iJRASET
International Journal For Research in Applied Science and Engineering Technology



# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

**Volume:** 14 **Issue:** I **Month of publication:** January 2026

**DOI:** https://doi.org/10.22214/ijraset.2026.76726

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538*
*Volume 14 Issue I Jan 2026- Available at www.ijraset.com*

# Development and Optimization of a Tulsi Based Hand Wash

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***Abstract:*** ***The main aim of this study is to formulate and evaluate a poly-herbal hand wash using natural ingredients like aloe vera and lemon juice. This formulation is intended to have fewer side effects and provide better hand cleaning. Since hands are a primary source of spreading infections, especially in children and workers in the pharmaceutical industry, the use of hand wash is essential in such environments. The prepared hand wash was tested for various physical parameters such as color, smell, pH, viscosity, and stability, and it showed good results with effective hand-cleaning properties. This highlights the importance of using antiseptic hand washes to prevent infections.***
***Additionally, the study focused on evaluating the antibacterial activity of different herbal oils, including cinnamon oil, eucalyptus oil, menthol oil, and lavender oil. Among these, cinnamon oil showed the best antibacterial effect. Based on these findings, a poly-herbal hand wash gel containing cinnamon oil was also formulated and evaluated.***
***Keywords: Poly-herbal hand wash, Aloe vera, Lemon juice, Antibacterial activity, Cinnamon oil ,Natural ingredients.***

## I. INTRODUCTION

Herbal medicine, also referred to as botanical therapy or phytomedicine, utilizes various plant parts—such as seeds, roots, leaves, bark, and flowers—for therapeutic and medicinal applications.For centuries, herbal medicines have been used to treat a wide range of diseases. Since the skin is the most exposed part of the body, it needs protection from harmful microorganisms. Hand washing plays a key role in preventing the spread of infections, especially in healthcare, food handling, and daily life.

Good hand hygiene is the simplest and most cost-effective method to prevent infections, especially in hospitals (nosocomial infections). The main goal of hand washing is to clean the hands by removing dirt, soil, and disease-causing microorganisms. Maintaining hygiene is essential for overall health and preventing the spread of both bacterial and viral infections.

Herbal treatments promote a healthy life and are commonly used as the first line of defense in traditional systems like Ayurveda, Unani, and Siddha. These natural remedies are known to help in treating wounds, inflammation, skin diseases, leprosy, diarrhea, scabies, ulcers, and even conditions like snake bites. Plants are a rich source of antimicrobial agents. Plant extracts have shown strong antibacterial activity against many pathogens, especially those resistant to synthetic drugs. Since hands are a major source of infection transmission, using herbal hand washes can be an effective and natural way to reduce microbial load.

This study focuses on formulating a herbal hand wash gel using Neem (Azadirachta indica), Aloe vera (Ghrita-kumari), and Lemon (Citrus limon). Neem, which belongs to the Meliaceae family, has been used in traditional Indian medicine for its antibacterial, antiviral, and antifungal properties. Neem oil, bark, and leaves have been used to treat leprosy, respiratory issues, intestinal worms, and other conditions.

. It is traditionally used for cleaning and preserving food. Its juice is often used in Indian medicine to fight microbial infections.

The link between hand washing and disease prevention was recognized in the 19th century. In 1847, Dr. Ignaz Semmelweis in Austria discovered that doctors were spreading infections through unwashed hands, even after autopsies. He suggested that "cadaverous particles" caused infections like childbed fever. Although his ideas were not accepted immediately, Louis Pasteur later provided scientific evidence supporting his theory, helping the concept gain worldwide acceptance.

In the 1980s, hand hygiene practices improved significantly. The first national guidelines on hand hygiene were released, followed by similar guidelines in other countries. In 1995 and 1996, the Centers for Disease Control and Prevention (CDC) in the USA recommended using antimicrobial soaps or alcohol-based sanitizers to clean hands effectively.

This study aims to combine traditional herbal knowledge with modern hygiene practices by developing a safe and effective herbal hand wash.

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### A. *Aim*

Development and optimization of a tulsi based handwash.

### B. *Objectives of the Study*

1) To promote consistent and improved hand hygiene practices.
2) To eliminate harmful germs and microorganisms that can cause infections.
3) To raise awareness about how illnesses are often caused by germs that travel from hands to the mouth, eyes, nose, etc.
4) To help reduce the rate of infections, especially those acquired in healthcare settings.

### C. *Plan Of Work*

1) Selection of Base for Herbal Hand Wash
2) Collection of Herbal Ingredients
3) Materials and Methods
4) Procurement of Raw Materials
5) Formulation of the Herbal Hand Wash
6) Evaluation and Testing of the Herbal Hand Wash
7) Observation and Results
8) Conclusion

## II. DRUG PROFILE

### A. *Tulsi*



Fig no 1: Tulsi (*Ocimum sanctum*)

#### 1) *Scientific Classification Of Tulsi*

| Taxonomical Rank | Taxon |
|---|---|
| Kingdom | Plantae -plants |
| Division | magnoliophyta |
| Class | Magnoliopsida |
| Order | Lameness |
| Family | Lamiaceae |
| Genus | *Ocimum* L |
| Species | *Ocimum* tonuiflorum |
| Biological name | *ocimum tenuifloram/Ocimumsanctum* |
| Nepali name | Tulsi |

Table no 01: Scientific Classification of Tulsi

TULSI

*Ocimum sanctum* commonly known as holy basil or Tulsi. Tulsi consist of fresh and dried leaves of *ocimum sanctum* belonging to family *Lamiaceae*. Tulsi is an aromatic perennial plant.tulsi known for its detoxifying purifying and antimicrobial properties.tulsi helps to protect your hands by killing 99.99%of germs. Tulsi now,days cultivated commercially for its volatile oil.it is much branched small herb 30 to 75cm in height. All parts of tulsi are used in medicine especially fresh and dried leaves.leaves are ablong acute with entire sterolate margins pubscent on both sides and minutely gland dotted. The leaves are green in colour with aromatic flavors and slightly compressed. Seeds are reddish black and subglobose. The leaf is dorsiventral stomach are of dicyclic type. Particularly abundant on lower surface.

*2) Chemical Constituents*

| | |
|---|---|
| Chemical constituents | Eugenia 70% |
| | Carvacrol 3% |
| | Eugene methyl Ether- 20% |
| | Caryophyllin |
| | Alkaloids |
| | Glycosides |

Table no 02: Chemical constituents

*3) Uses*

- Stimulants
- Aromatic
- Spasmolytic
- Antifungal
- Antiviral agents
- Tulsi can cure fever
- Tulsi is used to treat insect bites

*B. Aloe-Vera*

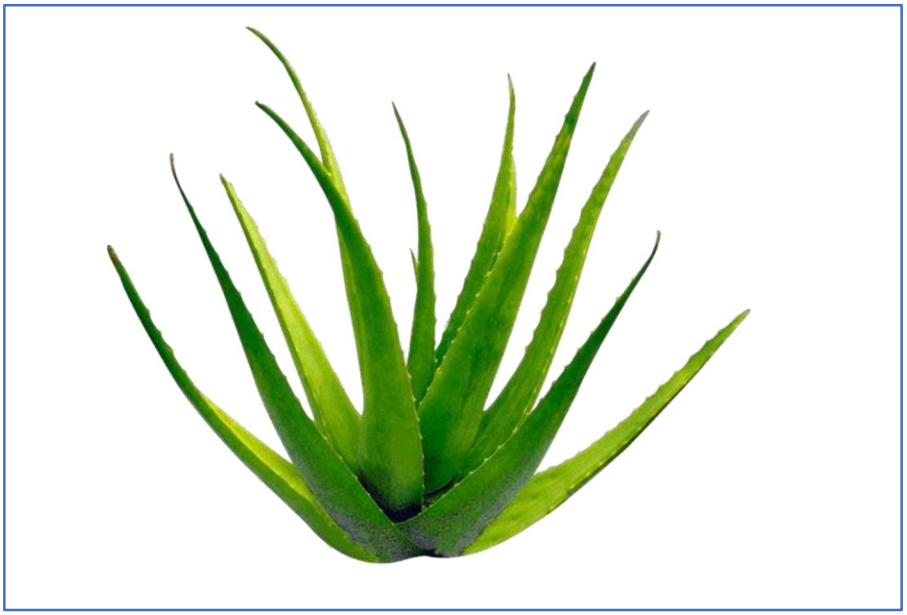


Fig no 2: Aloe vera (*Aloe barbadensis*)

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*1) Scientific Classification Of Aloe vera*

| Taxonomical Rank | Taxon |
|---|---|
| Kingdom | Plantae -plants |
| Division | magnoliophyta |
| Class | Liliopsida |
| Order | Aspargels |
| Family | Liliaceae . xanthorrhoeaceae |
| Genus | *Aloe L* |
| Species | *Aloe barbadensis mill* |
| Biological name | *Aloe barbadensis , aloe officinalis* |
| English name | Indian aloe , small aloe |

Table no 03: Scientific Classification Of Aloe vera

ALOE-VERA

Aloe is the dried juice collected by incision from the basis of the leaves of various Species of aloe.Aloe perry Baker,aloevera linn,or Aloe barbandesis belonging to family liliaceae,Aloe perry Baker is found in socotra and zanzibar Islands and in their neighbouring areas and so the obtain from these Species is known as soothing and zanzibar.Aloevera linn also known as vulgaris or Aloe barbendesis.aloe is an perennial growing to 0.8by 1ml ata slow rate. The plant prefers light (sandy)and medium soil. Can grow nutritionally poor soil. The plant prefer acid basic and neutral soil. It cannot grow in shade it requires dry or moist soil and can tolerate drought.They are xenophobic plant .it can be propagated by seeds.seeds are shown in the spring in warm green house.

*2) Chemical Constituents*

| | |
|---|---|
| Chemical constituents | Aloins |
| | Barbaloins |
| | Isobarbaloins |
| | Aloetic Acid |
| | Anthracene (11 -40%) |
| | Aloinosides A, B |

Table no 04: Chemical constituents:

*3) Uses*

- Relieves the burned skin caused by skin.
- Smooth and glowing skin can be achieved with the help of Aloe.
-

*C. Citrus Lemon*



Fig no 3 : Citrus Lemon ( *Citrus Limonis* )

*1) Scientific Classification Of Citrus Lemon*

| Taxonomical Rank | Taxon |
|---|---|
| Kingdom | Plantae -plants |
| Division | Mangoliophyta |
| Class | Mangolioosida |
| Order | Sapindales |
| Family | Rutaceae |
| Genus | *Citrus L* |
| Species | *C. Limon* |
| Biological name | *Cirus lemon* |
| English name | *Citrus limon* |

Table no 05: Scientific Classification Of Citrus Lemon:

LEMON

The Limon citrus Limon is a species of small evergreen tree in the flowering plant Family Rutaceae native to South Asia.primarly eastern India.

It is obtained from the ripe or nearly ripe fruit of citrus Limon belonging to the family rutaceae.The main raw material of citrus Limon is the fruit particularly essential oil and juice is obtained from it . Citrus Limon fruit juice has traditionally been used as a remedy for survey before the discovery of vitamin c

*2) Chemical Constituents*

| | |
|---|---|
| Chemical constituents | Terpenes oil |
| | 90% Limonene |
| | Terpenolene |
| | Citral and Citonellal |
| | Linolool |

Table no 06: Chemical constituents:

*3) Uses*

- The oil used in pharmacy and cosmetic formulation as, a flavour or aroma Corrigan as, well as natural preservative ➢ Flavouring agent and in perfumery.
- Terpeneless lemon oil is 20 times stronger than Lemon Oil.

## III. FORMULATION TABLE

| Ingredients | Quantity | Action |
|---|---|---|
| Tulsi Extracts | 8ml | Antimicrobial Agents |
| Citrus Lemon | 4ml | Antiseptic |
| Aloe-vera gel | 6ml | Healing Agents |
| Eucalyptus Oil | 0.5ml | Cooling Agents |
| Glycerin | 12ml | Moisturizing Agents |
| Methyl paraben | 0.3ml | preservatives |
| Reetha | 2 gm. | Foaming Agent |
| Water | Upto 60ml | - |

Table no: 7 formulation table

## IV. PROCEDURE

*1)* Prepare a methanolic extract of Tulsi leaves and mix it with 4 ml of Citrus limon (lemon) juice in 20 ml of distilled water.
*2)* Add Aloe vera gel in double the quantity and then incorporate an extract of *Sapindus mukorossi* (Reetha) to enhance foaming ability.
*3)* Gradually add the required amount of glycerin and eucalyptus oil while stirring gently to ensure proper mixing.
*4)* Add an appropriate quantity of preservative to maintain the stability and shelf life of the formulation.
*5)* Include Reetha powder as a natural foaming agent.
*6)* Mix the entire solution thoroughly until a uniform and homogeneous blend is obtained at room temperature. The final formulation is then ready for further evaluation and testing.

## V. EVALUATION PARAMETERS

*A. Physical Evaluation*

*1)* Appearance: - It was determined visually.
*2)* PH :- The ph was determined using digital ph meter and the ph of herbal wash was found to be 5.2
*3)* Colour:- It was determined visually.
*4)* Odour :- it was,determined manually.
*5)* Stability studies:- The stability of herbal hand wash gel was carried out by storing measured amount of gel at different temperature I.e.25'c,37'c,40'c.for one week during stability studies no change in colour and no phase separation were observed in the formulated hand wash.

*B. Foam height*

*1)* 1ml of sample of herbal hand wash taken and dispersed in 50ml distilled water.
*2)* Then transferred it into 500ml stoppers measuring cylinder, volume make up to 100ml with water.
*3)* 25 stroke was given and stand till aqueous volume measured upto 100ml and measured the foam height.

*C. Foam Retention*

50ml of herbal hand wash was taken into a 250ml graduated cylinder and shaken ten times.The volume of foam at 1minute interval for minute was recorded foam Retention should be stable at least 5 min**.**

### *D. Irritancy Test*

There was no adverse reaction is observed, the formulation is considered non-irritant and safe for skin use.

## VI. RESULT AND DISCUSSION

The formulated herbal hand wash was evaluated based on various parameters such as color, odor, pH, viscosity, stability, foaming ability, and skin irritancy. The results were found to be satisfactory and within acceptable limits.

### *A. Discussion*

The herbal hand wash formulated with natural ingredients showed promising results in terms of physical, chemical, and antimicrobial properties. It was effective in removing dirt and provided a gentle yet efficient cleansing effect. The combination of plant-based ingredients not only ensures safety but also contributes to the skin-friendly nature of the formulation. Compared to synthetic hand washes, the herbal version offers a natural, eco-friendly alternative without harmful side effects.

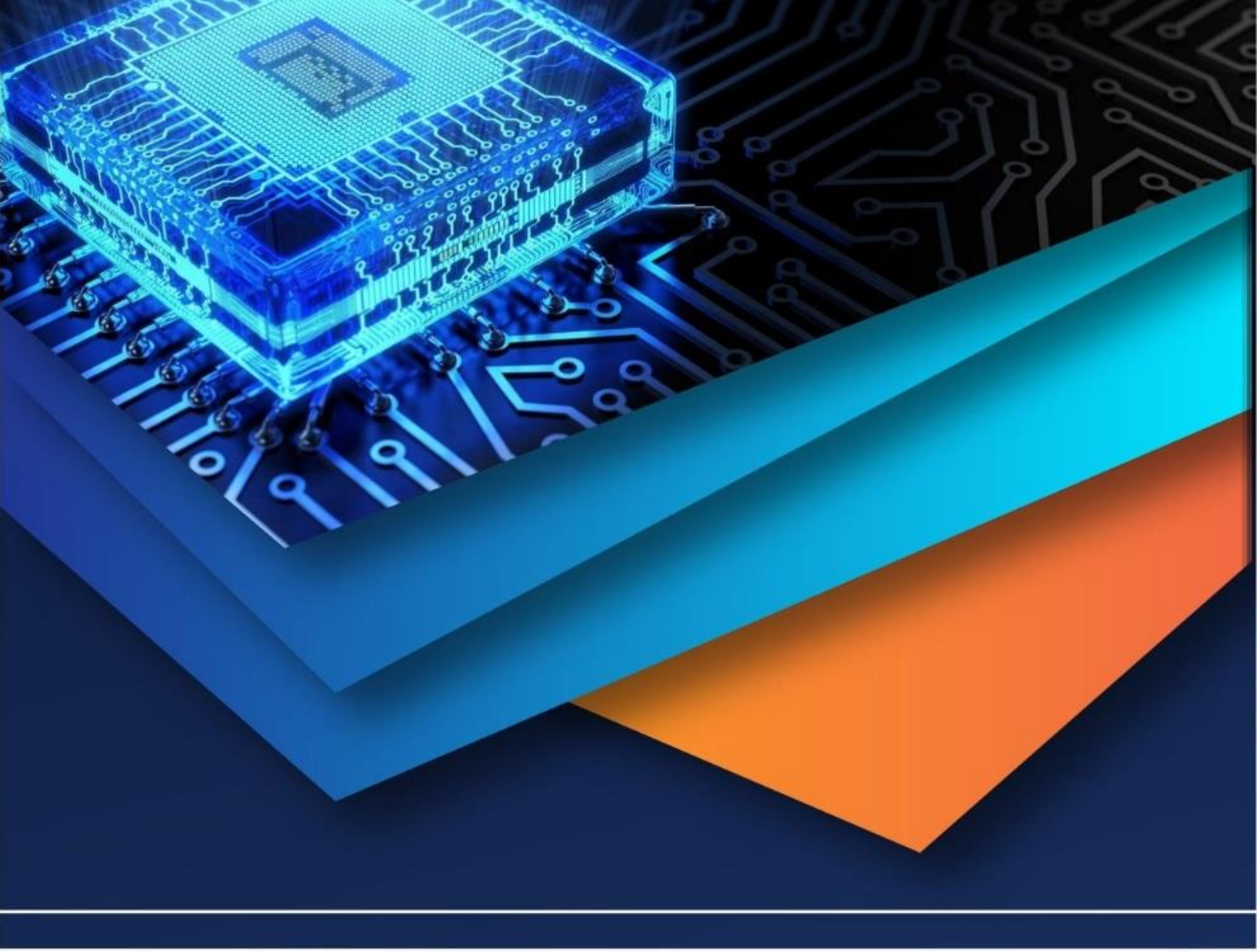
## VII. CONCLUSION

Hands are the primary source of disease related to skin, respiration, gastro intestinal tract etc. due to various disease and germs, the bar soap get contaminated which may lead to spread of germs. In this sophisticated world liquid hand washes are used much more frequently then the bar soap, the additional Advantages is the soap in the liquid hand wash is untouched leading uncontaminated. Hand wash with every new pump.

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