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Formulation And Evaluation Of Herbal Paper Soap

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Abstract

The present study focuses on the formulation and evaluation of herbal paper soap enriched with natural extracts to provide effective cleansing while offering medicinal and skincare benefits. Herbal extracts such as, Marigold (Calendula) and other ingredients were incorporated into the soap formulation to enhance its antibacterial, antifungal, and moisturizing properties. The soap was prepared by impregnating the herbal formulation onto a biodegradable paper base to create a portable and eco-friendly alternative to conventional soaps.

The formulated herbal paper soap was evaluated based on various parameters, including physical appearance, folding endurance, weight variation, pH, foam stability, and microbial efficacy. The results indicated that the herbal paper soap exhibited good cleansing properties, appropriate pH for skin compatibility, and effective microbial activity. Additionally, the paper soap showed uniformity in weight and excellent folding endurance, ensuring ease of handling and use. In conclusion, the herbal paper soap formulation demonstrated promising results as an ecofriendly, cost-effective, and convenient alternative for maintaining personal hygiene while offering therapeutic benefits. This innovative approach provides a sustainable solution to promote natural skincare and environmental safety.

Key-words: Herbal paper soap, formulation, evaluation, natural extracts, Calendula, and other ingredients antibacterial, antifungal, eco-friendly.

1. INTRODUCTION

Human skin is the outer covering of the body constituents the first line of defences against various pathogens. As the skin interfaces the environment, it is constantly exposed to different environmental stimulus a reaction, which makes skin damage. Similarly the damage skin will usually form scar tissue mostly hand is a part of body which connects to pathogens even through working in day-to-day life so therefore soap has been made as formulation which is mostly used in our day-to-day life to fight against various pathogens. Soap is nothing but, substances that, when dissolved in water, possess the ability to remove dirt from surfaces such as the human skin, textiles, and other solids . Soap cannot produce bubbles in hard water and thus condition results in the wastage of soap. Scum is not easily cleaned. It will leave a clear sediment that can be seen on clothes, and causes them to feel hard.

Why herbal soap ?

Herbal soap is often preferred because it contains natural ingredients like plant extracts, essential oils, and herbs that are gentle on the skin. Unlike commercial soaps that may contain harsh chemicals, herbal soaps typically offer benefits such as: 1. Gentle on Skin: Free from synthetic chemicals, making it suitable for sensitive skin. 2. Antibacterial and Antifungal Properties: Many herbs, like neem or tea tree, help prevent skin infections. 3. Moisturizing and Nourishing: Natural oils and ingredients keep the skin hydrated and healthy. 4. Environmentally Friendly: Often biodegradable and made from sustainable resources. 5. Rich in Antioxidants: Protects the skin from damage and promotes healing.

Why tagetes erecta used in Preparation of paper soap ?

Tagetes erecta, commonly known as marigold or African marigold, is used in herbal paper soap due to its numerous beneficial properties and ease of incorporation into soap formulations.

1. Antibacterial and Antifungal Properties: The plant contains compounds such as flavonoids and essential oils that help prevent bacterial and fungal growth, making the soap effective for maintaining hygiene.

2. Anti-inflammatory and Soothing Effects: It soothes irritated skin and helps reduce inflammation, making it ideal for sensitive or acne-prone skin.

3. Natural Antioxidant: Tagetes erecta has antioxidants that protect the skin from damage caused by free radicals, delaying skin aging.

4. Wound Healing: Its antimicrobial and antiseptic properties help heal minor cuts, wounds, and insect bites.

5. Fragrance and Aesthetic Appeal: The plant's natural fragrance adds a pleasant aroma to the soap, enhancing the user experience.

Morphological Uses of Tagetes erecta:

1. Flowers: The bright orange or yellow flowers are rich in essential oils and carotenoids, which are extracted and used in skincare formulations.

2. Leaves: The leaves contain medicinal properties that can be used to soothe skin infections and inflammation.

3. Roots: Known to have antifungal properties, they prevent the growth of harmful microbes. Tagetes erecta petals in herbal paper soap can serve several purposes.

What is use of tagetes erecta petels in herbal paper soap

1. Natural Colorant Tagetes erecta petals can be used as a natural colorant, imparting a vibrant yellow-orange hue to the soap.

2. Antimicrobial Properties The petals contain antimicrobial compounds like thiophenes, which can help reduce the growth of microorganisms on the skin.

3. Anti-Inflammatory Effects Tagetes erecta petals have anti-inflammatory properties, which may help soothe and calm irritated skin.

4. Aesthetic Appeal The addition of Tagetes erecta petals can create a visually appealing, natural, and herbal look for the paper soap.

5. Skin Benefits

The petals may also provide additional skin benefits, such as:

- Antioxidant properties to protect the skin from damage

- Anti-aging effects to reduce fine lines and wrinkles

- Soothing and calming properties to reduce skin irritation

How to Use Tagetes Erecta Petals in Herbal Paper Soap to incorporate Tagetes erecta petals into herbal paper soap:

1. Dry the petals thoroughly to prevent moisture from affecting the soap.

2. Grind the dried petals into a fine powder.

3. Mix the powdered petals with other herbal ingredients and soap base.

4. Create the paper soap using a suitable binding agent.

Paper soap :

The main focus of our research is manufacture of the paper soap sheet. Paper soap is a thin soap sheet. It is an anionic surfactant that is used in conjunction with water for washing and cleaning. The soap includes a substrate, a cleaning composition, and a holder. The cleaning composition is impregnated in the substrate so as to form a dry cleanser impregnated substrate is laid on to hold on to prevent exposure and evaporation of cleansing composition, since the cleanser impregnated substrate is dry. The holder removable holds at least one stacked dry and cleanser impregnated substrate is dry and cleanser impregnated substrate is removed from a holder and subjected to water, substrate dissolves leaving the cleansing composition dissolve in water for cleansing. It is portable, cheap and easy to use. The paper use in paper soap is environmentally friendly. By dissolving paper in water even if the paper is thrown away, the paper is biodegradable a disposable one. Hand washing with soaps is important because it is proven to clean hands from germs and bacteria. The paper soaps were made from and glycerine as a plasticizer.

The aims of this research were to determine both formulation of paper soap using coconut oil and castor oil and based with addition of glycerine, and determine the quality of the paper soaps which is disposable hand soap. Soap shell lets you wash your hand by effectively eliminating 99.9% bacteria by just adding water just before wash. Each travel pack comes with 10-20 thin sheets with each sheet with one hand washing session simple a convenient. This research used laboratory experimental method using descriptive analysis. These biodegradable sheets are advantageous to utilize. The paper soap is little and simple to carry, few paper soap tablets can wash their hands, disinfecting, cleaning is a decent accomplice for healthy self. Paper soaps are surprisingly ideal for travellers. Intended to suit your travel needs, these soaps are very compelling and convenient. For brisk hand wash at any spot whenever carry these global mart paper soaps for a sterile journey. These paper soaps come in adorable packs and shape sand are stuffed in travel-friendly, simple to carry tubes. Light and dainty soaps in the warm water.

The paper soap is very easy to use, the addition of moisture to avoid dry hands, its scent and it also helps the sink area tidy and makes its more demandable for urban areas especially for children, but in rural areas they don’t mostly prefer these products.

Fig. No.1 : Paper Soap

Tagetes erecta

Tagetes erecta, also known as *Tagetes erecta* is a vibrant, flowering plant in the Asteraceae family. Often referred to as "pot marigold," it is native to Europe but can now be found across many parts of the world. This annual plant features bright orange or yellow flowers and is widely admired for its ornamental beauty, as well as its medicinal and cosmetic uses. Calendula has a long history of use in herbal medicine, particularly for its anti- inflammatory, antiseptic, and healing properties. It is often used in skincare products like creams, ointments, and lotions due to its soothing effect on irritated or damaged skin. In addition to its medicinal uses, calendula is also a popular companion plant in gardens, helping to repel pests and attract beneficial insects. The flowers are edible, adding a splash of color and a mild, slightly spicy flavor to salads, soups, and other dishes.Calendula has a wide range of uses, particularly in herbal medicine, skincare, and culinary applications.

Fig. No.2 : Tagetes erecta

Here are some of the most common uses

1. Skincare

Soothing and Healing: Calendula is known for its anti-inflammatory and antiseptic properties, making it effective in treating skin conditions like eczema, rashes, and minor burns.Wound Healing: It accelerates the healing process of cuts, scrapes, and other wounds by promoting tissue regeneration.

Moisturizing: Calendula is often used in creams, lotions, and oils to hydrate dry or irritated skin. It can also help with acne, reducing redness and inflammation.

Anti-aging: The antioxidant properties of calendula may help reduce signs of aging by protecting the skin from oxidative stress.

2 .Medicinal Uses

Digestive Health: Calendula can be used to soothe the digestive system, helping with conditions like indigestion, bloating, and gastritis. It's often consumed as a tea.

Anti-inflammatory: Its natural compounds may reduce inflammation both internally (for conditions like arthritis) and externally (on the skin).

Immune Support: Calendula has immune-boosting properties and can be used as a tonic to help the body fight infections and illnesses.

Menstrual Relief: Calendula can help regulate menstrual cycles and reduce menstrual cramps due to its mild antispasmodic effects.

3. Culinary Uses

Edible Flowers: The vibrant petals of calendula can be used in salads, soups, or as a garnish. They have a mild, slightly spicy flavor and add a burst of color to dishes.

Herbal Teas: Calendula flowers are often used to make a calming herbal tea, which is believed to help with digestive issues, stress relief, and sleep problems.

4. Natural Dye

Calendula petals can be used to make a natural dye for fabrics, imparting a yellow or orange hue. It's often used in crafting and textiles.

5. Garden Use

Pest Repellent: Calendula is sometimes planted in gardens to deter pests like aphids and mosquitoes. Its strong scent can also attract beneficial insects, like bees and butterflies.

Companion Planting: It is often planted alongside vegetables and herbs to improve growth and health by attracting pollinators and deterring harmful insects.

Medicinal Applications

1. Antimicrobial properties: Tagetes erecta has been shown to exhibit antibacterial, antiviral, and antifungal properties, making it effective against various infections.

2. Wound healing: The flower's extracts have been used to treat wounds, cuts, and skin conditions like eczema and acne.

3. Anti-inflammatory: Tagetes erecta has anti-inflammatory properties, which can help alleviate pain and reduce swelling.

4. Skin and hair care: The flower's extracts are used in skincare products to treat skin conditions like acne, and in hair care products to promote healthy hair growth.

5. Natural dye: Tagetes erecta can be used as a natural dye for fabrics, giving them a vibrant yellow-orange color.

Sapindus emarginatus

Sapindus emarginatus is a tree native to the Indian subcontinent. Its fruits, commonly referred to as soapnuts, are used for a variety of purposes due to their natural cleansing properties.

Botanical Information:

Scientific Name: Sapindus mukorossi

Biological source: The biological source of reetha also known as Indian soapberry or washnut, is the fruit of the tree Sapindus mukorossi (or Sapindus trifoliatus in some contexts), a deciduous tree in the Sapindaceae family.

Family: Sapindaceae

Common Names: Reetha, Soapnut, Aritha

Fig. No.3 : Sapindus emarginatus

Uses and Benefits:

1. Natural Cleanser:

The dried fruits contain saponins, a natural surfactant that produces lather, making them a great alternative to chemical detergents and soaps.

Used to wash clothes, clean jewelry, and as a natural shampoo.

2. Hair care:

Ritha is used in Ayurvedic hair care treatments to promote healthy, shiny hair. It helps reduce dandruff, prevent hair fall, and strengthen hair roots.

3. Skin Care:

Its mild cleansing properties make it suitable for sensitive skin. Used to treat eczema and psoriasis due to its antibacterial properties.

4. Medicinal Uses:

Traditionally used to treat asthma, colds, and coughs.

Used in Ayurvedic preparations to remove intestinal worms and detoxify the body.

Advantages of herbal paper soap

1. Natural Ingredients
2. Antibacterial Properties
3. Moisturizing Effect
4. Eco-Friendly
5. Portability and Convenience

6. Hygienic Use

Disadvantages of herbal paper soap

1. Limited Lathering
2. Fragility
3. Ineffective on Heavy Dirt or Grease
4. Higher Cost
5. Short Shelf Life
6. Sensitivity to Moisture
7. Limited Availability
8. Potential for Residue

2. DRUG PROFILE & EXCIPIENTS PROFILE

Plant profile

1. Tagetes erecta

Synonym : Pot Marigold, Scotch Marigold, Ruddes Family: Asteraceae (Daisy family)

Biological source : The biological source of calendula is the marigold plant, Tagetes erecta , which is a member of the daisy family, Asteraceae. It is native to the Mediterranean Chemical constituent : flavonoids, triterpenoids, glycosides, saponins, carotenoids, volatile oil, amino acids, steroids, sterols, and quinines.

Uses :

Diaper rash: Tagetes erecta can help treat diaper rash and cradle cap. Eczema: Tagetes erecta oil can help soothe eczema.

Dry skin: Tagetes erecta extract can help enhance skin hydration.

Sensitive skin: Tagetes erecta creams can help soothe irritated, dry, and sensitive skin.

Wound healing: Tagetes erecta can help keep wounds clean and promote new tissue growth.

Medicinal Applications

1. Antimicrobial properties: Tagetes erecta has been shown to exhibit antibacterial, antiviral, and antifungal properties, making it effective against various infections.
2. Wound healing: The flower's extracts have been used to treat wounds, cuts, and skin conditions like eczema and acne.
3. Anti-inflammatory: Tagetes erecta has anti-inflammatory properties, which can help alleviate pain and reduce swelling.
4 .Skin and hair care: The flower's extracts are used in skincare products to treat skin conditions like acne, and in hair care products to promote healthy hair growth.
5. Natural dye: Tagetes erecta can be used as a natural dye for fabrics, giving them a vibrant yellow-orange color.

2. Sapindus mukorossi

Synonym: Chinese,soapberry,Soapnut,Reetha,WashnutAritha

Scientific name : sapindus mukorossi

Family: Sapindaceae

Biological Source : The biological source of "ritha," also known as Indian soapberry or washnut, is the fruit of the tree Sapindus mukorossi (or Sapindus trifoliatus in some contexts), a deciduous tree in the Sapindaceae family.

Uses:

1. Skin cleanser
2. Hair cleanser
3. Detergent
4. Jewelry cleaner

Excipients

1. Potassium hydroxide (KOH)

In the context of herbal paper soap, potassium hydroxide (KOH) is used as a caustic alkaline agent during the saponification process to transform fats and oils into soap, resulting in a softer, gentler soap compared to soaps made with sodium hydroxide (NaOH).

Uses

1. Potassium hydroxide is use to saponify oils & fat
2. Manufacture soaps
3. It can maintain pH balance of soap .

2. Citric acid

Citric acid is commonly used as an excipient in herbal paper soap due to its beneficial properties. Here's how it contributes:

1. pH Regulator and Buffering Agent

Citric acid helps maintain the pH of the soap at an optimal level (around 5.5–6.5), which is closer to the natural pH of the skin.This prevents the soap from being too alkaline, reducing the risk of skin irritation and dryness.

2. Enhances Cleansing Efficiency

It acts as a chelating agent, binding with metal ions (like calcium and magnesium) found in hard water.By preventing these ions from interfering with the soap, citric acid improves the lathering and cleansing properties of the herbal paper soap.

3. Preservative and Antioxidant

Citric acid has mild preservative properties that help exten extend the shelf life of the soap.It inhibits the growth of bacteria, mold, and fungi, preventing the soap from spoiling.

4. Skin Brightening and Exfoliating Agent

As a natural alpha-hydroxy acid (AHA), citric acid provides gentle exfoliation, removing dead skin cells and promoting smoother, brighter skin.

Uses

1. pH adjuster
2. water softener
3. chelating agent

3. Lavender

Lavender is commonly used in herbal paper soap for several beneficial reasons:

1. Fragrance: Lavender provides a soothing, calming, and floral scent to the soap, enhancing the overall sensory experience during use.

2. Skin Benefits: Lavender has natural antiseptic, anti-inflammatory, and soothing properties. It can help calm irritated skin, reduce redness, and promote healing, making it suitable for sensitive skin.

3. Aromatherapy: The scent of lavender has been shown to promote relaxation and reduce stress. Using lavender in herbal paper soap allows users to enjoy its therapeutic properties during use.

4. Antioxidant Properties: Lavender contains antioxidants that can help protect the skin from environmental damage, supporting overall skin health.

Uses of lavender

1. Antiseptic
2. Reduced skin inflammation & treat skin

4. Glycerine

Glycerine is a key ingredient in herbal paper soap due to its various beneficial properties:

1. Moisturizing: Glycerine is a humectant, meaning it draws moisture from the air into the skin. This helps keep the skin hydrated and soft, preventing dryness, which is especially important in soap.

2. Skin Soothing: Glycerine has a gentle, non-irritating nature, making it ideal for sensitive skin. It helps calm and smooth the skin, reducing irritation or inflammation.

3. Improves Lather: Glycerine can enhance the soap's lathering properties, making it more luxurious and effective when used.

4. Preservation: Glycerine can act as a natural preservative, helping to maintain the soap's shelf life by preventing it from drying out and hardening too quickly.

Uses

1. Moisturizer
2. Plasticizer
3. Help to maintain the viscosity of the soap soluction

5. Castor oil

Castor oil is a popular ingredient in herbal paper soap for several key reasons:

1. Moisturizing: Castor oil is rich in ricinoleic acid, which helps retain moisture in the skin. It provides deep hydration, making the soap especially beneficial for dry or sensitive skin.

2. Lathering: Castor oil is known for its ability to create a rich, creamy lather. This improves the overall texture and feel of the soap, making it more enjoyable to use.

3. Skin Nourishment: The fatty acids in castor oil help nourish and soothe the skin. It can promote skin softness and may have anti-inflammatory properties that help calm irritated or inflamed skin.

4. Cleansing: Castor oil has natural cleansing properties, which help remove dirt and impurities from the skin, leaving it clean and refreshed.

Enhances Soap Consistency: Castor oil contributes to a smoother, more consistent texture in soap, making it easier to apply and more effective during use.

Uses:

1. Moisturizing
2. Softening
3. Contributes to lathering

6. Cocunt oil :

Coconut oil is a common and highly valued ingredient in herbal paper soap for several important reasons:

1. Lathering: Coconut oil is known for creating a rich and abundant lather, which enhances the user experience by making the soap more foamy and effective when used with water.

2. Cleansing: It has excellent cleansing properties, helping to remove dirt, oils, and impurities from the skin without stripping it of its natural moisture. This makes coconut oil an ideal ingredient for soap formulations.

3. Moisturizing: Although coconut oil is cleansing, it also helps to moisturize the skin. It is rich in fatty acids, such as lauric acid, which can help retain moisture and prevent dryness, leaving the skin feeling soft and hydrated.

4. Antibacterial and Antifungal Properties: Coconut oil contains natural antimicrobial agents, making it beneficial for fighting bacteria and fungi. This can help with acne-prone skin or other skin conditions where bacteria may be a concern.

5. Skin Nourishment: The vitamins and antioxidants in coconut oil help to nourish and protect the skin, promoting overall skin health.

Uses:

1. Cleaning agent
2. Skin soothing and claming
3. Antioxidant proprties

7. **Sodium chloride (NaCl)**

Sodium chloride (NaCl), or common table salt, is used in herbal paper soap for several important reasons:

1. Thickening Agent: NaCl can help adjust the consistency of the soap. In liquid soaps, adding salt helps thicken the mixture, making the soap more stable and easier to use.

2. Enhancing Lather: Salt can improve the lathering ability of soap, creating richer and more stable foam when the soap comes into contact with water.

3. Preservative: While not as powerful as other preservatives, salt can act as a mild preservative by reducing the water activity in soap, which can help extend its shelf life and prevent microbial growth.

4. Improves Texture: In some cases, salt can contribute to a smoother texture in the soap, preventing it from being too runny or uneven.

5 Balancing pH: Salt can help balance the pH of the soap, ensuring it is not too harsh or alkaline, making it gentler on the skin.

Uses

1. Help in soap precipitation
2. Enhances lather stability
3. Improve texture

4. Act as a natural preservative

8. Sorbitol

Sorbitol is a key ingredient in herbal paper soap for several important reasons:

1. Moisturizing: Sorbitol is a humectant, meaning it attracts moisture from the air and helps retain it in the skin. This helps keep the skin hydrated and prevents dryness, especially when used in soap.

2. Improves Texture: Sorbitol contributes to the smooth, soft texture of the soap. It can help make the soap feel more pleasant and smooth when applied to the skin.

3. Lathering Agent: Sorbitol can enhance the soap's lather, contributing to a rich, creamy foam when mixed with water, improving the overall user experience.

4. Prevents Hardening: In herbal paper soap, sorbitol helps prevent the soap from becoming too hard or brittle, allowing it to maintain its soft, paper-like texture.

5. Skin Soothing: Sorbitol is gentle on the skin and can help soothe irritation or dryness, making it especially beneficial for sensitive skin types.

Uses :

1. Incresae Thickness
2. Humectant to prevent moisture lost

9. Sodium Lauryl Sulfate (SLS)

Sodium Lauryl Sulfate (SLS) is a surfactant and detergent that can be found in some herbal paper soaps for the following reasons:

1. Lathering Agent: SLS is known for its ability to produce a rich and bubbly lather, enhancing the soap's foaming properties when used with water. This makes the soap feel more effective and luxurious.

2. Cleansing: As a surfactant, SLS helps remove oils, dirt, and impurities from the skin. It effectively binds with the oils and allows them to be rinsed away, leaving the skin clean.

3. Emulsifying: SLS helps mix oil and water-based ingredients in the soap, ensuring a uniform, smooth consistency without separation.

Uses

1. Foaming agent
2. Surfactant
3. Helping to create lather
4. Improve the cleaning power of the soap

10. Whatman Paper for Soap Strips:

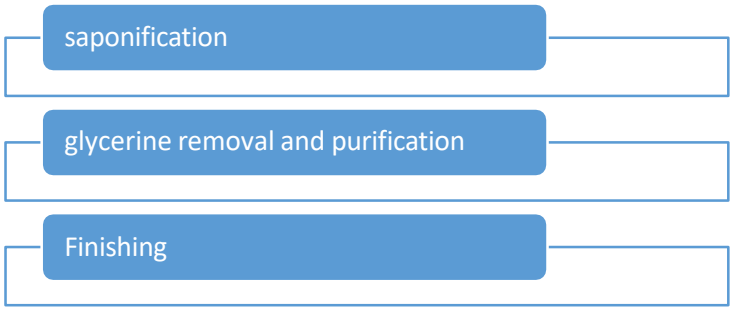
The soap solution is then applied to Whatman filter paper, which is then dried to form the paper soap strips.

Advantages of Using Whatman Paper:

1. Whatman filter paper is chosen for its ability to effectively filter out impurities, ensuring a clean and homogeneous product.
2. It also provides a suitable substrate for the soap solution to adhere to, forming the paper soap strips.

3. METHODOLOGY

Method for manufacturing paper soap



What is saponification?

Saponifiction is a type of chemical reaction between a strong alkali or base (such as sodium or potassium hydroxide) and fat. Animal and vegetable fats and oils are made of ester molecues called triglycerides. An ester is a molecules that is formed form an alcohol and an acid. In the case of fats, glycerin is the alcohol, and the acids are fatty acids like stearic, oleic, and palmitic acids. When the alkali solution is thoroughly mixed with the oils, a reaction called saponification begins. What this means is that the glyceride of the triglyceride breaks off to form glycerine and the sodium or potassium bond with the fatty acid to form soap. With potassium, you get liquid soap. Every oil or fat has what is called a saponification number, which is determined by the amount of alkali needed to compelety saponify the fat.

Glycerine removal

Glycerine is more valuable than soap so it must be removed from soap and some of the glycerine is left in sap that help to make it soap and avoid the shrinkage of skin. The salt is added to the wet soap causing it to separate out into soap and spent lye and avoid bunch formation. The product is then collected which is in pure form.

Purification and finishing

After complete saponification has occurred the “neat soap” is precipitated from the solution by adding common salt. In the fully boiled process on an industrial scale, the soap is further purified to remove any excess KOH, glycerol and other impurities are removed by boiling the soap and precipitating it with salt. Then the soap is mixed with additives. The liquid soap is then combined with fragrances i.e., essential oils.To make herbal soap the fresh herbs are extracted an added to it in convenient amount.

Materials and method for liquid soap preparation materials required

1. We require hand gloves form protecting our hand from harmful chemicals
2. Nose mask is required because the chemicals used such as lye is irritant to nose.
3. Turning stick a long spatula is required for adding and stirring purpose of chemicals mixing.
4. Measuring soon a funnel is required for filtration purposes.
5. Plastic bowls glassware’s i.e., measuring cylinder, beaker, conical flask etc.
6. Towel for cleaning purpose.
7. Distilled water plenty amount.
8. Thermostat and water bath for heating a saponification process.
9. Bunsen burner for boiled.

Collection, identification and processing of plant

Fig. No.4 : Separation method

1. The leaves of Tagetes erecta collected from different matured plant. The leaves were dried and kept in airtight bottles for studies. It involves two processes.

2. Preparation of herbal extract-300g of fresh Tagetes erecta leaves were crushed or grinded then the crushed leaves were filtered through muslin cloth a then filter paper. The crude extract was complete to use. Then the needed amount herbal extract was added to fully saponified soap preparation by continuous stirring until it dissolves properly.

Method for preparation of liquid soap

1. Prepare glycerin

Measure of glycerine into beaker of required size and heat it on 60^0C, stir glycerine gently a check temperature with thermometer

2. Prepare coconut oil and castor oil mixture:

Weigh 10 ml of coconut oil in required amount of beaker, heat coconut oil gently to melt the oil, and take 5ml of castor oil and pour to coconut oil and mix the oils by continuous stirring.

3. Prepare KOH solution

1. The 50 ml of water and 15gm of Potassium Hydroxide solution added to the flask. The mixture stirred by using stirring rod to mix the contents of the flask. Then keep KOH covered.
2. As KOH dust can be effective to nostrils and throat. Avoid breathing the dust or fumes when mixing KOH solution.

4. Mix soap

1. Gently pour KOH / water solution into glycerine. Heat the soap and maintain temperature of 60-70^0C. The mixture was stirring continuously during the heating process to prevent the mixture from foaming. If the mixture should foam to the point of nearly overflowing, the flask removed from the boiling-water bath until the foaming subsides, then continue heated. The mixture heated for 2-3hours until it undergoes complete saponification.

2. Then add Nacl solution on the mixture with continuous stirring. The Nacl solution was prepared by adding 16gm of Nacl into 200ml of water and stirs it properly until the Nacl salt dissolves properly then the mixture of alkali, fats an oil, glycerine and salt were heated in thermostat until it goes proper saponification.

3. The mixture was removed from the boiling-water bath and the flask cooled in an ice bath for 10-15 minutes.

4. While the flask is cooling assemble the vacuum filtration apparatus, the vacuum flask secured to a ring stand with a utility clamp to prevent the apparatus from toppling over.

5. A piece of filter paper weighted to the nearest 0.001 g and recorded. The filter paper placed inside the Buchner funnel. The filter paper was moisture with water so that it fits flush in the bottom of the funnel, The 150 ml of saturated, Nacl solution added to the flask to salt out the soap once the flask has cooled.

5. Preparation of Sodium Lauryl Sulfate (SLS)

1. Prepare the SLS Solution:

Measure 10-15g of SLS powder.

Dissolve the SLS in 70-75g of warm distilled water. Stir continuously until fully dissolved. Add 5-10g of glycerin to keep the soap from becoming too dry and brittle.

6. Optional

At this point we can add few grams of essential oil for scent of soap. Concentrated essential oil is strong and goes long way.

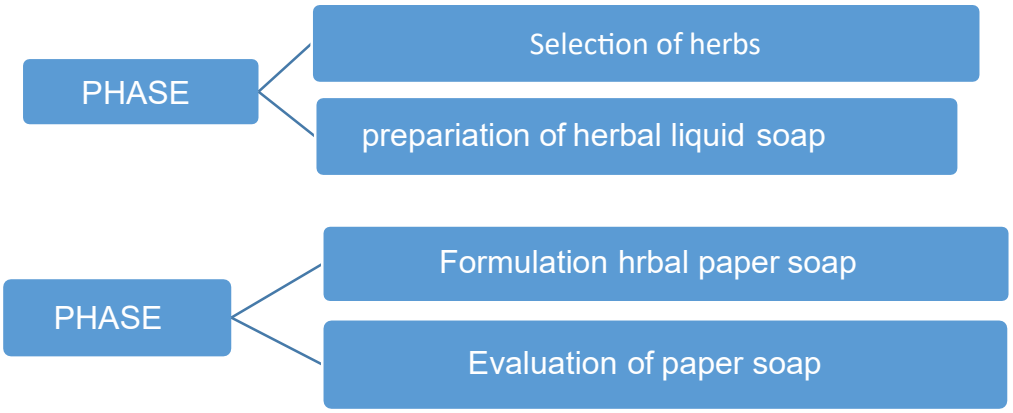
Formulation Table

Table no. 1

Sr No.	Ingredients	Amount		
		B1	B2	B3
1.	Tagetes erecta	20ml	30ml	10ml
2.	Sapindus Emarginatus	20gm	15gm	10gm
3.	KOH	10 gm	12gm	15gm
4.	Citric acid	1.5ml	1ml	2ml
5.	Distilled water	150ml	200ml	100ml
6.	Lavender	1ml	1.5ml	3ml
7.	Glycerine	10ml	15ml	30ml
8.	Castor oil	15ml	10ml	5ml
9.	Cocunet oil	20ml	12ml	10ml
10.	Nacl	20gm	25gm	16gm
11.	Sorbitol	3:1	1:1	2:1
12.	Any paper (eg.butter paper)	Required amount	Required amount	Required amount
13.	Sodium Lauryl Sulfate (SLS)	15gm	20gm	10gm

Material for manufacturing of paper soap formulation

Preparation of paper soap



Phase 1: Selection of soap solution soaps were prepared and coded as X and Y. Soap solution of varied concentration (5, 10, 15, 20% w/v) were prepared. Formation of foam was avoided during solution preparation. Foam test was the criteria for selection of good soap. The soap capable of producing maximum foam was selected. Selection of paper Six different branded papers (Whatman filter paper no. 41 and 42, filter paper, bond paper and butter paper) were selected and coded as A, B, C, D, E, and F. They were evaluated for their absorption capacity and weight gain. The paper showing maximum absorbing capacity was considered as the best paper.

Phase 2: Formulation of herbal paper soap strips the herb was incorporated in the selected formulation which showed good absorption capacity in phase-I studies. Accurately weighed was mixed with 15% soap powder and distilled water was added under constant and continuous stirring until a uniform soap-herb solution was formed. Then paper soap strips were prepared.

Formation of herbal paper soap strips

The paper soap strips were prepared by Dipping technique using modified disintegration apparatus and air dried overnight at 37±2 °C. For this purpose, different papers were dipped one after another into the soap solution and air dried overnight. Evaluation of herbal paper soap strips the prepared strips were subjected for determination of size, shape, weight variation, pH and foam test by a reported standard method and an average of 20 strips was taken.

4. EVALUATION & RESULT

Organoleptic Evaluation

1. Size

Herbal paper soap sheets typically come in sizes around 4.5 x 7 cm (1.77 x 2.6 inches). By using micrometer screw gauge.

They are designed for portability and convenience, often sold in packs of 20 or more sheets.

2. Shape

The most common shape for herbal paper soap is circular or round, although some variations might include heart-shaped or other small, portable designs.

3. Odour

Simple sensory evaluation by smelling the soap and also by evaluating fragrance of rose water.

Herbal and Natural Fragrances: The primary source of the scent comes from the herbs and plant-based ingredients used in the soap.

1. Colour - The pink color in herbal paper soap can be achieved naturally by using ingredients like rose water extract or beetroot powder.

2. Apperance **-** Good

It is design to dissolve easily when in contact with water.

3. pH **-** 7

The pH scale measures how acidic or alkaline a substance is, ranging from 0 to 14, with 7 being neutral.(pH can be measure by using pH paper).

Result

Batch B1 - In this batch reetha is used as a foaming agent the foam is not formed & it is insufficient.

Batch B2 - IN this batch the quantity coconut oil & castor oil are more so thus to phase as seen oil phase & water phase

Batch B3 - In this batch successful formulation should yield paper soap that is non-irritant,safe & effective for cleansing.stable with adequate disintegration,foaming & convenient for use and storage.

5. SUMMARY & CONCLUSION

Summary

Herbal paper soap, formulated with natural ingredients like Tagetes Erecta, and Sapindus Emarginatus , offers a natural and eco-friendly cleaning solution. These soaps are prepared using a dipping technique, where strips of paper are soaked in a herbal soap solution and then air-dried. Evaluation of these herbal paper soaps typically involves assessing their physicochemical properties, antimicrobial activity, skin irritation potential, and cleansing efficacy.

Conclusion

The formulation and evaluation of herbal paper soap have demonstrated promising results in terms of safety, effectiveness, and user satisfaction. The incorporation of herbal extracts such as neem, aloe vera, tulsi, and other natural ingredients has enhanced the antibacterial, antifungal, and moisturizing properties of the paper soap. The formulation showed satisfactory pH, foam stability, and cleansing ability, making it suitable for regular use without causing skin irritation.The evaluation parameters, including physical appearance, weight variation, folding endurance, and microbial efficacy, confirmed the quality and consistency of the herbal paper soap. Overall, the study highlights the potential of herbal paper soap as an eco-friendly and convenient alternative to conventional soaps, providing enhanced skincare benefits while minimizing environmental impact.

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