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Research Article

Formulation And Evaluation of Herbal Sanitizer Using Senna Leaves

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ABSTRACT

A growing interest in herbal alternatives has resulted from worries about skin irritation, dryness, and antibiotic resistance brought on by the increased usage of chemical-based hand sanitizers. The purpose of this study is to create a herbal hand sanitizer with the leaves of Senna alata, often known as Candle Bush, which have antibacterial, antifungal, and anti-inflammatory qualities (Siddhuraju & Becker, 2003). The leaves were dried in the shade, ground into a powder, and then extracted using Soxhlet with ethanol. The resultant extract was combined with distilled water, glycerin as a moisturizer, and carbopol as a gelling agent to create a gel-based product. The physical characteristics of the herbal hand sanitizer, such as its pH, viscosity, and spreadability, were assessed. Significant antibacterial efficacy was demonstrated in tests against Pseudomonas aeruginosa, Staphylococcus aureus, and Escherichia coli (Kumar et al., 2014). Active substances such as flavonoids, tannins, and saponins were found through phytochemical screening (Siddhuraju & Becker, 2003). According to stability tests, the formulation didn't change in consistency or appearance during a 30-day period.

INTRODUCTION

Keeping your hands clean is one of the best ways to stop infectious diseases from spreading. The use of hand sanitizers has grown in popularity because of their effectiveness and simplicity, especially in circumstances when soap and water are not available. Most alcohol-based hand sanitizers are efficient against a wide range of diseases. However, using chemical-based hand sanitizers for extended periods of time has sparked worries about dryness, irritation, and even disturbance of the skin's natural microbiota. Searching for safer and more sustainable alternatives is also necessary because of the increase in antimicrobial resistance brought on by an over-reliance on chemical agents.The antibacterial, anti-inflammatory, and skin-healing qualities of herbal products—especially those made from medicinal plants—have attracted attention recently. Natural plant extracts are used in herbal hand sanitizers, which present a viable

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substitute for synthetic ones. In addition to being kinder to the skin, these solutions utilize the medicinal advantages of bioactive chemicals produced from plants, which can offer more protective benefits than just disinfection. This study is important since it adds to the expanding market for personal care and herbal cosmetics. It creates new opportunities for the creation of natural, environmentally friendly, and healthconscious substitutes for common hygiene methods by fusing the effectiveness of medicinal plants with contemporary pharmaceutical processes.

CLASSIFICATION OF HAND SANITIZER :-

- A. Alcohol Based Hand Sanitizer
- B. Non Alcohol Based Hand Sanitizer
- A. Alcohol Based Hand Sanitizer :-

These sanitizers are the most widely used and are very good at destroying a variety of pathogens. In alcohol-based hand sanitizers, ethanol or isopropyl alcohol are usually the active ingredients. Both gel and liquid versions are accessible.

Alcohol content: For the sanitizer to effectively kill viruses, it must contain at least 60–70%

B. Alcohol Free Hand Sanitizer:-

Alcohol is not an active ingredient in these sanitizers. Rather, they employ other antibacterial agents such as plant extracts, triclosan, or benzalkonium chloride.

Active ingredients: Benzalkonium chloride, chlorhexidine, or plant extracts (such as Senna alata, neem, or aloe vera) are examples of active substances.



Figure No 01:- Hand Sanitizer And Hygiene

MATERIAL AND METHODS :-

MATERIAL:-

Senna Leaves Extract (Antibacterial and antimicrobial agent.),Aloe Vera Gel (Moisturizer and skin soother to prevent dryness),Glycerin (as a humectant to retain skin moisture), Triethanolamine (TEA)(pH adjuster), lemon oil (Add fragrance), Alcohol (Enhances antimicrobial effect), Distilled Water(Used as the solvent).

A. Decoction Process :-

• Gather dried or fresh senna leaves. To get rid of dirt and contaminants, give it a thorough



wash with clean water. If the leaves are fresh, dry them in the shade.

- Using a mortar and pestle or a grinder, crush or coarsely powder the dried senna leaves.
- Measure out the appropriate quantity of powdered senna leaves (20 25 grams, for example).
- A Soxhlet thimble is filled with 25–50 grams of powdered senna leaves. The thimble, which is attached to a round-bottom flask that contains 95% ethanol as the solvent, is placed inside the Soxhlet extractor. To enable constant solvent cycling, a condenser is affixed to the top.
- After being heated, the ethanol begins to reflux. The plant powder's active ingredients are repeatedly extracted by condensing vapors. The solvent in the siphon turns colorless after 6–8 hours of operation.
- Using a water bath or rotary evaporator set to 40–50°C, the extracted material is concentrated. This produces a thick, unrefined extract by eliminating additional ethanol. The extract is refrigerated and kept in an amber bottle.

B. Formulation of Sanitizer :-

FORMULATION TABLE OF SANITIZER

Sr. No	Ingredients	Measurement
1	Senna Leaves	20 Ml
2	Alovera Gel	15 Ml
3	Alcohol / Ethanol	15 ML
4	Triethanolamine (TEA)	1To 3 drop
5	Glycerine	3 M1
6	Lemon oil	1To 2 Drops
7	Carbopol 940	0.15 gm
8	Distilled Water	Q. S To Make 50 ml

- To make the decoction, boil coarsely ground senna leaves in distilled water, strain, and let cool.
- If you want Carbopol 940 in gel form, mix it with a little distilled water in a beaker.
- Glycerin and aloe vera gel should be added to the beaker and well mixed until homogeneous.
- Slowly add the Senna decoction to the mixture with constant stirring.
- To add aroma and further antibacterial activity, add two to three drops of essential oil.

- If carbopol was used, correct the pH and create a transparent gel by adding triethanolamine drop by drop.
- Adjust the final volume to 50 ml by adding distilled water.
- After thoroughly mixing, pour the mixture into a sterile bottle.

Evaluation Of Herbal Hand Sanitizer: -

A. Physical Apperance And Visual Appearance :-

Senna leaf-based herbal hand sanitizers are typically gels or slightly thick liquids. It feels nonsticky, has a gentle herbal scent, a silky texture,



and a pH that is good for skin. Immediately after application, it dries. Depending on the concentration of extract, it might seem light greenish-yellow to pale brown. If properly filtered, the sanitizer is usually clear or slightly hazy, homogeneous, and free of apparent separation or particles.

B. Determination of pH :-

A digital pH meter or pH paper are used to measure the pH of the herbal hand sanitizer made using senna leaves.

C. Skin sensitization test :-

A area of skin, typically the forearm, is treated with a tiny quantity of the herbal sanitizer, and the treatment is monitored for a whole day. The absence of redness, itching, or swelling indicates that the sanitizer is safe and does not cause skin irritation.

D. Foaming ability and foam stability :-

To evaluate the herbal hand sanitizer's foaming ability, shake a tiny amount in a test tube filled with water. Good cleansing action is indicated by the development of steady foam. The typical amount of foam produced by herbal sanitizers

E. Viscosity Test :-

A viscometer is used to measure viscosity. It displays the sanitizer's thickness and flow. The sanitizer distributes nicely and is neither too thick nor too runny when it has the right viscosity.

F. Anti-Microbial Test :-

The herbal hand sanitizer's capacity to eradicate or suppress dangerous pathogens like bacteria is assessed by the antimicrobial test. The widely used Agar Well Diffusion Method involves inoculating an agar plate with bacteria (such as S. or E. coli) and then placing a tiny quantity of the sanitizer in a well on the plate. The zone of inhibition surrounding the well, where bacterial growth is inhibited, is measured to assess the test after the plate has been incubated at 37°C for 24 to 48 hours. Stronger antimicrobial activity, which implies that the sanitizer is working against the bacteria, is indicated by a bigger clear zone. A zone that is narrower or nonexistent indicates a weaker or nonexistent antibacterial effect. This test makes sure the sanitizer offers consistent defense against dangerous bacteria.

G. Stability Studies :-

The effectiveness of the herbal hand sanitizer is assessed over a period of one month under a variety of circumstances. Important parameters are tracked, including viscosity, pH, appearance, microbiological contamination, and antimicrobial action. The sanitizer is kept in a variety of settings, and routine testing makes sure it continues to be safe, effective, and consistent. The sanitizer is deemed stable for usage if no notable changes are noticed.

RESULT: -

A. Physical Apperance And Visual Appearance :-

TEST	OBSERVATION	
Colour	Pale Yellow Colour	
Clarity	Slightly turbid	
Foam Ability	It have ability to produce	
	foam	

B. Determination of pH :-

The pH test results of the Her Hand Sanitizer showed a pH range of **5.4** This indicates that the Herbal Sanitizer has a slightly acidic to neutral pH.

C. Skin sensitization test :-



The skin irritation test is performing on the volunteer named Aditya Patil hand, we found that the Han Sanitizer doesn't produce any irritation to skin.

D. Foaming ability and foam stability :-

The foaming ability results of the Herbal Sanitizer showed a foam height of foam after shaking: 1.5 cm. Foam stability after 5 minutes: 1.2 cm

E. Viscosity test :-

The viscosity test results of the Herbal Hand Sanitizer showed a viscosity of 2.4 cps and it reported that the Herbal Sanitizer has a good viscosity.

F. Anti-microbial test:

The anti-Microbial test is performed on the nutrient culture media using different concentration of Herbal Sanitizer. After the incubation for 24 hrs it creates the zone of inhibition and it found that the Herbal Sanitizer Shows anti-microbial activity.



Figure No 02 :- Antimicrobial Test Result (E Coil Bacteria).

RESULTS:

Table No: 01

Antibacterial activity of test compound against <u>E</u>. <u>coli</u>

SR.NO	SAMPLES	ZONE IN DIAMETER (mm)
1	Control	00
2	Standard (Streptomycin)	28
3	Herbal Hand Sanitizer	17



Figure No 03 :- Anti Microbial Test Of Herbal Sanitizer

G. Stability Test :-

The effectiveness of the herbal hand sanitizer is assessed over a period of one month under a variety of circumstances. Important parameters are tracked, including viscosity, pH, appearance, microbiological contamination, and antimicrobial action. The sanitizer is kept in a variety of settings, and routine testing makes sure it continues to be safe, effective, and consistent. The sanitizer is deemed stable for usage if no notable changes are noticed.

STABILITY TEST RESULT



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Sr No	Parameters	Observation
1	Colour	Pale Yellow Colour
2	Odour	Slightly Bitter and Herbal Test
3	PH	5.4
4	Viscosity	2.4cps
5	Clarity	Slightly Turbide

H. Spreadability test :-

The sprayability test of the herbal hand sanitizer showed good performance. The sanitizer was released in a fine mist that spread evenly on the hands without dripping.



Figure No :- 04 Spreadability Test Of Sanitizer

CONCLUSION :-

The herbal hand sanitizer made from Senna leaf extract using Soxhlet apparatus showed good antibacterial and antifungal effects. It had a mild natural fragrance, was non-sticky, and dried quickly after use. The sprayability was smooth and even, with no leakage or clogging. The sanitizer was gentle on the skin, making it suitable for frequent use. Overall, it proved to be an effective, safe, and eco-friendly alternative to alcohol-based and chemical sanitizers.

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