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Formulation and Evaluation of Herbal Hand Wash

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Abstract:

Hand hygiene is a crucial practice for preventing the spread of infections in both domestic and clinical environments. Growing awareness regarding the harmful effects of synthetic chemicals has led to increased interest in herbal-based formulations due to their natural origin, safety, and antimicrobial properties. The present study deals with the formulation and evaluation of a herbal hand wash prepared using selected plant extracts and natural ingredients. Various formulations were developed by incorporating herbal components known for their antibacterial and skin-soothing effects. The prepared formulations were evaluated for different parameters such as colour, odour, pH, viscosity, foaming capacity, foam stability, and spreadability. Furthermore, quality control tests including homogeneity, greasiness, grittiness, and skin irritation were also performed to ensure product safety and effectiveness. The results obtained from the evaluation studies indicated that all formulations were within acceptable limits and showed satisfactory performance. The study concludes that the formulated herbal hand wash is effective, safe for regular use, and can be considered a promising alternative to commercially available chemical-based hand cleansers.

Keywords: Hand Hygiene, Hand Wash, Quality, Safe, Antimicrobial.

Introduction

Hands act as one of the major routes for the transmission of microorganisms and infectious diseases. During routine activities, hands come into contact with various contaminated surfaces, food materials, and individuals, leading to the accumulation and spread of harmful microbes. Hence, maintaining proper hand hygiene is considered one of the most effective and economical methods to prevent the spread of infections in both community and healthcare environments.

Contaminated hands can serve as carriers for pathogenic microorganisms, especially in food handling and healthcare settings. Food handlers may transfer microbes to food during preparation, which can result in foodborne illnesses upon consumption. Individuals involved in handling ready-to-eat foods without proper hygiene practices are at greater risk of spreading infections. Similarly, healthcare workers and caregivers must follow strict hand hygiene protocols to minimize cross-contamination and protect patient health.

Hand washing helps in removing visible dirt as well as reducing microbial load on the skin, thereby lowering the chances of infection transmission. It is recommended to wash hands at critical times such as before and after eating, after using the toilet, after coughing or sneezing, after handling waste, and before and after caring for sick individuals. Proper hand hygiene practices have been shown to significantly reduce the occurrence of infectious diseases.

In recent years, there has been growing concern regarding the use of synthetic chemicals in personal care products, which may cause skin irritation and contribute to antimicrobial resistance. This has led to increased interest in herbal formulations, which are considered safer, eco-friendly, and effective due to the presence of natural bioactive compounds with antimicrobial, anti-inflammatory, and antioxidant properties.

In this study, various herbal ingredients were selected based on their beneficial effects. Orange peel exhibits antimicrobial and antioxidant properties. Neem is well known for its antibacterial, antifungal, and antiseptic activity. Aloe vera provides moisturizing, anti-inflammatory, and antimicrobial benefits. Menthol offers a cooling effect along with mild antiseptic properties. Vitamin E acts as a skin-protective and moisturizing agent. Ginger possesses antimicrobial and cleansing properties, while Tulsi is recognized for its antibacterial and therapeutic effects.
The aim of this study is to formulate and evaluate a herbal hand wash using these natural ingredients, providing effective cleansing, antimicrobial action, and improved skin compatibility as an alternative to synthetic hand wash products.

Review Of Literature

Hand hygiene is considered one of the most important preventive measures for controlling the spread of infectious diseases. Several studies have highlighted its effectiveness in reducing both gastrointestinal and respiratory infections. Curtis and Cairncross (2003) reported that proper hand washing with soap, particularly after contact with fecal matter such as after defecation or handling child waste, can significantly reduce the incidence of diarrheal diseases by approximately 42–47%. Similarly, Rabie et al. (2006) observed that maintaining good hand hygiene practices can lead to nearly a 30% reduction in respiratory infections, even in areas with high levels of contamination.
A comprehensive meta-analysis conducted by Aiello et al. (2008) demonstrated that improved hand hygiene practices can reduce gastrointestinal illnesses by about 31% and respiratory infections by approximately 21%. These findings clearly indicate that hand hygiene is a simple, cost-effective, and efficient approach for disease prevention. However, despite its proven advantages, adherence to proper hand washing practices remains low. Studies suggest that compliance rates often remain below 50% in both community and professional settings, highlighting the need for increased awareness and behavioral change.
Furthermore, Sijbesma et al. (2009) emphasized the importance of hygiene education and promotion. Their study concluded that promoting hygiene practices can significantly enhance the effectiveness of water and sanitation programs, especially in developing countries, and can be achieved at a relatively low cost.
Overall, the reviewed literature strongly supports the critical role of hand hygiene in preventing infections and underscores the importance of encouraging proper hygiene practices among the population.

Plan Of Study

Methodology

All the apparatus used in the preparation were cleaned properly with water followed by concentrated hydrochloric acid and acetone in order to remove impurities and were dried before use.

Fresh aloe vera leaves were collected from the garden and washed thoroughly with distilled water. The outer green covering of the leaves was removed carefully with the help of a sterile knife and the transparent inner gel was collected in a clean beaker. The collected gel was triturated properly using mortar and pestle to obtain a smooth consistency.

Required quantity of glycerin was added to the aloe vera gel and mixed uniformly by gentle stirring. After complete mixing, Sodium Lauryl Ether Sulfate (SLES) was added slowly with continuous stirring to avoid excessive foam formation.

Rose water was prepared by collecting fresh rose petals and washing them with distilled water. The petals were added to a clean vessel containing sufficient distilled water and heated at low temperature for about 30–45 minutes until the petals lost their color. The solution was cooled and filtered to obtain rose water.

The prepared rose water was then added slowly to the formulation with continuous stirring. A few drops of lemon oil were added as fragrance. Sodium benzoate was added as preservative to improve the stability of the formulation.

Finally, the volume of the formulation was adjusted to 100 mL using distilled water and the prepared herbal hand wash was transferred into a clean airtight container for further evaluation studies.

Formulation Table: Herbal Hand Wash

Sr.No	Ingredient	Quantity
1	Aelo vera Gel	10g
2	SLES	30g
3	Glycerine	5ml
4	Rose Water	50-55ml
5	Lemon oil	2-3 drop
6	Sodium benzoate	0.2g
7	Distilled Water	q.s to 100

Need Of Study

1. Importance in Healthcare Hygiene:

Hand hygiene is essential in healthcare settings to prevent the transmission of infections and diseases. There is a growing need to develop safer and more effective hand wash formulations, especially those based on natural ingredients, to enhance hygiene practices.

2. Use in Daily Life:

Hand hygiene is equally important in everyday life, including household activities. The development of effective and user-friendly hand wash formulations for routine use is necessary to maintain overall health and cleanliness.

3. Need for Natural Antimicrobial Agents:

Conventional hand wash products often contain synthetic chemicals that may cause skin irritation and other side effects. Herbal formulations offer a natural alternative with antimicrobial properties, reducing dependence on synthetic agents.

4. Formulation and Standardization:

The study focuses on the development and standardization of herbal hand wash formulations. Standardization ensures consistency in quality, safety, and effectiveness, which is important for consumer acceptance and product reliability.

5. Evaluation of Formulation Parameters:
It is necessary to evaluate various parameters such as colour, odour, pH, viscosity, foaming ability, foam stability, and spreadability. These factors determine the quality, stability, and overall performance of the hand wash.

6. Skin Compatibility and Safety:
The formulation must be evaluated for skin irritation, greasiness, grittiness, and homogeneity to ensure that it is safe, non-irritating, and suitable for regular use, even for individuals with sensitive skin.

7. Cost-Effectiveness:
There is a need to develop economical and easily accessible hand wash formulations using locally available herbal ingredients. This makes the product affordable and suitable for use in resource-limited settings.

Herbal Monographs used in formulation

1) Alovera:-
Botanical name: Aloe Barbadensis Miller
Biological source: dried latex of leaves of Aloe Barbadensis Miller
Family: asphodelaceae

2) Rose water:-
Botanical name: Rosa Damascena mill l.
Biological source: steeping rose petals in water
Family: Rosaceae

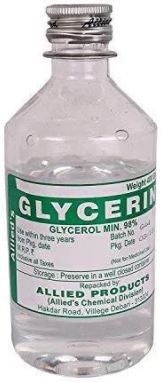
3) Glycirine

Glycerin:-

Chemical name: Glycerol

Biological source: Obtained from vegetable oils and fats

Family: Polyol compound



4) Lemon oil:-

Botanical name: *Citrus limon*

Biological source: Obtained from peel of lemon fruit

Family: Rutaceae

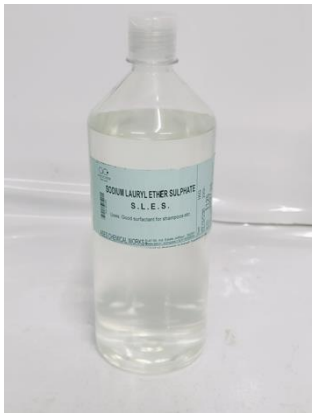
5) Sodium benzoate:-

Chemical name: Sodium benzoate

Biological source: Prepared from benzoic acid

Category: Preservative

6) Sles :-
Chemical name: Sodium Lauryl Ether Sulfate
Biological source: Synthetic surfactant
Category: Cleansing and foaming agent



7) Neem :-
Botanical name:-Azadirachta Indica
Biological source:- fresh or dried leaves of Azadirachta Indica
Family: meliaceae

Evaluation parameters
1. Organoleptic Evaluation
Parameters Evaluated
- Color
- Odor
- Appearance
- Consistency

Procedure
The prepared formulation was visually inspected for color, odor, appearance, and consistency and observations were recorded.
2. pH Determination
Procedure
About 1 mL of prepared herbal hand wash was diluted with distilled water and the pH was determined using pH paper or digital pH meter.
Ideal pH
5.5 to 7

3. Foam Height Test

Procedure

10 mL of prepared hand wash was taken in a measuring cylinder and 20 mL distilled water was added. The cylinder was shaken vigorously for 10 times and foam height was measured.

Observation

Good foam formation indicates satisfactory cleansing property.

4. Viscosity Test

Procedure

The viscosity of the prepared formulation was determined using Brookfield viscometer.

OR

If viscometer was not available:

The viscosity was observed visually and reported as thin, moderate, or thick consistency.

5. Washability Test

Procedure

A small quantity of herbal hand wash was applied on hands and washed with water. Ease of washing and smoothness after washing were observed.

Observation table

Sr.no	Evaluation parameters	observation
1.	color	Light green
2.	odor	pleasant
3.	apperance	smooth
4.	PH	6.1
5.	Foamability	Good
6.	Washability	Good
7.	Skin irritation	None
8.	Stability	Stable

Result And Discussion

The herbal hand wash containing Aloe vera was successfully prepared and evaluated for various physicochemical parameters. The formulation showed good appearance, pleasant odor, smooth texture, and acceptable consistency suitable for regular hand cleansing.

The pH of the prepared herbal hand wash was found to be within the range of 6.0–7.0, which is considered safe and compatible with human skin. The formulation produced sufficient foam and showed good cleansing activity during washing tests. The viscosity of the hand wash was appropriate, making it easy to pour and apply on hands.

The antimicrobial activity of the formulation was evaluated against common skin microorganisms. The presence of Aloe vera extract contributed to noticeable antibacterial action due to its natural bioactive compounds. The hand wash effectively reduced microbial growth and provided satisfactory cleaning without causing skin irritation or dryness.

Stability studies indicated that the formulation remained stable under normal storage conditions. No significant changes in color, odor, pH, or consistency were observed during the study period. The herbal ingredients also provided moisturizing and soothing effects on the skin, making the product suitable for frequent use.

Overall, the prepared herbal hand wash demonstrated good cleansing efficiency, antimicrobial activity, skin compatibility, and stability. The study supports the potential use of Aloe vera as an effective natural ingredient in herbal hand wash formulations

Summary And Conclusion

The herbal aloe vera hand wash was formulated successfully using natural ingredients such as aloe vera gel, rose water, glycerin, and SLES as cleansing agent. The prepared formulation showed satisfactory results for various evaluation parameters including color, consistency, pH, foamability, washability, and skin irritation test.

The formulation exhibited good cleansing action, pleasant appearance, acceptable pH, and produced adequate foam with no irritation to the skin. Aloe vera provided moisturizing and soothing effects, making the hand wash suitable for regular hand hygiene.

From the overall study, it was concluded that the prepared herbal hand wash can be effectively used for hand cleansing and maintaining healthy skin with minimal side effects compared to synthetic formulations

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