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FORMULATION AND EVALUATION OF FACE SERUM

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ABSTRACT

UV radiation and photodamage are the two undesired effects of aging skin, including wrinkles on the face. There are currently no practical methods for delaying the aging process of the skin. This facial serum with aloe vera, glycerin, and honeybee venom is a very concentrated cosmetic. Aloe Vera has the capacity to permeate deeper layers of the skin and absorb quickly, thus utilizing it not only provides immediate cosmetic benefits but also psychological benefits. Aloe Vera gel is frequently used to treat a variety of skin conditions, sunburns, small wounds, insect bites, and wound healing. It also has anti-inflammatory, anti-bacterial, and anti-fungal properties. Bee venom is a protective poison that bees make; it has been shown to improve collagen synthesis and blood flow.

The face serum was evaluated for its physiochemical parameters, pH, globule size, consistency. The stability study results showed that there was no change in visual appearance, homogeneity and globule size.

Background: *Wrinkles on the face and aging of the skin are an undesirable effect of photodamage and ultraviolet radiation. Serum has a quick absorption and ability to penetrate deep layers of the skin, as well as a non-oily finish and a deep formula with a very high amount of active ingredients.*

Methods: *In this study, we have formulated and evaluated a face serum containing combination of aqueous extract of olive oil and lemon oil.*

Results: *Facial serum was tested for its pH, physical appearance, viscosity, microbial testing, cyclic temperature test, etc. The results of the stability study show that there was no change in visual acuity, homogeneity.*

Conclusions: *Serum containing Fenugreek extract have been able to cure bacterial infections and inflammations of facial skin, and other signs also moistens the skin without any side effects making skin soft, smooth and supple.*

KEYWORDS: *Cosmetic, Anti-inflammatory, Anti-bacterial, Anti-oxidant, Face serum, Fenugree extract.*

INTRODUCTION

The examination of human skin is a crucial field for research and development in the fields of dermatology, toxicology, pharmacology, and cosmetology. This is because it allows for the evaluation of exogenous agents' effects, interactions, absorption mechanisms, and/or toxicity towards various cutaneous structures. The Humanity has recognized the value of aesthetics since the prehistoric era, and the desire to appear well and attractive has grown across society.

The Greek term "cosmetic" means "to adorn," as in adding something ornamental to a person or something. The study and practice of cosmetic treatments is known as cosmetology. It's the study of cosmetics and how they're applied, as well as the art or science of enhancing and beautifying the skin, nails, and hair. To get the desired result, a skin care formulation needs to be able to penetrate the skin and release the potent ingredient. The solution is a face serum, which penetrates the skin to provide the valuable active ingredient without the need for dangerous chemicals to get immediate results.

In the field of cosmetics, serum is a concentrated product that is frequently utilized. The term "professional cosmetology" originates from the field itself. Like any other cream, the cosmetic serum has the same concentration of water or oil. A concentrated solution with ten times more organic matter than cream is called a serum. Consequently, addresses the aesthetic issue in a timely and efficient manner.

Face serum is an oil-and water-based emulsion that is extremely concentrated. Because serums, also known as concentrates, have roughly 10 times the amount of biologically active ingredients than creams do, they can cure skin issues more effectively. Including a few drops of face serum in your regular skin care routine regimen will have observable effects in a month or less. This is due to the fact that face serums are composed of minuscule molecules that facilitate rapid, deep skin penetration. Numerous beneficial active

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ingredients and nutrients, including antioxidants, ceramides, amino acids, and others, are abundant in serum. This explains why the most expensive product in a skin care set is usually the face serum. Whether it's a skin care product, wrinkle reducer, or anti-aging

For optimal health, these nutrients are required for all skin types. For oily and combination skin, gel and liquid preparations work best; for normal to dry skin, serums and light lotions work best; and for extremely dry to very dry skin, more emollient lotions and moisturizing creams work best. Skin type is a major factor in texture, but the amazing Regardless of product, texture, or personal choice, all people need the same ingredients for healthy skin. The largest and most protective organ in the body, the skin works to mend and restore itself every day. However, there are a number of factors that can cause dry patches on the skin, including pollution, UV radiation, and makeup left on overnight that can irritate or trigger allergic reactions.

The face serum also contains AP-8, a neuropeptide involved in muscle contraction, beta- glucan, cell turnover and a regenerative extract believed to support a healthy immune system. Sodium hyaluronate, a humectant and extracellular matrix-derived substance, and CandE vitamin preparations and green tea, both of which are antioxidants, including polyphenols.The main difference between a serum and a lotion or cream is what the formula does not contain. They also contain less lubricants and thickeners such as nut or seed oil.Most serums are water based and completely remove oils..

Ingredient used in preparation of face serum

Aloe Vera

Aloe vera has long been used for treating hair loss. It also soothes the scalp and conditions hair. It can reduce dandruff and unblock hair follicles that may be blocked by excess oil. You can apply pure aloe vera gel to your scalp and hair a few times per week.

Botanical name :- Aloe barbadensis
Family :- Liliaceae
Synonym :- Aloe indica
Biological Source :- Aloe is the dried juice collected by incision, from the bases of the leaves of variospecies of Aloe. Aloe perryi Baker, Aloe vera Linn or Aloe barbadensis Mil and Aloe ferox Miller.
Chemical Constituents :- Aloin, Resin, Emodin Aloeemodin
Uses :- purga-tives, emollient, antibacterial activity.



Figure No 1 : Aloevera

Honey

Honey, sweet, viscous liquid food, dark golden in colour, produced in the honey sacs of various bees from the nectar of flowers. Flavour and colour are determined by the flowers from which the nectar is gathered. Some of the most commercially desirable honeys are produced from clover by the domestic honeybee.
Botanical name:- Apis mellifera
Family :- Apidae
Synonym :- Mel, Clarified Honey, Strained Honey
Biological source :- Honey is a saccharine secretion produced from the nectar of flowers and accumulated in the honeycomb by the Honeybee, Apis mellifi.ca Linn. (Family Apidae).

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Chemical Constituents :- Honey is composed of fructose, glucose, water, maltose, trisaccharides, sucrose, minerals, vitamins and enzymes
Uses :- An anti-inflammatory, antioxidant, and antibacterial agent that may help heal wounds, burns, infections, and colds



Fig No 2 :Honey

Lavender Oil
Lavender oil is derived from the lavender plant, primarily through steam distillation. It's renowned for its soothing aroma and numerous therapeutic properties. Lavender oil has been used for centuries in various cultures for its medicinal and aromatic benefits

Botanical name : Lavandula angustifolia oil
Family : Lamiaceae
Synonym :- lavender aromatic oil
Biological source :- Lavender oil is an essential oil obtain by distillation from the flower of sprikes of certain species of lavender.
Chemical Constituents :- Lavender oils include over 100 chemicals, with **linalool** and linalyl acetate being the two most prominent. Furthermore, it also contains phytosterols, coumaric acid, anthocyanins, monosaccharides, valeric acid, glycolic acid and its esters, ursolic acid, coumarin, and herniarin.

Uses

- Calming the body and mind and promoting better sleep
- Relieving pain, stress, and anxiety
- Improving blood circulation and disinfecting wounds
- Repelling insects and treating bug bites
- Treating dandruff and hair care
- Cleaning around the house
- Treating minor cuts and scrapes
- Treating mouth ulcers and diabetes (not proven)



Fig No 3 : Lavender oil.

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Coconut Oil

The lauric acid in coconut oil has nourishing properties that are especially prone to soak into the strands of your hair. Coconut oil absorbs into your hair quickly, providing moisture to tame frizz and heal breakage.

Botanical name :- Cocos nucifera.
Family :- Palmae
Synomym:- Coconut oil, coconut butter, copra oil.
Biological Source :- Coconut oil is the oil expressed from the dried solid part of endosperm of coconut, Cocos nucifera L.
Chemical constituents :- Caprylic acid, 2%; capric acid, 50–80%; lauric acid, 3%; and myristic acid about 1%, saturated fatty acids.
Uses :- Vegetable oil, Hair Growth.



Fig No 4 : Coconut oil.

Vitamin E

Vitamin E-rich oil can help replace that protective layer and bring back shine. Oil in general also helps seal out moisture, reduce breakage, and protect the hair from damage.
Synonym :- (+)-α-Tocopherol; D-α-Tocopherol
Chemical constituents :- It is composed by tocopherols and tocotrienols, which is group of compounds with neuroprotective properties. For hair, vitamin E is a source of supplement that improves hair growth by increasing capillary circulation in the scalp, thereby help improving hair volume. Vitamin E is a physiologically essential micronutrient and has been applied in various fields including medicine, pharmaceutics, cosmetics and foods.
Uses :- Anti-oxidant agent, prevents premature hair greying



Fig No 5 : Vitamin E.

Triethanolamine

IUPAC name :- 2,2′,2″-Nitrilotri(ethan-1-ol) **Other name :-** 2,2′,2″-Trihydroxytriethylamine **Chemical formula** :- N(CH2 CH2 OH)3 **Molar mass :-** 149.190 g·mol−1
Uses :- Preservative

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Olive Oil

Olive oil, oil extracted from the fleshy part of the ripened fruit of the olive tree, *Olea europaea*.

Olive oil varies in color from clear yellow to golden; some varieties obtained from unripe fruit have a greenish tinge.

Botanical name :- Olea Europoea.

Family :- Oleaceae

Synonym:- Sweet oil

Biological Source :- Olive oil is a fixed oil obtained by expression from pericarp of the ripe fruits of Olea europoea.

Chemical constituents :- The composition of olive oil is primarily **triacylglycerols** (~99%) and secondarily free fatty acids, mono- and diacylglycerols, and an array of lipids such as hydrocarbons, sterols, aliphatic alcohols, tocopherols, and pigments. A plethora of phenolic and volatile compounds are also present.

Uses

- Cooking, frying, and dressing salads
- Preserving olives and adding flavor to dishes



Fig No : 6 Olive Oil

❖ **Face Serum**

Face serum is a skincare product that fortifies your skin with high concentrations of active ingredients such as hyaluronic acid, vitamin C, retinol, and more. Face serum is a lightweight skincare product that absorbs quickly into your skin and nourishes it with active ingredients. Face serum is a lightweight skincare product that absorbs quickly into your skin and nourishes it with active ingredients. This serum contains ingredients that nourish your skin with nutrients and remove dead skin cells. Common ingredients of skin resurfacing serums include lactic acid, glycolic acid, and season.

➢ **Ideal Qualities of Face Serum.**

1. Soothes irritated skin: It is well known that aloe vera possesses antiviral and cell-regenerating capabilities. The advantages of aloe gel are comparable to how applying it to a sunburn feels.
2. Deep hydration: possess a special capacity to raise and decrease skin moisture.
3. Fight Acne and fades blemishes: Bael fruit stops the bacterial overgrowth that is the primary cause of acne and pimples.
4. Remove dark circle and puffiness: Vitamin E and antioxidants in abundance aid with eyelid discolouration, and the cooling impact reduces puffiness. It makes under-eye circles look less prominent. It removes dead skin cells, which encourages the synthesis of collagen.
5. It contains antioxidant qualities that encourage healthy-looking skin.

➢ **Advantages**

1. **Boosts skin hydration** – Face serums work like a magic potion for your skin by boosting hydration. They lock in moisture, leaving your skin feeling soft, supple and well- nourished.
2. **Evens out skin tone** – A unique benefit of face serums is their ability to even out skin tone. They help in reducing dark spots, blemishes and other skin discolorations, promoting a uniform complexion.
3. **Reduces fine lines** – They are also effective in reducing fine lines. By promoting cell regeneration, they help in smoothing out wrinkles, making your skin look younger.
4. **Enhances skin radiance** – One more benefit is that they enhance skin radiance. They add a natural glow to your skin,

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making it look healthier and more vibrant.

5. **Protects against environmental damage** – Face serums also act as a shield against environmental damage. They protect your skin from harmful pollutants, keeping it healthy and radiant.

➢ **Disadvantages**

1. **Can cause allergic reactions** – Face serums can sometimes lead to allergic reactions if your skin is sensitive to certain ingredients. This can result in redness, itching, or even hives.
2. **Might be expensive** – Despite their benefits, face serums often come with a hefty price tag. This can be a significant disadvantage for those on a budget.
3. **Not suitable for all skin types** – Not every skin type reacts well to face serums. For example, those with oily or acne-prone skin might find that serums exacerbate their issues.
4. **Can cause skin irritation** – Skin irritation is another potential downside. Some people may experience burning, stinging, or a rash after application.
5. **Overuse can dry out skin** – Overusing face serums can strip your skin of its natural oils, leading to dryness and flaking. It's important to use them sparingly to avoid this.



Fig No : 7 Face Serum

❖ **Benefits of using a Face Serum**

- From hydrating the skin in order to reduce the appearance of fine lines and wrinkles, to minimizing the appearance of dark spots and refining skin's texture, serum truly does it all. A good serum that contains antioxidants will protect the skin from environmental stressors and is worth the cost and effort alone. Serum can smooth the skin, firm the skin, and even exfoliate. It really just depends on what you're looking for your serum to accomplish.
- Religious usage of serum boosts collagen production and assists in improving the texture drastically and makes the skin firm, smooth and fresh. Especially vitamin C content plays a vital role in the rejuvenation of the skin. Dark spots, scars, and pimple marks can be easily lightened with serums that have high plant-based concentrates.

Types of serum

1. Hydrating Serum

Hydrating serums, formulated with water-attracting ingredients like hyaluronic acid, deliver an extra boost of hydration to dry or dehydrated skin. They complement moisturizers for prolonged hydration. Opt for a water or gel-based serum if you have oily, acne-prone skin and experience irritation or breakouts from traditional moisturizers. Suppose you are looking for a serum to hydrate and make your skin plump; opt for the product based on these ingredients. Hyaluronic acid, Glycerin, Ceramides, and Vitamin B5.

2. Anti-Aging Serum

To combat signs of aging effectively, individuals should incorporate anti-aging serums into their skincare routine as early as their 30s. Opt for gentler retinoids with lower concentrations (0.25– 0.5%) to slow down aging without causing skin sensitivity.

Anti-aging serums, best used overnight, contain potent ingredients like retinol, vitamin C, and peptides to minimize fine lines and wrinkles and promote collagen synthesis.

(Tip: For pregnant or lactating individuals, it's advisable to avoid retinol due to potential birth defect risks, especially in the first trimester. Use sunscreen during the day to protect against UV rays and prevent skin irritation.)

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3. Acne-Fighting Serum

Acne-fighting serums contain potent ingredients like salicylic acid and benzoyl peroxide, which effectively unclog pores and soothe inflammation. These serums not only treat existing acne but also prevent future breakouts by cleansing excess oil and dirt, preventing pore blockages. Key ingredient Niacinamide reduces inflammation and irritation caused by acne, making it an ideal choice for oily, acne-prone skin.

4. Brightening Serum

The ideal brightening serum features antioxidant-rich ingredients that effectively diminish hyperpigmentation and enhance skin tone and texture. These serums work by inhibiting melanin production and exfoliating dead skin cells. Ingredients like ferulic acid, Vitamin C, peptides, kojic acid, and Niacinamide are recommended for achieving a glowing complexion. Brightening serums target dark spots and uneven skin tone, revealing a brighter, more radiant complexion.

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Objectives

3,4

Need of study



Fig No. 8 :Need of study

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Objectives

- Deliver highly concentrated active ingredients to the skin.
- Address specific skin concerns such as fine lines, wrinkles, dark spots, and uneven skin tone.
- Absorb quickly into your skin.
- Soothe sensitive skin.
- Improve the appearance of fine lines and wrinkles.
- Protect your skin from free radicals and future damage.
- Provide more visible results.
- Clarify your skin and enhance your complexion.
- Eliminate the dark spots that result from hyperpigmentation and prolonged exposure to sunlight.

Hydration: Serums are lightweight and contain high concentrations of active ingredients. They provide intense hydration without feeling heavy or greasy.

Targeted Treatment: Serums can address specific skin concerns such as fine lines, wrinkles, dark spots, or acne. Look for serums with ingredients like hyaluronic acid, vitamin C, or retinol.

Brightening: Vitamin C serums can help brighten dull skin and fade hyperpigmentation.

Anti-Aging: Ingredients like peptides and retinol promote collagen production, reducing the appearance of wrinkles and improving skin elasticity.
Texture Refinement: Serums can refine skin texture, making it smoother and more even.

Fast Absorption: Due to their lightweight consistency, serums absorb quickly into the skin, allowing other products (like moisturizers) to be applied on top.

Plan of work

Phase I

- Review literature
- Selection of plant
- Selection and procurement of Excipient
- Preparation Of extraction
- Formulation of Face Serum

Phase II

- Evaluation of face Serum
- Physical appearance
- pH
- Viscosity
- Homogeneity
- Spreadability Test
- Stability

Material and Methods

❖ **Sources and Reagents**

- Aloe vera
- Vitamin E
- Almond Oil
- Coconut Oil
- Lavender oil
- Rose Oil
- Honey

❖ **Glassware's**

- Beaker
- Water Bath
- Stirrer
- Filter Paper

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Volume: 10 | Issue: 5 | May 2025 - Peer Reviewed Journal

- Gauze
- Measuring Cylinder
- Spatula
- Pippete
- Cotton Cloth

❖ **Instruments**

- Weighing balance
- Magnetic Stirrer
- Honoginizer
- Burner

Experimental Procedure for Face Serum

Clean all the glassware and dry them properly as per SOP.

⬇

Measure the accurate quantity of aloe vera from aloe plant, transfer it in beaker.

⬇

Mix 5ml of glycerine with 1/2ml of vitamin E in the aloe vera.

⬇

Then stir this mixture for 15 min on magnetic stirrer. Add distilled water uniformly.

⬇

Take another beaker and add oil phase in it. Firstly take honey 5-10 ml.

⬇

Take 1.8 ml olive oil with 0.4ml coconut oil in beaker and stir it continuously 10 min.

⬇

Then oil phase is added to the liquid phase by drop wise on the magnetic stirrer to obtain oil in water based on biphasic emulsion.

⬇

Add few drops of rose oil, Lavender oil and required quantity of preservative with tween 20.

⬇

Transfer final solution into the appropriate container with closure.

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Composition of Face Serum

Table No 1: Ingredients used in the preparation of face serum.

Sr no.	Ingredient	Working for (30ml)	Property
1	Aloe vera gel	10%	Conditioner
2	Honey	5 to 10 ml	Overnight hydration boost.
3	Vitamin E	1/2 ml	Anti-oxidant
4	Olive oil	1.8ml	Anti-oxidant, anti-inflammatory
5	Glycerin	5ml	Hydrolysis, Toner
6	Coconut oil	0.4ml	Moisturizer
7	Rose oil	2-3 drops	Perfuming agent
8	Lavender oil	2-3 drops	Perfuming agent
9	De-mineralized water	Qs up to 30ml	Cohesive and Adhesive

Table no 2. Material and collection

Sr no	Ingredients	Collection
1	Aloe vera	Late Bhagirathi Yashwantrao Pathrikar college of pharmacy, Pathri
2	Olive oil	Late Bhagirathi Yashwantrao Pathrikar college of pharmacy, Pathri
3	Honey	Late Bhagirathi Yashwantrao Pathrikar college of pharmacy, Pathri, Local market
4	Glycerin	Late Bhagirathi Yashwantrao Pathrikar college of pharmacy, Pathri
5	Coconut oil	Local market

Evaluation of Face Serum

Physical appearance

The Colour and appearance of the formulation was observed visually. The formulation procedure uniform distribution of extracts. This test was confirmed by visual appearance and by touch.

pH Value

A pH meter was calibrated using a standard buffer solution. Nearly 1 ml of the face serum was properly weighed and dissolve in 50 ml of distilled water and finally its pH was calculated. The skin has an acidic range and the pH of the skin serum should be in the range of 4.1-6.4.

Determination of Spread ability

2 gm of serum sample was placed on a surface. A slide was attached to a pan to which 20 gm weight was added. The time (seconds) required to separate the upper slide from surface was taken as a measure of Spreadability.

Stability Studies

Formulation and development of a pharmaceutical product is not complete without proper stability analysis carried out on it to determine physical and chemical stability and thus safety of the product. The stability studies is carried out as per ICH guidelines. Short term accelerated stability study was carried out for the period of few months for the prepared formulation. The samples were stored at different storage conditions of temperatures such as 3- 5oC, 250C RH=60% and 40oC±2% RH=75%.

Cyclical Temperature

These test is not carried out at any fixed temperature and humidity. In this test, temperature was changed cyclically every day. At room temperature and frizzing temperature to stimulates the changes in temperature.

RESULTS AND DISCUSSION

1. **Physical Appearance**

The physical appearance, color, odour and texture of the prepared herbal face serum are visually tested. Table 3 reflects the outcomes.

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Sr.No	Parameter	Observation
1	Colour	Whitish yellow
2	Odour	Lavender like
3	Texture	Smooth

Table No. 3 : Physical Appearance

2. pH

The pH scale is used to specify the acidity or basicity of a product in order to ensure that it is safe to use the value obtained is recorded in table 4.



Fig no. 9 : pH Meter

3. Viscosity

Brookfield viscometer is used to determine the viscosity of the formulation. The value obtained is recorded in table 4.

Sr No.	Parameter	Result
1	pH	6.46
2	Viscosity	240

Table No. 4 : pH and viscosity of Face Serum

4. Homogeneity Test

By visual examination of the appearance and presence of any lumps, flocculates, or aggregates, the produced herbal face serum was checked for homogeneity. The homogeneity of prepared serum has been shown to be fine.

5 Stability Test

Table 5 reveals that the herbal face serum was stable during the research time, as these serums showed no physical instability, and there was no noticeable difference in the pH before and after the study.

Sr No.	Parameter	Initial	Final
1	pH	6.46	6.9

Table No. 5 Stability test

Sr No.	Parameter	Result
1	Colour	Whitish yellow
2	Odour	Lavender like
3	Texture	Smooth
4	pH	6.46
5	Viscosity	240
6	Homogeneity	Good
7	Spreadability test	Easily Spreadable
8	Stability	Stable

Table No . 6 Evaluation test.

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CONCLUSION

This report's objective was to investigate the specifics of face serums, their background, and their general significance. The study covers the appropriate choice and application sequence. With a vast array of serums on the market for each and every .These days, it's crucial to know what to look for in a serum for every type of skin and skin issue.

Upon carefully examining each major skin concern and selecting an appropriate formulation, it is reasonable to conclude that notable improvements occur, resulting in positive outcomes. A good skin care regimen with the right serum for you can delay the aging process. Skin health is a vital component of overall body health skin and prevent the continued harm. In combination with the right moisturizer and sunscreen, it gets rid of wrinkles, dark spots, fine lines, and other imperfections.

Certain compounds address particular skin concerns; therefore, a blend of the best ingredients may have extraordinary effects. The report also includes a list of the many skin care companies and product descriptions for serums that are on the market.

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