

## Formulation and Development of Herbal 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. Novel Corona Virus has spread to 188 countries around the world which made the people infected, facing moderate respiratory illness. Currently one of the major strategies to deal with COVID-19 and reduce community transmission of infections is the frequent use of hand sanitizers. However, a large section of common mass is unable to buy them due to higher price. Therefore, an approach has been presented here to produce cheaper sanitizers with easily available herbal ingredients like Aloe Vera gel, boiled water, surgical spirit, Glycerine etc. The estimated making cost of 100ml of sanitizer was 16 rupees. The mass production of this sanitizer can be very effective for large scale use of sanitizers by common people.

### Introduction

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. The bacteria resides on hands are classified in two categories namely resident or transient. The resident flora are resides under the stratum corneum and can be found on surface of skin, namely *Staphylococcus epidermidis*, *S. hominis*, *Corynebacteria*, *Propionibacteria*, *Dermobacteria*, *Micrococci* and fungi *Malassezia* spp. The resident flora protects skin and has antagonistic functions, but cause infections in sterile body cavities, eyes or on non-intact skin. Transient flora colonizes the superficial layers of the skin and gets removed by routine hand hygiene, these flora depends on individual profession, habit and skin moisture and sporadically multiply on skin surface. The hands on healthcare workers get colonize while handling patients include pathogenic flora such as *S. aureus*, *Enterococcus* spp, *Acinetobacter iwoffii*, *Staphylococcus aureus* (MRSA) yeast and many more. These can be source of nosocomial infections if hand hygiene not maintained. These pathogens cannot be removed by simple washing, therefore hand sanitizing is required. Nowadays, in COVID-19 pandemic the need of cleaning hands has become mandatory and people have become aware of cleaning hands. Hand sanitizer or hand antiseptic is an alternative to the hand washing with soap and water.

### Background Study

D. Sawai reviewed about Aloe Vera and she showed a report that Aloe Vera is very much active against herpes simplex virus type-1 and 2, influenza virus, pseudorabies virus etc. E.V Christakietal. Investigated about the biological components and applications of Aloe Vera and concluded that Aloe Vera can be treated as an antibacterial effect. VK Chandegara, et al. showed about Aloe Vera components, various extractions process and handling methods. Mandankumund, et al. demonstrated a comparison between alcohol and non-alcohol based sanitizer and concluded that Alcohol based sanitizer is more effective than non-alcohol based sanitizer. EM Yaun, et al. studied to observe bactericidal potential of a formulated Guava hand sanitizer gel [1]. HA Rothan, et al. reviewed about symptoms of COVID-19 disease and transmission, epidemiology, pathogenesis, phylogenetic analysis of corona virus. He also showed some direction to control the spread of virus. Lischeng Wang, et al. described SARS-COV2 spreading background, genetic structure of corona virus, mode of transmission, diagnosis & treatment of SARS COV2, prevention of COVID 19, so that public can recognize and deal with the SARS-COV 2 [2]. AR

Sahin, et al. reviewed the way of treatment, prevention of early stage of COVID 19 & also described the sources & mode of transmission, pathogenesis of corona virus [3].

### Material and Method

The ingredients selected for making the Alcohol based hand sanitizer and amount of those ingredients are shown in Table 1.

### Method

Aloe Vera leaves and 10 pieces of Guava leaves are 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 and then put the gel into separate bowl. Washed Guava leaves were added in water and water was boiled with Guava leaves until it is reached a syrup. Then syrup was strained to remove dust. In a 100 ml bottle, at first, the bottle was filled 70 ml with surgical spirit. Then 7 ml of Glycerin is added and mixed thoroughly. In the mixture, 20 ml Aloe Vera gel and 2 ml Guava extract syrup were added [4]. At last, 1 ml Dettol was added and mixed the whole mixture to get homogeneous liquid sanitizer. The total

**Table 1:** The ingredients and the amount for making the Alcohol based hand sanitizer.

Material	Amount
Surgical Spirit	17 ml
Glycerin	7 ml
Aloe Vera Pulp	20 gm
Guava Leaf	10 leaves
Dettol	1 ml

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amount of Sanitizer is made 100ml. The ingredients were brought from market. The amounts and corresponding prices according to market are listed. Then, the amount of ingredients used to make the Sanitizer is listed and the corresponding prices are calculated. The total cost to make the 100 ml Sanitizer is also calculated.

## Review of Observation

The main ingredient of sanitizer is alcohol. Alcohol based Sanitizer is effective to control the transmission of disease and it maintains hand hygiene. Here, surgical spirit is used because it contains Isopropyl alcohol. After reviewing all the side effects of sanitizer some specific ingredients are used to make this sanitizer. The next important ingredient is Aloe Vera gel. Aloe Vera has high healing capacity. It reduces wrinkling of skin because it contains polysaccharides and growth hormone gibberellins. It also prevents the scar tissue and helps to form new cell. Aloe Vera gel also gives relief from skin burn and itching [5].

Aloe Vera is one of the most famous Herbal for skin treatment. Next is Glycerin. Some skin disease like dryness, damaging, cracking of skin, Eczema, skin irritating can be recovered by the application of Glycerin. It accelerates wound healing process and it also shows antimicrobial effect. Glycerin has unique ability to remove the dead skin cell and it helps to generate new skin cell.

That is why the Glycerin is introduced as ingredient. Guava extract is effective against bacteria. Guava leaves extract shows good activity against intestinal microbes, *Vibrio Cholera*, etc. Guava leaves has ability to heal the wound surface.

HO described that, there are many types of skin reaction like dryness, irritation, itching, allergy, skin cracking and bleeding are seen after the use of Hand Sanitizer. 13 years old girl suffered from severe distress with erythema and cracking on both hands. The patient reported that she washed her hands 10 times per day with soap and water, with application of Alcohol-based sanitizer.

Overuse of hand Sanitizer can disturb the skin and trigger autoimmune reactions like itching, swelling, peeling, cracking.

The use of Sanitizer can increase the risk of Eczema, skin irritation and affects the immune system. It also causes hormone problems. After studying these, two tests were performed to check if the sanitizer is harmful or not.

After making the Sanitizer, some sanitizer was poured in hand immediately. It was observed after two hours that there were no skin reactions and diseases in skin. Then, after two months again some sanitizer was poured in hand but still there was no negative result.

Maintaining proper hygiene is a very important part of sanitizer. Because of demand of sanitizer in this pandemic, new brands of sanitizer have come into market but there is always a doubt on effectiveness of sanitizers. If proper amount of alcohol is not used then sanitizer will not be effective. So, to check whether the amount of alcohol in Sanitizer is right or wrong, we performed two small experiments 1. Tissue paper test, 2. Wheat dough test.

## Physical stability of hand sanitizer

The pH of the sanitizer determined after preparation and at a week interval. The physical changes were determined by observing color, odor and pH of sanitizer weekly. The sanitizer was checked for turbidity also weekly. Viscosity and consistency were determined at weeks 0 and 12 of storage [5].

## Shelf life of hand sanitizer

The shelf life of the herbal sanitizer prepared was evaluated at temperature of  $4\pm2^{\circ}\text{C}$ ,  $27\pm2^{\circ}\text{C}$  and  $40\pm2^{\circ}\text{C}$ . The hand sanitizer was kept at different temperature and observed every week for homogeneity. Viscosity and consistency were determined at weeks 0 and 12 of storage [6].

## Skin exposure to sanitizer

Individual exposure will be assessed by questionnaires. The sanitizer prepared was applied 3ml to different individuals and feedback was taken. The individuals were asked questions regarding sanitizer odor and experience after using. The skin of hand was examined for redness, irritation and dryness. The feedback was collected in consent form filled by individuals [7].

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## Conclusion

The numbers of infected people by Corona Virus are increasing day by day. Until the invention of vaccine, Sanitizing is very much important in this pandemic. The approach of making effective, affordable, Alcohol based 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 product is resented in this paper. We did not get any chances to perform laboratory experiments. But after observing the observations, it can be concluded that this process can be a new approach of making sanitizer in future.

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