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Preparation And Evaluation Of Antimicrobial Moisturizing Soap Containing Neem

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ABSTRACT

Herbal soap is a one of the most popular cleaning agent for body. Intended to provide an eco-friendly, natural skincare product. To address the present customer need, this study prepares and evaluates antimicrobial moisturizing soap that contains neem. A plant with many therapeutic uses, neem (Azadirachta indica) is well known for its antibacterial, antifungal, and anti-inflammatory qualities, which make it a useful component of skincare products. The soap is formulated using a combination of neem extract, essential oil and natural surfactant, ensuring a chemical free alternative to synthetic soaps. The product's physical appearance, foaming ability, skin compatibility, moisturizing properties, and antimicrobial properties were all tested. An abundant and sustainable method of cleaning was achieved by using herbal soap that is free of chemicals and plastics. Packaging designs were developed, and packaging was made from recycled paper. Furthermore, the formulation was shown to be stable across all parameters after a month of stability testing.

KEYWORDS: Herbal soap, Antimicrobial, Moisturizer, Foaming test

INTRODUCTION

Cosmetics are a Greek word which means 'to adore'. Cosmetics are widely used in our daily life for beauty treatments such as to improve our skin, nail, hair etc. The word cosmetic was derived from the Greek word" kosmetika" meaning having the power, arrange skill in decorating.

The origin of cosmetics forms a continuous narrative throughout the history of man as they developed. The man in prehistoric times 3000BC used colors for decoration to attract the animals that he wished to hunt and also the man survived attack from the enemy by coloring his skin and adorned his body for protection to provoke fear in an enemy (whether man or animal). The origin of cosmetics were associated with hunting, fighting, religion and superstition and later associated with medicine. Herbal Cosmetics, here in after referred as Products, are formulated, using various permissible cosmetic ingredients to form the base in which one or more herbal ingredients are used to provide defined cosmetic benefits only, shall be called as "Herbal Cosmetics".

According to drug and cosmetics Act, the cosmetics is defined as articles intended to be rubbed, poured, sprinkled or sprayed on, introduced into or otherwise applied to the human body or any part for cleansing, beautifying, promoting attractiveness or altering the appearance. The herbal cosmetics are the preparations containing phytochemical from a variety of botanical sources, which influences the functions of skin and provide nutrients necessary for healthy skin.

The demand of herbal cosmetics due to the availability of new ingredients is the financial reward for developing the successful product. Nowadays herbs are widely used as remedial agents because herbs are easily available at less expensive and non- toxic. So the people have good faith in such remedies. Cosmetics from natural sources are considered better and safer. Plants are the natural source of cosmetic formulation. They can be used to design some useful inorganic materials that are called green synthesis. They are made from original ingredients in plants, leaves, roots, fruits and flowers which have properties for health and beauty.

Soap is a fundamental component in the cosmetics industry, serving as a primary cleansing agent in various personal care products. Soaps are typically formulated from a combination of oils, fats, and alkali, which are mixed and heated to produce a chemical reaction called saponification.

This process creates a molecule with both hydrophobic and hydrophilic properties, allowing soap to effectively emulsify and remove dirt, grime, and impurities from the skin. In cosmetics, soaps are used in a range of products, including bar soaps, liquid soaps, body washes, and facial cleansers. Soaps can also be customized with various additives, such as fragrances, colors, and moisturizers, to enhance their aesthetic and functional

properties. Overall, soap plays a critical role in maintaining personal hygiene and skin health, making it an essential ingredient in the cosmetics industry.

Fig 1 :- Soap

Here's a classification of soaps in cosmetics:

A. By Skin Type

1. Normal skin soaps: Gentle, non-comedogenic soaps suitable for everyday use.

2. Dry skin soaps: Moisturizing soaps with added humectants and emollients for dry, sensitive skin.

3. Oily skin soaps: Oil-control soaps with salicylic acid or tea tree oil to help regulate sebum production.

4. Sensitive skin soaps: Fragrance-free, hypoallergenic soaps for sensitive skin

B. By Ingredients

1. Glycerin soaps: Soaps with added glycerin for moisturizing and humectant properties.

2. Herbal soaps: Soaps infused with herbs like chamomile, calendula, or peppermint for their therapeutic benefits.

3. Antibacterial soaps: Soaps containing triclosan or chlorhexidine to help control bacterial growth.

4. Exfoliating soaps: Soaps with added exfoliates like sugar, salt, or alpha-hydroxy acids (AHAs) to help remove dead skin cells.

C. By Form

1. Bar soaps: Solid soaps in bar form, often with a higher pH level than liquid soaps.

2. Liquid soaps: Liquid soaps, often with a lower pH level than bar soaps, making them gentler on skin.

3. Soap flakes: Soap flakes or powders, often used for hand washing or as a gentle cleanser for sensitive skin.

D. By Purpose

1. Cleansing soaps: Soaps designed for everyday cleansing and hygiene.

2. Medicated soaps: Soaps containing active ingredients like sulfur, salicylic acid, or coal tar to help treat skin conditions like acne, psoriasis, or eczema.

3. Moisturizing soaps: Soaps designed to provide long-lasting moisturization and hydration to dry skin.

IMPORTANCE OF SOAPS

In order to preserve general health and personal cleanliness, soap is essential. Its significance cannot be emphasized because it is the body's main cleansing agent. By cleaning the skin of debris, grime, and microbes, soap helps stop the spread of infections and diseases. Additionally, by clearing clogged pores, eliminating dead skin cells, and lowering the risk of acne and other skin disorders, soap helps to preserve the health of the skin. As cleanliness is frequently linked to emotions of freshness, self-assurance, and wellbeing, soap has psychological and social benefits in addition to its physical ones. In general, soap is a vital tool for preserving general health and wellbeing, encouraging personal hygiene, and stopping the spread of illnesses.

BENEFITS OF SOAPS

A. Physical Benefits

1. Cleaning: Soap efficiently cleanses the skin of debris, filth, and microbes.

2. Hydration: The natural moisture barrier of the skin is preserved by soap.

3. Exfoliation: To aid in the removal of dead skin cells, several soaps contain exfoliating ingredients.

B. Health Benefits

1. Prevention of infection: By eliminating bacteria from the skin, soap helps stop the spread of infections.

2. Management of skin conditions: Psoriasis, eczema, and acne can all be controlled with soap.

3. Wound care: Wounds can be cleaned and cared for with soap.

C. Emotional and Social Benefits

1. Confidence and freshness: Soap gives people a sense of confidence and freshness.

2. Social acceptability: Social acceptance depends on maintaining proper personal hygiene, which soap helps with.

HERBAL SOAP

Herbal soap is a type of soap that is made with herbs, botanicals, and other natural ingredients. Because they frequently don't contain harsh chemicals, artificial perfumes, or dyes, these soaps are a popular choice for people seeking a gentler and more natural cleaning solution. The natural, mild, and efficient washing qualities of herbal soap make it a popular option in the cosmetics sector. Usually a blend of herbs, botanicals, and essential oils, these soaps offer a number of skin- benefitting properties. Herbal soaps can lessen inflammation, encourage the formation of healthy skin cells, and soothe and calm sensitive skin. Numerous herbal soaps are also useful against acne, minor cuts and scrapes, and other skin problems since they include antibacterial and antifungal qualities. Herbal soaps are also frequently devoid of harsh chemicals, artificial perfumes, and colors, which makes them an excellent choice for people who like natural goods or have sensitive skin. All things considered, herbal soap is a fantastic complement to any skincare regimen, offering a mild, efficient, and all-natural means of cleansing and nourishing the skin.

Antimicrobial properties are essential for cosmetics because they stop the growth of bacteria, yeast, and mold—all of which can taint and ruin products. This keeps cosmetics stable and intact, increasing their shelf life and guaranteeing consumer safety. Cosmetics containing antimicrobial compounds can also improve skin health by lowering acne and outbreaks, calming skin irritations, and stopping the development of infections. Manufacturers of cosmetics can produce safe, effective products that satisfy customer demands and legal requirements by combining antibacterial qualities. In order to guarantee the effectiveness, safety, and quality of products as well as to safeguard the health and welfare of consumers, antimicrobial properties in cosmetics play a critical role.

The moisturizing property in herbal soap is essential for giving the skin moisture and nourishment. Natural ingredients like shea butter, coconut oil, and aloe vera are used to herbal soaps to help moisturize and calm dry, irritated skin. Herbal soap's hydrating qualities also help to restore and rebuild the skin's natural barrier function, which lowers dryness and inflammation. Furthermore, herbal soaps frequently include anti-inflammatory and antioxidant ingredients that support skin health and shield the skin from environmental stresses. Herbal soaps offer a mild, efficient, and nourishing method of skin care that leaves the skin feeling soft, supple, and renewed by fusing the cleansing power of soap with the moisturizing qualities of natural substances.

NEEM

Neem, also known as Azadirachta indica, is a versatile and valuable plant in traditional Ayurvedic treatment. Neem, which originates in India and Southeast Asia, has been used for millennia to cure a variety of health and skin problems. Neem is known as a "wonder tree" because of its multiple advantages, which include anti-inflammatory, antibacterial, antifungal, and antiviral qualities. Neem oil, derived from the tree's seeds, is highly valued for its ability to soothe and calm inflamed skin, reducing redness and inflammation. Neem is also used

to cure acne, eczema, psoriasis, and other skin problems, as well as to repel insects and maintain healthy hair and scalp. Furthermore, neem has been proven to have immunomodulatory actions, which aid to improve the immune system and prevent infections. Overall, neem is a unique plant with numerous benefits, which makes it a popular element in natural skincare products, herbal cures.

Fig 2 :- Neem Leaf

ROLE OF NEEM

Neem is widely used in cosmetics due to its multiple skin and hair advantages. Here's how neem is used in cosmetics:

A. Skin Care

1. Acne treatment: Neem's antibacterial and anti-inflammatory qualities aid in acne treatment and prevention.

2. Anti-aging: Neem's antioxidants assist in diminishing fine lines, wrinkles, and age spots, encouraging a more youthful look.

3. Skin toning: Neem aids in balancing the skin's pH, minimizing the visibility of pores and resulting in skin that appears smoother and more uniformly toned.

4. Hyper-pigmentation: Neem's capacity to suppress melanin production assists in diminishing hyper-pigmentation and encourages a more uniform skin tone.

B. Hair Care

1. Dandruff treatment: Neem’s antifungal and antibacterial characteristics assist in managing dandruff, itchiness, and various scalp problems.

2. Hair growth promotion: Neem's capacity to enhance blood circulation and diminish inflammation contributes to the promotion of healthy hair growth.

3. Lice and tick control: Neem's insecticidal qualities assist in repelling and eliminating lice and ticks.

C. Other Benefits

1. Natural insect repellent: Neem's strong scent helps to repel insects, making it a popular ingredient in natural insect repellents.

2. Wound healing: Neem's antibacterial and anti-inflammatory properties help to promote wound healing and reduce the risk of infection.

3. Oral health: Neem's antibacterial properties help to reduce plaque, bad breath, and gum inflammation.

INGREDIANTS

ALOE VERA

Aloe vera is a succulent plant species of the genus Aloe. It is widely distributed, and is considered an invasive species in many world regions. The species has several synonyms: Aloe barbadensis, Aloe Indica, Aloe Per foliate. The leaves of Aloe vera contains significant amount of the polysaccharide gel acemannan, which can be used for topical purposes. Aloe skin contains aloin which is toxic. Products made from Aloe vera usually only use the gel. Aloe vera, renowned for its soothing and nourishing properties, is a key ingredient in our soap.

This natural wonder:

1. Soothes skin irritations: The anti-inflammatory qualities of aloe vera aid in reducing redness, itching, and irritation.

2. Hydrates and moisturizes: Aloe Vera’s rich vitamins and minerals help lock in moisture, leaving skin feeling soft and supple.

3. Promotes skin elasticity: The vitamins and amino acids in aloe vera aid to increase skin elasticity, which lessens wrinkles and fine lines.

Fig 3 :- Aloe Vera

2. VITAMIN E

Vitamin E is a fat-soluble vitamin that is essential for healthy eyes, skin, and hair. Benefits of vitamin E include:

- Antioxidant properties: Vitamin E helps shield cells from free radical damage, which can lead to chronic illnesses and aging.
- Skin health: Vitamin E protects the skin from UV damage, encourages the formation of collagen, and lessens the visibility of wrinkles and fine lines.
- Hair growth: Vitamin E increases hair growth by lowering oxidative stress and enhancing blood flow to the scalp.
- Eye health: Macular degeneration and cataracts brought on by aging are prevented by vitamin E.

Fig 4 :- Vitamin E

3. ROSE WATER

Rose petals are used to make the aromatic, tasty liquid known as "rose water." It is a . widely used ingredient in hair care, skincare, and cooking.

Benefits of Rose Water

Skincare Benefits

1. Hydrates and tones: Rose water hydrates and tones the skin by balancing its pH, which minimizes the visibility of pores and leaves the skin feeling smooth and soft.

2. Soothes and calms: Rose water's anti-inflammatory qualities can help lessen redness and irritation, which makes it a great treatment for rosacea, acne, and other skin disorders.

3. Antioxidant properties: Antioxidants included in rose water help shield the skin from pollution, giving it a more youthful appearance.

Fig 5:- Rose Water

4. GLYCERIN

Glycerin is a hygroscopic substance frequently utilized in beauty and personal care items because of its hydrating, calming, and safeguarding attributes.

Benefits of Glycerin in Cosmetics

1. Moisturizing and hydrating: Glycerin attracts and retains moisture in the skin, leaving it feeling soft, supple, and hydrated.

2. Soothing and calming: Glycerin possesses anti-inflammatory and antiseptic qualities, which make it a useful component for calming and soothing irritated skin.

3. Protective barrier: Glycerin aids in forming a protective layer on the skin's surface, guarding it against environmental stressors like wind, cold temperature, and dry air.

4. Improves skin elasticity: Glycerin's hydrating effects can enhance skin elasticity, minimizing the visibility of fine lines and wrinkles.

5. Enhances skin penetration: Glycerin can assist other ingredients in penetrating more thoroughly into the skin, thereby increasing their effectiveness.

Fig 6 :- Glycerin

PLAN OF WORK

The plan of work is as follows:

1. Selection of ingredients

- Pre Formulation study of drug and excipients
- Solubility
- Effect of light
- Viscosity
- Effect of heat
- Hygroscopicity

2. Preparation of Moisturizing Neem Soap

3. Evaluation of Moisturizing neem soap

- Physical appearance Test
- PH Test
- Antimicrobial Activity Test
- Skin irritation patches Test
- Foaming ability
- Washability Test
- Acid Value Test

- Moisturizing and skin compatibility Test

4. Short term Stability Studies

MATERIALS AND METHODS

Sl.no	Ingredients	sources
1	Stearic acid	Nice Chemicals, Kochi
2	Propylene glycol	Isochem Laboratories, Kochi
3	Sodium hydroxide	Isochem Laborotories, Kochi
4	Glycerin	Isochem Laborotories, Kochi
5	Coconut oil	Indomitra Farm Products Pvt.Ltd., Tamilnadu
6	Neem extract	Collected locally
7	Aloe vera gel	Dhathri life science Pvt.Ltd., Kayamkulam
8	Vitamin E	Procter and Gamble Health Ltd., Goa
9	Rose water	Vishal personal care Pvt.Ltd., Hyderabad
10	Perfume	Nice chemicals ,kochi

Table 1: Materials and their sources

PRE-FORMULATION STUDIES OF DRUGS AND EXCIPIENTS

The objective of preformulation study was to create an elegant, stable, effective, and safe dosage form by gaining a thorough understanding of the physicochemical characteristics of new drug substances and excipients prior to their development into a final formulation

A brief pre formulation study was done to understand the following:

- Degradation of the components upon exposure to the atmosphere
- Incompatibilities of active ingredients with excipients.
- Stability of the formulation both physically and chemically

In this study following physiochemical parameters were also studied:

i. Solubility:

The solubility of the active components and excipients was assessed using water, glycerin, and oil at room temperature to identify any solubility problems, crystal formation, etc.

ii. Effect of light:

The components were exposed to natural daylight at ambient temperature for a predetermined duration. This was performed to determine if the availability of light influences the stability of the components.

iii. Viscosity:

Physical evaluation was used in the viscosity studies to ensure that the selected ingredient was not overly viscous, as this could cause compatibility issues.

iv. Effect of heat:

The materials were exposed to natural daylight at room temperature for a predetermined amount of time. This was done to find out if the ambient temperature had any effect on the compounds' stability.

v. Hygroscopicity:

It is well known that many substances, including salts, are susceptible to moisture and water vapor. When a drug molecule comes into contact with moisture, it will either retain water by surface adsorption or capillary condensation. Moisture can affect the medication's and formulation's stability. the connection between surface area, temperature, and ambient humidity and equilibrium moisture content. Certain hygroscopic chemicals also adsorb water due to hydrate formation or specific site adsorption. In this investigation, solid materials were kept at room temperature for a predefined amount of time in order to test their hygroscopicity.

Preparation of moisturizing Neem soap

The preparation of moisturizing neem soap consisting of two parts.

Part 1: Preparation of stearic acid soap base

Table 2: name, weight, uses of ingredients

SI.no	Ingredients	Weighed quantity	Uses
1.	Stearic acid	15g	Adds hardness and stability to soap. Helps create a smooth, creamy lather.
2.	Propylene glycol	15ml	Helps retain moisture in skin. Adds smoothness and flexibility to soap.
3.	Sodium hydroxide	15g	Reacts with oils to create soap base. Helps remove dirt and impurities from skin.
4.	Distilled water	30ml	Helps dissolve lye and mix ingredients.
5.	Glycerin	10ml	Attracts and retain moisture in skin. Adds transparency and gloss to soap.
6.	Coconut oil	75ml	Moisturizes and nourishes the skin and has anti-microbial property.

Figure 7: Ingredients

Procedure:

- To make a lye solution, carefully combine water and sodium hydroxide (NaOH).
- In a separate container, heat 38°C to 45°C the coconut oil until it is fully melted.
- Add the stearic acid to the melted coconut oil and stir until it dissolves completely. set the accurate temperature.
- Make sure to thoroughly mix the glycerin with the lye solution. set the temperature between 38°C to 45°C
- Melt the coconut oil and stearic acid combination and then gradually add the lye-glycerin mixture.
- After the mixture is thoroughly combined and melted, add propylene glycol to the solution and stir to incorporate.
- Let the mixture cool. After testing the pH (5.5- 6), it is put into a mold and allowed to solidify.

Fig 8 :- Soap Base

Part 2:

Preparation of Neem soap

SI.no	Ingredient	Weighed quantity	Uses
1.	Stearic acid soap base	85g	Provide moisturizing property and durability to the skin
2.	Neem extract	0.2g	Provide antimicrobial and antibacterial property. Improve skin elasticity and promote healthy skin
3.	Aloe Vera gel	5.5g	Moisturizes and hydrate skin
4.	Vitamin E	3g	Provide antioxidant property and promote skin regeneration
5.	Rose water	6ml	Anti-inflammatory and antiseptic property, Making it an effective ingredient in soothing and calming irritated skin
6.	Perfume	0.3 ml	Provide a pleasant and lasting fragrance in soap

Table 3: name, weight, uses of ingredients

PROCEDURE

➢ Collection:

- Neem leaves that are in good health are gathered
- To get rid of any dust or debris, gently rinse the leaves in lukewarm water.
- If necessary, pat them dry with a fresh towel. To expedite the drying process, split apart huge leaves into smaller pieces.
- Look for a spotlessly clean area with adequate ventilation.
- Neem leaves should be spread out in a single layer. To allow air to circulate, try not to overlap them too much.
- Depending on the temperature and humidity, leave the leaves in the shady location for three to seven days.

➢ Extraction:

- After the neem leaves have completely dried, grind them into a fine powder using a grinder
- Ethanol is added to a conical flask containing the powder.
- The maceration process lasts five days.
- The leftover material is collected and purified.
- After being moved to a heating mantle, the filtrate is expelled.

➢ Preparation

- Weigh the soap base and cut it into small pieces
- For the production of high-quality, long-lasting soap, the Cold Process method is used
- In a heatproof mixing bowl, melt the soap base in a double boiler while stirring in between heatings.
- Add the vitamin E, aloevera gel, rose water, and neem extract. Mix well to incorporate.
- Once the heat is off, add the perfume, add the perfume
- After pouring the fluid into a mold, let it solidify.

Fig 9 :- Neem Soap

EVALUATION OF ANTIMICROBIAL HERBAL NEEM SOAP

Evaluation was conducted on the physical evaluation during 1 month of storage at room temperature. The following evaluation test was conducted.

1. Physical appearance

The colour, shape and size, texture, fragrance, hardness of the created formulation were all examined.

2 .Determination of PH

Cut a small sample of soap and dissolved a small amount of distilled water to create a dilute solution and the PH was measured using a calibrated PH strips.

3. Skin irritation test

Clean a specific area of the skin and apply a small amount of soap. Make sure the soap remains In contact with the skin in the tested area.Wash the area and check for any adverse skin reaction after a few minutes.

4. Foaming ability test

The foaming ability was determined using the cylinder shaking method. Take a small amount of the herbal soap solution was placed in a 250ml graduated cylinder, covered with hands and shaken for 10 minutes. After 1 minutes of shaking, the total volume of foam content was measured.

5. Moisturizing and skin compatibility test

Evaluate how well the herbal soap maintain skin hydration and ensure do not causes dryness. Clean a small area of skin and wash the area with the herbal soap then after 1 to 2 hours observe the skin for sign of dryness.

6. Washability test

Evaluates how easily the herbal soap can be rinsed off the skin, as well as how well it cleans without leaving any residue. Apply the herbal soap to a small area of skin and rinsing with clean water. After rinsing observe the skin for any residue thereby confirmed consistency.

7. Determination of acid value

Standardization of 0.1N KOH:

Weigh accurately 0.63gm of oxalic acid. Transfer to 100ml standard flask and makeup the volume. Pipette out 20ml of the solution into a conical flask and add 2 drops of phenolphthalein and titrate it against 0.1N KOH. End point is the appearance of pale pink color.

Determination of Acid value:

Weigh accurately 5gm of oil and dissolve it in a mixture of 12.5ml of ether and alcohol which was previously neutralized with 0.1N KOH to phenolphthalein. Shake well until the samples dissolve. Add phenolphthalein. Shake well until the samples dissolve. Add phenolphthalein. Shake well until the samples dissolve. Add phenolphthalein indicator and titrare it against 0.1N KOH until the solution become pale pink color.

8. Antimicrobial assay

Anti-bacterial activity by Agar well diffusion method:

In order to evaluate the antimicrobial activity of plant or microbial extracts, the agar well diffusion method is frequently used. By spreading a volume of the microbial inoculum over the whole agar surface and letting it develop in the presence of the extract to be tested, the spread plate technique is used to inoculate the agar plate surface.

Test Microorganisms and Growth Media:

The following clinically isolated microorganisms Gram positive Staphylococcus aureus, Gram negative E.coli were chosen based on their clinical and pharmacological importance. The bacterial strains were grown in the nutrient broth media (Himedia Labs Pvt.Ltd, Mumbai) at 37°C and maintained on nutrient agar slants (Himedia Labs Pvt.Ltd, Mumbai) at 4°C, The stock cultures were maintained at 4°C.

Mueller Hinton Agar (MHA) medium was used for determination of susceptibility of microorganisms to antimicrobial agents. Suspended 38 grams powder mixture (MHA) in 1000 ml distilled water. Heated until it boils to dissolve the medium completely and checked the pH (7.2). Sterilized the prepared media by autoclaving at 15 lbs pressure (121°C) for 15 minutes and cooled to 45-50°C. Mixed well and poured into sterile petri plates.

Anti-microbial activity testing was carry out by using agar cup method:

For the determination of zone of inbition, Antimicrobial Herbal neem soap prepared was taken as sample, Hamam soap [1g] ,pure amoxicillin [Himedia Labs Pvt.Ltd,Mumbai] dissolved(1mg/ml) in di-methyl sulfoxide(DMSO)- [nice chemical Pvt Ltd, kochi]. Was taken (at the concentration 25µg/ml) as a standard antimicrobial soap for comparison of their results. The product (F4) was screened for antibacterial activity against E.coli (gram–negative) and Staphylococcus aureus (gram- positive) bacteria.

MH agar plates were seeded with a fixed amount of test micro-organism by spread plate technique using a sterile glass spreader and allowed to stay. Using a sterile cork-borer of 6 mm diameter, four holes were made into the Petri dishes seeded with bacterial culture. The product [2.5g,5g of F4] were added into the 6mm diameter made in inoculated petri-dishes. Amoxicillin (25 µg/ml) and Hamam soap (1g) was used as the standard. Studies were performed in triplicates and the mean value was calculated. The cultures were incubated for 18 hours at 37 °C to allow the test microorganisms to proliferate after being maintained for 4 hours at 2–8 °C to allow for the diffusion of antibiotic metabolites. By measuring the sizes of inhibitory zones (including the agar cup's diameter) on the agar surface around the wells, the sensitivity of the microorganism species to the extract was ascertained. A zone scale was used to measure the zone of inhibition in millimeters, and the results were tabulated.

SHORT TERM STABILITY STUDY

Short term stability studies were conducted on 4 formulations F1, F2, F3, and F4 by storing at room temperature. They were then study for 1 month during which the temperature range is observed between 2 weeks of intervals for parameters such as PH, appearance, foaming ability, moisturizing and skin compatibility, skin irritation patches test, wash ability test.

RESULTS AND DISCUSSION

The finding and results of the study is categorized into the following sections;

A .Pre-formulation studies outcomes

1. Solubility :

- Neem soap is generally insoluble in water
- Aloe vera gel is partially soluble in water

2. Viscosity:

- Neem extract, typically has a moderate to high viscosity
- Vitamin E was found to be viscous
- Aloe vera was found to be extremely slimy

3. Effect of heat :

- During the exposure to room temperature no ingredients was affected by the heat for a predetermined period of time.

4. Hygroscopicity:

- Neem extract and Aloe vera has some degree of hygroscopicity
- All other ingredients are not hygroscopic in nature

B. Evaluation- Results and Discussion

1. Physical appearance test

Sl no	Evaluation Parameter	Result
F1	Color Odor Texture	• Pale green • Unpleasant odor • Smooth and spongy
F2	Color Odor Texture	• Light green • Characteristics odor • Smooth and gentle spongy
F3	Color Odor Texture	• Forest green • Characteristics odor • Smooth and stiff
F4	Color Odor texture	• Dark green • Characteristics odor • Smooth and stiff

Table 4: physical appearance of soap

2. pH Test:

Sl No	Evaluation Parameter	Results
F1	pH	7
F2	pH	7
F3	pH	6
F4	pH	6

Table 5: pH of soap

Figure 10: pH strip

3. Skin irritancy test

The results of the irritation test using the four formulas were safe to use. They were characterized by the absence of itching and irritation.

Sl no	Evaluation parameter	F1	F2	F3	F4
1	Skin irritancy	No effect on skin	No effect on skin	No effect on skin	No effect on skin

Table 6: Irritancy test values

Figure 11: Irritancy test

4. Foaming ability

F4 and F3 shows greater foaming ability when compare F1 and F2

Sl.no	Evaluation parameter	F1	F2	F3	F4
1	Foaming ability	Moderate foaming ability	Moderate foaming ability	Good foaming ability	Good foaming ability

Figure 12: foaming ability

Figure 12: foaming ability

5. Washability

The result of the washability test showed that all four formulas show good cleansing property.

Sl.no	Evaluation parameter	F1	F2	F3	F4
1	Cleansing action	Moderate	Good	Good	Very Good

Table 8: Result of washability

6. Moisturizing and Skin Compatibility Test

The result of the moisturizing and skin compatibility test showed that all four formulas show good moisturizing action.

Sl no	Evaluation parameter	F1	F2	F3	F4
1	Moisturizing action	Moderate	Moderate	Good	Good

Table 9: Moisturizing & compatibility test values

7. Acid value

Standardization of 0.1N KOH = 0.097N0

ASSAY

Sl. No	Burette Reading		Initial Value
	Initial	Final	
1	0	1ml	1ml

Table 10: Determine of acid value

$$\text{Determination of acid value} = \frac{5.61 \times \text{Titre value} \times \text{Actual normality}}{\text{Weight taken} \times \text{Expected normality}}$$

$$= \frac{5.61 \times 1 \times 0.097}{5 \times 0.1}$$

$$= 0.010$$

Report:

Acid value of the formulation F4 was found to be 0.010g.

8. Anti-Microbial Assay

Microorganism	Zone of inhibition in mm			
	STD		TEST	
	Hamam Soap (1g)	Amoxicillin (25µg/Ml)	Herbal Neem Soap	
			5g	2.5g
S.aureus	22.5mm	34mm	29.5mm	25.5mm
E.coli	Nil	24.5mm	Nil	Nil

Table 11 : Antimicrobial assay

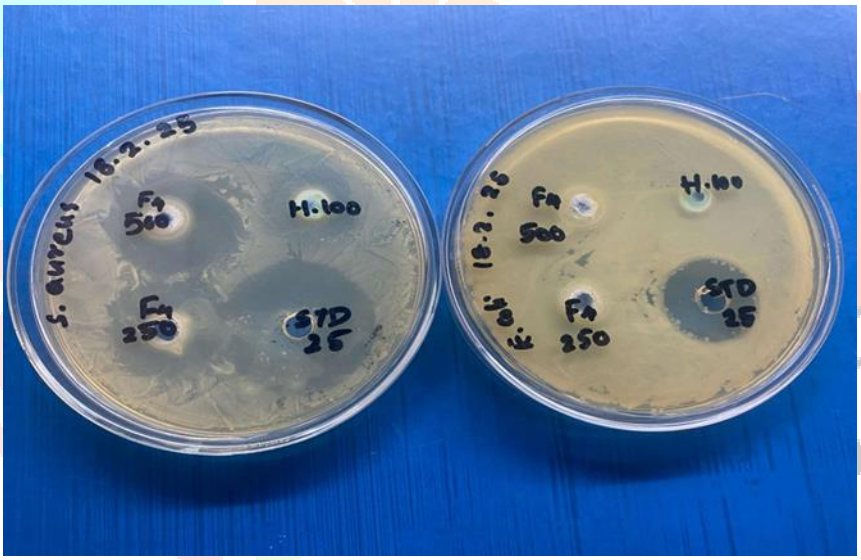

Fig 13: zone of inhibition

The sample F4 and standard (amoxicillin at a concentration of 25 µg/ml, Hamam soap at 1 g) inhibited the growth of Staphylococcus aureus species tested. The intensity of the inhibition for F4 was recorded to be an average of 29.5 mm against the average zone value of amoxicillin (34 mm) and hamam soap (22.5 mm) as standard. The standard amoxicillin (24.5 mm) E. coli didn't show any sensitivity against the formulated product. From the measurement we obtained, it can be observed that F4 was effective against gram-positive bacteria.

DISCUSSION

We worked on a project “preparation and evaluation of antimicrobial moisturizing soap containing neem”. The components are Neem, Aloe vera; Rosewater, Glycerin and Vitamin E have been shown to provide therapeutic benefits for the skin. The preparation and evaluation of antimicrobial moisturizing soap with Neem and Aloe vera involves careful selection of natural ingredients known for their beneficial properties in skin care. The antibacterial, antifungal, anti-inflammatory, and moisturizing properties of neem extract, along with the hydrating and calming properties of aloe vera, make it a perfect ingredient for treating dry, irritated, and acne-prone skin. The several parameters of quality control were examined. It was discovered after completion that F4 had a positive outcome. According to the current study's findings, adding the active ingredient of the medications to soap resulted in more stable goods with superior aesthetic appeal. It has been demonstrated that the pH of the soap plays a crucial role in maintaining the skin's natural barriers, reducing irritations, minimizing eye irritation, and properly washing the skin. Neem soap's antimicrobial qualities make it an efficient method of washing the skin while shielding it from dangerous microbes. Its antiviral, antifungal, and antibacterial properties offer a comprehensive remedy for common skin conditions like wrinkles, dark spots, acne, and fungal infections. To establish strong outcomes for the product's consumption and good results, such results are estimated from a formulation.

SUMMARY AND CONCLUSION

We selected this topic as people prefer to use cosmetics made up of natural ingredients that do not cause any harm to the skin and more beneficial than existing chemical products in the market.

Choosing the right ingredient ratios and mixing them to produce a well-balanced combination is the first step in the formulation process. After being melted and combined, the components are put into a mold to cool and solidify as soap. The combination of neem, aloe Vera, rosewater, and vitamin E offers a synergistic combination of beneficial qualities. Resulting in neem soap with antimicrobial, hydrating, and cleaning properties. A variety of tests are used to evaluate the neem soap, including a physical examination for appearance, color, texture, and odor. The ability of the soap to provide a moisturizing action is evaluated by a moisturizing test. Test for neem soap antimicrobial properties to find out how well it inhibits bacteria, fungus, and other microorganisms. Additional test including skin irritancy and pH testing to maintain it natural barriers and reducing irritation

F4 is the best, according to this experiment, because of its appearance, pH, foaming, skin irritancy, washability, moisturizing properties, and antibacterial activity.

However, the investigation was limited by time constraints, and no animal studies were carried out.

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