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Formulation and Evaluation of Polyherbal Handwash Containing Neem and Ginger Extract

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ABSTRACT

The COVID-19 pandemic provides an important reminder that one of the most effective ways to stop the spread of germs and stay healthy is done by one of the simplest Hand washing.

The aim of present work was to avoid the adverse effects - itching, irritation, dermatitis etc. An attempt has been made to formulate this poly herbal hand wash by using herbs Neem extract, Ginger extract, Lemon juice, Aloe vera showing range of antimicrobial activity.

This proved to be most effective product over Human Hygiene .Different combination of ingredients with plant extracts carried out by soxhlet apparatus method of extraction were tested on skin pathogens Streptococcus Aureus and E.Coli to evaluate the potential of antimicrobial activity by proper zone of inhibition. Ingredients showed significant antimicrobial activity than the commercial ones. Different evaluation parameter i. e physical testing, pH, foaming, viscosity etc. were carrier. The result from the work suggest and support the incorporation and utilization of herbs in formulation to give better synergistic effect. This Polyherbal Hand wash could have great potential for healthy living. So this plant extracts can be used in the preparation of herbal hand wash on commercial scale.

Keywords –Poly Herbal, Formulation, Human Hygiene, Hand Wash.

I. INTRODUCTION

Herbal formulations are defined as, "the dosage form consisting of one or more herbs processed herbs in specified quantities to provide specific health benefits, nutritional cosmetic effects to the humans", and these preparations are obtained by treatments of various extractions, distillations, fractionation, purification, concentration as well as by fermentation methods. There are various formulations by herbals available in market like

Tablets, capsules oral solutions, suspensions, emulsions, powders, granules, nasal aerosols, inhalers,

topical ophthalmic, ear preparations, suppositories, small and large volume parenteral, transdermal etc.
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.

We all must have heard the phrase – "Prevention is better than cure." Hand wash gel is an act that specially suits this phrase as a perfect example1. As skin being the largest organ is likely to be susceptible to variety of microorganisms and its primary mode of transmission is basically hands. In recent pandemic scenario hand wash is adaptable by everyone. It prevents a number of diseases and saves lot many lives.

There are Variety of types of Personal Hygiene. Each person's idea of personal hygiene differs. These main categories are a useful place to start for building good hygiene habits:

- Oral / Dental Hygiene.
- Shower Hygiene.
- Hair Care.
- Foot care
- Toilet Hygiene.
- Hand Hygiene.

Benefits

1. Reduction of the bacteria content on your hand.
2. Prevention of diarrhoea and uncomfortable intestinal conditions.
3. inhibition of respiratory tract infection
4. Ease of vacuity- sauces is fluently available in pastoral as well as civic areas, so they can be fluently used by anyone.
5. Cheap- Cost of herbal shops is less as compared to chemical constituents used in synthetic hand wetlands.
6. Increased effectiveness- Herbal hand wetlands are more effective in promoting hand hygiene.
7. Smaller side goods- Herbal hand wetlands have smaller side goods than other hand wetlands.

II. METHODS AND MATERIAL

1. Neem

Fig. no-1 Neem

Scientific name: Azadirachta indica
Family: Meliaceae
Taxonomical classification:
Kingdom : Plantae
Subkingdom : Tracheobionta
Division : Magnoliophyta
Class : Eudicot
Subclass : Rosidae
Order : Sapindales
Family : Meliaceae
Genus : Azadirachta
Species : A. indica

Chemical constituents:

- The most important active ingredients are Azadirachtin, salannin.
- Neem leaves contain Nimbosterol and Quercetin.

Uses:

1. Antibacterial
2. Insecticidal
3. Anti – inflammatory
4. Anti – oxidant activity

2. Ginger

Fig. no-2 Ginger

Scientific name: Zingier officinal

Family: Zingiberaceae

Taxonomical classification:

Kingdom : Plantae
Division : Magnoliophyta
Class : Liliopsida
Order : Zingiberales
Genus : Zingiber
Species : Zingiber officinale
Variety : Zingiber officinale var rubarum.

Chemical constituents:

- Ginger contains about 0.25-3% of volatile oil, 5-8% resinous matter, 56% starch and protein.
- Volatile oil contains a mixture of more than 25 constituents containing monoterpenes and sesquiterpenes.

Uses:

1. Ginger is used as a spice.
2. It is used in the preparation of Ginger oil and oleoresin.
3. It is used in the preparation of drinks, alcoholic beverages.
4. It is used as carminative and stimulant.

3. Alovera

Fig. no-3 Alovera

Scientific name: Asphodelaceae

Family: Liliaceae

Taxonomical classification:

Kingdom : Plantae
Order : Asparagales
Division : Spermatophyta
Subdivision : Angiospermae
Class : Monocotyledoneae
Family : Liliaceae
Genus : Aloe
Species : Barbadensis mill

Chemical constituents:

- Aloe is made up of a vast range of compounds which can be divided into three large groups. The first group, complex sugars (among which acemannan stands out), are inside the leaves gel and have an immune stimulating action.
- Next are the anthraquinones, contained in the outermost part of the skin, with a strong laxative action.

Uses:

1. Used as topical theraprutic application and in cosmetic product.
2. It posses good moisturizing properties.
3. Shows anti-inflammatory properties.
4. Aloe incraease the removal of the dead tissue due to its alcotine.

4. Lemon

Fig.no-4 lemon

Scientific name: Citrus limon

Family: Rutaceae

Taxonomical classification:

Kingdom : Plantae
Subkingdom : Angiosperms
Phylum : Eudicots
Class : Rosids
Order : Sapindales
Family : Rutaceae
Genus : Citrus
Species : C. limon

Chemical constituents:

- Lemon contains Terpenes, limonene, citral, citonellal.
- Other aromatic compounds like geranyl acetate and terpineol.

Uses:

1. Lemon juice shows antibacterial effects.
2. It is a carminative and stimulant.
3. Also use as perfuming and flavoring agents.

COLLECTION OF PLANT MATERIAL

- ❖ The plant species of neem, ginger were identified & collected from the "Nesari"
- ❖ Collection materials were subjected to shade drying at room temperature for several days to remove moisture content present in it. After drying they were grinded using household mixer & stored in tightly sealed polythene pouches & kept in plastic bottles to protect it from moisture.
- ❖ The 2nd herb i.e Lemon was obtained land from Nesari. They were also washed, wiped and squized to get lemon juice, it was then preserved.
- ❖ The 3rd herb Alovera was obtained from household planting shrubs from nesari "later washed, wiped and pulp was separated.

Solvent:

Methanol was used in extraction process. All the chemicals were of analytical grade quality and issued from Institute chemical store.

Extraction:

Extraction is done by with the help of soxhlet apparatus.

Fig.no-5 Extraction by soxhlet apparatus

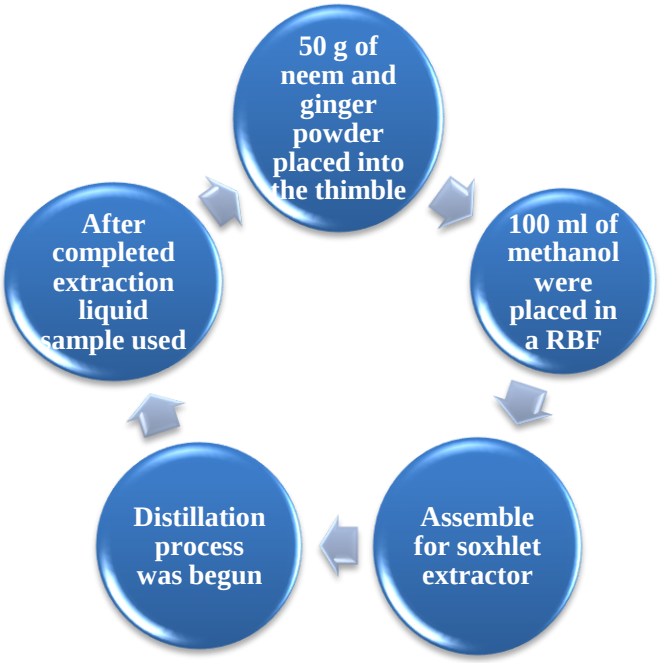

Table no.1 Formulation table

Sr.No	Ingredients	Quantity Given	Uses
1	Neem	10ml	Antibacterial
2	Ginger	5ml	Antimicrobial, antioxidant
3	Lemon juice	5ml	Antibacterial, carminative
4	Aloe vera	5ml	Moisturing agent
5	Sodium Lauryl Sulphate	5gm	Foaming agent ,surfactant
6	Glycerin	10ml	Humectant ,emollient
7	Methyl paraben	1gm	Preservative
8	Lavender oil	3ml	Perfume, flavouring agent
9	HPMC	2gm	Viscosity modifier
10	Carbapol 934	5gm	Thickening agents
11	Water	q.s.	Vehicle

Procedure:

1. Polyherbal Hand wash Gel was prepared usingCarbopol 934 as Gelling agent which is socked in 15ml distilled water overnight.
2. Neem and ginger extracts, lemon juice along with aloevera were measured accurately and dissolved by gentle heating.
3. After heating, keep the solution aside for sometimes.
4. 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 934) 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 Lavender oil was added for Fragrance.
7. Lastly, it was stored in well closed container and labeled suitably for further analysis.

Table no.2 preliminary Phytochemical test

Sr. no.	Test	Present
1	Test for tannins	Tannins present
2	Test for flavonoids	Flavonoids present
3	Test for glycosides	Glycosides present
4	Test for amino acid (protein)	Presence of protein
5	Test for steroids (salkowski test)	Presence of steroidal ring
6	Test for carbohydrates	Presence of carbohydrates

Evalaution Test

A. Physical Parameters

1. pH
2. Viscosity
3. Colour
4. Odour

B. Chemical Parameters

1. Foam testing
2. Skin irritation
3. Antimicrobial study

Physical Parameters

1. pH

- PH was measured through PH meter, before use it was calibrated.
- After calibration electrode was rinsed and then submerged into the tested
- solution .
- Recorded the displayed pH reading.

2. Viscosity

- Viscosity of polyherbal hand wash was measured by using Oswald Viscometer.
- Measured Quantity of polyherbal hand wash was taken into the beaker
- The tip of Viscometer was immersed into hand wash
- Flow time was observed to Measure the viscosity.

3. Stability

- The stability studies Polyherbal hand wash was stored for 7 days at room temperature.

4. Colour

- The colour was inspected visually.

5. Odour

- The odor was presented by sensing the formulation.

B. Chemical parameters

1. Foam Height

One gram of sample of Polyherbal Hand wash Gel was taken and dispersed in 50ml distilled water. Dispersion was allowed to stand for 5 minutes. And the Height of foam was measured.

2. Foam Retention

25ml of Polyherbal Hand wash Gel was taken into 100ml measuring 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. Remaining volume is made up with water to 10ml. Then the test tubes were shaken for 15 seconds. Then the test tube is allowed to stand for 5 minutes. And the Height of foam was measured.

3. Skin irritation

The formulation was applied on skin and left for 30 min.

Antimicrobial study of Polyherbal Hand Wash Gel

The Screening of anti - microbial efficacy of the formulated Polyherbal Hand wash Gel was performed on Soil Microbes by using agar plate method as per standard procedure. Two Sterile petri plates were taken for testing the antimicrobial activity against Soil Microbes. The plates were filled with nutrient agar solution and allowed for solidification. After solidification the so extract from the subculture were poured into the nutrient agar media by Pour Plate Method and inoculated for 24 hours. After 24 hours of inoculation, two cavities were made in it by Cup Plate Method. The First cavity is filled with Marketed Herbal Hand wash (Patanjali), Second one with Formulated Polyherbal Hand wash Gel. It was taken care that sample should be placed at the level of cavity. The Plates are placed in incubator at 37°C to test the activity. After 48 hours the plates were observed for the formulation of Zone of Inhibition. From the Zone of Inhibition, the antimicrobial activity of formulation is estimated. Efficiency of Polyherbal Hand wash ;\/of zone inhibition.

III. RESULT AND DISCUSSION

The present study was carried out to formulate polyherbal hand wash (gel).

The formulation was prepared by using Neem extract, ginger extract, lemon juice and aloevera juice with approved excipients that are compatible with herbal ingredients. It was organoleptically evaluated to ensure product stability and performed antimicrobial test to prove its efficacy to act against infectious bacteria.

Table no.3 Physical parameter

Sr. No	Evalution parameter	Formula I	Marketed Formula
1.	PH	6.32	6.71
2.	Viscosity	52	55
3.	Color	Dark green	Dark green
4.	Odour	Lavendor Oil	Fragrance smell

Table no.4 preliminary phytochemical screening

Sr. No.	Test	Result
1	Test for tannins	(+)ve
2	Test for flavonoids	(+)ve
3	Test for glycosides	(+)ve
4	Test for amino acid (protein)	(+)ve
5	Test for steroids (salkowski test)	(-) ve
6	Test for carbohydrates	(+)ve

pH

Table no.5- pH

Sr. No.	Batch	pH
1	F1	6.23
2	F2	6.25
3	F3	6.29
4	F4	6.32

Viscosity

Table no.6- viscosity

Sr. No.	Batch	Viscosity
1	F1	43 c Pascal's
2	F2	45 c Pascal's
3	F3	50 c Pascal's
4	F4	52 c Pascal's

Foam Height

Table no.7- Foam Height

Test tube	Sample:water	Foam height
1	**1:5**	**1**
2	**2:5**	**1:3**
3	**3:7**	**1:5**
4	**4:6**	**1:8**

Foam Testing: Foam volume of the formulation was measured by V1-V2 Where, V1= volume of foam with water.

V2 = volume of water

Table no 05- Foam testing

Sr.No.	Formula	V1	V2	Foaming
1.	Formula	60	40	20

Foaming capacity of formulation formulated hand wash formulation was compared with marketed hand

wash formulation and it was found to be in the range of 2

Skin Irritation:

No irritation felt on skin and no red was observed. So the formulated polyherbal formulation does not cause any adverse effects like itching, irritation, dermatitis.

Antimicrobial Studies:

Determination of MIC (Minimum Inhibitory Concentration): According to the zone of inhibition formed resulting from the plant extract and formulation prepared against bacteria isolated, shows that hand wash formulation have antibacterial activity.

Table no.6 Zone of inhibition

Sr. No.	Formulation	Zone of inhibition (mm)	
		S. aureus	E. coli
1	Formula	3.2	2.5
2	Marketed preparation	5	3

IV. CONCLUSION

The following conclusion can be drawn from the results obtained in the present work of investigation. This polyherbal hand wash is having an accentuate function in the maintaining the hand hygiene and prevent spread of microorganisms with minimum side effects than synthetic hand wash.

The marketed herbal hand wash and formulated polyherbal hand wash had been evaluated and compared with the standards specified by bureau of Indian standards.

Formulated polyherbal hand wash is capable of maintaining hand hygiene and shows antimicrobial activity against microbes like streptococcus aureus and E. coli. Evaluation and comparison of results with commercial herbal hand wash are demonstrated the formulated polyherbal hand wash is having equal patronizing and engrossing passion over the marketed formulations. The formulated polyherbal hand wash has good scope in future for natural remedies, research and hand hygiene of population. It is concluded that formulated polyherbal hand wash was found to be of good quality.

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