

Formulation and Evaluation of Organic Vitamin C Face Cream

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Abstract: *Wrinkles on the face and aging of the skin are an undesirable effect of photodamage and ultraviolet radiation. Serum has a quick absorption and 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, the purpose of this work was to make serum using orange peels. Orange peel thoroughly cleanses your pores and gets rid of acne-causing bacteria. It soothes your skin and keeps breakouts, whiteheads and blackheads at bay. Orange peels mainly contain high amount of vitamin C. Vitamin C is an effective antioxidant that protects your skin from free radical damage, which can result in signs of aging. Vitamin C helps to reduce skin marks, skin spots and helps to brighten the skin and treats pimples, acne as well...*

Keywords: Face serum, Anti-inflammatory, Evaluation, Premature aging, Penetrate, Active Substances, Polyhedral

I. INTRODUCTION

Study of human skin represents an important area of research and development in dermatology, toxicology, pharmacology, and cosmetology, in order to assess the effects of exogenous agents, their interaction, their absorption mechanism, and/or their toxicity towards the different cutaneous structures. (1) The importance of beautification to the mankind has been known since the prehistoric time and the desire to look beautiful and healthy has been developing in the society. A serum is a type of skin cure product that can penetrate the skin more deeply to deliver action ingredient resembling a gel, or moisturizing consistency (2) Serum is a concentrated product which is 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 cream. Serums are defined as concentrated product that contains ten times more organic matter than cream. Therefore, it deals with the cosmetic problem quickly and effectively. Serum is packed with a bunch of beneficiary active components and nutrients such as antioxidants, ceramides, amino acids and others. This explains why face serum always being the costliest item in a skin care set. Whether it is moisturizer, anti-wrinkle or anti-aging product or skin serum, (3) all these products should contain antioxidants, cell-communicating ingredients and skin-identical ingredients.

TYPES OF FACE SERUM:

1. Oil Serum:

The oil serum is the simplest to make of all the face serums. It often starts with a base of just premium, fast absorbing carrier oils, also referred to as "dry" oils. In addition to having moisturizing and barrier-repairing characteristics, the premium oils used in the serum also include polyphenols, essential fatty acids, and other substances that may be broken down by the skin (4)

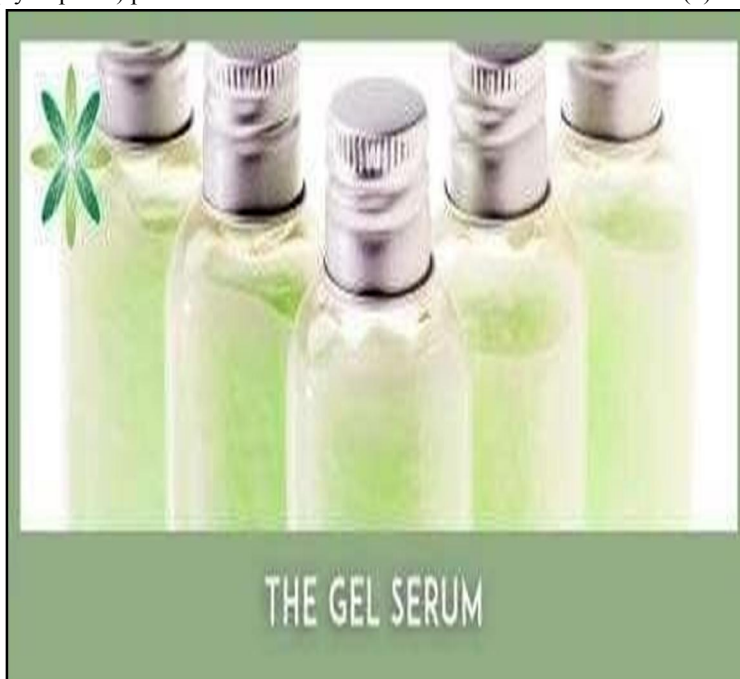




OIL SERUM

2. The gel serum:

Gel serums provide the skin a "tightening" sensation, giving your consumer the impression that their skin is momentarily lifted or tightened in particular regions of the face. The gel serum provides you the chance to include some fantastic water-based (hydrophilic) plant extracts because this formulation is water-based. (5)



GEL SERUM

3. The Water based serum:

Water-based serums are comparable to gel serums, although they may contain none or very little gums and thickeners. To administer high-performance hydrophilic plant extracts that are trapped against the skin beneath a cream or lotion, you would utilize a water-based face serum.





THE WATER BASED SERUM

4. The emulsion serum:

An emulsion-based face serum is a moisturizer that strengthens the skin's barrier function while also delivering high performance components to the skin. Two "immiscible" phases- phases like oil and water that don't want to mix-are combined in an emulsion. An emulsifier is used to bind water and oil together and retain them in a stable state. (6) The best chance of delivering high performance actives deeply into the tissues of the skin is through an Emulsion. (7) Given the skin's barrier function, it is highly difficult for any cosmetic component to penetrate the dermis, yet an oil and water mixture is best suited to accomplish this remarkable feat. The skin's barrier function will be strengthened by the emulsion's moisturizing characteristics.



5. The pressed balm serum:

A balm serum has a conventional balm basis of butters, waxes, and oils but also includes active substances that are oil-soluble (lipophilic) and may help the skin. The butters and waxes form an occlusive barrier on the skin that hydrates and nourishes it while allowing the pressed serum's active components to do their job. (8) In a balm serum, dozens of intriguing unique butters and waxes can be combined with thousands of exquisite plant oils.





THE PRESSED BALM SERUM

Ideal Qualities of Face Serum:

1. Soothes irritated skin.
2. Deep hydration.
3. Fight Acne and fades blemishes.
4. Remove dark circle and puffiness.
5. It contains antioxidant qualities that encourage healthy- looking skin

ADVANTAGES:

1. Improves skin texture.
2. Minimizes the skin pores.
3. Hydrates and nourishes the skin.
4. Improves skin elasticity.
5. Reduces Appearance of under eye circles.
6. Lightens Complexion.

LITERATURE REVIEW:

1. "Stability of Topical Vitamin C Derivatives" This study by Lin and Zhong (2020) evaluated the stability of various Vitamin C derivatives in cosmetic formulations. It found that certain derivatives, such as ascorbyl glucoside and magnesium ascorbyl phosphate, exhibited better stability compared to L- ascorbic acid.
2. "Enhancing Skin Penetration of Vitamin C" Research by Telang (2013) explored techniques to enhance the skin penetration of Vitamin C, such as microencapsulation and the use of penetration enhancers. This study highlighted the importance of delivery systems for maximizing Vitamin C efficacy.
3. "Efficacy of Vitamin C in Skincare" A review by Pullar et al. (2017) summarized the clinical evidence supporting the efficacy of Vitamin C in skincare. It discussed its role in collagen synthesis, antioxidant protection, and skin brightening, emphasizing the importance of stable formulations for optimal results.
4. "Safety Assessment of Topical Vitamin C" Research by Raschke et al. (2004) investigated the safety profile of topical Vitamin C formulations through clinical testing. The study concluded that Vitamin C serums were generally well-tolerated, with minimal risk of irritation or sensitization.



5. "Role of Vitamin C in Wound Healing" A review by Pullar et al. (2017) discussed the role of Vitamin C in wound healing and collagen synthesis. This study emphasized the potential benefits of Vitamin C serums in promoting skin repair and regeneration.
6. "Effect of pH on Vitamin C Stability" A study by Al- Niaimi and Chiang (2017) investigated the influence of pH on the stability of Vitamin C formulations. It found that acidic pH levels (around 3.5) were optimal for maintaining Vitamin C stability and skin penetration.
7. "Antioxidant Synergies in Skincare "Research by Dzialo et al. (2019) explored the synergistic effects of combining Vitamin C with other antioxidants, such as Vitamin E and ferulic acid. This study highlighted the potential for enhanced antioxidant activity and photoprotection in skincare formulations.
8. "Clinical Evaluation of Vitamin C Serums" A clinical trial conducted by Humbert et al. (2003) assessed the efficacy of a Vitamin C serum in improving skin texture and reducing wrinkles. The study demonstrated significant improvements in photoaged skin after regular application of the serum.
9. "Photostability of Vitamin C Formulations" An investigation by Lin et al. (2012) examined the photostability of Vitamin C formulations under different light conditions. It identified factors such as packaging materials and antioxidants that could help mitigate Vitamin C degradation upon exposure to light.
10. "Comparison of Vitamin C Derivatives" A comparative study by Campos et al. (2008) evaluated the stability and efficacy of various Vitamin C derivatives in skincare formulations. It provided insights into the relative performance of different derivatives in terms of antioxidant activity and skin penetration.

AIM & OBJECTIVE:

The main objective of this study is to determine the optimum and stable face serum. The specific objectives of this study are

To optimize the thickeners and emulsifiers of face serum formulation with regard to the viscosity and pH value. To determine the most stable face serum formulation in term of its physicochemical stability study and microbiological study.

To characterize the face serum formulation in term of its flow behavior and sensory profile.

FORMULATION OF FACE SERUM

In formulating a face serum, the physical properties and stability are the main characteristics in determining its quality. A face serum formulation is basically an emulsion consists of two immiscible liquids. In order to prevent emulsion instabilities, thickener and emulsifier are introduced to the system. (9)

Emulsifier will balance the system by minimizing the interfacial tension between the two immiscible liquids and at the same time stabilizes the dispersion phase from coalescence. Contributing to the system, thickener also plays an important role as rheology modifier and provides flexibility to the flow characteristic of the emulsion.

A chemical property which is considered important in formulating is pH value. If the pH value of the skin is changed, the skins natural microbiology and function will be interrupted. This in turn causes numerous skin problems including acne, skin flakiness, excessive sebum secretion and other serious conditions. The natural skin micro flora is intact on the skin with pH value ranging from 4 to 4.5, while pH value ranging from 8 to 9 eliminates the skin natural micro flora. Formulating a face serum with suitable pH range can help in improving the skin barrier function. (10)

Formulating a face serum or any other formulation can be challenging. (11) This is because the traditional One Factor at a Time (OFAT) method was highly time consuming and may result in unnecessary experiment that consume costs. OFAT was done by changing one factor at a time

while keeping the other factor as constant. It requires large number of tests. On the contrary, optimization using Design Expert software could save time, costs and labour. D-optimal design is suitable to be used in formulating cosmetic formulations thus it is applied in the formulation studies widely.

In formulating a face serum, the mixing of water phase and oil phase is crucial in order to create a stable system over an extended period or longer product shelf life. Naturally, the oil and water systems are thermodynamically unstable.

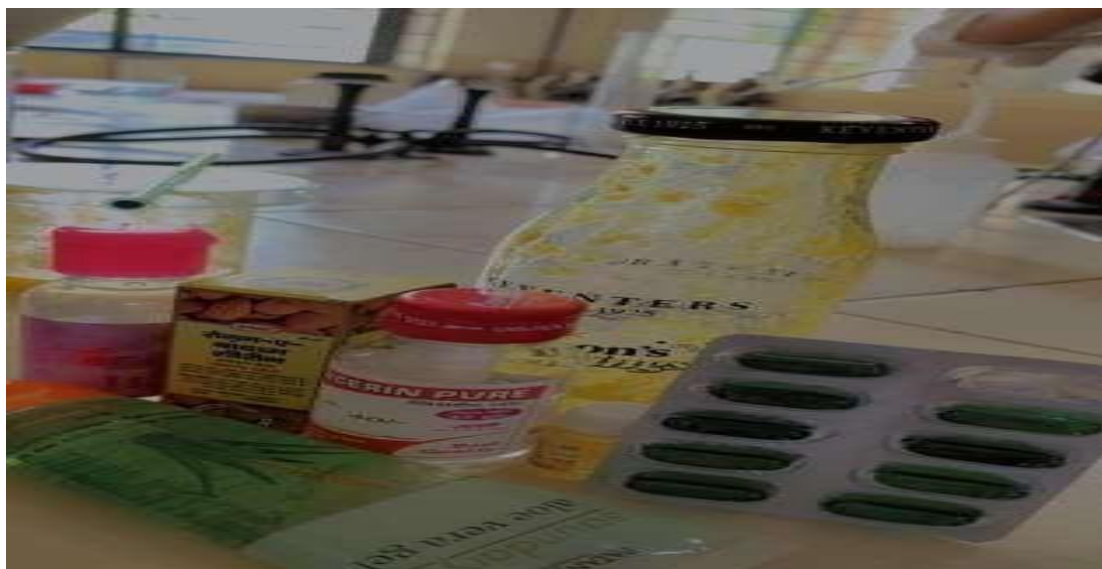


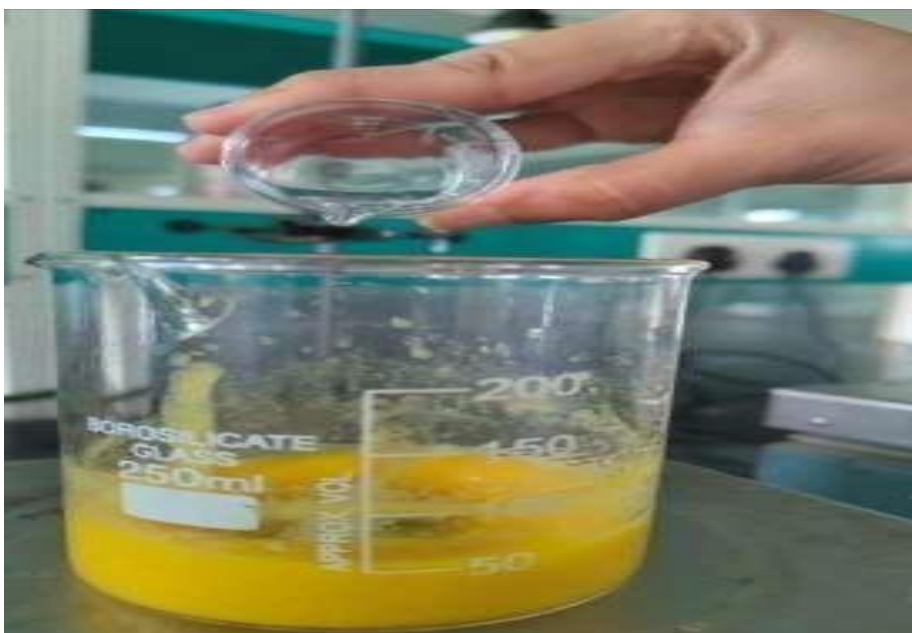
Incorporation of emulsifiers into the system can minimize the interfacial difference between the water and oil phases thus mix the system.

MATERIAL AND METHOD

The emulsion (o / w) was prepared according to the formula given below. The oily component consisting of almond oil and sandalwood oil and vitamin E is mixed together for 10 minutes to obtain a uniform solution. At the same time water phase was prepared by mixing aloe vera gel, glycerin and rose water uniformly. The oil phase added to liquid phase dropwise under mechanical vibration at 2500 rpm to obtain oil in water based on bi-phasic emulsion.

Sr. No	Ingredients	Standard Formula (100 ml)	Working Formula 30ml	Category
1.	Orange Peels	35%	10.5ml	Skin Brightening
2.	Glycerin	10%	3ml	Moisturizer
3.	Vitamin E	5%	1.5ml	Smoothing
4.	Rose Water	15%	4.5ml	Anti-inflammatory
5.	Almond Oil	5%	1.5ml	Reduce Pigmentation
6.	Aloe Vera Gel	25%	8.5gm	Antiaging
7.	Sandalwood Oil	5%	1.5ml	Antimicrobial properties





PREPARED FACE SERUM

A proper method has to be carried out while formulating the vitamin c face serum

1. Selection of active ingredients
2. Collection of active ingredients
3. Extraction method
4. Formulation of organic vit C face serum
5. Evaluation of face serum
6. Result





ACTIVE INGREDIENT USED IN FACE SERUM:

1. Orange Peel : (12) Synonyms- Orange zest

Biological source- It consists of dried fruits of Citrus sinuses family -Rutaceae.

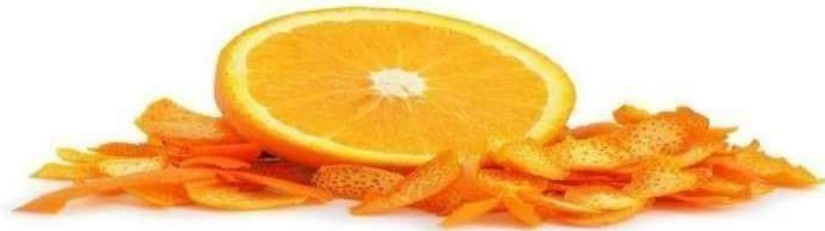
Description:

colour- Dark orange red Adour Aromatic

Taste – Bitter

Chemical constituents- Terpenes, Carotenoids, Flavonoids

Uses- Reduce skin marks, skin spots, help to skin whitening, Treat pimples, acne.



1. Orange Peel

1) Glycerin:

Glycerin will also help your skin become softer yet stronger by keeping your skin barrier moisturized and protected from environmental irritants. Garlapati says the ingredient is well- tolerated and suitable for all skin types. (13)



2. Glycerin

3) Vitamin E:

The antioxidant properties of vitamin E may aid it in protecting your skin from harm like pollution and sun damage. This may help keep your skin balanced, delaying the appearance of wrinkles. Soothing dry and itchy skin Moisturizing skin. (14)





3. Vitamin E

4) Rose Water:

Rose water is said to be a natural skin toner due to this amazing pH- balancing properties.



4. Rose Water

5) Almond Oil:

It reduces blemishes and helps to moisturize skin it is also used as facial cleanser reduces and dark circles. And help to remove acne.



5. Almond Oil



6) Aloe Vera :

Synonym: Indian Aloe,

Biological source: Aloe is obtained from dried juice of leaves of barbadensis miller

Family: Asphodelaceae

Description-

color- colorless mucilaginous gel

Odour - bitter

Taste - bitter

Chemical constituent- Anthracene, resins

Uses-

- Aloe Vera has been used to treat wounds and infections. Aloe Vera is now recognized as a crucial (15)(16)
- Ingredient in makeup thanks to advancements in beauty. It has nearly 20 amino acids, enough amounts of
- Nutrients like calcium, magnesium, and sodium, enzymes, vitamins, and Its polysaccharides, nitrogen, and other
- Ingredients make it a wonder plant for attractiveness. Here is a short explanation of some of the most significant. (17)



6. Aloe Vera

7) Sandalwood Oil:

Sandalwood is time-tested in Ayurveda for its pitta-reducing quality, cooling the skin in cases of tanning and sunburn and soothing the skin with its anti- inflammatory properties. especially in cases of acne, rashes, and insect bites, I say Ainsley Mayben of Kama Ayurveda. (19)



7. Sandalwood Oil



Formulation table for face serum (For 30gm)

Sr.no	Ingredient	Quantity given 100 ml	Quantity taken 30 ml	Category
1.	Orange Peel	35%	15 ml	Skin brightening
2.	Glycerin	10%	7.5 ml	Moisturizer
3.	Aloe vera Gel	30%	2.3 ml	Antiaging
4.	Sandalwood Oil	0.1%	0.02ml	Smoothing
5.	Vitamin E	5%	0.6 ml	Antioxidant
6.	Rose Water	15%	4.5 ml	Anti- inflammatory
7.	Almond Oil	5%	0.03 ml	Reduce pigmentation

EVALUATION TEST

Physical:

The Color and appearance of the formulation was observed Evaluation visually. The formulation procedure uniform distribution of extracts. This test was confirmed by visual appearance and by touch.

pH Value:

A pH meter was calibrated using a standard buffer solution. Nearly 1 ml of the face serum was properly weighed and dissolve 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.

Determination of Spread ability:

2 gm of serum sample was placed on a surface. A slide was attached to a pan to which 20 gm weight was added. The time (seconds) required to separate the upper slide from surface was taken as a measure of Spread ability.

Determination of Viscosity:

Viscosity is a critical parameter for topical formulation. Topical solutions with low viscosity have faster clearance than viscous solutions. In addition, highly viscous solutions can have an undesirable effect on the skin. Viscosity of the Face Serum was found to be 13759 Pa.

Stability Studies

Formulation and development of a pharmaceutical product is not complete without proper stability analysis carried out on it to determine physical and chemical stability and thus safety of the product. The stability studies are carried out as per ICH guidelines. Short term accelerated stability study was carried out for the period of few months for the prepared formulation. The samples were stored at different storage conditions of temperatures such as 3-5°C, 25°C; RH=60% and 40°C±2% RH=75%

Cyclical Temperature:

Test This test is not carried out at any fixed temperature and humidity. In this test, temperature was changed cyclically every day. At room temperature and frizzing temperature to stimulates the changes.



RESULT AND DISCUSSION

Physical Evaluation:

Physical Evaluation Table

Colour	Yellow translucent
Odour	Characteristics odour
Taste	orange
Texture	Smooth homogenous
Homogeneity	Good
pH	5.8
Washability	Washable

pH Value:

pH value of formulation was found to be 5.8. As the skin has acidic pH around 4.1 -6.7, this range of formulation is suitable for skin.



Determination of Spreadability:

Spreadability of liquid formulation that is ability of the face serum to spread over the skin and play important role in administration of standard dose of medicament formulation on skin.

Spreadability of face serum 5 to 6 cm was found.





Stability Studies:

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

Visual Appearance	Yellow
Visual appearance	Nil
Homogeneous	good

Cyclin Temperature Test

SR. NO	Parameter	Stability
1	Freezer temperature	Unstable
2	Room temperature	Stable

Benefits of using a face serum

From hydrating the skin in order to reduce the appearance of fine lines and wrinkles, to minimizing the appearance of dark spots and refining skin texture, serum truly does it all. A good serum that contains antioxidants will protect the skin from environmental stressors and is worth the cost and effort alone. Serum can smooth the skin, firm the skin, and even exfoliate. It really just depends on what you are looking for your serum to accomplish. (7)

Application Of a Facial Serum

Face serum is a lightweight water-based skincare essential that targets different skin concerns. There are various kinds of serums that are made with break through or game-changing ingredients like niacinamide, hyaluronic acid, vitamin C, AHAs and BHAs. If you truly want to reap the benefits of a face serum, you must know how to choose one that matches your skin type and skin concern. With such a plethora www.ijert.org © 2023 IJCRT | Volume 11, Issue 6 June 2023 | ISSN: 2320-2882 IJCRT2306095 International Journal of Creative Research Thoughts (IJCRT) www.ijert.org



a844 of serums available on the market, and with so many options to pick from and each claiming that they solve a skincare concern,

- Which serum do we pick?
- How many do we really need in our routine?
- When and how should we use them?
- When should I apply a serum? Is it when the skin is damp? If so, why?

It is best to cleanse face and gently pat semi dry. While the skin is damp, it is best to then apply serums which generally contain a higher concentration of actives. This is when the skin is more permeable, and penetration is improved

II. CONCLUSION

The aim of this report was to study about what exactly are facial serums and their history along with their overall importance. The study includes its proper selection and correct sequence of application. With tremendous amount of serums available in the market for each and every skin type and skin problem these days, it's essential for one to know what they are looking for in a serum precisely. When a righteous formulation is selected by scrutinizing every major skin issue, it is safe to say that significant improvements can be seen, leading to good results. Skin health is a crucial element of the altogether health of the body and having a proper skin care routine with an accurate serum for you, can sustain the ageing skin and ward off the ongoing damage. It eliminates fine lines, wrinkles, dark spots, and further blemishes if paired with appropriate moisturizer and sunscreen. Specific ingredients deal with a certain skin concern, as a result a combination of all the finest ingredients could show miraculous benefits. The report also shows numerous skin care brands for serums available in the market and a brief description of each product. This concludes that a facial serum is a boon for the cosmetic community and its addition is crucial in the skin care regime.

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