

## Preparation of Herbal Soap Paper Strips by Using Tulsi, Turmeric and Neem

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### ABSTRACT:

This study focuses on the formulation and preparation of herbal soap paper strips enriched with the therapeutic properties of Tulsi (*Ocimum sanctum*), Turmeric (*Curcuma longa*), and Neem (*Azadirachta Indica*). These herbs are renowned for their antibacterial, antifungal, and skin-nourishing attributes, making them ideal candidates for natural skincare products. The research involved the extraction of active compounds from Tulsi, Turmeric, and Neem which were then incorporated into the soap formulation. Various concentrations and combinations of these botanical extracts were tested to optimize the efficacy and sensory attributes of the soap paper strips. The prepared soap paper strips were assessed for their physical characteristics, including color, texture, some physicochemical properties and aroma as well as their antimicrobial properties against common skin pathogens. Furthermore, the foam stability of the herbal soap paper strips were evaluated under different storage conditions. The results demonstrated the feasibility of developing herbal soap paper strips with potent antimicrobial activity and desirable sensory attributes, offering a natural and sustainable alternative for personal hygiene and skincare practices.

**Key words:** Herbal paper soap, Anti-microbial, Anti-bacterial, Anti-inflammatory activity.

### I. INTRODUCTION:

The outermost layer of the human body, the skin, serves as the body's first line of defense against a variety of infections. Skin damage results from the constant exposure of the skin to various environmental stimuli and reactions at its contact with the environment. Since the hand is a portion of the body that frequently comes into contact with infections through daily activities, injury to the skin will also usually result in scar tissue. For this purpose, soap has been developed as a formulation that is mostly utilized in everyday life to fight against various pathogens. The rising number of

diseases brought on by bacteria and germs, cleanliness is crucial [1]. Various types of fats or oils are commonly utilized as raw materials in soap making. For being used in soap manufacture the type of utilizes needs to be selected in accordance with the use of soap itself. Soap is an important surface-active agent [2].

### HERBAL PAPER SOAP

Paper soap is a thin layer of soap. It is an anionic surfactant that is used with water to clean and wash, even though everyone prefers herbal products nowadays as they don't have any undesirable side effects. For this reason, we develop herbal paper soap along with herbal goods [3].

Advantages of herbal soap strips:

- Gentle on skin
- Easy of carrying
- Ecofriendly
- Low cost
- Biodegradable, compostable.

### 1. Tulsi:



Tulsi, also known as holy basil, is often used in soap strips for its antibacterial, antifungal, and aromatic properties. When infused into soap, tulsi can help cleanse the skin, fight off bacteria and fungi, and leave a refreshing scent. Additionally, tulsi is believed to have calming and stress-relieving effects, which can enhance the sensory experience of using the soap. Overall, the inclusion of tulsi in soap strips can contribute to both the physical and mental well-being of the users [4].

### 2. Turmeric



**Curcuma longa** is known for its antioxidant, astringent, anti-microbial, anti-inflammatory, anti-aging, and photo protective qualities. It also moisturizes and reduces wrinkles. According to recent research, curcuma can effectively reduce wrinkles and regulate inflammation and free radical generation [5].

### 3. Neem:



Neem is commonly included in soap strips for its potent antibacterial, antifungal, and anti-inflammatory properties. With compounds like nimbidin and nimbin, neem effectively cleanses the skin, fights off bacteria and fungi, and soothes irritation. Its moisturizing qualities, courtesy of its richness in fatty acids and vitamin E, help keep the skin hydrated and prevent dryness [6].

## II. MATERIALS AND METHODS

### 2.1 Materials required

Table: 1

S.NO	MATERIALS	Description
1	Tulsi	<b>Botanical name:</b> Ocimum tenuiflorum. <b>Part used:</b> leaves. <b>Chemical constituents:</b> eugenol germacrceterpens.
2	Turmeric	<b>Botanical name:</b> curcuma longa <b>Part used:</b> root <b>Chemical constituents:</b> curcumin DimethoxyCurmin.
3	Neem	<b>Botanical name:</b> Azadiractaindica <b>Part used:</b> leaves <b>Chemical constituents:</b> nimbin, nimbidin, azadirone.
4	Coconut oil	<b>Botanical name-</b> Cocus nucifera <b>Parts used-</b> oil <b>Chemical constituents-</b> lauric acid, myristic acid ,palmitic acid ,caprylic acid and phytosterols
5	Almond oil	<b>Botanical name:</b> prunus dulcis <b>Parts used :</b> seed <b>Chemical constituents:</b> oleic acid, vitamin-E.
6	Potassium hydroxide	<b>Chemical formula:</b> KOH <b>Other names:</b> caustic potash, lye. <b>Appearance:</b> white solid deliquescent.
7	Glycerin	<b>Chemical formula:</b> C <sub>3</sub> H <sub>8</sub> O <sub>3</sub> <b>Melting point:</b> 17.8 <sup>0</sup> c.

		<b>Boiling point:</b> 290 <sup>0</sup> c
8	Sodium chloride	<b>Chemical formula:</b> NaCl <b>Other names:</b> common salt, regular salt. <b>Appearance:</b> colourless cubic crystals.

## 2.2 Method of preparation:

### 1) Glycerin preparation:

Pour the necessary amount of glycerin into a beaker, heat it to 60 °C, stir it slowly, and use a thermometer to check the temperature.

### 2) Prepare the mixture of castor and coconut oils:

Weigh required amount of coconut oil into the beaker, gradually heat the oil to melt it, then add some of castor oil and stir continuously to combine the two oils.

### 3) Prepare KOH Solution:

The flask was filled with water and some amount of potassium hydroxide solution. The liquid was stirred by using a stirring rod to combine the contents of the flask. Then keep KOH is covered. KOH dust might have an effect on the nostrils and throat. Avoid breathing the dust or fumes when combining KOH solution.

### 4) Mix soap:

Gently pour the KOH/water solution into the glycerin. Heat the soap and keep the temperature between 60 and 70 degrees Celsius. To prevent foaming, the mixture was stirred continually during heating. If the mixture foams to the point of nearly overflowing, remove the flask from the boiling water bath until the foaming stops, then resume heating. Heat the mixture until completely saponified.

Then, while stirring continuously, add the NaCl solution to the mixture. The NaCl solution was created by pouring NaCl into some amount of water and stirring it properly until the NaCl salt dissolves properly. The mixture of alkali, lipids, oil, glycerin, and salt was heated in a thermostat until it went through adequate saponification. After taking the combination out of the boiling-water bath, the flask was allowed to cool in an ice bath for ten to fifteen minutes.

Assemble the vacuum filtration apparatus while the flask is cooling. To keep the device from falling over, secure the vacuum flask to a ring support with a utility clamp

A piece of filter paper was weighed to the nearest 0.001 gramme and recorded. The filter paper is inserted into the Buchner funnel. The filter paper was moistened with water until it fit flush in the bottom of the funnel. After the flask has cooled, add specific amount saturated NaCl solution to salt out the soap.



**Fig: 1 Soap Solution**

## 2.3 Collection, Identification, and Processing of Plant

The leaves of *Ocimum tenuiflorum* and neem were taken from various adult plants. The leaves were dried and stored in sealed vials for research. It includes two processes.

### 2.4 Preparation of herbal extract:

The required amount of fresh tulsi and neem leaves was taken, dried in a shaded region, and then crushed into powder. Next, the appropriate quantity of the powder is mixed into sufficient distilled water with continuously stirring. The mixture is filtered using Whatman filter paper to collect the extract.



**Fig: 2 Extraction**

## 2.5 Formulation of herbal soap

**Table: 2**

S.NO	Materials	Activity
1	Tulsi	Anti-fungal
2	Turmeric	Anti-bacterial
3	Neem	Anti-inflammatory
4	Coconut oil	Moisturizer
5	Almond oil	Fragrance
6	Potassium hydroxide	Stability of pH
7	Sodium chloride	Hardness
8	Glycerin	Thickening agent

### 2.5.1 Procedure:

**Weigh specified amount of glycerin and heat it at temperature of 60<sup>0</sup>c.**



**Following the heating add required amount of coconut oil.**



**Incorporate specific amount of castor oil**



**Add required amount of soap base into the solution with the help of continuous stirring.**



**Incorporate some amount of KoH solution and specific amount of Nacl into the soap solution.**



At final step add some amount of extraction into the soap solution.



Soap strips are formed.

### 2.5.2 Formation of herbal paper soap strips:

Dipping technique was used to make paper soap strips, which were then air-dried overnight at  $37\pm 2^{\circ}\text{C}$ . For this aim, several papers were dipped in 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 using a reported standard procedure, and strips was taken.



Fig: 3 Soap Strips

## III. EVALUATION

### Physicochemical factors:

Table: 3

S.NO	PARAMETER	TEST
1	Color	By visually
2	Odour	By smell
3	Texture	By touch

### 2. PH:

The pH of all prepared formulations was defined with a digital pH meter. During their two-hour storage, the formulations were dissolved in 100ml of distilled water. The formulation's pH was measured using a previously calibrated pH meter. The pH of all formulations was found to be 4.5-5.

### 3. Foam height:

A soap paper is taken and it get dissolved in 25ml of distilled water. After that, it was put into a 100 ml measuring cylinder and the volume was adjusted with water to produce 50 ml. Aqueous volume was measured up to 50 ml and 25 strokes

were applied. Above the aqueous volume is the foam height.

### 4. Foam test:

The soap's ability to clean is ascertained through the use of a foam test. A 100ml measuring cylinder was filled with roughly 20ml of distilled water. The soap strip was then added to the cylinder and shaken violently for one minute. The foam height (F1) was measured right away, and after five to ten minutes, the foam height (F2) was measured. Paper soap strips, both medicated and non-medicated, on average, were taken into consideration.

**5. Sensitivity test:**

Sensitivity is measured via a "patch test." When a product is applied to a 1cm patch of skin without any rashes or inflammation, the skin is said to be free of sensitivity.

**6. Irritations:**

A substance is applied to the skin and left for ten minutes. If no irritation then the product is considered as non-irritation product.

**7. Spread ability on paper:**

Product should spread easily in a pinch when applied on paper.

**8. Antibacterial Test:**

Paper soap's antibacterial properties were investigated. Microorganisms were used in the study of microbiology. The bacteria were cultivated

in the culture media and the paper soap was used to test its efficacy. The soap strip was applied to the agar media's surface and the mixture was then incubated for approximately 24 hours at 30 degrees Celsius. The herb enters the agar and diffuses out of the strip.

**9. Anti-fungal activity:**

The cup plate method was used to conduct the antifungal experiment against fungi. In this procedure, nutritional agar medium plates were seeded with 100ml of each microbe suspension containing 100-150CFU/ml. The soap solution is prepared by dissolving the soap in water. The soap solution is gently placed on the agar plates after being dried and sanitized. Following a 3-4 days incubation period at 25-28°C, the antifungal activity of the extracts was determined by measuring the diameter of the zone of inhibition in millimeters.



Fig:4 Anti-bacterial activity



Fig:5 Anti-fungal activity

**IV. RESULT**

Table: 4

S.NO	INGREDIENTS	F1	F2	F3	F4	F5
1	Neem powder(gm)	1	-	-	-	-
2	Tulsi powder(gm)	1	-	-	-	-
3	Turmeric powder(gm)	-	-	-	-	-
4	Extract of tulsi and neem(ml)	-	2	2	-	1

5	Extract of tulsi and turmeric (ml)	–	–	–	2	1
6	Soap base(gm)	1	1	1	1	1
7	Potassium hydroxide(gm)	0.5	0.5	0.5	0.5	0.5
8	Coconut oil(gm)	4	4	4	4	4
9	Castor oil(gm)	–	–	1	1	1
10	Sodium chloride(gm)	0.5	0.5	0.5	0.5	0.5
11	Glycerin	2	2	1	1	1
12	Almond oil	Sufficient amount	Sufficient amount	Sufficient amount	Sufficient amount	Sufficient amount

**V. DISCUSSION:**

Ayurvedic science, grounded in herbal remedies, holds great potential for humanity when used wisely and judiciously. Herbal products, derived from natural ingredients, are highly effective and offer minimal side effects. This study aims to develop and assess a Herbal Paper soap formulation, with the intention of minimizing any potential adverse effects.



**Fig:6 soap strips**

**VI. CONCLUSION:**

The preparation of herbal soap paper strips using tulsi, turmeric, and neem offers a promising avenue for natural skincare. Through this study, it was demonstrated that these ingredients possess antibacterial, antifungal, and anti-inflammatory

properties, making them effective for skincare applications.

In conclusion, the herbal soap paper strips formulated with tulsi, turmeric, and neem represent a natural and potentially beneficial alternative to conventional skincare products. Further research and development in this area could explore variations in formulations, concentrations, and applications to optimize their effectiveness and ensure their safety for widespread use. Overall, the integration of traditional herbal remedies into modern skincare formulations holds significant promise for promoting healthier and more sustainable skincare practices.

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