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Formulation and evaluation of herbal neem soap

Bornare Pratiksha S[1], Deokar Trupti D[1], Shinde Aishwarya A[2], Musmade Dipak S[3]

[1] Student, Department of Pharmacognosy, Nand kumar Shinde College of pharmacy Vaijapur Aurangabad DBATU University, Maharashtra, India

[2] Assistant Professor, Department of Pharmacognosy, Nand kumar Shinde College of pharmacy, Vaijapur Aurangabad DBATU University, Maharashtra, India

[3] Principal, Department of Chemistry, Nand kumar Shinde College of pharmacy, Vaijapur Aurangabad DBATU University, Maharashtra, India

Abstract
A local herb known as neem (semambu) or its scientific name Azadirachta indica has been used extensively in traditional treatment due to its medicinal properties. Neem leaves have been used traditionally for treating several epidermal dysfunctions, such as eczema, psoriasis, and acne. Neem is rich in antioxidants and helps to boost immune response in tissues of affected skin area. It also consists of bioactive compounds for antibacterial, antifungal, and anticancer activities. In this study, neem leaves extract was used in producing herbal neem soap as a remedy for curing skin problems. The herbal neem soap was made by blending 36.4% palm oil, 9.1% coconut oil, 27.3% sodium hydroxide, 9.1% neem oil extract, and 18.2% neem aqueous extract which formed a pale yellow soap base. The results of the selected physical and chemical properties of this study show that the moisture content of the soap was 4.02% with 10.60 pH value, 57.40% total fatty matter, and 0.44% free caustic alkali. The results imply that herbal neem soap is suitable for human skin and can be a therapeutic alternative to skin problems [1].

Keywords: azadirachta indica, herbal soap, formulation, skin problems

Introduction

People have been using Azadirachta indica (neem) tree as a source of medicine since time immemorial. Numerous compounds can be found from different parts of neem, such as its seed, bark, and leaf. The effectiveness of each part of neem in treating various types of diseases may differ due to their different chemical properties [2]. The neem tree Azadirachta indica A. Belongs to family Meliaceae, is a tropical evergreen related to mahogany. Native to east India and Burma, it grows in much of Southeast Asia and West Africa; a few trees have recently been planted in the Caribbean and several Central American countries, including México. The people of India have long revered the neem tree; for centuries, millions have cleaned their teeth with neem twigs, smeared skin disorders with neem-leaf juice, taken neem tea as a tonic, and placed neem leaves in their beds, books, grain bins, cupboards, and closets to keep away troublesome bugs. Trees will reach up to 30 m tall with limbs reaching half as wide. The shiny dark green pinnately compound leaves are up to 30 cm long. Each leaf has 10–12 serrated leaflets that are 7 cm long by 2.5 cm wide. It will grow where rainfall is as little, and thrives inareas that experience extreme heat of up to 48°C. Even some of the most cautious researchers are saying that neem deserves to be called a "wonder plant." The neem tree, was introduced to Baja California Sur, México, in 1989 by a group of private producers dedicated to organic horticulture in San José del Cabo. The first trees were brought from the Philippines [3, 4], and in 1992, this species was introduced to Yaqui Valley, Sonora, México [5]. Since 1994, trees have been Planted in small areas along roadsides, as a windbreak. Neem populations planted in Southern, Sonora, México, have phenotypic and quality differences, fruits are heterogeneous in size and form, and oil content and quality is variable. The objective of this study was to characterize 216 trees in a collection at the Instituto Tecnológico Agropecuario, in Southern Sonora Mexico.

Classification

- **Kingdom:** Plantae
- **Division:** Magnoliophyta
- **Class:** Magnoliopsida
- **Subclass:** Rosidae
- **Order:** Sapindales
- **Family:** Meliaceae
- **Genus:** Azadirachta
- **Species:** Azadirachta indica

Neem is commonly used in Ayurveda because it contains many active components such as azadirone, azadiractin, flavonoids, etc. These active components have potential therapeutic properties [6].

Neem leaf extract consists of nimbidin, cyclic trisulphide, cyclic tetrasulphide, and polyphenolic Flavonoids. These bioactive compounds support antibacterial, antifungal, and anticancer activities. It is also rich in antioxidant which helps develop new skin cell tissues. In Ayurvedic medicines, neem leaf has been used in the treatment of leprosy, eye problems, epistaxis, intestinal worms, anorexia, Biliousness, and skin ulcers. Meanwhile, neem oil contains various types of neem limonoids which can prevent mutagenic effect [2, 7, 8, 9].

Soap is a product formed from saponification reaction, where esters are split into alcohol and Salts. Saponification is more widely used in general terms as alkaline hydrolysis of ester. Soap is sodium or potassium salt of fatty acid produced by saponification reaction using sodium or potassium

hydroxide. Based on its chemical properties as an anionic surface active agent (surfactant), soap is used to clean and Wash skin and clothing. The fatty acids, stearic, palmatic, myristic, lauric and oleic acids, contribute to Lathering and washing properties of the soaps [10].

Herbal soap preparation is a medicine or drugs it contain Antibacterial & antifungal agents which e mainly uses of part of plants such as like leaves, stem, roots &fruits to treatment for a injury or disease or to achieve good health [11]. The chemical characteristics of soap depend on several factors: the strength and purity of alkali, The kind of oil used, completeness of saponification and age of the soap. Such chemical Characteristics include moisture content, total fatty acids (TFM), pH, free alkali, and percent chloride [12]. Lack of evidence on the efficacy of herbal Soap, and the poor aesthetic presentation, these products are mostly patronized by low income group in the local Communities in the past. But interestingly, the popularity of Herb-based soaps is increasing due to many years of Accumulated experience on their efficacy on topical Disorders. Currently, there are so many commercial brands of herb-based soaps with good claims of efficacy and are now enjoying increasing patronage. It is therefore important To investigate these soaps to validate the claims and also Establish other useful properties which will help in Promoting public acceptance and encourage wider usage Soaps act as emulsifiers or surfactants, softening the horny layer of the epidermis and acts as a germicide by enhancing The permeability of microbial envelope thereby disrupting The integrity of microbial cells. Antimicrobial activity of Soaps make them useful agent for bathing, laundry, washing,And cleansing of surfaces [13 ,14]. In this review article herbal soap conataining neem,tulsi and reetha as natural plant ingredients and this content gives or shows antibacterial antifungal & anti-inflammatory activity In this soap, neem is main compound, and shows medicinal properties. Neem leaf and Its extract exhibit immunomodulatory Anti-inflammatory, antiulcer antimalarial, Antifungal antibacterial antioxidant Anticarcinogenic property[15]. Reetha is an exceptional cleanser. Hence it's a perfect substitute for soap and facewash due the presence of saponin. It is also good for use on sensitive skin. A combination of Reetha and Chickpeas gives a gentle and enriching experience to the skin it has conditioning properties, therefore, it keeps skin moisturized and cool. Reetha prevents the skin from drying and keeps it soft and supple it also helps to treat eczema and psoriasis. Shikekai is quit effective in treating various skin infection like scabies and also used as a antiwrinkles property [15].

Other compounds involved in the preparation of the herbal soap are palm oil and coconut oil. These Compounds are rich in vitamin E, thus help to protect body tissue from damage and heal wounds faster [16]. Thus the producing of this natural remedy using neem leaves extract could produce an affordable herbal soap that is free of harmful chemicals to the skin.

Fig 1

Brand of neem soap

1. Patanjali
2. Hamam
3. Himalaya
4. Medimix
5. Margo

Methods

Materials

Azadirachta indica (neem) leaves were collected from Kuala Pilah, Negeri Sembilan, Malaysia. The neem leaves were segregated and washed with distilled water. The leaves were dried at room temperature, grinded to small pieces, and kept for further usage [9, 17] Distilled water, sodium hydroxide (NaOH), palm oil, and coconut oil were used as received without further purification.

Extract of neem in oil

Grinded leaves measuring 80 g were soaked into 800 mL of palm oil and heated at 120 °C for 3 h. After they have cooled to room temperature, the mixture was then filtrated by using filter paper to remove the leaves residue. The oil filtrate was kept for further experiment.

Aqueous extract of neem

The neem leaves aqueous extraction was prepared by using blending method. Grinded leaves measuring 20 g were taken and placed into a grinder machine filled with 200 mL of distilled water and blended for 5 min. Then the sludge in the mixture was removed by using filter paper. The aqueous filtrate was kept for further experiment.

Soap preparation

The mixture of palm oil (400 mL), coconut oil (100 mL), neem oil extract (100 mL), and neem aqueous extract (200 mL) was placed in a 2000 mL beaker. The mixture was then stirred at room temperature for 30 minutes by using mechanical stirring. A 300 mL NaOH was added into the mixture to initiate the saponification process whereby the mixture was stirred until the reaction has completed.The excess of NaOH was removed by washing the neem soap paste with (5–10%) hot water at 90 °C and then was continued washing with 10mL of distilled water. The neem soap paste was poured into a mould and left to dry at room temperature [1]

Contents of the Soap [18]

NEEM

Fig 2

Botanical name: Azadiractaindica
Part typically used: Leaves
Colour: Green
Description: Compound alternate, rachis 15-25cm long, 0.1cm thick, leaflet with oblique, serrate, 7-8.5 cm long and 1-1.7 cm wide slightly yellowish green in color.
Constituents: Flavonoids, Alkaloids, Azadirone, Nimbin, Nimbidin, Terpenoids, Steroids, Margosicacid, Vanilic acid, Glycosides, B-sitosterol, Nimbectin, Kaempeerol, Quercursertin are present in Neem Leaf [9].

Ritha

Fig 3

Biological name: Sapindus mukorossi
Part Typical used: Seeds
Colour: Brown
Uses: Detergent
Surfactant Description: The fruit is a small leathery skinned drup 1 to 2 cm in diameter, yellow ripening blackish, containing 1 to 3 seeds.

Fig 4

Shikekai
Biological name: Acacia concinna
Common name: shikekai
Chemical Constituents: Spinasterone, Acacic acid
Part Typical used: Fruits pods
Colour: Brown
Uses: Antidandruff detergent.

Table 1

Chemical	Source
Sodium hydroxide	Laboratory reagent
Palm oil	Laboratory reagent
Coconut oil	Laboratory reagent

Table 2

Herbal plant	Source
Neem	Plant
Reetha	Plant
Shikekai	Plant

Formula
The formula shown in Table 3 is best suited for the preparation of herbal soaps

Table 3

Sr. No	Ingredients	Quantity (%)
1	Palm oil	400 ML
2	Coconut oil	100 ML
3	Neem oil extract	100 ML
4	Neem aqueous extract	200 ML
5	NaoH	300 ML

Evaluation [19, 20]
The herbal soap formulated was evaluated for the following:

Organoleptic evaluation:
A. Colour: light brown
C. Appearance: Good

Physical evaluation [21, 22]
The herbal soap formulated was evaluated for the following properties:

a. **pH:** the pH was determined by using pH paper .the pH was found to be basic in nature
b. **Foam retention:** 25 ml of the one percent soap solution was taken into a 100 ml graduated measuring cylinder the cylinder was covered with hand and shaken 10 times. the volume of foam at 1 minutes interval for 4 minutes was recorded. It was found to be 5 minutes.
c. **Foam height:** 10cm
d. **Antimicrobial test:** there was various study conducted on antimicrobial activity of name and hence according to research paper by antimicrobial activity of Azadiricta indica leaf, bark and seed extract.

Conclusion
A herbal soap has been produced successfully from neem leaves extract in this study. The results from the physicochemical properties of the neem soap prepared was compared to neem seed oil soap and commercial neem soap. The results imply that the neem soap produced is suitable for human skin. Moreover, it is a product innovation of a natural medicated soap produced from neem leaves extract that is free from chemicals, such as sodium sulfate (SLS), artificial colourant, and artificial fragrance, thus can be an affordable alternative therapy for consumers who have skin problems.

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