



FORMULATION AND EVALUATION OF FACE SERUM CONTAINING CARICA PAPAYA AND ALOE VERA

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ABSTRACT:

Skin ageing and facial wrinkles are undesirable results of UV exposure and photo damage. Serum has deep formula with high concentration of active substances, rapid absorption and the ability to penetrate deep layers of skin. This study aimed to create and assess the effectiveness of a papaya fruit face serum for skincare. Papaya is known for its natural enzymes that can brighten and exfoliate the skin. To formulate the serum, papaya extract was combined with other beneficial ingredients. The serum was then tested for its efficacy in improving skin texture, brightness, and hydration. Results showed that the papaya fruit face serum significantly enhanced skin appearance, leaving it smoother, more radiant, and well-moisturized. Furthermore, the serum was well-tolerated by most skin types, with minimal side effects reported. Overall, the findings suggest that the formulated papaya fruit face serum holds promise as a natural and effective skincare product, offering multiple benefits for enhancing skin health and appearance. The face serum was evaluated for its physicochemical parameter, pH, stability, spreadability, viscosity etc.

KEY WORDS: Face serum, Papaya, Aloevera, Skin texture, Moisturisation, Evaluation.

❖ INTRODUCTION:

Skin is the most superficial part of body. It constitute 15 to 20 % of total body mass skin is constantly changing organ made up of various specialized cells and structure. Changes in skin impact on how its looks! The skin is most protective organ and first layer of defence can occasionally appear for a variety of reasons, including exposure to UV rays, pollutants, and makeup that has been worn overnight and may have irritated or allergic reactions.

Cosmetic is a Greek word which means to 'adorn' (addition of something decorative to a person or a thing). Cosmetology is the study and application of beauty treatment. It's an art or science of beautifying and improving the skin, nails and hair and the study of cosmetics and their application.

A skin care formulation must be able to deliver the powerful agent into the skin to fulfil the intended objective. Serum are type of skin care product with a moisturizing consistency that has the ability to enter the skin more deeply and release active components. A quality face serum may give your skin a smoother, firmer structure, reduce pore size, and boost hydration levels. All of these product-moisturizer, anti-wrinkle, anti-aging, or face

serum-should include antioxidants, chemical that communicate with cells, and skin -like component. These ingredients are necessary for the healthiest potential complexion on all skin types.

Herbal face serum have fewer side effect and don't affect physiological and biochemical pathway. Carica papaya plants various parts including leaves, bark, roots, latex, fruits, seed are used to treat various skin problem. Papaya serum is power house of nature enzymes and vitamins, delivering nourishment and hydration to your skin, enriched with antioxidant. It reduce signs of ageing, diminish darks spots, promote radiant complexion. Its light weight formula absorb skin quickly, leaving skin silky smooth with natural antioxidant it protect against environmental damage. Both aloe vera and papaya fruit extract have distinct anti-oxidant and anti-aging compounds that can sustain the appearance of healthy and youthful skin. Aloe Vera's polysaccharides have excellent moisturising qualities, and when combined with essential oils, they create products that are great for solar protection and skin smoothing. Aloe Vera is recommended for a number of skin conditions by Ayurveda due to its calming and refreshing properties. The antibacterial and antifungal properties of aloe Vera extract may also be useful in the therapy of mild cutaneous diseases.

The demand for cosmetic items has increased as a result of the rising expense of living worldwide. One of the most significant economic resources is the Malaysian-based cosmetics business. Cosmetics have become increasingly valuable as society's desire to look and feel young and attractive has grown. . All skin care products, whether they are moisturising, anti-aging, anti-wrinkle, or serums, should contain antioxidants, compounds derived from cells, and components that resemble skin. These components are necessary for the healthiest possible skin for all skin types. For oily skin, gel preparations and liquids work best; for normal to dry skin, serums and light lotions work best; for dry to extremely dry skin, creams with higher emollients work best. Skin type has everything to do with skin texture, but no matter what product, texture, or preference you like, the key ingredient for healthy skin is the same for everyone. Cosmetic serum was categorised based on how well it absorbed and could reach the deeper layers of the skin. Today, there is a huge need for cosmetics in daily life, and many people use them.

WHAT IS FACE SERUM :

Face serum is defined as a thin-viscosity or a lightweight product that contain concentrated amount of active ingredients. It is lighter and delivers active ingredients to the skin quickly if goes on first, after you've cleansed your skin.

OBJECTIVES OF RESEARCH:

- To determine the optimum and stable face serum.
- To determine the most stable face serum formulation in term of its physio-chemical stability study.
- To characterise the face serum formulation in term of its flow behavior and sensory profile.

Ideal Qualities of Face Serum:

- Hydration: Effective serums should deeply hydrate skin, helping to maintain moisture levels and prevent dehydration.
- Absorbency: They should be lightweight and quickly absorbed into the skin without leaving a greasy or sticky residue.
- Non-irritant: They should not irritate the skin.
- Active Ingredients: Serums should contain high concentrations of active ingredients tailored to address specific skin concerns such as antioxidants, vitamins, etc.
- Remove dark spots and puffiness: Vitamin E and antioxidants in abundance aid with eyelid discolouration , and the cooling impact reduces puffiness.
- It removes dead skin cells, which encourages the synthesis of collagen.

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 nourishes the skin.
- Improve skin texture.

Disadvantages:

- Some serums may contain potent ingredients that could cause irritation or allergic reactions.
- Proper storage and packaging are essential to maintain the effectiveness of serum.
- Using multiple product simultaneously or applying to the skin leads to adverse effects.

❖ METHODOLOGY:

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

1. Selection of active ingredient.
2. Collection of active ingredient.
3. Extraction method of carica papaya.
4. Formulation of herbal face serum.
5. Evaluation of herbal face serum.
6. Result

Active Ingredient used in herbal face serum:**1) Papaya**

- **Kingdom :** Plantae
- **Order:** Brassicales
- **Family; Caricaceae**
- **Genus : Carica**
- **Species: Carica papaya**
- **Botanical Name: Carica papaya Linn**
- **Synonyms: Papai, Papita**



Fig.1: Papaya Fruit

Biological Source: It is a succulent fruit of a large plant of the family Caricaceae.

Geographical source:

The papaya is an important fruit of tropical and subtropical regions of the world .In India papaya is grown commercially in Kerla, Orissa, Andra Pradesh, Tamil Nadu, Bihar, Maharashtra, Uttar Pradesh, and Karnataka. Plains and frost free areas of north-eastern India offer vast potentialities for the successful production of papaya.

Chemical Constituents:

It contains various type of vitamins like Vitamin A,C,E and K. Papaya contain beta carotene, lycopene and other carotenoids which is potent antioxidant and responsible for fruit colour. It is good source of dietary fibre. Papaya contain minerals such as potassium, magnesium and calcium. It also contain flavonoids and phenolic compounds.

Papaya benefits for skin:

- **Skin Brightening:**
The natural enzymes and alpha hydroxyl acids in papaya help to lighten and brighten the skin by reducing the appearance of dark spots,acne scars and blemishes.
- **Anti-Aging Properties:**
Papaya is rich in antioxidants like vitamin C and carotenoids, which help to neutralize free radicals that can cause premature aging. Regular use of papaya can diminish the appearance of fine lines and wrinkles,promoting a more youthful complexion.
- **Acne Treatment:**
The antibacterial properties of papaya help to fight acne causing bacteria, making it effective in treating and preventing breakouts.
- **Toning and Tightening:**
The natural astringent properties of papaya help to tone and tighten the skin, reducing the appearance of enlarged pores and giving the skin a firmer, more youthful appearance.

2) Aloe Vera

- **Kingdom:** Plantae
- **Order :** Asparagales
- **Family:** Asphodelaceae
- **Genus:** Aloe

- **Species:** Aloe vera
- **Botanical name:** Aloe barbadensis mille
- **Synonym:** India aloe, Ghrith kumara, Korfad



Fig.2: Aloe Vera

Biological Source: It is the juice collected by incision, from the bases of the leaves of various species of Aloe.

Geographical source:

Aloe is native to Africa, specifically in region such as South Africa, Madagascar and the Arabian Peninsula. In India, aloe vera is primarily cultivated in states with warmer climates such as Rajasthan, Gujarat, Maharashtra and Andhra Pradesh.

Chemical Constituents:

It contain polysaccharides like acemannan, which have moisturizing properties and help to hydrate skin. Aloe contain glycoproteins, vitamin A,C and E. Also contains enzymes like amylase and lipase, also minerals like calcium, magnesium, zinc.

Aloe Vera benefits for skin:

- **Blisters and Scratching:**

Additionally, aloe Vera relieves itchiness and aids in the healing of sores. Vitamin B1, B2, B6, B12, and vitamin C are all found in aloe, which gives epidermis a calming and pleasant feeling.

- **Freshness:**

Aloe Vera gives off a new feeling. It aids in expanding blood circulation, which facilitates simpler oxygen exchange among cells and nourishes them.

- **Sun-burns:**

The ability of aloe Vera to lessen sunburn pain is exceptional. For this reason, it is rubbed immediately on skin. Sunburns may be treated with the plant's raw juice or after-sun products containing Aloe Vera.

- **Moisturizing:**

Aloe vera gel is a popular natural moisturizer. It hydrate skin without the leaving greasy, making it suitable for all skin types.

3) Almond Oil

Almond oil is a versatile ingredient for skincare. It can be used as makeup remover, facial cleanser, moisturizer and even treatment for dark circles under the eyes. It is also used to remove dirt impurities from the skin. It is a natural sunscreen agent.



Fig.3: Almond oil

4) Coconut oil

Coconut oil is rich in fatty acids, making it an excellent moisturizer for the skin. It helps to remove dead skin cells and promote smoother, more radiant skin.



Fig.4: Coconut oil

5) Rose water

Rose water can be used as a gentle toner to balance skin pH levels, tighten pores, remove impurities. Rose water provides instant hydration and refreshment. Also has calming and mood-enhancing effects.



Fig.5: Rose water

Material and Collection:

Sr. No.	Ingredients	Collection	Category
1	Papaya	Local market	Anti-acne
2	Aloe Vera extract	NSCOP, Vaijapur	Anti-aging
3	Glycerin	NSCOP, Vaijapur	Toner(skin hydrate)
4	Almond oil	Local market	Moisturizer
5	Coconut oil	NSCOP, Vaijapur	Moisturizer
6	Vitamin E	Local market	Anti-oxidant
7	Rose water	Local market	Toner(skin hydrate)
8	Tween 20	NSCOP, Vaijapur	Emulsifying agent
9	Sodium Benzoate	NSCOP, Vaijapur	Preservative

Table No.1: Matetial and collection

Extraction Method:

- **Extraction Method of Carica Papaya fruit using Maceration Process:**

Take ripe papaya fruit, wash them to remove dirt or debris. Cut the papaya fruit in small pieces to increase surface area for extraction. Boil 200ml water and slices of papaya in a beaker. Allow to evaporate the water for 30 minutes. Then cool at room temperature and blend using blender. Keep a side for over night for soaking. After that filtrate the sample by using filter paper. Now, residue remain on the filter paper and extract was collect in a beaker.



Fig.6: Maceration Process



Fig.7: Filtration



Fig.8: : Carica Papaya fruit extract

❖ **Formulation of face serum:**

Sr. No.	Ingredients	Formulation 1 (50 ml)	Formulation 2 (50 ml)
1	Papaya extract	18 ml	15 ml
2	Aloe vera extract	15 ml	10 ml
3	Glycerin	8 ml	12 ml
4	Almond oil	4.5 ml	4.5 ml
5	Coconut oil	1 ml	1 ml
6	Vitamin E	0.1 ml	0.1 ml
7	Rose water	3 ml	3 ml
8	Tween 20	0.5 ml	2 ml
9	Sodium Benzoate	q.s.	q.s.

Table No.2: Formula of face serum

- **Preparation of face serum**

The emulsion (o/w) was prepared according to formula.

- 1) Preparation of oil phase: The oily component consisting of Vitamin E, almond oil, coconut oil, tween 20 are taken into one beaker and melted at 70 C.
- 2) Preparation of water phase: The water phase is prepared at same time by mixing papaya extract, aloe vera extract, glycerin, sodium benzoate and rose water upto qs.
- 3) Preparation of emulsion: Emulsion was prepared by adding oil phase into liquid phase drop wise under mechanical stirring at 700 to 800 rpm to obtain o/w biphasic emulsion. Then final product is transferred to amber colour glass bottle.

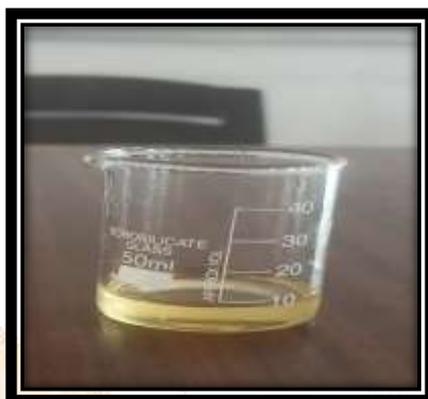


Fig.9: Oil phase



Fig.10: Water phase



Fig.11: Final Product

❖ Evaluation Of face serum:

- 1) Physical Evaluation: The formulation is tested by visual appearance and touch. The properties like colour, odor, texture etc are judged for their appearance.
- 2) pH Value: With the use of a standard buffer solution, a pH meter was calibrated. The pH of the mixture was assessed after precisely measuring and combining almost 1 ml of the facial serum with 50 ml of pure water. The skin has an acidic pH range, and skin serums should have a pH of 4.1 to 6.7.
- 3) Determination of spreadability: Spreadability may be expressed by the extend of the area to which the topical application spreads when applied to affected part on the skin. By adding 20gm of weight to the pan and pulling on the top plate with the aid of a thread linked to the hook, a sample of around 3gm was placed between two glass slides and they were squeezed together to create a film of a consistent thickness. It is noted how long it takes the upper glass slide to travel 10 cm across the lower plate.
- 4) Stability Studies: A proper stability analysis must be performed on a pharmaceutical product's formulation and development in order to assess its physical and chemical stability and, consequently, its safety. For a few months, a short-term accelerated stability evaluation of the produced formulation was conducted. The samples were kept under a variety of storage conditions, including 35°C, 25°C, and 40°C .
- 5) Washability: Formulations were applied to the skin, and the amount of water washing was personally evaluated.
- 6) Patch test: Apply a small amount of serum on a patch of skin, such as the inner forearm, and observe for any adverse reactions like redness, itching. This help determine if the serum is suitable for your skin type.

❖ Result:

A. Physical Evaluation

Color	Light Yellow
Odor	Characteristics odor
Texture	Smooth homogenous

Table No.3: Physical evaluation

B. Chemical Evaluation

- 1) PH Value: The formulation pH was discovered to be 5.8. The pH range of skin is between 4.1 to 6.7, hence this selection of formulas is suitable.
- 2) Determination of spreadability: For the skin to receive a typical dose of pharmaceutical formulation, the spreadability or ability of the face serum over the skin is essential. Spreadability of face serum was determined to be 5 to 6 cm.
- 3) Stability studies: Stability tests for the formulation were conducted for both chemical and physical changes. There were no observable significant differences in the formulations qualities.
- 4) Washability: The face serum is applied to the skin and washed with water. After washing face serum remove easily.
- 5) Patch test: Face serum applied to 1 sq.cm of forearm for 24 hours, after given time there is no allergy, redness, itching occurred.

PH	5.8
Spreadability	5-6
Phase separation	Nil

Table No.4: Chemical evaluation

❖ Conclusion:

The papaya face serum offers a promising solution for skincare enthusiasts seeking natural and effective remedies. Its high concentration of papaya extract, rich in vitamins A, C, and E, along with lycopene, provides gentle exfoliation, brightening, anti- ageing and anti-inflammatory properties. Users report noticeable improvements in skin texture, tone, and radiance with consistent use. Aloe vera is also potential benefits for skin care such as hydration, soothing properties and moisturizing. Moreover, its lightweight formula absorbs quickly without leaving a greasy residue, making it suitable for various skin types. Overall, the papaya face serum stands out as a reliable option for achieving a healthier, more vibrant complexion.

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