

**FORMULATION AND EVALUATION OF HERBAL FACE SERUM**

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**ABSTRACT**

This study has been undertaken to investigate on *Mimosa pudica* leaf face serum. Face serum are made to very small molecules that help it to penetrate deep into the skin quickly. *Mimosa pudica* leaf face serum is a cosmetic product containing *Mimosa pudica* extract, Aloe vera gel, Almond oil, Rosewater, Vitamin C, Glycerin were used to formulate this face serum. The goal of this research work has to create a face serum using *Mimosa pudica* based on anti-microbial, beauty effects and psychological satisfaction. The face serum was evaluated for its physicochemical properties, pH, consistency, washability, cyclic temperature.

**KEYWORDS:** Face serum, Emulsion- based, *Mimosa pudica* leaf extract, Aloe vera gel, Anti-Microbial Test.

**INTRODUCTION**

Before 1938, cosmetics had been now no longer regulated as drugs, and cosmetology ought to regularly be taken into consideration as a manner to promote desires in place of goal efficacy; protection for purchasers changed into additionally every now and then precarious. Subsequently, the Food and Drug Administration (FDA), via the Federal Food, Drug and Cosmetic Act, regulated cosmetics that had been required to be secure for the consumer.

The word ‘cosmetic’ derived from a Greek word ‘kosmesticos’ that means to adorn, that is any material used to beautification or promoting appearance is known as cosmetic. The significance of cosmetics has accelerated as many human beings need to live younger and

attractive. Cosmetics are conveniently to be had nowadays within side the shape of lotions, serum, lipstick, perfumes, eye shadows, nail polishes, hair sprays etc.

Herbal cosmetic are defined as beauty products with desirable physiological properties such as healing, smoothing appearance and conditoning properties because of herbal ingredient.

**SERUM:** Serum is the concentrated solution which is commomnly used in cosmetology. It deals with skin problem quickly and effectively. Serum are cosmetic product that penetrate deep into skin layers and release active ingredient. Incorporating a few drops of face serum with daily skin care routine will deliver noticable result within a month or less. This is because of face serum are made up of very small molecules that help it into penetrate deep into skin quickly.

### **TYPES OF FACE SERUM**

#### **→ WATER BASED SERUM**

A watery serum that contain some gum and thickness. Water-based serum have the best ability to penetrate deep into the skin and release the active ingredient into the skin. You would use a water based serum to apply high performance hydrophilic plant extracts that are trapped against the skin below a lotion or cream.



*Fig. 1.*

#### **→ OIL BASED SERUM**

An oil serum is the simplest form of face serum that contains a carrier oil as a base that absorbs, also known as dry skin. Premium oil have been used to bring out the moisturizing properties of oil serum.



*Fig. 2.*

### ➔ GEL BASED SERUM

The Gel serum has a firming effect on the applied skin areas. Water based plant extract can be added to the gel serum to enhance the effect of the serum.



*Fig. 3.*

### ➔ EMULSION SERUM

The Emulsion serum is a moisturizing serum that strengthens the skin and transports the active ingredients to the skin. In an emulsion, the two immiscible phase oil and water are combined. An emulsifier is used to achieve a stable emulsion state.



*Fig. 5.*

### BENEFIT OF HERBAL FACE SERUM

- Reduces fine lines and wrinkles
- Reduces dark circles
- Protect from the free radical

**PLANT PROFILE*****MIMOSA PUDICA***

*Mimosa pudica* is usually a short prickly plant with its branches growing close to ground. It is also called sensitive plant, sleepy action plant, touch me not, or shameplant. It grows upto a height of about 0.5m and spreads up to 0.3m. the roots are cylindrical, tapering with secondary and tertiary branches. it has longitudinally wrinkled surface with hard and woody fracture, more or less rough: greyish brown to brown. There are 10-12 pairs of secondary leaflets which are 0.6-1.2cm long. The flowers are pink, spherical in globose head arise from leaf axils in mid summer. The fruits are leguminous, simple, dry having 2-5 seeds. The fruit consists of clusters of two to eight pods, these being prickly on the margins. The seeds are oval-elliptic, brown to grey in colour.



**Fig. 6.**

Common name: touch me not, sensitive plant

Chemical constituents: Flavanoids, alkaloids, saponins, tannins.

**Uses:** Anti- microbial, Anti -inflammatory

**ALOE VERA**

Aloe vera has been used to treat wounds and infections. Aloe vera is now recognised as a crucial ingredient in makeup things to improve beauty. It has nearly 200 aminoacids, enough amount of nutrients like calcium, magnesium and sodium, enzymes, vitamins. The medicinal properties of aloe vera is anti-acne, anti-inflammatory, anti-microbial, moisturizing effect and also lightens blemishes in face.



**Fig. 7.**

**Common name:** Aloe, Burn plant, Barbados aloe

**Chemical constituents:** Aloin, Iso Barbaloin, Alkaloids, Flavanoids

**Uses:** Moisturizer, Anti-oxidant

## **MATERIALS AND METHODS**

### **MATERIALS**

Other ingredients used are Almond oil, Glycerin, Rosewater, Tween 20, Vitamin E, Sodium benzoate and Distilled water.

### **EXTRACTION METHOD OF *MIMOSA PUDICA***

The leaves of *Mimosa pudica* were collected, shade dried and finely powdered. 30 gm of coarsely powdered leaves was extracted in 300 ml of hydroalcohol by cold extraction upto 48 hours. After extraction the extract was filtered and the filtrate was collected and stored in amber coloured bottle.



**Fig. 8.**

### **EXTRACTION METHOD OF ALOE VERA**

The leaves were collected and washed with distilled water. A sterile scalpel was used to cut the leaf lengthwise. The colorless parenchymatous tissue of the aloe vera plant was

then cut away with a clean scalpel. The fibers and impurities are then removed within a muslin cloth. A filter or filter product, which is a transparent aloe vera gel, was then used in the preparation.



**Fig. 9.**

## FORMULATION TABLE

**Table 1.**

| SL NO | INGREDIENT           | F1    | F2     | F3    |
|-------|----------------------|-------|--------|-------|
| 1.    | <i>Mimosa pudica</i> | 1.5ml | 2.0 ml | 2.5ml |
| 2.    | Aloe vera gel        | 6.8ml | 7.5ml  | 8.0ml |
| 3.    | Almond oil           | 5.1ml | 5.1ml  | 5.1ml |
| 4.    | Vitamin E            | 2ml   | 2ml    | 2ml   |
| 5.    | Rosewater            | 3ml   | 3ml    | 3ml   |
| 6.    | Glycerin             | 2.7ml | 2.7ml  | 2.7ml |
| 7.    | Tween 20             | 0.6ml | 0.6ml  | 0.6ml |
| 8.    | Sodium benzoate      | 0.3g  | 0.3g   | 0.3g  |
| 9.    | Distilled water      | qs    | qs     | qs    |

## METHOD OF PREPARATION

The Emulsion (O/W) prepared by according to the formula given above. In a beaker take Almond oil, vitamin E and tween 20, mix well to make oil phase. In another beaker take *Mimosa pudica* extract, Aloe vera gel, rosewater, glycerin and sodium benzoate and mix it well. The oily phase was added to the water phase drop by drop.

## EVALUATION OF HERBAL FACE SERUM

### ORGANOLEPTIC PROPERTIES

The formulation were characterized for organoleptic properties such as colour, odour, consistency. The formulation are visually inspected for its clarity and presence of any foreign particles.

**pH OF THE SERUM**

pH of is evaluated by pH meter. The skin has an acidic range and the pH of the face serum should be in the range of 4.1-6.7.

**WASHABILITY**

Washability test was carried out by applying a small amount of formulation on the hand and then washing it with tap water.

**SPREADABILITY**

The spreadability capacity of the formulated serum was measured by using a spreadability apparatus. The spreading diameter of 1 gm of formulation was evaluated by placing it between two 7\*3 cm glass plates. The weight tied on the upper plate was 20 gm and the length of plate was 7 cm. the following equation was used to access the spreadability:

$$S = m \cdot l / t.$$

**DETERMINATION OF VISCOSITY**

Viscosity is defined as the resistance to flow. viscosity is determined by using Ostwald viscometer.

**CYCLIC TEMPERATURE**

These test is not carried out at any fixed temperature and humidity. In this test, temperature was changed cyclically everyday. At room temperature and freezing temperature to stimulates the change in temperature.

**MICROBIAL TEST**

Anti-microbial activity of herbal face serum was done against microbial culture of staphylococcus aureus by using agar well diffusion method.

- Grow the microorganism of interest (staphylococcus aureus) in a suitable medium.
- Using a sterile swab, spread a uniform suspension of the bacterial culture over the surface of a sterile agar plate.
- Make a small well in the centre of the agar plate.
- Place the herbal face serum (the anti microbial agent) into the well.
- Keep the plate in an incubator at an appropriate temperature for 18-24 hours, allowing the bacteria to grow

- After incubation, check for a clear zone around the well. This “zone of inhibition” shows where the serum stopped bacterial growth.
- The size of the zone of inhibition is usually related to the level of anti- microbial activity present in the product., a large zone of inhibition is usually means that the microbial is more potent (that is serum is more potent against the bacteria).

## RESULTS

### ORGANOLEPTIC PROPERTIES

| SI No | PARAMETER   | F1                  | F2                  | F3                  |
|-------|-------------|---------------------|---------------------|---------------------|
| 1.    | COLOUR      | Light mustard shade | Light mustard shade | Light mustard shade |
| 2.    | ODOUR       | Mild                | Mild                | Mild                |
| 3.    | CONSISTENCY | Viscous             | Viscous             | Viscous             |

**Table 2.**



**Fig. 10.**

### pH OF THE SERUM

**Table 3.**

| SL.NO | PARAMETER | F1   | F2   | F3   |
|-------|-----------|------|------|------|
| 1.    | pH        | 5.56 | 5.29 | 5.22 |

### WASHABILITY

Washability test was carried out by applying a small amount of formulation on the hand and then washing it with tap water. The formulation was easily washable.

**Fig. 11.****SPREADABILITY**

Spreadability of formulation was found to be

| FORMULATION | SPREADABILITY<br>(g.cm/sec)<br>WEIGHT = 20gm |
|-------------|----------------------------------------------|
| F1          | 18.1g.cm/sec                                 |
| F2          | 16.6g.cm/sec                                 |
| F3          | 16.6g.cm/sec                                 |

**Table 4****DETERMINATION OF VISCOSITY**

Viscosity of the formulation was found to be:

**Table 5.**

| FORMULATION | VISCOSITY (cp) |
|-------------|----------------|
| F1          | 8.85 cp        |
| F2          | 7.41 cp        |
| F3          | 7.48 cp        |

**CYCLIC TEMPERATURE****Table 6.**

| Sl. No | PARAMETER            | STABILITY |          |          |
|--------|----------------------|-----------|----------|----------|
|        |                      | F1        | F2       | F3       |
| 1.     | Room Temperature     | Stable    | Stable   | Stable   |
| 2.     | Freezing Temperature | Unstable  | Unstable | Unstable |

**MICROBIAL TEST**

The face serum was tested against staphylococcus aureus in an anti-microbial test. a zone of inhibition was observed, indicating that the herbal face serum possess potent anti-microbial activity.

**Table 7.**

| FORMULATION | ZONE OF INHIBITION | CONTROL |
|-------------|--------------------|---------|
| F1          | 10mm               | 18mm    |
| F2          | 11.5mm             | 18mm    |
| F3          | 11mm               | 18mm    |

**Fig. 12.**

## CONCLUSION

This research study focused on the formulation and evaluation of a herbal face serum containing *Mimosa pudica* extract as active ingredient. The study successfully developed a stable oil in water serum using suitable excipients and the formulation demonstrated acceptable organoleptic and physicochemical characteristics including appropriate pH, viscosity, spreadability and stability under storage conditions, indicating its suitability for topical application.

Anti-microbial studies demonstrated that the serum shows noticeable inhibitory activity against selected microorganism (*Staphylococcus aureus*), which can be attributed to the presence of bioactive phytoconstituents such as flavanoids, tannins and phenolic compounds present in *Mimosa pudica*. These constituents are known for their anti-oxidant and anti-microbial properties, suggesting that the formulation may help in protecting the skin from microbial growth and environmental stress.

Overall, the developed herbal face serum proved stability, safety and significant anti-microbial and skin beneficial properties, indicating its potential as an effective skin care product.

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