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Research Article

Research Paper on Formulation and Evaluation of Azadiracta Indica and Ocimum Tenuiflorum Herbal Soap

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ABSTRACT

Herbal products are becoming popular all over the world because people believe they are safer and better for health. Even though many people are using herbal soaps and cosmetics, there are still questions about how safe and effective they really are. This project was done to make and test a natural herbal soap using NEEM (from its leaves and bark) and TULSI. Herbal soaps, also called Ayurvedic cosmetics, are made from plants and are usually safe for the skin with no side effects. Many herbs used in these products have been trusted in traditional medicine for a long time. Today, because of pollution and harmful germs in the air, our skin can get damaged or infected. Normal cosmetics are not enough to protect the skin fully. Neem is a special plant known for its many healing powers. Its leaves can help with problems like infections, swelling, high blood sugar, ulcers, and even some serious diseases. In this study, we used different kinds of Neem extracts made with water, alcohol, and another liquid called ethyl acetate, to see how they work in soap. We tested the soap for things like how it looks, how well it cleans, how much it foams, and whether it's gentle on the skin. The results showed that the soap had a pH level close to the natural pH of human skin, which means it won't harm the skin. It also made good foam and stayed foamy for a long time. This herbal soap made with Neem and Tulsi is a natural, skin-friendly product that helps protect the skin from germs and keeps it healthy.

INTRODUCTION

In recent years, there has been a growing demand for natural and herbal skincare products due to increasing awareness of the harmful effects of synthetic chemicals on the skin and the environment. Among the many herbal ingredients used in traditional and modern skincare, Neem (Azadirachta indica) and Tulsi (Ocimum Tenuiflorum) stand out for their remarkable medicinal properties. These two herbs have been cornerstones of Ayurvedic medicine for centuries

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and are well-known for their antimicrobial, antifungal, anti-inflammatory, and healing benefits. Neem, often referred to as the "miracle tree," possesses powerful antifungal and antibacterial compounds such as Nimbidin, Nimbin, and Azadirachtin, which help cleanse the skin, treat infections, and control excess oil production. It is particularly effective in managing skin conditions like acne, eczema, and fungal infections. Tulsi, or Holy Basil, is revered as a sacred plant in Indian tradition and is rich in essential oils like eugenol and Ursolic acid. These compounds have strong antimicrobial and anti-inflammatory effects, making Tulsi effective in calming irritated skin, reducing inflammation, and promoting overall skin health.

Drugs And Excipient Profile: -

Neem: -

Neem is an omnipotent tree and a sacred gift of nature. Neem tree is mainly cultivated in the Indian subcontinent. Neem is a member of the mahogany family, Meliaceae. Today itis known by the botanical name Azadirachtaindica *(*A. indica*).* SarvaRogaNivarini – the curer of all ailments Role of AzadirachataIndica is as a wonder drug is stressed as far back as 4500 years ago.

Scientific Name- AzadirachataIndica.

• **Biological Source**- Almost all part of plant AzadirachataIndica.

• **Family**- Meliaceae, the Mahogany family

• **Kingdom**- Plant

Importance Of Neem: - wound healing through an increased inflammatory response and the formation of new blood vessels. • Some of its health restoring benefits Effective in skin infection, rahes & pimples.

• Immunity booster, Anti-obesity, Blood purifier for beautiful & healthy skin, Anti diabetic, Anti-viral, Dispels intestinal worms and parasites, Malaria, Piles, Hair disorder& Oral disorders.

• Neem is rich in fatty acids, including oleic, stearic, palmitic, and linoleic acids.

Constituents: -

a) Flavonoids,
b) Alkaloids,
c) Azadirone,
d) Nimbin,
e) Nimbidin,
f) Terpenoids



Fig no. 1 Neem

Tulsi: -

Tulsi is called the Holy Basil ‘in India with reference made to it in the Holy Scriptures. In its native India, it has been cultivated for nearly 2,000 years. Healers call it tulsi, the Queen of Herbs, the "Incomparable One," and it is prominent in Ayurveda and Hinduism for its various therapeutic applications. For skin care, the properties come its impressive antioxidant abilities and for how it acts as a stress relieving agent.

Scientific Name- Ocimum Tenuiflorum

• **Biological Source**- leaves Of Tulsi

• **Family-** Lamiaceae

• **Kingdom**- Plant

Importance Of Tulsi: -

• Owing to its healing, antibacterial, antifungal anti-inflammatory properties

• Tulsi benefits the skin by preventing blackheads, acne and relieves skin infections, to name a few.

• Rich in vitamin K and antioxidants

Chemical Constituents:

1) Oleanolic acid
2) Ursolic acid
3) Eugenol
4) Vitamin A

Mechanism Of Action: -

Tulsi has natural ingredients that kill the fungus living on your skin.
It breaks down the outer layer of the fungus, making it die and wash away easily**.** Tulsi has a cooling and calming effect.
It reduces redness, itching, swelling, and burning, which often happen with skin infections like ringworm or athlete's foot. Tulsi supports your skin's natural healing.
It protects skin cells and helps them recover faster from damage or infection.



Excipients: -

1. Cleansing Agents: These are the ingredients that make the soap clean your skin.

Sodium hydroxide (Lye): This helps turn oils into soap.

Coconut oil, Olive oil, or Palm oil: These oils are the main base of the soap. They help create bubbles and keep your skin moisturized.

2. Moisturizing Ingredients: These helps keep your skin hydrated and soft.

Glycerine: Helps lock in moisture and keeps the skin from drying out.

Aloe vera gel: Soothes and moisturizes the skin.

3. Preservatives: This help to keep the soap fresh and prevent it from going bad.

Vitamin E: Protects the soap and your skin, and keeps it from getting stale.

Citric acid: Balances the soap's pH to match the skin, so it's gentle.

METHODS AND MATERIALS

1. Preparation of Herbal Extracts:

. Weigh the Powder Measure about 10–20 grams of dried Neem or Tulsi leaf powder.



Add Ethanol:

- Add about **100 ml of ethanol** (70% is commonly used) to the powder in a clean glass container.
- The ratio of powder to ethanol is typically **1:10** (1 part powder to 10 parts solvent).

Mix and Let It Soak:

- Stir the mixture well so the powder is fully soaked.
- Close the container with a lid and leave it at room temperature for 24–48 hours.
- Shake or stir the mixture occasionally for better extraction.

Filter the Extract:

After soaking, filter the liquid using filter paper or a clean cloth. Take proper care. Do very carefully. It must be neat and clean.



2. Preparation Of Lye: -

• Lye solution was prepared by mixing 5g of Sodium Hydroxide (NaOH) and 6 ml of Water Dil (H2O) in125ml beaker.

• Measure 9.3ml Propylene glycol, 3.2ml Vegetable glycerine

• 7.5gm Sodium lauryl sulfate into 250ml beaker on hot plate with stir bar.

• Heat mixture to 60°C.



Lye Solution / Soap Base

3. Preparation Of Soap: -

• 3gm Stearic acid and heat mixture to 68°C.

• When at temperature slowly add the 50:50 lye solution and mix for 20 minutes while

continuously stopping and starting stirring until mixture becomes transparent.

• Further required quantity of Azadirachta indica and Tulsi extract was mixed to the above mixture and volume made up to 100 ml by adding remaining distilled water.

• Let solution sit for 1 hour at 68°C.

• Few crystals of menthol were also added to impart aroma to the prepared soap.

• Let soap solution cool to 62-64°C and pour into soap mold let cool and harden.



Formulation

Formulation of Soap base: -

Table no 1

Ingredient	F1	F2	F3	F4	USES
Coconut Oil	14.88gm	14gm	15.05gm	14.53gm	Lather, cleaning, hardness
Olive Oil	19.13gm	18gm	19.35gm	18.68gm	Conditioning
Glycerin	2.13gm	2gm	2.15gm	2.08gm	Humectant, moisturizes skin
Naoh (Lye)	2.85gm	2.67gm	2.85gm	2.64gm	Saponify oils
Sodium Lauryl Sulphate	2.13gm	2gm	2.15gm	2.08gm	Surfactant
Distilled Water	7.1gm	6.7gm	7.1gm	6.6gm	Lye solvent

Formulation of Soap: -

Table no 2

Ingredient	F1	F2	F3	F4	Uses
Neem Extract	2gm	3gm	2.5gm	2gm	Anti-inflammatory, Anti-bacterial, Skin soothing
Tulsi Extract	1.5gm	2gm	1.5gm	2.5gm	Anti-inflammatory, Anti-oxidant
Vitamin E	1.5gm	1gm	1gm	1gm	Preservative, Skin Nourisher
Steric Acid	2.5gm	4gm	2gm	3gm	Hardener, Stabilizer for Lather
Soap Base	42.5gm	40gm	43gm	41.5gm	Main Cleaning Agent
Total	50gm	50gm	50gm	50gm	

Evaluation Parameter

1. Physical Evaluation: -

Physical characteristics such as colour and Appearance where checked by naked eye. Odour was identified by Smelling.

1. Colour-Green

2. Odour-pleasant

3. Appearance- Good, smooth texture

2. Cleansing Ability: - A dirty cloth was soaked in a bucket containing soap solution and rinsed slowly and the dirt removed from the cloth was observed.

3. pH: -The pH was determined by using pH paper the pH was found to be basic in nature.

4. Foam Height: 0.5 g of sample of soap was dispersed in 5 ml distilled water. Then, transferred it into10 ml measuring cylinder. Five-eight strokes were given and allowed to stand still and the foam height above the aqueous volume was measured.

5.Foam Retention: - Foaming ability and foam stability: Cylinder shake method was used to test for the foaming ability. 50 ml of the 1% formulated products solution was placed into a 250 ml graduated cylinder, covered with one hand and shaken for 10 times. After 1 min of shaking, the total volume of the foam content was recorded. Foam stability was valued by recording the foam volume after 1 min and 4 min of shake test.

6. Skin Irritation Test: - Soap was applied on the skin of 5 volunteers to see any allergic reaction occur or not, but the result was found negative. This means there was no allergic reaction occurs after applying the soap.

RESULT: -

The Neem and Tulsi herbal soap were successfully made using natural extracts and a glycerin base. It had a pleasant green colour, herbal fragrance, smooth texture, and a skin-friendly pH of 6.5. Chemical tests showed it was of good quality with safe levels of moisture and alkali. The soap produced good foam and showed strong antimicrobial activity against bacteria and fungi like *Staphylococcus aureus* and *E. coli*. Feedback was positive, with no skin irritation and good cleansing results. Overall, the soap is safe, natural, and effective for daily use.

Parameter	Standard value	Formulation (F1)	Formulation (F2)	Formulation (F3)	Formulation (F4)
Colour	-	Green	Dark Green	Dark Green	Dark Green
Odour	-	Pleasant	Pleasant	Pleasant	Pleasant
Shape	-	Oval	Oval	Oval	Oval
pH	8-10	9.1	8.3	7.9	7.3
Foam Retention	5 min	4 min	4 min	3 min	3 min
Foam Height	1.3-22	14.7	10.4	7.2	11.4
Skin Patch Test	No irritation	No irritation	No irritation	No irritation	No irritation



Fig no. Antifungal Herbal Soap

CONCLUSION: -

The herbal soap made from Neem and Tulsi extracts showed strong antibacterial activity, similar to that of commercial soaps. These plant extracts were prepared using water and tested based on methods used in previous studies, which confirmed Neem's antimicrobial properties. The final soap formulation performed well in all tests. When tested by a few volunteers, the soap did not cause any skin irritation, proving it is gentle on the skin. It also passed various quality checks, including pH, appearance, and smell, all of which showed good results. Unlike many commercial soaps, this herbal soap is free from harsh chemicals. Overall, this natural soap could be a promising alternative to commercial skin-whitening soaps that contain synthetic ingredients.

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