

# A Review on Formulation and Evaluation of Herbal Face Serum

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**Abstract:** Facial wrinkles and the aging of the skin are frequently attributed to sun exposure and ultraviolet (UV) radiation, with no currently available methods proving effective in decelerating the aging process. A concentrated facial serum containing Aloe Vera, glycerine, and honeybee venom serves to enhance skin health. Aloe Vera not only offers immediate cosmetic advantages but also exerts psychological benefits. The serum is formulated for rapid absorption, allowing it to reach deeper skin layers. Aloe Vera is recognized for its efficacy in addressing various skin conditions, including sunburns, minor abrasions, and insect stings, and it possesses healing, anti-inflammatory, antibacterial, and antifungal properties. Bee venom, a natural toxin secreted by bees, is thought to promote improved blood circulation and stimulate collagen synthesis. The quality of the face serum was rigorously evaluated, focusing on parameters such as pH, consistency, and droplet size. Stability assessments confirmed that the serum retained its visual appeal, texture, and consistency without any alterations.

**Keywords:** face serum , aloe vera , polyherbal , evaluation , anti-bacterial

## I. INTRODUCTION

The examination of human skin holds significant importance across various disciplines, including dermatology, toxicology, pharmacology, and cosmetology. This research is essential for comprehending the effects of external agents on the skin, their interactions, and their potential toxicological implications. The pursuit of beauty and healthy skin has been a fundamental concern since ancient civilizations, which has subsequently led to the evolution of cosmetic products. The term "cosmetic" is derived from a Greek word that signifies "to adorn," and cosmetology encompasses the scientific study of enhancing and improving the appearance of skin, nails, and hair. In the realm of skincare, the primary objective is to effectively deliver active ingredients into the skin while avoiding harmful chemicals. Face serums serve as a viable solution, as they are formulated with concentrated active ingredients that yield faster and more visible results. A serum typically contains a higher concentration of active components—up to ten times more than a standard cream—whether in aqueous or oily formulations, thus establishing its significance in the field of cosmetology. Serums are enriched with a variety of beneficial active substances and nutrients, including antioxidants, ceramides, and amino acids, which contribute to their higher cost compared to other skincare products. Whether it is a moisturizer, an anti-wrinkle treatment, or an anti-aging serum, all these formulations should incorporate antioxidants, cell-communicating ingredients, and skin-identical components. These ingredients are essential for maintaining optimal skin health across all skin types. For oily and combination skin, gel and liquid formulations are most effective, while serums and lightweight lotions are preferable for normal to dry skin. More emollient lotions and moisturizing creams are recommended for dry to very dry skin. The choice of texture should align with skin type; however, the fundamental ingredients necessary for healthy skin remain consistent for all individuals, irrespective of product type, texture, or personal preference. The skin, as the body's largest protective organ, continuously strives to heal and repair itself. Nonetheless, it can occasionally develop dry patches due to various factors, including UV exposure, environmental pollutants, and residual makeup, which may lead to irritation or allergic reactions.

## II. HISTORY OF FACIAL SERUMS

A serum is defined as the clear, yellowish liquid that results from the separation of whole blood into its solid and liquid components after coagulation. It is therefore not surprising that the early formulations of modern serums were derived

from sources such as horse blood, egg albumin, and bovine placenta. The commercial availability of these products was facilitated by packaging them in sterile ampoules, initially preserved with oxyquinoline and later with the advent of parabens. This practice has persisted since the early days of short product shelf life, necessitating the production of small batches that needed to be utilized promptly to prevent spoilage. During the 1800s, there was a strong emphasis on exercise, hygiene, and skincare. Zinc oxide was commonly employed to lighten the skin, although it frequently led to allergic reactions. The primary aim of this research is to identify the optimal and stable formulation for a face serum. The specific objectives of this study include optimizing the thickeners and emulsifiers in the face serum formulation with respect to viscosity and pH levels, as well as determining the most stable formulation based on physicochemical and microbiological stability assessments.

### Types of face serum

#### The oil serum

The formulation of oil serum is among the most straightforward of all facial serums. Typically, it begins with a foundation composed solely of high-quality, fast-absorbing carrier oils, commonly known as "dry" oils. These premium oils not only possess moisturizing and barrier-repairing properties but also contain polyphenols, essential fatty acids, and various other compounds that can be metabolized by the skin.



Fig No.1.Oil serum

#### The gel serum

Gel serums impart a sensation of "tightening" to the skin, creating the perception for users that specific areas of the face appear temporarily lifted or firmer. This water-based formulation allows for the incorporation of beneficial hydrophilic plant extracts, enhancing the serum's efficacy.



Figure 2 : Gel serum

**The Water based serum**

Water-based serums can be likened to gel serums, though they typically contain minimal to no gums or thickeners. These serums are employed to deliver potent hydrophilic plant extracts that remain adhered to the skin beneath a cream or lotion. The optimal method for enhancing the absorption of water-based ingredients into the skin involves layering an anti-aging face mist beneath an emulsion, followed by an application of oil. This approach facilitates the deeper penetration of water-soluble compounds, allowing their active components to reach the deeper layers of the skin. The oils create an occlusive barrier that further enhances the absorption of these beneficial ingredients.



Figure 3 : Water based serum

**The emulsion serum**

An emulsion-based facial serum serves as a moisturizer that enhances the skin's barrier function while simultaneously delivering potent active ingredients. This formulation consists of two immiscible phases, such as oil and water, which naturally resist blending. An emulsifier is employed to unite these phases, ensuring their stability. The emulsion format provides the optimal means for effectively transporting high-performance actives into the deeper layers of the skin. Due to the inherent barrier function of the skin, the penetration of cosmetic ingredients into the dermis poses a significant challenge; however, the combination of oil and water is particularly effective in overcoming this obstacle. Additionally, the moisturizing properties of the emulsion contribute to the fortification of the skin's barrier.



Fig 4: The emulsion serum

**The pressed balm serum**

A balm serum is characterized by a traditional base composed of butters, waxes, and oils, while also incorporating active ingredients that are oil-soluble (lipophilic) and beneficial for the skin. The butters and waxes create an occlusive layer on the skin, providing hydration and nourishment, while simultaneously enabling the active components of the serum to function effectively. Within a balm serum, a diverse array of unique butters and waxes can be blended with a multitude of high-quality plant oils.



Figure 5: Pressed balm serum

### **Ideal Qualities of Face Serum**

#### **Soothes irritated skin**

Aloe vera is widely recognized for its antiviral properties and its ability to promote cellular regeneration. The benefits of aloe gel can be likened to the soothing sensation experienced when it is applied to sunburned skin.

#### **Deep hydration**

Exhibit a unique ability to regulate skin hydration levels.

#### **Fight Acne and fades blemishes**

Bael fruit inhibits the excessive proliferation of bacteria, which is the main contributor to the development of acne and pimples.

#### **Remove dark circle and puffiness**

Vitamin E and a rich array of antioxidants contribute significantly to alleviating eyelid discoloration, while their cooling properties help diminish puffiness. This combination effectively reduces the visibility of under-eye circles. Additionally, the removal of dead skin cells promotes collagen production.

#### **It contains antioxidant qualities that encourage healthy-looking skin**

### **Advantages**

- Enhances the texture of the skin.
- Reduces the appearance of skin pores.
- Moisturizes and provides essential nutrients to the skin.
- Increases the elasticity of the skin.

### **Disadvantages**

- The liquid or gel-like consistency of a serum may not be suitable for individuals suffering from chronic skin conditions such as eczema or rosacea, as these conditions compromise the skin barrier.
- For such individuals, the rapid absorption of serums can lead to irritation.

## **III. FORMULATION OF FACIAL SERUMS**

The formulation of a face serum is primarily characterized by its physical properties and stability, which are critical indicators of quality. Essentially, a face serum is an emulsion composed of two immiscible liquids. To mitigate potential instabilities within the emulsion, the incorporation of thickeners and emulsifiers is essential. Emulsifiers function to equilibrate the system by reducing the interfacial tension between the two immiscible liquids, thereby preventing the dispersion phase from coalescing. Additionally, thickeners serve a significant role as rheology modifiers, enhancing the flow characteristics of the emulsion. Another crucial chemical property in formulation is the pH value. Alterations in the skin's pH can disrupt its natural microbiome and physiological functions, leading to various skin

issues such as acne, flakiness, excessive sebum production, and other serious conditions. The skin's natural microflora thrives within a pH range of 4 to 4.5, while a pH range of 8 to 9 can severely diminish this microflora. Therefore, creating a face serum with an appropriate pH range is vital for enhancing the skin barrier function. The process of formulating a face serum, or any cosmetic product, presents challenges. The traditional "One Factor at a Time" (OFAT) approach is often labour-intensive and can lead to unnecessary experimental costs, as it involves altering one variable while keeping others constant, resulting in a high number of tests. In contrast, optimization through Design Expert software offers a more efficient alternative, saving time, costs, and labour. The D-optimal design is particularly well-suited for cosmetic formulation studies and is widely utilized in this field.

### **Method Of Preparation**

The oil-in-water emulsion was formulated as outlined in the following procedure. The oily phase, comprising olive oil, sandalwood oil, Tween 20, and coconut oil, was blended for a duration of 10 minutes to achieve a homogeneous solution. Concurrently, the aqueous phase was created by uniformly combining aloe vera gel, glycerin, and a minimal quantity of distilled water. The oily phase was then gradually introduced into the aqueous phase while subjecting the mixture to mechanical agitation at 2500 rpm, resulting in the formation of a biphasic oil-in-water emulsion.

### **Prepared Face Serum**

A proper method has to be carried out while formulating the herbal face serum.

1. Selection of active
2. collection of active ingredient
3. Extraction method of Aegle marmelos, aloe vera.
4. formulation of placebo herbal face serum
5. formulation of herbal face serum
6. Evaluation of herbal face serum
7. Result

### **Active Ingredient Used In Herbal Face Serum**

#### **Aloe Vera**

Kingdom : Plantae

Order : Asparagales

Family : Asphodelaceae

Subfamily : Asphodeloideae

Genus : Aloe

Species : Aloe vera

Botanical name : Aloe barbadensis miller •English : India aloe

Aloe Vera has a long history of application in the treatment of wounds and infections. In contemporary beauty practices, it has emerged as an essential component in cosmetic formulations. This remarkable plant contains nearly 20 amino acids, along with significant quantities of nutrients such as calcium, magnesium, and sodium, as well as enzymes and vitamins. Its polysaccharides, nitrogen, and other constituents contribute to its reputation as a remarkable botanical for enhancing beauty. Below is a brief overview of some of the most important applications of Aloe Vera in cosmetics.





Figure 6: Aloe Vera

**Sandalwood Oil**

Sandalwood essential oil possesses anti-inflammatory and skin-clearing attributes, making it effective in alleviating acne and blemishes while providing a calming effect on the skin.



Figure7 :Sandalwood oil

**Olive oil**

Olive oil contributes to the reduction of acne by eliminating the bacteria responsible for its development. Additionally, it is recognized for its ability to moisturize and hydrate the skin effectively.



Figure 8 : Olive oil

**Coconut oil**

This formulation is rich in beneficial fatty acids, including linoleic acid, which contribute to moisture retention in the skin, thereby providing protection and hydration.



Figure 9: Coconut oil

**Material**

Table.. composition of face serum  
Sr.no. Ingrident Collection Catergy  
Aloe vera , Anti-aging  
Olive oil,Moisturizer  
Scandalwoodoil ,Essencial oil  
Glycerin toner  
Coconut oil

**Ingredients Standard Formula (100ml)**

**Working Formula (30 ml)**

Aloe vera gel 50% 10%  
Olive oil 9% 1.8ml  
Sandalwood oil 0.1% 0.02ml  
Glycerin 25% 5ml  
Coconut oil 2% 0.4ml  
De-mineralized  
Water

**IV. CONCLUSION**

The objective of this report was to investigate the nature and historical development of facial serums, as well as their overall significance in skincare. The analysis encompasses the appropriate selection of serums and the correct sequence for their application. Given the vast array of serums available today, tailored to various skin types and concerns, it is imperative for individuals to clearly identify their specific needs when choosing a serum. By carefully selecting a formulation that addresses key skin issues, one can expect to see notable improvements, resulting in enhanced skin health. Skin health is a vital component of overall bodily health, and maintaining a suitable skincare routine that includes the right serum can help mitigate the effects of aging and prevent ongoing damage. When used in conjunction with a suitable moisturizer and sunscreen, serums can effectively reduce fine lines, wrinkles, dark spots, and other imperfections. Specific ingredients target particular skin concerns, and thus, a synergistic combination of high-quality

ingredients can yield remarkable benefits. The report also presents a variety of skincare brands offering serums, along with concise descriptions of each product. In conclusion, facial serums represent a significant advancement in the cosmetic industry, and their incorporation into skincare routines is essential.

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