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Research Article

Formulation And Evaluaton Of Polyherbal Body Wash

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ABSTRACT

The growing demand for safe and natural personal care products has led to increased interest in herbal-based formulations. The present study focuses on the formulation and evaluation of a polyherbal body wash using plant-based ingredients known for their cleansing, antimicrobial, and skin-nourishing properties. The formulation incorporates herbal extracts such as aloe vera, tulsi, neem, and reetha, which collectively contribute to effective cleansing while maintaining skin health. The body wash was prepared using suitable surfactants, stabilizers, preservatives, and viscosity enhancers to ensure optimal consistency, stability, and usability. Various evaluation parameters including physical appearance, pH, viscosity, foam height, spreadability, and antimicrobial activity were assessed to determine the quality and performance of the formulation. The results indicated that the prepared polyherbal body wash exhibited good cleansing action, satisfactory foam formation, skin-friendly pH, and stability under different conditions. Additionally, the presence of herbal constituents provided mild antimicrobial effects and minimized the risk of skin irritation compared to conventional synthetic products, indicating its potential as a safer and effective alternative for routine skincare derivatives. The results showed encouraging antibacterial qualities and might be used as lead compounds to create novel antibacterial drugs.

INTRODUCTION

The skin, the largest organ of the human body, acts as a protective barrier against environmental pollutants, microorganisms, and harmful chemicals. Proper skin hygiene is essential to prevent infections, irritation, and dermatological

disorders. With increasing awareness of personal care, the use of cleansing products such as body washes has significantly increased.

Conventional body washes often contain synthetic surfactants, preservatives, and artificial additives that may cause skin dryness, irritation, and

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disruption of the natural skin barrier upon prolonged use. This has led to a growing preference for herbal and natural cosmetic formulations, which are considered safer and more skin-friendly.

Polyherbal formulations, consisting of multiple medicinal plants, offer synergistic therapeutic effects and improved efficacy. Neem (*Azadirachta indica*) exhibits antimicrobial activity, Aloe vera (*Aloe barbadensis*) provides moisturizing and soothing effects, Turmeric (*Curcuma longa*) possesses anti-inflammatory and antioxidant properties, and Reetha (*Sapindus mukorossi*) acts as a natural cleansing agent due to its saponin content

The present study focuses on the formulation and evaluation of a polyherbal body wash using selected herbal ingredients, with the aim of assessing its physicochemical properties, stability, and safety for topical application.

Characteristics

- **Natural Ingredients:** Herbal body washes are made from natural plant extracts, essential oils, and herbs.
- **Mildness:** They are generally milder than traditional body washes, making them suitable for sensitive skin.
- **Aromatherapy:** Many herbal body washes include essential oils that provide aromatherapy benefits, such as relaxation or invigoration.
- **Eco-friendly:** Herbal body washes often use organic or sustainably sourced ingredients, making them more environmentally friendly.
- **Variety:** There is a wide variety of herbal body washes available, catering to different skin types and preferences.

Advantages

- **Gentle on Skin:** Herbal body washes are less likely to cause irritation or dryness, making them suitable for people with sensitive skin.
- **Natural Fragrance:** The natural ingredients in herbal body washes provide a pleasant, natural fragrance without the use of artificial perfumes.
- **Moisturizing:** Many herbal body washes contain moisturizing ingredients that can help hydrate the skin.
- **Aromatherapy Benefits:** The essential oils in herbal body washes can provide therapeutic benefits, such as stress relief or improved mood.

Choice of Topic: Formulation and Evaluation of Polyherbal Body Wash

- The topic was selected due to the increasing demand for herbal and chemical-free skincare products.
- Conventional body washes contain synthetic surfactants and chemicals that may cause skin irritation and dryness.
- Polyherbal formulations provide synergistic effects, enhancing therapeutic efficacy with minimal side effects.
- Selected herbs like neem, tulsi, aloe vera, and turmeric offer antimicrobial, soothing, and antioxidant properties.
- The study focuses on developing an SLES-free, skin-friendly formulation suitable for daily use.
- It also allows practical understanding of formulation techniques and evaluation parameters in cosmetics.
- The topic has both industrial relevance and scope for innovation/entrepreneurship.

Objectives of Polyherbal Body Wash



- Formulation of a polyherbal body wash using neem, tulsi, aloe vera, turmeric, and other natural ingredients.
- Development of an mild surfactant system suitable for topical application.
- Evaluation of physicochemical parameters including pH, viscosity, and foaming ability.
- Assessment of formulation stability under varying storage conditions.
- Determination of antimicrobial activity against common skin microorganisms.
- Evaluation of skin compatibility and irritation potential.
- Analysis of cleansing efficiency and moisturizing properties.
- Promotion of herbal, biodegradable, and skin-friendly cosmetic formulations.

Skin Anatomy

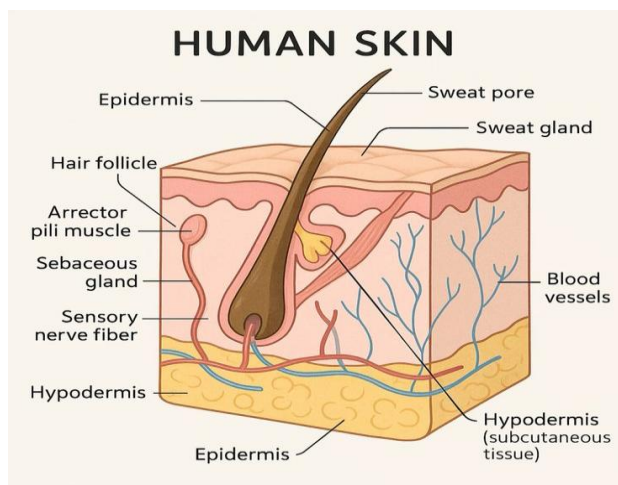


Fig 1- Skin Anatomy

The skin is primarily made up of three layers. The upper layer is the epidermis, the layer below the epidermis is the dermis and the third and deepest layer is the subcutaneous tissue (see fig.1 The Common Integument , Section of skin and The Common integument Section of epidermis.

It is a natural defence mechanism and is characterized by pain, fever, redness, swelling , and loss of function.

How to choose right BODY WASH for YOUR skin

Choosing the right body wash depends on understanding your skin type and selecting suitable ingredients. For dry skin, moisturizing formulations containing ingredients like aloe vera

or glycerin are preferred, while oily skin benefits from gel-based cleansers with oil-control properties. Sensitive skin requires mild, fragrance-free products to avoid irritation. It is also important to choose a pH-balanced body wash to maintain the natural skin barrier and prevent dryness. Avoiding harsh chemicals such as sulfates and artificial fragrances further helps in protecting the skin. Thus, selecting a bodywash based on skin needs rather than fragrance or brand ensures better skin health and hygiene.

Common Misconceptions About Body Wash

Most people think that using body wash daily can make your skin dry. However, body wash is gentle, mild, and balances pH, so you can use it twice daily or more. Another misconception about

bodywash is that it causes acne. Whereas body washes are effective in treating acne.

Body Wash Vs Bar Soap

Your skin type, naturally, should play a central role in deciding what you use for your skin. If you have dry skin, which can often be extremely flaky, then shower gel is your best option as they're known to be way more moisturizing than bar soap.

- Bar soaps available in the market often have synthetic surfactant that has the tendency to strip your skin of its natural oil.
- Bars also tend to have a high pH level, when this comes in contact with your body's naturally low pH level, it can cause irritation and a change in your skin's texture.
- Even with natural ingredients present in a soap bar, they may still have high pH levels

Natural Polyherbal Body Wash

As we know, Body Wash is commonly gel-based. Therefore, they do not overstay their welcome on our precious skin! The best part is that they keep the moisture locked-in and do not strip our skin of the natural oils we produce.

However, it's time you check the label of your favourite Body Wash. Take a look at the ingredients — if they include chemical surfactants or synthetic additives, they might be doing you more harm than good.

Herbs and botanicals, working in synergy to cleanse, nourish, and protect your skin — naturally. One of their greatest benefits is that they harness the potency of nature's own ingredients, eliminating the need for harsh chemicals to keep your skin clean and healthy.

Each herb in a polyherbal formulation brings its own unique benefit — whether it's soothing, antibacterial, antioxidant, or skin-brightening — making it far more effective than a single-ingredient or synthetic alternative.

HERBAL DRUG PROFILE

1. TURMERIC

Synonyms : Saffron Indian; haldi (Hindi); Curcuma; Rhizoma cur-cumae.

Botanical Name: Curcuma longa and Curcuma aromatica

Family: Zingiberaceae



Fig 2 - Turmeric

Biological sources: Turmeric powder is derived from the root of the turmeric plant (*Curcuma longa*), which is a member of the ginger family. The turmeric plant is native to India and other Southeast Asian countries, and is now cultivated in many tropical regions around the world.

Chemical Constituents: Turmeric contains yellow colouring matter called as curcuminoids

(5%) and essential oil (6%). The chief constituent of the colouring matter is curcumin I (60%) in addition with small quantities of curcumin III, curcumin II and dihydrocurcumin. The volatile oil contains mono- and sesquiterpenes like zingiberene (25%), α -phellandrene, sabinene, turmerone, arturmerone, borneol, and cineole. Choleric action of the essential oil is attributed to β -tolylmethyl carbinol.

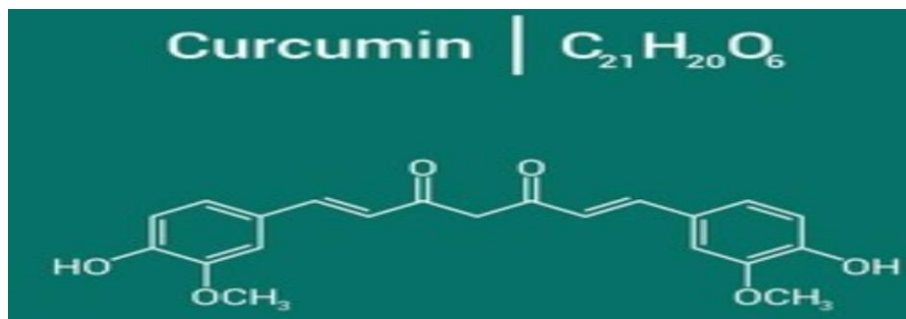


Fig 3 - Chemical Constituents

Mechanism of action of Turmeric : Turmeric is a potent antioxidant, anti-inflammatory, antimutagenic, antimicrobial, and anticancer. Due to its rich emollient properties, it aids in maintaining a balance between water loss and moisture absorption.

Uses of turmeric in Body Wash:

- Anti-inflammatory and Antioxidant properties.
- Helps with skin irritation and redness.

- Deeply cleansing and hydrating.
- Brightens complexion.
- Balances and evens skin tone and texture.

2. REETHA

Synonyms: Soapnut, Soapberry, Aritha.

Biological Name: *Sapindus mukorossi*; also *Sapindus trifoliatus*.

Family: Sapindaceae.



Fig 4- Reetha

Biological Source: Reetha consists of the dried pericarp (fruit rind) of *Sapindus mukorossi* or *Sapindus trifolius*, mainly obtained from plants grown in India, especially in the Himalayan region.

Chemical Constituents: Saponins are found throughout the plant, but are particularly concentrated in the fruit. Saponins are secondary plant metabolites with diverse biological activities. *Sapindus* saponins are a mixture of six sapindosides (sapindosides A, B, C, D and mukoriji saponins (E1 and Y1)), with sapindoside B as one of the main components, and have been characterized by liquid chromatography and mass spectroscopy. All *Sapindus trifolius* contain phenolic acids such as protocatechuic acid, cis-p-coumaric acid,

p - hydrobenzoic acid and cinnamic acid.

Mechanism of Action:

- Saponins act as natural surfactants.

- They reduce surface tension of water and produce foam.
- Help in emulsification of oils, dirt, and impurities.
- Facilitate easy removal of contaminants from skin.

Role in Polyherbal Body Wash:

- Acts as a natural cleansing agent.
- Provides foaming action without synthetic chemicals.
- Mild and suitable for sensitive skin.
- Exhibits antimicrobial activity.
- Enhances overall formulation effectiveness.

3. ALOEVERA

Synonyms: Aloe, Musabbar, Kumari

Botanical name: *Aloe barbadensis* miller

Family: Asphodelaceae (Liliaceae)



Fig 5-Aloevera

Biological source: Aloe is the dried juice collected by incision, from the bases of the leaves of various species of Aloe.

Chemical Constituents: Aloe vera contains more than 75 active constituents present mainly in the gel and yellow sap. The gel is composed mostly of water (>98%) along with polysaccharides, while the yellow sap contains hydroxyanthrone

derivatives. The major constituents include sugars such as monosaccharides (mannose-6-phosphate) and polysaccharides (glucomannans and acemannan). It also contains anthraquinones like aloin and emodin, sterols (cholesterol, campesterol, β -sitosterol, lupeol), and enzymes such as alkaline phosphatase, amylase, bradykinase, catalase, cellulase, lipase, and



peroxidase. Additionally, Aloe vera is rich in minerals (calcium, magnesium, potassium, zinc, etc.), hormones (auxins and gibberellins), amino acids (including essential ones), and vitamins A, C, and E, which contribute to its antioxidant properties.

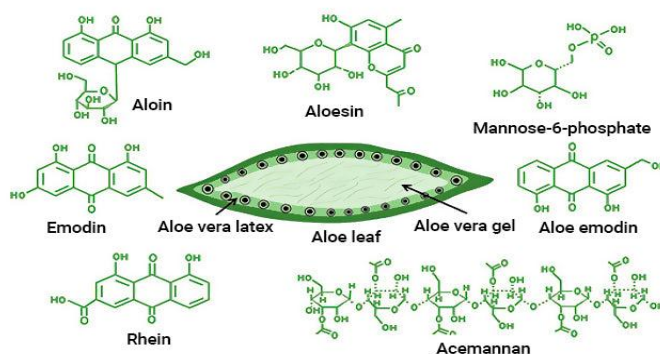


Fig 6- Chemical Constituents

Mechanism of action :

- Anti-inflammatory action: Aloe vera inhibits the cyclooxygenase pathway and reduces prostaglandin E2 production from arachidonic acid due to the anti-inflammatory compound called C-glucosyl chromone present in the gel.
- Antiviral and antitumor activity: These actions may be due to indirect or direct effects. Indirect effect is due to stimulation of the immune system and direct effect is due to anthraquinones.

- Skin conditioner: Improves softness and smoothness
- Healing agent: Supports repair of minor skin damage
- Antimicrobial agent: Helps control bacteria and fungi
- Base ingredient: Acts as a natural gel base improving texture and spreadability.

4. TULSI

Synonyms: Holy Basil, Basil ,तुलसी (Tulsi), Surasa.

Biological Name: Ocimum sanctum Linn. (also known as Ocimum tenuiflorum)

Family: Lamiaceae

Role in Polyherbal Body Wash:

- Moisturizing agent: Keeps skin hydrated and prevents dryness
- Soothing agent: Reduces irritation, redness, and itching



Fig 7- Tulsi

Biological Source : Consists of fresh and dried leaves of *Ocimum sanctum*, a small aromatic shrub native to India.

Chemical Constituents : Eugenol (phenolic compound), Ursolic acid (triterpenoid), Rosmarinic acid (polyphenol), Flavonoids (orientin, vicenin), Essential oils.

Mechanism of Action

- Antimicrobial: Disrupts microbial cell membrane (eugenol)
- Anti-inflammatory: Inhibits inflammatory mediators
- Antioxidant: Scavenges free radicals
- Immunomodulatory: Enhances skin defence.

Role in Polyherbal Body Wash

- Acts as a natural antibacterial agent.
- Helps prevent body odor & infections.
- Provides soothing and anti-acne effect.
- Enhances cleansing efficiency.
- Adds herbal fragrance and freshness.

5. SANDALWOOD

Synonyms: Chandan oil, Sandal oil, Yellow sandal wood oil.

Botanical name : *Santalum album*

Family: Santalaceae



Fig 8- Sandalwood

Chemical Constituents : Sandal wood oil contains mixture of two isomers α and β -santalol (90%), α and β -santalene, santalone, santanone, isovaleraldehyde, α and β -santallic acids, etc.

Mechanism of Action

- Antibacterial & Antiseptic – helps prevent microbial growth
- Anti-inflammatory – reduces irritation and redness
- Skin soothing – calms sensitive or inflamed skin
- Astringent effect – helps tighten pores and reduce fine lines

- Anti-acne activity – controls acne-causing bacteria
- Improves skin elasticity – supports skin renewal and cell turnover
- Skin barrier strengthening – protects against environmental damage

Uses

- Used as a fragrance and flavoring agent in cosmetics, perfumes, and pharmaceuticals
- Acts as a cooling agent in traditional medicine
- Used as an expectorant in respiratory conditions



- Applied in skin care preparations for acne, dryness, and irritation
- Suitable for daily care – especially for dry, sensitive, and oily skin types

Synonyms: Neem, Indian Lilac, Margosa, नीम (Neem), Nimba.

Biological Name : Azadirachta indica A. Juss.

Family : Meliaceae

6. NEEM

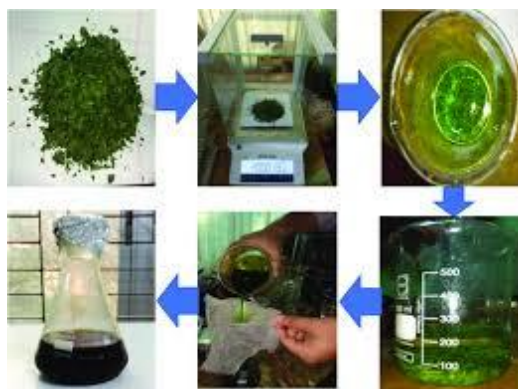


Fig 9- Neem

Biological Source : Consists of fresh and dried leaves, bark, and seeds of Azadirachta indica, a medium-sized evergreen tree native to India.

Chemical Constituents : The most important active constituent is Azadirachtin and the others are Nimbolinin, Nimbin, Nimbidin, Nimbidol, Sodium Nimbinate, Gedunin, Salannin, and Quercetin.

Mechanism of Action

- Antibacterial: Inhibits growth of bacteria and fungi
- Anti-inflammatory: Reduces skin irritation and redness
- Antifungal: Effective against skin infections

- Antioxidant: Protects skin from oxidative damage

Role in Polyherbal Body Wash

- Acts as a powerful antibacterial and antifungal agent
- Helps treat acne and skin infections
- Prevents body odor
- Purifies and detoxifies skin

7. ORANGE PEEL

Synonyms: Orange rind, Sweet orange peel, Dried orange peel.

Botanical Name: Citrus sinensis

Family: Rutaceae

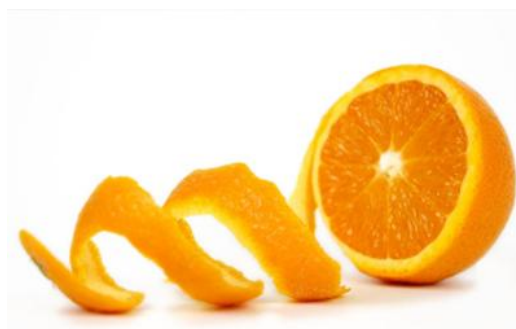


Fig 10 - Orange Peel

Biological Source : Orange peel consists of the fresh or dried outer pericarp (epicarp and part of mesocarp) of ripe fruits of *Citrus sinensis* (L.) Osbeck.

Chemical Constituents : The composition of the volatile oils is significantly different in flowers, leaves and peel. Linalyl acetate (50%), Linalool (35%), Limonene, Folic acid, D-limonene, Hesperidin, Naringin, Auraptene.

Mechanism of action:

- Orange peel contains bioactive compounds like flavonoids (hesperidin, naringin), carotenoids, and essential oils that show strong antioxidant and anti-inflammatory properties.
- Flavonoids reduce inflammation by regulating pathways like NF- κ B and MAPK, slowing inflammation-related aging.
- It inhibits matrix metalloproteinases (MMPs), preventing collagen breakdown and maintaining skin structure.

Role in polyherbal Body wash

- It acts as a natural cleansing and refreshing agent because of its essential oils, which help remove dirt, excess oil, and impurities from the skin.
- The presence of flavonoids and vitamin C provides strong antioxidant activity, protecting

the skin from oxidative damage and promoting a healthy glow.

SYNTHETIC DRUG PROFILE

1. HPMC

- Construction grade Hydroxypropyl Methyl Cellulose (HPMC) as a new building material, It is non-ionic cellulose ether made by natural refined cotton as raw material and series of chemical processing.
- It is odorless, tasteless and non-toxic white or slightly yellowish powder, which can be dissolved in water to form a transparent viscous solution.
- It is used as thickener, emulsifier, film-former, binder, dispersing agent, protective colloids and water-retention agents in construction mortar.

2. EDTA

Ethylenediaminetetraacetic acid (EDTA), also called EDTA acid, is an aminopolycarboxylic acid with the formula $[\text{CH}_2\text{N}(\text{CH}_2\text{CO}_2\text{H})_2]_2$. This white, slightly water-soluble solid is widely used to bind to iron ($\text{Fe}^{2+}/\text{Fe}^{3+}$) and calcium ions (Ca^{2+}), improves stability of herbal ingredients, enhances preservative action, forming water-soluble complexes even at neutral pH.

Benefits of EDTA

- Keeps pores clean by binding excess minerals and impurities
- Helps retain nourishment from oils and actives
- Improves the absorption of beneficial nutrients
- Maintains product freshness and consistency

3. SODIUM LAURYL SULPHATE

SLS is used as a primary surfactant in this formulation in combination with reetha extract. This means it lowers the surface tension between ingredients, which is why it's used as a cleansing and foaming agent.

Anionic surfactants are used in various cleansing products due to its ability to remove oils and dirt from the skin. SLS disrupts the lipid bilayers that help maintain the skin's barrier function, which helps to solubilize and emulsify the oily residues on the skin.

4. GLYCERINE

Glycerine functions as a humectant, a chemical that aids in the skin's ability to retain moisture. It can relieve dryness, increase skin moisture, and revitalize the skin's surface. Additionally, softens the skin because it is an emollient.

Benefits :

- Hydrating the skin's outer layer
- Relieving dry skin
- Protecting the skin barrier
- Exfoliating, Anti-aging
- Smoothing the skin
- Calming the skin Improving complexion

5. SODIUM BENZOATE

Sodium Benzoate is used as preservative in polyherbal body wash formulations to inhibit the growth of bacteria, yeast and fungi. It helps in

extending the shelf life of the product while maintaining its safety, stability and overall quality. It is most effective in slightly acidic conditions, typically within a pH range of 5-6, which is suitable for skin friendly formulations.

6. FRAGRANCE – LAVENDER OIL (ESSENTIAL OILS)

Lavender is the most widely used essential oil — and often the most diluted. The version that matters is *Lavandula angustifolia* (true lavender), not *lavandin*. Steam-distilled from the correct botanical, this oil retains its natural linalool profile — responsible for its soft aroma and calming character. A versatile essential oil for aromatherapy, skin, and scalp use. Always dilute before applying.

7. CITRIC ACID

Citric acid is one of the most commonly used organic acids in cosmetics and personal care products, typically produced through surface fermentation. It functions primarily as a pH regulator, helping maintain the proper acidity of body wash, cleansers, and creams so they remain gentle on the skin while supporting the skin's natural barrier. In addition, citric acid provides preservative support by enhancing the effectiveness of other preservatives, thereby helping to extend the shelf life of creams, lotions, and cleansing formulations.

8. SODIUM CHLORIDE

Sodium Chloride is used primarily as a viscosity-enhancing agent in polyherbal body wash formulations. It helps to adjust and increase the thickness of the product, providing a desirable consistency and improving ease of application. Additionally, it stabilizes the formulation by optimizing the performance of surfactants,



contributing to better texture and overall product quality.

FORMULATION OF POLYHERBAL BODY WASH

Table 1 - Formulation Of Polyherbal Body Wash

Sr. No.	Ingredient	Quantity	Unit	Role
1	Distilled Water	qs	ml	Vehicle
2	HPMC	1	g	Thickening Agent
3	Glycerin	12.5	ml	Humectant
4	SLS	3	g	Foam Stabilizer
5	Reetha Extract	5	ml	Foam Stabilizer And Cleanser
6	Neem Extract	5	ml	Antibacterial
7	Tulsi Extract	5	ml	Antinflammatory
8	Aloevera Extract	10	ml	Soothing Agent
9	Sandalwood Extract	2.5	ml	Cooling Agent
10	Orange Peel Extract	5	ml	Antioxidant
11	Turmeric Extract	5	ml	Antinflammatory and Antimicrobial
12	Sodium Chloride	1.5	g	Viscosity Adjuster
13	EDTA	0.5	g	Chelating Agent
14	Lavender Oil	0.5	ml	Fragrance
15	Colour	qs	-	Additive
16	Citric Acid	0.3	g	pH Stabilizer
17	Sodium Benzoate	0.5	g	Preservative

Preparation of Herbal Extracts

Method: Aqueous Extraction

• Procedure

1. Take dried powders: Neem, Tulsi, Orange peel, Sandalwood.
2. Weigh ~10g each powder.
3. Add 100ml distilled water.
4. Heat at 60-70°C for 30-45 min (do not boil strongly)
5. Cool and filter using muslin cloth/Whatman filter paper

6. Collect filtrate – use them as extract.

(store in refrigerator if not used immediately)

For Turmeric

- Use hydroalcoholic extract if possible (better curcumin extraction)
- Or simple aqueous extract

Method of Preparation

Step 1: Preparation of Base

A clean and dry beaker was taken, and the required quantity of distilled water was added. Glycerin was then incorporated into the water and mixed



thoroughly to form a uniform base. Aloe vera gel was added slowly to the mixture with continuous stirring using a magnetic stirrer (or glass rod) to ensure proper dispersion and to avoid lump formation.

Step 2: Addition of Surfactants

SLS was added gradually to the base mixture under gentle stirring. The mixture was stirred carefully to ensure proper blending of surfactants without generating excessive foam. Vigorous shaking was strictly avoided at this stage to maintain formulation stability.

Step 3: Incorporation of Herbal Extracts

The herbal extracts were added sequentially to the formulation in the following order: neem, tulsi, turmeric, sandalwood, and orange peel extracts. Each extract was added individually with continuous stirring to ensure uniform distribution throughout the mixture. This step enhances the therapeutic and antimicrobial properties of the formulation.

Step 4: Addition of Functional Ingredients

Honey was incorporated into the formulation as a natural humectant, followed by the addition of selected essential oils for fragrance and additional therapeutic benefits. The mixture was stirred continuously to ensure homogeneity.

Step 5: Preservation and pH Adjustment

A suitable preservative was added to enhance the shelf life of the formulation and prevent microbial growth. The pH of the formulation was measured using a calibrated pH meter. It was then adjusted to an optimal skin-friendly range of 5.5–6.0 using a small quantity of citric acid solution.

Step 6: Final Processing

The final formulation was mixed thoroughly to ensure complete uniformity. It was then allowed to stand undisturbed for 24 hours to eliminate entrapped air bubbles and to improve clarity and stability.



Fig 11- Final Formulation

EVALUATION STUDIES

Formulation was subjected to evaluation parameters to assess their:



- Physical properties (appearance , viscosity, spreadability etc)
- Chemical stability

1. Organoleptic Evaluation

The prepared gel formulation containing Lantana Camara was inspected visually to assess its:

- Color: Orange (Sienna)
- Odour: Pleasant
- Appearance: Creamy
- Syneresis: Absent (no liquid separation)
- Texture : Smooth

These attributes suggest good physical stability and patient acceptability of the formulation.

2. Measurement of pH

The pH of the lotion was measured using a digital pH meter:

- Procedure:**
1 gm of body wash was dissolved in 100 ml of distilled water and kept aside for 30 minutes. The pH was then measured in triplicate, and the average value was recorded.
- Result:**
The body wash formulation showed a pH of 5.5, which is ideal for topical application and compatible with skin pH.

3. Spreadability

The spreadability was expressed in terms of time in seconds taken by two slides to slip off from the cream, placed in between the slides, under certain load. Lesser the time taken for separation of the two slides better the spreadability. Two sets of glass slides of standard dimension were taken.. Then one slide of suitable dimension was taken and the cream formulation was placed on that

slide. Then other slide was placed on the top of the formulation. Then a weight or certain load was placed on the upper slide so that the cream between the two slides was pressed uniformly to form a thin layer. Then the weight was removed and excess of formulation adhering to the slides was scrapped off.

The upper slide was allowed to slip off freely by the force of weight tied to it. The time taken by the upper slide to slip off was noted.

$$\text{Spreadability} = \frac{m \times l}{t}$$

Where,

m- Standard weight which is tied to or placed over the upper slide (50g)

l-length of a glass slide (9 cm)

t- time taken in seconds.(15 sec)

$$= \frac{50 \times 9}{15 \text{ sec}} = 30 \text{ g.cm/sec}$$

Where,

m-Standard weight which is tied to or placed over the upper slide (50g)

l-length of a glass slide (9 cm)

t- time taken in seconds.(15 sec)

Result: 30g.cm/sec (Higher value – better spreadability)





Fig 12- Spreadability Test

4. Acute Skin Irritation Study

- The formulation was tested on human skin under controlled conditions.
- **Observation:** No signs of redness, irritation, edema, or allergic reaction were observed.
- **Conclusion:** The gel is safe for topical use and non-irritant to the skin.



Fig 13- Before



After

5. Dirt Dispersion Test

Two drops of Body wash were added in a large test tube contain 10 ml of distilled water. 1 drop of India ink was added; the test tube was stoppered

and shaken for ten times. Shown in figure given below. The amount of ink in the foam was estimated as None, Light, Moderate, or Heavy.

Result: None



Fig 14- Dirt Dispersion Test

6. Foam stability test:

The foam stability test for the polyherbal liquid body wash and placebo were performed by diluting 1g of the sample in 10 ml of distilled water in a test tube. The solution was shaken by turning the test tube back and forth, and the initial foam level was recorded. The tube was then left undisturbed for 10 minutes to measure the retained foam height.

Final Foam Height

Foam stability = ----- X 100

Initial Foam Height

4.5

= _____ X 100

5

= 90 %

Result: Indicates high foam stability.

7. Determination of foamability:

To determine foamability, 1g of the polyherbal liquid body wash or placebo was dissolved in 50ml of water in a beaker, shaken vigorously 10 times, and transferred to a 100ml measuring cylinder. The foam volume was then read directly.

Result : Found to be 1.5 cm .

8. Determination of viscosity

The viscosity of the prepared polyherbal body wash (250 ml) was determined using a Brookfield viscometer and found to be 6000 cP, indicating acceptable consistency and good flow properties.

9. Determination of Solid Content

Procedure:

- Take a known weight of body wash (e.g., 5 g) in a pre-weighed evaporating dish.
- Evaporate the sample on a water bath or hot plate until all water is removed.

- Dry the residue completely and cool in a desiccator.
$$= \frac{\text{Wt. of dry residue}}{5} \times 100$$
- Weigh the dish again.
$$= 30\%$$

Formula:

Wt. of dry residue

Solid content (%) = $\frac{\text{Wt. of dry residue}}{\text{Initial wt. of sample}} \times 100$

Initial wt. of sample

1.5

Result: The solid content of the body wash was found to be 30 %.

Significance: Indicates the amount of active ingredients and overall quality of the formulation.

RESULTS :

Table 2

SR. NO.	TEST	RESULTS
1	Organoleptic evaluation	Color- Orange (Sienna) Odour - Pleasant Appearance - Creamy Syneresis- Absent (no liquid separation) Texture - Smooth
2	Measurement of pH	5.5
3	Spreadability	30g.cm/sec
4	Acute Skin Irritation study	Non-irritant
5	Dirt Dispersion Test	None
6	Foam Stability Test	High foam stability
7	Determination Of Foamability	1.5cm
8	Determination Of Viscosity	6000 cP
9	Determination Of Solid Content	30%

CONCLUSION:

The study successfully formulated and evaluated a polyherbal body wash using medicinal plant extracts such as neem, tulsi, aloe vera, reetha, turmeric, sandalwood, and orange peel along with suitable excipients. The formulation showed satisfactory results with a skin-friendly pH (5.5), good spreadability, high foam stability, and acceptable viscosity, ensuring effective cleansing and ease of use.

Organoleptic properties confirmed good stability and user acceptability, while the formulation demonstrated effective cleansing action and no signs of skin irritation, indicating safety for regular use. The herbal ingredients provided multiple benefits including antimicrobial, anti-inflammatory, antioxidant, moisturizing, and soothing effects.

Overall, the developed polyherbal body wash is a safe, effective, and skin-friendly alternative to



synthetic products, with potential for further research and commercial development.

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