



‘Characterization, Properties And Evaluation Of Herbal Under Eye Cream.’

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ABSTRACT

The eye, which is the point of convergence, not only conveys the full range of human emotion but also has a significant impact on how one is perceived in terms of health and beauty. Whenever correlated with other body parts, the skin around the eye is a region without many oil glands and collagen, so it is more inclined to scarce differences and drying out. Additionally, when there is more melanin produced around the eyes than is usual giving them a darker colour, the condition is called periorbital hyperpigmentation. As a result, the signs of aging, stress, disease, environmental pollution, melanin deposition, lifestyle, and genetics are initially visible as puffiness, bags, pigmentation, and dark circles around the eyes. Dark circles refer to the symmetrical, circular, uniform pigmented spots on the lower eyelid area. The plant-based ingredients like tea tree oil, tomato juice, lemon juice, aloe vera gel, almond oil, have been reported to possess beneficial properties such as anti-tanning, anti-aging, skin whitening, anti-puffiness, antioxidant, and moisturizing activities. The inherent properties of these herbal ingredients contribute to maintaining smooth, moisturized, anti-puffiness, and pigmentation-free skin around the eyes.

KEY WORDS: Periorbital hyperpigmentation, melanin, dark circles, tea tree oil.

INTRODUCTION

To appear stunning and beautiful is a natural aspiration. This increased awareness of looking good has also brought about a greater sensitivity to skin problems, particularly those affecting the face. The eyes are often referred to as "The Windows of our Soul." ⁽¹⁾

One prevalent problem that affects individuals of all age groups is the presence of dark circles. ⁽⁸⁾ The skin beneath the eyes is extremely thin, and when blood flows through the prominent veins near the surface, it can create a bluish hue on the skin. The circles appear darker when the skin is more transparent. Periorbital hyperpigmentation is the term used to describe the condition when there is an excessive production of melanin around the eyes, resulting in a darker colour. ⁽¹⁶⁾ The causes of dark circles include fatigue, stress, excessive sun

exposure, lack of sleep, long working hours, an imbalanced diet, dehydration, and medical conditions related to the kidneys, thyroid, and anaemia. ⁽³⁾⁽⁴⁾ Eye care products are among the top-selling cosmetics worldwide, and there is currently a wide range of under-eye creams available in the market. However, many of these creams have been reported to cause common side effects such as redness, burning, itching, peeling, and swelling. Numerous studies on cosmetic reactions have revealed that fragrances are often the main culprits responsible for cosmetic allergies. ⁽⁵⁾⁽¹⁵⁾ Therefore, most of the agents used to treat skin hyperpigmentation or discoloration tend to have common adverse effects, including mild irritation, an increased risk of sun damage or sensitivity, and minor skin cracking, as many of them contain artificial colours or perfumes. Furthermore, several studies have demonstrated that naturally occurring colours and perfumes are typically associated with fewer or even no side effects. ⁽⁶⁾

- **Vessel Fragility:**

Dark under-eye circles begin in the capillaries. When the blood vessels become fragile, they can be broken easily and haemoglobin spills out into the surrounding skin. As the haemoglobin separate, pigmented degradation products form and accumulate in the dermis and epidermis. This may cause hyperpigmentation in the surrounding eyes. ⁽⁷⁾

- **Poor circulation under eyes:**

Poor circulation brings about less oxygenated blood, and consequently causes a bluish appearance. ⁽⁷⁾ Nowadays, there is a wide scope of methodology and products that can effectively treat the darkness (Periorbital hyperpigmentation) around the eyes. There are variety of depigmenting agents like hydroquinone, azelaic acid, kojic acid, and topical retinoic and and physical therapies such as chemical peels, surgical corrections and laser therapy, topical serums, fillers, carboxy therapy, plasma rich platelet injections, blepharoplasty, normobaric oxygen. ⁽¹⁰⁾



Fig no.1: Under eye dark circle

The blood capillaries around the eyes can become strained and leak due to various factors such as toxins, stress, allergies, exhaustion, insomnia, and excessive sun exposure, leading to the formation of black blotches. ⁽⁹⁾ With the rise of the natural skincare trend, individuals are now turning towards natural eye treatments to rejuvenate and brighten the pigmented areas beneath their eyes. The use of herbal and plant extracts has been acknowledged for their ability to maintain healthy skin and promote collagen production, resulting in soft and radiant skin.

Creams are circumfluous conflation lozenge forms containing further than 20% water or unpredictable factors and generally lower than 50% hydrocarbons, waxes as vehicles⁽¹⁷⁾

Cream is classified:

- 1) Oil in water
- 2) Water in Oil

Research indicates that the inclusion of antioxidants in skin care products can lead to positive effects on skin health, including the prevention of aging and dark circles. Vitamins E, Tea Tree Oil, Tomato juice, Lemon Juice and Aloe vera gel are some important antioxidants that are used in cosmetic products.

The aim of this research is to develop and assess an under-eye cream that contains Tea Tree Oil, Aloe vera juice, Tomato juice, Lemon Juice and Vitamin E.

The Aloe vera plant, also known as Aloe barbadensis, possesses antioxidant properties and has been scientifically proven to have skin lightening effects by reducing melanin content. Its polyphenols act as powerful antioxidants and it has been suggested that topical application of aloe vera gel can slow down skin aging.⁽¹¹⁾ Aloe vera also has hydrating and nutritive properties that aid in the formation of skin fibers and prevent premature breakdown. It helps retain moisture and improves skin integrity, while its polysaccharides contribute to skin rejuvenation.⁽¹²⁾

The Tea Tree Oil has anti-inflammatory properties, which enable it to effectively reduce swelling and puffiness, while also enhancing blood circulation. Additionally, it provides hydration and nourishment to the skin surrounding and beneath the eyes. By addressing fluid accumulation resulting from sleep deprivation, allergies, or water retention, tea tree oil aids in alleviating and repairing puffy eyes and dark circles.

Tomatoes contain a significant amount of lycopene, which has the ability to promote softer and more supple skin. Additionally, lycopene can effectively diminish the visibility of dark under-eye circles. The natural bleaching properties found in tomatoes contribute to lightening the skin tone. Moreover, the antioxidant lycopene present in tomatoes aids in reducing the appearance of dark discoloration under the eyes. Tomatoes are also rich in essential nutrients like Vitamin A, B, C, as well as minerals such as sulphur, potassium, calcium, and iron. Therefore, tomatoes are an excellent choice for reducing the prominence of dark circles.

Vitamin E is an important fat-soluble lipophilic antioxidant and it is used in many cosmetics including anti-aging creams, eye serums, sunscreen, and makeup.⁽¹⁴⁾

CLASSIFICATION OF DARK CIRCLES:

Dark circles refer to a uniform, circular darkening of the skin surrounding or beneath the eyes. They can be categorized based on the clinical analysis of pigmentation and blood vessels into the following types,

1. Pigmented (brown colour)
2. Vascular (blue/pink/purple colour)
3. Structural (skin colour)
4. Mixed

- Pigmented-Vascular (PV)
- Pigmented-Structural (PS)
- Combination of Pigmented - Vascular-Structural (PVS) ⁽²⁾

1. Brownish Tone / pigmented Dark Circles:

These are caused due to post- inflammatory pigmentation. These clusters of brown pigment collect under the eye due to sun damage, genetics, or chronic rubbing, making the dark circles look brownish-black. This type of dark circles is more common in medium to dark-skinned tones. These dark circles can be results of extra melanin production and uneven pigment distribution.

2. Bluish, Purple Tone / Vascular Dark Circles:

Enlarged veins and thin under eye skin causes bluish dark circle. These enlarged veins are caused by caffeine, energy drinks, and other medications. These stimulants dilate the blood vessels, causing the under-eye area to look bluish. Purplish tones are the types of dark circles which can be caused by allergies, poor blood circulation, lack of sleep and certain medications.

3. Structural Dark Circles:

These dark circles are shadows that are caused by skin laxity, fat loss under the skin, and eye bags.

4. Mixed Dark Circles:

It is a combination of two or three types of dark circles such as pigmented structural, pigmented vascular, pigmented vascular structural, etc.



Fig no.2: Types and Causes Dark Circles

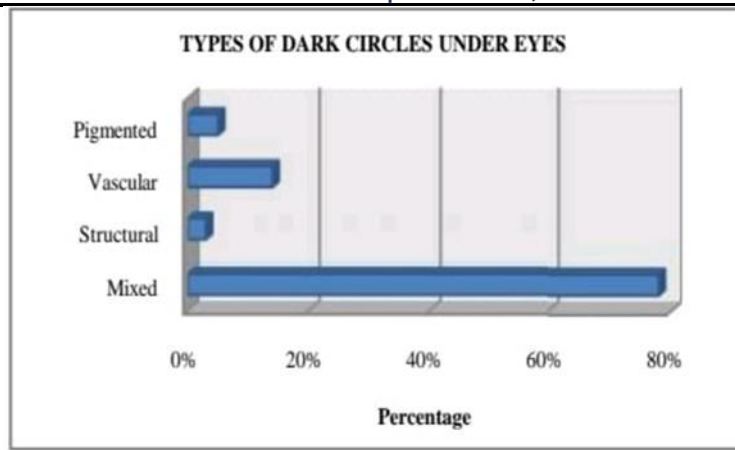


Fig no.3: Recent statistics of people with Dark circles

Table no.1: Types and Appearance of Dark circles

S. No	Type	Appearance
1.	Pigmented Type (P)	Appears as infraorbital, brown hue
2.	Vascular Type (V)	Appears as infraorbital, blue, pink, or purple hue with or without periorbital puffiness
3.	Structural Type (S)	Appears as structural shadows formed by facial anatomic surface contours. It can be associated with infraorbital palpebral bags, blepharoptosis, and loss of fat with bony prominence
4.	Mixed Type (M)	Combines two or three of the above appearances

Causes of dark circles: (18)

- Poor sleep.
- Disinclinations, including hay fever
- Hyperactive saturation, which happens when the body produces further melanin
- Reduced situations of adipose towel around the eyes
- Thinning skin under the eyes
- Anaemia from iron insufficiency
- Overexposure to sun
- Frequent rubbing of the eyes
- Smoking
- Inherited genes
- Thyroid conditions
- Dehumidification
- Dermatitis
- Eye drop treatment for glaucoma
- Aging

Advantages of Herbal Cream:⁽¹⁹⁾

1. It's helps to skin glow.
2. Herbal cream has pure and organic ingredients.
3. They are free from side effects or minimize the side effects.
4. Herbal cream is easily available in market and suitable for all skin types.
5. They also help to reduce skin damage, dryness of skin completely.
6. To cure the skin irritation the herbal cream is really useful.
7. They have no synthetic and harmful additives.
8. Herbal cream for skin glow is made to strengthen the skin follicles by giving essential oils.
9. They also nourishment all types of skin.

Disadvantages of synthetic cream:⁽²⁰⁾

1. Synthetic cream may lead to skin breakage.
2. Overuse of synthetic cream can clog skin follicles.
3. Infrequent skin washing can cause scaly skin.
4. Ingredients like sulphates increase skin sensitivity and strip skin of their natural oil cause dryness.
5. Paraben increase risk of skin cancer.
6. Alcohol makes your skin dry and brittle.
7. May have less natural appearance movement and feel.
8. Too much use can cause skin dryness.
9. Sodium Lauryl sulphate is commonly used in cream which may harmful to eyes and skin.
10. It also can cause headache and vertigo or soreness in eyes, nose, throat and lungs.

Benefits of eye cream:

Essential oils offer a plethora of advantages as they are derived from natural sources such as herbs, fruits, woods, and other parts of trees. Here are a few benefits of utilizing Essential oils to combat Dark Circles:

1. Increase Skin Firmness:

The presence of depressions and the casting of shadows around the eyes can contribute to the enhancement of dark circles, as well as the presence of loose, sagging, or wrinkled skin. To address this concern, specific essential oils can be utilized to effectively reduce dark circles and tighten the skin surrounding the eyes.

2. Reduced Puffiness:

Under-eye puffiness and dark circles are frequently seen together. Essential oils are thought to assist if you have swollen eyes as a result of your dark circles. Almond Oil has been scientifically proven to be effective. It also contains a lot of vitamin E, which is good for the skin.

3. Increase Skin Hydration:

The skin beneath the eyes becomes thinner and more transparent when it lacks hydration, and it is also situated closer to the vein's underneath. To combat dryness, various oils can be used to rehydrate and safeguard this delicate skin. The application of oil helps to create a protective barrier that prevents further loss of moisture.

4. Protection against UV Rays:

Excessive sun exposure can cause an over production of melanin, causing gradual damage to the sensitive skin under the eyes. As a result, the excess melanin can cluster and brown considerably more quickly than the rest of the body. Use Essential oils for skin protection from UV exposure and reduce the formation of extra melanin.

5. Eye cream helps prevent common signs of aging:

Dull, fatigued, and lackluster skin can occur due to various factors, with dehydration and environmental stressors being significant contributors. To combat these issues, it is beneficial to utilize a natural eye cream that contains antioxidants and hydrating components, such as Eyes Baby. This cream effectively shields against these harmful agents, ensuring healthier and revitalized skin.

6. It can lessen the appearance of fine lines and wrinkles:

Curated antioxidants, vitamins, and hydrators also contribute to the smoothing and rejuvenation of the skin, leading to a reduction in the visibility of wrinkles and fine lines.

7. It soothes tired eyes:

Eye creams contain soothing and nourishing components that provide relief to the delicate skin under your eyes. They can vary in texture, ranging from luxurious and creamy to lightweight and non-greasy, while also offering a refreshing sensation.

8. It prepares your skin for makeup:

Eye creams are highly effective in reducing the visibility of dark spots and puffiness, resulting in a smoother appearance. This, in turn, facilitates the even application of concealer and prevents it from accumulating in facial lines throughout the day.

INGREDIENTS

The main aim of our work is to develop an herbal cream which can give good and best effect we have use polyherbal ingredient our preparation like –

Table no.2: Ingredients of under eye cream

SR.NO.	INGREDIENTS	ROLE
1.	TEA TREE OIL	Help to lighten dark circles, Reduce puffiness
2.	TOMATO JUICE	Protect eye from light damage
3.	LEMON JUICE	Antioxidants
4.	STRAWBERRY JUICE	Astringent, Soothe under eyes
5.	ALOVERA GEL	Anti-ageing, Moisturizer

6.	VITAMIN E CAPSULE	Dark circle remover
7.	ALMOND OIL	Help to regenerate skin cells
8.	STEARIC ACID	Emulsifier
9.	METHYL PARABEN	Preservative
10.	PROPYL PARABEN	Preservative
11.	GLYCERIN	Moisturizing agent
12.	POTTASIAM HYDROXIDE	Stabilizer
13.	SODIUM HYDROXIDE	Help to adjust pH
14.	ROSE WATER	Vehicle
15.	PURIFIED WATER	Vehicle

- **Tea tree oil** - It is used as antibacterial, antifungal and anti-oxidant. It may help treat certain skin conditions including acne, itching and oily skin and reduces dark circles, reduces puffiness.
- **Tomato juice** - Tomatoes are also rich in essential nutrients like Vitamin A, B, C, as well as minerals such as sulphur, potassium, calcium, and iron. Therefore, tomatoes are an excellent choice for reducing the prominence of dark circles.
- **Lemon juice** - Lemon juice is widely recognized as a natural bleaching agent, renowned for its ability to diminish the appearance of dark circles and alleviate puffiness around the eyes
- **Strawberry juice** - Strawberries possess astringent properties that aid in soothing the area under your eyes and diminishing the inflammation responsible for the presence of under-eye bags.
- **Aloe Vera gel** - moisturizer, reduce acne and skin irritation.
- **Almond oil** - Almond oil used to lighten the dark circles under eyes and reduce under-eye puffiness. It shows anti-inflammatory and antioxidant properties. Almond oil is used to keep skin elegant.

In market there are large no of eyes cream is currently available. But in marketed eye cream have side effects like redness, irritation, itching. To make activities from naturally occurring traditionally plant materials belong to Ayurvedic.

TEA TREE OIL



Fig no. 4: Tea tree oil

Scientific name - *Melaleuca alternifolia*

Family - Myrtaceae

Order - Myrtales

Kingdom - Plantae

Part used - leaves

Height - 20 feet

Leaves - smooth, soft and linear in shape

Extraction - Steam distillation

Use - Antibacterial, antifungal, antioxidant

Preparation of tea tree oil

Tea tree leaves to be steamed at approximately 100 °C for 2 hours.

↓
Generated steam then passes through a condenser with temperatures of 35 to 55 °C, forming an oil-water mixture.

↓
Pass through separator wherein it's possible to separate the essential oil from the water.

TOMATO JUICE



Fig no.5: Tomato juice

Scientific name - *Solanum lycopersicum*

Family - Solanaceae

Order - Solanales

Kingdom - Plantae

Part used - Fruit

Height – 3m

Use – Antioxidant

LEMON JUICE⁽²¹⁾**Fig no.6:** Lemon juice**Scientific name** – Citrus limon**Family** - Rutaceae**Order** - Sapindales**Kingdom** - Plantae**Part used** - Fruit**Height** - 20 feet**Higher classification** - citrus**Use** -antioxidant, skin brightening**ALOVERA GEL****Fig no.7:** Aloe Vera gel**Scientific Name** - aloebardensis miller**Family** - Asphodelaceae**Higher Classification** - vera**Order** - asparagales**Kingdom** - plantae**Rank** - species**Extraction Method** - simple drain method**Part Used** - leaves

Height - 24-39 inches/ 60-100cm

Leaves - sculant erect In Summer- grows indoors year -round

Use – burns

ALMOND OIL ⁽²⁵⁾



Fig no.8: Almond oil

Scientific name – Prunusdulcis

Family - rosaceae

Higher classification – drupe

Order - Rosales

Kingdom - Plantae

Rank - Species

Extraction Method - Hydraulic press and screw press

Part used - Oil expressed from seed

Height - 2 cm

Leaves - Long with a serrated edge

In summer - Grow alternately on the branch

Use - Anti-Inflammatory

PROCEDURE

Phase A: Oil Phase

The emulsifying agent stearic acid was dissolved in propyl paraben added and heated at 75 °C. Oil phase was prepared.

Phase B: Aqueous phase

To prepare this phase, some water-soluble compounds like methyl paraben, sodium hydroxide, potassium hydroxide added in water. Then heated at 75°C. Aqueous phase was prepared.

Phase C: Herbal phase

Glycerine and Aloe Vera gel were added in tea tree oil, then tomato juice mix with lemon juice after that add strawberry juice. Mixed properly after that vitamin E capsule and almond oil were added, then quantity sufficient rose water was added.

Evaluation test for herbal under eye cream:

1. Physical evaluation:

Colour, odour, texture, and status of the cream were all determine in this test.

2. Irritation:⁽²²⁾

On the any hand dorsal surface, make a (1cm) mark. The cream was then applied to the affected area, and the time was recorded. Then, for up to 24 hours, it is evaluated for irritancy and edema, if any, and reported.

3. Wash ability:⁽²²⁾

After applying a little amount of cream to the hand, it was washed with tap water.

4. pH:^{(23) (25)}

PH was measured using a digital pH meter after 0.5 g cream was spread in 50 ml distilled water.

5. Phase separation:⁽²²⁾

The cream that had been prepared was kept in a sealed container, away from light, at a temperature ranging from 25 to 100 °C. Subsequently, for a period of 30 days, the process of phase separation was observed every 24 hours. The examination of phase separation was conducted to verify if any alterations had occurred.

6 Spread ability:⁽²²⁾

The spread ability of the cream was evaluated based on the duration it took for two glass slides to separate from each other when the cream was placed in between them and subjected to a specific force. A shorter separation time indicated better spread ability. Two standard-sized glass slides were utilized, with the cream mixture applied to one slide and another slide placed on top. The cream was then uniformly spread between the two slides by applying a weight or load on the upper slide. After removing the weight, any excess cream on the slides was removed. The upper slide was then gently lifted off due to the force of the weight, and the time it took for it to separate from the cream was recorded.

$$\text{Spread ability} = m \times l/t$$

Where,

m = represents the standard weight attached to or put on top of the upper slide

l = represents the length of a glass slide

t = represents the time taken

7. Test for microbial growth:

After preparing the Agar media, the formulated cream was introduced into it using the agar well diffusion method. Subsequently, the plate was placed in the incubator and left to incubate at a temperature of 37°C for a duration of 24 hours. Following the incubation period, the plates were removed and the presence of microbial growth was examined.

8.Greasiness:

A layer of cream was spread onto the skin and examined to determine if it had an oily or greasy texture.

RESULTS AND DISCUSSION**1.Physical evaluation:**

In this test colour, odour, texture and state of the four formulations were checked.

2.Irritancy:

Make a mark measuring 1 cm² on the dorsal surface of the left hand. Subsequently, apply the cream to the affected area and note down the time. Following that, observe the area for any signs of irritation or swelling for a duration of up to 24 hours and provide a report accordingly.

3.Wash ability:

To assess the wash ability, a small quantity of cream was applied to the hand and subsequently rinsed off with tap water. The washability of formulas proved to be effortless.

4.pH:

The formulations pH was discovered to be in close proximity to the pH of the skin, suggesting their safe usage on the skin.

5.Phase separation:

The cream that had been prepared was stored in a container that was covered and kept away from light, at a temperature ranging from 25 to 100 °C. Subsequently, the cream underwent phase separation testing for both 24 hours and 30 days. The examination of the phase separation was conducted to identify any alterations. Based on the results obtained, it was determined that no phase was present.

6.Spread ability:

The spread ability of the formulations was tested.

7.Test for microbial growth:

There was no sign of microbial growth after 24 hrs of incubation at 37°C.

8.Greasiness:

Cream was applied on the skin surface in the form of a smear and checked whether smear was oily or greasy like and the formulation was non-greasy.

Table no.3: Evaluation of herbal under eye cream

SR.NO.	NAME OF THE TEST	SPECIFICATION	OBSERVATION
1	Colour	Reddish pink	Reddish pink
2	Odour	Pleasant	Pleasant
3	Texture	Smooth, Slippery, Pearlescent	Smooth, Slippery, Pearlescent, scrubby
4	Greasiness	Non-greasy	Non-greasy
5	Cohesiveness	High/Moderate/Low	Moderate
6	Firmness	High/Moderate/Low	Moderate
7	Rub outs	Average 7-8 rubout	Average 5 rub outs
8	Spread ability	Complete/Moderate/Low	Complete
9	Residue left	Low	Low
10	PH	4-7	5
11	Flow	Highly viscous	Slightly viscous
12	Phase separation	No	No

CONCLUSION

The aforementioned data research has been conducted in order to develop a formulation that includes traditional ingredients and investigate their efficacy in eliminating the eye contours using in-vitro techniques. This study primarily involves the development and evaluation of an under-eye cream, with a main emphasis on the potential of the extract for cosmetic purposes. It aids in diminishing dark circles in the under-eye area, and further investigations can be carried out to obtain more precise results, such as anti-tyrosine and anti-wrinkle properties. The primary focus of this study is to explore the potential of extracts for cosmetic purposes. The use of cosmetics has significantly increased in the personal care industry. The eye cream prepared in this study was an w/o type emulsion, making it easy to wash off with plain water, resulting in better customer compliance. Our research findings suggest that the formulations were highly stable, with good spread ability and no evidence of phase separation. The formulations maintained a constant pH, had emollient properties, were non-greasy, and easily removable after application. The stable formulations were also found to be safe, with minimal occurrences of skin irritations and allergic sensitizations.

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