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Research Article

Formulation And Characterization of Orange Peel Extract Vitamin C Herbal Serum for Brightening and Hydrating Effect of Skin

Sharad Kamble, Siddhi Pardeshi*, Namira Mujawar

Nootan College of Pharmacy, Kavthemahankal, India 416405

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ABSTRACT

Beauty products play an important role in skin care. Herbal products have good activity and no side effects so they attract people very quickly. The largest and most visible organ that may be influenced by environmental variables is the skin. The skin is harmed by shifting lifestyles as well. Vitamin C serum is a topical skincare product containing a high concentration of ascorbic acid, the active form of vitamin C. It provides numerous benefits for the skin, including increased collagen production, reduced signs of aging, improved skin tone and texture, and protection against sun damage. Our serum contains benefits to help fight all of these issues. The face serum's ability to swiftly reach the skin's deeper layers. Examining elements such as concentration, composition, and extra components is necessary when comparing various vitamin C face serums. A serum's proportion of vitamin C can fluctuate, usually falling between 5% and 30%. Greater concentrations may provide more powerful benefits, but they also carry a higher risk of causing irritation, particularly in cases when the skin is sensitive. It's essential to find a balance that suits your skin's needs and tolerance. Always patch test new products and consult with a dermatologist for personalized recommendations. Using the serum effectively involves applying a few drops to clean, dry skin once or twice a day, followed by sunscreen during the day. The results can vary depending on individual skin types and routines. To determine the percentage of vitamin C in a serum, you typically look at the product label or consult the manufacturer's specifications. Using the serum effectively involves applying a few drops to clean, dry skin once or twice a day, followed by sunscreen during the day. The results can vary depending on individual skin types and routines.

INTRODUCTION

The increasing demand for natural and sustainable skincare products has driven the cosmetic and pharmaceutical industries to explore plant-based

***Corresponding Author:** Siddhi Pardeshi
Address: *Nootan College of Pharmacy, Kavthemahankal, India 416405.*
Email : pardeshisiddhi4@gmail.com

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ingredients with potent bioactive properties. Among these, Vitamin C (ascorbic acid) is well recognized for its antioxidant, brightening, and hydrating properties, making it a key active ingredient in modern skincare formulations. However, synthetic sources of Vitamin C often suffer from stability issues and limited bioavailability. As a result, there is a growing interest in harnessing natural sources of Vitamin C, such as citrus fruits, which are abundant, cost-effective, and environmentally friendly.

Orange peels, a major by-product of the citrus industry, are rich in Vitamin C, flavonoids, and essential oils. These bioactive compounds offer a range of dermatological benefits, including anti-aging effects, skin tone enhancement, and improved hydration. Utilizing orange peel extract not only adds value to agricultural waste but also aligns with the principles of green chemistry and sustainable development.

This research focuses on the formulation and characterization of a herbal serum incorporating orange peel extract as a primary source of natural Vitamin C. The serum is developed with the aim of enhancing skin brightness and hydration, targeting consumers seeking effective yet gentle skincare solutions. The study evaluates the physicochemical properties, stability, antioxidant activity, and skin compatibility of the serum, providing a scientific basis for its potential use in cosmeceutical applications.

1. MATERIALS AND METHODS -

1. Rose Water

Rose water is a natural hydrosol obtained from rose petals through steam distillation. It is widely used in skincare for its soothing, anti-inflammatory, and hydrating properties. Rose water also helps maintain the skin's pH balance and control excess oil.

Product used: Dabur Gulabari Premium Rose Water – A popular natural toner used for cleansing, toning, and moisturizing.

2. Vitamin E Capsule

Vitamin E (tocopherol) is a powerful antioxidant that protects the skin from oxidative stress, promotes cell regeneration, and improves skin elasticity. When used topically, it nourishes and repairs damaged skin

Product used: Evion 400 by Merck – A commonly used Vitamin E capsule, often used in DIY skincare routines.

3. Glycerine

Glycerine is a natural humectant that draws moisture into the skin, keeping it soft, supple, and hydrated. It is non-comedogenic and suitable for all skin types, especially dry and sensitive skin.

Product used: Patanjali Saundarya Glycerine – Used in skincare to retain moisture and improve skin texture.

4. Coconut Oil

Coconut oil is a natural emollient rich in fatty acids and antioxidants. It helps nourish and hydrate the skin while providing antibacterial and anti-inflammatory benefits.

Product used: Parachute 100% Pure Coconut Oil by Marico – Widely used in India for hair and skin care.

2. METHOD-

2.1. MACERATION PROCESS:

2.1.1. Selection and Preparation of Orange peel-

Use a vegetable peeler or knife to remove the peel. Avoid the white pith, as it can be bitter and might

affect the aroma of the extract. Orange peels are dried under the shed for 8 to 10 days .Ensure the peels are clean and free from any pesticides or contaminants. After drying, use Mortar and Pestle to crush the peel. Crushing or grinding increases the surface area, facilitating the better extraction of the active ingredients.

2.1.2. Maceration with solvent-

Take 32gm of dried orange peel powder in a container and add 640 ml of Ethanol as solvent. Mix well by stirrer and place the container in a cool and dark place (away from sunlight) to allow the orange peel to macerate. The mixture is typically 3 to 7 days to allow the time for the extraction of Vitamin C, essential oils, and antioxidants from the peel into the solvent. During the maceration period stir the jar occasionally to enhance the extraction**.**

2.1.3. Filtration of Extract-

After the maceration period, the mixture will have a concentrated extract of Vitamin C and other active ingredients from the orange peel. Use filter paper and strain out the solid material from the liquid extract through funnel. Extract is obtained.

FIG.1. Dried orange peel

FIG.2. Dried peel powder

FIG.3. Maceration

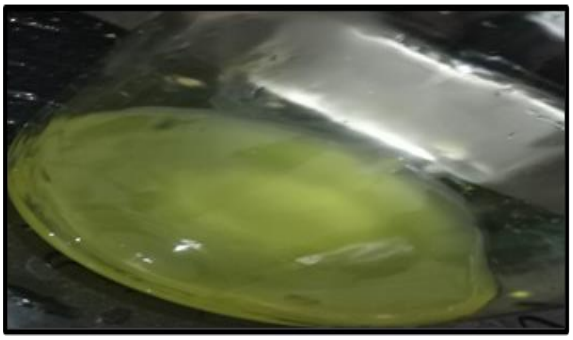

FIG.4. Extract

2.2.Formulation Table-

Sr. no	Composition	F1	F2	F3	Purpose
1	Vitamin c extract	10%	20%	30%	Brightening property
2	Rose water	15%	15%	15%	Hydrating property
3	Vitamin E	2%	2%	2%	Anti-oxidant
4	Glycerine	5%	5%	5%	Toner
5	Coconut oil	2%	2%	2%	Moisturizer
6	Phenoxyethanol	1%	1%	1%	Preservative

3. FORMULATION-

Preparation of Serum-
Step 1: Take 10 ml orange peel extract.
Step 2: Add orange peel extract in rose water of equal quantity.
Step 3: Add Glycerine 5ml to the above solution and mix well.
Step 4: Add the contents of 3 Vitamin E gel capsules.
Step 5: Add coconut oil 2ml in the above mixture.
Step 6: Add 1 ml of phenoxyethanol as a preservative. Stir this solution with a stirrer and then keep it in a cool and dark place.
Step 7: Check and adjust the pH.
Step 8: Bottle the serum in a dark amber glass bottle to protect it from light.
Step 9: Label and store in a cool place. Shelf life: 6–12 months.

4. USAGE

1. Apply 2-3 drops on clean skin at night.
2. Follow with moisturizer.
3. Always wear sunscreen during the day when using Vitamin C products.

4.1.**Tests to ensure the safety and effectiveness of the serum**:

4.1.1. pH Testing-

Facial products should match the skin's natural pH around 4.5-6.0.
Digital pH meter has been used to check the pH.

4.1.2. Skin Irritation Test-

To check for skin reactions like redness, itching, or burning.
Apply a small amount on the area of hand for 24 - 48 hours.

4.1.3. Homogeneity-

The formulation was tested for homogeneity by visual inspection and touch.

5. RESULT

Property	Serum 1	Serum 2	Serum 3
Colour	Yellow	Yellow	Yellow
Odour	Characteristic odour	Characteristic odour	Characteristic odour
Texture	Smooth	Smooth	Smooth
consistency	Watery/Thin	Watery/Thin	Watery/Thin
Homogeneity	Good	Good	Good
pH	4.5	4.5	4.5

Homogeneity-

The homogeneity of the formulated serum was judged by visual appearance and touch. The appearance and touch of the serum was good.

6. CONCLUSION

The appearance of formulated serum was very attractive regarding color and odor. The pH of the serum is acceptable for use on skin. The Vitamin C serum after applying on skin at bed time and leaving overnight is appealing in fresh appearance to skin and hence proven to be safe. Sensitive skin beauties may feel a slight tingling sensation initially. If this happens, one may want to start using it on alternate nights for the first few weeks until skin adapts to it. The ideal percentage of vitamin C in a face serum can vary depending on individual skin sensitivity and tolerance. Generally, concentrations between 10% and 20% are common and effective for most people. Higher concentrations, like 30%, can be more potent but may also increase the risk of irritation, especially for sensitive skin types. It's best to start with a lower concentration and gradually increase if needed while monitoring how your skin reacts.

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