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Formulation and Evaluation of Herbal Hand Wash Using *Eucalyptus globulus*



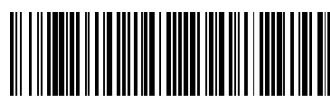
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ABSTRACT

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 handwash formulations an attempt has been made to formulate a herbal hand wash using extracts of *Eucalyptus globulus* 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, Skin irritation test *etc.* and obtained results were in the acceptable limits with less or no side effects.

INTRODUCTION:

Hands are primary mode of transmission of microbes and infections ^[1]. Hand hygiene is therefore the most important measure to avoid the transmission of harmful germs and prevent the infections. Hand hygiene is the single most important, simplest, and least expensive mean of preventing nosocomial infections ^[2]. Hand washing is the act of cleaning hands with the purpose of removing soil, dirt, pathogenic microorganisms and avoid transmitting of transient microorganism. Hand washing removes visible dirt from hands and reduces the number of harmful microorganisms such as *E. coli* and salmonella can be carried by people, animal or equipment & transmitted to food. To defend the skin from harmful microorganism and to avoid spreading of numerous contagious diseases, hand washing is extremely significant precaution ^[3].

Hand wash:^[4]

Definition:

Hand washing or hand hygiene is the act of cleaning one's hands with or without the use of water or another liquid or with the use of soap for the purpose of removing soil, dirt and or microorganisms.

Introduction:

- Hand wash is a first break of infection, and the most effective and ineffective ways to prevent infection including nosocomial infections.
- The majority of HAI cases are preventable through a combination of strategies including environmental control and cleaning, use of isolation precautions, and use of personal protective equipment when appropriate.

Hand cleaning:

Action of performing hand hygiene for the purpose of physically or mechanically removing dirt, organic material, and/or microorganisms.

Hygienic hand wash:

Treatment of hands with an antiseptic hand wash and water to reduce the transient flora without necessarily affecting the resident skin flora. It is broad-spectrum, but usually less efficacious and acts more slowly than the hygienic hand rub.

Ideal properties of hand wash:

- It does not cause any irritation.
- Ease of rinsing
- Good cleansing property
- Produce pleasant fragrance
- It should be less toxic.
- It should have biodegradability.
- It should have good foaming property.

Formulation composition of herbal hand wash:

Various excipients used in herbal hand wash formulation;

Antimicrobials:

Antimicrobials are substances which prevent microbial growth.

Example: Neem, *Eucalyptus*, turmeric, tulasi.

Humectants:

Humectants is a hygroscopic substance used to keep things moist, they attracts and retains the moisture in the air nearby via absorption, drawing the water vapor into or beneath the object's surface.

Examples: Glycerin

Surfactants:

Surfactants are compounds that lower the surface tension between (or interfacial tension) between two liquids, between a gas and a liquid, or between a liquid and a solid. Surfactants may act as detergents, wetting agents, emulsifiers, foaming agents and dispersants.

Examples: Sodium lauryl sulphate, Ethoxylated propylene glycol, Polysorbates (Tweens, Spans).

Preservatives:

Preservatives is the substance or a chemical that is add to products such as food, beverages, pharmaceutical drugs, paints, biological samples, cosmetics, wood and many other products to prevent decomposition by microbial growth or by undesirable changes.

Examples: sodium benzoate, vitamin C, BHA (Butylated hydroxyl anisole) methylparaben. Bacterial growth inhibitors like sodium nitrite, sulphurdioxide.

Thickening agent:

Thickening agents are the substances which increase the viscosity of a solution are liquid preparations.

Examples: Acacia Tragacanth, Gelatin.

Antioxidants:

An antioxidant is a substance that inhibits the oxidation of other molecules. Oxidation is a chemical reaction that can produce free radicals, leading to chain reactions that may damage cells.

Examples: Ascorbic acid, sodium metabisulphate.

MATERIAL AND METHODS:

PREPARATION OF HERBAL HAND WASH:

COLLECTION AND PREPARATION OF PLANT MATERIALS:

Eucalyptus globulus: ^[5]

Fresh Leaves of *Eucalyptus globulus* were collected from the local market, dried completely over, recollected those leaves and make them into powder.

PROCESS FOR EXTRACTION OF PLANT MATERIAL:

- Extraction is carried out by simple distillation method.
- Weighed 50 gm of powder and taken into round bottom flask.
- Add 400 ml water into RBF.
- Arrange the simple distillation for extraction process.
- Distillation is carried out for 1hour.

After completion of one hour distillation process extract was collected.

PREPARATION OF HAND WASH: [6]

The hand wash was prepared by *Eucalyptus* extract with aloe vera gel and stirred continuously up to homogeneous mixture was obtained. Then methylparaben and SLS was added slowly to this mixture as per the requirement of standard procedure for preparation of hand wash and finally the volume is makeup to 100 ml.

S. No.	Ingredients	Quantity	Category
1	<i>Eucalyptus</i> extract	25 ml	Antibacterial activity
2	Aloe vera	50 ml	Thickening agent, humectants
3	Methylparaben	0.5 gm	Preservative
4	Sodium lauryl sulphate	5 gm	Surfactant
5	Water	q.s	vehicle

EVALUATION TESTS:[7,8]

Organoleptic evaluation:-

Organoleptic evaluation (colour, odour) was done by sensory and visual inspection and compared to the marketed hand wash.

Washability

The product was applied on hand was observed under running water.

Viscosity:-

The viscosity of hand wash was determined by using Ostwald viscometer. 50 ml of herbal hand wash is taken into 100 ml of beaker and the tip of viscometer was dipped into the beaker containing hand wash formulation and its viscosity was measured.

Fragrance test:-

It was based on individual observation for its acceptability. 5 people were asked for acceptability of fragrance and their opinion was taken. And fragrance was evaluated base on the below-described criteria;

- A) Fragrance was good, as good as the fragrance of reference hand wash.
- B) Fragrance was not so good but comparable to the reference hand wash.
- C) Fragrance of the toothpaste was poor than the reference hand wash.

pH

PH of 1% aqueous solution of the formulation was measured by using a calibrated digital pH meter at constant temperature.

Determination of Homogeneity:-

The formulated hand wash was examined for their homogeneity and phase separation by visual inspection. For any signs of lesions or irritation.

Foam Height:-

1gm of 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 herbal hand wash was taken into a 250 ml 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.

Primary Skin irritation test:-

Primary skin irritation test was planned to perform on human volunteer, five volunteers were selected. 1.0 g of formulated hand wash was applied on an area of 2 square inch to the back of hand, covered with cotton and secured firmly in adhesive plaster. This was allowed to remain in close contact with the skin for over 24 hours, after which the site of application was examined.

Stability:-

The stability studies were carried out by storing at different temperature conditions like 40°C, 25°C & 37°C for 1 week. During the stability studies change in color and phase separation was observed in the formulated hand wash.

RESULTS AND DISCUSSION:

Organoleptic evaluation:

No change was observed color and odor of the formulation.

Fragrance:

The prepared formulation shows agreeable fragrance.

pH:

The pH of the formulation was found to be 7.8.

Homogeneity:

Phase separation is not observed after the prepared formulation.

Foam height:

Foam height ranges from 35-15 cm. (1-30 min)

Foam retention:

Foam retention is 30 min.

Primary skin irritation test:

The prepared formulation does not show any skin irritation after the site of application was observed.

Stability:

The stability studies were carried out by storing at different temperature conditions like 40°C, 25°C & 37°C for 1 week. During the stability studies, no change in color and phase separation was not observed in the formulated hand wash.

The results of quality study relieved that the organoleptic properties formulations lies within quality parameters as shown given table.1.

Table No. : 1 studies for organoleptic properties

S. No.	Parameter	Result
1	Color	Brown
2	Fragrance	Agreeable
3	Skin irritation	No

The prepared formulation was evaluated for their physico-chemical properties like solubility, washability and stability. Results were shown in table no.2 and reveal that all of them were unacceptable.

Table No. : 2. Studies for Physico-chemical properties

S. No.	Parameter	Result
1	Solubility	Soluble
2	Washability	Good
3	Stability	NC

NC: no change

The prepared formulation was evaluated for their pH value shown in table 3.

Table No. : 3. Studies for pH

S. No.	Parameter	Result
1	pH	7.8

The prepared formulation was evaluated for foam efficiency like foam height and foam retention values are shown in table 4.

Table: 4. Studies for Foam efficiency

S. No.	Foam height (cm)	Foam retention (min)
1	35	1
2	35	2
3	33	3
4	30	4
5	28	5
6	25	10
7	20	15
8	18	20
9	15	30

DISCUSSION

The herbal hand wash was formulated using *Eucalyptus* aqueous extract along with various ingredients as mentioned in table 1. The formulation evaluated against various quality parameters like pH and viscosity. The results of quality study revealed that the formulation lies within quality parameters as shows in table 2, 3, 4, 5. The formulation was found to be clear and homogenous with pH value is 7.8 which range desired pH the hand wash will cause less or no irritations affection the skin of hands and arms. The rheological value also supported the good quality of hand wash. The formulation was found homogenous, easily washable, Fragrance in agreeable flour, foam height was 15-35 cm, foam retention in every min. The stability study of formulation was also performed and it was found to be stable since no phase separation was observed and also observe the good foaming property.

SUMMARY AND CONCLUSION

The whole plants material is collected authenticated shade dried coarsely powdered and extracted by using water under simple distillation method.

The extracts to use to prepare the formulation of hand wash in various ingredients. Based on the formulation the prepared hand wash performed various evaluation tests and record the results.

Natural remedies are more acceptable in the belief that they are safer with few side effects than the synthetic ones herbal formulations have growing demand in the world market. it is a very good attempt to establish the herbal hand wash extracts of *Eucalyptus*, and aloe vera this study revealed that the development herbal formulation it was comparatively better than other formulations.

Thus it can be concluded that such type of herbal extract can be incorporated in bases in order to prepare superior herbal hand wash with less cost, less side effects and good foaming.

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