

"NATURAL SYNERGY IN SKINCARE: POLYHERBAL FACE SERUM COMPOSITION AND ITS APPLICATIONS"

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ABSTRACT

The growing demand for safe and effective skincare treatments has prompted increased interest in natural and herbal remedies, with a particular focus on herbal face serums. These serums are gaining popularity due to their perceived safety, minimal side effects, and ability to cater to various skin types, including oily, dry, and combination skin. As a crucial component in a typical skincare routine—comprising a cleanser, serum, moisturizer, and sunscreen—herbal serums provide targeted action to enhance skin health. This review explores the formulation, benefits, and efficacy of herbal face serums, which are known for stimulating blood circulation, rejuvenating skin tissues, maintaining elasticity, and cleansing pores of impurities. Enriched with concentrated vitamins and bio-active compounds, these serums offer therapeutic potential by improving skin texture, reducing signs of aging, and promoting a youthful appearance. Additionally, the review highlights the importance of selecting

formulations tailored to individual skin types and emphasizes the role of herbal serums as a sustainable, non-toxic, and effective alternative to chemical-laden products in modern skincare.

KEYWORDS: Herbal face serum, guva, rice, fenugreek, pomegranate, orange peel powders, evaluation and applications.

INTRODUCTION

As the name implies, herbal extracts are made from herbs that have historical significance in the Vedas, Bible, and Unani texts. When one or more herbal substances are used to provide

specific cosmetic benefits, the term 'herbal cosmetics' refers to products made with a variety of approved cosmetic ingredients.^[1]

Like any other cream, face serum is a highly concentrated mixture of water or oil. Because serums, sometimes referred to as concentrates, have around ten times as many physiologically active chemicals as creams, they can address cosmetic concerns more rapidly and effectively. Numerous active compounds found in face serums help treat a range of skin conditions. They contain a combination of active ingredients that address several related issues in addition to a particular skin condition. Compared to moisturizers, serums are lighter skincare formulations.^[2] Antioxidants, ceramides, amino acids, and other nutrients are among the many beneficial active ingredients and nutrients found in serum. This explains why the most expensive product in a skincare kit is always face serum. Antioxidants, cell-communicating compounds, and skin-identical ingredients should be present in all products, whether they are moisturizers, anti-aging or anti-wrinkle products, or skin serums. Although the skin is the body's largest and most protective organ, it can occasionally develop dry patches for a variety of causes, such as exposure to UV radiation, pollution, or makeup that can irritate or trigger allergic reactions if left on overnight. The face serum contains a number of substances, such as a neuropeptide, that are linked to improved barrier function and the appearance of fine lines and wrinkles.^[3]

TYPES OF FACE SERUMS: Different types of face serums are shown in Figure 1.



Figure 1: TYPES OF FACE SERUMS (a) Oil serum (b) Gel serum (c) Water-based serum (d) Emulsion serum (e) Pressed balm serum.

1. Oil serum

Of all the face serums, the oil serum is the simplest to make. Usually, it starts with a foundation of premium, quickly absorbing carrier oils, sometimes referred to as "dry" oils.

These high-quality oils have moisturising and barrier-repairing qualities, but they also include polyphenols, important fatty acids, and other substances that the skin may absorb.

2. Gel serum

Gel serums create the appearance of temporary lifting or firming in specific facial areas by giving the skin a "tightening" sensation. The formulation's water-based nature provides a chance to add plant extracts that are hydrophilic, or attract water, which may be good for the skin.

3. Water based serum

Although they may contain very little or no gums and thickeners, water-based serums are similar to gel serums. You would use a water-based face serum to apply high-performance hydrophilic plant extracts that are trapped against the skin below a cream or lotion. The best way to encourage more penetration of water-based compounds into the skin and deliver their high-performance components a little deeper into the skin's layers is to layer an anti-aging face mist under an emulsion and then under an oil. Higher component penetration will be encouraged by the occlusive barrier that the oils will create.

4. Emulsion serum

An emulsion-based face serum is a moisturiser that contains potent active ingredients and improves the skin's barrier function. Two immiscible phases—oil and water—that are inherently resistant to mixing are combined to form an emulsion. The water and oil are kept stable by binding them together with an emulsifier. The best possibility of deeply distributing high-performance actives into the tissues of the skin is with an emulsion. An oil and water blend is the best way to get beyond the skin's barrier, which prevents many cosmetic components from penetrating the dermis. The emulsion's moisturising qualities also contribute to the skin's barrier strengthening.

5. Pressed balm serum

A balm serum contains active ingredients that are oil-soluble (lipophilic) and may benefit the skin in addition to the traditional balm base of butters, waxes, and oils. The occlusive barrier that the butters and waxes create on the skin nourishes and moisturises it while enabling the active ingredients in the pressed serum to perform their functions. Thousands of beautiful plant oils can be mixed with dozens of fascinating, unusual butters and waxes to create a balm serum.^[4]

Advantages

- Penetrate deeply into the skin.
- Boost collagen production.
- Protect against UV damage.
- Reduce sign of ageing.
- Reduces inflammation.
- Quickly absorbed into the skin.
- Hydrate and nourish the skin.
- Improve skin texture.

Disadvantages

- Certain serums may include strong active components that can trigger skin irritation or allergic reactions.
- Ensuring correct storage and appropriate packaging is vital to preserve the serum's potency and effectiveness.
- Applying multiple products at the same time or directly to the skin without caution may lead to harmful or adverse effects.^[5,6]

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 a 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.^[7]

TYPES OF FACIAL SERUMS

1. Antioxidant Serums
2. Hydrating Serums
3. Brightening Serums
4. Anti-ageing Serums
5. Serums for Hyperpigmentation
6. Serums that reduce acne and fades acne scarring

7. Serums for sensitive skin.

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 night.^[7]

Hydrating Serums

Hydrating serums, enriched with humectants such as Hyaluronic Acid, draw and retain moisture in the skin, helping to keep it soft and supple. While they are generally suitable for daily use, applying them once a week is often recommended for best results. These serums can be used either in the morning or at night, depending on individual preference.

Brightening Serums

Brightening serums aim to improve skin tone and radiance by reducing dullness and preventing discoloration. Instead of targeting existing dark spots, these serums focus on blocking the processes that cause pigmentation. By interfering with the underlying causes of uneven skin tone, they help maintain a more balanced and luminous complexion.

Anti-aging Serums

As we get older, especially after the age of 25, our natural collagen production begins to decline, making it important to add anti-aging serums to our skincare routine in our early 20s. While peptides provide gentle anti-aging effects and are commonly included in many serums, tretinoin is known as the powerful (though potentially irritating) form of vitamin A, often regarded as the gold standard for anti-aging. For a milder option, retinol and retinyl palmitate are softer alternatives. Unless your serum doesn't contain vitamin A derivatives, it can be used both day and night for the best results.

Serums for Hyperpigmentation

Uneven pigmentation can result from factors such as natural skin tone, genetics, excessive sun exposure, stress, or changes in the environment. Common areas where pigmentation

issues appear include under the eyes, around the mouth, and on the cheeks. Vitamin C and Niacinamide serums are essential for tackling these concerns. Niacinamide is a versatile ingredient that works well for all skin types, especially in addressing pigmentation issues. It's beginner-friendly, making it an excellent choice for those new to skincare routines. For instance, incorporating niacinamide into your regimen can effectively help combat hyperpigmentation.

Serums for Acne and Acne Scarring

Acne scarring is a common concern for all skin types, typically appearing as dark spots after breakouts. These scars, particularly on individuals with brown skin, can take time to fade on their own. However, the right serum can help speed up the process. A niacinamide serum is an effective option for treating acne scars. For more focused care, you can use niacinamide as a spot treatment

- The results from niacinamide may take anywhere from 3 weeks to 3 months to become visible, so patience is essential.
- Sunscreen is crucial in helping acne scars fade more quickly by shielding the skin from sun exposure, which can worsen discoloration and delay healing.
- Applying SPF is essential when using ingredients like Vitamin C in your skincare routine to avoid heightened sensitivity to sun damage. Always prioritize sun protection for healthier, more resilient skin.

Serums for Oily Skin

Oily skin is often linked to acne breakouts, which can lead to scarring. To effectively manage this, it's important to focus on soothing the skin, reducing irritation, and minimizing inflammation. Choose a gentle serum that helps control pimples without causing additional skin problems. A niacinamide-based serum works well as a daytime moisturizer, especially during warmer months, as it nourishes the skin without the heavy, greasy feeling that cream-based moisturizers can leave behind.

Serums for Sensitive Skin

Sensitive skin needs gentle care to prevent irritation and dryness. Vitamin C can be helpful, but it's best to choose Sodium Ascorbyl Phosphate, a more stable and milder form of vitamin C compared to the stronger L-Ascorbic Acid often found in skincare products. Serums with hyaluronic acid and peptides, which are naturally produced by the body, are also great options for sensitive skin because they provide soothing and hydrating benefits.

Serums for Combination Skin

Combination skin, which has both dry and oily areas, thrives with serums formulated to balance these different needs. Look for serums containing vitamin C, hyaluronic acid, and peptides to help maintain skin harmony and address both dryness and oiliness. These ingredients work synergistically to keep your skin nourished and balanced.^[7]

HERBAL SERUM

Herbal serum is a concentrated skincare product made primarily from natural plant-based ingredients, such as herbal extracts, essential oils, and bioactive compounds derived from medicinal plants. Herbal serums are safer and more skin-friendly than chemical serums, as they are made from natural plant extracts with minimal side effects. They offer antioxidant, anti-inflammatory, and healing properties, making them suitable for all skin types, especially sensitive skin. Unlike chemical serums, which may cause irritation, herbal serums promote long-term skin health and are also eco-friendly. Natural elements such as fenugreek, rice, cucumber, rice extract, coconut oil, pomegranate peel powder, orange peel powder, rose water, and aloe vera are included in this herbal face serum formulation.^[8] Herbal serums are often made from a variety of common plants, such as pomegranate, cucumber, fenugreek, rice, guava, aloe vera, and orange. The section that follows goes into detail about a few of these plants.

VARIOUS COMMON HERBS USED IN HERBAL SERUM PREPARATION:

Cucumber: Active Ingredient: Cucumber peel extract, Biological Name: *Cucumis sativus* Family: Cucurbitaceae, Use: Cucumber peel extract helps protect the skin from UV rays and environmental pollution, while also combating free radicals that contribute to wrinkles and signs of aging.^[9]

Fenugreek: Since ancient times, fenugreek, often referred to as menthi, has been utilized as a treatment for several illnesses. Folic acid, thiamine, vitamins A, C, K, B6, riboflavin, niacin, iron, magnesium, potassium, zinc, selenium, calcium, copper, and more are among its many healthy ingredients. This nutrient-dense superfood gives the skin vital nourishment, improves natural skin brightness, and fights free radical damage. It also helps to balance the pH levels of the skin. Fenugreek is very good for skin health because of its inherent anti-inflammatory, antibacterial, and antioxidant qualities. In addition to creating radiant skin, it may be used for cleansing, anti-aging, moisturising, and minimising acne, dark circles, and blemishes.^[10]

Rice: Rice is a natural skincare cure that contains vitamins, minerals, and amino acids that are believed to preserve and restore skin. Rice has anti-aging properties, brightens the complexion, strengthens the skin barrier, and can lessen facial oiliness.^[11]

Guava: Guava leaves (GLs) are a great source of bioactive chemicals and other micro- and macronutrients that are good for your health. In terms of total phenolic components, they contain 82.47% moisture, 3.64% ash, 0.62% fat, 18.53% protein, 12.74% carbohydrates, 103 mg ascorbic acid, and 1717 mg gallic acid equivalents (GAE).^[12]

Aloe vera: Fibroblasts, which produce collagen and elastin fibres, are stimulated by aloe vera, increasing the skin's suppleness and decreasing wrinkles. It has long been used to treat wounds and infections because of its antibacterial and antioxidant qualities. Aloe vera also helps to preserve the skin's natural moisture balance by blocking UVA and UVB rays. It boosts the immune system's reaction and helps avoid sunburn.^[4]

Orange Peel powder: In addition to important elements like calcium, magnesium, and vitamins A, B, and C, orange peels are a great source of flavonoids, phytochemicals, and antioxidants. They help protect the skin from UV rays.^[13]

Pomegranate Peel powder: Pomegranate peel contains vitamin C, which helps to keep the skin hydrated, encourages skin cell renewal, and helps stop moisture loss. Additionally, it tightens the skin, minimises pore size, and helps to lessen the appearance of wrinkles and fine lines.^[8]

The present research aims to formulate multipurpose polyherbal face serum composed of various extractions such as rice, cucumber, guava leaves, fenugreek, aloe vera, orange peel, pomegranate peel powder. The serum was evaluated to various parameters such as pH, appearance, viscosity, spreadability, irritancy, antimicrobial activity, antioxidant activity, and stability studies.

Papaya benefits

✓ Skin Brightening

The natural enzymes and alpha hydroxy acids in papaya help lighten and brighten the skin by reducing the appearance of dark spots, acne scars, and blemishes.

✓ **Anti-Aging Properties**

Papaya is packed with antioxidants, such as vitamin C and carotenoids, which help neutralize free radicals that contribute to premature aging. Regular use of papaya can reduce the appearance of fine lines and wrinkles, promoting a more youthful and vibrant complexion.

✓ **Acne Treatment**

The antibacterial properties of papaya help combat acne-causing bacteria, making it effective in treating and preventing breakouts.

✓ **Toning and Tightening**

The natural astringent properties of papaya help tone and tighten the skin, reducing the appearance of enlarged pores and giving the skin a firmer, more youthful look.

Almond Oil: Almond oil is a versatile skincare ingredient that can be used as a makeup remover, facial cleanser, moisturizer, and even as a treatment for dark circles under the eyes. It is also effective in removing dirt and impurities from the skin. It is a natural sunscreen agent.^[13]

Rose water: Rose water serves as a gentle toner to balance the skin's pH levels, tighten pores, and remove impurities. It provides instant hydration and refreshment, while also offering calming and mood-enhancing effects.^[14]

Coconut oil: Coconut oil is rich in fatty acids, making it an excellent moisturizer for the skin. It helps remove dead skin cells, promoting smoother, more radiant skin.^[15]

Evaluation of herbal face serum: Herbal serums are evaluated for different parameters as shown in table 1.

CONCLUSION

Herbal serums represent a promising advancement in natural skincare, combining the therapeutic properties of medicinal plants with modern cosmetic formulations. Rich in antioxidants, vitamins, and bioactive compounds, these serums offer targeted benefits such as hydration, anti-aging effects, reduction of pigmentation, acne control, and overall skin rejuvenation. Their plant-based composition makes them suitable for all skin types, including sensitive skin, minimizing the risk of irritation or adverse effects often associated with synthetic products.

This review highlights the potential of herbal serums as effective, safe, and eco-friendly alternatives to conventional skincare products. The synergistic action of multiple herbal ingredients enhances their efficacy, making them a valuable addition to any skincare routine. Continued research and standardization of herbal formulations will further strengthen their role in dermatological applications, promoting healthy, radiant, and balanced skin through nature-derived solutions.

Table 1: Evaluation of Herbal Face Serum.^[19-26]

Parameter	Observation/Result	Reference
Physical Appearance	Clear, golden-yellow liquid with a pleasant fragrance	Sharma et al., 2021
pH	5.5 – 6.5 (ideal for skin application)	Rathi et al., 2020
Viscosity	Moderate viscosity suitable for easy application and absorption	Patel & Mehta, 2019
Spreadability	Easily spreadable with non-greasy feel	Joshi et al., 2022
Stability	Stable at room temperature and under accelerated conditions for 30 days	Singh et al., 2021
Antioxidant Activity	High antioxidant activity due to the presence of phenolic compounds in herbal extracts	Kumar et al., 2020
Anti-inflammatory Effect	Significant reduction in redness and swelling in in-vivo studies	Ahmed et al., 2019
Skin Irritation Test	No signs of irritation or allergic reaction in patch test	Desai & Kaur, 2021
Effect on Skin Hydration	Improved moisture retention observed after 2 weeks of regular use	Sharma et al., 2021
Consumer Acceptability	High satisfaction rate for texture, fragrance, and visible results	Rathi et al., 2020
Targeted Benefits	Brightening, anti-acne, anti-aging, hydration, and pore cleansing	Patel & Mehta, 2019; Joshi et al., 2022

Applications of Polyherbal Serum

Polyherbal face serums have gained significant attention in dermatology and cosmetology due to their multifunctional properties derived from a blend of medicinal plants. These formulations are used widely for various skin-enhancing and therapeutic purposes, thanks to their rich content of antioxidants, anti-inflammatory agents, vitamins, and enzymes. Various application of polyherbal serum was given in table 2.

Table 2: Application of polyherbal serum.^[19-26]

Application	Description	Reference
Anti-aging	Reduces fine lines, wrinkles, and signs of premature aging by promoting collagen	Sharma et al., 2021

	synthesis	
Skin Brightening	Ingredients like rice, papaya, and aloe vera help improve skin tone and texture	Patel & Mehta, 2019
Acne and Blemish Control	Anti-inflammatory and antibacterial herbs like fenugreek and neem reduce acne and prevent scarring	Ahmed et al., 2019
Hydration and Moisturization	Aloe vera, almond oil, and coconut oil provide deep hydration and retain skin moisture	Desai & Kaur, 2021
Reduction of Hyperpigmentation	Papaya enzymes and natural AHAs help in fading dark spots and evening out skin tone	Kumar et al., 2020
Soothing and Cooling Effects	Cucumber and rose water provide a calming effect on irritated or sun-damaged skin	Rathi et al., 2020
Antioxidant Protection	Protects skin from oxidative damage caused by pollution and UV radiation	Joshi et al., 2022
Improvement in Skin Elasticity and Firmness	Herbal actives promote better circulation and enhance skin's firmness	Singh et al., 2021

CONFLICT OF INTEREST

Authors declare there is no conflict of interest in publishing this manuscript.

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