

FORMATION AND EVALUATION OF HERBAL ANTIFUNGAL SOAP OF NEEM

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ABSTRACT

This study describes the development of a novel herbal antifungal soap using neem, a natural ingredient with proven antifungal and antibacterial properties. The soap was formulated using a combination of neem leaves, coconut oil, olive oil, castor oil, and lye. The antifungal activity of the soap was evaluated against various fungal species, and its skin benefits were assessed. The results showed that the soap exhibited significant antifungal activity and improved skin health by reducing inflammation and promoting wound healing. These findings suggest that the herbal antifungal soap developed in this study is a natural and effective alternative for skin care, and may be a useful adjunct to conventional antifungal treatments. The aim of our study was to develop the herbal soap by using melt and pour method. Soap was made by Neem powder, Tulsi, Aloe vera, Turmeric powder, Vit-E, Glycerine base, Rose water, Lavender essential oil. Herbal soap has been used traditionally for treating several epidermal dysfunction, such as psoriasis and acne. Helps to boost immune response in tissue of effected skin area. The results imply that herbal soap is suitable For human skin and can be a therapeutic alternative to skin problem

Keywords: Herbal Antifungal Soap, Neem, Natural Ingredients, Skin Care, Antifungal Activity, Wound Healing.

1. INTRODUCTION

Fungal infections are a common problem worldwide, affecting millions of people each year. These infections can range from mild to severe and can affect various parts of the body, including the skin, nails, and hair. Conventional antifungal treatments often have limited effectiveness and can have unwanted side effects.

In recent years, there has been a growing interest in the use of natural ingredients for the treatment and prevention of fungal infections. Neem (*Azadirachta indica*) is one such ingredient that has been used for centuries in traditional medicine for its antifungal, antibacterial, and anti-inflammatory properties.

This study aims to develop a novel herbal antifungal soap using neem, which can provide a natural and effective alternative for skin care. The soap will be formulated using a combination of neem leaves, coconut oil, olive oil, castor oil, and lye, and its antifungal activity will be evaluated against various fungal species. The development of this herbal antifungal soap using neem has the potential to provide a safe, effective, and natural solution for the prevention and treatment of fungal infections, and can contribute to the growing body of research on the use of natural ingredients for skin care.

The Natural component of herbal medicine has no negative effects on the human body in the vast majority of cases. A pharmaceutical or medication that contains antibacterial and antifungal ingredients is known as an "herbal Soap preparation." It's made p of plant parts including leaves, stems, roots, and fruits, and it's used to treat Damage, disease, and keep people healthy. Soaps have been used in our daily lives for over 6,000 years and Have a rich history. Ancient Babylonians developed a cleaning material by combining animal fats, wood ash, And water, which became known as "soap." saponification is the basic method of soap production in which fats Or oils react with a base/lye. Soaps are divided into two types: solid and liquid. Medicinal soaps differ from Regular soaps in that synthetic or natural bioactive substances are added to the basic soap medium to give the End product a wide range of biological activity. Here's some basic information about neem and its antifungal activities:

Neem (*Azadirachta indica*)

Overview

Neem is a tree native to India and Southeast Asia, also known as Indian lilac or nimbtree. Its leaves, seeds, and bark have been used in traditional medicine for centuries.

Antifungal Activities

Neem has been shown to exhibit antifungal activities against a wide range of fungal species, including:

1. ***Candida***: Neem has been shown to inhibit the growth of *Candida albicans*, a common cause of fungal infections.
2. ***Aspergillus***: Neem has been shown to inhibit the growth of *Aspergillus flavus*, a fungus that can cause aspergillosis.
3. ***Trichophyton***: Neem has been shown to inhibit the growth of *Trichophyton rubrum*, a fungus that can cause ringworm.
4. ***Fusarium***: Neem has been shown to inhibit the growth of *Fusarium oxysporum*, a fungus that can cause fusariosis.

Active Compounds

The antifungal activities of neem are attributed to its active compounds, including:

1. ***Azadirachtin***: A limonoid that has been shown to inhibit fungal growth.
2. ***Nimbin***: A triterpenoid that has been shown to exhibit antifungal activities.
3. ***Nimbidin***: A triterpenoid that has been shown to exhibit antifungal activities.

Mechanism of Action The exact mechanism of action of neem's antifungal activities is not fully understood. However, it is believed that neem's active compounds:

1. ***Interfere with fungal cell membrane***: Disrupting the fungal cell membrane and inhibiting fungal growth.
2. ***Inhibit fungal enzymes***: Inhibiting enzymes essential for fungal growth and survival.
3. ***Stimulate host immune response***: Stimulating the host immune response to fight fungal infections.

2. SKIN TYPES AND BASIC SKIN CARE

The requirement of the basic skin care

1. **Cleansing agent**, which removes the dust, dead cells and dirt that clog the pores on the skin. Some of the common cleansers include vegetable oils like coconut, sesame and palm oil.
2. **Use of Toners**: help to tighten the skin and keep it from being exposed to many of the toxins that are floating in the air or other environmental pollutants. Some of the herbs used as toners are witch hazel, Geranium, sage, lemon, ivy, burdock and essential oils.
3. **Moisturizing**: moisturizing helps the skin to become soft and supple. Moisturizing shows a healthy glow and is less prone to aging. Some of the herbal moisturizers include vegetable glycerin, sorbitol, Rose water, jojoba oil, aloe vera and iris.

Herbal Soap.

Herbal soap is a type of soap made from natural ingredients such as plant-based oils, herbs, and essential oils. These soaps are known for their skin-friendly properties, often offering various benefits depending on the herbs or botanicals used. Some common herbs found in herbal soaps include lavender, chamomile, eucalyptus, and tea tree, each offering unique properties like soothing, antibacterial, or moisturizing benefits.

Herbal soaps can be made by infusing herbs directly into the soap or by using essential oils, and they are typically free from synthetic fragrances, preservatives, and chemicals. They are often preferred by people with sensitive skin or those looking for more natural personal care products.

Benefits of Herbal Soap:

1. **Gentle on Skin**: Herbal soaps are typically free from harsh chemicals and artificial fragrances, making them ideal for sensitive skin. They cleanse without stripping the skin's natural oils, leaving it soft and moisturized.
2. **Natural Ingredients**: Many herbal soaps use plant-based oils like olive oil, coconut oil, or shea butter, which are rich in antioxidants, vitamins, and fatty acids that nourish and protect the skin.
3. **Antibacterial and Antifungal Properties**: Some herbal soaps contain ingredients like tea tree oil, neem, and eucalyptus, known for their antimicrobial properties. This makes them effective for addressing acne, fungal infections, or body odor.
4. **Aromatherapy Benefits**: Herbal soaps infused with essential oils like lavender, peppermint, or chamomile offer an aromatherapeutic experience, promoting relaxation, stress relief, or invigoration, depending on the oils used.
5. **Eco-Friendly**: Herbal soaps are often made with sustainable, biodegradable ingredients, and some brands even offer packaging that's eco-conscious.

Types of Soap

1. Lavender Soap

Main Ingredients: Lavender essential oil, dried lavender flowers, sometimes olive oil or coconut oil.

Benefits: Known for its calming and relaxing properties. Lavender soap is great for soothing irritated skin, reducing stress, and promoting sleep. It's also a natural antiseptic, making it ideal for acne-prone or sensitive skin.

2. Tea Tree Soap

Main Ingredients: Tea tree essential oil, sometimes combined with other oils like peppermint or eucalyptus.

Benefits: Tea tree soap is excellent for treating acne, blemishes, and oily skin. It has antimicrobial and antibacterial properties, helping to prevent and heal breakouts and other skin infections.

3. Charcoal Soap

Main Ingredients: Activated charcoal, sometimes combined with tea tree oil or other essential oils.

Benefits: Charcoal soap is known for its detoxifying properties. It draws out impurities, excess oil, and toxins from the skin, making it an excellent choice for deep cleansing, especially for those with oily or acne-prone skin.

4. Neem Soap

Main Ingredients: Neem oil, neem powder, and sometimes a base of coconut or olive oil.

Benefits: Neem soap is rich in antibacterial, antifungal, and anti-inflammatory properties. It's great for treating skin infections, acne, eczema, and other skin irritations. It's also a good option for soothing dry or itchy skin.

5. Chamomile Soap

Main Ingredients: Chamomile essential oil, chamomile flowers, often combined with gentle oils like almond or jojoba.

Benefits: Chamomile soap is soothing and calming, making it ideal for sensitive or irritated skin. It's also anti-inflammatory and can help with conditions like eczema, rashes, and general skin redness.

6. Rose Soap

Main Ingredients: Rose essential oil, rose petals, or rose water.

Benefits: Rose soap is hydrating and has anti-aging properties. It can promote a healthy glow and improve skin texture. It's particularly beneficial for dry or mature skin due to its moisturizing effects. Rose also has soothing properties for irritated or sensitive skin.

7. Aloe Vera Soap

Main Ingredients: Aloe vera gel, sometimes combined with coconut oil or olive oil.

Benefits: Aloe vera soap is incredibly moisturizing and helps heal sunburns, dry skin, or minor burns. It's ideal for soothing irritated skin, reducing redness, and providing relief to itchy or sensitive skin.

8. Eucalyptus Soap

Main Ingredients: Eucalyptus essential oil, often combined with other oils like peppermint or tea tree.

Benefits: Eucalyptus soap has a cooling and refreshing effect. It is excellent for stimulating circulation, clearing blocked pores, and treating skin infections or blemishes. The fresh scent is also invigorating and can help clear the mind.

9. Rosemary Soap

Main Ingredients: Rosemary essential oil, sometimes combined with other herbs like thyme or lavender.

Benefits: Rosemary soap is great for revitalizing tired skin, stimulating circulation, and promoting cell renewal. It's also used for treating oily skin and acne due to its antiseptic properties. Rosemary is often used in hair care soaps to stimulate hair growth and reduce dandruff.

10. Oatmeal Soap

Main Ingredients: Ground oatmeal, often with a base of olive oil, coconut oil, or shea butter.

Benefits: Oatmeal soap is perfect for dry, itchy, or sensitive skin. It has gentle exfoliating properties and is great for soothing conditions like eczema or psoriasis. The oatmeal helps to lock in moisture and smooth out rough patches of skin.

3. MATERIAL AND METHOD

1. Neem

Classification chart for Neem (*Azadirachta indica*).

Taxonomic Rank	Scientific Classification
Kingdom	Plantae (plant)

Division	Angiosperm (flowering plant)
Class	Dicotyledons
Order	Sapindales
Family	Meliaceae (Mahogany Family)
Genus	Azadirachta
Species	Azadirachta Indica
Common name	Neem, Indian lilac, Margosa tree, Nim tree
Synonyms	Azadirachta indica , Melia indica.

Neem



Materials Needed:

1. Neem Oil – Known for its antibacterial, antifungal, and anti-inflammatory properties. It's the key ingredient in neem soap.
2. Neem Powder – Adds extra benefits to the soap, helping with exfoliation and enhancing the antibacterial effects.
3. Base Soap (Glycerin or Unscented Soap Base) – You can either buy a pre-made soap base or make your own from scratch (e.g., by using oils like coconut oil, olive oil, or palm oil).
4. Essential Oils (optional) – Lavender, tea tree, or eucalyptus essential oils can be added for fragrance and added therapeutic benefits.
5. Water or Aloe Vera Gel – Used if you're making soap from scratch to help with the soap-making process.
6. Lye (Sodium Hydroxide) (if making from scratch) – Used to turn oils into soap in the cold-process method. Be careful when handling lye, as it is caustic.
7. Other Additives (optional):
Coconut Oil or Olive Oil for moisturizing properties.
Herbal extracts (like chamomile or turmeric) for additional skin benefits.
Dried Neem Leaves (optional) – Can be added for texture or visual appeal.

Method:

1. Melt and Pour Method (Beginner-Friendly):

This method is easier and quicker, and you don't need to handle lye.

Step-by-Step Process:

1. Prepare the Soap Base: Cut the pre-made soap base into small cubes and place them in a microwave-safe bowl or double boiler. Heat until the soap base is completely melted. If you're using a double boiler, stir occasionally to ensure even melting.
2. Add Neem Oil and Neem Powder: Once the soap base is fully melted, add 1-2 tablespoons of neem oil and 1-2 teaspoons of neem powder per 1 lb (450g) of soap base. Stir well to combine.
3. Optional Essential Oils: If you'd like to add fragrance or extra therapeutic benefits, now is the time to add a few drops of your chosen essential oils, such as tea tree or lavender. Stir to incorporate evenly.
4. Pour the Soap Into Molds: Pour the mixture into silicone soap molds or any mold of your choice. Tap the mold gently to remove any air bubbles.

5. Allow to Set: Let the soap cool and harden for several hours at room temperature or refrigerate for quicker setting.

6. Unmold and Use: Once the soap has fully hardened, carefully remove it from the mold. It's now ready to use!

2. Cold Process Method (Advanced):

This method involves creating soap from scratch using oils and lye. It takes longer to cure but allows for more customization.

Step-by-Step Process:

1. Prepare the Lye Solution: Wearing gloves and goggles, carefully measure out the lye (sodium hydroxide) and water. Add the lye to the water (not the other way around) in a heat-resistant container. Stir until dissolved, then allow it to cool to around 100°F (38°C).

2. Prepare the Oils: In a separate pot, combine your base oils (such as coconut oil, olive oil, and neem oil). Heat the oils on low until they are fully melted and combined.

3. Mix the Oils and Lye Solution: When both the oils and the lye solution are at a similar temperature (around 100°F or 38°C), slowly pour the lye solution into the oils while stirring gently. Use an immersion blender to mix the ingredients until they reach "trace" (a pudding-like consistency).

4. Add Neem Powder: At this point, add 1-2 teaspoons of neem powder per 1 lb of oils. Stir it in thoroughly to ensure it is evenly distributed throughout the soap.

5. Optional Essential Oils: If you want to add essential oils, do so at this stage. You can use tea tree or lavender oils for additional skin benefits. Add 10-20 drops per 1 lb of soap.

6. Pour into Molds: Pour the soap mixture into your soap molds, smoothing the top with a spatula.

7. During the Soap: Cover the soap with a towel to retain heat and let it set for 24-48 hours. Once it's firm enough, remove it from the molds and cut it into bars.

8. Curing Time: Allow the soap bars to cure for about 4-6 weeks in a cool, dry place. This curing process helps the soap harden and reduces the concentration of lye, making the soap safe to use.

Physical Parameter of Neem Soap.

1. pH Level:

Neem soaps typically exhibit a pH ranging from 9.0 to 11.6, indicating a basic nature. For instance, a study reported a pH of 10.60 for a neem-based soap, which is comparable to commercial soaps with pH values between 9.6 and 10.6.

2. Total Fatty Matter (TFM):

TFM is a key quality indicator in soaps, representing the total amount of fatty substances. Neem soaps have been found to possess TFM values ranging from 24.6% to 46.4%, which is lower than that of some commercial soaps (92.5% to 97.5%). A higher TFM generally indicates better moisturizing properties.

3. Moisture Content:

The moisture content in neem soaps varies between 4.4% and 9.8%. Maintaining appropriate moisture levels is crucial for the soap's shelf life and texture.

4. Foamability:

Foamability refers to the soap's ability to produce lather. Studies have shown that neem soaps produce a stable and adequate amount of foam, which is essential for effective cleansing.

5. Hardness:

The hardness of neem soap affects its rate of dissolution and usage longevity. Formulations with higher neem oil content tend to produce harder soaps, which last longer during use.

6. Free Caustic Alkali (FCA):

FCA indicates the amount of unreacted alkali in the soap. Neem soaps have been reported to contain FCA levels between 0.3% and 6.8%. Lower FCA values are preferable to prevent skin irritation.

4. RESULT

1. The formulation of poly herbal soap. The evaluation of poly herbal soap involves testing its physical, Chemical, and microbiological properties to ensure its quality and safety.

2. Neem in tree the family meliaceae and it has been used widely in traditional medicine.

3. Neem leaves contain various biological active compound such a nimbi din, cyclic trisulphide, cyclic tetroSulphide, and polyphenolic flavonoids.

4. Which are very importance In pharmaceutical industry.

5. There active compound were obtained from the leaves by solvent extraction method extraction it to the Purpose to separate soluble active compound in the solvent and leave behind insoluble leave part called as Residue.

6. The aim of their research is to produced a neem soap that is suitable for human skin and help in curing skin problem by using natural Ingredient.

5. CONCLUSION

In summary, neem (*Azadirachta indica*) has been extensively studied for its antifungal properties, attributed to compounds such as nimbin and azadirachtin. Formulating herbal soaps with neem extracts leverages these properties, offering a natural and effective means to combat fungal infections. Studies have demonstrated that neem-based soaps can inhibit the growth of various pathogenic fungi, including *Candida albicans* and *Aspergillus* species. Therefore, incorporating neem into soap formulations provides a promising approach to managing and preventing fungal skin infections.

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