



## Formulation and Evaluation of Poly Herbal Anti-Bacterial Gel Based Hand Wash

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### ABSTRACT

Herbal medicines are significant part of healthcare throughout the world. Herbal medicines have been extensively utilized as effectual remedies for the prevention and management of multiple health conditions. Hands are a prime mode of transmission of microbes and nosocomial infections. Hand-washing is extremely imperative in healthcare and domestic sector. Numerous of the antiseptic hand wash available in the market are alcohol based sanitizers which have some adverse effects. To avoid these adverse effects like itching, drying, irritation, dermatitis etc., of the synthetic hand wash formulations an attempt has been made to formulate a poly herbal hand wash using extracts of *Garcinia indica*, *Curcuma longa* extracts. The anti-microbial activity of the prepared poly-herbal hand wash was tested against the skin pathogens collected from volunteers, and its efficiency was verified using Cup Plate Method. The results from Cup Plate Method showed that the hand wash prepared from alcoholic extract of *Curcuma longa* and aqueous extract of *Garcinia indica* have effective activity due to the combined activity of phytoconstituents present in the extracts. The results from the present work support the incorporation and utilization of herbs in the formulations to give a better effect. Herbal hand wash evaluated by tested parameters like physical parameters like colour, fragrance and chemical parameters like pH, Viscosity, Foam height, Foam retention, Anti-Microbial Activity, Skin irritation test etc. and obtained results were in the acceptable limits with less or no side effects.

**Keywords:** Herbal hand wash, *Garcinia indica*, *Curcuma longa*, Anti microbial activity, Cup Plate Method.

### INTRODUCTION

Plants are the oldest resource of pharmacologically active compounds and have provided human kind with many medicinally valuable compounds from centuries. Hands are primary mode of transmission of microbes and infections.

Hand hygiene is therefore the most important measure to avoid the transmission of harmful germs and prevent the nosocomial infections.<sup>1,2</sup>

To defend the skin from harmful micro-organisms and to avoid spreading of numerous contagious diseases, hand washing is extremely significant precaution.

Hand washing is the act of cleaning the hands with for the purpose of removing soil, dirt, pathogenic microorganisms and avoid transmitting of transient micro-organisms.<sup>3,4</sup>

### MATERIALS AND METHODS

#### Plants Material

#### Collection and drying of Plant parts

The fresh fruits of *Garcinia indica* were collected from the local Market.

The plant specimen was dried and authenticated.

#### Method of Aqueous Extraction of *Garcinia indica*

Extraction procedure for *Garcinia indica* as shown in Figure 1.

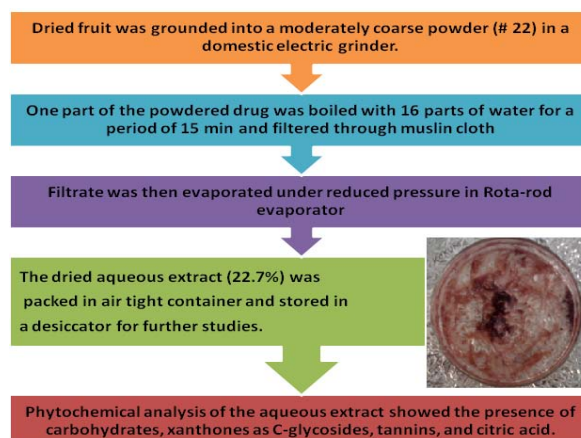


Figure 1: Preparation of *Garcinia Indica* extract<sup>5</sup>

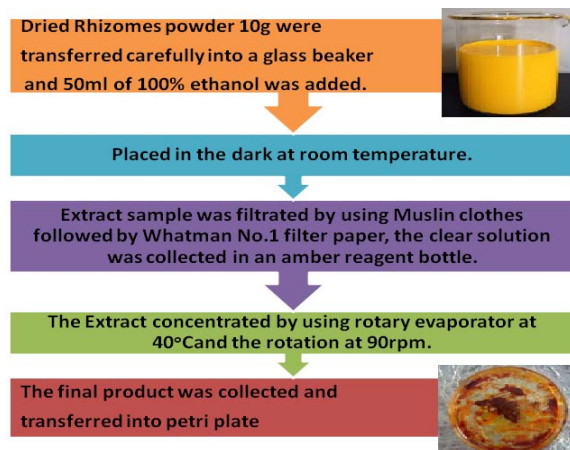


Figure 2: Preparation of *Curcuma Longa* extract

## Preparation of Extract of *Curcuma Longa*

### Collection and Drying of Plant parts

The fresh fruits of *Curcuma Longa* were collected from the local Market. The plant specimen was dried and authenticated.

### Method of Ethanolic Extraction *Curcuma Longa*


Extraction procedure for *Curcuma Longa* shown in Figure 2.

### Formulation of Gel Based Hand Wash using extracts of *Garcinia indica* and *Curcuma longa*

Herbal gel was prepared using carbopol-934 as a gelling agent in 1% w/w concentration with deionized water overnight. Then the swelled polymer was stirred using a mechanical stirrer to ensure the uniform dispersion of the polymer. The pH was adjusted to 7.0 by the addition of minute quantities of triethanolamine with continuous stirring. Then this base was used to incorporate extract of *Garcinia indica* and *Curcuma Longa* to prepare a formulation of hand wash gel as per Table 1 and 2. The formulation was undergone organoleptical evaluation.

**Table 1:** Preparation of Poly-Herbal Gel Base for Poly-Herbal Hand Wash

	Ingredients	Quantity Taken	Role
1.	Cabopol-940	0.3 gm	Jelling agent
2.	Purified Water	20 ml	Vehicle
3.	Triethanolamine	q.s	Neutralizer



**Table 2:** Preparation of Poly-Herbal Gel Based Hand wash

S. No.	Ingredients	Quantity Taken
1	Gel base	30ml
2	<i>Garcinia indica</i>	1.5gm
3	<i>Curcuma longa</i>	0.6mg
4	Sodium lauryl sulphate	0.3gm
5	Methyl paraben	0.1gm
6	Rose Water	10 ml

## Evaluation of Gel Base for Herbal Hand Wash

### Physical Evaluation

The Poly-Herbal Gel Based Hand wash was subjected to Physical evaluation visually. The test parameters were Color, Odor and Texture.

### Appearance and Homogeneity

The Poly-Herbal Gel Based Hand wash were homogenous; Yellow in color and translucent in nature.

### Spreadability<sup>6</sup>

Spreadability was determined by the apparatus which consists of a wooden block, which was provided by a

pulley at one end. By this method spreadability was measured on the basis of a slip and drag characteristics of gels.

An excess of gel (about 2g) under study was placed on this ground slide. The gel was then sandwiched between this slide and another glass slide having the dimension of fixed ground slide and provided with the hook.

A 1 kg weighted was placed on the top of the two slides for 5 minutes to expel air and to provide a uniform film of the gel between the slides. Excess of the gel was scrapped off from the edges. The top plate was then subjected to pull of 80 gms. With the help of string attached to the hook and the time (in seconds) required by the top slide to cover a distance of 7.5 cm be noted. A shorter interval indicates better spreadability.

Spreadability was calculated using the following formula:

$$S = M \times \frac{L}{T}$$

Where, S = Spreadability, M = Weight in the pan (tied to the upper slide), L = Length moved by the glass slide and T = Time (in sec.) taken to separate the slide completely each other.

### pH

1 gm of sample of Poly Herbal Gel Based hand wash was taken and dissolved it into 100 ml distilled water. The pH of solution was taken in previously standardized digital pH meter.

### Viscosity

The viscosity of Poly Herbal Gel Based hand wash was determined by using digital Brookfield viscometer.

### Foam Height

1gm of sample of Poly Herbal Gel Based hand wash was taken and dispersed in 50 ml distilled water. Then, transferred it into 500 ml stoppered measuring cylinder; volume was make up to 100 ml with water.

25 strokes was given & stand till aqueous volume measured upto 100 ml & measured the foam height; above the aqueous volume.

### Foam Retention

50 ml of the Poly Herbal Gel Based hand wash was taken into a 250ml graduated cylinder and shaken 10 times. The volume of foam at 1-minute intervals for 4 minutes was recorded.

Foam retention should remain stable for at least 5 minutes.

### Antimicrobial Studies of Herbal Hand Wash Gel

The screening of anti-microbial efficacy of the formulated Poly Herbal Gel Based hand wash was aseptically performed on Volunteers Culture by using Cup Plate Technique.<sup>8,9</sup>

### • Volunteers Sample

Swabs from hand palm skin of volunteers were included in his study.

### Stability Studies

The stability study was performed as per ICH guidelines. The formulated Poly Herbal Gel Based hand wash were filled in the collapsible tubes and stored at different temperatures and humidity conditions, for a period of three months and studied for appearance, pH, viscosity and Spreadability.<sup>7</sup>

## RESULTS AND DISCUSSION

The present study was carried out to formulate *Garcinia indica* and *Curcuma longa* extracts based hand wash using gel base as carriers. The formulation was prepared by using generally approved excipients that are compatible with any similar hand cleansing formulations. It was organoleptically evaluated to ensure product stability and performed *in-vitro* antimicrobial test to prove its efficacy to act against infectious bacteria collected from volunteers.

### Physical Parameters

#### Colour and Appearance

Yellowish in colour with a translucent appearance.

#### Fragrance

Rose.

### Chemical Parameters

The result of Chemical parameter as shown in Table 3.

**Table 3:** Determination of Chemical Parameters

S. No.	Parameters Tested	Results
1	pH of solution	6.56
2	Viscosity (cps)	52 c Pascal's
3	Foam Height	450 ml
4.	Foam Retention at 5 min	23.5 ml

### Phytochemical Screening of the Plant Extracts

Phytochemical screening of *Garcinia indica* and *Curcuma longa* extracts was carried out for the presence of Tannins, Phenolic Compounds, Flavonoids, Terpenoids, Carbohydrates, Glycosides, Amino Acids, and Proteins. Results were noted as shown in Table 4.

**Table 4:** Phytochemical screening of *Garcinia indica* and *Curcuma longa* Extracts

S. No.	Phytochemical constituents	<i>Garcinia indica</i> extracts	<i>Curcuma longa</i> extracts
1.	Alkaloids	-	+
2.	Saponins	-	+
3.	Tannins and Phenolic compounds	+	+
4.	Flavonoids	+	+
5.	Terpenoids	+	-
6.	Carbohydrates	+	-
7.	Glycosides	+	+
8.	Amino acids and proteins	+	+

The screening of anti-microbial efficacy of the formulated Poly Herbal Gel Based hand wash was aseptically performed on Volunteers Culture by using Cup Plate Technique and result shown in Table 5. and Figure 3.

### Skin Irritation Test

Soft feeling with no skin irritation after 30 min.

## CONCLUSION

Traditional Indian medicine indicating the potential medicinal value of *Garcinia indica* and *Curcuma longa*.

Natural remedies are more acceptable in the belief as they are safer with fewer side effects than the synthetic ones. Herbal formulations have emergent demand in the global market.

It is an attempt made to establish the herbal gel based hand wash containing *Garcinia indica* and *Curcuma longa* extract at various concentrations. It is concluded that from the result that the gel formulation is good in appearance, homogeneity.

This preliminary *in-vitro* study demonstrated that *Garcinia indica* and *Curcuma longa* extracts and herbal gel based hand wash was as effective against pathogenic bacteria in volunteers samples with no side effects on human tissue.

Hence a new way can be found to come back antibiotic resistant of pathogenic organism and provide safe and healthy living through germ free hand, all though the removal is not 100% but a major number can be reduced.

**Table 5:** Antimicrobial activity of extract and Herbal Hand Wash

Sample for antimicrobial study	Zone of Inhibition (mm)				
	<i>Garcinia indica</i> Extract	<i>Curcuma longa</i> Extract	SLS	Herbal Hand Wash	Standard (Streptomycin)
Volunteers Sample 1	21	22.6	10	27.4	33
Volunteers Sample 2	21.2	22.2	10	27.8	33.2
Volunteers Sample 3	21	23	10	28	33.1
Volunteers Sample 4	21.4	22.4	10	27.6	32.8



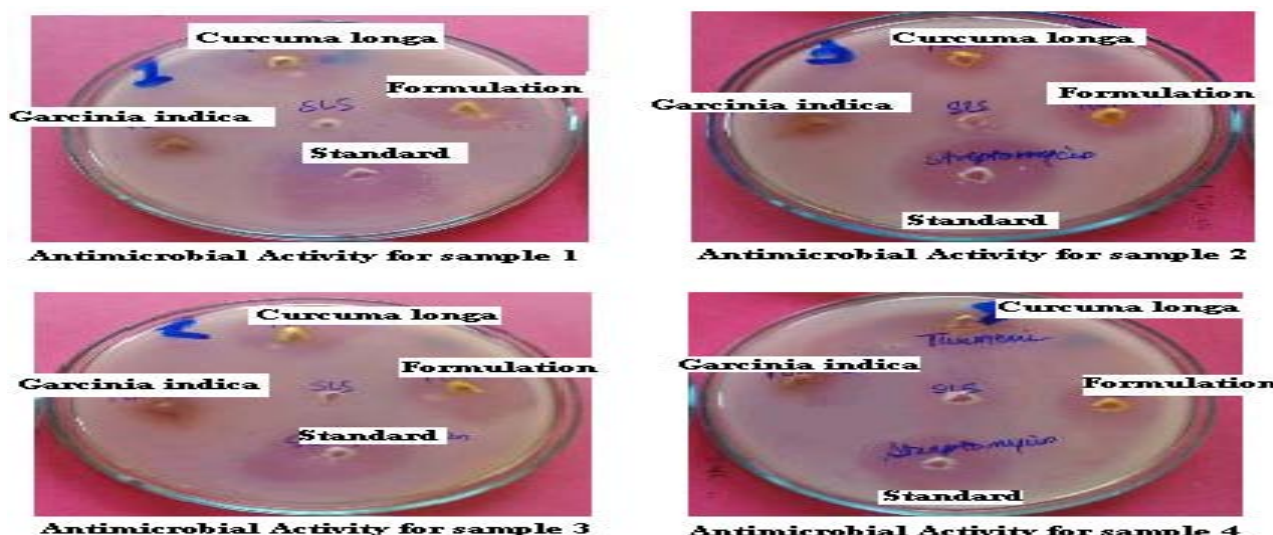


Figure 5. Antimicrobial activity of extract and herbal hand wash

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