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Research Article

DEVELOPMENT OF A NATURAL FACE SERUM FORMULATION

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ABSTRACT

The growing demand for safe and natural skincare products has lead to increased interest in herbal cosmetic formulations with antioxidant properties. Face serums containing natural extracts are effective in improving skin brightness, hydration and protection against oxidative stress. The present study focuses on the development and evaluation of a natural face serum formulated using kiwi fruit extract and cucumber extract. Kiwi extract is rich in vitamin C, antioxidants, and polyphenols that help neutralize free radicals and support collagen synthesis while cucumber extract possesses soothing, cooling, hydrating and anti-inflammatory properties. The face serum was prepared using suitable excipients such as Aloe vera gel, glycerin, rosehip oil, Tween 20, Span 80 and an appropriate preservative. The formulated serum was evaluated for physicochemical parameters including pH, viscosity, spreadability, homogeneity and appearance. Stability studies and antioxidant activity was also assessed to ensure safety and effectiveness. The results indicated that the developed formulation showed good stability, acceptable cosmetic characteristics and enhanced antioxidant activity. The study concludes that the natural face serum is a safe and effective cosmetic formulation for improving skin health and complexion.

Keywords: Kiwi extract, Cucumber extract, Antioxidants, Skin brightening, Tween 20.

INTRODUCTION

Skin is the largest organ of the human body and acts as the first line of defense between the body and the external environment. It plays a vital role in protection, sensation, temperature regulation and maintenance overall health. The skin is made up of three main layers: Epidermis, Dermis, Hypodermis, Shields the body from microorganisms, UV rays, heat and chemicals. Contains sensory receptors for touch, pressure, temperature and pain. Acts as the main target site for topical formulations. Good skin health enhances absorption and efficacy of face serums including vitamin C serums with kiwi extract. The Stratum corneum plays a major role in regulating absorption of active ingredients. Face serum is a lightweight, fast absorbing skincare formulation enriched with concentrated vitamin C that helps brighten the skin reduce dark spots and protect against environmental damage through its antioxidant action. It shows more effective results than a regular cream or lotion. Face serum is used to help brightening [vitamin C], Hydration [glycerine], Anti-aging [retinol], pigmentation reduction [vitamin C], acne control [salicylic acid] and also helps in skin repair and smoothness. Because serums are made with small molecules they penetrate the skin more deeply. The main characteristics of face serum are that it is lightweight, non-sticky, high concentration of actives and applied before moisturizer. Hydrating serums, Brightening serums, Anti-aging serums, Acne-fighting serums, Exfoliating/resurfacing serums, Antioxidant serums.

MATERIALS AND METHODS

Preparation of Herbal Extracts

All the extracts were extracted by using cold extraction (ethanol-undenatured 100% or 95%) or heat process (glycerine).

Heat process

Step 1: Add the extract to a small quantity of water, heat and Stirr. Step 2: Close with a tight wrapper and continue heating for half an hour. Step 3: Filter the solution using

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filter paper into a clean beaker. Step 4: Clarify the extract by weighing with 20% water and 400% Glycerine. Step 5: Make up to 100 ml. Step 6: Pour into a tightly closed container.

Preparation of Face serum

The natural face serum was prepared using the cold blending method to preserve the activity of herbal ingredients.All the ingredients were accurately weighed according to the table 2. Preparation of aqueous phase. The required quantity of distilled water or rose water was taken in a clean beaker. Water-soluble ingredients such as glycerin, aloe vera gel, and herbal extracts were added gradually with continuous stirring until a uniform solution was obtained. Step 2: preparation of oil phase. Natural oils such as jojoba oil, almond oil, or vitamin E oil were taken in a separate beaker. The oil-soluble components were mixed thoroughly and set aside at room temperature. Step 3: mixing of phases. The oil phase was slowly added to the aqueous phase with constant stirring using a magnetic stirrer or mechanical stirrer to form a clear and homogeneous serum. Step 4: addition of active ingredients Heat-sensitive ingredients such as essential oils, preservatives, and antioxidants were added at the final stage and mixed gently. The pH of the formulation was adjusted to 5.5-6.5 using suitable buffering agents to match the natural skin pH. Step 6. Filling and storage. The prepared serum was transferred into a clean, airtight container and stored at room temperature for further evaluation.

Table 1. List of raw materials used in face serum and their chemical constituents.

S. No	Ingredients	Biological source	Chemical Constituents	Uses
1.	Kiwi	*Actinidia deliciosa (Actinidiaceae)*	Vitamin C Fructose Malic acid	Immunity boosting Reduces pigmentation
2.	Cucumber	*Cucumis sativus Linn (Cucurbitaceae)*	Vitamins Tannins Flavonoids	Provides hydration due to high water content Reduces puffiness
3.	Aloe Vera	*Aloe barbadensis Miller (Asphodelaceae)*	Polysaccharides Vitamins enzymes	Skin hydration Anti-aging Skin brightening

Figure 1. Raw materials (a) Kiwi, (b) Aloe vera, (c) Cucumber.

Table 2. Formulation of face serum

Ingredients	Quantity
Kiwi fruit extract	1ml
Cucumber extract	1.5ml
Aloe vera gel	30ml
Glycerine	2ml
Vitamin E	0.5ml
Tween 20 (Polysorbate 20)	1.5ml
Span 80	0.5 ml
Benzoic acid	0.5ml
Distilled water	12.25ml
Lemongrass oil	0.25ml

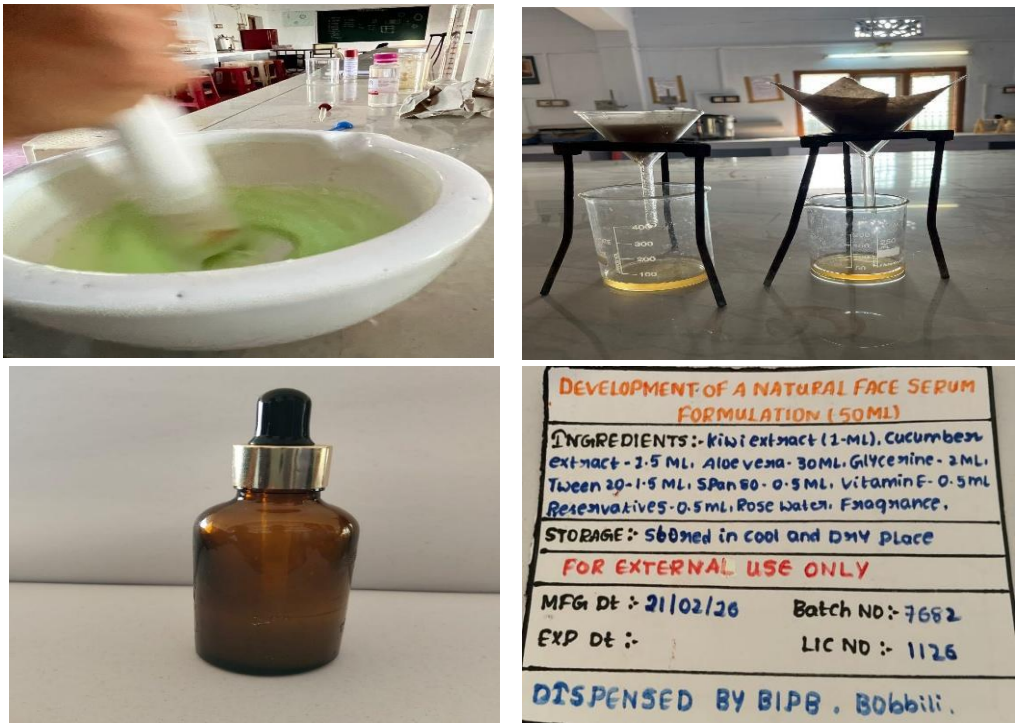

Figure 2. Mixing, Screening filling and labeling

Evaluation tests

All the evaluation tests carried out for the face serum as per the guidelines and results were tabulated in table 3.

Table 3. Evaluation test results.

Parameters	Test results
Colour	Light Green Colour
Odour	Pleasant
Smell	Lemongrass Oil Fragrance
Texture	Smooth
After Feel Effect	Cooling Effect On Application
pH	6 (Skin Friendly)
Viscosity	2 Mints
Homogenicity	No Lumps Observed
Density	1.080kg/M^3
Patch Test	No Irritation
Microbial Growth	Not Detected

Figure 3. Homogenicity, Microbial test and skin patch test results

The development of a natural face serum formulation focused on designing a stable, effective, and skin-compatible product using plant-based and naturally derived ingredients. The formulation strategy emphasized the selection of bioactive compounds with proven antioxidant, moisturizing, soothing, and skin-protective properties, while avoiding synthetic irritants. Suitable solvents, humectants, gelling agents, and natural preservatives were optimized to achieve desirable physicochemical characteristics such as clarity, viscosity, pH, spreadability, and uniformity. The prepared serum was evaluated through standard tests, including organoleptic assessment, pH determination, homogeneity, stability studies, and basic skin compatibility evaluation. The results demonstrated that the formulated natural face serum met acceptable quality parameters and maintained stability under defined storage conditions, indicating its potential suitability for topical cosmetic application.

CONCLUSION

The present study successfully demonstrated the formulation and preliminary evaluation of a natural face serum incorporating bioactive natural ingredients aimed at improving skin health. The optimized formulation showed satisfactory physicochemical properties, stability, and skin compatibility, supporting its feasibility as a safe and effective cosmetic product. The use of natural components aligns with the growing consumer demand for eco-friendly and dermatologically gentle skincare formulations. Overall, this research provides a scientific basis for the development of natural face serums and can serve as a foundation for further investigations, including advanced stability testing, in-vitro and in-vivo efficacy studies, and scale-up for commercial production.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest

ETHICS APPROVAL

Not applicable

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AI TOOL DECLARATION

The authors declares that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on request

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