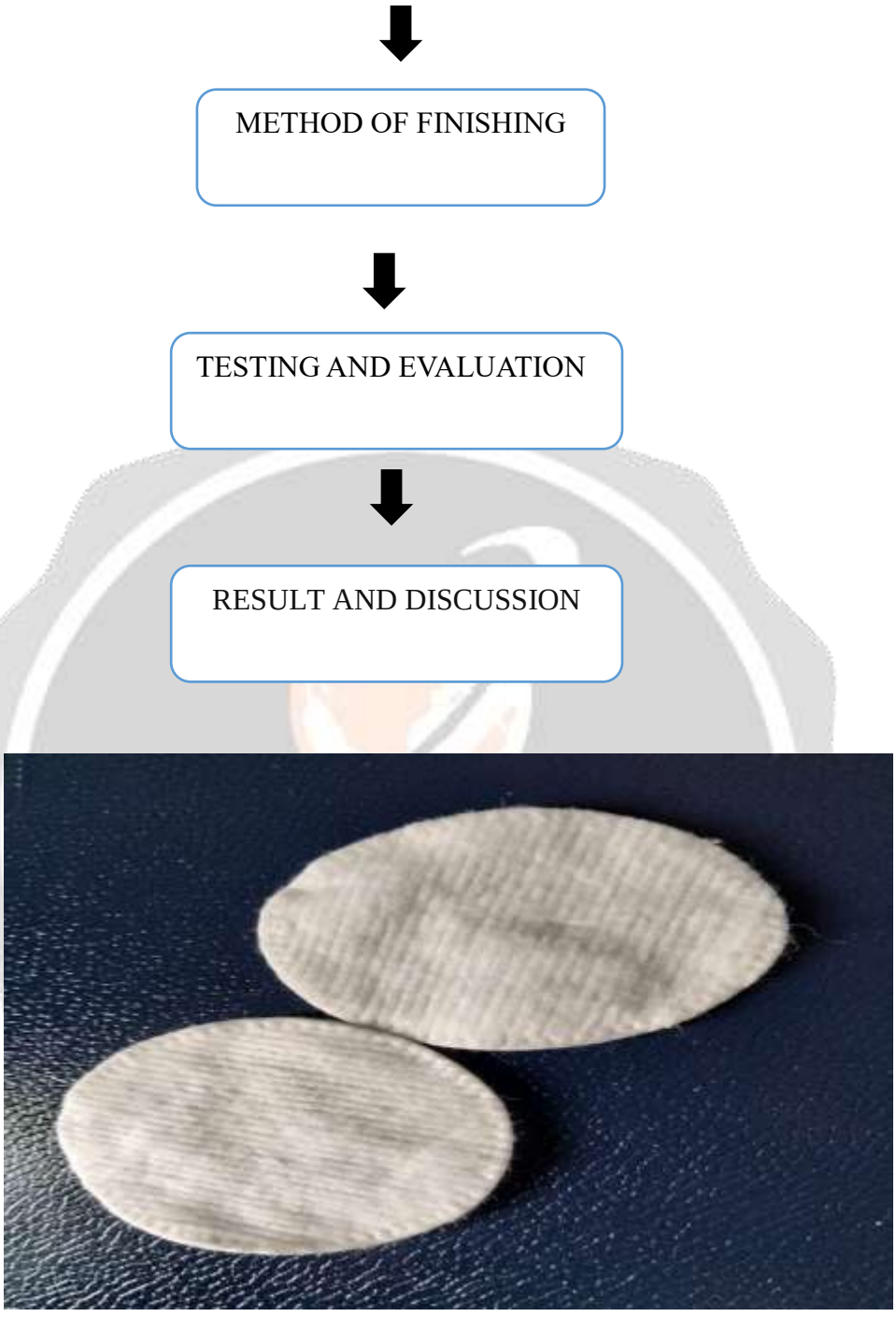


FIG:3.1 COTTON PADS

3.1SELECTION OF FABRIC

Cotton pads are pads made of cotton which are used for medical or cosmetic purposes. For medical purposes, cotton pads are used to stop or prevent bleeding from minor punctures such as injections or venipuncture. They may be secured in place with tape. Cotton pads are also used in the application and the removal of makeup. Cotton pads are soft enough that they can be used to clean babies. Cotton balls have much of the same applications as cotton pads, and can be used interchangeably. Cotton pads are made from raw cotton. They are compressed and shaped which makes them stronger for holding liquids and less likely to collapse or end up soggy. The compressed feature ensures that threads will not be left behind or unraveled. The usage of purified

cotton pads for applications in cosmetics, sanitary, and medicine has gained traction over the years. Consumers seeking absorbent hygiene products made of natural materials are on the rise. Cotton pads that are superior in absorbency, softness, cleanliness, and hypoallergenic properties. The usage of cotton pads for face and makeup removal is designed for high performance and they are an essential part of daily skin routine.

3.2.SELECTION OF HERB

3.2.1Herbs:1 Potato peel- *Solanum tuberosum*

3.2.2.Herbs:2 Athimathuram -*Glycyrrhiza glabra* L. (Licorice)

3.2.1.Potato peel- *Solanum tuberosum*

Fig:3.2.1.Potato peel extract

Potato peel- *Solanum tuberosum*

Potatoes are one of the most commonly consumed vegetables throughout the world. The global consumption of potatoes as food is shifting from fresh potatoes to value added processed products such as French fries, chips and puree. Peels are the major byproducts of potato processing industries, which represent a waste disposal problem for the industry concerned. However, these waste peels are also promising source of compounds, which may be used because of their valuable technological or nutritional properties. Peel contains about 40-50% dietary fiber and has been considered as a new source of dietary fiber in bread making. In addition to these, peels are rich source of phenolics and fair source of vitamins like riboflavin, ascorbic acid, folic acid and vitamins B6. The phenolic compounds extracted from the potato peel have been shown to prevent lipid oxidation in bulk oils and in muscle model systems. Phenolic compounds from potato peels were shown to bound carcinogens and reported to have anti-carcinogenic properties. In experiment animals' potato peel power was shown to have hyperglycaemic and cholesterol lowering properties. Furthermore, potato peel powder in the diet also appeared to attenuate the eye lens damage associated with the diabetic condition. This chapter will deal in detail the composition of potato peel, its different health benefits and safety aspects of potato peel glycoalkaloids.

3.2.2. Athimathuram -*Glycyrrhiza glabra* L. (Licorice)

Athimathuram or scientifically termed as Glyceria glabra Glycyrrhiza glabra or Liquorice plant is a cultivated acclaimed for its medicinal properties. It is commonly called as sweet wood. Athimathuram comprises active compound namely, glycyrrhizic acid, in abundance.

3.3 Rosa damascene-Rose water

Fig3.3 Rosa damascene

Rose water is created by distilling rose petals with steam. Rose water is fragrant, and it's sometimes used as a mild natural fragrance as an alternative to chemical-filled perfumes. Rose water has been used for thousands of years, including in the Middle Ages. It's thought to have originated in what is now Iran. It's been used traditionally in both beauty products and food and drink products. It also comes with plenty of potential health benefits, including the following.

3.4. METHOD OF FINISHING

- Solanum tuberosum (potato peel) skin were collect 20g and extract were taken from potato peel
- Athimathuram (Licorice) were (10g) were mixed in solanum tuberosum extract
- Rose water 10m were mixed with extract

- Rose water (Rose Damascene) extract is used for the purpose of having antibacterial and antioxidants properties
- Cotton pads were used for eye patches.and extract was directly apply through eye patches

3.4.TESTING AND EVALUATION

3.4.1.QUANTITATIVE ANALYSIS

The developed product was physically evaluated using a group of 20 people. A questionnaire was prepared based on the usage of the reusable diaper and eco- friendly product. People's review about the product is taken as the major aspects and other details like positive and negative feel of the product was also questioned below.

EYE MASK PRODUCT SURVEY QUESTIONNAIRE

NAME: OCCUPATION:

AGE: LOCATION:

Q1. Have you ever worn an eye patch before?

Q2. What is the primary reason you use an eye patch?

Q3. How frequently do you wear an eye patch?

Q4. Where do you typically purchase your eye patches?

Q5. What material do you prefer for your eye patches?

Q6. How important is comfort when choosing an eye patch?

Q7. Do you prefer reusable or disposable eye patches?

Q8. Are you more inclined towards functional eye patches or those with aesthetic designs?

Q9. 9. Have you experienced any challenges or discomfort while wearing an eye patch?

Q10.What features would you like to see in an ideal eye patch design?

Rating: 1/2/3/4/5 SIGNATURE

4. RESULTS AND DISCUSSION

4.1. QUANTITATIVE ANALYSIS

Have you ever worn an eye patch before?

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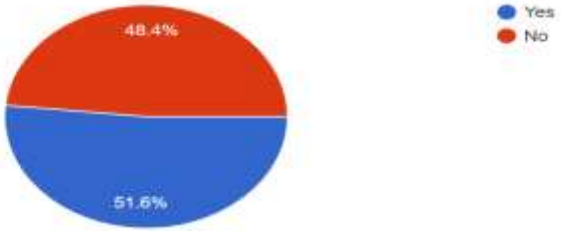

What is the primary reason you use an eye patch?

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How frequently do you wear an eye patch?

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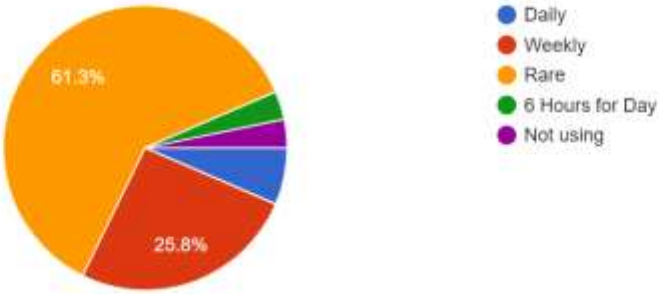

Where do you typically purchase your eye patches?

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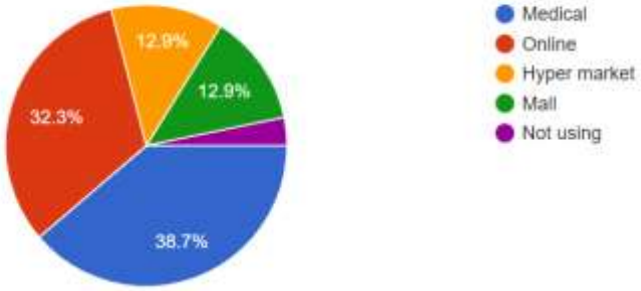

What material do you prefer for your eye patches?

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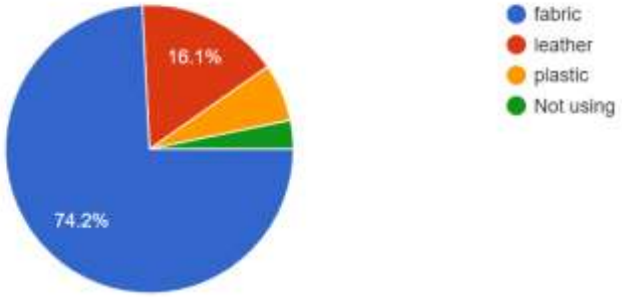

6. How important is comfort when choosing an eye patch?

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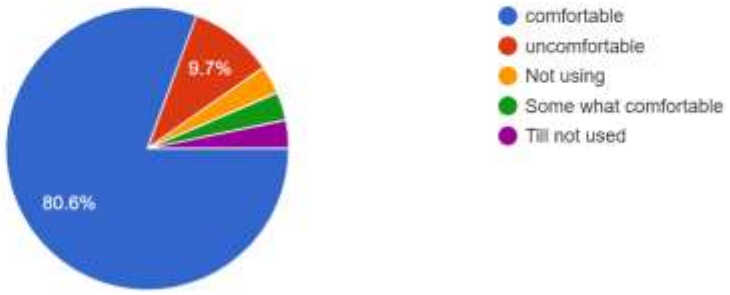

7. Do you prefer reusable or disposable eye patches?

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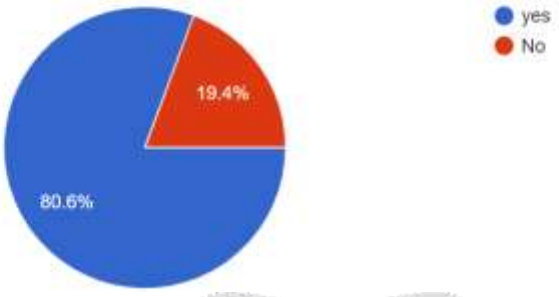

8. Are you more inclined towards functional eye patches or those with aesthetic designs?

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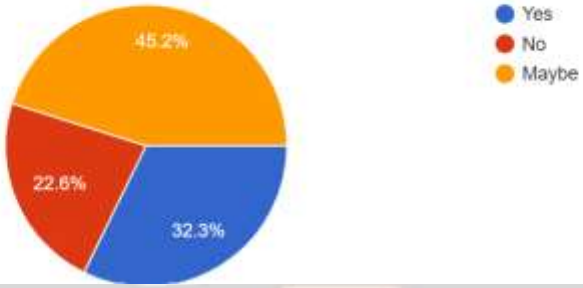

9. Have you experienced any challenges or discomfort while wearing an eye patch?

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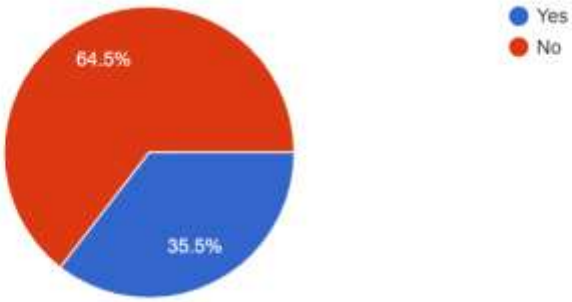

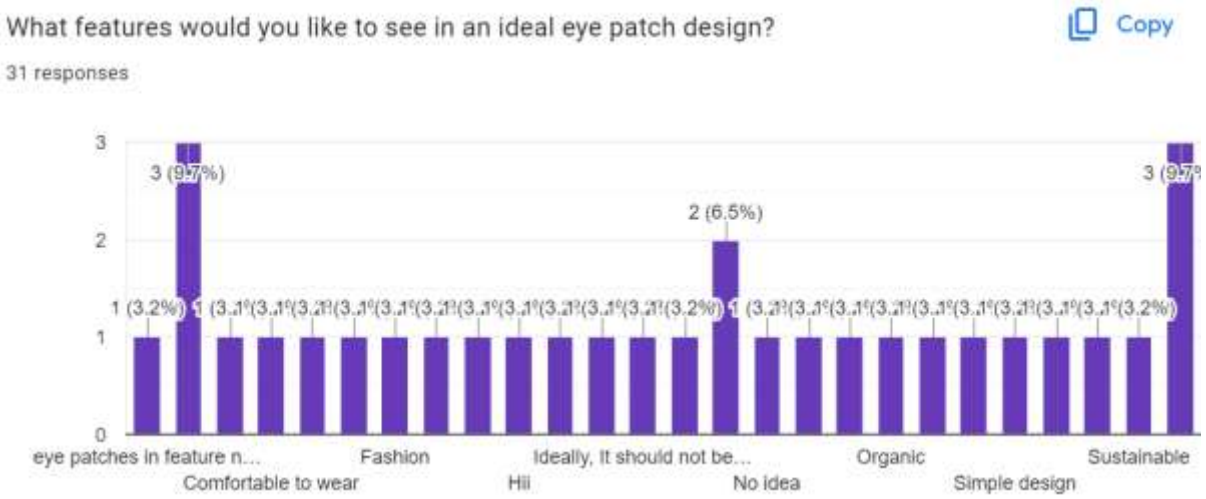

COST OF THE PRODUCT:

Cotton pads	**Rs.30**
Herb	**Rs.70**
Production cost	**Rs. 50**
Total cost	**Rs.150**

According to calculated amount for raw materials used for developing the eye mask, the cost for pair of eye patches is Rs.150. The product is affordable. When the product is produced in large amount, the cost can be cheaper.

FUTURE SCOPE

- This product is a very good source for dark circles, puff-eyes, eye irritation and also gives cooling effect. If this gives good result of course it will have high sales rate because of these benefits also it is budget friendly because the ingredients used in this sleeping eye patches like potato peel extract, licorice, rose water and cotton pads is also budget friendly . Also, it is very essential in today's life style.
- To sell this product it is good to make a tie-up with famous cosmetic or beauty companies. It is not that easy to have a tie-up with famous beauty or cosmetic company. Step by step process will give successful output.

5.SUMMARY&CONCLUSION

Eye patches is a best product for reducing dark circle and reduce irritation in eyes. In this modern world most of the people using more time in their mobile phones. So, their eyes will get irritated and it will cover with dark circles. This eye patches will be really helpful for them to get rid of dark circles and reduce their puffiness in their eyes. Regular use of this patches will give a good result.

6.ANNEXURE

FIG 6.1 EYE PATCHES

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