

## Design and development of natural powder hand wash for skin care

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### Abstract

Hands are primary site of inspection transmission and route for micro-organisms. Hand wash is one of the types of cosmetics which is widely used in daily life. The main aim is to develop natural and effective poly-herbal hand wash. In the present research works focuses drying powder of lemon grass (*Cymbopogon*), Tulsi, Aloe vera, lemon peels, Reetha, Shikakai and Mentha they have antibacterial, antifungal, antiseptic agents, with the herbal ingredients developed and evaluates as herbal powder hand wash. Herbal powder hand wash was developed by using Carbopol 930 as jelling agent, methyl paraben as neutralizer, and Sodium lauryl sulphate as surfactant. The hand wash showed multipurpose effects and all these herbal ingredients significant different activities. The ingredients use in herbal powder hand wash having properties cleaning, remove dirt as well as promote healing. The prepared formulation was evaluated based on number of criteria including consistency, pH test, stability, cleaning test, foam ability and grittiness.

**Keywords:** Natural Drug; Natural Drug Powder; Lemongrass; Antiseptic

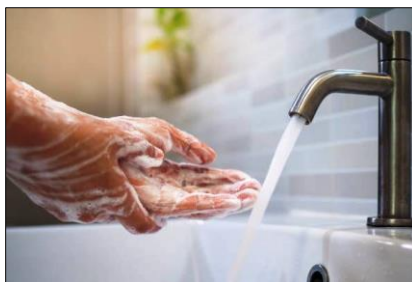
### 1. Introduction

Hand medicine is a botanical treatment or phyto-medicine, plant component for medical purpose and has been utilised for centuries to combat various ailments.<sup>[1]</sup> Lemon grass is a rich source of flavonoids and phenolic compounds, which contain that, contain anti- inflammatory. Hand hygiene is most crucial step to take in order to stop the spread of dangerous germs and diseases because hands are the primary means of transmission for bacteria and infections.<sup>[2,8]</sup> Since the skin is the most exposed part of the body, it needs to be protected from skin pathogens. <sup>[10]</sup> The scent of the herbal hand wash keeps the skin looking and feeling fresh. Protecting one's hands is just as important as stopping bacteria getting in. The gentle frothing activity causes aggravation while utilizing natural hand wash. Additionally, it aids in the prevention of diarrhea, respiratory infections, and even skin and eye infection.

#### 1.1. Hand washing

It refers to washing hands with plain or antimicrobial soap or water. In actual practice, it can vary considerably from a brief rinse of hands extensive scrubbing. Hand washing assumes a critical role in preventing infection transmission, representing the simplest and economically feasible approach it is an important precaution. Skin is one of the most exposed part of the body requires protection from the pathogens.

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**Figure 1** Hand wash

### *Objectives*

- To formulate and evaluate herbal powder hand washes.
- To promote good hygiene practice.
- To remove visible dirt, grime, and microorganisms.
- To make skin soft and remove infectious microbes.

### *Properties*

- A good powder hand wash should be stable and have pleasant appearance.
- The powder hand wash should viscous easily, after added water.
- The powder hand wash should spread easily on the skin, it make easy to foam.
- The powder hand wash should soften easily without grittiness.
- The physical action of the hand wash should be that of flushing the skin and clean hands.

## **2. Material and methods**

### **2.1. Collection of materials**

Lemon grass, Tulsi, Aloe vera, Lemon collected from local Ayurvedagarden Nasik, Shikakai and Reetha are collected from local market Nasik And Carbopol 930, Methyl paraben and Sodium lauryl sulphate are collected from SMBT Institute of D. pharmacy Laboratories.

*2.1.1. Instrument used: Hot air oven, Digital pH meter.*

**Table 1** Herbal drug and their uses

Sr No.	Name of Crude drugs / Medicinal plants	Chemical constituents	Uses
1	Lemon grass (Cymbopogon)	Flavonoids, Citral	Antiseptic, it is use in the treatment and prevention of infection.
2	Tulsi	Eugenol, Linalool	Antibacterial
3	Aloe vera	Salicylic acid, Cinnamom acid	Soothing and Cooling
4	Shikakai	Eugenol, Tannins	Antifungal, Cleaning
5	Reetha	Saponins, Phenolic acid	Natural soap, Moisturizing
6	Lemon peels	Limonene	Natural ph adjuster
7	Mentha	Menthol, Menthone	Antioxidant, Flavouring agent

### 3. Additives used in powder hand wash

#### 3.1. Thickening Agent

A thickening agent is a substance which can increase the viscosity of a liquid without substantially changing its properties. An additive used as thickener, stabilizer and emulsifier, Carbopol 930 is mostly used as thickening agent.

##### 3.1.1. Preservatives

To prevent the growth of harmful bacteria and germs. Methyl paraben is a methyl ester of p-hydroxybenzoic acid. It is a stable, non-volatile compound used as antimicrobial preservative.

##### 3.1.2. Foaming Agent

Sodium lauryl sulphate (SLS), is used in cosmetics and other personal care products. The sodium lauryl sulphate formula is a highly effective anionic surfactant used to remove dirt and oiliness.

##### 3.1.3. Preparation of Natural powders

Lemon grass, Aloe vera, mentha and Tulsi leaf powders

Take lemon grass leaves, Aloe vera, mentha and Tulsi fresh leaves. After all leaves are dried for 15-20 days and then powder with help of mixture and use sieving method they get fine powder from the leaves.

##### 3.1.4. Lemon peels powder

Take 3-4 lemons, separate their peels using a sterile knife. And separate the peels for drying, dried to 4-5 days, after powder with help of mixture to get peels powder. Separate the powder from sieves.

##### 3.1.5. Shikakai and Reetha powders

The shikakai and Reetha, collect from market to dried form. They get and powdered with the help of mixture, after the powder separated from sieves.

##### 3.1.6. Preparation of Natural Powder Hand washes

First get lemon grass powder, tulsi leaves powder, mentha leaves powder, aloe vera powder, and lemon peels powder, shikakai and reetha powder.

Then get a weighing balance to weigh individual drug powder and also additives like Carbopol 930, SLS and Methyl paraben as preservatives.

Mix it properly and to make an herbal powder hand wash.



**Figure 2** Hand wash

### 3.2. Composition of Natural Powder Hand Wash

**Table 2** Formulation Table

Sr No.	Name Of Drug	F1	F2	F3	Uses
1.	Lemon grass Powder	2 gm	2 gm	1.5 gm	Antiseptic property
2.	Tulsi leaves Powder	1.5 gm	2 gm	2gm	Anti-bacterial property
3.	Aloe vera Powder	2 gm	2 gm	2gm	Soothing and Cooling agent
4.	Lemon peels Powder	1.5 gm	1.5 gm	1.5 gm	Natural cleanser
5.	Shikakai Powder	1 gm	1 gm	1 gm	Anti-fungal
6.	Reetha Powder	2 gm	1.5 gm	2 gm	Moisturizer
7.	Mentha leaves Powder	1 gm	1 gm	1 gm	Antioxidant
8.	Methyl Paraben	0.5 gm	1.5gm	1 gm	Preservative
9.	Carbopol 930	1 gm	1 gm	1 gm	Stabilizer and Emulsifier
10.	Sodium lauryl sulphate	2.5 gm	2 gm	2 gm	Foaming and Cleaning agent

**Powder characteristics:** General powder characteristics include evaluation test of those parameters are going to affect the external properties of formulation, Characteristics evaluated under this section are powder size, angle of response and bulk density. [5,6,8]

#### 3.2.1. Particle size

Particle size is a parameter, which affect various properties like spread ability, grittiness, etc. it is determined by sieving method.

#### 3.2.2. Angle of response

It is defined as the maximum angle possible in between the surface of pile of powder to horizontal flow.

#### 3.2.3. Bulk density

Bulk density is an important characteristic in powder preparation. It is a ratio between the given mass of a powder and its bulk volume. The required amount of the powder is dried and filled in a 50 ml measuring cylinder up to 50 ml mark. Then the cylinder is dropped on to a hardwood surface from height of 1 inch at 2- second intervals. The volume of the powder is measured. Then the powder is weighed. By using formula,

$$\text{Bulk Density} = \frac{\text{Mass of the herbal powder hand wash}}{\text{Volume of the herbal powder hand Wash}}$$

#### 3.2.4. Tapped density

The tapped density is an increased bulk density attained after mechanically tapping container containing the powder sample. After observing the initial powder volume or mass, the measuring cylinder or vessel is mechanically tapped for 1 min and volume or mass readings are taken until little further volume or mass change was observed. It was expressed in grams per cubic centimeter (g/cm<sup>3</sup>).

#### 3.2.5. Hauser's ratio

It is a guide of ease of powder flow. It is the ratio of tapped density by bulk density. Lesser the value of Hausner's ratio better is the flow characteristic. It can be calculated by formula: Hausner's ratio = Tapped density/Bulk density.

### 3.3. Evaluation parameters

- **Physical Evaluation:** Physical parameters, such as colour, appearance and consistency, are examined for people with visual Impairment.

- **pH:** Using a digital pH meter calibrated at constant temperature the pH is found to be at constant 7.
- **Viscosity:** Viscosity is checked by Brookfield viscometer.
- **Foaming capacity:** The foam generating capability of Herbal Hand wash plays role in determining a consumer satisfaction. To conduct the test, a 250 ml graduated cylinder was filled with 50 ml of a 1% of hand wash solution. The cylinder is covered and shaken ten times. The quantity of foam within one minute was measured and documented.

**Table 3** Pre-Evaluation parameter of Powder

Test	Formulation (F1)	Formulation (F2)	Formulation (F3)
Texture	Fine and Smooth	Fine and Smooth	Fine and Smooth
Particle size	20-25 um	20-25 um	20-25 um
Angle of response	27.3	27.7	27
Bulk density	0.35g/cm <sup>3</sup>	0.32g/cm <sup>3</sup>	0.34g/cm <sup>3</sup>
Tapped density	0.095g/cm <sup>3</sup>	0.092g/cm <sup>3</sup>	0.095g/cm <sup>3</sup>
Hausner's ratio	0.25	0.28	0.27

**Table 4** Evaluation Parameter of Powder Hand wash

Test	Formulation (F1)	Formulation (F2)	Formulation (F3)
Colour	Brownish	Brownish	Brownish
Odour	Aromatic	Aromatic	Aromatic
Taste	Characteristics	Characteristics	Characteristics
pH	5	5.7	6
Water soluble	12.15%w/w	12.72%w/w	13.02%w/w
Moisture content	3.01%	3.56%	3.37%
Viscosity	1740cP	1840cP	1680cP
Foaming capacity	3.5 ml	3.7 ml	4 ml
Wash ability	Easily Washable	Easily Washable	Easily Washable

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#### 4. Result and Discussion

The lemon grass, aloe vera, tulsi, lemon peels, shikakai and reetha containing powder hand wash was showed multipurpose effect. The powder hand wash was formulated and evaluated for color, odor, pH, viscosity, angle of response, bulk density, tapped density, foam ability and obtained results are given no.3 formulation F3 is better than F1 and F2 because it is good spread ability, foam ability, pH is acidic and powder hand wash is in solid form so that it can be easily stored in container.

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#### 5. Conclusion

By using Lemon grass powder, Aloe vera powder, Lemon peels powder, Shikakai powder, Reetha powder, Methyl paraben, Carbopol 930, Sodium lauryl sulphate the powder hand wash shows very good effect and all these herbal

ingredients showed significant different activities. Based on result and discussion, the formulation is stable in terms of physical parameters and can safely used on hands. It is used to smoothing, and cleaning of hands

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## Compliance with ethical standards

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No conflict of interest to be disclosed.

### *Author's Contribution*

- Conception, design and writing of the work: Ms.SnehaS.Gawali
- Drafting the article: Ms. BhavanaD.Tambe
- Critical revision of the article: Ms. SnehaGawali
- Final approval of the version to submitted- All named authors should approve the paper prior to submission: Ms.SnehaS.Gawali, Ms. BhavanaD.Tambe

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