

Preparation of Herbal Hand Sanitizer

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ABSTRACT: Hands are the first mode of transmission of microbes and infections. Hand hygiene is a key principle and exercise in the prevention, control and reduction of infections. Due to COVID pandemic the need of hand sanitizer has increased which causes less dryness to hand. Considering the need, we prepared a herbal sanitizer using commonly available herbal plants extract and other ingredients. This research paper is centred on the effectiveness, bringing to light and optimistic effect of herbal hand sanitizer using Psidium guajava and aloe vera leaves extract. A large portion of the research has focused on hygiene by controlling the entry of pathogens into the body through hands. Having run over the positive advantages on reducing the microbes, the aim for the current study is set up. Natural herbal hand sanitizer are effective, environment, friendly, and biodegradable, inexpensive.

KEYWORDS: Handsanitizer, Hygiene, Pathogens, Psidium guajava, Aloe vera.

I. INTRODUCTION:

Hand sanitizer, also called hand antiseptic, or hand rub, agent applied to the hands for the purpose of removing common pathogens (disease-causing organisms). Hand sanitizers typically come in foam, gel, or liquid form. Hygiene is defined as maintenance of cleanliness practices which carries utmost importance in maintenance of health. Personal as well as hand hygiene is important to prevent many communicable diseases. Hand hygiene is the single most important, simplest, and least pricey means of preventive nosocomial infections. Contaminated hand can give out vectors for the transmission of microorganisms. Pathogenic microorganisms responsible for epidemics are spread from the hands and then passes these microorganisms to consumers by means of hand contact with food or drinks. The consumer is bared following the intake of these microorganisms, which

may cause gastrointestinal illness. Hand contact with ready-to-eat foods symbolizes a very important means by which pathogens may enter the food supply. To guard the skin from harmful microorganisms and to prevent spreading of many communicable diseases, hand washing is absolutely an important safeguard. Before the invention of contemporary medicine, plants were the chief remedy for treating various diseases. With the arrival of different antibiotics, microbes also slowly develop resistance to these substances. These bring researchers importance towards the plants having antimicrobial, antibacterial properties. They endeavour to develop the inimitable ability of different secondary metabolites to show constant and long-lasting activity against broad spectrum microbes.



Figure No.1 - Hand Sanitizer

In the current scenario of mechanized life style; a consumer will always prefer ready-made formulation of alcohol hand rub rather than hand washing (application of a non-antimicrobial or antimicrobial soap; and mechanical friction is generated by rubbing the hands together for 1 minute, followed by rinsing with water, and then drying thoroughly with a disposable towel). India has very long, safe and continuous usage of many herbal drugs in the officially recognized health care systems viz. Ayurveda, Yoga, Unani, Siddha, and Homeopathy. Evidence-based herbal based hand

sanitizers are widely used in the diverse systems and manufactured, as per the pharmacopoeial guidelines, by a well organized industry. Indian traditional herbal medicine is very famous since India is leading in the medicinal systems of Ayurveda and Siddha. These medicinal plants are also important source of other type of beneficial compounds including the ingredients for functional foods. The functional foods promoted the better health to prevent the chronic illness. Plant based hand sanitizers are very common in India and this literature review paper highlights the comparison between herbal hand sanitizers and chemical based hand sanitizers. There are many advantages of herbal hand sanitizers as compared to chemical-based hand sanitizers which are toxic and there are many health issues have been discussed.

Several studies suggested that, sanitizers with at least 70% alcohol were suggested to kill 99.9% of the bacteria on hands. To formulate and evaluate herbal sanitizer comprise of combination of extracts of guava leaves and aloe vera gel along with suitable excipients, humectants which can be used as a ready-made herbal hand sanitizer. Various strategies are taken to reduce only the transmission of virus through person to person. One of the most important strategy to reduce transmission is hand sanitization by the use of hand sanitizer. In the present situation, demand and selling rate of sanitizer are very high. The production rate of sanitizer cannot compete with selling rate. Therefore, an approach has been presented here to produce cheaper sanitizer with easily available ingredients. All level of people in society can also buy this product.

PLANT PROFILE :

Aloe vera :

Kingdom	Plantae
Sub-kingdom	Tracheobionta
Super-division	Spermatophyta
Division	Magnoliophyta
Class	Liliopsida
Subclass	Lilidae
Order	Liliales
Family	Aloaceae
Genus	Aloe L.
Species	Aloe vera(L.)Burm. F.

Table No. 1 –Aloe vera



Figure No. 2 - Aloe vera

Guava leaves :

Table No. 2 - Guava leaves

Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Rosidae
Order	Myrtales
Family	Myrtaceae
Genus	Psidium
Species	P. guajava



Figure No. 3 – Guava plant

MATERIALS / CHEMICALS

- Aloe vera pulp
- Guava leaves
- Surgical spirit
- Glycerine
- Perfume

EQUIPMENTS / APPARATUS

- Beaker
- Stirrer
- Water bath
- Funnel
- Measuring cylinder
- Filter paper

II. METHODOLOGY AND EXPERIMENTAL WORK :

In the present study herbal sanitizer was prepared and its efficacy was checked on different bacterial strains isolated from the hospital premises. The study was carried out.

Collection of leaves of the plant

The plants leaves were collected for the preparation of sanitizer from in and around the campus of the hospital premises. The plant selected on the basis of its potent antimicrobial activity reported in research articles. The plants used for the study were Aloe barbadensis (Ghrithkumari) and guava (Psidiumguajava). The plants leaves collected were weight, washed, cleaned and shade dried in laboratory. After drying plant extract was prepared and used for the preparation of hand sanitizer.

Preparation of extract for hand sanitizer

A)Extraction procedure for Guava leaves :



Figure No. 4 –Guava leaves

- 10 fresh leaves of guava (Psidiumguajava) were collected.
- Washed thoroughly to remove the unwanted particle and dust.
- Leaves were cut into small pieces.
- Washed Guava leaves were added in water and water was boiled with Guava leaves until it is reached a syrupy.
- Then syrup was strained to remove dust.

B) Extraction procedure for Aloe vera :



Figure No. 5 – Aloe vera gel

- Fresh Aloe vera were collected.
- Washed thoroughly to remove the unwanted particle and dust.
- The Aloe vera leaves are cut into half and inner pulps are separated from leaves by knife.
- The pulps were grinded in grinder machine.
- Then put the gel into separate bowl.

Procedure for formulation of hand sanitizer

- Take a 100 ml of transparant bottle, at first.
- The bottle was filled with 70 ml surgical spirit.
- Then 7 ml of glycerine is added and mixed thoroughly.

- In the mixture, 20 ml Aloe vera gel were added.
- In the mixture, 2 ml Guava extract syrup were added.
- At last, 1 ml perfume was added.
- Mixed the whole mixture to get homogeneous liquid sanitizer.

Material	Quantity
Surgical spirit	70 ml
Glycerine	7 ml
Aloe verapulp	20ml
Guava leaves	10 leaves
Perfume	1 ml

Table No.3 – Formulation of hand sanitizer

EVALUATION PARAMETERS

Organoleptic Properties : Tests like Colour, Odour and Clarity were carried out.

Physical properties :

- **Irritancy test :** 5 healthy volunteers were selected. The herbal hand sanitizer was applied on palm and time was noted. Irritancy, dryness and itching were checked.
- **pH :** The pH was determined by using pH paper.
- **Evaporation rate :** 5 healthy volunteers were selected. The herbal hand sanitizer was applied on their palm while rubbing the sanitizer on palm, evaporation took place and that time was noted. Evaporation rate was below 1 min.

Tissue paper test :

This test is based upon paper chromatography. We draw a circle by ball pen on tissue paper and poured some drops of sanitizer on circle. If sanitizer contains sufficient amount of alcohol the ink will be dissolved into sanitizer and starts spreading. It is observed that sanitizer slowly diffused and moved out the circle.

Wheat dough test :

Other process is that we poured some sanitizer on 1 table spoon wheat and mixed it. If

excess water is present then it will make the wheat into dough. It is observed that there was no formation of dough.

Antibacterial test :

The antibacterial activity of herbal sanitizer using different solvents of aerobic and anaerobic micro-organisms was evaluated by standard cup plate method. For this standard cup plate method, the nutrient agar medium was used as a culture media.

Sr No.	Ingredients	Quantity (gm)
1	Peptic digest of animal tissue	5
2	Sodium chloride	5
3	Beef extract	1.50
4	Yeast extract	1.50
5	Agar	8.5

Table No. 4 – Composition of Agar medium

To perform antibacterial test, the pre-sterilized petri plate was used. To pre-sterilized, the petri plate was incubated for 24 hrs at 37°C. Then next to this, the agar culture media was poured on the petri plate uniformly in aseptic condition. After spreading the agar medium was covered with another Petri plate and kept aside for 24 hrs in refrigerator to solidify the agar medium. After this the plate was removed and on these plates the cup was formed. On two particular plates, the standard solution which contains micro-organisms strains i.e. E.coli and Bacillus subtilis were uniformly spread in aseptic condition. Now, in which the cup was formed on two petri plates, the standard which is pure antibiotics gentamycin ; 1 ml was added by the pipette and in the next cup, the formulated herbal hand sanitizer was added in aseptic condition. Then these two plates were kept for incubation for 24 hrs at 37°C. After the incubation period, the zone of inhibition was found

on the petri plate.

The zone of inhibition of herbal hand sanitizer and pure form of antibiotic gentamycin was appeared. Result of antibacterial test of herbal hand sanitizer against standard of pure antibiotic gentamycin was measured in mm by scale.

III. RESULTS

Evaluation parameters:

Organoleptic properties:

- Colour – Green
- Odour - Characteristics
- Clarity – Opaque

Physical properties :

- Irritancy test – No irritancy
- pH – 4 to 6
- Evaporation test – Less than 1 min

Tissue paper test :

The ink will be dissolve into sanitizer and start spreading, it is observed that sanitizer slowly diffused and move out the circle. It conclude that sanitizer contain sufficient amount of alcohol.

Wheat dough test :

It was observed that there was no formation of dough, it conclude that there were absence of water.

Antibacterial test :

In this particular evaluation test, the antibacterial of herbal hand sanitizer was found to be safe and on the basis of this information, we can say that the herbal hand sanitizer shows somewhat lesser activity than pure antibiotic gentamycin. But, definitely the formulated herbal hand sanitizer has antimicrobial activity against bacterial species like E.coli and Bacillus subtilis.

Sr. No	Parameters	Results
1.	Organoleptic properties	
	• Colour	Green
	• Odour	Characteristics
	• Clarity	Opaque
2.	pH	4 to 6
3.	Irritancy test	No irritancy

4.	Evaporation test	Less than 1 min
5.	Tissue paper test	Positive result
6.	Wheat dough test	Positive result
7.	Antibacterial test	Positive result

Table No. 5 –Results

IV. DISCUSSION

The herbal hand sanitizer was evaluated for its organoleptic properties, physical properties and antibacterial test. The prepared formulation of herbal hand sanitizer showed good effect on bacterial strains like E. coli And Basillusubtilis. It also has antimicrobial, antibacterial, anti-inflammatory effects. It was found that the formulation was green in colour with liquid consistency and smooth texture.

V. CONCLUSION

The numbers of infected people by Corona Virus are increasing day by day. Until the invention of vaccine, sanitizing is very much important. The approach of making effective, affordable, herbal hand sanitizer was taken to reduce the transmission of Corona Virus. Various research papers are searched and also reviewed about ingredients of branded sanitizers. After that, a new method of making effective sanitizer with herbal products is presented in this paper. Herbal hand sanitizer is based alternative for chemically prepared containing active silver nitrates. Natural herbal hand sanitizers are effective, environment friendly, and biodegradable, inexpensive.

REFERENCE

- [1]. AChakroborty, A Mukhopadhyay, A Sur, Dr.S. Ghosh, Production of cheap hand sanitizer with herbal ingredients, Journal of Physics : Conference Series, 1797 (2021) 012036, IOSER 2020.
- [2]. FirdousShaikh, Priyanka Bhosale, SnehalMore, Formulation and Evaluation of Herbal Hand Sanitizer Using PsidiumGuajava Leaves Extract, Int. J. Pharm. Sci. Rev. Res., 62(2); Article No. 07, Pages: 37-39, 2020.
- [3]. Jyotsana Singh Chandravanshi, ShaziaMansoor, Asha Agarwal, RupaGuha Nandi, and N. Ganesh, Formulation of herbal hand sanitizer from Indian

- herbs,ISSN-0211-2574, Article in Lino, July 2021.
- [4]. X Fatima Grace, Sowmya K. V., Darsika C., Arul Jothy, S. Shanmuganathan, PolyherbalHand Sanitizer – Formulation and Evaluation, Indian Journal of Pharmacy and Pharmacology, April-June 2015;2(2); 143-144.
- [5]. Ravindra B. Malabadi, Kiran P.Kolkar, NeelambikaT.Meti and Raju K.Chalannavar, Role of Plant Based Hand Sanitizers During the Recent Outbreaks of Coronavirus (SARS-CoV-2) Disease (Covid-19),Crimson Publishers Wings to the Research, Significances of Bioengineering &Biosciences, Volume– 5, Issue-1, 2021.
- [6]. Shaloo, Shayna Shafi, Simran Singh, Shashi Verma, Ritesh Kumar Tiwari and Devika, Formulation and development of mint containing herbal hand sanitizer, European Journal of Pharmaceutical and Medical Research ejpmr, 2017, 4(11), 454 – 457.
- [7]. Rayan Y.booq, Abdullah A. Alsehri, Fahad A. Alumghem, Nada M. Zaidan, Walaa S. Aburayan, Abrar A. Bakr, Sara H. Kabli, Hassa A. Alshaya, Mohammed S. Alsuabeyl, Essam J. Alyamani and Essam A. Tawfik, Formulation and Evaluation of Alcohol – Free Hand Sanitizer Gels to Prevent the Spread of Infections During Pandemics, International Journal of Environmental Research Hand Public Health, 9 June 2021.
- [8]. Suganya Natarajan, PreethiAnand, KothaiSelvaraj, Review on the importance of herbal hand sanitizers with the emergence of COVID-19, International Journal of Pharmaceutical Research and Application, Volume 6, Issue 3, May-June 2021, pp : 702-705, ISSN : 2249-7781.
- [9]. NandkishorS. Wani, Ashish K. Bhalerao, VikramP. Ranaware, Rahul Zanje, Formulation And Evaluation Of Herbal Hand Sanitizer,International Journal of PharmTech Research CODEN (USA):IJPRIF, ISSN : 0974-4304, Vol. 5, No. 1, pp: 40-43, Jan-Mar 2013.
- [10]. Kun Harismah, NurulDiahAriningrum, Ahmad Muhammad Faudi,MuhammadMujiburohman, Muhammad Mirzaei, Formulationand Evaluation of Herbal Hand Sanitizer Based onStevia (Stevia rebaudiana), Journal of Physics :Conference Series, ICETIA 2020,1858 (2021)012053.
- [11]. Vijaya B. Surwase, Manasi M. Savale, Ranjit S. Jadhav, Akshaykumar B. Kadam, Pradnya P. Shinde, Polyherbal Natural Hand Sanitizer Formulation and Evaluation, Journal of University of Shanghai for Science and Technology, ISSN:1007-6735, Volume 23, Issue 6, June-2021, Page No. 932-939.
- [12]. VardhamanMulchand Jain, GundabakthaNagappaKaribasappa, Arun Suresh Dodamani, Vishwakarma K. Prashanth, Gaurao Vasant Mali,Original Article Comparative assessment of antimicrobial efficacy of different hand sanitizers : An in vitro study, Dental Research Journal / September 2016 / Vol 13 / Issue 5.
- [13]. JerikiasMarumure, ZakioMukuvara, RichwellAlufasi, Lazarus Chapungu&ClaudiousGufe. Effectiveness of hand sanitizers in the prevention of COVID-19 andrelated public health concerns : A review. Cogent Public Health (2022),9:2060904.
- [14]. Emma A. Yaun, and Brian A. Vasquez, Antibacterial activity of formulated Psidiumguajava (guava) hand sanitizer gel on Staphylococcus aureus, University of the Visayas Journal of Research, Volume 11, Issue 1, 2017.
- [15]. Shri Balakrishna Acharya, Saradindu Ghosh, Giriraj Yadav, Kavita Sharma, Dr.Sirsendu Ghosh, Dr.Sushil Joshi, Formulation, Evaluation and Antibacterial Efficiency of water-based Herbal Hand Sanitizer Gel, July 24, 2018.
- [16]. VaibhavRajendraSuryawanshi, HiralChaturSurani, HariramRamashray Yadav, Formulation, Evaluation and Antimicrobial Efficiency of Alcohol Based Herbal Hand Sanitizer, IJESC, Volume 10, Issue No. 3, March 2020.
- [17]. Oyeniyi Y. J, MumuniA. M., Formulation development of an herbal hand sanitizer containing Moringaolifera silver nanoparticles, Brazilian Journal of Technology, Curitiba, v. 4, n. 1, Page No. 36-49, Jan 2021.
- [18]. Jane Lee Jia Jing, Thong Pei Yi,Rajendran J. C. Bose, Jason R. McCarthy, NagendranTharmalingam and ThiagarajanMadheswaran. Hand Sanitizer : A Review on Formulation Aspects, Adverse Effect and Regulations, International Journal



- of Environmental Research and Public Health, 11 May 2020.
- [19]. Huda Ahmed Alghamdi, Original article A need to combat COVID-19; herbal disinfection techniques, formulations and preparations of human health friendly hand sanitizers, Saudi Journal of Biological Sciences, 28 (2021) 3943-3947.
- [20]. Marc Maurice Cohen, Tulsi – OcimumSanctum : A herb for all reasons, Journal of Ayurveda & Integrative Medicine, October- December 2014, Vol 5 | Issue 4.