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Research Paper

Formulation and Evaluation of Herbal Eye Patches for Under - Eye Hydration and Dark Circles Reduction

Kritisha Nayan Kamli*, Poonam Mulay

Dr. D. Y. Patil College of Pharmacy, Akurdi, Pune.

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ABSTRACT

To study the herbal formulation of under-eye hydrogel patches that help prevent under-eye hydration and also prevent the reduction of Dark circles. It includes natural ingredients such as coffee powder, agar agar powder and distilled water. As it is an herbal eye patch, we can also add Aloe Vera gel, cucumber, rose water and liquorice extract. As natural ingredients help prevent side effects in sensitive skin, the study emphasises the medical properties of these ingredients, since many synthetic products can cause problems in the under-eye skin. This formulation involves hydrogel moulded patches. This is analysed to access their physical properties and the stability of the eye patch. This eye patch indicates results as a good texture, flexibility and adhesion that demonstrates enhanced skin moisture levels and a visible decrease in dark circles. It confirms better skin hydration and diminished under-eye discolouration by observations derived from user feedback, which showed that hydration under the eye and prevention of dark circles, as observed, the hydrogel eye patches do not melt when it is applied to the skin. The herbal eye patch was evaluated by performing parameters such as colour, odour, moisture content, melting point, pH measurement, according to skin and adhesion on skin. The herbal eye patch doesn't use any dyes or synthetic preservatives to avoid chemical use in the herbal product. This study aims to [1,4,5,2]

INTRODUCTION

1.1 What are dark circles?

Dark circles are the under-eye skin problem, which is the most common beauty problem. This problem loses our self-confidence and makes us feel worse.

These dark circles give us an appearance of tiredness, weakness and illness. It is mainly caused due to the sleepless nights and extreme use of mobile phones. Nowadays, mobiles are the main cause of eye damage because the radiation released from the phone directly affects the eyes. The area near the skin is very sensitive and thin,

*Corresponding Author: Kritisha Kamli

Address: Dr. D. Y. Patil College of Pharmacy, Akurdi, Pune.

Email ✉: kittuukamli@gmail.com

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and blood passing through the veins has a bluish tinge. When melanin is produced in high amounts, it causes dark circles. People also experience the discomfort of the eyes due to illness, dry eyes, and environmental factors. People also used the ointments and eye drops, but this may cause side effects like irritation and swelling. This herbal eye patch hydrates the skin and overcomes side effects.

[6,30,23,4,1]

1.2 What are eye patches?

- Herbal eye patches are the most commonly used herbal cosmetics to treat dark circles and under-eye hydration.
- It provides the brightening of the under-eye skin and also feels relaxation and comfort to the eye. These are the treatment to treat under eye dark skin. [6,14]
- These patches used natural ingredients to avoid toxic chemicals. [7,26]
- These eye Patches are designed for the lighting of skin, hydration under the eye, reduce puffiness. [14,20]
- Hydrogel eye patches are made from the hydrophilic polymer matrix, which holds the max amount of water and active ingredient. This patch includes ingredients such as agar agar powder, distilled water and coffee powder. [10,8,5]
- These patches are flexible, jelly-like, and easily stick under the eye. [10,12]

1.3 Hydrogel-based moulded eye patch:

- These are the jelly-like moulded eye patches which adhense on skin. These are the lightweight cooling effects of the eye patch. [10,9]
- In a hydrogel eyepatch, agar agar powder is used for flim forming agent, which enhances the elasticity and smooth texture of eye patches. [20,10]



Prepared Eye Patches In Laboratories.

2. Need and Objective:

2.1 Aim: Formulation and Evaluation of Herbal Eye Patches for Under-Eye Hydration and Dark Circles Reduction.

2.2 Objective of the study:

- Formulation of a herbal eye patch for safe and effective application for sensitive under-eye skin.
- Preparation of eye patches using herbal ingredients. [19,25]
- Film-forming Agents: Adheres well to the skin and creates a smooth and elastic layer. [8,5]
- Evaluation of the effectiveness of herbal active Ingredients (eg: coffee powder, beetroot extract). [1,4,22]
- Provides cooling, hydration and relief from tiredness of the eyes.
- Moisturising and Hydrating: a polymer such as agar agar powder helps retain moisture and keep skin hydrated. [5,20]
- Access parameters like pH, viscosity, stability, uniformity, and thickness. [8,12]
- To evaluate improvement in hydration and reduction of non-eye wrinkles. [23,5]

3. Herbal ingredients used in the formulation:

3.1 Agar agar powder:



Agar agar powder is used as a gelling agent for formulating herbal eye Patches. Agar agar powder is obtained from red algae (seaweed). It contains a high amount of polysaccharides to form a gel-like consistency. [2,10,5]

3.2 Distilled water:

It is an important base ingredient for the formulation of herbal eye patches. During the formulation, distilled water is purified by boiling

the water at 80-90°C, which gives a safe, effective and stable herbal formulation. [10,12]

3.3 Coffee powder:

Coffee is derived from the beans of the coffee plant (eg: Coffea arabica, Coffea canephora). It is used as an antioxidant. Coffee improves blood circulation under the eyes, which reduces dark circles. It also hydrates the Under-Eye skin. [1,22,11]

4. Methodology:

Ingredients used in the Formulation: (100gm batch preparation)

Ingredients	Quantity taken	Role	Nature
Agar Agar powder	1.5gm	Film-forming, Gelling agent.	Natural Polymer
Distilled water	98 ml	Hydration, cooling effect.	Natural
Coffee powder	0.5gm	Antioxidant, enhances hydration, reduces dark circles.	Natural

5. Methodology for preparing a hydrogel eye patch

Material required:

- Agar Agar powder
- Distilled water
- Coffee powder

Apparatus required:

- Beaker
- Stirrer
- Clean gloves
- Water bath
- Thermometer
- Measuring cylinder



Ingredients Used For The Formulation Of Eye Patches.

6. Procedure:

Extraction of coffee:

1. Grinding

Coffee beans are ground to increase surface area.

Finely grounded coffee beans.

2. Water Heating:

Ideal temperature: 90–96°C

Too hot → bitter taste



Too cold → weak extraction

3. Brewing / Extraction:

Hot water passes through coffee grounds.

Soluble compounds dissolve into water:

Acids (first)

Sugars (middle)

Bitters (last)

4. Filtration / Separation:

Grounds are separated using:

Filter paper

Metal mesh

Cloth filter

7. Process of eye patch preparation

1. Weigh all ingredients:

Weigh all the ingredients accurately

Weigh 2 g of agar agar powder.

In a measuring cylinder, take 98ml of water accurately.

Take coffee powder 0.5gm

2. Preparation of base:

- Take 98 ml of distilled water.
- Heat the distilled water in a beaker up to 80-90°C on a water bath
- Then add agar agar powder, stir the mixture for at least 5 min until the agar agar powder is fully dissolved.
- Then add coffee powder 0.5 gm to it.
- Remove the mixture beaker from the water bath.

3. Moulding of eye patch:

- Pour the mixture into the eye patch mould.
- Allow the eye patches to cool down to room temperature until it becomes thick.

4. Demoulding of eye patches:

- Demould the eye patches carefully.
- Remove slowly from the mould.

5. Storage condition:

- Store the eye patch in an airtight container.
- Avoid direct sunlight.
- Store at room temperature.

8. Evaluation parameters:

Sr. no	Parameters	Methods	Result	Interpretation
1.	Colour	Visual inspection	Brown	Acceptable
2.	Odour	Sensory evaluation	Coffee-Like.	Acceptable
3.	Appearance	Visual inspection	Smooth, no cracks.	Acceptable
4.	Weight variation	10 batches of eye patches were prepared, each was weighed individually, and the moisture content was calculated using the percentage deviation formula	Within 15% of the limit range.	Acceptable limits
5.	Moisture content	Select 5-6 eye patches, allow them to dry in a hot air oven at 100-105°C for 1 hour, remove the patches, then calculate the moisture content using the moisture content formula.	F2 have a good moisture content of 68.04%.	Good Hydration content
6.	pH	Dissolve the eye patch in 15-20ml of water, then allow to stand for 30 minutes, stir the solution, then check with pH paper. Take reads 3 times.	5.6-5.9 .	Suitable for skin



7.	Thickness	The thickness of the eye patch is measured using the vernier caliper	Good thickness was found by F2 0.53.	Acceptable thickness
8.	Folding endurance	The eye patches were folded at one place to observe the folding endurance of the eye patch	3-4 folds.	Good folding endurance
9.	Adhesion test	Stick the patch on the skin to observe the adhesion of the eye patches	Stayed for more than 30 minutes.	Good adhesion
10.	Spreadability	Take a glass slide and spread the mixture on the slide. Observe the Spreadability of the mixture.	Easily spreadable.	Good consistency
11.	Cooling effects	Notice by user feedback.	Gives an immediate cooling sensation	Effective
12.	Skin irritation test	Applied to various volunteers.	No redness/irritation	Safe for skin
13.	Puffiness reduction	Visual observation.	Reduced under-eye swelling	Effective



pH measurement of the herbal eye patch



Adhesion test for eye patch

CONCLUSION

The herbal eye patches were evaluated using natural ingredients and successfully formulated. The physicochemical properties were confirmed

by following methods, such as appearance, thickness, weight variation, moisture content, adhesion test and cooling, etc. The patches reflect the non-irritating nature of the skin. It concludes that the patch developed was safe and effective. It

is also suitable for skin care as a cosmetic application, mostly for hydration and the reduction of dark circles. [3,8,5,12]

RESULTS

The eye patches were formulated and evaluated; it was found to be safe, effective, smooth, and flexible. The odour of the eye patches was evaluated by sensory evaluation it was found to be coffee-like. The moisture content was found to be within an acceptable limit. The pH of the eye patch was acceptable within the skin range. The thickness of the eye patches was determined. [12,3] The weight variation of the eye patch was found using the percentage deviation formula. It has a good spreadable consistency. It has good folding endurance, easily sticks to skin, and lasts for more than 30 minutes. The skin irritation test was performed on different volunteers; no irritation or redness of the skin was found. It also gives a cooling sensation. [13,8]

To overcome the dark circles, the eye patch was found to be safe for skin care therapy. [1,4,6,22]

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