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Herbal Beetroot Facewash: A Review on Formulation, Phytochemistry and Cosmeceutical Application

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Abstract: ***Herbal cosmetics have become increasingly popular due to their safety, effectiveness, and minimal side effects compared to synthetic cosmetic products. Herbal gel face wash formulations are widely accepted because they provide cleansing, moisturizing, antioxidant, and skin-protective effects.***

Beetroot (Beta vulgaris) is a natural source of betalains, flavonoids, vitamins, minerals, and antioxidants that help maintain healthy skin and protect against oxidative damage. The present review focuses on the formulation and evaluation of herbal gel face wash using beetroot powder as the principal active ingredient. The review discusses the composition, method of preparation, role of excipients, evaluation parameters, and therapeutic benefits of the formulation. Beetroot-based herbal face wash formulations exhibit good cleansing activity, skin compatibility, antioxidant properties, and stability. Therefore, beetroot powder can be effectively utilized in herbal cosmetic preparations for daily skin care applications. (3,4)

Keywords: Herbal gel facewash, Beetroot powder, Beta vulgaris face cleanser, BetalainsNatural cleanser, Polyherbal gel, Cosmeceutical formulation (1,5)

I. INTRODUCTION

Skin is the outermost protective organ of the human body and plays an important role in protecting

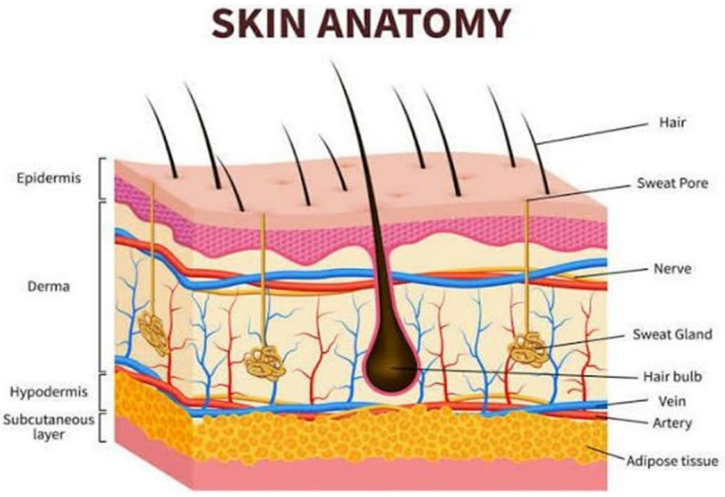


Fig.1 Layer of skin

internal tissues from environmental pollutants, microorganisms, ultraviolet radiation, and harmful chemicals. Exposure to dust, smoke, excessive oil, and microorganisms can result in acne, pigmentation, dryness, irritation, and premature aging. Proper cleansing of the skin is essential for maintaining healthy skin condition Face wash preparations are commonly used cosmetic products that help remove dirt, dead cells, excess sebum, and microbial contaminants from the skin surface. In recent years, herbal cosmetic products have gained considerable attention because of their natural origin, reduced toxicity, and better compatibility with skin.Gel-based face wash formulations are preferred due to their non-greasy nature, smooth texture, cooling effect, and ease of application. Herbal gels also provide better patient compliance and aesthetic appearance compared to creams or ointments.

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Beetroot (Beta vulgaris) is a medicinal plant rich in natural antioxidants and bioactive compounds. Beetroot powder contains betalains, polyphenols, flavonoids, iron, folic acid, potassium, and vitamin C, which provide antioxidant, anti-inflammatory, moisturizing, and skin nourishing effects. Due to these beneficial properties, beetroot powder is considered a valuable ingredient for herbal skincare formulations. (2,6,18)

A. Need for Herbal Gel Face Wash

Synthetic cosmetic products often contain harsh chemicals such as parabens, sulfates, alcohols, and artificial fragrances that may cause irritation, dryness, or allergic reactions. Herbal formulations provide safer alternatives with fewer adverse effects and improved skin compatibility.

1) Herbal gel face wash formulations offer several advantages
2) Gentle cleansing action
3) Improved skin hydration
4) Antioxidant protection
5) Reduced skin irritation (9,16)

B. Aim

To formulate and evaluate an herbal gel face wash using beetroot powder for effective cleansing, moisturizing, and antioxidant skin care activity.

C. Objectives

To prepare a stable herbal gel face wash using beetroot powder.

1) To evaluate the physicochemical properties of the formulation.
2) To study the cleansing and foaming ability of the gel.
3) To evaluate skin compatibility and irritation potential.
4) To assess stability of the formulation under different storage conditions.
5) To develop a natural and safe cosmetic preparation for daily use. (11,13)

D. Drug Profile of Beetroot



Fig. No2 Beetroot

1) Biological Source -Beetroot consists of the swollen taproot of Beta vulgaris belonging to the family Chenopodiaceae.
2) Synonyms -Beetroot, red beet , garden beet
3) Chemical Constituents – Betalanins ,betacyanins ,folic acid,vitamin c,potassium,iron
4) Pharmacological Activities -Antioxidant activity,Anti-inflammatory activity,Skin nourishing effect,Moisturizing activity, anti ageing property.

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5) Mechanism of action -Mechanism of Beetroot in Facewash – Short VersionAntioxidant: Betalains + Vitamin C neutralize free radicals → prevent skin damage and sebum oxidation.Anti-inflammatory: Betanin inhibits COX-2 → reduces acne redness and irritation.Antimicrobial: Phenolics inhibit P. acnes and S. aureus → helps control acne.Brightening + Hydration: Vitamin C inhibits melanin; natural sugars bind moisture → gives glow, prevents dryness.Result: Cleanses gently while giving antioxidant, soothing, and mild brightening effect without stripping skin. (15,17,19)

II. MATERIALS USED IN FORMULATION

1) Beetroot Powder -Beetroot powder acts as the active ingredient. It provides antioxidant and skin revitalizing properties due to the presence of betalains and flavonoids.
2) Carbopol 940 -Carbopol 940 is used as a gelling agent to provide suitable consistency and viscosity to the formulation.
3) Sodium Lauryl Sulfate -Sodium Lauryl Sulfate acts as a cleansing and foaming agent that removes dirt and oil from the skin surface.
4) Glycerin -Glycerin acts as a moisturizer and prevents skin dryness after washing.
5) Methyl Paraben -Methyl Paraben is used as an antimicrobial preservative to increase shelf life
6) .Propyl Paraben -Propyl Paraben enhances preservation and prevents microbial contamination.
7) Triethanolamine -Triethanolamine neutralizes Carbopol dispersion and adjusts pH of the gel.
8) Rose Water -Rose water provides soothing, cooling, and refreshing effects and improves fragrance of the preparation.
9) Purified Water -Purified water acts as the vehicle for uniform mixing and dispersion of ingredients. (7,8,10)

A. *Method of Preparation*

1) *Preparation of carbopol gel base*



Fig no -3 carbopol gel base

Take the required quantity of distilled water in a beaker.Sprinkle Carbopol 934 slowly with continuous stirring.Allow it to hydrate for 20–30 minutes until a smooth gel base is formed.

2) *Preparation of beetroot extact :*

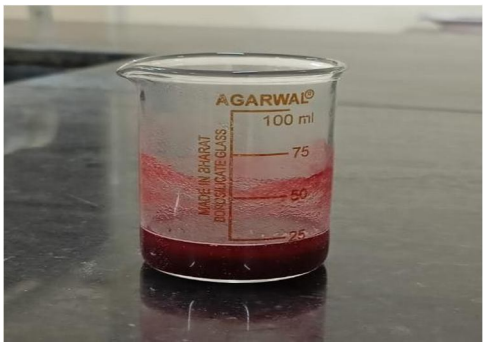


Fig no4 beetroot extact

Weigh the required quantity of beetroot powder.Mix it with a small quantity of rose water or distilled water.Weigh the required quantity of beetroot powder.

3) Preparation of turmeric extract

Take dried turmeric powder in a clean conical flask.Add sufficient quantity of ethanol or distilled water.Heat gently for 15–20 minutes with continuous stirring.Allow the mixture to cool and filter using muslin cloth or filter paper.Collect the filtrate and concentrate it to obtain turmeric extract.

4) Addition of Herbal Ingredients

Add aloe vera gel to the Carbopol base.Add glycerin as humectant. Incorporate the prepared urmeric extract slowly with stirring.Add methyl paraben and propyl paraben dissolved in warm water.

5) Addition of Surfactant

Add Sodium Lauryl Sulfate (SLS) slowly into the formulation. Stir gently to avoid excessive foam formation.

6) Incorporation of Beetroot Mixture

Add the beetroot dispersion into the gel base gradually.Mix thoroughly to obtain a uniform gel

7) pH Adjustment

Add triethanolamine dropwise with continuous stirring.Adjust the pH to 5.5–6.5 suitable for skin.

8) Addition of Rose Water

Add rose water for fragrance and soothing effect.Mix properly until a homogeneous formulation is obtained.

9) Final Mixing and Packaging

Stir gently to remove air bubbles.Fill the prepared herbal gel face wash into clean airtight tubes or containers.Store in a cool and dry place. (21,22)

B. Formulation Table

Sr No	Ingrident	Quantity
1	Beet root extact	5 ml
2	Turmeric extact	0.5 -1 ml
3	Alovera gel	3ml
4	Carbopol	1.75 gm
5	Methyl paraben	0.25 gm
6	Propl paraben	0.1 gm
7	Triethanolamine	1 ml
8	Sodium lauryl sulphate	2 gm
9	Glycerin	2 ml
10	Distilled water	QS
11	Rose water	QS

III. EVALUATION PARAMETER

A. Physical Appearance

The formulation is evaluated visually for:
Color,odor,texture ,homogenisity ,consistency

B. pH Determination

The pH of the formulation is measured using a digital pH meter. The ideal pH range for skin preparations is 5.5–7.

C. Viscosity

Viscosity is determined using a Brookfield viscometer to evaluate flow characteristics and consistency.

D. Spreadability

Spreadability determines ease of application of the gel on skin surface.

E. Foamability

Foamability is evaluated by shaking the formulation with water and observing foam formation.

F. Washability

Washability indicates ease of removal of the gel from skin using water.

G. Skin Irritation Test

The formulation is applied on skin to observe redness, itching, irritation, or inflammation.

H. Stability Study

The formulation is stored under different temperature conditions to evaluate changes in color, pH, viscosity, and consistency over time.

I. Extrudability

Extrudability measures the ease with which gel can be removed from the container. (23,14)

IV. RESULT AND DISCUSSION

Sr. No.	Test	Observation
1.	Colour	Reddish Pink
2.	Odour	Characteristic
3.	pH	5.5-6.5
4.	Washability	Good
5.	foamability	Foam appears
6.	Spreadability	spreadable
7.	Irritancy	Non irritant
8.	Microbiale Growth	No Microbiale Growth
9.	Consistency	Smooth

The herbal gel face wash formulated using beetroot powder shows good homogeneity, smooth texture, satisfactory spreadability, and acceptable viscosity. The formulation exhibits suitable cleansing and foaming properties due to the presence of sodium lauryl sulfate. Glycerin provides moisturizing effects and prevents excessive skin dryness after washing.

The antioxidant constituents present in beetroot powder help protect skin from oxidative stress and environmental damage. The formulation demonstrates acceptable pH and minimal skin irritation, indicating good compatibility with skin. Stability studies reveal that the herbal gel face wash remains stable without significant changes in color, odor, pH, or consistency under normal storage conditions. (20)

A. Advantages of Herbal Gel Face Wash

1) Natural and safe formulation
2) Less skin irritation.
3) Antioxidant protection
4) Moisturizing effect
5) Easy application and washability
6) Eco-friendly preparation
7) Uitable for regular use
8) Better skin compatibility (25)

V. CONCLUSION

The present review concludes that herbal gel face wash formulated using beetroot powder is an effective natural cosmetic preparation with antioxidant, cleansing, moisturizing, and skin nourishing properties. Beetroot contains valuable phytoconstituents such as betalains, flavonoids, vitamins, and minerals that contribute to improved skin health and protection against oxidative damage.

The formulated gel exhibits satisfactory physicochemical characteristics including suitable pH, viscosity, spreadability, foamability, and stability. The herbal preparation also shows good skin compatibility with minimal irritation. Therefore, beetroot powder can be successfully incorporated into herbal gel face wash formulations as a promising natural ingredient for daily skin care .(24,12)

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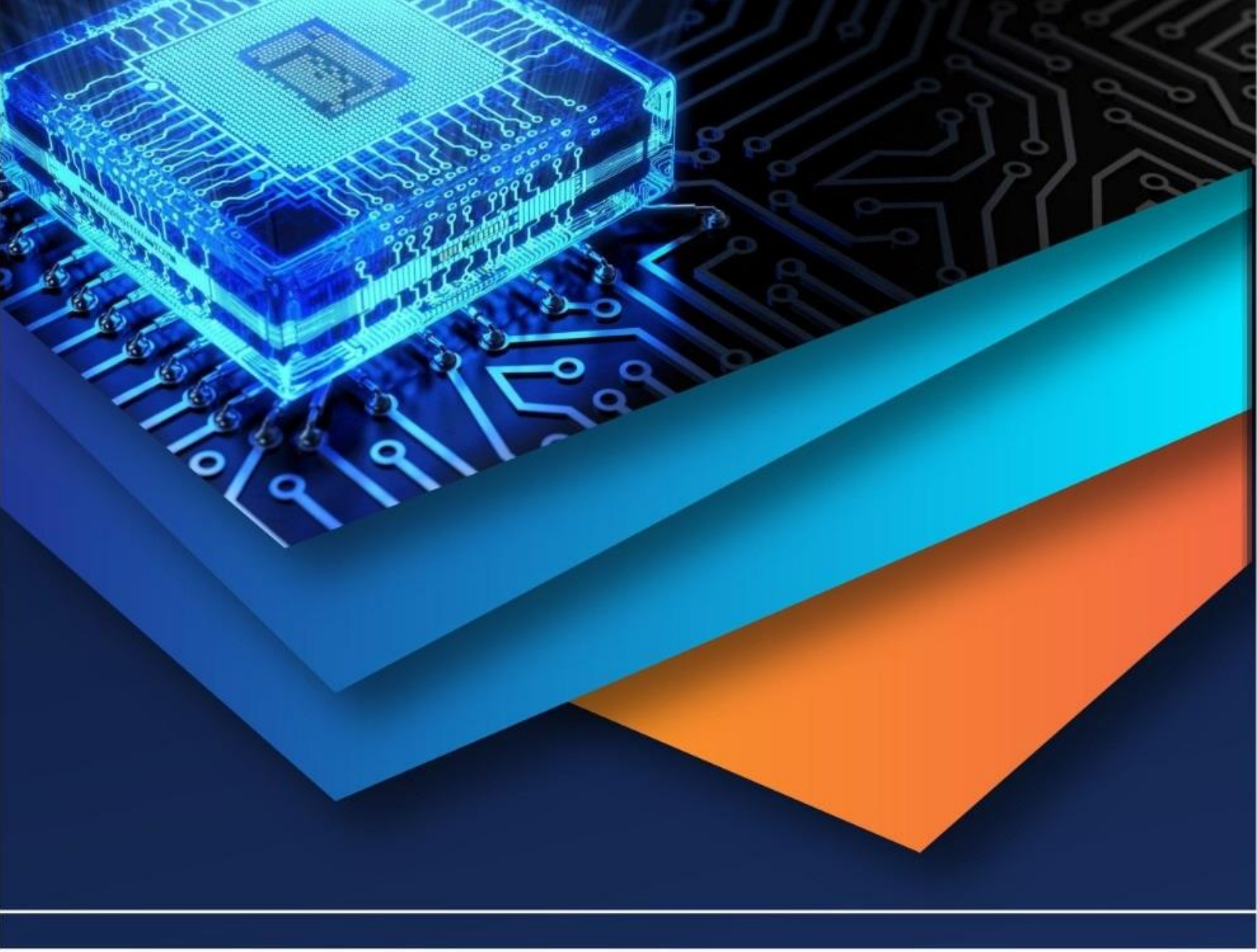
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