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# Formulation and Evaluation of Sandalwood Herbal Soap

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**Abstract**: *This research focuses on the formulation and evaluation of herbal soap using the melt and pour method, a simple and effective approach for soap production. The soap was prepared using a glycerin-based soap base, with the incorporation of natural herbal ingredients such as comfrey, hibiscus powder, reetha extract, and essential oils like lavender oil. These herbs were selected for their known skin benefits, including antimicrobial, anti-inflammatory, and soothing properties. The formulated soap was evaluated based on its physical appearance, texture, pH level, foaming ability, and overall skin compatibility. The evaluation process aimed to determine the soap's effectiveness in terms of cleansing, skin hydration, and safety. The pH of the soap was measured to ensure that it is within a safe range for skin use, while its foaming ability was tested to assess its cleansing performance. A skin patch test was conducted to identify any potential allergic reactions or irritation. The results indicated that the soap had a smooth, uniform texture with a pleasant herbal fragrance. The pH of the soap was found to be between 8-9, which is suitable for most skin types. The foaming ability was moderate, which is typical for herbal soaps, and it effectively cleansed the skin without causing dryness or irritation. Overall, the herbal soap demonstrated good potential as a natural alternative to commercially produced soaps, offering both skin care benefits and a safer, more environmentally friendly product*

**Keywords**: Sandalwood Herbal Soap, Glycerine Soap Base, Turmeric Powder, Sandalwood Oil, Sandalwood Powder, Almond Oil, Neem Oil

## I. INTRODUCTION

In recent years, there has been a growing interest in natural skincare products due to the potential harmful effects of synthetic chemicals commonly found in commercial soaps. Herbal soaps, made from plant-based ingredients, offer a safer and more skin-friendly alternative. These soaps often incorporate herbs such as comfrey, thyme, and hibiscus powder which are well-known for their medicinal properties, including antimicrobial, anti-inflammatory, and moisturizing effects. These benefits make herbal soaps particularly appealing for individuals with sensitive or problem-prone skin. The melt and pour method is a popular soap-making technique that allows for easy customization by using a pre-made soap base, typically glycerin-based, which is melted and mixed with natural ingredients before being poured into Molds. This method eliminates the need for handling harsh chemicals, such as lye, making it accessible for beginners and those seeking a simple yet effective way to create soap. The objective of this study is to formulate an herbal soap using the melt and pour method, incorporating natural herbal extracts and essential oils to enhance the soap's therapeutic properties. The study will also evaluate the physical properties, pH balance, foam stability, and overall skin compatibility of the soap. The aim is to provide a natural and effective alternative to commercial soaps, promoting the use of herbal ingredients in skincare for their environmental sustainability and skin health benefits. [1,2,3]

### SANDALWOOD HERBAL SOAP:

Plant-based components and botanical extracts are used to make herbal soaps, sometimes referred to as natural soaps. Because they include natural components, they provide the skin with a number of advantages. The following are a few possible advantages of using herbal soap:

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Gentle and Mild: Herbal soaps generally don't cause too much skin irritation. They are free of harsh chemicals, synthetic fragrances, and synthetic ingredients that could irritate or dry your skin.
Rich and Emollient: usually made up of organic butters and oils like coconut, cocoa, or shea. These ingredients support the skin's ability to stay hydrated, soft, and supple by providing moisture.
Cleaning: effectively cleanse your skin of oil, dirt, and other impurities without compromising its natural oils by using herbal soaps. They can help maintain the skin's natural pH balance and reduce excessive dryness.
Natural Fragrances: These are derived from plants. Some people may find it irritating because artificial chemicals are not used in the production of these natural perfumes, despite their pleasant scent. [4,5,6]

Fig. 1 Sandalwood Soap

**SOAP:** Soap is a fatty acid salt. The primary purpose of soaps is as surfactants for bathing, cleaning, and washing.

**SOAP TYPES:**

**Bar Soap:**
Traditional bar soap is made by combining lipids with an alkali, such as sodium hydroxide. Even though it cleans effectively, utilizing it could cause your skin to become dry. Due to the natural moisturizer glycerin, which it includes, glycerin soap is better suitable for dry or sensitive skin.

**Castile Soap:**
Castile soap is made using olive oil and other vegetable oils. It is gentle and biodegradable.

**Antibacterial soap:**
Containing antimicrobial agents like triclosan or triclocarban that work to eradicate germs. However, their use has been disputed because of bacterial resistance and other health hazards.

**Exfoliating soap:**
It may include ingredients like pumice, oats, or crushed seeds to help remove dead skin cells. Components of

**Body Soap:**
The primary cleansing agents that help eliminate oil and dirt from the skin are known as surfactants. Common surfactants are sodium lauryl sulphate (SLS) and sodium Lauretha sulphate (SLES). [7,8,9]

**Moisturizers:**
Ingredients such as glycerin, shea butter, and various oils (coconut, olive, and almond) are used to keep skin moisturized.

**Fragrances:**
Added to provide a pleasant aroma, however people with sensitive skin may prefer options without scents.

**Colorants:**
Added to soap to provide an eye-catching colour. Colorants might be natural or manufactured.

**Preservatives:** Used to prevent the growth of microorganisms in liquid soaps.

Benefits of Using Body Soap: Herbal Soap benefits are many, one being effectively removing dirt, impurities, and excess oil, leaving your skin feeling clean and refreshed.

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**MATERIALS OF HERBAL SOAP**

**Sandalwood Powder:**


Fig. 2 Sandalwood powder

The scientific name of sandalwood is Santalum spp. There are several species of sandalwood, which are commonly used in soap making and other cosmetic applications. Sandalwood powder is obtained from the heartwood of sandalwood trees and is known for its distinctive aroma, which is often described as woody, sweet, and exotic. In soap making, sandalwood powder is used as a natural colorant, fragrance, and skin-conditioning ingredient.

**Here are some common uses of sandalwood powder in soap making**

**Exfoliation:** Sandalwood powder has a fine texture that can act as a mild exfoliant, helping to gently remove dead skin cells and unclog pores, which can contribute to smoother, brighter skin.

**GLYCERINE:**

FIG.3 Glycerin Soap Base

**Characteristics:**

**1. Moisturizing:** Glycerine soap base is known for its moisturizing properties, making it suitable for dry or sensitive skin.

**2. Gentle:** Glycerine soap base is generally gentle and non-irritating, making it suitable for all skin types.

**3. Transparent:** Glycerine soap base is often transparent or translucent, giving it a clear appearance.

**4. Customizable:** Glycerine soap base can be customized with various fragrances, colours and additives to create unique soap products. [10,11,12]

**Benefits:**

1. Hydrating: Glycerine soap base helps to retain moisture in the skin, leaving it feeling soft and hydrated.
2. Soothing: Glycerine soap base can help to soothe and calm irritated skin, making it, meaning suitable for skin conditions such as eczema or acne.
3. Non-comedogenic: Glycerine soap base is often non-comedogenicity won't clog pores or cause breakouts.
4. Environmentally friendly: Glycerine soap base is often made from natural ingredients and is biodegradable, making it a more environmentally friendly option.

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Uses:

1. Soap making: Glycerine soap base is commonly used in soap making to create handmade soaps.
2. Skincare: Glycerine soap base can be used as a gentle cleanser for the skin, particularly for dry or sensitive skin.
3. Cosmetics: Glycerine soap base can be used in the production of various cosmetics, such as lotions, creams, and body washes.

**Types:**

1. Vegetable glycerine soap base: Made from vegetable glycerin, this type of soap base is suitable for vegans and those with sensitive skin.
2. Animal-derived glycerine soap base: Made from animal-derived glycerin, this type of soap base may not be suitable for vegans or those with certain skin conditions.
3. Synthetic glycerine soap base: Made from synthetic glycerin, this type of soap base may not be as gentle or moisturizing as natural glycerine soap base.

**SANDALWOOD ESSENTIAL OIL:**

**Biological Name:** Santalum album

**Family:** Santalaceous

**Other Names:**

Sandalwood oil

Chandan oil (in India)

**Chemical Constituents:**

Sandalwood essential oil is rich in several key compounds that contribute to its therapeutic properties:

Santillo: The primary component responsible for sandalwood's characteristic aroma and many of its medicinal properties. It has antiseptic, anti-inflammatory, and calming effects. Santyl acetate: Provides a sweet, woody scent and contributes to the oil's calming and relaxing properties. [13,14,15]

Fig.4 Sandalwood oil

**Uses:**

Sandalwood essential oil is valued for its wide range of therapeutic and cosmetic applications:

Aromatherapy: Known for its calming and grounding effects, it is used to reduce stress, anxiety, and promote relaxation.

Skin Care: Often used in skincare products for its anti-inflammatory and antimicrobial properties. It helps soothe irritated skin, reduce acne, and improve skin texture.

Perfumes and Fragrances: Sandalwood oil is a popular ingredient in high-end perfumes due to its rich, woody aroma.

Wound Healing: Its antiseptic properties aid in the healing of minor wounds and cuts.

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**Almond oil:**

Fig.5.Almond oil

**Benefits:**

1. Moisturizing: Almond oil hydrates and softens skin and hair.
2. Antioxidant-rich: Almond oil contains vitamins E and A, protecting against oxidative stress.
3. Anti-inflammatory: Almond oil may help soothe skin irritations and inflammation.
4. Improves skin elasticity: Almond oil's fatty acids support skin health.

**Uses:**

1. Skincare: Almond oil is used in moisturizers, serums, and face masks.
2. Haircare: Almond oil nourishes and conditions hair.
3. Massage oil: Almond oil is a popular choice for massage therapy.
4. Culinary: Almond oil is used in cooking and baking.[16,17,18]

**Types:**

1. Sweet almond oil: Extracted from sweet almonds, often used in skincare

**5.Turmeric**

The scientific name of turmeric is Curcuma longa. Turmeric is a yellow-coloured spice that is widely used in culinary and traditional medicine for its various health benefits. In soap making, turmeric can be used as an ingredient to provide several potential benefits to the soap. Some potential uses of turmeric in soap include. [19,20,21]

Fig.6 Turmeric Powder

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**Uses**

Antioxidant properties
Anti-inflammatory properties
Skin-brightening properties
Mild exfoliation

**Vitamin E**

is a fat-soluble vitamin that plays a crucial role in maintaining overall health. Here are some key benefits and uses
Benefits:

1. Antioxidant properties: Vitamin E helps protect cells from damage caused by free radicals.
2. Skin health: Vitamin E promotes skin health, reducing the appearance of fine lines and wrinkles.
3. Immune system: Vitamin E supports immune function, helping to fight off infections.
4. Eye health: Vitamin E may help reduce the risk of age-related macular degeneration.

**Food sources:**

1. Nuts and seeds: Almonds, sunflower seeds, and pumpkin seeds are rich in vitamin E.
2. Vegetable oils: Olive oil, coconut oil, and grapeseed oil are good sources of vitamin E. [22,23,24]
3. Leafy greens: Spinach, broccoli, and kale contain vitamin E.


Fig.7 Vitamin E

**Uses:**

1. Skincare**:** Vitamin E oil is used in skincare products to promote skin health and reduce signs of aging.
2. Supplements: Vitamin E supplements are available in various forms, including capsules and tablets.
3.Food fortification: Some foods, such as cereals and juices, are fortified with vitamin E.

**Neem Oil:**

The scientific name of neem oil is Azadirachtolide indica. Neem oil is a vegetable oil extracted from the seeds of the neem tree, which is native to the Indian subcontinent. It has been used for centuries in traditional medicine and has many potential uses, including in soap making. In soap making, neem oil can be used as an ingredient to provide various benefits to the soap. Some potential uses of neem oil in soap include

Antimicrobial properties
Moisturizing properties
Soothing properties

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Fig. 8 Neem oil

**Uses:**

**1. Agricultural Uses**

Natural pesticide: Effective against aphids, whiteflies, spider mites, mealybugs, and other pests. [25,26,27]

Fungicide: Helps control fungal diseases like powdery mildew and rust.

Soil conditioner: Improves soil health by acting as a natural nematicide.

**2. Skincare**

Acne treatment: Reduces inflammation and kills acne-causing bacteria.

Moisturizer: Helps with dry skin conditions like eczema and psoriasis.

Anti-aging: Contains antioxidants that help reduce wrinkles and fine lines

**3. Medicinal Uses**

Wound healing: Speeds up healing of minor cuts and infections.

Antiseptic: Used in ointments and creams for its antibacterial properties.

Oral care: Sometimes found in toothpaste or mouthwash for its antibacterial benefits.

**4. Pet Care**

Flea and tick repellent: Used in shampoos and sprays for pets.

Skin treatment: Soothes skin irritations in animals.

5**. Household Uses Insect repellent:** Used in sprays and candles to repel mosquitoes and other insects. [28,29,30]

**Formulation Table: -**

| Sr. No. | Ingredients | F1 | F2 | F3 | F4 | F5 |
|---|---|---|---|---|---|---|
| 1 | Glycerin Soap Base | 35gm | 40gm | 50gm | 55gm | **60gm** |
| 2 | Sandalwood powder | 5gm | 10gm | 5gm | 5gm | **5gm** |
| 3 | Sandalwood oil | 1 ml | 1 ml | 1 ml | 1 ml | **1 ml** |
| 4 | Almond oil | 3 ml | 3 ml | 3 ml | 3 ml | **3 ml** |
| 5 | Turmeric Powder | 2 ml | 2 ml | 2 ml | 2 ml | **2 ml** |
| 6 | Neem oil | 3 ml | 3 ml | 3 ml | 3 ml | **3 ml** |
| 7 | Vitamin E | 1ml | 1ml | 1ml | 1ml | **1ml** |

**Table No.1 Formulation Table**

**Evaluation Parameters**

**Texture:** The texture of the soap was evaluated by rubbing the soap between fingers or palms to assess its smoothness, consistency, and feel.

**Lather**: The lather or foam generated by the soap when used with water was observed and evaluated for its quantity, stability, and creaminess**.**

**Cleansing ability**: The ability of the soap to effectively cleanse the skin was assessed by using it to wash the skin and evaluating its ability to remove dirt, oil, and impurities.

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**Risibility:** The ease with which the soap could be rinsed off from the skin and leave no residue was assessed.

**Overall sensory evaluation:** The overall sensory attributes of the soap, including colour, shape, odour, texture, lather, cleansing ability, moisturization, and risibility, were evaluated holistically by panellists using their senses to provide an overall assessment of the soap's quality and performance.

**pH:** The pH of the prepared soap was determined using two methods. Firstly, a pH strip was touched to the freshly formulated soap to obtain a pH reading. Secondly, 1 gram of soap was dissolved in 10 ml of water, and the pH of the resulting solution was measured using a digital pH meter.

**Foam Height:** To assess foam height, 0.5 grams of the soap sample was dispersed in 25 ml of distilled water. The mixture was then transferred into a 100 ml measuring cylinder, and the volume was made up to 50 ml with water. The solution was agitated with 25 strokes and allowed to stand until the aqueous volume measured up to 50 ml. The height of the foam above the aqueous volume was then measured.

**For foam retention testing:** 25 ml of a 1% soap solution was taken in a 100 ml graduated measuring cylinder. The cylinder was covered with a hand and shaken 10 times. The volume of foam was recorded at 1-minute intervals for a total of 4 minutes.

**Irritation testing:** Was carried out by applying the soap on the skin for 10 minutes. If no irritation occurred, the soap was considered non-irritant based on the absence of any adverse skin reactions.

**Result**

| Sr. No. | Test | Result |
|---|---|---|
| 1 | Appearance | Smooth brownish, pleasant aroma |
| 2 | pH | (1% solution) 8.5 |
| 3 | Foam height | 2.8 cm |
| 4 | Hardness | Hardness |
| 5 | Total fatty matter (TFM) | 72% |
| 6 | Moisture content | 12% |
| 7 | Cleansing action (test | Excellent |
| 8 | Skin irritation test | No irritation observed |

Table No. 2 Evaluation Parameters

## II. CONCLUSION

The herbal soap was prepared using a cold process technique and contains ingredients with antioxidant and antibacterial properties. Formulation which consists of 55 gm of soap base, 2gm of Sandal wood powder, 4 g gel of Aloe barbadensis, and 2 ml oil of Azadirachta indica, was found to be a promising polyherbal soap with potential Tan remover, Brighten skin anti-bacterial and anti-oxidant properties. The presence of natural ingredients with potential health benefits may make this polyherbal soap a promising option for skincare routine. Further research and clinical studies can provide more evidence of the efficacy and safety of this polyherbal soap for beauty and skincare purposes.

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