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Research Article

Formulation and Evaluation of Herbal Hand Wash Containing Methanolic Leaf Extract of *Lantana Camara*

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ABSTRACT

A *Lantana camara* hand wash utilizes the antimicrobial properties of *Lantana camara* plant extract, which is traditionally used for its antibacterial and antifungal effects, to create a cleansing solution for hands, potentially offering a natural alternative to conventional hand soaps while providing effective germ-killing capabilities due to the plant's bioactive compounds like flavonoids, terpenoids, and saponins present in its leaves and flowers; this formulation aims to provide thorough hand hygiene while potentially offering additional benefits like skin conditioning due to the plant's natural antioxidants. *Lantana camara* is a plant from the family - Verbenaceae. It is found in many states of India, mostly in Jammu-Kashmir, Himachal Pradesh, Tamil Nadu, South India, Uttar Pradesh, and several parts of Maharashtra and other countries also. Mainly in disturbed areas, including roadside, railway tracks, and canals. It is an ornamental plant but, in ancient times, it was used traditionally. The plant having various traditional uses. Parts of plant extracts are used traditionally such as the healing of wounds, cuts, skin itches, and eczema. The plant containing many more phytoconstituents such as alkaloids, glycosides, saponins, steroids, terpenoids, carbohydrates, flavonoids, and coumarins. It has various pharmacological activities antioxidant, antimicrobial, antibacterial, antifungal, antiulcerogenic, anthelmintic, anti-hyperglycemic, anti-inflammatory, analgesic, anticancer, antitubercular, etc. It also having mosquito larvicidal activity. This review article was written by the study of many research and review articles from 1956 to March 2021 in which 72 articles were cited. This article reviewed different phytochemicals present in *L. camara*. The review draws attention to the traditional uses, analytical work, pharmacological activities, and toxicology of this plant and also the potential uses of this plant.

INTRODUCTION

Lantana camara Linn. is a flowering ornamental plant belonging to family Verbenaceae. *L. camara*

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is also known as Lantana, Wild Sage, Surinam Tea Plant, Spanish flag and West Indian lantana. In India, *L. camara* was probably introduced before 19th century. Currently *L. camara* is distributed throughout India where there is a moderate to high summer rainfall and well- drained. Most variants have a preference for fertile organic soils, but some or all can survive on siliceous sands and sandstone-derived soils where these are of moderate depth and other conditions, especially year-round moisture, are suitable. It is a native to tropical regions and exists as dozens of strains and varieties that are highly variable in appearance. *L. camara* is known by different name in various different languages in India viz, Raimuniya (Hindi), Chaturangi and Vanacehdi (Sanskrit), Arippu and Unnichedi (Tamil), Samballei and Nongballei (Manipuri), Tantani and Ghaneri (Marathi), Pulikampa (Telugu), Kakke and Natahu (Kanada sloping sites.[1] The use of medicinal plants with therapeutics properties represents a secular tradition in different cultures, mainly in underdeveloped countries. *Lantana camara* Linn and *Lantana montevidensis* Briq (Verbenaceae) found in tropical and subtropical areas around the world are popularly known as “camará” or “chumbinho. The purpose of this study was to evaluate the in vitro antibacterial activity of ethanolic extracts from *L. camara*. Microbial infection is a critical issue in children and employer in pharmaceutical industry. so the of hand wash is more is in industrial site the formulated hand wash hence found to be good in physical parameter with good cleaning of hand . therefore it brings up the use of antiseptic for hand washing purpose . the prepared hand wash evaluated by the different parameter. *Lantana camara* has been investigated for its potential as a natural antimicrobial agent due to compounds

found in its leaves. Research suggests it could be effective against certain pathogens, but more studies are needed to confirm its efficacy and safety for use in hand washing or other applications.

2.1 Morphology of *L. camara*- is reported in *camara* is a subscandent vigorous shrub with tetragonal stem, stout recurved pickles and a strong odour of black currents. Plant grows up to 1 to 3 meters and it can spread to 2.5 meter in width. Leaves are ovate or ovate oblong, acute or sub acute, crenate serrate, rugose above, scabrid on both sides. The leaves are 3-8 cm long by 3-6 cm wide and green in colour. Colour usually orange, sometime varying from white to red in various shades and the flower usually change colours as they ages. Flowers are having a yellow throat, in axillary head almost throughout the year. The calyx is small, corolla tube slender, the limb spreading 6 to 7 mm wide and divided in to unequal lobes. Stemen four in two pairs, included and ovary two celled, two ovuled. Inflorescences are produced in pairs in the axils of opposite leaves. Inflorescences are compact, dome shaped 2-3 cm across and contain 20-40 flowers. Root system is verng[1][2][3]



Figure No.1: Leaves of *L. camara*

2.2 Geographical Distribution -L.camara is topical in origin. It is native to central ,south America and Caribbean .Now it is dispersed to nearly 60 tropical and subtropical countries and the distribution is still expanding within many islands and countries that are Galapagos islands, palau, saipan, tinian ,Solomon islands, futuna islands and Yap [8][9].

2.3 Chemical constituents-chemical constituents of the leaves, stem, roots, flowers of L. camara contained several: alkaloids, glycosides, steroids, saponins, flavonoids, coumarins, tannins, carbohydrates, hydroxy anthraquinones, anthraquinone glycosides, proteins, phytosteroids, fats, fixed oils, triterpinoids, . Triterpinoids .Pentacyclic triterpenoids (camaryolic acid, methylcamaralate, and camangeloyl acid), β -sitosterol 3-O-beta-D-glucopyranoside, octadecanoic acid, docosanoic acid, palmitic acid, oleanolic acid, icterogenin, lantanolic and camaric acid, lantadene A and B and lantadene C . [3]

2.4 Information of hand wash-Hand washing helps prevent spread of infectious diseases that disease can be spread from one person to another person by contaminated hands. Herbal preparation is a natural entity so our bodies can respond to it positively.

2.5 Extration Method- Extraction process of Lantana Camara leaves by maceration process. The hand wash was prepared from the methanolic extracts of each plant material; 20 gm of the powdered material were extracted with 80 ml of methanol solution for 48 hrs . The content was filtered through Whatman filter paper in order to get particle free extract.

2.6 Medicinal use –[3]

1. Lantanacamara can give urolithiatic activity .
2. It is used for its mosquito repellent activity .
3. The leaves of L.camara can display fungicidal, insecticidal and antimicrobial properties .
4. It is used in the traditional herbal medicines for treating skin itches , chicken pox ,cancer ,ulcer.
5. It also has some other uses like source of firewood, mulch, and making hedges .
6. L. camara can also show antioxidant , anti-inflammatory ,anti-asthmatic , antidiabetic , antimotility, antihypertensive activity.[3]
7. The extract of plant was also used in the folk medicine for the treatment of the headache.

3) Review and literature –

- 1) Gaurav Madke et . al-. Lantana camara has many therapeutic uses and it is identified as a prospective target for the drug discovery. The various parts of the lantana camara plant are used for the treatment of various diseases. The urolithiatic activity, chemical constituents and the other pharmacological activities of the Lantana camara are reviewed in this paper.
- 2) Rohit Jaysing Bhor et. al -The main objective of the work was to analyze the phytochemical constituents from herbal hand-wash prepared by using extract of Neem leaves, Tulsi leaves, Lemon leaves, Tantani leaves, Black pepper, Babool leaves and Clove. Herbal hand-wash extract was prepared by leaves of Neem leaves, Tulsi leaves, Lemon leaves, and Tantani leaves
- 3) Neha Jaywant Lokhande et . al -. Herbal hand wash was evaluated using tested parameters like color, fragrance, and chemical parameters like pH, viscosity, foam height, foam retention, antimicrobial activity, and skin irritation test, among other things. and the results that were obtained were within the acceptable limits and



had little or no side effects. The appearance, pH, and viscosity of two handwash formulations were examined for their physical characteristics. The agar diffusion method was used to test the antimicrobial activity of prepared hand wash formulations against skin pathogens such as Staphylococcus, Pseudomonas aeruginosa, and Escherichia coli.

- 4) Vaishnavi Jagtap et al - Herbal remedies are getting increasing patient compliance as they are devoid of typical side effects of allopathic medicines. The present research has been undertaken with the aim to formulate and evaluate the herbal gel containing Lantana camara linn leaves extract. The gel formulation was designed by using Carbapol 940, Lantana camara leaf Hydro –alcoholic extract, propylene glycol, methyl paraben, propyl paraben and required amount of distilled water.
- 5) Gaurave kumar et al - The knowledge of traditional medicine and medicinal plants and their study of scientific chemical principles may lead to the discovery of newer and cheaper drugs. Lantana camara is well known to cure several diseases and used in various folk medicinal preparations.

4.1 Preformulation -

Leaves are collected from our locality . these were dried a period of one week to remove the moisture . Then the dried leaves were powder using a suitable grinder and they were sieved by use mesh no 22.

4.1.1 Selection of Extraction Method -

The hand wash was prepared from the methanolic extracts of each plant material; 20 gm of the powdered material were extracted with 80 ml of methanol solution for 48 hrs . The content was filtered through Whatman filter paper in order to get particle free extract.

4.1.2 Selection of Excipient-

The hand wash was prepared by using different excipient it includes glycerin, sodium lauryl sulphate, methyl paraben, leamom oil and xanthan gum were added as per the requirement of standard procedure for preparation of hand wash.

4.2 Extration –The hand wash was prepared from the methanolic extracts of each plant material; 20 gm of the powdered material were extracted with 80 ml of methanol solution for 48 hrs . The content was filtered through Whatman filter paper in order to get particle free extract

4.3 Formulation of Hand wash-

The hand wash was prepared by adding methanolic extracts of each plant material in glycerin and distilled water Finally sodium lauryl sulphate, methyl paraben and flavoring agents were added as per the requirement of standard procedure for preparation of hand wash. The solution was made homogenous under room temperature and stored for the further analysis.

4.4 Antibacterial Activity -

The bacterial stains were subcultured to get fresh culture of bacteria. for this purpose , a single colony from bacterial stain was inoculated on nutrient broth. The standardized microorganisms are inoculated onto a growth medium, such as agar



plates or broth, using aseptic techniques. After incubation, the zones of inhibition (clear areas where microbial growth is inhibited) are measured for disks or wells, or the reduction in microbial growth is measured for liquid culture. Positive control (known antimicrobial agent) and negative control (no antimicrobial agent) are included for comparison. The antimicrobial activity is interpreted based on the size of the inhibition zones or the degree of growth inhibition compared.

5. Excipient Profile

5.1 Sodium Lauryl Sulfate

Physical form: - White solid

PH: - 7-9.5

Melting Point: - 206°C

Solubility: - Highly soluble in water

Use: - As wetting agent & Detergent in cosmetic.

5.2 Lemon Oil

Physical form: - Yellow green liquid

PH: - 7

Melting Point: - -153°C

Solubility: - Soluble in both water and alcohol

Use: - As flavoring agent.

5.3 Xanthan Gum

Physical form: - White yellow powder

PH: - 2-12

Melting Point: - 64.43°C

Solubility: - Soluble in water

Use: - As stabilizer and foam enhancer.

5.4 Glycerin

Physical form: -white thick liquid

PH: -6

Melting Point: -20°C

Solubility: -soluble in water

Use: - humectant

6. Experimental Work -

6.1 Extraction -L. Camara leaves extracted by Maceration process

The hand wash was prepared from the methanolic extracts of *lantana camara* leaves material; 20 gm of the powdered material were extracted with 80 ml of methanol solution for 48 hrs. The content was filtered through Whatman filter paper in order to get particle free extract.[4]



Figure No. 2: Extraction of *Lantana Camara* Leaves

6.2 Formulation

preparation of herbal handwash (100 ml)

Formulation of herbal hand wash –

Table No.1: Formulation Table

Sr. NO	Ingredients	Quantity
1	L. camara extract	20 ml
2	Sodium laury sulphate	6 gm



3	Glycerine	40 ml
4	Methyl paraben	0.3 gm
5	Lemon oil	4 ml
6	Xanthan gum	2 gm
7	Water	Q.S

Procedure of preparation of herbal handwash -

The hand wash was prepared by adding methanolic extracts of *Lantana camara* in glycerin and distilled water. Finally sodium lauryl sulphate, methyl paraben and flavoring agents were added and make volume with distilled water up to 100 ml, this solution is made homogenous under room temperature and store with ideal condition suitable handwash with Container [4]



Figure No.3: Formulation of Hand Wash

7. Evaluation Parameters -

7.1 Organoleptic properties

7.2 Stability Test

7.3 pH

7.4 Foam height

7.5 Foam Retention

7.6 Viscosity

7.7 Skin Irritation Test

7.8 Antibacterial activity

7.1 Organoleptic properties -

Colour -: It was observed visually.

Odour -: It was observed manually.

Appearance -: It was observed visually.

7.2 Stability Test -

The Stability studies were carried out for herbal Hand wash formulation by storing at different temperature conditions like 40°C, 25°C, and 37°C for 1 week. During the stability studies no change in colour and no phase separation were observed in the formulated hand wash.[5]

7.3 PH -

In 100 millilitres of distilled water, 1 gm of herbal hand wash was mixed. The pH of the mixture was examined using a previously standardised digital pH meter[6]

7.4 Foam height -

1) 1ml of sample of herbal hand wash taken and dispersed in 50ml distilled water.

2) then transferred it into 500ml stoppers measuring cylinder, volume make up to 100ml with water.

3) 25 stroke was given and stand till aqueous volume measured upto 100ml and measured the foam height.[5]

7.5 Foam Retention: -

50ml of herbal hand wash was taken into a 250ml graduated cylinder and shaken ten times. The volume of foam at 1 minute interval for minute was recorded foam Retention

7.6 Viscosity -

Viscosity was obtained by using an Brookfield viscometer.



7.7 Skin Irritation Test-

In order to check the skin's irritability, the herbal handwash was applied over the skin and was allowed to remain for 30 minutes. After the 30 minutes had passed, the skin was checked for itching, rashes, or redness using both sensory and visual method.[5]

7.8 Antibacterial Activity-

The antibacterial activity is estimated by comparing the inhibition of growth of sensitive microorganisms produced by known concentration of the isolated substance or extract or synthetic compound to be examined against a reference substance

7.8(A) Method -

Two general method usually employed; One is the cup-plate method [Agar well diffusion method]-The agar cup plate method depends upon diffusion of the antibiotic from a vertical agar [CUP] Cylinder through a solidified agar layer on a Petri dish. Sterile Agar is inoculated by suspension of the microbial inoculum. Then a hole with diameter of 6 to 8 mm is punched aseptically with a sterile cork borer or a tip, and then of the antimicrobial solution at desired concentration is introduced into the well. Then, agar plates are incubated under suitable conditions depending upon the test microorganism. The antimicrobial agent diffuses in the agar medium and inhibits the growth of the microbial strain entirely in a zone around the cylinder containing a solution of the substance to be tested. [11][12]

7.8(B) Preparation of the sample solution

Weigh 5.00 mg /10 mg of each sample and dissolve/dilute with 5 ml Dimethyl Sulphoxide (DMSO) Preparation of Test organism and suspension: Test organisms Staphylococcus aureus Slant ATCC ,Echerchia coli ATCC .

Stock culture: Staphylococcus aureus ATCC . Streak a loopful of Staphylococcus aureus ATCC on, two slants of pre incubated Nutrient agar. Incubate the slants at 30-35°C for 24 hours in an incubator[11]

Stock culture: Echerchia coli ATCC Streak a loopful of suspension ATCC. on two slants of pre incubated Nutrient agar. Incubate the slants at 30-35°C for 24 hours in an incubator After incubation pick up the growth from incubated slant and inoculate in 3 ml of saline solution and vortex to prepare the uniform suspension. Adjust the O.D. of culture to approx. 60-70 % OD at 530 nm using sterile saline and calorimeter. After adjusting O.D. store the test organism in refrigeration at 2-8°C.

Note: Approximately viable count is 10^6 to 10^8 cfu/ml against 60-70 % OD at 530 nm Note: Approximately viable count is 10^6 to 10^8 cfu/ml against 60-70 % OD at 530 nm 7.8(C) Plate Preparation for analysis: After the suspension is prepared, use each 2 ml of culture suspension of S. aureus and Echerchia coli is to inoculate separately in 200 ml of sterile molten and cooled medium at 40 C - 45 C Antibiotic Assay Medium. 15-20 ml of Sterilized agar medium is poured into a sterile Petri plate with the help of sterile measuring cylinder give a depth of 3 to 4 mm. Allow to cool at room temperature by placing the dishes or plates on a level surface. Keep plates in refrigerator for 15 to 20 minute for hardening. Ensure that the layers of medium are uniform in thickness. Make 4-5 agar cups on each plate using 8-10 mm SS



borer. Label the plates for sample, standard and negative control samples and analysis details.

7.8(D) Analysis - Volume of solution added to each cylinder or cavity must be uniform and sufficient almost to fill the holes when these are used. Add 100 μ l 1mg/ml Solution A to agar cup labeled as STD. Add 100 μ l 1mg/ml = Solution B to agar cup labeled for each compound ID labeled on plate. Add 100 μ l Dimethyl Sulphoxide(DMSO) to agar cup labeled as N (Negative). Leave the dishes or plates standing for 15-20 min. at 2-8°C or as appropriate, as a period of pre- incubation diffusion to minimize the effects of variation in time between the applications of the different solutions. Incubate them for about 24-48 hours at the temperature 30-35°C for bacteria and 20-25°C for yeast and mould. After completion of incubation accurately measure the diameters or areas of the circular inhibition zones and record the results.

7.8(E) Observations:

Dose of compound:-5 mg /ml

Control: DMSO -10 mg/ml

Dose of standard:1 mg /ml

8. RESULT AND DISCUSSION -

8.1 Physical properties – The physical properties of formulated hand wash were judged by its colour ,odour and texture .[7]

- 1) Colour – brown
- 2) Odour- characteristic
- 3) Texture- thick

8.2 pH-

The result of pH of prepared handwash was found to be 4.62 which are suitable for topical application because skin pH is in between 4.5 – 6. [7]



Figure No. 4: pH of Prepared Hand Wash

8.3 Skin Irritacy test -A small amount of sample was applied externally on the skin surface for few minutes and checked for reactions on skin . it was found to be non-irritant.[7]



Figure No. 5 : Skin Irritancy Of Prepared Hand Wash

8.4 Foam height – The sample of handwash mix with water and generate the foam more than 1cm and prepared solution generate foam 1.8 cm so it passes the foam test .





Figure No.6: Foam Height of Sample

8.5 Viscosity –

The viscosity of prepared hand wash using Brookfield viscometer was found to be 600centipoise and viscosity of standard hand wash in between 500-1000centipoise.

8.6 Antibacterial activity –[10][11][12]

The antibacterial activity is estimated by comparing the inhibition of growth of sensitive micro- organisms produced by known concentration of the isolated substance or extract or synthetic compound to be examined against a reference substance.[9]

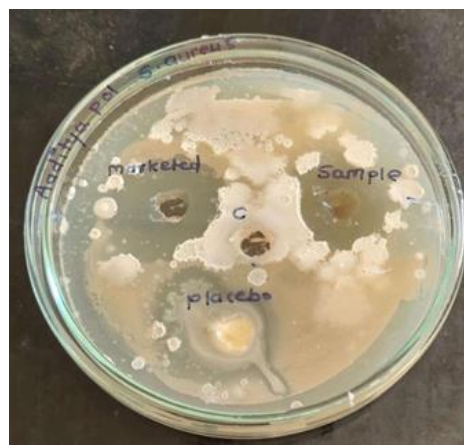


Figure No.7: Staphylococcus Aureus Slant ATCC



Figure No.8: Echerchia Coli Slant ATCC

Table No .2 Zone of Iinhibition of S. aureus and E. colli

Sr. No	Sample	Concentration	Zone of inhibition (mm)	Zone of inhibition (mm)
			S. aureus	E. coli
1.	Control	-	-	-
2.	Marketed	100µl	39	36
3.	Sample	100µl	35	33
4.	Placebo	100µl	22	18

CONCLUSION OUTCOME

The present study contain formulation and evalution of antimicrobial handwash using leaves

of *LANTANA CAMARA* and During the study it has been found that sample showed good inhibiting the growth of micro- organisms against *Staphylococcus aureus* and *Escherichia Coli* thus



from the result and prepared formulation shows good antimicrobial activity against Staphylococcus aureus and Escherichia Coli is 39nm and 36nm.

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