



# FORMULATION AND EVALUATION OF HERBAL HANDWASH FROM CARROT PEEL EXTRACT

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**Abstract:** Numerous hand wash are available in the market. Out of these many hand wash show adverse effect like drying, itching, irritation by synthetic formulated hand wash. Hence an attempt has been made to formulate and evaluate herbal hand wash by using carrot peel (*Daucus carota*) extract. Hand washing is widely acknowledged to be crucial in preventing the spread of germs and reducing infections which contribute to 27 neonates deaths /1000 live births A number of infectious diseases can be spread from one person to another by contaminated hands. Hands are the primary source of infection specially in child, hence to formulate herbal hand wash becomes essential. The formulated hand wash has found to be good anti-microbial activity and cleaning hands along with good physical parameters like odour, colour, pH, viscosity and stability.

**Index Terms – Carrot (*Daucus carota*), Reetha (*Sapindus mucorosis*), Phytochemical screening, Anti-microbial,**

## 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<sup>1,2</sup>.

Hands are the major route of microbe and illness transfer. Hand cleanliness is the most efficient way to prevent the spread of hazardous germs and diseases. In healthcare, hand cleanliness is the best and most effective, simplest, and affordable technique to prevent nosocomial infections<sup>3</sup>.

The hands of healthcare providers are the main cause of the spread of multidrug-resistant bacteria and sickness to patients. As an outcome, it presents the issue of hygienic hand cleansing . Various antimicrobial compounds are now accessible as alcohol-based hand wash, detergent, and other items on the market. These soaps or solutions aid in the prevention of health-care-associated microbiological contamination although they come with certain disadvantages or adverse reactions. Their usage on a regular basis might promote skin irritation and infection resistance<sup>4,5</sup>.

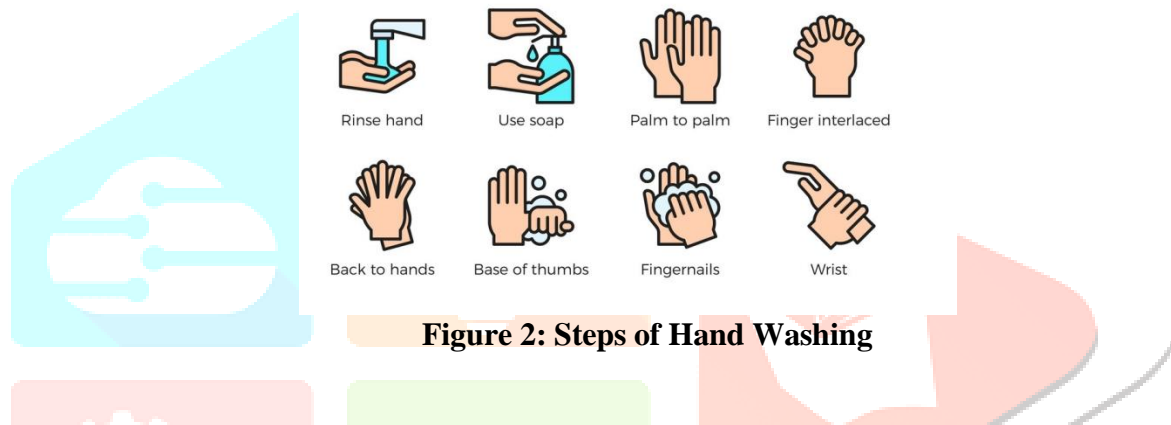
Carrot (*Daucuscarota*) is classified as vitaminized food as it is rich in  $\beta$ -carotene, ascorbic acid and tocopherol<sup>6</sup>. Carrot is also a significant source of phenolic compounds such as hydroxycinnamic acids and derivatives<sup>7</sup>, para-hydroxybenzoic acids<sup>8</sup> and polyacetylenes<sup>9</sup>.

Due to appreciable level of variety of different compounds present, carrots are considered as a functional food with significant health promoting properties. Carrot processing residues e.g. peels, pomace, are usually discarded or used as animal feed which are high in phenolic and antioxidant properties. The studies on evaluating the phenol content of carrot revealed the peel had higher content of phenolic than the flesh<sup>10,11</sup>.



**Figure 1: Carrot (*Daucus carota*) and powdered carrot**  
**Importance and benefits of hand washing:**

- Hand washing is simple act that saves lives from many life threatening diseases.
- It help to prevent diarrhea and respiratory infections and may even help prevent skin and eye infection.
- It prevent communicable diseases and bacteria infection
- Hand wash prevent germs from entering into our body.
- The easiest way to get rid of microorganism.
- Easier access compared to using soap and water.



**Figure 2: Steps of Hand Washing**

### How to wash your hands:

It is important to wash your hands properly. Make sure that you wash both your hands including the tips of your fingers, the palms of your hands and thumbs.

The steps below explain how to wash your hands properly:

- wet hands with water
- apply enough soap to cover all surfaces of hand
- rub hands palm to palm
- right palm over back of left hand with interlaced fingers and vice versa
- palm to palm with fingers interlaced
- back of fingers to opposing palms with fingers interlocked
- rotational rubbing of left thumb clasped in right palm and vice versa
- rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa
- rinse hands with water
- dry hands thoroughly with a single use towel
- use towel to turn off tap

## Hand washing and hand hygiene :

Washing your hands properly is one of the most important things you can do to help prevent and control the spread of many illnesses. Good hand hygiene will reduce the risk of things like flu, food poisoning and healthcare associated infections being passed from person to person.



**Figure 2: Carrot (*Daucus carota*)**

- **Taxonomy classification**

Kingdom	: Plantae.(Plant)
Division	: Magnoliophyta. (flowering plant)
Class	: Magnoliopsida. ( dicotyledons )
Order	: Apiales.
Family	: Apiaceae.
Genus	: Daucus.
Species	: Daucus carota.

- **Vernacular names**

Hindi	:Gaajar
Telugu	:Karet

- **Chemical constituents**  $\beta$ -Carotene,  $\alpha$ -Carotene, Carotol, Falcarinol, Falcarindiol, Choline, Polyacetylene, Table sugar, water, oil, lipid...

- **Plant morphology**

The carrot is a root vegetable, usually orange or white, or red white blend in colour.

Root shapes range from globular to long, with lower ends blunt to pointed.

The root grow to between 5 and 50 cm (2.0-20 in ) long and reach 5 cm (2.0 in ) in diameter.

- **Therapeutic use**

Carrot root is used for Vitamin A deficiency and other nutrient deficiencies. It is used as antimicrobial activity and improve digestive health as well.



**Figure 3: Sapindus mucorosis**

### Sapindus mucorosis:-

Sapindus mukorosis commonly known as Indian soap berry, washout or Rita. It is a species of tree in the family sapindaceae. It is a deciduous tree that grows in the lower foothills and mid hills of the Himalayas at altitude of up to 1200 meters. Sapindus is a Genus of about five to twelve species of shrubs and small trees in the lychee family, sapindaceae, Negative to warm temperatures to tropical region of the world. The Genus includes both deciduous and evergreen species. Member of the Genus are commonly known as soapberries or soap nuts because the fruit pulp is used to make soap. The generic name is derived from the Latin words, soap meaning soap and indicus, meaning of India.

- **Scientific classification:-**

Kingdom	: Plantae
Class	: Angiosperm
Order	: Apindales
Family	: Sapindaceae
Subfamily	: Spindoideae
Genus	: Spindus

### MATERIAL AND METHODS:

#### 1. Collection and authentication of the selected medicinal plant:

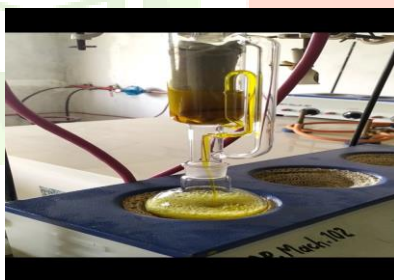
Carrot (*Daucus carota*) collected from the market of Gondia district, Maharashtra, India.

Herbarium sheet of plant specimen is certified by the Department of Botany , DB Science, Gondia.

#### 2. Preparation of plant extract:

##### Carrot peel Extract:

The extraction was carried out using soxhlet method. Sixty two point six nine grams (30gm) of powdered extract was weighed and dispensed in 200mls of Methanol in a conical flask and the crude preparation was left for 24hours in a shaker at room temperature and mixture was filtered using funnel and non-adsorbent cotton wool which serve as stopper. The filtrate was transferred into pre-weighed beaker and concentrated by evaporating the solvent at 60OC in water bath and the methanolic extract was stored in sample bottle at 40OC prior to use.



**Figure 4: Soxhlet extractor for *Daucuc carota***

##### Reetha (*Sapindus mucorosis*) Extract:

The dried shells of *Sapindus mucorosis* (soap nuts) was washed and weighed 50gm soaked in 100ml distilled water for overnight. The resultant mixture was agitated on a rotary shaker for 6 hours and boiled on the heating mantle at 60 degree Celsius for 20 minutes. The extract was allowed to cool and later on centrifuged at 3200rpm for 10 minutes. The extract was then filtered and stored till the next procedure.

### 3. Preliminary phytochemical screening of extract:

By using established technique, a preliminary analysis of extracts was conducted to determine the presence of several phytoconstituents. The findings of the subsequent chemical tests were compiled in Table 1:

**Table 1: Preliminary phytochemical screening of extract**

Sir.no	Phytochemical Constituents	Test/Reagents	Result
1.	Flavonoids	• Sodium hydroxide test	+
		• Ferric chloride test	+
		• Shinoda test	+
2.	Alkaloids	• Dragendorff's test	+
		• Mayer's test	+
		• Wagner's test	+
3.	Saponins	• Frothing test	+
4.	Carbohydrates	• Molisch's test	+
		• Fehling's test	+
5.	Tannins	• Lead sub acetate test	-
		• Ferric chloride test	-
6.	Cardiac Glycosides	• Kella-kelliani test	-
7.	Steroids	• Liebermann-Burchard's test	-
		• Salkowski's test	-

### 4. Formulation of hand wash:

- Methanolic extract of carrot peel is mixed with extract *Sapindus mucorosis* to produce sufficient foaming capacity.
- Then add desired quantity of glycerine and eucalyptus oil with moderate stirring.
- Add preservative in sufficient quantity.
- At the end add rose water in sufficient quantity.
- Then stirring the formulation until do not get mix properly.

**Table 2: Formulation of Hand Wash**

Sr.no	Ingredients	Quantity	Uses
1.	Carrot peel extract	10ml	Anti-microbial agent
2.	<i>Sapindus mucorosis</i>	20ml	Foaming agent
3.	Glycerin	5ml	Moisturizing agent
4.	Eucalyptus oil	0.5ml	Cooling/Foaming agent
5.	Methyl paraben	0.3ml	Preservatives
6.	Rose water	5ml	Fragrance
7.	Gum acacia	1gm	Thickening agent
8.	Purified water	Up to 50ml	Vehicle

## 5. Evaluation of formulated hand wash:

Prepared formulation of carrot peel herbal hand wash was subjected to the following evaluation parameters:

- a) **Organoleptic Evaluation:** Parameters like color, odour, texture was carried out, color and texture were evaluated by visual and touch sensation respectively. The formulation was sensed in order to examine the odour.
- b) **Appearance:** It was determined visually.
- c) **pH:** The pH was determined using digital pH meter and the pH of herbal wash was found to be 5.2
- d) **Grittiness:** 1ml of hand wash was taken on finger tips and rubbed between two finger tips, then the formulation was evaluated.
- e) **Viscosity:** The viscosity of formulated hand wash was determined by using Ostwald viscometer.
- f) **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 color and no phase separation were observed in the formulated hand wash.
- g) **Foam height:** 1ml of sample of herbal hand wash taken and dispersed in 50ml distilled water. Then transferred it into 500ml stoppers measuring cylinder, volume make up to 100ml with water, 25 stroke was given and stand till aqueous volume measured up to 100ml and measured the foam height.
- h) **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.

## RESULT AND DISCUSSION:

**Table 3: Evaluation Parameters**

Sr.no.	Evaluation Parameters	Result Obtained
1.	Colour	Reddish Brown
2.	Odour	Aromatic
3.	Texture	Smooth
4.	Appearance	Cloudy
5.	pH	6.4
6.	Grittiness	Non gritty
7.	Stability	Stable
8.	Foam height	3.4cm
9.	Foam retention	Stable

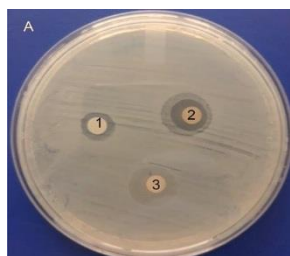


**Figure 5: Formulated Hand Wash**

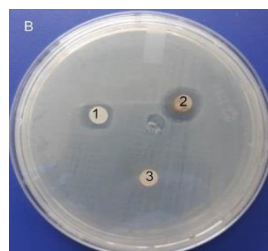
**Antimicrobial activity:** The antibacterial activity of the carrot peel extract against the test bacteria was analyzed by well diffusion method. The results of this method showed that the prepared hand wash from methanolic extract of carrot peel extract along with whole formulation has shown significant antimicrobial activity. The data of zone of inhibition of formulations is shown in below table 4:

**Table 4: Zone of Inhibition of Sample**

Sample	<i>E. Coli</i>	<i>S. aureus</i>
Antibiotic	25mm	29mm
Methanolic Extract	14mm	15mm
Formulated hand wash	11mm	13mm



**Figure 6: *S. aureus***



**Figure 7: *E. Coli***

## CONCLUSION:

Hands are the primary source of disease related to skin, respiration, gastrointestinal track, 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 than bar soap. The additional Advantages of the soap in liquid hand wash is untouched leading uncontaminated hand wash with every new pump. In market there are various type of hand washes are available, claiming that they kill the harmful germs at considerable rate at minimum time. To determine this, it is necessary to determine the efficiency of hand wash, average percentage reduction and log reduction of the organisms determined for hand wash performing viable count.

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