



Formulation And Evaluation Of Antifungal, Antibacterial (All Purpose) Polyherbal Soap By Using Melt And Pour Technique.

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Abstract:

Soaps are essential for maintaining our hygiene and health because they eliminate dirt from the body in addition to having bactericidal properties. Our study's objective was to create herbal soap using the melt-and-pour technique. The purpose of this research is to create an antibacterial polyherbal bath soap using some of the antibacterial qualities of herbal plant extracts. In this review, we looked at the various herbal plants that are used to make soap that has antibacterial, antifungal, and antibacterial properties. Many naturally occurring herbal plants contain a range of chemical components that are used in cosmetic preparations. Because they have a high activity level and no negative effects, herbal cosmetics are particularly significant. Fungi is the most common type of skin infection in humans, and it requires special care to keep the skin healthy and to heal. A specific type of soap called soap is used to treat different fungal infections. Both conventional herbal remedies, such as plant extracts or herbal oils, and allopathic medications can be used to treat these infections. It aids with acne and pimple prevention, skin brightening, softening, and smoothing, and skin polishing, replenishing, and rejuvenation. In this review, we looked at various herbal plants that have antifungal, antibacterial, and antimicrobial properties, including turmeric, guava, banana, and mango leaves, as well as Aloe Vera and Tulsi. Because of their antibacterial and antifungal properties, all of these herbal remedies are highly regarded and well-known in Ayurveda. People are most commonly affected by fungal skin infections, which need careful attention both during treatment and in order to maintain healthy skin. On *Candida albicans*, *Azadiracta indica*, *Aloe berbadensis*, *Curcuma longa*, and *Ocimum sanctum* exhibit activity. Soap NoHerbal helps to address fungal skin infection issues. Antibacterial soaps clearly contain antibacterial agents that have the ability to either kill or inhibit bacteria. The majority of commercial soaps include ingredients that may be bad for your skin. It was determined what the formulations' physicochemical parameters were (pH, foaming ability, stability, and physical evaluation). The formulation had an excellent foaming index and a pH level that was almost identical to that of skin, according to the results.

Keywords: Herbal soap, Melt and pour technique, antifungal, antibacterial, antimicrobial, TFM, , guava leaf, banana leaf, mango leaf, anti-inflammatory, etc.

Introduction:

India has a long history of using various forms of traditional medicine, including Ayurveda, Siddha, and Unani. In this nation, traditional medicine has flourished for many centuries. Modern scientific methods can be used to investigate Ayurveda and other Indian medical systems for improved health outcomes¹. Certain types of soap, known as antifungal soap, may be able to help people treat a variety of fungal infections.⁽¹⁾ The cutaneous membrane, commonly referred to as the skin, shields the body's exterior. It is the largest organ in the body in terms of weight and surface area. The skin's many functions include regulating body temperature, storing blood, providing protection from the environment, cutaneous sensations, excretion and absorption, and producing vitamin D. The skin offers some protection against pollutants, viruses, and the sun, but it is the most exposed part of the body. The most common skin conditions are eczema, allergies, psoriasis, warts, acne, and rashes. One of the most significant and effective advances in modern science and technology for the prevention and treatment of infectious diseases is the discovery and development of antibiotics ^(2, 3).⁽⁴⁾ Both traditional and contemporary medicines can be effectively derived from medicinal plants. Research has demonstrated the true value of herbal medicine, which is why 80% of people living in rural areas rely on it for their primary medical needs.^(5,6,7) Skin disorders are a common medical condition. Skin problems can be caused by infections, allergies, sun exposure, injuries, and other factors. ⁽⁸⁾ A variety of herbs with high nutritional value have been found to possess antioxidant, antibacterial, cytotoxic, anti-microbial, hypotensive, anti-diuretic, anti-inflammatory, anti-spasmodic, anti-diabetic, anti-helminthic, and anti-hemorrhagic properties. Natural products can be used to treat almost any disease or skin condition because of their high medicinal value, affordability, availability, and compatibility. ⁽⁹⁾ A wide range of formulations are employed to use the medicinal and cosmetic benefits of plants. ⁽¹⁰⁾ According to a WHO report, skin diseases account for an astounding 34% of all occupational disorders. Data from 2020 showed that the number of skin disease-related deaths in India was 17,857, or 0.21% of all deaths. Therefore, the best course of action to address the situation is to include herbal potentials in the formulation, which have fewer effects and impart effective treatment options with lower risk and higher safety. Thus, the current study focuses on creating medicated herbal soap that incorporates the active properties of various herbs to create an antioxidant and antibacterial soap that can be used as a standard bath soap. ^(11, 12). These soaps' infusion of herbs has therapeutic and healing properties that provide targeted advantages to the skin, including moisturizing, strengthening, nourishing, and healing. Super fatty oils, vitamin E, aloe vera, and essential oils linked to improved skin and general health are also present in these soaps.⁽¹³⁾ Herbal soaps are also useful in treating a variety of skin conditions. Herbal soap preparations are medications or treatments that primarily use plant parts, such as leaves, stems, roots, and fruits, to treat illnesses or injuries and promote overall health. ⁽¹⁴⁾ This review article's herbal soap contains polyherbs, which are naturally occurring plant ingredients with antibacterial, antifungal, and anti-inflammatory properties. ⁽¹⁵⁾. To make a base that can be used to treat a variety of skin conditions, herbal cosmetics are made by combining one or more herbal substances with other cosmetic ingredients. Cosmetics are substances that are applied to the face and hands of humans in order to improve appearance, soothe the skin, and promote beauty without altering the structures or functions of the body. Herbs are beneficial for promoting health and preventing disease ^(16,17, 18). Herbal soap formulations are quite popular in the treatment of fungal infections because of their all-natural ingredients, wide range of effectiveness, and low number of side effects. ⁽¹⁹⁾.

What is melt and pour soap?

The melt and pour soap making technique involves melting a ready-made base, so there's no need to mess around with chemicals. You can then add your own fragrances, colours or other additives before pouring the soap mixture into a mould. The soap sets quickly and is ready to use after just a couple of hours. ⁽²⁰⁾

Skin:

The skin makes up around 15% of an adult's total body weight, making it the largest organ in the body. It carries out a multitude of essential tasks, such as preventing the body from losing excess water and aiding in thermoregulation, in addition to providing defense against external physical, chemical, and biological threats. The mucous membranes that line the body's surface are a continuous layer of skin. (21)

The system of external defense stops the entry of microorganisms into the body. The largest external defense system is the skin. In addition to serving as the body's outermost layer of defense, skin serves other purposes. It acts as a mechanical wall dividing the body's interior from the outside environment. Skin temperature can range from 30 to 40°C, depending on the surrounding conditions. (22)

Functions of the Skin:

1. The skin is a vital organ that covers the entire body like an envelope and contains all of the underlying structures, including subcutaneous tissue, muscle, bone, arteries, nerves, etc.
2. Guarding against harm such as chemical and physical wounds as well as preventing infections, antigens, and haptens from entering the body.
3. Controlling the temperature.
4. Lubrication and water proofing, which stops water from entering through the exterior and vice versa through sebum secretion.
5. The body's ability to absorb UV light and synthesize vitamin D, both of which are vital for promoting growth.
6. Insulation via the fat beneath the skin.
7. Feeling.
8. Defense and cutting through the nails.
9. The reserve of calories.
10. Odor emanating from the body (apocrine sweat glands).
11. Psychosocial demonstration (via nail, hair, and lip art).

Anatomy of the skin:

SKIN ANATOMY

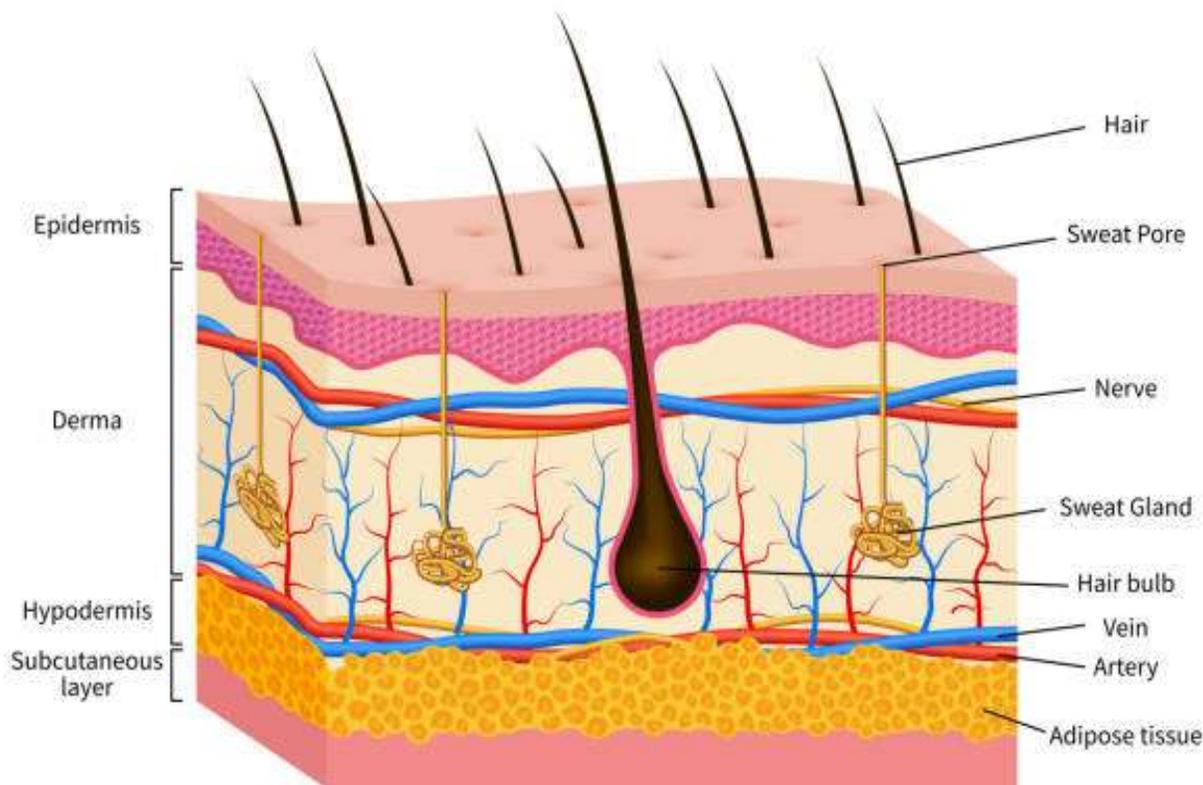


Fig 1 : Anatomy of skin

The epidermis, dermis, and subcutaneous tissue are the three compartments that make up the skin's anatomy.

1. The epidermis is made entirely of cells.
2. The blood vessels and connective tissues that make up the dermis.
3. The fat-based subcutaneous tissue, which serves as a cushion to protect against mechanical trauma.

Skin types:**1. Normal skin tone:**

This skin type is just right—not overly oily or dry. It doesn't require special care because it has a regular texture, is flawless, and has a clean, soft appearance. (23)

2. Dry Skin:

Usually a transient condition, dry skin is brought on by environmental factors like the temperature, low air humidity, and immersion in hot water. Small cracks that, in more severe cases, may be deeper and even bleed, are typically seen in cases of extremely dry skin. (24)

3. Oily skin:

The appearance of oily skin is porous, humid, and bright. It is brought on by the sebaceous glands' excessive production of fat, which is typically inherited or brought on by hormonal factors.(25)

4. Combination skin (both oily and dry skin) :

Based on its location, it presents characteristics of both dry and oily skin since the distribution of sebaceous and sweat glands is not homogeneous. The area with more oil is usually the T- zone (forehead, nose, and chin), while the skin on the cheeks is normal or dry.

5.Sensitive skin :

It is a fragile skin, usually accompanied by feelings of discomfort, such as heat, tightness, redness or itching .

It is a delicate skin that needs more care to fight dryness, roughness and its usual appearance. Sometimes, it is referred to as irritated skin instead of sensitive, but these terms are synonymous and there are no dermatological differences between them.(26)

Soap :

A material called soap is used to wash one's body or other objects.

SOAP TYPES:

There are numerous varieties of soaps on the market.

Soap classification according to uses :

1. Disposal soap
2. Soaps other than those for the toilet
3. Clear soap

Considering form :

1. Handcrafted soaps
2. Soap bars
3. Soaps in liquid form

According to the ingredients :

1. Lavender Soap
2. Edible Soap
3. Soap Animal
4. Exquisite Soap
5. Fragrances

Based on method of manufacture:

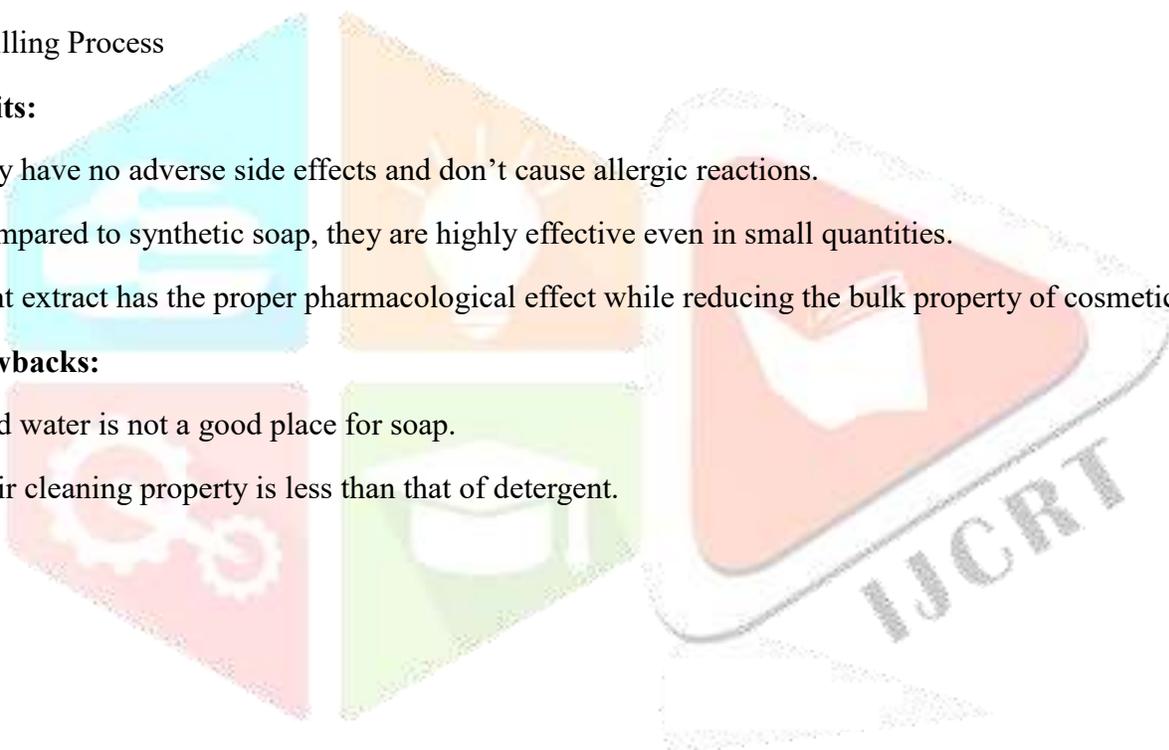
1. Pour and Melt Technique
2. The Cold Press
3. Hot Press Methods
4. Milling Process

Benefits:

1. They have no adverse side effects and don't cause allergic reactions.
2. Compared to synthetic soap, they are highly effective even in small quantities.
3. Plant extract has the proper pharmacological effect while reducing the bulk property of cosmetics.

• Drawbacks:

1. Hard water is not a good place for soap.
2. Their cleaning property is less than that of detergent.



Herbal soap:

Fig 2 : Herbal soap

Herbal soap helps to strengthen the immune response in the tissue of the affected skin area and has been used traditionally to treat a number of epidermal dysfunctions, including psoriasis, acne, and eczema.

Types of herbal soap according to their medicated use :

1. Anti-bacterial soap
2. Anti fungal soap
3. Antimicrobial soap
4. Antiviral soap.

Bacterial infection :

When pathogenic bacteria enter the body and grow, it can lead to bacterial infections and illness. The skin, respiratory tract, urinary tract, and gastrointestinal tract are just a few of the body parts that these infections can impact. Depending on the kind and location of the infection, bacterial infections can present with a variety of symptoms, such as fever, pain, inflammation, and unusual discharge. (27)



Fig 3 : Bacterial infection.

1 . Antibacterial :

Antibacterial soaps, also referred to as antiseptic or antimicrobial soaps, contain certain ingredients that are absent from regular soap. These substances are added in an effort to lessen or eliminate bacterial infection. Antibacterial agents are compounds that either stop bacteria from growing or eradicate them. They are frequently found in hand sanitizers, cleaning supplies, and some drugs that either treat or prevent bacterial infections. (28)

Fungal infection:

Fungi are the cause of fungal infections, also known as mycosis, which are skin conditions. There are a million different species of fungi. They are present in the earth, on vegetation, in everyday objects, and even on human skin. On rare occasions, they may result in skin issues like breakouts or rashes. Many fungal species can cause fungal infections. Infection can occasionally be caused by fungi that are unusual for being on or inside of your uncontrollably growing cells. Yeast infections are communicable. They could be transferred from one person to another. Among the most urgent dermatological problems in the world today are fungal skin infections. Based on studies, developing In both developed and developing countries, about 40 million people suffer from fungal infections.(29, 30)



Fig 4 : Fungal infection.

Antifungal:

Antifungal agents, also referred to as anti-mycotic drugs or fungistatics, are used to treat and prevent serious systemic infections like cryptococcal meningitis and athlete's foot as well as serious mycosis. Athlete's foot, psoriasis, eczema, and many other fungal illnesses are treated with topical antifungal soaps as a supportive measure. Herbal soap formulations are widely used in the treatment of fungal infections because of their all-natural ingredients, wide range of efficacy, and low number of side effects. Nowadays, there is a growing demand for these preparations. At the moment, people are more susceptible to fungal infections because of People can get rid of fungal infections and the discomfort they cause by using the suggested remedy. Antifungal soap has the benefit of treating infections with little adverse effects and at a reasonable cost (32).

Herbal soap:

Everyone is familiar with soap, a basic cleaning agent. Numerous characteristics have been applied to soap. (33). Because herbal soap preparations have antibacterial, anti-aging, anti-oxidant, and antiseptic properties, they are considered medicines. They frequently treat wounds, cure illnesses, and advance health using plant parts such as seeds, rhizomes, nuts, and pulps. Herbal soap is free of artificial colors, flavors, fluorides, and other additives when compared to the ingredients of commercial soap. Herbs are the most widely used natural products in the treatment of almost all diseases and skin disorders because of their great medicinal value, affordability, compatibility, and availability. Herbal soap preparations are medications or pharmaceuticals that are mainly used to treat wounds, cure illnesses, and advance health. These plant parts include leaves, stems, roots, and fruits. Herbal soap contains neem, tulsi, and other natural plant ingredients that together have antibacterial, antifungal, and anti-inflammatory qualities. The main component of this soap, neem, has medicinal properties. Neem leaf and extract contain immune-modulating, anti-inflammatory, anti-ulcer, anti-malarial, anti-fungal, antibacterial, antioxidant, and anticarcinogenic qualities. Tulsi has the highest therapeutic value. 34, 35

Ideal Characteristics Of Herbal Soap:

Herbal soaps, which are made from natural ingredients and plant extracts, offer a wide range of benefits for the general health and health of the skin. Herbal soaps are gentle and soft on the skin, which makes them ideal for those with sensitive skin. As herbal soaps don't contain harsh chemicals, artificial fragrances, or synthetic additives that could irritate skin, they provide a healthier option than traditional soaps.

Moisturizing: A lot of herbal soaps include natural oils like olive, coconut, shea, or cocoa butter that work to hydrate and moisturize the skin. These oils help to prevent skin from drying out by forming a protective barrier. It hydrates, softens, and smoothes the skin.

Calm and soothing: Herbal soaps frequently contain plants and botanical extracts that are well-known for their calming and sedative qualities. By lowering skin inflammation, redness, and irritation, ingredients like calendula, chamomile, and aloe vera can help treat conditions like eczema, psoriasis, and sunburn.

Cleaning and Detoxification: Using herbal soaps, the skin is thoroughly cleansed while its natural oils are preserved. Dirt, excess oil, and other impurities are removed. Certain plants, such as neem and tea tree, have antifungal and antibacterial properties that can help clear up skin (36, 37).

Aim and objectives:

Aim:

To create a polyherbal soap with strong antibacterial and antifungal qualities by utilizing the melt and pour method.

Objectives:

Picking Herbs: Look for and choose herbs like neem, turmeric, Tulsi, guava, mango, almond, and aloe vera (polyherbs) that are recognized for their antibacterial and antifungal qualities.

1. Formulation Development: Create a soap recipe that combines the selected herbal extracts with a melt-and-pour soap base to guarantee that the active ingredients are distributed efficiently.

2. Optimization of Concentration: To enhance the antibacterial and antifungal effectiveness of the soap without sacrificing its physical qualities, find the ideal concentration of each herb extract.

3. Preparation and Manufacturing: To ensure uniform quality and homogeneity in the finished product, prepare the polyherbal soap using the melt and pour method.

4. Quality Control: Assess the physical and chemical properties of the soap, such as pH, hardness, and lathering ability, to ensure it meets cosmetic standards.

5. Antibacterial and Antifungal Testing: Conduct in vitro tests to evaluate the antibacterial and antifungal activity of the soap against common pathogens like *Staphylococcus aureus*, *Escherichia coli*, and *Candida albicans*.

6. Stability Studies: Perform stability testing to ensure the soap maintains its efficacy and physical characteristics over time.

7. Safety and Toxicity Assessment: Evaluate the safety of the soap through dermatological testing to ensure it is non-irritating and safe for human use.

8. Comparative Analysis: Compare the efficacy of the polyherbal soap with commercial antibacterial and antifungal soaps to validate its effectiveness.

9. Documentation and Reporting: Document the formulation process, testing results, and findings to support potential commercialization and regulatory approval.

These objectives collectively aim to create a scientifically validated, effective, and safe polyherbal soap with significant antibacterial and antifungal properties using the melt and pour technique.

Plan of work:

Literature Review

Objective: To gather information on the antifungal and antibacterial properties of various herbs.

Activities:

Review scientific articles, books, and other relevant literature.

Identify effective antifungal and antibacterial herbs.

2. Selection of Herbs

Objective: To select herbs with known antifungal and antibacterial properties.

Activities:

List potential herbs (e.g., neem, turmeric, tea tree, aloe vera, lavender). Evaluate each herb's properties and synergy with others.

4. Procurement of Materials

Objective: To obtain all necessary materials for soap formulation.

Materials:

Herbs: Neem leaves, turmeric powder, tea tree oil, aloe vera gel, lavender oil, etc.

Soap Base: Glycerin melt and pour soap base.

Additives: Essential oils, colorants, preservatives (if needed).

Equipment: Double boiler, molds, mixing tools, measuring tools, thermometer.

5. Preparation of Herbal Extracts

Objective: To prepare extracts from selected herbs.

Methods:

Aqueous Extraction: Boil herbs in water and filter.

Ethanollic Extraction: Soak herbs in ethanol and filter.

6. Formulation of Soap

Objective: To create different formulations of the polyherbal soap.

7. Evaluation of Soap

Physical Evaluation:

Appearance: Color, texture, and uniformity.

pH: Measure the pH level of the soap to ensure it's skin-friendly.

Hardness: Assess the firmness of the soap.

Foaming Ability: Evaluate the lather produced by the soap.

Antibacterial and Antifungal Activity

Stability Testing:

8. Safety and Skin Irritation Testing

Objective: To ensure the soap is safe for use on the skin.

9. Data Analysis

Objective: To analyze the data collected from various tests.

Methods: Use statistical tools to evaluate the significance of the results. Compare the effectiveness of different formulations.

10. Documentation and Reporting

Objective: To document the entire process and results.

Activities: Compile all data, observations, and analysis.

Prepare a detailed report outlining the methodology, results, and conclusions.

11. Final Presentation

Objective: To present the findings of the project.

Activities: Create a presentation summarizing the project.

Discuss the effectiveness, safety, and potential marketability of the soap.

This plan ensures a systematic approach to developing and evaluating a polyherbal soap with antifungal and antibacterial properties using the melt and pour technique.

Literature review:

Sr. No	Journal	Author	Summary
1.	INDO AMERICAN JOURNAL OF PHARMACEUTICAL RESEARCH. ISSN NO: 2231-6876	G. Sai Manoj, D. Varaprada, K. Abesana Chanu, M. Ritheesh, K. Blessi Priyanka*	The poly herbal soap was formulated using melt-pour process technique possessing moderate anti-bacterial property. The further clinical studies of this formulation can evaluate the use of poly herbal soap. The most important thing that poly herbal soap possesses is that free from chemicals and more eminent than synthetic soaps. Thus, in this research work, the prepared poly herbal soap possesses anti-bacterial properties that can be used as beauty regime which the exhibit satisfactory effect.
2.	INTERNATIONAL JOURNAL OF PHARMACY PHARMACEUTICAL RESEARCH . ISSN NO : 2349-7203	L.Gopi*, S.Sandhiya, V.Ramya, S.Sandhiya, B.Rohini, R.Reshma	The present work involves the formulation of herbal soap by using different oil base. Literatures regarding, herbal soap form preparation, excipients selection, manufacturing method, etc., has been collected and reviewed.
3.	INTERNATIONAL JOURNAL OF RESEARCH PUBLICATION AND REVIEWS.	Mr. Shaikh Awais Danish Mazhar Jamal , Miss. Gayatri Anil Patil , Miss. Gayatri Punjaram	In this review we concluded that antifungal soaps form herbal origin are prepared and hence we can conclude that the

	Journal homepage: www.ijrpr.com ISSN 2582-7421	Mahale , Mr. Chetan Motilal Chaudhari , Dr. Swapnil Dilip Deo , Dr. Gajanan Tulsiram Daffal.	neem, aloe vera, turmeric and tulsi can be combined to make soap that has antifungal properties that can be used on a variety of skin conditions as well as in daily life for healthy skin.
4.	INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT) ISSN NO : 2320- 2882	Sohil Bendre , Milind Buradkar, Twinkle Baisware , Manjiri Bharasakare , Ashwini Armarkar.	Polyherbal soap have less side effects as compared to marketed soap because the phytochemicals present in the plants strengthen, nourish, and moisturise the skin, making the herbal soaps significantly superior in antibacterial properties.
5.	EUROPEAN JOURNAL OF MOLECULAR AND CLINICAL MEDICINES. ISSN NO : 2515- 8260	Vibhavari M. Chatur , Anuj N. Nahata, Prachi S. Pipada , Aniket K. Pacharne, Shubham Patil, Nazma M. Ansari, Sanjay G. Walode ,Shashikant N. Dhole	The purpose to develop and evaluate a novel drug delivery system in the form of Antifungal Herbal Antibacterial soap was achieved. The formulation was designed for the use of patients of all ages and sex.

Material and methods:

Material:

Turmeric Powder, Neem leaves, Aloe Vera Gel, Tulsi, Banana leaves , Guava leaves, Mango leaf, Almond Leaves, were collected from various areas and localities in Maharashtra . We have to use Goat milk & Glycerine soap base, etc.

1.Neem:

-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, Quercusertin are present in Neem Leaf.

- Synonym : Neem, Margose, Nimtree
- Biological Source: It consists of the fresh or dried leaves and seed oil of *Azadirachta indica* J.
- Family: Meliaceae.



Fig 5 : Neem leaves.

➤ **Chemical constituents:**

Azadirachtin is the primary active component, followed by salannin, quercetin, sodium nimbinat, nimbolinin, nimbin, nimbidin, and nimbidol. Leaves contain the following compounds in addition to ascorbic acid, n-hexacosanol, 6-desacetyl-7-benzoylazadiradione, 17-hydroxyazadiradione, and nimbiol: nimbin, nimbanene, 6-desacetylnimbinene, nimbandiol, nimbolide, and nimbandiol. Fresh neem leaves were used to extract the polyphenolic flavonoids quercetin and β -Sitosterol, which are known to have antibacterial and antifungal properties 38, 39.

Medicinal uses:

Antifungal activity: a condition associated with fungi Since the beginning of time, people have held the belief that neem is beneficial in combating certain fungi that infect humans. It has been discovered that a number of significant fungi are resistant to neem treatments. These include fungi that grow in the lungs, bronchi, and

mucous membranes; ringworm, which attacks the skin and nails; and athlete's foot fungus, which affects the skin, nails, and feet. Extracts from neem leaves and oil seeds work well against a range of fungi, such as Trichosporon, Candida, Microsporon, and Epidermophyton. Antibacterial, antiviral, and antioxidant activity (40,41,42).

2. Aloe Vera :

- Synonym: Chinese Aloe, Cape Aloe
- Biological Source: It obtained from the dried juice of the leavers of Aloe barbadensis miller.
- Family: Liliaceae



Fig 6 ; Aloe Vera .

➤ Chemical constituents:

Aloe Vera contains over 75 potentially active substances, such as vitamins, enzymes, minerals, carbohydrates, lignin, saponins, salicylic acids, and amino acids. The most important constituent of Aloes are three isomers of Aloins, Barbaloin, , which constitute the so – called 'crystalline' (43,44).

➤ Medicinal Uses:

Antifungal activity: Aloe barbadensis miller, also known as aloe vera, has been utilized for therapeutic purposes since ancient times, and it is known that one of its medical features is antifungal activity. Aloe Vera exhibits powerful antifungal action against certain pathogenic fungi. In comparison to other extracts, the

alcohol-based aloe vera extract can produce greater outcomes. Impacts of gamma and UV radiation on skin exposure, Immunity-related Effects, Reduction of inflammation Effects of laxatives, Antiseptic effect, Antitumor activity.(45,46,47).

3. Turmeric:

- Synonyms: Haldi, Curcuma
- Biological source: It consist of dried, as well as fresh rhizomes of plant *Curcuma longa* linn.
- Family: Zinziberaceae.



Fig 7 : Turmeric powder.

➤ Chemical constituents:

Known collectively as curcuminoids (3-6%), curcumin, demethoxycurcumin, and bisdemethoxycurcumin are the primary polyphenolic components found in turmeric rhizomes. The main coloring agent found in the turmeric rhizome was discovered and given the name “Curcumin” in the 19th century. 7-bis (4-hydroxy-3-methoxyphenyl)-1-hydroxy-1-(6E)Another phenolic compound present in the rhizome of turmeric is -6-heptene-3,5-dione. Turmeric’s volatile oil (4-6%) is pale yellow to orange-yellow in color and contains several mono and sesquiterpenes (.48,49,50).

➤ Medicinal Uses:

Curcuma longa has antifungal activity against a particular type of fungal infection. It is applied externally to wounds brought on by ringworm, athletes' foot, small cuts, and other illnesses.⁵¹ Turmeric has potent anti-inflammatory and antibacterial qualities. After combining the mixture with a small amount of water, apply it to the affected area. Use in a mixture with warm water or as a tea to benefit the environment inside the body. This is one of the most straightforward natural remedies for a fungal infection. ⁵². Boost digestive system The ability to neutralize antitumor effect hyperlipidemia.

3. Tulsi:

➤ Synonyms: Holy basil, Gauri

➤ Biological source: It consists of the fresh and dried leaves of *Ocimum sanctum* L.

➤ Family: Labiatae



Fig 8 : Tulsi leaves.

➤ Chemical constituents:

Eugenol, carvacrol, estragole, linalol, caryophyllene, ursolic acid, rosmarinic acid, and oleanolic acid are the main chemical constituents of tulsi. For many years, these substances have been utilized in dental procedures, food products, cosmetics, and other oral hygiene products. Which contains about 20% methyl eugenol and 71% eugenol. Fresh leaves and stem extract from *Ocimum sanctum* were produced. Considerable concentrations of the antioxidants phenolic compounds circimaritin, circilineol, and *Ocimum sanctum* leaves have 0.7% volatile oil in them. Eugene's isothymusin and rosameric acid. (53,54).

➤ Medicinal Uses:

Antifungal activity: *Ocimum sanctum* contains antifungal properties, and the extracts from the leaves may be helpful for treating dermatophytic infections. Tulsi exhibit antifungal action against the certain pathogenic fungus. The ancient medical practices of Ayurveda, Greek, Roman, Siddha, and Unani all Make extensive use of tulsi leaves. The herb tulsi has also been used to treat respiratory conditions. Tulsi leaves are frequently used to make Ayurvedic Medicine, which is used to treat a variety of illnesses and ailments. It is quite helpful for chronic fever . 55,56.. The whole plant used has; Hypotension, Antiperiodic activity, Antibacterial properties, Expectorant properties .(57).

4. Banana leaf:

Synonyms: Plantain leaf, Musa leaf

Biological source: Banana leaves come from the banana plant, scientifically known as *Musa spp.*

Family: Musaceae family

Chemical constituents:

Polyphenols: Due to their antioxidant qualities, these substances aid in defending the skin against oxidative stress and damage. Tannins: Due to their astringent qualities, tannins can help tone and tighten the skin, which helps to hide pores. Flavonoids: Flavonoids can help calm and shield the skin because of their anti-inflammatory and antioxidant properties. Lignin: Lignin enhances the elasticity and texture of the skin. Vitamins: Vitamins A, C, and E found in banana leaves are important for maintaining healthy skin and can aid in the production of collagen and skin repair. Approximately 60% of the phytonutrients in banana leaves are medicinal nutrients. Three percent of the total contains carbohydrates (5%), fiber (72%), lignin (5–10%), hemicellulose (6–19%), pectin (3–5%), tannins (0.11%), cellulose (60–65%), selenium (24.9%), potassium (11.6%), calcium (<8.0%), and magnesium. 1.1 % ,Phosphorus 0.7 % . (58).



Fig 9 : Banana leaves.

Medicinal use :

It might mend injuries.

It might treat ulcers. It might possess anti-tumor properties.

It might improve digestion.

It might possess anti-diarrheal properties.

It might have antioxidant properties.

It might possess antifungal and antibacterial properties.(59)

Our skin is delicate, and prolonged sun exposure may have a negative impact on it. Skin tanning and redness may result from it.

5. Almond leaf:

Common name: Indian Almond;

Botanical name: Terminalia catappa

Family : Combretaceae;

Name in Tamil : Nattuvadumai, Vadumai

Chemical constituents:

Almond leaves are composed of flavonoids, tannins, phenolic acids, and cyanogenic glycosides, among other chemical components. These substances may have antibacterial, anti-inflammatory, and antioxidant effects in addition to contributing to the plant's therapeutic qualities. (60).



Fig 10 : Almond leaves .

Medicinal uses :

Anti-inflammatory properties: Compounds found in almond leaves may help reduce inflammation, making them useful for conditions such as arthritis and inflammatory skin conditions.

Antimicrobial activity: Almond leaves contain compounds that exhibit antimicrobial properties, which can help in fighting infections caused by bacteria, fungi, and viruses.

Antioxidant effects: The presence of flavonoids and phenolic compounds in almond leaves contributes to their antioxidant properties, which help neutralize free radicals and protect cells from oxidative damage.

Wound healing: Almond leaves have been used topically to promote wound healing and soothe irritated skin due to their anti-inflammatory and antimicrobial properties. (61)

6. Guava leaf:

Synonyms: Guava leaf is commonly referred to as Psidium leaf.

Biological source: Guava leaves come from the guava tree, scientifically known as *Psidium guajava*.

Family: Guava belongs to the Myrtaceae family.



Fig 11 : Guava leaves.

Chemical constituents:

Guava leaves contain various chemical constituents, including flavonoids (such as quercetin, kaempferol, and rutin), tannins, phenols, triterpenoids, essential oils, and vitamins (such as vitamin C and vitamin E). These constituents contribute to the medicinal properties of guava leaves, including their antioxidant, antimicrobial, anti-inflammatory, and wound-healing effects.

Medicinal uses:

Antifungal properties have also been studied by Padrón-Márquez et al. (62).

The acetone and methanol extracts displayed relevant activity against dermatophytic fungi, and thus could be considered as new agents against skin disease. Furthermore, phenols from the leaves were tested on human-skin fibroblast cells and showed antifungal properties (63).

7.Mango leaf:

Synonyms: Mango leaf is commonly referred to as *Mangifera indica* leaf.

Biological source: Mango leaves come from the mango tree, scientifically known as *Mangifera indica*.

Family: Mango belongs to the Anacardiaceae family.



Fig 12 : Mango leaves.

Chemical constituents:

Mango leaves contain various chemical constituents, including flavonoids (such as quercetin, isoquercetin, and kaempferol), tannins, phenolic acids, mangiferin, and essential oils. These constituents contribute to the medicinal properties of mango leaves, including their antioxidant, antimicrobial, anti-inflammatory, and wound-healing effects.(64).

Medicinal uses:

Antioxidant properties: Compounds like flavonoids and mangiferin in mango leaves possess antioxidant properties, helping to protect the skin from oxidative stress and premature aging caused by free radicals.

Antimicrobial effects: Mango leaf extracts have antimicrobial properties, which can help cleanse the skin and inhibit the growth of harmful bacteria and fungi, reducing the risk of skin infections.(65,66).

Anti-inflammatory effects: The presence of phenolic acids and flavonoids in mango leaves contributes to their anti-inflammatory properties, helping to soothe and calm irritated or inflamed skin conditions like acne or eczema.

Skin rejuvenation: Mango leaf extracts may promote skin regeneration and repair, contributing to a healthier and more youthful appearance.(67).

DISTILLED WATER :

To dissolve the lye, as tap water contain minerals which can affect the quality of your soap. The iron In tap water can encourage the oils In your soap to become rancid and create DOS (dreaded orange Spots).



Fig 12 : Distilled water .

Glycerine soap base :

Glycerin is a humectant, meaning it attracts moisture. When applied to the skin through cosmetics, Glycerin can cause a barrier on the skin that locks in existing moisture from washing, as well as drawing moisture from the atmosphere.

Goat milk soap base:

Moisturizing properties : Goat milk's fatty acid and cholesterol content contribute to its moisturizing qualities by nourishing and hydrating the skin. Those with sensitive or dry skin will benefit most from it.

Exfoliation: Lactic acid, a mild exfoliant that aids in the removal of dead skin cells and encourages the development of new, healthy skin cells, is one of its ingredients. Skin that is brighter and smoother may arise from this.

Anti-Inflammatory: The milk's anti-inflammatory qualities can aid in relieving skin irritation. Because of this, it helps with psoriasis, eczema, and other inflammatory skin conditions.

Rich in Minerals and Vitamins: Zinc and selenium, along with vitamins A, C, and D, are found in goat milk and are vital for keeping skin healthy. Vitamin A aids in the preservation and repair of skin, and selenium offers benefits in preventing sun damage.

Anti-Aging Benefits: Goat milk's antioxidants, which include vitamins A and C, fight free radicals and lessen the appearance of fine lines and wrinkles while also improving the texture of the skin as a whole.

Gentle on Skin: The natural balance of the skin is preserved by goat milk's pH level, which is comparable to that of human skin. Because of this, it is less irritating and appropriate for skin types with sensitivity. Using goat milk in skincare products, such as lotions, creams, or soaps, can offer these numerous advantages and promote healthier skin. (68)

PERFUME:

In addition to masking offensive odors and hiding the scent from the combination of other chemicals.

Benefits of aromatherapy with orange oil: Orange oil aromas can improve mood by lowering stress and fostering a sense of wellbeing.

Pleasant Experience: Using skincare products is enhanced by the zesty and refreshing scent, which adds to the overall sensory experience and makes daily routines more enjoyable.

Equipment:

Double boiler, molds, mixing tools, measuring tools, thermometer, stirrer, Beaker, weighing balance, spatula, Burner ,etc.

FORMULATION TABLE OF POLYHERBAL SOAP :

Sr . No	Ingredients	Quantity	Uses
1.	Neem powder	1.5gm	Antibacterial
2.	Almond leaves powder	1.5gm	Antibacterial, antifungal
3.	Banana leaves powder	1.5gm	Antifungal, antiacne, anti-inflammatory
4.	Guava leaves powder	1.5gm	Antibacterial
5.	Mango leaves powder	1gm	Antibacterial
6.	Tulsi leaves powder	2gm	Antibacterial, antifungal
7.	Aloe Vera gel	1gm	Moisturizer
8.	Turmeric powder	1gm	Colouring agent, anti-inflammatory, antioxidant
9.	Glycerine base	50gm	Moisturizer, soap base
10.	Goat milk base	50gm	Moisturizer , soap base
11.	Fragrance	q.s	Perfume
12.	Distilled water	q.s	Extraction
13.	Ethanol	q.s	Extraction

Formulation batches:

Sr No	Formulation	Weight of soap
1.	F1	10g.
2.	F2	50g
3.	F3	100g

METHOD OF COLLECTION OF CRUED DRUG EXTRACT:

Extraction procedure:

Weigh all the powder ingredients which quantities are mentioned in the table, except turmeric and almond powder.

Extraction: 1

Now to take Neem and Tulsi powder in a beaker then it add sufficient quantity of water and boil it at 50°C for 20mins.

Then cool it and filter through filter paper.

Extraction: 2

Now We have to take remaining all powder in a beaker then it add sufficient quantity of ethanol and boil it at 50°C for 15 – 20 mins.

Then cool it and filter through filter paper.

PROCEDURE:

Process of Formulation : Melt and pour method: Beginning with the melt and pour method is one of the simplest ways to get started in the soap-making hobby. (69) You can experiment with add-ins, fragrance, color, and appealing soap molds using a pre-purchased soap base. Other kids can use it as long as an adult is watching.

1. Chop up 50g of Glycerine soap base into chunks and add it in beaker and boil it. Alternatively you can melt the Soap base in the top of a double boiler. Check the temperature after some time. The temperature at rise up to 60°C then add the 50g of chopped goat milk soap base in the melted glycerine base. Continuous stir it and observe both bases are melted completely. Watch the soap base Carefully to avoid overheating it. (The glycerine base melt at 120°C and goat milk base melt at 54- 60°C.)

2. When the soap is melted, gently stir in a few drops of Color and fragrance, Aloe Vera gel and add above extract of polyherbal of About 10ml and mix gently.

3. Pour the soap into the molds and place them on a level Surface. Allow the soap to cool completely, which usually takes At least an hour.

4. When the soap is cool, pop it out of the Molds and it is ready to use. (70)



Fig 13 : Polyherbal soap.

Evaluation parameters of soap:

The prepared formulation's quality was evaluated using the following physical-chemical parameters in comparison to commercial herbal soap.

Physical characteristics: The prepared soap was placed on a white background so that the color and clarity could be seen with the unaided eye. One smelled the soap's order.

Foam test: The 5 ml of soap solution is taken in the test tube and shaken well. Then, the result is observed with naked eyes.

Foam Height: 0.5 grams of sample of soap was taken dispersed in 25 ml distilled water. Then, transferred it in to 100ml measuring cylinder; volume was make up to 50 ml with water. 25 strokes were given and stand till aqueous volume measured up to 50 ml and measured the foam height, above the aqueous volume was measured. (71)

Foam retention: A measuring cylinder is filled with 5 mL of soap solution, which is measured and it is shaken briskly. Foam started to show up. Throughout a 10-minute period, the volume of foam was measured at 1-min intervals.

Primary skin irritation test: For this three volunteers were selected and the prepared soap were given to them and checked for irritation. (72)

pH:

A digital pH meter was used to measure the soap's pH after it was prepared. Following two hours, the prepared formulation was dissolved in 100 milliliters of distilled water. The solution's pH was measured using a pH meter that had previously been calibrated. (73)

% free Alkali content:

150 ml of distilled water was then added to the beaker containing 10g of dried soap. The soap was heated at reflux for 30 to 40 minutes on a water bath in order to dissolve it. This mixture was allowed to cool before being moved, along with the washings, to a 250 ml conical flask. Distilled water was then added to the flask. Ten milliliters of the soap solution in the titration flask were mixed with two drops of the phenolphthalein indicator. After that, the solution was titrated against 0.1M HCl until it lost its color.

Moisture content:

A sample of soap weighing 10g was weighed right away and noted as "wet weight of the sample." Using the appropriate drying equipment, This wet sample was dried to a constant weight at a temperature not to exceed 115 °C. After cooling, the sample was weighed once more to determine its "dry weight." The following equation was used to calculate the sample's moisture content.

$$\% \text{Weight} = \frac{A-B}{B} \times 100$$

Where; %Weight = % of moisture in sample, A = weight of wet Sample (gm), B = weight of dry sample (gm). Alcohol insoluble matter 50 ml of warm ethanol was introduced to a conical flask containing a 5 gm sample of soap in order to dissolve it. Using tarred filter paper And 20 ml of warm ethanol, the liquid was filtered and then dried at 1050 C for an hour. The weighted filter paper had dried out.

Determination of TFM (total fatty matter):

The process for analyzing the total amount of fatty matter in the soap sample involves reacting the soap with an acid while hot water is added. During this process, 150 milliliters of distilled water were used to dissolve about 10 grams of the soap sample. It was heated until it dissolved. After that, 20% sulfuric acid was added to the soap solution, and it was heated until the solution became clear. Fatty acids were visible on the film's surface, which was subsequently heated once more and solidified with the addition of 7 g of beeswax. There is cake formation, which is then taken out and weighed.

$$\% \text{ Total Fatty Matter} = (A - X) / W \times 100$$

Where, X= weight of wax

A= weight of wax+ oil

W= weight of soap

Antimicrobial activity:

Microbial study has been done using microorganisms such as *c. albicans*. For measuring the effectiveness of an antimicrobial agent against fungi/bacteria grown in culture, the microorganism of interest was swabbed uniformly across a culture plate. Then a soap solution was poured on the surface of the agar. Then the plates were placed in incubator for 24 hrs at 30 °C. The drug diffuses out from the soap into the agar. The concentration of the compound will be higher near the solution.(74)

Anti-Fungal Activity :

The formulated herbal soap were inoculated on the plates of agar diffusion method and a Control Amphotericin-B was prepared by herbal soap. The plates were placed in to the Incubator and are incubated at 37 °C for 24 hours. After the incubation period, plates were Taken out and check the microbial growth by comparing it with the control.

Weight Variation: Collected 3 soap's and calculate the individual weight then finally calculated the average weight of herbal soap's.

Solubility:

2gm of soap added 10ml of solvents and shake it 2 min view the solubility result.

Result:

Sr . No	Evaluation parameters	F1	F2	F3
1.	Colour	Yellowish	Yellowish	Yellowish brown
2.	Odour	Characteristics orange like odour	Characteristics orange like odour	Characteristics orange like odour
3.	Texture	Soft	Soft	Soft
4.	Clarity	Good	Good	Good
5.	PH	7.34	7.41	7.3
6.	Solubility	Good	Good	Good
7.	Sensitivity	No inflammation & rashes	No inflammation & rashes	No inflammation & rashes
8.	Irritation	No	No	No
9.	Foam	Good	Good	Good
10.	Foam height	25cm	24cm	26cm
11.	Foam retention	8min	8min	8min
12.	Moisture content	2.96%	2.88%	3.25%
13.	TFM	80%	80%	85%
14.	% free alkali	0.31%	030%	0.31%

In-Vitro Antimicrobial Activity by Agar Plate Diffusion

Method:

Sr . No	Organisms	Zone of inhibition
1.	Staphylococcus aureus	20
2.	E coli	25
3.	Aspergillus Niger	23

Antimicrobial screening of prepared formulation.

Conclusion :

The primary objective of creating and assessing antifungal and antibacterial polyherbal soap through the use of the melt and pour technique was accomplished, as the outcomes demonstrated the soap's ability to successfully treat or prevent topical bacterial and fungal infections. It is affordable, practical, and produced good foam on the affected part. Melt and pour is the most significant and novel technique used in that study. In doing so, premade soap bases are employed. Using this method to make antibacterial and antifungal soap at home is very simple. The composition of the polyherbs soap was created to address any kind of skin condition or disease. All ages and genders can use this soap on a daily basis. There are no dangerous chemicals in it. Our team's preparation of the antibacterial, and antifungal polyherbal soap with balanced pH was a wonderful learning experience and a major accomplishment. Additionally, a variety of physical and chemical tests were conducted on the prepared soap to assess its performance in terms of pH, appearance, color, odor, antifungal activity, moisture content, TFM, foam formation, solubility, skin irritation, and stability.

References :

1. Rohan R. Vakhariya*, Swati Talokar, Archana R. Dhole, Dr. S.K. Mohite, Dr. C.S. Magdum, Comparative Standardization Study of Two Marketed Shatavari Churna Formulation, Asian Journal of Pharmaceutical Analysis, 2016, 6 (1), 1-6.
2. Tortora g. J, grabowski s. R., 2003, principles of anatomy and physiology 10th edition published by john wiley and Sons, 140-143.
3. Pravin v. Gomase* , mo. Javed ahamad, mohd danish salahuddin, deshmukh n. I, khan g. J., 2019, development And evaluation of antibacterial polyherbal soap, international journal of pharmacy and pharmaceutical research ,15(3), 231-239.
4. Ge Y, Difuntorum S, Touami S, Critchley I, Burli R, Jiang V, Drazan K, Moser H (2002). In vitro antimicrobial activity of GSQ1530, a new Heteroaromatic polycyclic compound. Antimicrob. Agents. Chemotherap. 46: 3168-3174.
5. Farnsworth NR, Akerele O, Bingel AS (1985). Medicinal plants in Therapy. Bull. WHO, 63: 965-981.

6. Akinyemi KO, Oladapo O, Okwara CE, Ibe CC, Fasure KA (2005). Screening of crude extracts of six medicinal plants used in South-West Nigerian unorthodox medicine for anti-methicillin resistant *Staphylococcus aureus* activity. *BMC Comp. Alt. Med.* 5: 6-13.
7. Kolarsick PAJ, Kolarsick MA, Goodwin C. Anatomy and Physiology of the skin. *J Dermatol Nurs Assoc.* 2011;3(4):203-13. Doi: 10.1097/JDN.0b013e3182274a98.
8. Solanki R. Treatment of skin diseases through medicinal plants In different regions of the world. *Int J Res.* 2011;2(1):73. Doi: 10.7439/ijbr.v2i1.82.
9. Saikia AP, Ryakala VK, Sharma P, Goswami P, Bora U. Ethnobotany of medicinal plants used by Assamese people for Various skin ailments and cosmetics. *J Ethnopharmacol.* 2006;106(2):149-57. Doi: 10.1016/j.jep.2005.11.033, PMID 16473486.
10. Kareru PG, Keriko JM, Kenji GM, Thiong'o GT, Gachanja AN, Mukiira HN. Antimicrobial activities of skincare preparations From plant extracts. *Afr J Tradit Complement Altern Med.* 2010;7(3):214-8. Doi: 10.4314/ajtcam.v7i3.54777, PMID 21461148.
11. Ge Y, Difuntorum S, Touami S, Critchley I, Burli R, Jiang V, Drazan K, Moser H (2002). In vitro antimicrobial damaging effect.
- 12.1. Grace X. F, Sowmya K. V, Darsika C, Polyherbal Hand Sanitizer Formulation and Evaluation, *Indian Journal of Pharmacy and Pharmacology*, 2015,2(2): 143-144.
13. Tortora GA Grabowski S Principles of Anatomy and Physiology 10th edition, published by John Wiley and Sons, 2003, 140-143.
14. Sunhyo R, Peter I. 5, Chang H. S, Hyeonsook C, Yoonkyung P, Colonization and infection of the Skin by *S. aureus* immune System Evasion and the Response Cationic Antimicrobial Peptides, *International Journal of Molecular Science*, 2014;15(5): 8753- 8772
15. Kapoor, V. P. (2005), Herbal cosmetics for skin and hair care.4(4). 306-315.
16. Glazer DA, Anti-aging products and cosmeceuticals. *Facial Plastic Surgery Clinics of North America*, 2004;12(4):363-372, DOI:10.1016/j.fsc.2004.03.004 PMID: 15261173.
17. Ko, Adulterants in Asian Patent Medicines, *The New England Journal of Medicine*, 1998;339:847. DOI: 10.1056/NEJM199809173391214.
18. Kumar Sumit, Swarankar Vivek, Sharma Sujata, Baldi Ashish, Herbal Cosmetics: Used for Skin and Hair Cosmeceuticals, *Inventi Journal*, 2012;4:306-314. ISSN 0976-3864.
19. Laxmi S Joshi and Harshal Ashok Pawar, Herbal Cosmetics and Cosmeceuticals: An Overview, *El Mednifico Journal*, 2015;3(1):1-8. DOI: 10.18035/emj.v3i1.261.
20. <http://www.soapqueen.com/bath-and-body-tutorials/melt-and-pour-soap/free-beginners-guide-to-soapmaking-melt-and-pour/>
21. Kanitakis, J. (2002). Anatomy, histology and immunohistochemistry Of normal human skin. *European Journal of Dermatology*, 12(4), 390–401.
22. Choudhari S, Sutar M, Chavan M, Formulation, Evaluation and Antibacterial Efficiency of herbal hand wash, *Indo American Journal of Pharmaceutical Research* 2016; 6(04): 5202-2503.
23. Mayo Clinic. Slide show: Common skin rashes [Internet]. 2019 Sep 28 Available at: <https://www.mayoclinic.org/skin-rash/sls-20077087?s=1>.
24. Mayo Clinic. Dry Skin [Internet]. 2019 Aug 20 [cited 2020 Feb 19]. Available at: <https://www.mayoclinic.org/diseases-conditions/dry-skin/symptoms-causes/syc-20353885>.

25. MedlinePlus. Oily Skin [Internet]. [Cited 2020 Feb 19]. Available at: <https://medlineplus.gov/ency/article/002043.htm>.
26. Berardesca, E., Farage, M., Maibach, H. Sensitive skin: An overview. Vol. 35, International Journal of Cosmetic Science. Int J Cosmet Sci; 2012. P. 2–8.
27. Jaiarj P, Khoohaswan P, Wongkrajang Y, et al. Anticough and antimicrobial activities of *Psidium guajava* Linn. Leaf extract. Journal of Ethnopharmacology. 1999;67(2):203–212. [PubMed] [Google Scholar]
28. Nascimento GGF, Locatelli J, Freitas PC, Silva GL. Antibacterial activity of plant extracts and phytochemicals on antibiotic-resistant bacteria. Brazilian Journal of Microbiology. 2000;31(4):247–256. [Google Scholar]
29. Moghadamtousi S. Z, Kadir H. A, Hassandarvish P, Tajik H, Abubakar S, Zandi K, A Review on Antibacterial, Antiviral and Antifungal Activity of Curcumin, BioMed Research International, 2014: 02.
30. Stevens, J. (2001). Fungal skin infections. School of Medicine, University of New Mexico.
31. White, S. (2006). Fungal skin infections. Davis, USA: University of California.
32. Panda, H. (2011). Herbal soaps and detergents handbook. NIIR Project Consultancy Services.
33. Kapoor.V.P., Herbal Cosmetics for Skin and Hair Care, Natural Product Radiance, p 306-314.
34. Sankholkar.D.S, Current Regulations and Suggested Way Forward, The Pharma Times, Vol.41, No.8,2009.
35. Adaku, U. and Melody, M. (2013) Soap Production Using Waste Materials of Cassava Peel and Plantain Peel Ash as an Alternative Active Ingredient, Implication for Entrepreneurship, IOSR Journal of VLSI and Signal Processing,3(3): 2319 – 4197.
36. Kareru, P. G., Keriko, J. M., Kenji, G. M., Thiong'o, G. T., Gachanja, A. N., and Mukiira, H. N. (2010). Antimicrobial activities of skincare Preparations from plant extracts. African Journal of Traditional, Complementary and Alternative Medicines, 7(3).
37. Bandyopadhyay, U., Biswas, K., Sengupta, A., Moitra, P., Dutta, P., Sarkar, D, and Banerjee, R. K. (2004). Clinical studies on the effect of Neem (*Azadirachta indica*) bark extract on gastric secretion and gastroduodenal ulcer. Life Sciences, 75(24), 2867-2878.
38. Amrita Majumdar¹, Bhavay Thakkar², Shobhit Saxena³, Pradeep Dwivedi^{4*} and Vijaya Tripathi⁵ Acta Scientific Nutritional Health (ISSN:2582-1423).
39. Mr. Pramod B Chikkodi , Mr. Mahesh H Mohite , Miss. Vaishnavi S. Jadhav Dr. Amol Patil , Dr. R G Patrakar Herbal Antifungal Soap International Journal of Advanced Research in Science, Communication and Technology (IJARSCT) Volume 3, Issue 1, June 2023.
40. Sadekar RD, Kolte AY, Barmase BS, Desai VF, Immunopotentiating effects of *Azadirachta indica* (Neem) dry leaves powder in broilers, naturally infected with IBD virus. Indian J. Exp. Biol., 1998, 36, 1151–1153p.
41. Reddy, I.V.Srinivasa & Palagani, Neelima. (2022). Neem (*Azadirachta indica*): A Review on Medicinal Kalpavriksha. International Journal of economic Plants. 9.10.23910/2/2021.0437d. Isman, M. B., Koul, Luczynski A. and J. Kaminski.(1990). Insecticidal and antifeedant bioactivities of neem oils and their relationship to azadirachtin content. Journal of Agricultural Food Chemistry.38:1406-1411.
42. Mirza JI, Hameed S, Ahmad I, Ayub N. and Strang R. H.C. In vitro antifungal activity of neem products against *Phytophthora infestans*. Pakistan Journal of Biological Sciences 2000, 3(5), 824- 828.
43. Ruckmani K, Krishnamoorthy R, Samuel S, Kumari H. L. J, Formulation of Herbal Bath Soap from *Vitex negundo* Leaf Extract, Journal of chemical and pharmaceutical sciences, 2014; (2): 95.
44. Surjushe, Amar et al. “Aloe vera: a short review.” Indian journal of dermatology vol. 53,4 (2008): 163-6. Doi:10.4103/0019-5154.44785.

45. Surjushe, Amar et al. "Aloe vera: a short review." *Indian journal of dermatology* vol. 53,4 (2008): 163-6. Doi:10.4103/0019-5154.44785.
46. Basmatekar G, Jais N, Daud F. Aloevera: A valuable multifunctional cosmetic ingredient, *International Journal of Medicinal and aromatic plants*, 2011;1:338- 341.
47. Saikia A.P., Ryakala V.K., Sharma P., Goswami P., Bora U., (2006). Ethnobotany of medicinal plants used by Assamese people for various skin Ailments and cosmetics. *Journal of Ethnopharmacology*.106(2): 149-157.
48. Ainie K, Hamirin K, Peang-Kean L, Assessment of the Physicochemical Properties of Selected Commercial Soaps Manufactured and Sold in Kenya *J. Am. Oil Chem. Soc.*, 1996, 73,105-108p.
49. Moghadamtousi S. Z, Kadir H. A, Hassandarvish P, Tajik H, Abubakar S, Zandi K, A Review on Antibacterial, Antiviral and Antifungal Activity Of Curcumin, *BioMed Research International*, 2014: 02.
50. Padalia RC, Verma RS, Velusamy S, Chauhan A, Chanotiya CS, Yadav A. Volatile terpenoid compositions of leaf and rhizome of *Curcuma amada* Roxb. From Northern India. *J Essential Oil Res* 2013;25:17-22.
51. Randeep G, Vandna K, Amandeep S. Phytochemical investigation and evaluation of anthelmintic activity of *Curcuma amada* and *Curcuma caesia*-A comparative study. *J Ethnopharmacol* 2011;2:1-4.
52. Moghadamtousi S. Z, Kadir H. A, Hassandarvish P, Tajik H, Abubakar S, Zandi K, A Review on Antibacterial, Antiviral and Antifungal Activity Of Curcumin, *BioMed Research International*, 2014: 02.
53. Solanki R. Treatment of skin diseases through medicinal plants in different regions of the world. *Int J Biomed Res* 2011;2:73-88.
54. Kumar, K. P., Bhowmik, D., Tripathi, K. K., and Chandira, M. (2010). Traditional Indian Herbal Plants Tulsi and Its Medicinal Importance. *Research Journal of Pharmacognosy and Phytochemistry*, 2(2), 93-101.
55. Mojtab Didehdar, Zahra Chegini, Aref Shariati, Eugenol: A novel therapeutic agent for the inhibition of *Candida* species infection.
56. Gediya SK, Mistry RB, Patel UK, Blessy M, Jain HN. Herbal plants: used as cosmetics, *Journal of Natural Product and Plant Resources*, 2011;1:24-32.
57. Basra MK, Shahrukh M. Burden of skin disease. *Expert Rev Pharmacoecon Outcomes Res* 2009;9:271-83.
58. Wasule D, Kawale A, Pandey D. Determination of Banana Leaf Extract for Sunscreen Property. *Intern J for Res Tre and Innov.* 2018;3(12):80. Available from: <https://www.ijrti.org/papers/IJRTI1812014.pdf>.
59. Kumer Saha, Acharyaa S, Sohikul S, Shovon H, Royb P, Saha R. Medicinal activities of the leaves of *Musa sapientum* var. *sylvestris* in vitro *Asian Pacific Journal of Tropical Biomedicine*. *Asian Pac J Trop Biomed*. 2013;3(6):476–82. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3644576/pdf/apjtb-03-06-476.pdf>
60. Anand A. V., Divya N., Kotti P. P. (2015). An updated review of *Terminalia catappa*. *Pharmacogn. Rev.* 9, 93–98. 10.4103/0973-7847.162103 [PMC free article] [PubMed] [CrossRef] [Google Scholar].
61. Chyau C. C., Ko P. T., Mau J. L. (2006). Antioxidant properties of aqueous extracts from *Terminallia catappa* leaves. *LWT – Food Sci. Technol.* 39, 1099–1108. 10.1016/j.lwt.2005.07.016 [CrossRef] [Google Scholar]
62. Padrón-Márquez B., Viveros-Valdez E., Oranday-Cárdenas A., Carranza-Rosales P. Antifungal activity of *Psidium guajava* organic extracts against dermatophytic fungi. *J. Med. Plants Res.* 2012;6:5435–5438. Doi: 10.5897/JMPR12.240. [CrossRef] [Google Scholar]
63. Suwanmanee S., Kitisin T., Luplertlop N. In vitro screening of 10 edible thai plants for potential antifungal properties. *Evid. Based Complement. Altern. Med.* 2014;2014:138587. Doi: 10.1155/2014/138587. [PMC free article] [PubMed] [CrossRef] [Google Scholar].

- 64.Nijveldt RJ, van Nood E, van Hoorn DE, Boelens PG, Klaske van Norren K. Flavonoids: a review of probable mechanisms of action and potential applications. *Am J Clin Nutr.* 2001;74:418–425. Doi: 10.1093/ajcn/74.4.418. [PubMed] [CrossRef] [Google Scholar]
- 65.Rao PS, Sundari BT, Venkateshwara SKR. Formulation and evaluation of gel containing *Mangifera indica* leaves extract for anti-bacterial activity. *Int J Pharm.* 2018;5(1):61–68. [Google Scholar]
66. Spizzirri UG, Aiello F, Carullo G, Facente A, Restuccia D. Nanotechnologies: an innovative tool to release natural extracts with antimicrobial properties. *Pharmaceutics.* 2021;13:230. Doi: 10.3390/pharmaceutics13020230. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
- 67.Rawung RBV, Tangel SJC, Nurkolis F, Mayulu N. Cookies rich in antioxidant from mango (*Mangifera indica*) with binahong (*Anredera cordifolia*) as a potential for postoperative wound healing. *Ann Roman Soc Cell Biol.* 2021;25(6):6607–6611. [Google Scholar]
- 68.L.Celleno, A Mastroianni, AVasselli, M.V. Tolaini, F. Macchia. Department of Dermatology. Dermatological evaluation of cosmetic products for skin detergency, *J Appl Cosmetol* 11. 1-22, 1993.
- 69.Mukherjee, P.K., Biswas, R., Sharma, A., Banerjee, S., Biswas, S., Et al., (2018). Validation of medicinal herbs for anti-tyrosinase Potential. *J Herb Med*, 14, 1-16.
- 70.Reddy, Y.R.R., Kumari, C.K., Lokanatha, O., Mamatha, S., & .Reddy, C.D. (2013). Antimicrobial activity of *Azadirachta Indica* (neem) leaf, bark and seed extracts. *Int J Res Phytochem Pharmacol*, 3(1), 1-4.
- 71.Kuril.M, Yadav Y, Sahi A.K, Shukla.K; Research article; Formulation and evaluation of polyherbal paper soap; *Journal of innovation and invention in pharmaceutical sciences*, 2020; 1(1): 54-57.
- 72.Afsar Z., Khanam S., “Formulation and evaluation of polyherbal soap and hand sanitizer” *International Research Journal of Pharmacy*, volume-7(8), 2016, page. No.55.
- 73.Gana Manjusha.K, Balakrishnaiah.P, Syamala.R, Mounik.N, Ravi Chandra, Formulation and Evaluation Of Herbal Bath Soap Containing Methanolicextracts Of Three Ayurvedic Varnya Herbs; *Asian Journal of Pharmaceutical and Clinical Research*, 2019; 12(11): 213-215.
- 74.Kokare CR. *Pharmaceutical microbiology principles and applications.* 6th ed. Pune: Nirali Prakashan; 2008. P.19.4-19.5.