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FORMULATION AND EVALUATION OF HERBAL SANITIZER

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Abstract:

The primary goal of the herbal hand sanitizer's formulation is hand sanitization. Handwashing is crucial for minimizing, preventing, and managing infections. Thus, the purpose of this formulation is to preserve hand cleanliness. The hand sanitizer is the most effective and claims to eliminate 99.99% of microorganisms.In order to prevent and reduce healthcare-acquired infections, hand cleanliness is an essential practice. The best defense against diseases brought on by various germs is hand sanitization.

In the present experiment, herbal hand sanitizer was prepared by using *Azadirachtaindica, Citrus oil, Aloe barbadensis miller, Syzygiumaromaticum(L), Lavandulaangustifolia mill, Melaleuca alternifolia, Rosmarinusofficinalis L* etc. It is certain that combination of these ingredients acts as an effective hand sanitizer.The product's effectiveness was primarily tested using microbes like *Staphylococcus aureus* and *Escherichia coli*.The formulation of hand sanitizer was prepared and evaluated for physical properties such as color, odor and pH etc.

Keywords:Efficacy, hand hygiene, Anti-microbial property, Infections

Introduction:

"Hand hygiene" is the primary goal of making herbal hand sanitizer. Since the hands are the main site of microbe transmission, the skin, which is the most exposed area of our body, needs to be protected from skin pathogens. Thus, it raises the issue of using antiseptics to wash hands.

In addition to handwashing with soap and water, hand sanitizer acts as an antimicrobial. Hand sanitizer comes in a variety of forms, including gel, foam, liquid solution, etc.

Nosocomial infections are those that develop or start in a hospital or other healthcare facility and are brought on by a high frequency of compromised hosts, pathogens, and effective patient-to-patient transmission mechanisms.Plants have long been utilized by traditional healers to treat or prevent infectious diseases. Numerous secondary metabolites found in plants, including flavonoids, alkaloids, terpenoids, and tannins, have been shown to exhibit antibacterial qualities in vitro.Hence, the present study was aimed to formulate and evaluate the herbal hand sanitizer from Amepurva forum's nirant institute of pharmacy Boramani.

History of Hand Sanitizer:

Healthcare facilities began using hand sanitizers in 1966, and they became widely used in the early 1990s. It is likely that the idea of using an antiseptic to clean hands first surfaced in the early 1800s. In the modern mechanized lifestyle, consumers consistently choose premade alcohol hand rub formulations over hand cleaning. A French pharmacist showed as early as 1822 that solutions containing soda or lime chlorides could eliminate the unpleasant smells connected to human remains and could be applied as antiseptics and disinfectants. This pharmacist claimed in an 1825 paper that using a liquid chloride solution to wet hands would be beneficial for medical professionals and other staff members caring for patients with infectious disorders. Using hand sanitizers, also known as hand antiseptics, is an alternative to washing your hands with soap and water.

Matrials and mthods

1. Matrials:

1]*Azadirachta indica* leaves

- Scientific Name: *Azadirachtaindica*
- Family :*Meliaceae*
- Common Name: *Azadirachta indica*
- Kingdom :*Plantae*
- Order: *Sapindales*
- Genus: *Azadirachta*
- Species: *A. indica*

Phytoconstituents:

Compound Name	Source	Biological activity
Cyclic trisulphide and tetrasulphide	Leaf	Antifungal

2] Lemon

- Scientific Name :*Citrus limon(L.)*
- Family :Rutaceae
- Kingdom: Plantae

- Order: Sapindales
- Genus: Citrus
- Species: C.Limon

3] clove oil

- Scientific Name :*Syzygiumaromaticum (L.)*
- Family :Myrtaceae
- Common Name : Clove
- Kingdom: Plantae
- Order :Myrtales
- Genus: Syzgium
- Species: s.aromaticum

4] Levender oil

- Scientific Name :*Lavandulaangustifolia Mill*
- Family :Lamiaceae
- Common Name : Lavender
- Kingdom: Plantae
- Order :lamiales
- Genus:Lanvandula L.

5] Tea tree oil

- Scientific Name :*Melaleuca alternifoliacheel*
- Family :Myrtaceae
- Common Name : Tea tree
- Kingdom: Plantae
- Order: Myrtales
- Genus: Melaleuca
- Species: M. alternifolia

6] Rosemary oil

- Scientific Name :*Rosmarinusofficinalis L.*
- Family :Lamiaceae
- Common Name : Rosemary
- Kingdom: Plantae
- Order: Lamiales
- Genus: Salvia
- Species : S. rosmarinus

7] Reetha

- Scientific Name: *Sapindusmukorossi*
- Family :Sapindaceae
- Kingdom : Plantae
- Genus: Spindus
- Species: S. mukorossi

Excipients :

- Perfumes
- Preservative
- Deionised water
- Camphor oil

METHOD OF PREPARATION OF EXTRACT

Extraction process of leaves:

Azadirachtaindica leaves are gathered, properly cleaned with distilled water, and then allowed to dry in the shade for 10 days.

Using a mixer grinder, 1000g of dried leaves were ground into a fine powder. Then, using the cold maceration procedure, they were extracted three times in 50% ethanol.

Fig. Extraction of Neeem leaves

IN VITRO CONFIRMATORYTESTS OF *AZADIRACHTA INDICA*ETHANOLIC EXTRACT

TABLE-Tests

TEST	OBSERVATION	RESULT
1] Test for Alkaloids: Add few drops of mayer's reagent to the *Azadirachta indica* extract	Creamy white ppt	Absence of alkaloids
2] Test for flavonoids: Magnesium turnings + few drops of conc.HCL	Red,pink ,orange colour	Presence of flavonoids
3] Test for tannis and phenol: Add 1% ferric chloride solution	Greenish Black	Presence of phenol and tannis
4] Test for Terpenoids: 2ml chloroform +conc.H2So4	Reddish brown colour	Presence of terpenoids
5] Test for Steroids: 2ml acetic anhydride + conc.H2So4	Green or Blue	Absence of Steriods

1 2 3 4 5

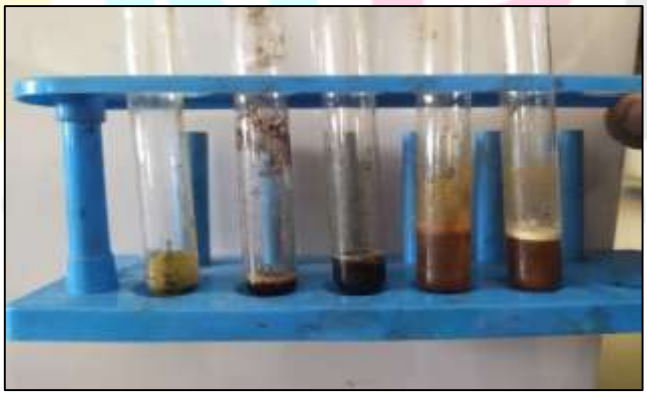

Fig.Chemical Tests of *Azadirachta indica* Extract

FORMULATION OF HAND SANITIZER:

1] Extract of *Azadirachta indica* was prepared by maceration process.

2] Aloe vera gel was added to deionized water with constant stirring. Following even mixing, saponin was added while swirling slowly to prevent any potential air bubbles from forming in the finished product.

3] Set aside for a full day.

4] Plant extract and Aloe vera gel were combined with glycerin and essential oil in an aqueous phase.

5] Lastly, fragrances and rosemary oil were added as a preservative. 6] Stirred slowly to get a homogenous mixture. The polyherbal sanitizer without alcohol was made.

Fig. Hand Santizer

FORMULATION TABLE

Table-Formulation

Sr.No	Ingredients	Category	Qty
1	*Aloe barbadensis miller* (Aloevera gel)	Antimicrobial	25 gm
2	*Citrus limon (Lemon extract)*	Antibacterial, Antiviral	10 ml
3	Azadirachtaindica (*Azadirachta indica*)	Antibacterial	10 gm
4	Glycerin	Humectants	5 ml
5	*Ugnia caryophyllus (L.) (Clove oil)*	Anti-inflammatory	13.3 ml
6	*Lavandulaangustifolia mill (Lavender oil)*	Perfuming agent	13.3 ml
7	*Melaleuca alternifolia (Tea tree oil)*	Disinfectant	13.3 ml
8	De-ionized water	For make upto 100ml	q.s
9	*Rosmarinusofficinalis L (Rosemary oil*)	Preservative	2 ml
10	*Sapindusmukorossi* (Reetha)	Surfactant	0.1 ml
11	*camphora officinarum* (Camphor oil)	Evaporating agent	0.1 ml

Evaluation parameter

1] Colour:

It was determined visually.

Observation -That is the light Green.

2] Odour:

It was determined manually.

Observation - That is the Mild.

3] pH:

A digital pH meter was used to measure the hand sanitizer gel compositions' pH values. The study's objective was to assess the neutralization of different manufactured formulations, which most likely refers to the procedure of bringing the formulation's pH down to a desired level. To avoid skin irritation and inflammation, a topical dosage form, such a hand sanitizer gel, should have a pH between 4.0 to 7.0, which is the natural pH range of the skin.

The average pH readings from this investigation were found to be approximately 4.3, which is near the lower end of the skin's normal pH range and is quite acidic. The recipe contains a substantial amount of aloe vera, which naturally has an acidic pH of 4.0 to 4.5. This could be the reason for the lower pH readings. It is crucial to remember, nevertheless, that the pH level may also be influenced by other formulation components.

4] Clarity:

Clarity test was determined to evaluate presence of particulate matter visually.

Observation -There is no any presence of matter.

5] Stability:

The physical changes were determined by observing color, odor, and PH of sanitizer weekly.

Observation -The product is stable

6] Skin Irritation Test:

Skin Irritancy of hand sanitizer was evaluated by taking small amount of formulation on palm. Checked for local irritation or any inflammatory reactions (if present or not).

Observation – There is no any irritation.

6] Anti-microbial activity of hand sanitizer:

By agar well diffusion method:

Nutrient agar that had been sterilized was put into sterile petri dishes and let to set. The surface of the agar plates was equally covered with 0.1 ml of culture. A well with a diameter of 6 to 8 mm was drilled using a cork borer or a tip. Herbal sanitizer (0.1 ml) was added well. After being labeled, the plates were incubated for 24 hours at 37°C. A clear zone or zone of inhibition was seen because the antimicrobial drug diffuses in the agar medium and stops the growth of the tested microbial strain.

Zone of Inhibition:

Fig. Zone of inhibition(*E.Coli*)

Fig.zone of inhibition *(Staphylococcus aureeus*)

Fig. Zone of inhibition

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Report

Antibacterial activity of the test sample

Method- Agar well diffusion method.

Result-

Sr. No.	Name of the microorganism	Diameter of zone of inhibition(mm)	
		Streptomycin (10mg)	Sanitizer
1	*Staphylococcus aureus*	20	25
2.	*E.coli*	20	24

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Antimicrobial activity of the test sample(Agar well diffusion method)

CONCLUSION

The herbal hand sanitizer's formulation offers a potent combination of antibacterial activity, skin-moisturizing properties, and calming effects.

Both user safety and environmental friendliness are guaranteed by the use of natural components. The overall substantially antibacterial potential was enhanced by the herbal extracts, even though the ethanol content was somewhat below recommended levels. This study promotes more investigation and improvement in order to produce herbal sanitizers on a broad scale as profitable goods.

sanitizer minimum inhibitory concentrations were determined and compared to the standard culture of S aureus and E coli in various dilutions. The sanitizer can be used in hospitals because it was found to be effective.

The sanitizer passed every test that was performed, including the pH, antibacterial, skin irritation, and clarity tests. Additionally, it can be stated that the indicated pathogens, Staphylococcus aureus and E. coli, are significantly affected by the antibacterial properties of herbal sanitizer.

Therefore, the use of herbal antimicrobial treatments as a means of controlling multidrug-resistant bacteria and preventing their spread through hands has enormous promise.

FUTURE SCOPE

Pandemic situations seem to have no end, and lockdowns have a devastating effect on citizens' economies and mental health. In these situations, sanitizing is necessary, even though significant innovations like film that provides constant protection against bacteria and viruses make people's live easier and also reduce psychological stress. There is still a lot of work to be done in the hand sanitization market, and there is potential for future development of herbal hand sanitizers.

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