

Formulation and Evaluation of Face Serum Containing Citrus Limon and Ashwagandha

Pravin Khartode¹, Swaroop Jadhav², Rakesh Kamble³, Atharv Jadhav⁴, Gouri Patil⁵, Priyanka Pawar⁶, Mahima Chopade⁷, Pranav patil⁸, Sudheer Langare⁹.

^{1,3,4,5,6}Final Year B Pharmacy, ^{2,7,8}Assistant Professor, ⁹Principal
^{1,2,3,4,5,6,7,8,9}Mahadevrao Wandre Institute Of Technology, Turkewadi Kolhapur.

Abstract

Unwanted goods of UV exposure and photodamage include wrinkles on the face and skin ageing. Serum is a deep formula that has a high attention of active constituents, similar as citrus bomb and ashwagandha absorbs snappily, and penetrates the skin deep layers. The purpose of this study is to develop and estimate a citrus limon fruit and ashwagandha face serum for skincare. Natural enzymes set up in citrus limon are well known for their capability to slip and buck up skin. Lemon excerpt was mixed with other healthy rudiments like Citrus bomb oil painting, ashwagandha, almond oil painting, coconut oil painting, glycerin, vitamin E, rose water, tween 20 to produce the serum. The serum's capability to enhance skin hydration, brilliance, and conflation herbal vexation and disinclinations. Results showed that the Citrus Limon Fruit face serum significantly enhanced skin appearance, leaving it smoother, more radiant, and well Moisturized. likewise, the serum was well- permitted by utmost skin types, with minimum side goods Reported. Overall, the findings suggest that the formulated citrus Limon fruit face serum holds pledge as a Natural and effective skincare product, offering multiple benefits for enhancing skin health and appearance. The face serum was estimated for its physicochemical parameter, pH, stability, spreadability, density etc. The results showed that all the phrasings produced satisfactory results and the use of sauces in the serum will produce a successful volition to other dangerous chemical cosmetics.

Keywords: Face serum, Citrus Limon, Ashwagandha, Skin Texture, Moisturisation, Evaluation.

1. 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 worm 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. 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.^{1,2}

Objectives of research:

1. To determine the optimum and stable face serum.
2. To determine the most stable face serum formulation in term of its physio-chemical stability study.
3. To characterise the face serum formulation in term of its flow behavior and sensory profile.^[1,2]

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.

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.

Advantages: Penetrate deeply into the skin. Boost collagen production. Reduce sign of ageing. Reduces inflammation.

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. ^{1,2}

Materials and methodology: ^{3,4}

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 Ashwganda
4. Formulation of herbal face serum.
5. Evaluation of herbal face serum
6. Result.

Active ingredient used in herbal face serum:**1) CITRUS LIMON****Fig No-2 Citrus Limon**

- **Kingdom :** Plantae
- **Order:** Sapindales
- **Family;** Rutaceae
- **Genus :** Citrus
- **Species:** Citrus limon
- **Botanical Name:** Citrus X Limon
- **Synonyms:** Lemon
- **Biological Source:** The lemon (*Citrus × limon*) is a species of small evergreen tree in the Citrus genus of the flowering plant family Rutaceae.
- **Geographical source:** Origins. The lemon, like many other cultivated Citrus species, is a hybrid, in its case of the citron and the bitter orange. Lemons were most likely first grown in northeast India. The origin of the word lemon may be Middle Eastern.
- **Chemical Constituents:** Stituents, including monoterpenes, sesquiterpenes, and phenolic compounds.

Citrus Limon benefits for skin

- **Reduces acne:** Lemon's astringent properties can help reduce inflammation, kill bacteria, and decrease excessive oil secretion.
- **Brightens skin:** Lemon's vitamin C helps keep skin healthy and glowing.
- **Reduces dark spots:** Lemon can help bleach and reduce the appearance of dark spots and acne marks.
- **Boosts collagen:** Vitamin C is required by the body for the synthesis of collagen, which helps maintain skin elasticity.
- **Treats blackheads:** Lemon can effectively treat blackheads.^{3}

2) Ashwagandha



Fig No-3 Ashwagandha

- **Kingdom:** Plantae
- **Order :** Solanales
- **Family:** Solanaceae
- **Genus:** Withania somnifera
- **Species:** Withania somnifera
- **Botanical name:** Withania somnifera
- **Synonym:** Hayagandhaa, Ashwakanda, Gandharvagandhaa, Turaga, Turagagandhaa, Turangagandhaa, Vaajigandhaa, Gokarnaa, Vrishaa.
- **Biological Source:** Ashwagandha is a woody shrub that is the biological source of the plant Withania somnifera. It is a member of the Solanaceae family.
- **Geographical source:** Ashwagandha (\Withaniasomnifera\) is a woody shrub that grows in dry, warm regions of Asia, Africa, and the Mediterranean. It's a key ingredient in Ayurvedic medicine, a traditional Indian medical system.
- **Chemical Constituents:** The main chemical constituents are alkaloids and steroidal lactones. These include tropine and cuscohygrine. The leaves contain the steroidal lactones, withanolides, notably withaferin A, which was the first withanolide to be isolated from W. somnifera.

Ashwagandha benefits for skin:

- Prevents and heals acne – Ashwagandha root has both antibacterial and antimicrobial properties which protect the skin from infections or acne. It also boosts the collagen in the skin which prevents it from ageing.
- Ashwagandha for Dry Skin- Numerous problems result from dry skin, including rough texture, itchiness, flakiness, and redness. Ashwagandha reduces transepidermal water loss and increases moisture levels, helping to rehydrate and soften the skin.
- Ashwagandha for Skin Elasticity The loss of skin elasticity naturally follows the aging process and leads to more prominent aging signs, such as deep wrinkles, nasolabial folds, and jowls.^[4]

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. ^{6}



Fig No-4 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. ^{6}



Fig No-5 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. ^{5}



Fig No-6 Rose Water

Extraction method:

Extraction Method of Ashwagandha Powder using Maceration Process:

Take dried 15g Ashwagandha Powder, Fill the Filter paper Pouch and take in the Soxlet Apparatus and ,Set The Assembly and in Round Bottom Flask 100 Ml water,they Continue Heating To the 70 Degree Celcius in Water Bath To Complete the Cyle and same Continue Cyle to be collected ashwagandha Water Extract.Then Filter the ashwagandha Water extract to pure Ashwagandha Extract.^{10}



Fig No- 7 Soxlet Apparatus



Fig No -8 Ashwagandha Pure Extraction

FORMULATION OF FACE SERUM-

Sr.No	Ingredients	Formulation(1) 50ml	Formulation(2) 50ml
1.	Citrus limon Oil	18ml	15ml
2.	Ashwagandha Extract	15ml	10ml
3.	Glycerine	8ml	12ml
4.	Almond Oil	4.5ml	4.5ml
5.	Coconut Oil	1ml	1ml
6.	Vitamin E	0.1ml	0.1ml
7.	Rose water	3ml	3ml
8.	Tween 20	0.5ml	2ml

Table No.1: 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 Citrus Limon Oil, 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 Ashwagandha extract, glycerin, sodium benzoate and rose water upto q.s.
- 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.^{11}



Fig No-9 Oil Phase



Fig No-10 Water Phase



Fig No-11 Final Product

Evaluation of face serum:

1) Physical Evaluation: The formulations were characterized for organoleptic properties such as colour, odour, Homogeneity. The formulations are visually inspected for its clarity and presence of any foreign particles. ^{12}

2) pH Value: pH of is evaluated by pH meter. The pH meter was calibrated with a standard buffer solution. Almost 1 ml of facial serum was accurately weighed and dissolved in 50 ml of distilled water and finally its pH was calculated. The skin has an acidic range and the pH of the skin serum should be in the range of 4.1-6.7. ^{13}

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. ^{13}

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 ^{14}

5) Washability: Formulations were applied to the skin, and the amount of water washing was personally Evaluated. ^{14}

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. ^{12}

7) Determination Of Viscosity: Viscosity of all the formulations was noted using Brookfield viscometer of spindle no: 64 at 50 rpm. ^{15}

9)Phase Separation: The prepared preparation was kept in a closed container at room temperature from 25 to 1000 °C protected from light. Phase separation was then checked after 24 hours. Changes in phase separation were observed.^{16}

10) Anti-Microbial Assay: Antimicrobial activity of herbal face serum was done against microbial culture of Propionibacterium Acne, by using agar well diffusion method.

- A bacterial strain of interest is grown in pure culture (Propionibacterium Acne)
- Using sterile swab, a suspension of the culture is spread evenly over a sterile agar plate.
- The anti-microbial agent is applied to the center of the agar plate.
- A hole can be bored in the center of an agar for a liquid substance. The agar plate is incubated for 18-24 hours, at a temperature suitable for the test microorganism.
- If anti-microbial agent leaches from object into the agar and then exerts a growth-inhibiting effect, then a clear zone (the zone of inhibition) appears around the test product.
- The size of the zone of inhibition is usually related to the level of antimicrobial activity present in the sample or product, a large zone of inhibition is usually means that the microbial is more potent.^{17,18,19}

Result:

Sr.No	Parameters	Formulation 1	Formulation 2
A)	Physical Evaluation		
1)	Colour	White	White
2)	Odour	Elegant Aromatic	Elegant Aromatic
3)	Homogeneity	Good	Good
B)	Chemical Evaluation		
1)	pH	5.96	5.96
2)	Phase Separation	No	No
3)	Viscosity	11 Cp	11 Cp
4)	Determination of spreadability	5cm To 7cm Spreadability	5cm To 7cm Spreadability
5)	Washability	Easy To Washable With Water Remove	Easy To Washable With Water Remove

Table No :2 Physical Evaluation And Chemical Evaluation

6)Patch Test: Face serum applied to 1 sq.cm of forearm for 24 hours, after given time there is no allergy, redness, itching occurred.

7) Stability Studies: During stability studies F1 formulation produces good results during 1 month, The samples were kept under a variety of storage conditions, including 25°C, 35°C, And 40°C .

Temperature	1 Month Stability Studies	Parameter	Result
25°C	7 days,14 days,30 days	Colour	White
		Phase separation	No Phase Separation
		Homogeneity	Good
35°C	7 days,14 days,30 days	Colour	White
		Phase separation	No Phase Separation
		Homogeneity	Good
40°C	7 days,14 days,30 days	Colour	White
		Phase separation	No Phase Separation
		Homogeneity	Good

Table No:3 Stability Studies

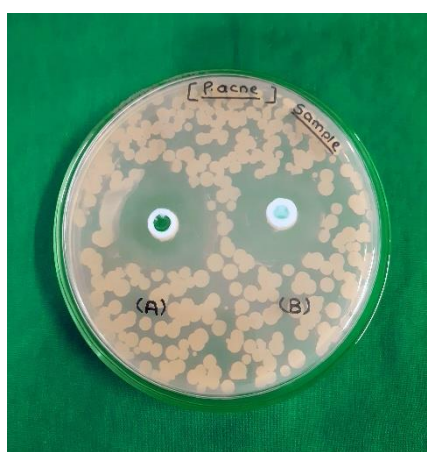
8)Anti-Microbial Assay: Anti-microbial activity was tested for the face serum and zone of inhibition is measured. The area around the antibiotic disk that has no bacterial growth is known as the zone of inhibition.

Contents	Zone Of Inhibition
Standard	D=15mm
Formulation 1	D=11mm
Formulation 2	D=10mm

Table No:4 Anti- microbial Assay



Fig No-12 Standard Sample



**Fig No-13 Formulation 1
And Formulation 2**

Conclusion

The aim of the study was to prepare an herbal facial serum using Citrus Limon Oil and Ashwagandha for facial treatment. Citrus Limon Oil, which is the main ingredient in the formula, has anti-Acne properties for the skin. They slow down the acne of the skin. Ashwagandha another important ingredient with anti-aging and anti-inflammatory properties. Vitamin E has also been added to improve antioxidant properties. Sodium Benzoate is used to give the serum an antimicrobial effect. Glycerine soothes the skin. Almond oil and Coconut oil used in moisturizer. Tween 20 is used as an emulsifier. A total of two formulations (1And 2) were prepared by varying the proportion of all ingredients. All Two formulations were o/w type emulsions. All dosage forms were free of solid particles. Among the Two formulations prepared, Formula 1 was found to be the superior formulation based on its pH, viscosity, homogeneity, irritation, phase separation and Zone of Inhibition. Such a stable composition with excellent performance can be attributed to its use.

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