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Review Article

Unlocking the Power of Nature: A Comprehensive Review of Herbal Face Serums

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ABSTRACT

These days, the demand for skin care products and treatments has increased to a larger extent. There is an obsession among humans to look beautiful. As a result, several products have been introduced to look smart and young. The use of herbal ingredients has been grown across worldwide. The need for herbal cosmetic is increasing in the world market and is an irreplaceable asset of nature. Formulation of herbal cosmetics is done using different herbal ingredient that is mixed with a cosmetic base for nourishing and curing various ailments. Therefore, focus has been made in order to take care of the skin among people and companies. Blood circulation, skin revitalization, suppleness retain, and debris elimination from the pores is promoted by herbal face packs. Benefits of herbal cosmetics are to be non-toxic, allergic responses reduction. Cleanser, a serum, a moisturizer and a sunscreen are skin care routine. Serums are the recent product in case of building a great routine of skin. Serums offer various formulation types ranging from oily, dry or anything in between type of skin. This literature review aims to highlight various advantages of using the right serum formulation for different skins and what results majority of the people can expect. It also has information about various skin healing and brightening ingredients which are used in the serums now a days and work of the ingredients on the skin giving it a specific glow which otherwise might not be possible. Although at present there is no benefit process available that can slow down the skin aging conditions, serums that are made up of various concentrated vitamins and acids have shown miraculous effects.

INTRODUCTION

Herbal cosmetics refer to skincare and beauty items that contain approved cosmetic components along with natural plant-based elements. These herbal ingredients contribute specific benefits to

enhance your appearance. The term cosmetic is derived from the Greek word “kosmeticos” meaning having the power, arrange, skill in decorating. The origin of cosmetics lastly were linked with hunting, fighting, religion and

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superstition and after that associated with Herbal extracts, derived from plants, have roots tracing back to ancient texts like the Bible, Vedas, and Upanishads¹. While traditional medicine relies solely on allopathic treatments, there's growing interest in complementing them with herbal remedies. Studying human skin is crucial for understanding how external agents affect our bodies, particularly in fields like dermatology, toxicology, pharmacology, and cosmetology. The desire for beauty and wellness dates back to prehistory, and people continue to seek ways to appear youthful and healthy. "Cosmetic" originates from the Greek word meaning "to adorn," referring to adding decorative elements to oneself or objects. As per the Food Drug & Cosmetic Act, cosmetics consist of articles meant to cleanse, beautify, promote attractiveness, or change appearances when applied to the human body. Today, cosmetics come in various forms, such as lotions, serums, lipsticks, perfumes, eye shadows, and nail polishes. For instance, face powders give skin a radiant finish by layering over foundation creams. Cosmetology encompasses the practice of enhancing skin, nails, and hair through beauty treatments and studying cosmetics and their applications². Serums, a highly concentrated product widely utilized in cosmetology, derive their name from their prominence in professional skincare. These cosmetic formulations, whether water or oil-based, pack a potency akin to creams. Defined by their high concentration, serums typically contain ten times more active ingredients than creams, allowing them to address cosmetic concerns rapidly and effectively. A high-quality face serum delivers potent active ingredients deeply into the skin without relying on harsh chemicals for immediate results. Available in both water-based and oil-based formulations, face serums typically contain around ten times more biologically active substances compared to regular creams. By incorporating just some drops of face

serum into a daily skincare regimen, individuals may observe visible improvements in less than a month due to the tiny molecular size allowing quick skin penetration³. Face serums often comprise beneficial components that are active and nutrients like antioxidants, ceramides, amino acids, and other essential compounds. Skincare products cater to varying skin types, with gel and liquid preparations suitable for oily and combination skin, while serums and lighter lotions work best for normal to dry skin, and more emollient lotions and moisturizing creams benefit those with dry to very dry skin. Despite differences in textures, the fundamental ingredients required for healthy skin remain consistent across various products. Lastly, the skin our largest organ continuously strives to heal and repair itself, yet it can occasionally develop dry patches due to factors such as UV exposure, pollution, and improper removal of makeup. Facial serums containing ingredients linked to improved fine line and wrinkle reduction and enhanced barrier function Herbal extracts, derived from plants, have roots tracing back to ancient texts like the Bible, Vedas, and Upanishads. While traditional medicine relies solely on allopathic treatments, there's growing interest in complementing them with herbal remedies⁴. Studying human skin is crucial for understanding how external agents affect our bodies, particularly in fields like dermatology, toxicology, pharmacology, and cosmetology. The desire for beauty and wellness dates back to prehistory, and people continue to seek ways to appear youthful and healthy. Serums come in the form of a gel, lightweight lotion, or moisturizer, and have the ability to penetrate deeply into the skin to deliver active ingredients. A high-quality skin serum can help improve the texture of your skin, reduction in the pores appearance, and increase moisture levels. They provide intensive nutrition to the deeper skin layers and have a non-greasy finish, making them



all skin types suitable. The facial serum incorporates several key ingredients, including AP-8, a neuropeptide linked to muscle contraction regulation, beta-glucan, an extract renowned for its cell movement and also regenerative properties believed to bolster healthy immunosurveillance, sodium hyaluronate, a humectant vital for the extracellular matrix, and formulations of vitamins C and E, alongside green tea, recognized for its antioxidant properties rich in polyphenols. A significant point of divergence between cream and serum or lotions lies in their formulation, notably in what they exclude. Serums typically possess some lubricating and thickening agents such as nut or seed oils, with most being water-based formulations, thus completely eliminating oils⁵.

Advantage

- Improve skin texture
- Minimizes the skin pores.
- Hydrates and nourishes the skin.
- Improve skin elasticity

Disadvantages

- The gel or liquid like serum texture is an unsuitable for people who have skin condition that are chronic like eczema or rosacea, that weakens the skin barrier.
- For this people, serum may penetrate too quickly, causing irritation⁶.

Ideal Qualities of Face Serum

- **Soothes Irritated Skin:**

Aloe vera gel, known for its antiviral and cell-regenerating abilities, offers a comforting effect similar to applying it to sunburn.

- **Deep Hydration:**

Capable of raising and lowering skin moisture levels.

- **Fight Acne and Fade Blemishes:**

Bael fruit prevents bacterial overgrowth, reducing acne and pimples.

- **Remove Dark Circles and Puffiness**

Vitamin E and abundant antioxidants help with eyelid discoloration and cool puffiness.

- **Reduces Under-Eye Circle Prominence:**
Improves the appearance of under-eye circles.

- **Removes Dead Skin Cells:**
Encourages collagen synthesis.

- **Contains Antioxidant Properties:**
Supports healthy-looking skin⁷.

HISTORY OF FACIAL SERUMS

A serum is a clear, yellowish fluid that is obtained by whole blood separation into components like solid and liquid after it becomes a clot. The source of ancient serums was obtained from horse blood, egg albumin, and bovine placenta. These products were packed in the form of sterile ampoules and oxyquinoline was used as preservatives and later parabens, making them commercially available. However, because of the reduce shelf life, small batches had to be made and used up quickly before the product spoiled. During the 1800s, highly valuable process were exercise, cleanliness, and skincare. To lighten skin zinc oxide was used; however, it causes reactions that were allergic. Hygiene products were cheap and high approachable. Harsh cleansers were frequently used, same like egg yolks, honey, and oatmeal in order to soften the skin and help in reducing blemishes⁸. Lemon juice was also in use which naturally bleaches the skin in lighter shades. Chapstick, baby powder and Vaseline were discovered during this time and were all used in skincare regimes. The 1900s saw an explosion in accessible skincare for women. In 1937 Carmex was invented, and in 1944 sunscreen. Estee Lauder launched their cosmetics line in 1946 in NYC, and in the 1950s, Clearasil, Ponds, Oil of Olay, and Clinique these all were launched. The 1980s saw a rise in all-natural skincare products, with Dr. Howard Murad's line being launched in 1989 and Burt's Bees in the 1980s. Botox was approved by FDA in 2002 for frown lines on the face. In 2007, battery-operated device The Zeno, a



hand-held, was invented to transfer heat onto a blemish; bacterial killing and disappearing them after little treatment. Firstly, serums were introduced for wrinkles reduction and tightening face appearance. These serums were albumin based, egg white tightening ingredient, used by women as facial mask across the world for longer period of time. The molecule of serum is generally very minute and the ingredients are delivered to all skin layers without pores clogging with any oil, glycerin, or other comedogenic fillers⁹.

TYPE OF FACE SERUM

The primary determinants of quality are physical properties and stability during formulation of a face serum. Essentially, formulation of a face serum constitutes an emulsion composed of two immiscible liquids. A thickener and emulsifier are incorporated into the system, to mitigate emulsion instabilities. The emulsifier works to have a balance in the system by reducing interfacial tension between the two immiscible liquids while simultaneously stabilizing the dispersion phase to prevent coalescence. Additionally, the thickener contributes to the system by acting as a rheology modifier; imparting flexibility to the flow characteristic of the emulsion¹⁰. A critical chemical property to consider during formulation is the pH value. Altering the skin's pH can disrupt its natural microbiology and function, leading to various skin issues such as acne, flakiness, excessive sebum secretion, and more severe conditions. The skin's natural microflora remains intact within a pH range of 4 to 4.5, whereas a pH range of 8 to 9 eradicates the skin's natural microflora. Face serum formulation within the appropriate pH range can aid in enhancing the skin's barrier function. Face serum formulation and other cosmetic formulation can pose challenges. Traditional methods like the 'One Factor at a Time' (OFAT) approaches are time-consuming and may result in unnecessary experiments that incur costs. OFAT involves

altering one factor at a time while holding other factors constant, necessitating a large number of tests. In contrast, optimization using Design Expert software can save time, costs, and labor. The D-optimal design, specifically, is well-suited for formulating cosmetic formulations and is widely applied in formulation studies¹¹.

Oil serum

The oil serum is the simplest type of face serum to make. It typically consists of premium, fast-absorbing carrier oils that have moisturizing and barrier-repairing properties. These oils also contain polyphenols, essential fatty acids, and other substances that can be easily absorbed by the skin¹².



Figure 1: Oil based serum

Gel serum

Gel serums gives a "tightening" sensation to the skin, making it feel certainly uplifted or tighter in specific areas of the face. Serum of this type allows for the inclusion of water-based plant extracts, making it a water-based formulation¹³.



Figure 2: Gel based face serum

Water-based serum

Serum based on water are same as that of gel serums, but they may contain little or no gums and thickeners. They are ideal for delivering hydrophilic plant extracts of high performance which are trapped against the skin beneath a cream or lotion. An anti-aging face mist layered under an emulsion and after that an oil is the best way to that water-based compounds high penetration into the skin. The perfect way to encourage greater penetration of water-based ingredients into the skin, thereby delivering their high-performance ingredients slightly deeper into skin layers, is by layering an anti-ageing facial mist underneath an emulsion and after underneath an oil. The oils will create an occlusive barrier which will encourage greater penetration of ingredients. A facial serum will contain a foundation that consists of water-based ingredients such as hydrosols which can have soothing, skin toning and balancing properties. You would then include skin-feel ingredients such as humectants, which help the serum, cling to the skin¹⁴.



Figure 3: Water based face serum

Emulsion serum

An emulsion-based face serum is a type of moisturizer which leads to strengthening barrier of the skin function during delivering high-performance skin components. It combines two "immiscible" phases, such as oil and water, using an emulsifier to bind them with each other and remain them in a state that is stable. This serum is

best suited for delivering high-performance actives deeply into the tissues of the skin¹⁵.



Figure 4: Emulsion based face serum

Pressed balm serum

A balm serum comprises of a conventional balm base of butters, waxes, and oils, but it also includes oil-soluble active substances that can help the skin. The butters and waxes make them an occlusive barrier on the skin and hydrating and nourishing it while allows them to press active components of serum to perform their action. This type of serum can combine dozens of specific butter and waxes with thousands of exquisite plant oils¹⁶



Figure 5: Pressed balm serum

SELECTION OF FACIAL SERUMS

Facial serums play an important role in skincare routines, acting as the main activity similar to a boiling pot in cooking. Similar to saucepan lid that helps cooking happen faster and more effectively by sealing in heat, a moisturizer complements the serum's benefits by providing a protective layer for the skin. There isn't a one-size-fits-all serum, as they occur in several types such as antioxidant, hydrating, anti-aging, brightening, or exfoliating serums. Each type serves specific skincare needs and should be used based on individual requirements and preferences.

Antioxidant Serums

These facial serums shield your skin from free radicals (like UV rays and pollutants), slowing down the aging process. Antioxidants not only combat free radicals but also offer additional benefits, such as boosting collagen production or soothing irritations. Due to their wide range of benefits, antioxidant serums are among the most sought-after skincare products. Look for serums rich in antioxidants like Vitamin C, E, and Resveratrol. These serums work best in morning application and to safeguard your skin throughout the day, though they can also be utilized at night¹⁷.

Hydrating Serums

Packed with humectants like Hyaluronic Acid, these serums attract and maintain moisture within the skin, keeping it smooth and plump. Although recommended for daily usage, it's suggested to apply hydrating serums once weekly for optimal results. You might choose to utilize these serums either in the morning or at night according to personal preference

Brightening Serums

Brightening serums are designed to enhance skin tone and clarity by preventing discoloration and dullness. Contrary to removing existing discoloration, these serums primarily work by inhibiting its formation in the first place. By addressing the factors that trigger pigmentation, these brightening ingredients help prevent the development of dark spots, ensuring a more even complexion

Anti-aging Serums

As we age past 25, our natural collagen production decreases, making it essential to incorporate anti-aging serums into our skincare routine in our early 20s. While peptides offer gentle anti-aging benefits and are commonly found in various serums, tretinoin stands out as the potent (albeit potentially irritating) form of vitamin A often considered the gold standard for anti-aging. For a milder approach, retinol and retinyl palmitate are gentler alternatives. Unless your serum lacks vitamin A derivatives, it can be used both during the day and at night for optimal results¹⁸.

Serums for Hyperpigmentation

Uneven pigmentation can stem from various factors like natural skin tone, genetics, excessive sun exposure, stress, or environmental changes. Common areas where pigmentation issues arise include under the eyes, around the mouth, or even on the cheeks. Vitamin C and Niacinamide serums are key players in addressing these concerns. Niacinamide is a versatile ingredient which is suitable for all types of skin, particularly effective in targeting pigmentation problems. It's beginner-friendly, making it a great option for those new to skincare routines. For example, niacinamide incorporation into your regimen to combat Hyperpigmentation effectively.

Serums for Acne and Acne Scarring

Acne scarring is a prevalent issue across all skin types, often manifesting as dark spots left behind after breakouts. These scars, especially in individuals with brown skin, may take time to fade naturally. However, the right serum can expedite this process. Opt for a niacinamide serum to address acne scarring effectively.. For targeted care, you can use niacinamide as a spot treatment. Remember:

- Results from niacinamide may take 3 weeks to 3 months to become noticeable; patience is key.
- Sunscreen plays an important role in fading acne scars faster by protecting the skin from sun exposure that can prolong discoloration.
- Using SPF is essential when incorporating ingredients like Vitamin C into your skincare routine to prevent increased vulnerability to sun damage. Don't forget to prioritize sun protection for healthier skin.

Serums for Oily Skin

Dealing with oily skin often leads to acne breakouts, which can result in scarring. To address this issue effectively, focus on calming the skin, reducing irritation, and inflammation. Opt for a gentle serum that can help manage pimples without causing further skin issues. Consider using a niacinamide-based serum as a daytime moisturizer, especially in warmer months, as it



provides nourishment without the heavy, greasy feel commonly associated with cream-based moisturizers¹⁹.

Serums for Sensitive Skin

Sensitive skin requires gentle care to avoid irritation and dryness. Vitamin C is a beneficial ingredient, but opt for Sodium Ascorbyl Phosphate, a stable and milder form of vitamin C compared to L-Ascorbic Acid commonly found in skincare products. Additionally, serums containing hyaluronic acid and peptides, naturally produced by the body, are excellent choices for sensitive skin due to their soothing and hydrating properties.

Serums for Combination Skin

Combination skin, characterized by both dry and oily areas, benefits from serums designed to balance these contrasting needs. Choose for serums containing vitamin C, hyaluronic acid, and peptides to help maintain skin equilibrium and address both dryness and oiliness effectively. These ingredients work together to keep your skin nourished and harmonized²⁰.

APPLICATION OF A FACIAL SERUM

It is a vital, lightweight water-based skincare product that targets various skin concerns. These serums contain innovative ingredients like niacinamide, hyaluronic acid, vitamin C, AHAs, and BHAs that can work wonders for your skin. To truly benefit from a face serum, it's crucial to select

one that suits type of skin and addresses your specific concerns. With the abundance of serums available in the market, choice of right one is highly appreciable. How many serums do you really need in your routine? When and how should you use them?

To apply a serum effectively:

1. Cleanse your face and gently pat it semi-dry.
2. Apply the serum while your skin is still damp as it enhances penetration due to increased permeability.
3. Use upward sweeping motions to apply the serum from your décolletage and neck to your face.
4. Allow the serum to fully absorb into your skin before applying eye cream, moisturizer, and sunscreen.
5. Unlike thick creams that are massaged into the skin, serums should be applied with gentle tapping motions using fingertips or palms.
6. Avoid excessive rubbing; let the serum absorb naturally into your skin²¹.
7. By following these steps, you can maximize the benefits of your facial serum and achieve healthier, glowing skin.

1. Begin with a fresh, clean face:

Before applying a serum, it is crucial to cleanse and exfoliate your skin to eliminate excess sebum, dirt, or toxins that may hinder the serum's absorption.



Figure 6: Showing washing and cleaning of face

2. Apply a small amount:

Applying serum less is more on the application of serum. Take a small amount on your palm or use a dropper, then gently massage it onto your skin.



Figure 7: Applying serum

3. Use gentle circular motions:

When applying a natural face serum, use gentle circular motions to ensure even absorption of the

ingredients into your skin. You can also try the tapping method²².



Figure 8: Showing gentle massaging while applying serum

4. Avoid the eye area:

The delicate area of skin around your eyes should be avoided when applying serum to prevent irritation. Serum is allowed to absorb for a few minutes before makeup or moisturizer is applied.

5. Absorption Allow time:

After applying the face serum, it is for absorption into skin at least for 5 minutes before proceeding with moisturizer or makeup application.

6. Store properly:

To maintain the efficacy of your face serum, it is stored in a cool, dark area like a cabinet or drawer to prevent light and heat from degrading its ingredients

7. Use within six months:

For optimal effectiveness, use your face serum within six months of opening it. After this period, the ingredients may lose their potency.

8. Replace every 3-4 months:

Face serums possess a shelf life and will eventually expire.

To maximize the benefits of your product, replace it every 3-4 months. High-quality serums should absorb quickly and no stickiness is left or oily residue on your skin. It's essential to start using face serums in late 20s or early 30s when they can provide significant benefits without being too active for younger skin²³.

BENEFITS OF USING A FACE SERUM

Face serum offers a multitude of benefits for your skin. From hydrating the skin to reduce fine lines and wrinkles, to minimizing dark spots and refining skin texture, serums are versatile products that can address various skin concerns. A good serum containing antioxidants can protect the skin from environmental stressors, providing value that justifies the cost and effort of incorporating it into your skincare routine. Serums can help smooth and firm the skin, as well as exfoliate, depending on your specific skincare goals. Consistent use of serums can boost collagen production, significantly improving skin texture and firmness, leaving your skin looking fresh and smooth.

Vitamin C content in serums plays an important role in rejuvenating the skin, lightening dark spots, scars, and pimple marks effectively. Serums with high plant-based concentrates can lighten dark spots and prevent the need for harsh treatments like chemical peels, which can make the skin more vulnerable to sun damage. Additionally, serums with coffee and vitamin C can reduce the size of open pores, treating and preventing blackheads and whiteheads while nourishing and hydrating the skin²⁴. Under-eye serums are often overlooked but can be beneficial for all skin types, helping to address issues like dark circles and wrinkles while restoring and protecting the delicate under-eye area. A detoxifying and brightening under-eye serum with anti-inflammatory properties can instantly refresh your look and brighten your eyes. For those with sensitive skin prone to inflammation, using serums with anti-inflammatory properties can help reduce redness, dryness, and prevent further damage, leaving your skin looking fresh and well-moisturized. Moisturizing serums containing ingredients like retinol are highly effective in treating skin elasticity, wrinkles, uneven skin tone, spots, blemishes, hydration, and nourishment. Incorporation of serum into skincare routine, you can achieve plump, youthful-looking skin by retaining moisture effectively. Ingredients such as vitamins and essential oils play a key role in maintaining healthy-looking skin over time. Embracing the benefits of face serums can help in achieving radiant, healthy skin that looks naturally youthful²⁵.

Choosing the Right Face Serum for Your Complexion

While selecting a face serum to enhance your skin's appearance, consider these tips to ensure optimal results:

- Conduct a patch test first: Before applying a new serum across your entire face, a patch test should be performed on inner elbow. Wait at

least 24 hours to observe if there are signs of irritation or allergy reactions. If no adverse effects occur, continue using the product according to its guidelines. Particularly relevant for individuals with sensitive skin

- Opt for affordable yet quality options: While expensive doesn't always equate to effectiveness, avoid choosing the lowest-priced alternatives because they could be inefficient or potentially damaging to your skin²⁶.
- Consult customer feedback: Reading online reviews provides valuable insights about others' experiences with the product, offering a balanced perspective.
- Verify the expiration date: Ensure that the serum hasn't passed its expiration date; otherwise, it may lose efficacy and possibly lead to irritation or harm.
- Follow the manufacturer's instructions: Typically, serums should be applied twice daily once in the morning and once in the evening. Choose a serum suitable for your skin type, ensuring proper cleansing and toning. Remember that every individual's skin is unique, and the right serum identifying requires patience and experimentation. By keeping these points in mind, you increase the likelihood of discovering a serum that meets your needs and expectations^{27, 28}.

KEY INGREDIENTS USED IN FACE SERUM

Serums boast a diverse array of ingredients, ranging from commonplace to exotic, tailored to suit your specific skincare objectives. Here are some key ingredients to keep an eye out for:

Vitamin C

Vitamin C, a water-soluble antioxidant vitamin, serves as an important co-factor for collagen biosynthesis, carnitine and catecholamine metabolism, and dietary iron absorption. It is a widely recognized natural anti-aging ingredient.



For individuals in their late 30s or 40s with dry, patchy skin, selecting a serum containing vitamin C is advisable. This vitamin diligently works to repair, protect, and rejuvenate the complexion, combating ageing signs. Two particularly potent vitamin C forms commonly found in facial serums are L-Ascorbic Acid (water-soluble vitamin) and C Ester (fat-soluble vitamin)²⁹.

Hyaluronic Acid

Hyaluronic Acid is a highly effective ingredient for addressing dehydrated and uneven skin. It works by locking in the skin's natural moisture and water levels, ensuring it remains hydrated. A naturally healthy and radiant complexion by replenishing moisture in dry, parched skin is promoted by this ingredient. Hyaluronic Acid acts as a biological humectant, effectively retains water in the skin and serving as a valuable component in topical moisturizing products³⁰.

Antioxidants

Antioxidants play a significant role in shielding the skin from stress and environmental pollutants, while also aiding in the reduction of pigmentation, fine lines, and wrinkles. Combining antioxidants in smaller doses has been advocated as the safest approach for their use.

Anti-inflammatory

For those with sensitive skin, opting for a serum with anti-inflammatory properties is beneficial in preventing redness, breakouts, dryness, and inflammation. Throughout history, plant oils are used as effective anti-inflammatory agents³¹.

Retinol

Retinol stands mostly clinically proven anti-aging ingredients available today. It stimulates collagen production, that results in firm and plump skin. Additionally, retinol tightens pores and reduces hyperpigmentation, promoting an even skin tone. This vitamin imparts a fresh, vibrant glow and visibly softer skin³².

Alpha Hydroxy Acids (AHAs)

AHAs, natural derived acid from fruits such as lemons, grapefruits, and oranges, serve as chemical exfoliators, maintaining clear and vibrant complexions by eliminating skin cells that are damaged and dead. They also prevent pore blockages and acne breakouts. By exfoliating the skin, AHAs remove dead skin and debris, allowing facial products to work more effectively and absorb more efficiently. AHAs is used as superficial peeling agents and improves keratoses and acne in dermatology appurtenances³³.

Vitamin E

This vitamin is another potent antioxidant that works well in association with vitamin C. The essential nutrient reduces free radicals and and sign of ageing gets reduced. It also helps in skin moisturizing, and leaves a soft, luscious complexion. .

DMAE (Dimethylaminoethanol)

DMAE is commonly hailed as a "facelift in a bottle." This nutritional compound has undergone clinical testing, demonstrating its ability to lift, firm, and tighten the skin. Particularly effective in anti-aging treatments, DMAE aids in reversing the natural sagging and drooping that occurs over time. In dermatology, DMAE has shown potential for an anti-inflammatory effect and has been documented to increase skin firmness, potentially improving underlying facial muscle tone³⁴.

Glycerin

Glycerin is renowned for its ability to attract and retain moisture in the skin, ensuring it remains supple and noticeably soft. These qualities contribute to a youthful appearance and minimize signs of aging. Glycerin serves various functions, act as a denaturant, fragrance ingredient, hair conditioning agent, humectants, oral care agent, oral health-care drug, skin protectant, skin conditioning agent (humectants), and viscosity-decreasing agent³⁵.

Green Tea

Green Tea, often praised for its internal health benefits, also provides significant support for external skin health. This potent antioxidant exhibits strong anti-inflammatory effects, protecting the skin from damage caused by free radicals stemming from poor diet, pollution, UV rays, and smoking. Additionally, the appearance of wrinkles and fine lines, rejuvenates the skin, evens out complexion, and diminishes dark spots and hyperpigmentation is reduced by green tea. Its antioxidant properties encourage the exfoliation of dead skin cells, enhancing the skin's overall

radiance. Some studies suggest antiproliferative activity is possessed by green tea³⁶.

Stem Cells

Stem cells demonstrate remarkable capabilities in cellular repair and renewal. They stimulate cellular rejuvenation, promote proper cellular function, and increase collagen production, ultimately rejuvenating and protecting the skin.

Stem cells are typically derived from plants such as lilac, grape seed, edelweiss, and Swiss apple. Additionally, sheep placenta extract is other important form used in facial serums³⁷.

List Of Plants Used In Formulation Of Herbal Face Serum With Its Functional Properties

Sr No.	Name of plant	Chemical constituents	Functional properties	Parts used in face serum preparation
1	Aloe vera	Amino acids, polysaccharides, minerals, organic acids, phenolic compounds, anthrones, C-glycosides	Anti-inflammatory, anti-itch, pain reduction, wound healing, antioxidant properties	Aloe leaf gel ³⁸
2	Liquorice	Glycyrrhizin, flavonoids, coumarins, triterpenoids	Anti-inflammatory, antioxidant, antimicrobial, hepatoprotective properties	Roots ³⁸
3	Manjistha	Rubiadin, purpurin, munjistin, p-methoxy benzoic acid	Anti-inflammatory, antioxidant, antimicrobial properties	Dried roots ³⁸
4	Lavender	Linalool, linalyl acetate, lavandulyl acetate	Relaxant, anti-anxiety, anti-inflammatory properties	Essential Oil of Flowers ³⁸
5	Rosemary	Rosmarinic acid, carnosic acid, ursolic acid	Antioxidant, anti-inflammatory, memory-enhancing properties	Leaves ³⁹
6	Green Tea	Catechins (EGCG), caffeine	Antioxidant, anti-inflammatory, weight loss support properties	Leaves ³⁹
7	Almond	Oleic acid, linoleic acid, vitamin E	Moisturizing, anti-aging, skin barrier repair properties	Oil ³⁹
8	Coconut	Lauric acid, caprylic acid, vitamin E	Moisturizing, antimicrobial, anti-inflammatory properties	Oil ⁴⁰
9	Ginseng	Ginsenosides	Adaptogenic (stress-reducing), immune-boosting properties	Root and Leaf ⁴¹
10	Jjoba	Wax esters	Moisturizing (similar to skin's natural oils), anti-inflammatory properties	Oil ⁴¹

11	Olive	Oleuropein	Antioxidant (anti-aging), anti-inflammatory properties	Fruit and leaves ⁴¹
12	Turmeric	Curcumin	Anti-inflammatory (arthritis relief), antioxidant properties	Rhizomes of turmeric ⁴²
13	Calendula	Flavonoids(quercetin),triterpenoids Thymol	Anti-inflammatory (skin conditions), wound healing properties	Petals ⁴²
14	Thyme	Thymol	Antimicrobial (against bacteria and fungi), antioxidant properties	Oil ⁴³
15	Peppermint	Menthol	Digestive aid (relieves indigestion), headache relief properties	Oil ⁴⁴
16	Chamomile	Apigenin	Relaxant (calms nerves and promotes sleep), anti-inflammatory properties	Flower's Oil ⁴⁵
17	Shea Butter	Oleic acid, stearic acid	Moisturizing (skin and hair), anti-inflammatory properties	Oil shea butter ⁴⁶
18	Argan	Tocopherols (vitamin E), fatty acids	Moisturizing (skin and hair), antioxidant properties	Argan oil ⁴⁷
19	Cilantro	Linalool	Antioxidant (removes free radicals), antimicrobial properties	Leaves or coriander leaves ⁴⁸
20	Bay Leaf	Eugenol	Anti-inflammatory (joint pain relief), digestive aid properties	Leaf Oil ⁴⁹

MARKETED FACE SERUMS

Biotique Dandelion Anti-Ageing Serum

A magical serum crafted with nutmeg oil and pure dandelion, vitamin E and minerals rich. This serum is like a gift for your face, making it the ultimate whitening solution. Perfect for everyday use, it works wonders by dark spots fading and gives skin a radiant glow. Renowned as top face serums in India, it not only erases wrinkles but also banishes all imperfections, leaving skin flawlessly radiant.

TruSkin Naturals Vitamin C Serum for Face

A powerful serum designed to combat aging, specifically targeting wrinkles, fine lines, and other ageing sign your face. Using this serum promises you a future with luminous, clear, and velvety-smooth skin, thanks to its scientific

formula that boosts collagen production. This face serum is a blend of natural and organic ingredients that not only calm the skin but also diminish age-related marks, acne, and breakouts, catering even to the extreme delicate skin types.

Radha Beauty Vitamin C Serum

Radha Beauty's vitamin C serum for a youthful and vibrant complexion. This anti-aging elixir not only diminishes wrinkles and fine line but also bestows upon your skin that is silky, clear, and tender. For a solution to acne, age spots, or skin sensitivity, simply apply it generously across your face and neck. Renowned as a leading antioxidant serum in India, it shields your skin from sun damage while rejuvenating it; a fresh and youthful glow is left.

9.4. O3+ Radiant Oxygenating Facial Serum



OZ+ Radiant Serum, a game-changer for your skin. This serum is packed with molecules of like a charm to give you radiant skin. It's the best in India and is a potent antioxidant that promotes skin brightness. Not only does it enhance the skin's natural glow, but it also serves as a perfect base for normal to oily skin types before makeup application. This product is paraben free works efficiently and helps in skin whitening on your face, leaving you with a bright, evenly toned complexion that's also lighter.

Good Vibes Rose Hip Radiant Glow Face Serum

Serum that soothes puffiness with almond oil, boosts collagen with rosehip oil, and keeps sebum in check. With sesame oil guarding against UV rays and Vitamin E shielding from oxidative harm, this serum's blend of cleansing and hydrating ingredients caters perfectly to all skin types, ensuring a healthy and radiant complexion⁵¹.

Jovees Herbal Vitamin C Face Serum

Jovees herbal serum, breathing life into tired skin and enhancing its texture and radiance.

This lightweight formula is your ally in the battle against aging signs like fine lines, thanks to its abundance of Vitamin C and natural fruit extracts that rejuvenate your skin. Delving deep into your skin, this serum nourishes and illuminates, while grape seed extract ensures optimal hydration. Say goodbye to hyperpigmentation and dark spots as this serum works its magic to unveil a brighter, more even complexion.

Minimalist 10% Niacinamide Face Serum

The Minimalist Niacinamide 10%+ Zinc serum. This aloe-infused formula, enriched with niacinamide, enhances protein synthesis, evens out skin tone, and hinders melanin production. Zinc joins the mix to control sebum, calm inflammation, and refine the skin's texture. Designed for oily, acne-prone, and blemish-prone skin types, this pH-balanced serum is a safe addition daily routine of skin care.

StBotanica Retinol 2.5% + Hyaluronic Acid Face Serum

The St. Botanica Retinol 2.5% E & Hyaluronic Acid Professional Facial Serum, a potent elixir crafted to combat dryness and shield your skin from the harmful effects of UV exposure.

Infused with 2.5% retinol, this serum stimulates cell renewal and repair, effectively stalling premature aging for a more youthful appearance. The hyaluronic acid in this serum acts as a magnet for moisture, ensuring your skin stays hydrated and supple.

L'Oréal Paris Revitalift 1.5% Hyaluronic Acid Face Serum

This L'Oréal Paris hyaluronic acid serum is a dermatologist recommended remedy for plump, radiant, and supple skin. It is driven by 1.5% hyaluronic acid, is a potent humectant which can hold up to 1000 times its weight in water and seal moisture to the skin. It profoundly penetrates the skin to moisturize and make it supple and smooth⁵².

CONCLUSION

This report delves into the world of facial serums, exploring their origins, significance, and proper application techniques. With a vast array of serums that caters to different types of skin and concerns flooding the market, it becomes imperative to understand one's specific needs when selecting a serum. By carefully choosing a serum that addresses individual skin issues, remarkable improvements can be witnessed, leading to positive outcomes. Skin health plays a crucial part in overall well-being, and incorporating the right serum into skin care routine can combat aging and shield against environmental damage. Each ingredient targets specific skin concerns, and when combined effectively, they can yield remarkable results. The report also highlights various skincare brands offering serums in the market, emphasizing the indispensable role of facial serums in modern skincare routines.



CONFLICT OF INTEREST:

The authors have no conflicts of interest regarding this investigation.

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