

Formulation and Evaluation of Herbal Handwash Gel from Jasmine Leaf Extract with Antimicrobial Activity.

Sayukta Pahurkar*¹, Minal Narkhede¹, Monica Kardile¹

¹S.M.B.T College of Pharmacy Dhamangaon, Igatpuri, Nashik, Maharashtra-422403

Submitted: 01-08-2022

Accepted: 07-08-2022

ABSTRACT

Personal hygiene is a significant risk factor that contributes to foodborne illness. Appropriate handwashing behaviors can significantly reduce this risk. Recently, world is facing covid-19 pandemic situation. Hand hygiene is vital principle and exercise in the prevention, control and reduction of health care acquired infection. Hence, worldwide its demand is increasing. In market hand wash are available using synthetic ingredient which imposes side effect like drying of skin, irritation, itching, dermatitis. Hence use of natural hand wash is recommended to overcome the above side effects. Herbs are famous for they possess antimicrobial properties. Thus, utilization of herbs in hand wash product will help in terminating germs and viruses. So these plant material can be used in the preparation of herbal hand wash on commercial scale.

OBJECTIVE The objective of present work is to formulate and evaluate liquid hand wash. This formulation formulated aiming less side effect and good antimicrobial effect using extract of jasmine leaf.

METHOD: The formulation prepared using SLES (26% w/w), aloe vera juice (26% w/w), Vit-E (0.17% w/w), cinnamon oil (0.34% w/w), NaCl (4.3% w/w), and water (47%). The prepared formulation was evaluated by different parameters like organoleptic, physicochemical along with antimicrobial test (using agar plate)

RESULT: The formulated hand wash was found to be good in physical parameters with good cleansing and antimicrobial activity

KEYWORD: Herb, hygiene, antimicrobial properties, hand wash, organoleptic, Jasmine angustifolium

I. INTRODUCTION:

Hands get contaminated despite the fact that they don't sound that way. Minute microorganisms and infections can join to our hands and make us wiped out in the event that we aren't mindful so as to clean our hands regularly.

Our hand has approximately 5,000 microbes at some random time. Handwashing is believed to be viable for the anticipation of transmission of the runs microorganisms. Anyway it isn't decisive that handwashing with cleanser is more compelling at lessening defilement with microbes related with the runs than utilizing water as it were. Hand washing consistence among wellbeing experts overall is inadmissibly low particularly in non-industrial nations like Ethiopia (range, 5%-89%; normal, 38.7%). Handwashing with non-antibacterial cleanser and water is more powerful for the expulsion of microbes of likely waste beginning from hands than handwashing with water alone and ought to hence be more valuable for the anticipation of transmission of diarrhoeal infections. Various examinations have thought about various hand cleanliness techniques in emergency clinic settings. (1) Conversely, hardly any examinations have been distributed on the impact of hand cleanliness on bacterial tainting of hands locally. Hoque and partners observed that a wide assortment of hand purging means in unfortunate settings (cleanser, debris, mud) are successful in lessening the tainting with coliform microorganisms on hands. (2)(3) In a little randomized preliminary a similar creator detailed that cleanser might be more compelling than water in lessening the presence of coliform microbes on hands. Upgraded hand cleanliness is a grounded means to forestall the transmission of contaminations in emergency clinic settings (4) as well as in other semi-shut conditions with high contamination pressure, for example, day care focuses (5), schools (6) and military help. (7)

During different everyday exercises, our hands are in contact with the things which are dirty with different sorts of microbes. Hand borne contaminations transmission is mindful for auto-contamination by the faeco-oral course found in threadworm infestation or through food controllers.

HCPs in LUTH have great hand washing information however poor practices particularly with hand-drying. Clinic the executives ought to

give legitimate hand drying offices, diminish responsibility and coordinate preparation on contamination control consistently.(8)

A study done in 2011 by Night project and Engender Health in Ethiopia showed that health care workers do not usually wash their hands on arrival to work place before putting on gloves .(9)

A study conducted in Jimma University Hospital in Southwest Ethiopia also showed that hand washing practice by the nursing staff was inadequate. This study demonstrated that only 43.2% of the nursing staff practice adequate hand washing while 56.8% of them practice inadequate hand washing .(8)

A study conducted in Health Institutions of Bahir Dar City Administration showed that 82.5% of health professionals had hand hygiene practice after completing the procedure they perform and about 50.8% wash their hand before the procedure. The overall hand hygiene practice score was 69.0% .(10)A study conducted in Shenen Gibe Hospital in Southwest Ethiopia showed that 68.8% had adequate practice and 82.97% were knowledgeable about hand washing .(11)

II. METHODOLOGY

Skin is the most uncovered piece of body requires insurance from skin microbes. Nasocomial infections also called as healthcare associated or hospital acquired infections ,which are a subset of infectious disease acquired in health care.(12)The most common source of transmission of multidrug safe microbes and disease to patients is the hands of the Health Care Workers (HCWs). Actually because of this the demand of disinfectant raises for handwashing purpose. A considerable lot of the synthetics disinfectant are presently accessible in market as liquor based sanitizers, chlorohexidine items, and so on .These cleansers or arrangements assist with lessening medical care associated transmission of infectious illness more effectively. Anatomy and Physiology of skin: Skin is the layer of normally delicate, adaptable external tissue covering meanwhile it is a biggest organ of the human body which plays an obstruction between the outside and the inside climate that is serves capacity of assurance and homeostasis. Normal pH of skin is 4 to 5.6. Mainly it consist of three layers: - Epidermis, Dermis, Subcutaneous tissue.

a) Epidermis: The Epidermis is a dainty layer of skin. It is the external layer of skin. It is made out of epithelial tissue. Elements of the epiderm is incorporate touch and insurance. This Skin is

additionally isolated in to five separate layers, they are the: Stratum Corneum, Stratum Lucidum, Stratum Granulosum, Stratum Spinosum, and Stratum Basale

b) The Dermis: A center layer of skin is dermis. Under the epidermis lies the dermis.

(c) The Subcutaneous Tissue/Hypodermis/Subcutis: It is the deepest layer of the skin which is made up off at cell sand connective tissue.(13)

The idea of purging hands with a disinfectant specialist presumably arose in the mid-19th century. As soon as 1822, a French drug specialist showed that arrangements containing chlorides of lime or soft drink could destroy the foul smells related with human carcasses and that such arrangements could be utilized as sanitizers and disinfectants.

Cleanliness is characterized as support of tidiness rehearses which conveys most extreme significance in upkeep of wellbeing. (14) One of the essential methods of transmission of microorganism are hands. The FDA reports uncovered that unfortunate individual cleanliness is a huge gamble factor (40.9%) that might prompt foodborne ailment. Handwashing and sterilization is viewed as a significant stage in forestalling the spread of irresistible sickness. WHO has suggested all individuals should wash hands prior to during and subsequent to planning food, prior to eating food, when really focusing on somebody who is wiped out, when treating a cut or twisted, in the wake of utilizing the latrine and switching diapers or cleaning around a utilized the youngster latrine. To shield the skin from destructive miniature life forms and to forestall spreading of numerous infectious illnesses, hand washing is totally a significant safeguard.(15)

Many promoted hand washes are substance based so there continuous use can prompt skin bothering and furthermore safe among microbe so Herbal hand wash is best. The primary benefit of utilizing regular source is that they are effectively accessible, modest, and innocuous contrasted with synthetic item. Along these lines research has been hugely expanded towards making regular item with worked on quality yet more affordable and no secondary effects over substance.(14)

Food workers will involve the accompanying cleaning methodology in the request expressed to clean their hands and uncovered bits of their arms, including proxy prosthetic gadgets for hands and arms:

(1) Rinse under perfect, running warm water;

- (2) Apply a measure of cleaning compound suggested by the cleaning compound manufacturer;
- (3) Rub together overwhelmingly for something like 10 to 15 seconds while: (a) Paying specific regard for eliminating soil from under the fingernails during the cleaning strategy, and (b) Creating grinding on the surfaces of the hands and arms or substitute prosthetic gadgets for hands and arms, fingertips, and regions between the fingers;
- (4) Thoroughly flush under spotless, running warm water; and
- (5) Immediately follow the cleaning system with intensive drying involving a technique as determine. (15)

Antimicrobial plants importance:-

Antimicrobial properties of specific Indian therapeutic plants were accounted for in light of old stories data and just couple of reports are accessible on inhibitory action against specific pathogenic microscopic organisms and parasites. Utilization of plants as wellspring of medication has been acquired and is a significant part of the medical care framework in India. In these frameworks of Indian medication, most specialists form and administer their own plans; thus this requires legitimate documentation and examination.

Plant are the oldest resource of pharmacologically active compounds and have provided human kind with many medicinally valuable compounds from centuries.

JASMINES

Jasminum sp. are financially significant blossom crop developed for its alluring and fragrant blossoms in the Southern and Eastern pieces of India. A local of tropical and subtropical district, jasmine is regarded for its appealing fragrant blossoms. Indo-Malayan area being the focal point of beginning, the variety existing in jasmine is huge in India. The circulation of Jasminum sort is container tropical yet countless species are based on India, China and Malaya (Annon, 1959). Having a place with family Oleaceae, class Jasminum contains in excess of 200 species (Dickey, 1970) of which many are equivalents and 90 are valid in presence (Muthukrishna and Pappiah, 1980). Jasmines are monetarily developed for their blossoms in the Southern and Eastern pieces of India. Significant jasmine creating states in India are Tamil Nadu and Karnataka. Karnataka, is known for development of jasmines because of its flexible utility as new blossoms incereemonies, strict contributions, perfuming the hair oils, and so on Jasmine angustifolium (family: Oleaceae), the wild jasmine,

is a types of jasmine local to India, Sri Lanka and the Andaman Island. It is a little climbing bush. Stem is smooth yet branchlets minutely pubescent. Oppositely organized, straightforward leaves are truly factor even on a similar plant. Leaves are 1-3 cm long, 7-20 mm wide, elliptic-praise. The smooth leaves are intense, base coldhearted or practically adjusted. One inch across white, star-like blossoms are stunningly fragrant. The blossoms are either alone or all the more typically in threes. Petals 7 or 8, yet can be more in number. Petals are straight, inhumane, and exceptionally intense. Carpels two normally very much evolved. Blooming: June-August.

Components of Jasmine:-

Alkaloids is from the natural world, essentially alludes a class of nitrogen containing natural mixtures in the Plantae, the majority of them have more intricate cyclic design, the nitrogen iota is joined with inside the circle, for the most part seems basic, and consolidates with corrosive to be salt; a considerable lot of them have critical physiological movement.

Most plants containing alkaloids region assortment of alkaloids exist together and alkaloid biosynthesis pathway are frequently comparable in a similar plant, so substance structure is likewise comparable, have a place with similar group of plants regularly have a similar parent core, or a similar design as the compound. (16)

Saponins are a huge group of primarily related mixtures of steroid or triterpenoid agly-cone (sapogenin) connected to at least one oligosaccharide moieties by glycosidic linkage. The carb moiety comprises of pentoses, hexoses, or uronic acids. The presence of both polar (sugar) and nonpolar (steroid or triterpene) bunches give saponins solid surface-dynamic property (1). Their physiochemical and organic properties include underlying variety which prompted various customary and modern applications. (17)

Surfactants (Surface dynamic specialists) structure an interesting class of substance intensifies which are generally involved and track down an enormous number of uses in modern, beauty care products and drug items. The requests on surfactants frameworks have expanded in the course of the last many years. s. Lauryl ether sulfates are more dissolvable in water and milder than Lauryl sulfates. Sodium lauryl ether sulfates, SLES are a workhorse surfactant for fluid cleansers. SLES is a reasonable and exceptionally successful frothing specialist is regularly utilized in clothing and hand and dish washing cleansers. It is

considered gentle and valuable as commonly used to plan corrective items (regularly facial or body cleaning agents and shampoos).(18)

The broad utilization of anti-toxins has prompted an amassing of deposits in bee colony items (particularly in honey), in this way diminishing their quality and impeding advertising amazing open doors. Natural ointments can be refined from the leaves and parts of cinnamon *Cinnamomum zeylanicum* Breyne, a lasting tree having a place with the Lauraceae family.

Plants have given a decent wellspring of hostile to infective agents. Plant extricate have a potential as antimicrobial mixtures against a few pathogenic microorganisms which cause contaminations illness and obstruction towards engineered drugs⁶. The fundamental benefit of utilizing regular source is that they are effectively accessible modest and hurt less contrasted with synthetic products. Medicinal ointments are normally fluid, cleared surprisingly shaded, complicated and the current mixtures are unstable, described by a solid request and orchestrated by sweet-smelling plants during auxiliary metabolites. Natural oils have been displayed to gang's antibacterial, antifungal, antiviral insecticidal and against oxidant properties. There has been an expanded interest in checking antimicrobial properties of concentrates from fragrant plants, especially medicinal balms out. Consequently, it is sensible to expect an assortment of plant compound in these oils with explicit as well as broad antimicrobial movement and anti-toxin potential. Medicinal balms likewise (additionally called unstable oils) are sweet-smelling sleek fluids got from plant material (blossoms, buds, seeds, leaves, twigs, bark, spices, wood, products of the soil). n assessed 3000 rejuvenating balms are known, of which 300 are financially significant in aroma market.(19)

III. MATERIALS AND METHODS:

MATERIAL: Dried leaves of Jasmine *angustifolia*, SLES, aloe vera gel(soothing effect),green colour,Vit E ,cinnamon oil,NaCl ,SLS(surfactant),Methanol, ammonia.

AUTHENTICATION OF PLANT MATERIAL:

The Jasmine *angustifolia* leaves were collected from the Nashik District, India, identified and authenticated by Dr. A.R. Surana, HOD, Dept. of Pharmacognosy, S.M.B.T College of Pharmacy, Dhamangaon, Nashik. The herbarium of the plant specimen has been deposited at S.M.B.T College

Of Pharmacy, Dhamangaon, Nashik. The herbarium specimen No. ASP-1.

PROCUREMENT OF PLANT MATERIAL

The leaves of Jasmine *grandifolium* are shaded dried and powdered was prepared by passing through sieve #38, and kept in air tight polythene bags for futher study.

PLANT EXTRACTION METHOD Shaded dried leaves were coarsely powdered and soaked with 10% ammonia solution for 12 hrs. Extraction is carried out by successivesolvents (methanol) by using soxhlet apparatus. After complete extraction the solvent was evaporated and concentrated to dry residue. Extract further treated with acetone. After this solution is subjected to basic solution and to maintain ph-12 it will further treat with acid (H_2SO_4 , HCl) to give precipitate which tend to give salting out .collect the precipitate and allow it to dry which give plant extract.(20)



Preparation of SLES: SLS powder was taken in a beaker and water is added to it with continuous stirring .after complete mixing of SLS powder addition of sodium sulphate was done with stirring for 5 to 6 minute. The solution of SLES was prepared.(21)

PREPARATION OF HERBAL HAND WASH GEL

For the preparation of herbal hand wash gel, ingredient which are used having following significant properties: 1.The SLES (sodium lauryl ether sulphate) act as surfactant and it also has excellent emulsification and foamability. It is widely used in rinse off product. 2. Aloe vera juice having antimicrobial activity which prevent growth of microbes and also possess soothing effect. 3. Vitamin-E act as an antioxidant. 4. Cinnamon oil active against microorganism. 5. NaCl reduces pH of solution and act as thickening agent. Herbal hand wash was prepared by mixing required quantity of suspended methanolic plant extract to water, NaCl, green color, cinnamon oil, vitamin E, aloe vera juice are mixed and added in SLES.The solution was made homogeneous under room temperature and further utilize for screening of activity.

Table1: FORMULATION FORHerbal Hand Wash GEL

INGREDIENTS	QUANTITY
Aloe vera gel	150 ml
Plant extract	6 gm
SLES	150 ml
Cinnamon	2 ml
Vitamin E	1 ml
Green colour	q.s
Nacl	25 gm
Water	275 ml

EVALUATION OF HERBL HAND WASH GEL

ORGANOLEPTIC EVALUATION:

The colour and odour was finished by visual and sensoryreview.

pH :

The not entirely set in stone by utilizing computerized pH meter. The not entirely set in stone by taking 50 ml of gel into the measuring glass of 100 ml limit and the pH anode is dunked into the gel and the pH has recorded.

Spreadability Test:

The spreadability test for planned hand wash gel was done by setting a measure of gel in the middle of two clean slides. Over the slides 1 kg weight is set for better outcomes. After 2 min the weight is taken out and the distance across of gel spread was estimated.

STABILITY TEST:

The stability of home grown hand wash gel was completed by putting away a deliberate measure of gel at various temperature for example 25°C, 37°C, 40°C, for multi week. During solidness concentrates on no adjustment of shading and no stage division were seen in the planned hand wash. Additionally the plan endures its action.

ITTITABILITY TEST:

The home grown hand wash gel was tried for irritability by applying it on left hand palm and washed off with water.

Antimicrobial Studies

The screening of hostile to microbial viability of the formed home grown hand wash gel was aseptically performed onBacillus subtilis by utilizing Dip well Agar Diffusion Technique. An all-around was ready in the plates (containing 15ml of Nutrient and MacConkey agar medium individually for the two microorganisms'). 100µl of the test compound (natural hand wash gel) was brought into the well. The standard anti-toxin plates like streptomycin were utilized as a norm. The plates were brooded for the time being at 37°C. Proficiency of hand wash not entirely set in stone by estimating the distance across of zone of restraint.

IV. RESULT AND DISCUSSION

The results of the organoleptic evaluation, pH, spreadability test, stability studies and irritability test given in table 2.

Table 2: Evaluation of Herbal Hand wash Gel

TEST	OBSERVATION
Organoleptic evaluation: Colour:- Odour:-	Bright green Pleasant
pH	6.7
Spreadability	2.39cm
Stability	Stable
Irritability	Non irritant

Formulation of Herbal Hand wash Gel by using jasmine leaf extract proved to be beneficial with excellent antimicrobial activity.

Table 3:Antimicrobial Studies of Herbal Hand wash Gel

TIME	ZONE OF INHIBITION
6	+
12	++
24	+++
36	++++
48	++++

V. CONCLUSION

This preliminary in-vitro study demonstrated that formulation of herbal hand wash gel by using jasmine leaf extract was as effective against microorganism. It is an attempt made to establish the herbal gel based hand wash containing jasmine leaf extract. From the result we can say that the gel formulation is good in appearance, stable and acceptable. A new way can be found to combat antibiotic resistance of pathogenic organisms and provide safe and healthier living through germ-free hands. Finally it is concluded that this herbal gel hand wash gel provide an effective and safe alternative to existing marketed hand wash gels.



REFERENCES:-

[1]. Burton M, Cobb E, Donachie P, Judah G, Curtis V, Schmidt WP. The effect of handwashing with water or soap on bacterial contamination of hands. *Int J Environ Res Public Health*. 2011;8(1):97–104.

[2]. Hoque BA, Briend A. A comparison of local handwashing agents in Bangladesh. *J Trop Med Hyg*. 1991;94(1):61–4.

[3]. Hoque BA, Mahalanabis D, Alam MJ, Islam

MS. Post-defecation handwashing in bangladesh: Practiceand efficiency perspectives. *Public Health*. 1995;109(1):15–24.

[4]. Pittet D, Allegranzi B, Sax H, Dharan S, Pessoa-Silva CL, Donaldson L, et al. Evidence-based model for hand transmission during patient care and the role of improved practices. *Lancet Infect Dis*. 2006;6(10):641–52.

[5]. Pönkä A, Poussa T, Laosmaa M. The Effect of Enhanced Hygiene Practices on Absences Due to Infectious Diseases among Children in Day Care Centers in Helsinki. *Infection*. 2004;32(1):2–7.

[6]. Lennell A, Kühlmann-Berenzon S, Geli P, Hedin K, Petersson C, Cars O, et al. Alcohol-based hand-disinfection reduced children’s absence from Swedish day care centers. *Acta Paediatr Int J Paediatr*. 2008;97(12):1672–80.

[7]. Mott PJ, Sisk BW, Arbogast JW, Ferrazzano-Yaussy C, Bondi CAM, Sheehan JJ. Alcohol-based instant hand sanitizer use in military settings: A prospective cohort study of army basic trainees. *Mil Med*. 2007;172(11):1170–6.

[8]. Jemal S. Knowledge and Practices of Hand Washing among Health Professionals in Dubti Referral Hospital, Dubti, Afar, Northeast Ethiopia. *Adv Prev Med*. 2018;2018:1–7.

[9]. Jemal S. Knowledge and Practices of Hand Washing among Health Professionals in Dubti Referral Hospital, Dubti, Afar, Northeast Ethiopia. *Adv Prev Med*. 2018 Nov 22;2018:1–7.

[10]. Gulilat K. Assessment of Knowledge, Attitude And Practice of Health Care Workers on Infection Prevention in Health Institution Bahir Dar City Administration. *Sci J Public Heal*. 2014;2(5):384.

[11]. Stotie Alemu B. Knowledge and Practices of Hand Washing and Glove Utiliz ation Among the Health Care Providers of Shenen Gibe Hospital, South West Ethiopia. *Sci J Public Heal*. 2015;3(3):391.

[12]. Ali H, Shehab NG, Abdul Rasool BK. FORMULATION AND EVALUATION OF HERBAL HAND WASH FROM MATRICARIA CHAMOMILLA FLOWERS EXTRACTS Transdermal drug delivery View project community practices View project [Internet]. Article in *International Journal of Research in*

- Ayurveda and Pharmacy. 2011. Available from: www.ijrap.net
- [13]. Terkar N, Sharma A, Tekawade J, Momin T, Sayyad E. Formulation and Evaluation of Polyherbal Hand Wash (Gel). *Int J Sci Res* [Internet]. Available from: www.ijsr.net
- [14]. Sushma KR, Bhavya P, Anitha V, Azharuddin S, Hemanth M, Sudhakarbabu AMS, et al. FORMULATION OF POLY HERBAL HAND WASH WITH ANTIMICROBIAL ACTIVITTY Katakam Revathi Sushma Assistant professor Pharmaceutical Biotechnology. *Indo Am J Pharm Res* [Internet]. 2017;7870. Available from: www.iajpr.com
- [15]. Yu H. Improved Handwashing through Behavior-Based Training. 2015.
- [16]. Yubin JI, Miao Y, Bing W, Yao Z. The extraction, separation and purification of alkaloids in the natural medicine. Available online www.jocpr.com *J Chem Pharm Res* [Internet]. 2014;6(1):338–45. Available from: www.jocpr.com
- [17]. Yang C-H, Huang Y-C, Chen Y-F, Chang M-H. Foam Properties, Detergent Abilities and Long-term Preservative Efficacy of the Saponins from *Sapindus mukorossi*. Vol. 18, *Journal of Food and Drug Analysis*. 2010.
- [18]. Prasanthan P. Study on acidic degradation of SLES and its impact on phase behavior. A thesis submitted towards partial fulfillment of BS-MS Dual Degree Programme.
- [19]. Mounika A, Jyothi V. Formulation and evaluation of poly herbal hand wash gel containing essential oils [Internet]. Vol. 6, and *Analytical Research*. Available from: www.ijpar.com
- [20]. Chindarkar P V. Formulation and Evaluation of Herbal Hand wash Gel from *Hyptis suaveolens* Flowering-tops. Available from: www.ajptr.com
- [21]. Barra Caracciolo A, Cardoni M, Pescatore T, Patrolecco L. Characteristics and environmental fate of the anionic surfactant sodium lauryl ether sulphate (SLES) used as the main component in foaming agents for mechanized tunnelling. *Environ Pollut* [Internet]. 2017;226:94–103. Available from: <http://dx.doi.org/10.1016/j.envpol.2017.04.008>