

# Formulation and Evaluation Polyherbal Handwash

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**Abstract:** *The present investigation aims to design antimicrobial Polyherbal Handwash by using different types of herbal plants like Aloe vera, neem, mimosa pudica. Formulations of polyherbal hand wash were prepared and the formulations were evaluated like appearance, color, odor, pH, viscosity, foam height, and foam retention time. The antimicrobial activity of the six hand wash formulations was tested using the agar plate method against Staphylococcus aureus and Escherichia coli. The herbal hand washes showed significant antibacterial action, according to the zone of inhibition results. In the culture plates, the activity of polyherbal hand wash formulation revealed significant inhibition of bacterial growth. It was non-irritating to the skin. As a result, these plant ingredients can be used to make herbal hand wash on a commercial basis. This review is all about Polyherbal Hand wash. In this article we have given more emphasis on why one should use herbal hand wash and their different methods to prepare polyherbal hand wash. Hands are responsible for transmission of microbes and infections. From the time of Pandemics people get to know the importance of hand hygiene and herbal preparations. We can reduce the risk of transmitting infection by proper hand hygiene. There are a good many synthetic hand wash formulations available in the market with a few adverse effects like itching, dermatitis, irritation and with increased antibiotic resistance in microorganisms, etc. To overcome these adverse effects and herbs antibiotic activity various efforts have been made to prepare Polyherbal hand wash.*

**Keywords:** Aloe vera, neem, mimosa pudica, anti-bacterial

## I. INTRODUCTION

Hand washing with soap and water has been taken part of personal hygiene for hundreds of years and has been usually embedded in spiritual and cultural behavior. Although, the link among Hand washing and the spread of disease changed into set up simplest two centuries in the past, despite the fact that this can be considered as extraordinarily early with admire to the discoveries of Pasteur and Lister that passed off decades later. In the middle of 19th century, Ignaz Semmelweis in Vienna (Austria), and Oliver Wendell Holmes in Boston (USA), revealed that the hands of health care workers spread nosocomial infection.

In 1847, observations of Semmelweis concluded that after performing autopsies by physician on their hands had a disagreeable odor despite hand washing with soap and water before entering the clinic. He hypothesized therefore that "cadaverous particles" were transmitted via the hands and caused the childbed fever. After a theory of disease offering developed by Pasteur, Semmelweis's findings go worldwide acceptance after his death, when Pasteur developed the scientific theory of disease offering a theoretical explanation for Semmelweis's findings. In 1980s remarkable evolution made in concepts of hand hygiene in health care. Simultaneously in the same year first national hand hygiene guidelines were published, furthermore several other countries also published the new guidelines in this array. In the year 1995 and 1996, the CDC/HICPAC within the USA recommended that besides antimicrobial soap or alcoholic antiseptic agent be used for washing hands.

**Anatomy and physiology of skin:** Skin is the layer of usually soft, flexible outer tissue covering and largest organ of the human body that plays a physical barrier between the external and the internal environment that serves function of protection and homeostatics. PH of skin is 4 to 5.6. The Skin composed of three layers:

- a) Epidermis
- b) Dermis

c) Subcutaneous Tissue.

**Epidermis** The Epidermis is a thin layer of skin. It is the outer layer of skin. It is composed of epithelial tissue. Functions of the epidermis include touch and protection. This skin is further divided into five separate layers, they are the: 1) Stratum Corneum The Stratum Corneum is the outermost layer of epidermis, and is made up of 10 to 30 thin layers of continually shedding, dead keratinocytes. The corneum is referred to as the 'Horny layer', because its cells are toughened like an animal's horn

**Stratum Lucidum** Present only in skin of fingertips, palms, and soles; consists of four to six rows of clear, flat, dead keratinocytes with large amounts of keratin.

**Stratum Granulosum** The Stratum Granulosum is a thin layer which is placed in between the stratum spinosum and stratum lucidum. This layer helps to form a waterproof barrier that functions to prevent fluid loss from the body. In this layer production of keratin occurs which is the main component of skin.

**Stratum Spinosum** The Stratum Spinosum layer is found in between the stratum basale and the stratum granulosum. This layer provides strength and flexibility to skin.

**Stratum Basale (Stratum germinativum)** Eight to ten rows of many-sided keratinocytes with bundles of keratin intermediate filaments; contains projections of melanocytes and intraepidermal macrophages.

**The Dermis:** The Dermis is a middle layer of skin. Underneath the epidermis lies the dermis. As there is presence of blood vessels the skin is nourished due to oxygen and nutrients and helps to remove waste products. It contains nerves that help us relay signals coming from the skin. These signals include various sensations like touch, pressure, temperature, etc. It also contains Collagen, a protein that is responsible for giving skin strength.

**The Subcutaneous Tissue / Hypodermis / Subcutis:** It is the innermost layer of the skin which is made up of fat cells and connective tissue. The Subcutis acts as a layer of insulation to protect internal body organs and muscles from shock and changes in temperature. Skin being the most exposed part of our body requires protection from skin pathogens. Usually, transient and resistant flora types of microbes are present on the hands. Resident flora (E. g., *Staphylococcus aureus*) colonize deeper skin layers, Transient flora (Gram negative bacilli) which colonize the superficial skin layers and these microbes are easily removed by hand washing. In the current scenario of mechanized life style, natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. Herbal formulations have growing demand in the world market. Considering this ultimatum; an attempt has been made to screen classical literature for the herbs with antimicrobial properties and found that *Azadirachta indica* (Neem) and *Mentha Piperita* (Pudina) has this antimicrobial activity.

#### **Aloevera**

- Kingdom : Plantae
- Order : Asparagales
- Division : Spermatophyta
- Subdivision : Angiospermae
- Class : Monocotyledonous
- Family : Lamiaceae
- Genus : Aloe
- Species : *barbadensis* Mill

**Medicinal use of allover** -Aloe vera gel's anti-inflammatory properties help wounds heal faster due to its antibacterial properties. Aloe gel inhibits *Streptococcus pyogenes* and *Streptococcus faecalis*, two types of bacteria. It kills *Pseudomonas aeruginosa* by killing bacteria. Aloe vera's liquid and leaf pulp combat pathogenic fungi in plants. Additionally, the preparation of aloe gel inhibits *Candida albicans*. By interfering with the synthesis of proteins, the lectin-rich fraction of aloe gel directly inhibits the growth of cytomegalovirus. Aloe leaf anthraquinone derivatives have been shown to kill enveloped viruses. The majority of viruses, including Varicella zoster, influenza, the pseudorabies virus, and herpes simplex viruses, are inactivated by aloe emodin.

**Neem**

- Kingdom: *Plantae*
- Subkingdom: Tracheobionta
- Division: Magnoliophyta
- Class: Eudicot
- Subclass: Rosidae
- Order : Sapindales
- Family: Meliaceae
- Genus: Azadirachta
- Species : *A . indica*



**Medicinal uses**

Azadirachtaindica is a member of the meliaceae family of plants. Neem is its common name. It is a source of many therapeutic agents in traditional medicine. It is known that the leaves of neem have antimicrobial and antifungal properties against a variety of pathogenic bacteria, including *E. coli*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*. Neem is a versatile tree that has numerous health benefits. It was demonstrated that various parts of the tree had antimicrobial properties against a wide range of microorganisms. Moreover, Neem leaves might be utilized for the therapy of different sicknesses including dermatitis, ringworm, skin break out, irritation, constant injury contamination, hyperglycemia, diabetic foot and gas gangrene.

**Mimosa pudica**

- Kingdom:-Plantae
- Clade:-Tracheophytes
- Clade:-Angiosperms
- Clade:-Eudicots
- Clade:-Rosids
- Order:-Fabales
- Family:-Fabaceae
- Subfamily:-Caesalpinioideae
- Clade:Mimosoid clade
- Genus:-Mimosa
- Species:-*M. pudica*

**Medicinal uses**

From the above experimental data it is clear that a polyherbal handwash formulation with herbal ingredients such as aloe, *Mimosa pudica* and *Azadirachtaindica* has good characteristics and also possesses a good antimicrobial activity against *Bacillus subtilis*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* .



### **Methods of preparation**

#### **Aim and objective of the present work**

The aim of the present study is to formulate and evaluate herbal hand wash gel by Using extracts of Azadirachta Indica (neem powder), aloe , mimosa pudica , carbopol 940 (gelling agent), methyl Paraben (preservative), Glycerin (softening agent), distilled water, (vehicle), Turmeric (colorant), rose oil (perfume).

#### **Objective**

To select the plant materials.

To extract powders from plants by air drying method to get particle free extract

To prepare herbal hand wash gel by using suitable agents.

To evaluate herbal hand wash gel.

#### **1) Procedure**

Polyherbal Hand wash Gel was prepared using Carbopol 940 as Gelling agent which is soaked in 15ml distilled water overnight.

Neem and Peppermint extracts, Rita Powder along with Tulsa and Clove oil were measured accurately and Dissolved by gentle heating.

After heating, keep the solution aside for sometime.

The required quantity of Sodium lauryl Sulphate dissolved in 10ml distilled water along with Glycerine were mixed In above aqueous phase with continuous stirring.

5) The methyl paraben was dissolved in remaining quantity of purified water and dispersed into the extract.

6) The swelled polymer (Carbopol 940) was stirred using a mechanical stirrer to ensure the uniform dispersion of polymer and finally added into the above mixture to form a Homogenous Gel and then the required quantity of Rose oil was added for Fragrance.

7) Lastly, it was stored in well closed container and labelled suitably for further analysis [5,6].

#### **Advantages of Herbal Hand wash:**

1) No side effects.

2) Bacteria on our hands can be minimized.

3) It also helps to clear antiseptic and fungal problem faced by the skin.

4) It also helps to remove dirt and oil effectively from the skin.

5) Easier access compared to using soap and water.

6) The easiest way to get rid of microorganism.

7) Hand wash prevent germs from entering into our body.

#### **2) Procedure**

1) extract of neem and mimosa pudica leaves is mixed with 4ml citrus neem juice in 20ml of water. 2) Then add aloe vera twice and add extract of sodium lauryl sulphate to produce sufficient foaming capacity. 3) Then add desired quantity of glycerin and rose oil with moderate stirring.

- 4) At the end add preservative in sufficient quantity .
- 5) The solution is mixed, made homogeneous under room and further utilized for screening activity

#### **Evaluation test for herbal hand wash**

##### **Foam Height**

One gram of sample of hand wash gel was taken and dispersed in 50ml distilled water. Dispersion was transferred to 500ml measuring cylinder. Volume was made up to 100ml with water. 25 strokes were given and kept it aside. The foam height above the aqueous volume was noted.(21)

##### **PH test**

In 100 millilitres of distilled water, 1 gm of gel-based herbal hand wash was mixed. The pH of the mixture was examined using a previously standardised digital pH meter.

##### **Stability Test**

The Stability studies were carried out for Polyherbal Hand wash Gel formulation by storing at different temperature conditions like 40°C, 25°C, and 37°C for 1 week. During the stability studies no change in colour and no phase separation were observed in the formulated hand wash.

##### **Spreadability test**

A sample of 0.5 g of each formula was pressed between two slides and left for about 5 minutes where no more spreading was expected. Diameters of spreaded circles were measured in cm and were taken as comparative values for spread ability. The results obtained are average of three determinations. International Journal of Research Publication and Reviews, Vol 4, no 3, pp 4498-4504 March 2023 4503

##### **Viscosity**

The viscosity of hand wash was determined by using digital Brookfield viscometer. Measured quantity of herbal hand wash was taken into a beaker and the tip of viscometer was immersed into the hand wash gel and the viscosity was measured in triplicate.

## **II. CONCLUSION**

Due to various diseases and germs, bar soap can become contaminated, which may lead to the spread of germs. In today's sophisticated world, liquid hand washes are used much more frequently than bar soap. The additional advantages of liquid hand washes include the fact that the soap in the liquid hand wash is uncontaminated and hand wash with each new pump. In the market, various types of hand washes are available, claiming to kill harmful germs at a significant rate in a short amount of time. In order to ascertain this, it is necessary to ascertain the handwash's efficiency—the average percentage reduction and log reduction of the organisms found during the viable count performed by hand.

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