

Formulation and Evaluation Of Under Eyederma Gel

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ABSTRACT:

All Human beings are want to look less age, attractive and stunning which is a natural desire. The skin which is around the eyes is very thin and fat content in this area is less than the other areas of the skin, because of

this reason, the effects of aging, stress, disease, melanin deposition, lifestyle and genetics environmental pollution, are first seen as puffiness, bags, pigmentation and dark circles around the eyes. Dark circles are the bilateral, round, homogeneous pigment macules on the infra orbital region of the eyes. Major concerns around the eyes are periorbital hyper-pigmentation, puffiness, fine lines and wrinkles. Therefore there is a need of cosmetic product, to prevent puffiness bags, pigmentation and dark circle under the eye. There is number of synthetic and herbal products available to treat complication which is mention above. Our present work deals with the development and evaluation of herbal under eye derma gel containing Avocado oil, Papaya, Carbapol 936, Rose water, Triethanolamine OR Biethanolamine, Orange Peels, Glycerin, Almond oil, Methylparaben OR Propylparaben

. All the above mentioned plant ingredients were reported for having good anti-tanning, anti-aging, skin whitening, anti-puffing, antioxidant and moisturizing activity. They are also very helpful in preventing the problems like puffiness, wrinkles, fine lines. Above properties of the herbal ingredients helps to make the skin anti-aged, wrinkle free and prevent the dark circle around the eye.

Key words: avacado (persea americana), papaya (carica papaya), rose oil, orange (citrus aurantium), multipurpose gel, herbal cosmetics.

I. INTRODUCTION:

The "Windows of our Soul" are human eyes. One of the most prevalent conditions that

people of all ages experience is dark circles. Blood seeps through the delicate skin beneath the eyes. The skin turns blue as the blood flows through the large veins. Dark circles can develop when the skin surrounding the eyes is excessively thin, darken even more. When melanin production is at its highest higher than usual, giving the area surrounding the eyes a darker appearance. Periorbital hyper pigmentation is the term for the condition¹.

DARK CIRCLES

Under the eyelids or around the eyes, dark circles are a very common ailment that affects people of all ages. Another name for it is a consistent, circular darkening of the skin under or around both eyes². Excessive pigmentation, shadows from eye bags, infra-orbital fat prolapse, shadows from infra-orbitals sagging and wrinkles, and thin, translucent skin above the orbicularis oculi muscle can all result in dark circles.

Pathomechanisms of Dark Circles

Numerous external and endogenous factors, such as sex, ageing, anatomical differences, atopic dermatitis, dryness, genetics, and other physical problems, might contribute to the development of dark circles. Some of the clinical factors that caused dark circles include excessive pigmentation, tear troughs, shadowing from infra-orbital laxity and wrinkles, thin translucent skin on top of the orbicularis oculi muscle, shadowing from infra-orbital fat herniation, and vein running. Below is a list of the main pathomechanisms that cause dark ring³.

Infra-orbital Fat Herniation

Though it does not directly produce dark circles, the infra-orbital fat protrusion does deepen the tear trough and exacerbate the black circles.

Thin, Translucent Skin Overlying the Orbicularis Oculi Muscle

The transparent eyelid skin allows one to see the underlying subcutaneous vascular plexus or vasculature within the muscle.

Tear Troughs (Naso-jugal groove)

The transparent eyelid skin allows one to see the underlying subcutaneous vascular plexus or vasculature within the muscle.

Excessive Pigmentation

People who have allergic contact dermatitis and atopic dermatitis are more prone to have dark circles under their

eyes. These people may develop post-inflammatory hyper-pigmentation (PIH) around their eyes as a result of periorbital dermatitis and an itch-rubbing habit. Post-purpuric pigmentation (PPP), which develops following a cosmetic procedure, is another cause of periorbital darkening.

Wrinkles and Laxity

Age-related wrinkles and infra-orbital laxity make the dark circles worse.

- Classification of Dark Circles**
1. Pigmented (brown color)
 2. Vascular (blue/pink/purple color)
 3. Structural (skin color)
 4. Mixed⁴

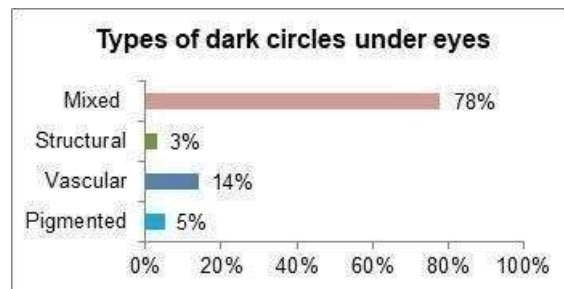


Fig1. Recent statistics of people with dark circle

TABLE 1. TYPES AND APPEARANCE OF DARK CIRCLES⁵

SR.NO	TYPES	APPEARANCE
1.	Pigmented	Appears as infra-orbital, brown
2.	Vascular Type (V)	Appears as infraorbital, blue, pink, or purple with or without periorbital puffiness
3.	Structural Type (S)	anatomic surface contours. It can be associated with infra-orbital palpebral bags, blepharoptosis, and loss of fat with bony prominence

4.	Mixed Type(M)	Combines two or three of the above appearances
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II. MATERIALS AND METHODS

Aim

It hasn't been generally reported how herbal under eye gel affects dark circles. The purpose of this thesis was to learn and comprehend the effectiveness of herbal under eye gel in removing dark circles without causing any negative side effects while also delivering soothing and nourishing results to the skin. To determine that gels are quickly absorbed by the skin in comparison to other products, the effects of a variety of factors on dark circles were examined.

work schedule

- Essential oils and crude drug collection.
- Extract preparation
- Gel base preparation.
- An analysis of herbal under-eye gel.

Materials

Avocado oil, Papaya, Carbapol 936, Rose water, Triethanolamine OR Biethanolamine, Orange Peels, Glycerin

, Almond oil, Methylparaben OR Propylparaben.

Organic ingredients used in preparation under eye dermal gel;

Avocado (Persea Americana)

Martin Fernandez de Enciso of Spain wrote the earliest description of the avocado fruit, *Persea Americana*, which belongs to the Lauraceae family, in 1519⁶. Biggest avocado producing countries are Mexico, Peru, Indonesia, Colombia, Kenya, Brazil etc⁷. Flavonoids, tannins, saponins, phenolics, and alkaloids are just a few of the phytochemical components found in avocado. The primary phenolic substances found in avocado include catechin, hydroxybenzoic acid, caffeic acid, chlorogenic acid, coumaric acid, ferulic acid, and triterpenoid glycosides⁸. Typically, avocados were extracted by peeling and deforming the fruit, squeezing the pulp, and then drying it. The paste would next be heated using hot water and chalk or NaCl, followed by spinning, pressing, or skimming the oil out naturally⁶. Vitamins A, C, D, and E, as well as fatty acids, can moisturise dry

skin around the eyes. The nutrients in this oil aid to improve skin suppleness and promote blood flow around the eyes. The carotenoids in this oil prevent wrinkles around your eyes and counteract age-related deterioration.

Avocado oil's anti-aging properties aid in reducing the appearance of facial wrinkles and fine lines. Your skin will get lighter thanks to vitamins like C and B complex that aid to lighten dark spots⁹

Papaya (Carica papaya L)

The Caricaceae family includes the Carica papaya L

¹⁰. Papaya cultivating major countries are India, Dominican

Republic, Brazil, Mexico, Indonesia¹¹. It is a herbaceous plant that thrives in nations with tropical and subtropical climates. Glucose predominates in the early stages of fruit development, but sucrose content rises throughout ripening and can account for up to 80% of the total sugars. Na, K, Ca, Mg, P, Fe, Cu, Zn, and Mn are among the macro- and microminerals present in the edible part of ripe papaya fruit. Carotenoids, vitamin C, thiamine, riboflavin, niacin, vitamin B6, and vitamin K are all found in *Carica papaya*¹⁰. Due to its water, carbohydrate, and fat content, the pulp of ripe papaya fruit provides nutrient and hydration to the skin. By accelerating the removal of dead skin cells, the papain enzyme miraculously restores the appearance of your skin as being evenly toned.

Due to its skin-repairing, exfoliating, and moisturising properties, papaya slows down the ageing process. There is some evidence that it also has direct anti-aging effects. The dermal collagen and elastic fibres are modulated by the papain enzyme, which minimises wrinkles¹².

Rose (Damascena x Rosa Herrm)

Damascena x Rosa Herrm. is one among the Rosaceae family's most well-known and significant plants. Due to their wide pharmacological usefulness, rose oil, rose water, and extracts from their blooms have been used for centuries in perfumes, cosmetics, aromatherapy, and medicine¹³. Phenylethanol (43%), Geranylacetate (15.6%),

Geraniol(10.5%),Linalool(6.9%),Benzylalcohol(3.3%),Benzaldehyde(1.5%),Nerol(5-10%),andCitronellyl acetate (0.3%) were the significant chemical components extracted from flower petals by gas chromatography. Additionally, it includes minerals, salts of malic and tartaric acids, tannins, oligomeric proanthocyanides, saccharin matter, pectin(11%),riboflavin,sugars, andpurgativeglycosides(multiflorinA&B)¹⁴.Tomini mise dark circles, rose petal extract inhibits the UV-induced MAPK-MAPK signalling pathway¹⁵. The majority of rosespeciesareindigenoustoAsia,withasmallernumberoccurringinNorthAmerica,afewinEurope,andveryfewinnorthwestAfrica.Tomakerosewater,freshrose blossoms (2.0kg)weredistilledafterbeingimmersedin water(5.0L)fortwohours(1.0L).Asanalternative,rose watercanbemadebydistilling1.0kgofair-driedrose flowers that have been soaked in 12.5L of water overnight(5.0L).DichloromethaneAR(250mLx5)wasused to extract 500 mL of well-stirred rose water, which was then dried on fused calcium chloride/anhydrous sodium sulphate. Distillation was used to remove the solvent, and the yield was measured as a v/w percentage. Before analysis, the extracts were kept in a -5°C freezer. Additionally, 250 g of sodium chloride, 250 mL each of chloroform,hexane,andbenzene,500mLofwellstirred rosewater,and500mLofwell-stirredrosewaterwere extracted with AR grade dichloromethane and then processed as previously indicated. Additionally, the oil was separated using a Clevenger-style equipment and 500 mL of rose water over the course of three hours. Benzene had trapped the oil¹⁶.

Orange(Citrusaurantium)

Afruitofnumerouscitruspeciesbelongingto theRutaceafamilyisanorange.Todistinguishitfrom theclosely related Citrus aurantium, also known as bitter orange, it generally refers to Citrus sinensis, also known as sweet orange¹⁷. A region that includes Southern China, Northeast India,Brazil, Spain, Egypt and Myanmar¹⁸. Orange peelisedibleandrichindietarymineralslikepotassium andmagnesiumaswellasvitaminC,dietaryfibre,total polyphenols,carotenoids,andlimonene.Becauseofrich vitaminC,dietaryfibrepotassiumandmagnesiumit lightenedtheskinmakeskinbrighterandremoveddarkcircles.It hasantioxidantactivitywhichalsomakes skin brighter¹⁹.

Additivesusedinherbalundereyedermagel, Carbopol

Carbopol® 940polymeris a white powder,crosslinkedpolyacrylic acidpolymer. It isanextremelyefficient rheologymodifiercapableofprovidinghighviscosity andforms sparklingcleargelsorhydroalcoholicgelsand creams. Its short flow, non-drip properties are ideal for applications such as clear gels, hydroalcoholic gels, and creams²⁰.

Triethanolamine

Triethanolamine is found in skincare and cosmetic products such as moisturizers, eyeliners, mascaras, hair care, and sunscreens. It stabilizes and increases the pH of products to improve the way they feel and interact with the skin. Triethanolamine is safe for the skin and does not have any side effects, as most products keep its concentrationbetween1%and3%.Atthisconcentration,triethanolamineissafeforskinapplicationanddoes not lead to irritation of the skin or any other side effects²¹.

Methylparaben

Methylparabenissaidtobenotharmfultotheskinwhenusedatlowdoses.Theingredientisabsorbedtotheskin (origestionitcomesfromfood)andit'shydrolyzedand quicklyexcretedfromthekidney.Becauseofthis,the FDA regards methylparaben as safe²².

Glycerin

Glycerin is great for the skin because it acts as a humectant, which is a substance that allows the skin to retain moisture. It can increase skin hydration, relieve dryness, and refresh the skin's surface. It's also an emollient, which means it can soften skin²³.

ExtractionProcesses

ExtractionprocessofOrange Maceration

- Soak10gorangepeelin100mlalcohol &keepit for7days.
- Limoneneistheoilextractedfromthepeelsoforan gesandothercitrus fruits.
- Peoplehavebeenextractingessentialoilsslikelimonenefromcitrusfruitsforcenturies.

ExtractionprocessofAvocado

- WashtheAvadocutithorizontalandremovethe pulp.
- Pulpisdryinhotairdryerat110C°for10min .

- Collect the pulp.
- Oil is obtained by keeping pulp in cotton cloth and applying pressure on it.

Formulation of Herbal gel formulation

- 0.3g Carbopol 940 is stirred with 50ml water for 1 hr in mechanical stirrer.
- Add triethanolamine and methylparbene is also stirred

red in 30ml water

- Mix avocado extract + methylparben + triethanolamine. Carbapol extract
- Add glycerin in this with constant stirring frequently
- Aqueous hydrogel is formed
- Add tinofrose oil in mix it properly

Formulation

The herbal under eye derma gel is made using the following ingredients.

Gel code	F1H	F2H	F3H
Carbopol 936(g)	0.3	0.4	0.5
Triethanolamine(ml)	0.2	0.2	0.2
Avocado Extract(ml)	5	5	5
Rosemary oil(ml)	0.1	0.1	0.1
Methylparaben (g)	0.3	0.4	0.5
Papaya extract(g)	0.5	0.5	0.5
Orange peel(g)	0.5	0.5	0.5
Demineralized water	q.s	q.s	q.s

Evaluation:

The evaluation of gels was done using the following variables.

Visual appearance and clarity:

Under fluorescent lighting, the visual appearance and clarity of the created in situ formulation are examined for the presence of any particle matter against a white and black background.

Determination of pH:

By completely submerging the glass electrode in the gel system to cover the electrode, the gel pH was measured using a digital pH metre. Measurements were made three times, with the average of those measurements being recorded.

Spreadability:

Slides of standard size were taken in two sets. On one of the slides, the herbal gel formulation was

inserted. The gel was positioned at a distance of 7.5 cm along the slide, sandwiched between two slides, and another slide was placed on top of the gel. The gel between the two slides was pushed equally to form a thin layer by placing 100g of gel on the upper slide. The extra gel that has adhered to the slide is scraped off after the weight is removed. The top slide is the only one that can slide freely because of the gravity-related to it because the two slides are securely fixed to the platform without even the tiniest movement. The top slide is firmly attached to the 20g weight. It was timed how long it took the higher slide to move 7.5 cm and detach from the bottom slide when under the influence. Three times the experiment was run, and each time the average computation time was used. Viscosity: Using a Brookfield viscometer (S-62, model LVDV-E) set to 25°C and rotating at 60 rpm, the viscometer's spindle speed was used to measure the viscosity of the herbal under-eye derma gel.

Extrudability:

The crimped end is tightly forced against a closed collapsible tube filled with about 20g of gel, and a clamp is affixed to prevent rewinding. The gel is extruded after the cap has been removed. The amount of gel that was extruded was gathered and weighed. It was computed how much gel was extruded.

Photosensitivity:

It has been discovered that many pharmaceutical formulations are photosensitive, showing instability when exposed to light. A sun exposure test was done to gauge the product's photostability. In this experiment, the herbal gel's physical properties were tracked as it dried in the sun from 9 am to 18 pm²⁴.

Advantages of herbal under eye derma gel

Advantages of herbal under eye derma gel over synthetic

Herbal cosmetics are becoming more and more popular since natural products are now favoured over those made of chemicals to enhance attractiveness because they provide nutrients, improve health, offer satisfaction, and have less negative side effects than synthetic cosmetics.

1. **Natural products** : Herbal under eye derma gel are, as the name implies, all- natural and free of any synthetic chemical that may otherwise be damaging to the skin. These goods, including rose water and avocado oil, use various plant parts and plant extracts in place of conventional synthetic products. They also include natural nutrients including vitamin E, which maintains healthy, radiant skin.
2. **Safe to employ** : Natural herbal under eye derma gel are safe to use when compared to other synthetic products. They are hypoallergenic, hypoallergenic, dermatologist tested and dermatologist verified to be safe to use anytime, anywhere. Users do not need to be concerned about skin rashes or itching because they are manufactured of natural substances.
3. **Appropriate for all skin types**: A lot of options to pick from Although natural under eye derma gel is still a

relatively new type in the beauty business, there are now several options available that are all made from natural ingredients.

4. **Inexpensive**: Natural cosmetics don't cost a lot. So many of these items cost less than synthetic alternatives. A WHO estimate shows that due to side effects and the rising cost of modern medicine, over 80% of the world's population relies on natural goods for their health care.

III. LITERATURE REVIEW

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- 2) Singh Nishant Kumar Ramkrishna et al, (2019), Formulation and evaluation of liposomal gel for effective treatment of acne. Results obtained during this work have shown that liposomes may be an interesting carrier for clindamycin phosphate in skin disease treatment.
- 3) B. Nex et al , (2016) , Using of avocado oil for dark circles. Applying avocado to your skin can unclog skin pores, remove dead skin cells and remove excess soil. Moreover avocados provide skin nourishment, boost skin, repair and rejuvenation.
- 4) Riya Arora et al , (2019) , Herbal active ingredient used in skin cosmetics. We used avocado oil as your herbal active ingredient. Avocado oil comprises of Vitamin E, Vitamin D, beta-carotene, protein, fatty acids , and lecithin.
- 5) Dr. Surbhi et al , (2021) , Benefits of papaya for skin. For the maximum benefit of papaya for your skin use the peel rather than the pulp of this fruit. Papaya is also used for skin whitening. Papaya is also rich source of vitamin C , vitamin A , Vitamin E , pantothenic acid , folate , magnesium and potassium.
- 6) Kanaze et al, (2008), Orange peel for herbal cosmetic preparation. Potential rationale for use of orange peel, which is primary waste fraction in the production of orange tincture , contains flavonoids associated with antioxidant activity. The glycoside hesperidin and narigin are mainly responsible for the

purported antioxidant activity of citrus peel extracts.

- 7) Franciso Jose Gonzalez-minero et al, (2020), Rosmarinus officinalis L. (Rosemary): An Ancient Plant with uses in personal healthcare and cosmetics. Rosemary has been one of the best known plants since ancient times. In the volatile essential oil of rosemary, up to 150 different compounds have been found with most of them being monoterpenes.
- 8) Rafie hamidpour et al, (2017), Rosemary A novel therapeutic agent in herbal cosmetics preparation. Rosemary is used as Therapeutic agent for Antioxidant, antimicrobial, anticancer, antidiabetic, antidepressant, neuroprotective, anti-inflammatory and Anti-obesity treatment. Rosemary essential oil and extract were found to contain several biologically active compounds. Compared to synthetic agents, Rosmarinus officinalis displayed low toxicity levels and few side effects.
- 9) Mark L Dreher et al, (2013), Has avocado composition and potential health effects. The avocado oil consists of 71% monounsaturated fatty acids (MUFA), 13% polyunsaturated fatty acids (PUFA) and 16% saturated fatty acids (SFA), which helps to promote healthy blood lipid profiles and enhance the bioavailability of fat-soluble vitamins and phytochemicals from the avocado or other fruits and vegetables, naturally low in fats, which are consumed with avocados. Abdulkarim Kassem Alzomrotal, (2015), Formulation and Extraction of rosemary as anti-Wrinkle cream and gel. Rosemary leaves extract are known to have significant antioxidant properties. It is used as a flavoring agent. Rosemary contains a large number of compounds responsible for its antioxidant, the main antioxidant compounds found in rosemary extract are rosmarinic

IV. CONCLUSION

Periorbital hyperpigmentation (under eye dark circles) is a common benign problem. Though, there are number of treatments available for the same, the developed formulation made from Avocado, orange peel extract and some other essential oils was found to be more better and

promising herbal under eye derma gel compared to other research work. The fact that herbal under eye derma gels are chemical-free and more effective than synthetic under eye gels is the most significant quality they have. Thus, in this research work, the prepared herbals under eye derma gel makes the skin refreshing and free from dark circles.

V. ACKNOWLEDGEMENT

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