



# FORMULATION AND EVALUATION OF ANTI-AGING SERUM

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## ABSTRACT

The purpose of this work was to make serum using polyherbal extract. Aloe vera gel, glycerin, and almond oil face serum are highly concentrated cosmetic products. Aloe vera extract helps naturally increase collagen production in the body, which further helps reduce the visible signs of aging such as fine lines and wrinkles. Liquorice also contains glycyrrhizin, an antioxidant that helps protect skin against damage from free radicals and the sun's UV rays, which in turn prevents premature aging. Wrinkles on the face and aging of the skin are undesirable effects of photodamage and ultraviolet radiation. The serum has quick absorption and the 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. Based on these properties, this work aimed to make serum using a polyherbal extract. Coconut oil exerts a powerful antioxidant effect to bond with collagen and has been shown to notably protect the body from premature (skin) aging.

## KEYWORDS

Antioxidant, Cosmetic, Face serum.

## INTRODUCTION

Skin aging is a result of cellular DNA and protein damage, which results in a continuous process of deterioration. Sequential skin aging and photo-aging are two distinct categories under which the aging process is divided. Both categories have unique clinical and historical characteristics. Sequential skin aging is a universal and predictable process that is characterized by a change in how the skin functions physiologically. As we age, keratinocytes lose their capacity to create a functional stratum corneum and their rate of neutral

lipid production slows down, leaving behind dry, wrinkled skin. In contrast, excessive exposure to sunlight's UV radiation results in photoaging. It is distinguished by dry, pale, superficial skin that exhibits fine lines as well as broad furrows brought on by the disarray of epidermal and dermal components linked to elastosis and heliodermatitis. Herbs and plants have already proved useful as a tool in complementary medicine.

Cosmetics are utilized to improve the appearance and appeal of skin while safeguarding it against external and internal irritants. The usage of cosmetics contributes to the duration of good health by preventing skin problems in addition to generating an attractive external look. The artificial or natural components in skin care products support the skin's health, texture, and integrity, moisturize, maintain skin elasticity by reducing type I collagen, and provide photoprotection, among other functions. This cosmetic trait results from the inclusion of chemicals in skin care formulations, which aid in lowering the generation of free radicals in the skin and managing its properties over an extended period. The best option to reduce skin issues like hyperpigmentation, skin aging, skin wrinkling, rough skin texture, etc.

The serum is a concentrated product which widely used in Cosmetology. The name comes from itself in professional cosmetology. The cosmetic serum is as concentrated in water or oil as any other serum. Serum, or other concentrated product that contains ten times more organic matter than serum. Therefore, deal with the cosmetic problem quickly and effectively. The rising global cost of living has led to an increase in demand for cosmetic products. The cosmetics industry established in Malaysia is one of the most important economic resources. The value of cosmetics has increased as more and more people want to stay young and attractive. The serum is a skin care product that contains a gel or lightweight lotion or moisturizer and has the ability to penetrate deep to bring active ingredients to the skin. A good skin serum may give your skin firmness, and a smooth texture, make the pores appear smaller, and increase moisture levels. Whether it is a moisturizing, anti-aging, or anti-wrinkle product or serum for the skin, all of these products should contain antioxidants, cell-based ingredients, and skin-like ingredients.<sup>1</sup> All skin type needs these ingredients to be as healthy as possible. Gel and liquids preparations are best for oily and combination skin, serums and light lotions are best for normal to dry skin, and more emollient lotions and moisturizing creams are best for dry to very dry skin. The texture is all about skin type- but the brilliant ingredients for healthy skin are the same for everyone, regardless of product, texture, or personal preference.<sup>2</sup>

The serum is a skin care product containing a gel or lightweight lotion or moisturizing consistency and can penetrate deeper to deliver active ingredients into the skin. A good skin Serum may provide your skin with a firmer, smoother texture, make pores appear smaller, and increase moisture levels.<sup>3</sup> Aloe Vera extract has antibacterial and antifungal activities, which may also help in the treatment of minor skin infections.<sup>4</sup>

## **MATERIALS**

Aloe vera plant leaves, liquorice roots, are extracted. other oils are purchased from the market. Glycerine, sodium benzoate, and rose water get from college. The magnetic stirrer is used to get a homogenized mixture of biphasic emulsion.

## METHODE OF EXTRACTION

### 1) For aloe vera gel

Extract the gel from fresh and intact aloe vera leaves. aloe vera gel was collected.

### 2) For liquorice extract

Liquorice extract is collected by boiling the liquorice roots in distilled water for 15-20 minutes.

Extraction of glycyrrhizin from licorice root was extracted by using the method of maceration with slight modification in the method described in the literature. For this purpose, drug (licorice roots) powders were macerated with the solvent mixture of acetone and dilute nitric acid for 2 h. The contents were filtered and an additional 20 ml of acetone was added to the marc and warmed gently. The contents were filtered and the filtrate was obtained. To this filtrate sufficient volume of dilute ammonia solution was added till the precipitation of ammonium glycyrrhizinate is completed. The precipitate was collected and washed with 5 ml of acetone, dried, and collected.<sup>5</sup>

## EMULSION PREPARATION

The oily component consists of sandalwood oil, coconut oil, almond oil, and tween 20. etc. This is mixed together to obtain a uniform mixture.

At the same time, the water phase is prepared by mixing aloe vera gel, glycerine, liquorice extract, and rose water uniformly. Add some amount of sodium benzoate as a preservative.

The oil phase is added to the liquid phase dropwise on the mechanical stirrer at high speed to obtain a water-based biphasic emulsion.<sup>6</sup>

**TABLE 1: FORMULA FOR FACE SERUM**

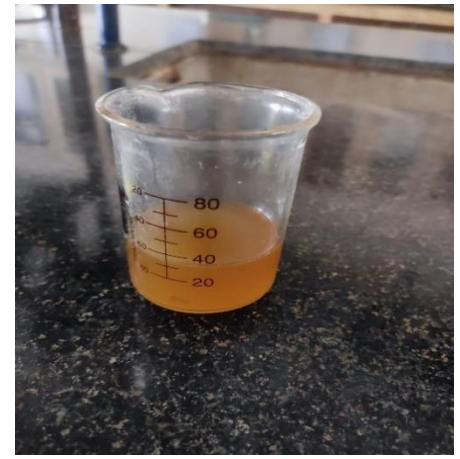
SR.NO.	INGREDIENTS	QUANTITY	CATEGORY
1	Aloe vera Gel	11ml	Anti-aging
2	Liquorice Extract	9ml	Skin brightening
3	Sandal Wood Oil	1 ml	Fragrance
4	Coconut Oil	0.6 ml	Antioxidant
5	Almond Oil	1.8 ml	Anti-wrinkle
6	Tween 20	0.2 ml	Emulsifier
7	Sodium Benzoate	0.001 gm	Preservative
8	Rose Water	1 ml	Anti-inflammatory
9	Glycerine	5 ml	Moisturizer



F1H



F2H



F3H

Sr. no.	Ingredients	Formulation	Formulation	Formulation
		F1H	F2H	F3H
1	Aloe vera gel	9 ml	9.8 ml	11 ml
2	Liquorice extract	6.5 ml	7.8 ml	9 ml
3	Sandal Wood Oil	2 ml	1.8 ml	1 ml
4	Coconut Oil	1 ml	0.8 ml	0.6 ml
5	Almond Oil	2 ml	2.2 ml	1.8 ml
6	Tween 20	0.2 ml	0.4 ml	0.2 ml
7	Sodium Benzoate	0.002 gm	0.002 gm	0.001 gm
8	Rose Water	2 ml	2 ml	1 ml
9	Glycerin	6.9 ml	6.5 ml	5 ml

## ALOE VERA

Aloe vera plant is high water content, ranging from 99.99.5%. The remaining 1.0% solid material is reported to contain over 75 different potentially active compounds including water- and fat-soluble vitamins, minerals, enzymes, simple/complex polysaccharides, phenolic compounds, and organic acids. Many beneficial effects of this plant have been attributed to the polysaccharides present in the pulp. The clear pulp which is also known as the gel is widely used in various medical, cosmetic, and nutraceutical applications.<sup>7</sup>

The invaluable oligo-elements present in Aloe juice, manganese, and selenium, constitute the enzymes superoxide dismutase and glutathione peroxidase, recognized as powerful antioxidants and cellular anti-aging agents. Their high antioxidant properties slow down the aging process. Skin becomes smoother, hydrated, and more elastic, protected from free radicals and their degenerative activity, resulting in impressive/substantial antiaging effects.<sup>8</sup>

Aloe stimulates fibroblasts to produce collagen and elastin fibers thereby making the skin more elastic and less wrinkled. Aloe vera gel gloves improved skin integrity and decreased the appearance of fine wrinkles and erythema in the treatment of dry skin associated with occupational exposure indicating its moisturizing effects.<sup>9</sup>

## LIQUORICE EXTRACT

Licorice root contains numerous bioactive natural products, many of which are potent cosmeceutical ingredients.<sup>10</sup> Its roots possess some nutritive value and medicinal properties. Glycyrrhiza glabra root extract showed that it contains saponin triterpenes (glycyrrhizin, glycyrrhetic acid, and licorice acid), flavonoids (liquirtin, isoflavonoids, and formononetin) and other constituents such as coumarins, sugars, amino acids, tannins, starch, choline, phytosterols, and bitter principles.<sup>11</sup> Glycyrrhizin is the major ingredient present in licorice, the root of Glycyrrhiza glabra. Glycyrrhiza glabra, family Leguminosae. Phytochemical analysis of Glycyrrhiza glabra root extract showed that it contains saponin triterpenes (glycyrrhizin, glycyrrhetic acid and licorice acid), flavonoids (liquirtin, isoflavonoids and formononetin) and other constituents such as coumarins, sugars, amino acids, tannins, starch, choline, phytosterols and bitter principles.<sup>12</sup>

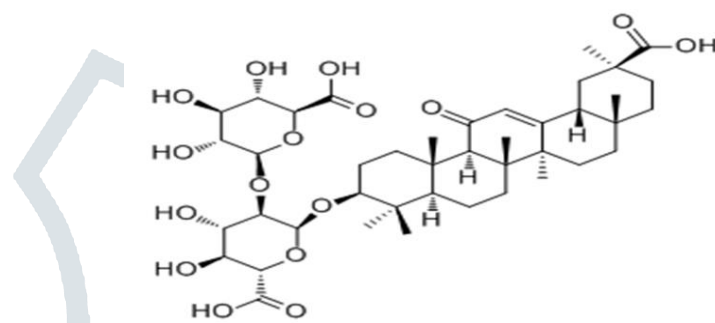


figure 1. structure of glycyrrhiza glabra

## SANDALWOOD OIL

The sweet powerful and lasting odor makes sandalwood oil useful in the perfume industry.<sup>13</sup> Indian sandalwood oil is the essential oil obtained by steam distillation of the aromatic heartwood of Santalum album, consisting predominately of sesquiterpenes. The oil is renowned for its olfactory characteristics, having a soft, warm, and woody odor. As a result of this odor, the oil has found its way into many applications such as perfumery, attars, and incense.<sup>1</sup> Sandalwood oil has been utilized for various purposes throughout history, with its integration into foods, cosmetics, and pharmaceutical products. It's now being increasingly recognized for its effects on wrinkled skin.<sup>15</sup>

## COCONUT OIL

Coconut and its by-products have been used for centuries as culinary, cosmetic, and medicinal agents.<sup>16</sup> Coconut oil is an edible oil obtained from the kernel of harvested mature coconuts of the coconut palm. In recent years this oil has attained superstardom in the health food world.<sup>17</sup> Coconut oil is of two varieties: virgin and refined oil. Virgin coconut oil is made by cold-pressing the liquid from the fresh part of coconut meat. It has a milky appearance. This oil extraction method prevents the loss of vitamin E, pro-vitamin A, and polyphenols. It has various properties such as analgesic, anti-inflammatory, and anti-cancer.<sup>18</sup>

## ALMOND OIL

Almond oil is used in the cosmetic industry for its penetrating, moisturizing, and restructuring properties. Oleum amygdalae are prepared from a variety of almonds and is a glyceryl oleate, with a slight odor and a nutty taste. It is almost insoluble in alcohol but readily soluble in chloroform or ether and it is used as a substitute for olive oil as it exhibits similar carrier properties.<sup>19</sup>

## ROSE WATER

The rose water contains the major phytoconstituents, polyphenolic compounds flavonoids, tannins, triterpenoids, and saponins, which are mainly responsible for the antioxidant and anti-inflammatory properties.<sup>20</sup>

## GLYCERINE

Glycerin is reported to function in cosmetics as a denaturant, fragrance ingredient, hair conditioning agent, humectant, oral care agent, oral health-care drug, skin protectant, skin conditioning agent—humectant, and viscosity-decreasing agent.<sup>21</sup>

## CHARACTERIZATION OF EMULSION AND STABILITY STUDIES

### Rheological parameters

Emulsions are non-Newtonian systems, so the formulation's viscosity was measured using a multipoint viscometer (Brookfield Viscometer) at 100 revolutions per minute. A small amount of the serum was placed in a beaker, and the spindle was dipped in it for about 5 minutes before the readings were recorded.

### Colour and Appearance

The colour and appearance of the formulation (face serum) were observed visually which appeared translucent yellow in colour.

### Homogeneity

The extracted materials were distributed evenly throughout the formulation. The preparation's homogeneity was confirmed visually by the lack of particulates and physically by touching the result.<sup>6</sup>

### pH of the serum

A pH meter was calibrated using a standard buffer solution. The pH of the serum is measured by using a pH meter.

### Globule size determination

The prepared serum was properly analyzed under a microscope using a stage micrometer to determine globule size.

### Spreadability

When applying gel to skin or an affected area, spreadability refers to the size of the area to which the gel spreads easily. The spreading value of serum also affects how well it is bioavailable.

### Stability studies

Any pharmaceutical or cosmetic product cannot be properly formulated or created without adequate stability assessments of the prepared formulation. This is done in order to assess the prepared product's physical and chemical stability and, consequently, its safety under accelerated settings, when the product is exposed to higher temperatures and moisture in accordance with ICH guidelines. The sample was stored at 25<sup>o</sup>c temperature.

## RESULTS AND DISCUSSION

The serum's composition was a smooth, uniform, light yellow liquid that had a glossy look. Within a second, the formulation was re-dispersed. After usage, it had an emollient, slippery feel and left no residues, making it simple to wash off.

### Physical appearance

The serum formulation was light yellow in color, a viscous liquid preparation with a smooth homogeneous texture and glossy appearance.

### pH

The pH of the formulation was found 6.2. as the skin has an acidic pH of around 4.1-6.7. This range of formulations is suitable for the skin.

### Globule size determination

The globule size was found to be in the range of 0.1-0.3  $\mu\text{m}$ . This range of particles enhances the penetration power of the formulation.

### Stability studies

The formulation was undertaken stability studies for physical and chemical change. No considerable variations in the properties of the formulation were observed.

## CONCLUSION

The aim of the study was to formulate different herbs into a serum for moisturizing and glowing activity on the skin. Cosmeceuticals are skin-care products that cater to both cosmetics and drugs.<sup>22</sup> When used in conjunction with the wash and moisturizer to treat photodamaged skin, the face serum may be efficient and well-tolerated and may lessen the appearance of fine lines and wrinkles.

This serum contains aloe vera. Fresh aloe Vera gel from the leaf's inner middle section (parenchyma) often has very good activity in treating radiation dermatitis as well as acne, pimples, eczema, and other skin issues. Numerous vitamins and minerals found in aloe vera offer potent hydrating and anti-aging properties and liquorice has an anti-wrinkle property to keep skin looking young and healthy. The aloe vera gel encourages cell proliferation, which helps the skin's ability to heal from harm. In order to address skin-related issues, this serum can be utilized.

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## AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

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