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Review Article

Application of Phytoconstituents In Herbal Soap Formulation

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A B S T R A C T

Natural components including herbs, essential oils, and plant extracts are used to create herbal soap. The skin may benefit from these all-natural compounds in a number of ways, including hydration, calm, and healing. There is a wide variety of smells and forms available, and each has its own set of advantages. If you're searching for a gentler, more environmentally friendly soap, herbal soap is a great alternative. Here, we'll look back at recent efforts to formulate herbal bath soap for treating bacterial and fungal infections or skin-related disorders using potentially therapeutic herbs. Science Direct, Web of Knowledge, Pub Med, Google Scholar, etc. were only a few of the databases used for this review. Based on the findings of recent studies, it's safe to say that herbal bath soaps are a good option for those with sensitive skin since they don't include any harsh chemicals or synthetic smells. In conclusion, herbal soap has more benefits than chemically produced soaps.

Keywords: Herbal, Soap, Formulation, Extract, Antibacterial.

Introduction

The history of civilization coincides with the history of beauty and cosmetics. Herbal cosmetics, sometimes known as "natural cosmetics," are a popular alternative. The use of one or more herbal components is effective in treating a variety of skin conditions, and herbal cosmetics are made by mixing several cosmetic components to produce a basis. Novel pharmaceuticals and cosmetics derived from plants are increasingly being researched and developed.[1] In their raw or extracted forms, herbs play a central role in herbal cosmetics.[2]

Products, sometimes known as Herbal Cosmetics, are made by combining numerous legal cosmetic ingredients to create a stable foundation, and then using one or more legal herbal compounds for their specific cosmetic effects. There is no quick relief from using herbs. They allow one's body to reacquaint itself with the natural world.[3]

U.S. Society of Cosmetic Chemists co-founder Raymond Reed is credited with creating the phrase "cosmeceuticals" in 1961. In fact, he coined the word to characterize those cosmetics with an active ingredient and a scientific basis. In 1984, Dr. Albert Kligman elaborated on the above phrase to apply to medications that serve both aesthetic and therapeutic purposes.[4]

Cosmeceuticals are a kind of cosmetic-pharmaceutical hybrid that include active components that improve the skin's health and appearance by modifying its biological texture and activity.[5]

One of the world's oldest medical traditions, Ayurveda has been practiced for thousands of years in India, Sri Lanka, and other South Asian nations.[6]

There are anti-aging and illness treatments accessible in the form of Ayurvedic herbs. About 200 different herbs, minerals, and fats for skin health and attractiveness are described in its literature.[7]

There has been a dramatic uptick in research into Indian herbs in recent years, coinciding with the current renaissance of interest in natural remedies.[8]

In recent years, plenty of personal care products infused with Indian herbs have entered the market. Indian botanicals have been employed in both conventional medicine and in experimental cosmetics. Herbal therapies are gaining popularity since they are gentle on the skin and have few side effects. Herbal cosmetics are wonderful since they include only natural ingredients like herbs and shrubs and have no negative side effects. Herbal supplements are safe for human consumption since their nutritional value is derived only from their natural constituents.[9]

Herbal Cosmetics, as Opposed to Synthetic Ones, Have Several Advantages.

The newest thing in cosmetics and makeup is herbal products. There has been a rise in the use of these agents because many women would rather use all-natural alternatives to chemical ones in order to enhance their appearance. This is because natural alternatives to synthetic cosmetics are often more nourishing to the body, better for the user's health, and more gratifying to them.[10]

Some of the reasons why natural cosmetics are better than synthetic ones are as follows:

Natural Products

Herbal cosmetics are made from natural ingredients such as herbs, plant extracts, and essential oils. These ingredients are gentle on the skin and do not contain harsh chemicals that can cause irritation or allergic reactions.[11]

Moisturizing

Herbal cosmetics contain natural oils that help to moisturize the skin. They help to keep the skin soft and supple, preventing dryness and flakiness.[11]

No Side Effects

Artificial cosmetics have been linked to skin inflammation and acne. They may cause your pores to get blocked, leading to either dryness or oiliness. When using organic beauty products, they are not a problem. The use of all-natural ingredients ensures that there will be no side effects, and the method is suitable for usage in any setting.[12]

Healing Properties

Many herbal cosmetics contain herbs and plant extracts that have healing properties. For example, tea tree oil is known for its antibacterial properties, while aloe vera is known for its soothing and healing properties.[12]

Environmentally Friendly

Herbal soaps are often made using sustainable and eco-friendly practices. They do not contain synthetic ingredients that can harm the environment.[11]

Aromatherapy Benefits

Herbal cosmetics often contain essential oils that provide aromatherapy benefits. These oils can help to relax and calm the mind, providing a spa-like experience in the comfort of your own home.[13]

Compatible With all Skin Types

Herbal cosmetics are gentle on the skin and are suitable for people with sensitive skin. They do not contain harsh chemicals that can cause irritation or allergic reactions.[13]

Safe to Use

There is less risk of adverse reactions while using natural cosmetics. They have been proven safe for use at any time by dermatologists and are hypoallergenic.[14]

Cost-Effective

Herbal cosmetics are often more cost-effective than commercial soaps. They are made using natural ingredients that are readily available, making them an affordable option for those on a budget.[14]

Anti-Aging Properties

Many herbal cosmetics contain ingredients that have anti-aging properties. For example, rosehip oil is known for its ability to reduce the appearance of fine lines and wrinkles.[12]

Acne Control

Herbal soaps can help to control acne by reducing inflammation and killing bacteria. Ingredients such as neem oil and turmeric are known for their acne-fighting properties.[14]

Brightening and Whitening

Some herbal cosmetics contain ingredients that can help to brighten and whiten the skin. For example, licorice extract is known for its ability to reduce dark spots and hyper pigmentation.[13]

Advantages of Herbal soap

Herbal Soaps

Skin disorders have far-reaching effects on both people and communities, making them a major public health concern. They cause distress, decrease normal functioning, and diminish quality of life. As more people use skin care products containing harmful synthetic chemicals, the incidence of these diseases is growing.

The most common kind of skin infection is caused by fungi, and it has to be treated right away and maintained with regular care. Millions of individuals have suffered from skin conditions for a long time. Some of the most prevalent skin issues are acne, scars of acne, hives, dryness, rashes, cracked skin, psoriasis, sun damage, dullness, stretch marks, eczema, and suppleness.[15]

Skin issues are caused by bacterial infections. Gram-positive bacteria are responsible for the majority of bacterial infections, including those caused by *Propionibacterium acnes, Streptococcus pyogenes, and Staphylococcus aureus. Pseudomonas aeruginosa and Pasteurella multocida* are two examples of Gram-negative bacteria that seldom cause skin diseases[16]

Today, most commercial soaps have chemical ingredients that fight germs and, in certain cases, remove infected skin. Disinfectants like detergents and soaps are part of daily hygiene regimens. Soaps are cleaning products that may be used in a variety of different forms. To keep oneself healthy and attractive and to get rid of unpleasant smells, they are used on one's body and on inanimate objects like clothing.[17]

Toxic substances including mercury, aluminium, barium, bisphenol A (BPA), and plastics are often used to make commercial soap. These chemicals may be absorbed via the skin and lungs, causing a variety of health problems.[18]

Herbal soaps, in contrast to conventional ones, do not include harmful chemicals like fluoride, artificial colors, or fragrances.[19]

Plants used for their antibacterial properties, which have been found to be effective against certain types of skin diseases. Herbs are the most widely used natural remedy for the treatment of almost every illness and skin condition because of their great medicinal value, low cost, wide availability, and universal compatibility.[20,21] Therefore, it may serve as a soap foundation.

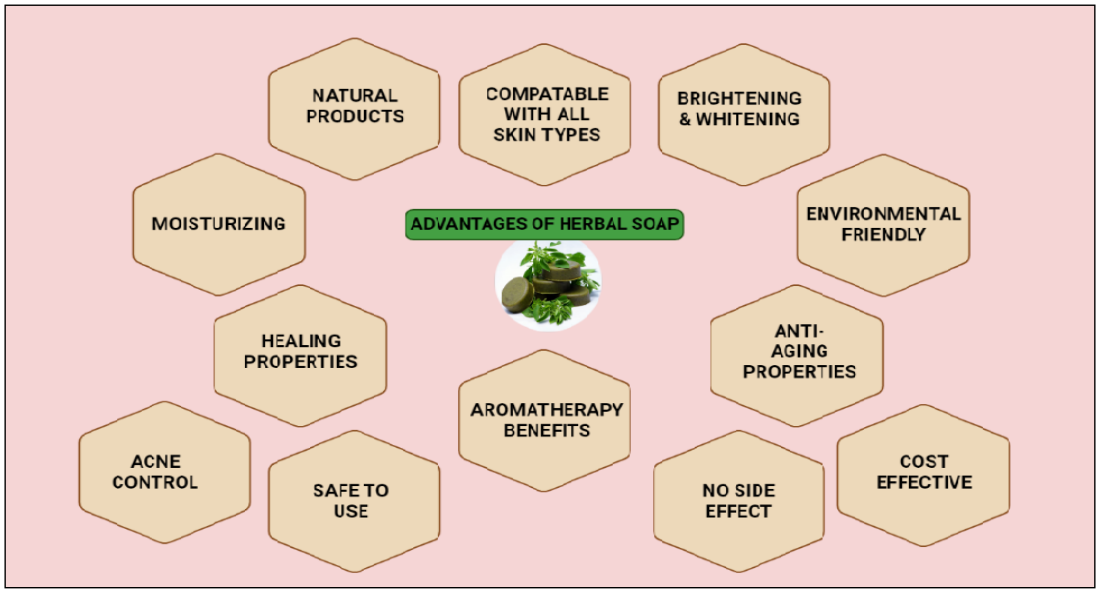

Figure 1. Advantages of Herbal Soap

Figure 2. Medicinal Plants Used for Soap Formulation

Phytochemicals Used for Soap Formulations

Herbal Soap for Healthy Skin

The goal of the research is to develop three distinct herbal Aloe camphor soap recipes (F1, F2, and F3). Various skin conditions can be alleviated or prevented with this formulation, and overall health is improved. Most people go for Aloe Vera soap when they have dry skin, acne, need sun protection, want to cleanse their faces, or want to moisturize their skin. There were three different ways in which we were compared to one another. As a result, F3 was the optimal formulation among F1 and F2. The manufactured soap is compared to the commercially available variety. You may get specialty soaps like aloe soap or camphor soap. We have successfully made and tested combination soap. In this study, aloe Vera and camphor soap is combined and produced.[22]

Herbal soap used in the study was made from herbs that were gathered in the wild, and its essential oils were extracted without the use of any synthetic solvents. As a result of Herbal soap was developed with carefully considered components, including two for scent and three for skin. Formulation 1,2,3,4 and 5 were all discovered to have pH values between 7 and 9. Which pH is most agreeable to the skin? The foam levels observed for the foam types F1, F2, F3, F4, and F5 ranged in height from 3 to 5 centimeters. Having a lower foam height than the norm. Retention times for F1, F2, F3, F4, and F5 foam are 3 to 5 minutes. Clearly, there was effective memory retention. The skin-irritation test showed no irritation when compared to the commercially available herbal soap standard. Total Fatty Matter levels between 6 and 10 percent are considered optimal. When compared to commercially available Herbal soap standards, other evaluations have shown positive results.[23]

Research on a new soap recipe using ethanol-preserved Ayurvedic varnya extracts is the primary emphasis of the scientific community. Soap was designed to be a solid that does not melt, change colors, or otherwise look bad; it is naturally frothy and requires no additional surfactants. When tested on the skin of 10 healthy volunteers. it was shown to be compatible and irritant-free. The soap was classified as Grade 1 due to its high TFM estimation (77%). The results of the other tests showed that the designed herbal soap was effective and could compete with commercial skin-whitening soaps containing chemicals.[24]

Cosmetics based on Ayurvedic principles are very beneficial and safe. Neem leaf, tulsi, Aloe Vera, vitamin C, and Tocopheryl acetate were used in the creation of the herbal soap. Each individual component of herbs is easily obtained. As a medicine, neem is superior. Anti-carcinogenic, anti-mutagenic, anti-inflammatory, anti-hyperglycemic, anti-malarial, anti-ulcer, anti-fungal, antibacterial, and anti-mutagenic properties are found in neem and its chemical components. Burns, psoriasis, and acne may all be treated with cosmetics containing aloe plant extract. The antioxidant and anti-inflammatory properties of tocopheryl acetate may protect skin against sunburn. Tulsi beep is a skin cleanser. Acne is reduced by vitamin C and turmeric. We may thank soap plants for softer skin, deeper skin penetration, less acne, and quicker healing times. Several experiments showed that the combination of neem leaf, Aloe Vera, tulsi, vitamin C, and tocopheryl acetate was effective. Several test subjects reported no discomfort from using these soaps. Soap's pH, appearance, and aroma were also evaluated to ensure uniformity.[25]

Bark and leaf and extract of *Azadirachta indica, Sapindus mukorossi, Ocimum tenuiflorum*, and powder of *Acacia concinna* were used to make herbal soap and hand sanitizer. This research examined the effects of neem leaf extracts in aqueous, ethanolic, and ethyl acetate. The neem *(Azadirachta indica)* tree is famous for its wide range of medicinal properties, including anti–inflammatory, ant-hyperglycemic, antiulcer, ant-malarial, antifungal, antibacterial, ant-mutagenic, and anti-carcinogenic properties. Herbal soaps made from neem,reetha, shikakai, and tulsi all included neem leaf and seed, which were effective against several dermatophytes. Shikakai and Reetha clean and foam, while Tulsi is antiviral.[26]

Research produced and tested herbal soap made from *Solanum lycopersicum* skin, Jatropha podagrica roots, and *Pandanus amaryllifolius* leaves. Using *ethanolic* extraction at three different strengths (%v/v), crude extracts were produced for use in making herbal soap. Herbal soap was tested for pH, *emolliency*, and foaming tendency. Sensory profiling was also done using modified quantitative descriptive analysis. The soap containing 1.0671% (v/v) of each of the ethanolic extracts from *J. podagrica, P. amaryllifolius,* and *Solanum lycopersicum* exhibited the most stable foam because of their combined viscosity. In the soap emolliency test, T1, T2, and T3 showed mild, moderate, and high translucency, indicating that ethanolic extract concentrations impacted soap emolliency. The three soap compositions differed in texture ($p = 0.03278$) and colour ($p = 0.00757$) according to Quantitative Descriptive Analysis (QDA). Lathering intensity and odour were the same. When tested for foaming tendency, T2 came out on top.. Soap pH was normal in all treatments. Treatment 3 performed well in quantitative descriptive analysis. Laboratory testing such antibiotic tests were advised.[27]

Soap was developed using a concentrated extract of kaffir lime peel. In order to get a concentrated extract of kaffir lime peel, 500 grams of powder should be macerated in 96% ethanol. Producing soap is a chilly process. The results

of the experiment were a solid bath soap that smelled like oranges, was blue to turquoise in colour, felt great all over, and was malleable and easy to shape. Formulation 1 with 1% kaffir lime peel extract had a pH of 10, a foam height of 5 cm, 1.76 percent water, and 2.51 percent free fatty acids. Formula 2 had 3% kaffir lime peel extract, a pH of 10.0, a foam height of 5.0 cm, a moisture content of 1.95%, and free fatty acids of 2.51%, while Formula 3 had 5% kaffir lime peel extract, a pH of 10.0, a foam height of 5.0 cm, a moisture content of 0.73%, and free fatty acids of 2.51%. The SNI number 3532 of 2016 tests for pH and moisture content are passed by the thick kaffir lime peel extract in the solid bath soap, however, the test for free fatty acids failed.[28]

Using the underused tropical seed *Citrus sinensis* seed oil and natural ingredients including leave extract of *Ocimum gratissimum*, honey, and coconut oil, *Moringa oleifera* seed oil, this research created "green" medicinal soaps without synthetic additions. A neglected bioresource, *C. sinensis* seed oil has been investigated for its chemical make-up, cosmeceutical applications, and biological activity. Soap made from *C. sinensis* seed oil has great properties, such as good solubility, foaming ability, texture, color, low free caustic alkali, antimicrobial activity, antioxidant potential, anti-parasite, and low cytotoxicity, despite being a common waste product in the environmental and natural fruit juice industries. These findings provide chemical compositions as the basis for the bioactivities of *C. sinensis* seed oil (and soaps). Seed oil should be explored as most cosmetic customers today seek "green," natural, and environmentally friendly products. This study supports the waste-to-wealth programme to reduce poverty and protect the land and marine environment. These findings would benefit soap and cosmetic companies.[29]

Herbal Soap for Skin Infection

Herbal soaps were made using extracts from the plant's *Tithonia diversifolia* Helms. (A Grey), *Azadirachta indica (A. Juss), and Aloe secundiflora (Miller)*, while an herbal lotion was made with the seed oil of the plant *Thevetia peruviana (Schum)*. Bacterial growth was observed to be slowed by Phytoconstituents in this study. The *T. diversifolia* herbal plant produced the most powerful soap against E. coli. All concentrations of *T. diversifolia* extract found in herbal soap showed increased anti-E. coli activity. Both the aloe and Neem soaps were effective in eliminating the *E. coli* bacteria. Below 9% Tithonia extract, the *T. diversifolia* soap had no effect on *C. albicans*, making it the least effective of the soaps tested. These results provided evidence that *T. diversifolia* plant extract was effective in treating skin infections. Extracts of *A. secundiflora* and *Neem* were used to treat skin conditions. This research demonstrated the antibacterial efficacy of Neem and *A. secundiflora.* Herbal soaps showed varying impacts on the test bacteria depending on the extract content. Antimicrobial properties were observed in skincare products using plant extracts *(Tithonia diversifolia, Azadirachta indica, Aloe secundaflora* and *Thevetia peruviana)*. Soaps made from *Azadirachta indica* and *Tithonia diversifolia* plant extract were the most efficient against *E. coli* and *Candida albicans*, respectively.[30]

Herbal soap made from *S. auriculata* active extract has strong antibacterial activity against *S. aureus.* The in vitro assessment showed no microbiological growth on the plate using *S. auriculata* herbal soap compared to the control (ciclopirox olamine). The active extract of *S. auriculata* contains compound *1 That is* a 3,6-dioxygenated steroid found in plants that grow in water, which has been shown to have a profound inhibitory effect on *S. aureus* strains. This activity may also be linked to synergism with unidentified compounds from the active extract. Nonetheless, *S. auriculata* herbal soap demonstrated significant inhibition against an S. aureus infection of cows' udders, suggesting the plant's potential as an excipient in antiseptic soap to wash the udders of animals before milking and reduce bovine mastitis, particularly on smaller farms. These discoveries are economically, industrially, and veterinary significant.[31]

Plectranthus ornatus Codd; was used to create an antibacterial soap. The extract was prepared using dichloromethane. The findings of this research suggest that *P. ornatus* herbal soap may be used as an antiseptic in pre- and post-dipping without the risks associated with iodine- and sodium-based disinfectants. As an added bonus, they are also useful as disinfectants and other adjuvant in the fight against illness. The significant degree of inhibition shown by these herbal soaps against S. aureus from cows' udders suggests that this plant might be used as excipients in the manufacturing of antiseptic soaps to combat bovine mastitis infections, particularly on smaller farms. The results of this study provide credence to the idea of using *P. ornatus* for disease control in agricultural operations of a modest scale.[32]

An antimicrobial herbal soap was developed by analyzing the antibacterial characteristics of *C. fistula, N. nucifera, and A. indica*, as well as their combined extract. In this study, the antimicrobial efficacy of *C. fistula, N. nucifera, and A. indica,extracts* in both water and alcohol was evaluated against *C. albicans, S. aureus, and P. aeruginosa.* The antibacterial activity of the combined extract from *C. fistula* ethanol extract, A. indica aqueous extract, *N. nucifera* aqueous extract, and herbal soap was greater than that of the individual plant extracts. The physical and chemical qualities of formulated herbal soap are satisfactory. Soaps containing an antibacterial plant extract may be produced

at last. Herbal soap that has been created might benefit from standardization and safety testing .[33]

This research aims to develop a herbal bath soap with antibacterial qualities by combining Neem oil with Nalpamaradhi oil. The Neem oil, Nalpamaradhi oil, and sodium hydroxide used to make the herbal soap followed typical procedures for cold Saponification. The findings of this research will be used to standardize Herbal Soap across a number of physicochemical criteria, including colour, aroma, texture, pH, total fatty matter, moisture content, hardness, and foam test. The formulated herbal soap was tested for its antimicrobial activity, and the results showed that it was effective against microorganisms, including bacteria like *Staphylococcus aureus* and *Pseudomonas aeruginosa* and fungi like *Aspergillus niger* and *Candida albicans.*[34]

An Aantibacterial soap was developed with extracts from the plants *T. catappa, C. longa,* and *G. indica*. The current findings suggest that extracts from *T. catappa, C. longa,* and *G. indica*, as well as combinations thereof, may be used to create antiseptic soaps that are more effective against skin infections than those currently on the market. As a result, we may find a whole new strategy for reducing the spread of disease, thanks to the beneficial effects of aseptic hand hygiene on reducing the prevalence of antibiotic-resistant pathogens. Natural soap is cheap, safe, and effective in reducing the microbial burden in the body. This might be the sound base for making the herbal soap. This has paved the way for the development of chemical-free "antiseptic soap.".[35]

Another unique herbal soap was developed that is based on the aforementioned mixed extract, and to examine its antibacterial properties. The antibacterial activity of the manufactured herbal soap employing the extract of *A.indica, N. nucifera,* and *C. fistula* was substantially greater than that of *C.albicans, P.aeruginosa,* and *S.aureus,* when compared to the antimicrobial activity of the individual plant extracts. The results of this investigation suggest that the additive or synergistic effects of the elements or the combination as a whole may result in more effective growth suppression of the microorganisms subjected to the experiment. The pH, free alkalinity, alcohol solubility, and moisture levels of the manufactured soap all fell within the standard parameters. Future research into the efficacy and safety of the formulated soap should involve clinical trials.[36]

This research formulates and evaluates *C. rotundus* antibacterial soap. *C. Rotundus* antiseptic soap, a solid soap, exploits the weed's antioxidant, antibacterial, and anti-inflammatory qualities. *C. Rotundus* antibacterial soap is dark brown, granular, and has a scent that varies by responder. Organoleptic qualities descriptively, X2 is the best in colour, texture, and scent, whereas statistically, X1, X2, and X3 are comparable. Only X2's texture is better. The three *C. Rotundus* antiseptic soap compositions destroy germs better than conventional antiseptic soaps. *C. Rotundus* antiseptic soap PH levels. Because people like foam, puzzle grass tuber soap has low foaming power but can still clean and roughen the skin.[37]

Aloe Vera gel, extract of tea, and citronella oil was used to make herbal soap. Aloe Vera is antibacterial, antiviral, wound-healing, and relaxing. Black tea extracts colors and lemongrass oil scents. Coconut oil and NaOH saponified at 40 °C to make soap base. Aloe Vera gel at 8% weight-by-weight was added to the formula for its soothing effects, 4% citronella oil for fragrance, and 4% black tea extract for colour. Color, fragrance, texture, washing performance, and relaxing effect were all evaluated after letting the soap cure for 72 hours at 32 degrees Celsius. Total fatty matter (TFM), free alkali, and NaOH ratio were also measured. The soap was brownish gold, smooth, had a light scent, and soothed hands. The values of the density, NaOH proportion, free alkali content, and TFM were all calculated to be 0.95 mg/ml, 4.16, 0.007 mol/dm3, and 79.6%, respectively, as per standard soap formulations and previous research. Based on its TFM rating, the soap that was manufactured is considered to be of good quality and low hardness. The research suggested using natural herbal soap for hand cleaning. Before selling soap, evaluate competitors and quality.[38]

Essential oils from *Schinus terebinthifolius* and Piper nigrum were used to create a solid and liquid antibacterial soap, respectively, which was then examined and compared to commercially available antimicrobial soaps. The current study introduced the creation of liquid and bar formulations of antimicrobial soaps, employing the essential oils of black pepper, pink pepper, and both, to prevent skin illnesses aggravated by bacteria. This information will guide the importance of phytocosmetics. Resolution 07/2015 addresses the microbiological control of cosmetic goods, and the items manufactured here conform to that standard. The pink pepper bar soap, the essential oil soap and the liquid soaps of various formulations are all fresh, promising and inventive goods on the market for antimicrobial soaps.[39]

This study aims to develop a polyherbal bath soap including the antibacterial agent's *curcuma longa* [Turmeric] and *Organum Vulgare.* Using the agar well diffusion method, the produced soap's antibacterial capacity was measured against *Escherichia coli, staphylococcus aureus,* and *Aspergillus Niger*. The antibacterial properties of *curcuma longa* and *Organum vulgare* led to their inclusion in a multi herbal soap. The soap's antimicrobial properties were tested. With zones of inhibition of 20, 25, and 23 mm against *Escherichia coli, Staphylococcus aureus,* and *Aspergillus niger,* respectively, the findings showed that the soap

solution has antibacterial activity. All of the standardized tests conducted on the manufactured soap formulations including those for pH, colour, aroma, appearance, percent free alkali, alcohol-insoluble matter, foam height, and foam retention, resulted in positive findings. Human safety has been established for the formulation.[40]

Methanolic extracts of three Ayurvedic plants: *Hemidesmus indicus*, *Cyperus rotundus*, and *Saussurea lappa* was used to develop a herbal soap for bathing purpose. Soxhlet apparatus extracted *S. lappa, H. indicus*, and *C. rotundus* roots and rhizomes with ethanol. Saponifying oil and lye with these extracts produced soap. The soap had an acceptable total fatty matter, moisture content, and pH of 77, 5.3%, and 8. The soap removed hand germs well.[41]

The ethanolic extract of herbal *Leucas aspera* leaves was selected for the preparation of herbal soap. This study suggests that compared to other herbal soaps, *Leucas aspera* extract may be a more effective and cost-efficient choice. The composition of herbal soaps is crucial in countering the negative effects of synthetic soaps. Results of evaluation concluded that formulation of herbal soap containing ethanolic extract of *Leucas aspera* plant may not have the same antibacterial properties as conventional soaps, but the ingredients used in their creation are all-natural and gentle on the skin. The maximum yield was found in the alcoholic Soxhlet extract. Several physicochemical parameters, including clearance, pH, appearance, % free alkali, alcohol-insoluble matter, foam retention, and foam height, were measured and shown to be optimal for the standardized formulations.[42]

Bioactive herbal plant extracts from *Sapindus mukorossi, Solanum lycopersicum, Acacia nilotica, Piper betle, Citrus limon, Aloe barbadensis, Curcuma longa,* and *Cocus nucifera* was used to develop herbal soap for bathing purpose. The extraction procedures used were appropriate for obtaining all plant components. A combination of the extract, lye, and fat was used to create cold Saponification. It had a wonderful aroma and presentation. The pH levels were variable, between 7 and 10. The percentage of free alkali, alcohol insoluble matter, foaming ability, moisture percentage, and foam stability were other criteria for evaluating soap quality. According to biological standards, the manufactured soap possesses strong antioxidant and antibacterial capabilities. According to the findings, cold-process herbal soap may be manufactured by taking into account skin type, herbal potential and herbal activity.[43]

Ixora coccinea root extract was used to create a medicated soap that might be used to treat skin infections. Initially Phytochemical analysis was performed on an ethanolic extract of dried *Ixora coccinea* roots. Olive oil, Coconut oil, and peanut oil were used in the soap making process. Antimicrobial activity, stability, alcohol insoluble and total fatty matter, content were also measured in addition to visual appearance, % free alkali content, pH, height of foam, total fatty matter and moisture content. After analyzing the physicochemical features and antibacterial activity of each formulation, it was determined that formulation F2 containing 58.4 gm of coconut oil was the most promising and *Ixora coccinea* ethanolic extract soap is an effective antibacterial, making it a possible treatment option for skin infections.[44]

Polyherbal transparent soap with antibacterial and antioxidant action was developed using extracts from *Mimusops elengi L.* and *Senna auriculata* and oil from *Ocimum basilicum.* Poly herbal clear soaps were created by combining glycerin with extracts of dried flowers from *S. auriculata, M. elengi L.* and *O. basilicum* oil at concentrations of 1% and 3%, respectively. Physiochemical parameters of soaps were analyzed in accordance with BIS guidelines. The effectiveness as an antibacterial was determined by agar well diffusion testing. Staphylococcus aureus and Escherichia coli were used in an experiment to determine the soap's and extract's antibacterial efficacy. The generated soap was subjected to standardization and analysis for its physiochemical qualities, including pH, colour, moisture content, % alkalinity, and other parameters, with encouraging results. In tests against S. aureus, soap containing 3% extract showed a greater zone of inhibition. Overall, the product failed to effectively combat *E. coli.* Results indicate that herbal soaps may eventually replace chemical ones.[45]

This research created four herbal soaps using *Tridax procumbens* leaves extract and varying concentrations of components and medicine. Newly formulated soaps smelled and looked amazing. F1 (0.68%) has lowest free alkalinity. High-free base soaps irritate skin and should be avoided. F1 is the most reliable soap. Its 4% matter insoluble in alcohol level is among the lowest and below BIS's 10% limit. F1 soap's decreased moisture content also sets it different. F1 foam stability lasted 5 minutes. F3 has enhanced foam stability. Despite this, F1 soap outperformed other soaps. Natural properties make *Tridax procumbens* leaves antimicrobial. The other ingredients, including coconut oil, Vitamin E oil, Tulsi oil, and Aloe Vera gel, are dermatologist-safe and good for the skin. Thus, the developed soaps' skin infection-fighting capacity may be tested. *T. procumbens*-infused soaps exist. F1 fared highest in efficacy testing. The Bureau of Indian Standards says it foams well and has few pollutants. More studies may explore utilizing soaps to treat skin infections. Like many herbal remedies, *T. procumbens* may be converted into soap.[46]

The purpose of this research was to create a cold-process poly herbal hygienic soap and test its antibacterial

efficacy utilizing the agar well diffusion technique. Researcher's blended coconut oil, castor oil, Neem oil, Mentha oil, rose petals extract, and NaOH (lye) into the Saponification process to manufacture soap. The herbal formulation was tested for antibacterial activity, pH, moisture content, foaming index, foam retention duration, Saponification, total fatty acid (TFA) measurement, and ethanol solubility in different soap solution concentrations. Herbal soap has a pH range of 6.5-7, 3.5% moisture content, 16.5% foam index, 10.0 minutes foam retention, 161.287 mg/ml saponification, 72% total fatty mattes (TFM), and 63.80% ethanol solubility. The assessment tests also demonstrated that the herbal soap produced comparable antibacterial outcomes to those of a typical antibiotic. In addition, oils are included to help with daily moisturizing and the treatment of a wide range of skin conditions.[47]

Spirulina Platensis Soap removes dirt and bacteria of the skin. Spirulina is added to soap at 3 and 5 gm. *Spirulina platensis* may be produced into solid soap, according to this study. Spirulina gives solid soap a light green colour, a solid texture, and a tea tree oil scent. Soap foam has a pH of nine, a stability of 75% to 37%, and very copious and coarse foam. Based on the aforementioned findings, the author gives various suggestions. Spirulina should be included to liquid and dish soap in future research. Study how foam stability affects soap formulations. Learn about soap antimicrobial testing.[48]

Using *Azadirachta indica* and *Ocimum tenuiflorum* oil, this study set out to produce and evaluate an antibacterial herbal soap. The antibacterial activity of the manufactured formulations was tested against *Pseudomonas aeruginosa, Staphylococcus aureus*, and *Escherichia coli* using the agar well diffusion method. As determined by the evaluation findings, two distinct formulations (F1 and F2) were made using the cold press technique, and both demonstrated desirable properties across a range of characterization criteria, including transparency, hue, aroma, form, dimensions, mass, and pH. The microorganisms P*seudomonas aeruginosa, Staphylococcus aureus,* and *Escherichia coli* were all effectively combated by these compounds. The results of the research show that medicated herbal soaps made utilizing the cold process technology may effectively include herbs to fight germs.[49]

Herbal soap produced from *Aegle marmelos* extract and clear soap base and that formulation was examined for physicochemical properties. Siddha, Unani, Ayurveda, and traditional medicine use *Aegle marmelos*. Drugs use root bark, leaves, blossoms, and mature fruit rind. Colour, smell, appearance, and pH were assessed. The compositions were pleasing and pH 7.0. Measurements included percentage free alkali, retention, foam height, high temperature stability and alcohol insoluble matter. Cold-processed poly herbal soap is compatible with clear components and particle-free. Formulation has great physical characteristics. The formulation foams well, is alkali-free, and performs best in F2 formulation testing. Herbal antimicrobial *Aegle marmelos* soap was eco-friendly.[50]

Antiseptic soap containing coriander seeds was developed that moisturized and protected the skin against microbial development. Several physicochemical experiments were conducted on the antiseptic soap formulation employing the new seed extract, and the findings were shown. According to the results of the stability research, there was no appreciable change in the formulations' stability characteristics over time, therefore it is feasible to make Antiseptic Soap with coriander seed extract and it may be used more effectively.[51]

This research looked at the mechanisms by which Carica soap slowed the spread of *Staphylococcus epidermidis.* Carica provides vitamins, minerals, and active ingredients for skin care. This investigation employed agar diffusion. This study included 12 different Carica soaps and a papaya soap control. Findings were examined using ANOVA with a 5% confidence interval. No statistically significant differences in the inhibitory zone against S. epidermidis bacteria were found across soap formulations ($p = 0.472 > 0.05$). Formula 1 soap has the biggest inhibitory zone (1.38 cm), formula 7 soap has the lowest (1.1 cm), and papaya soap (positive control) has 1.7 cm. Carica soap inhibited *Staphylococcus epidermidis* growth without substantial changes in bacterial inhibition zones. Bacterial inhibition zones are 1.19–1.38 cm. Based on these findings, it would be interesting to see whether Carica fruit extracts have any antibacterial effects against *Staphylococcus epidermidis* bacteria, to reformulate Carica soap, and to do similar experiments with additional skin germs.[52]

Senna alata and *Eugenia uniflora* leaf extracts were used to create potent antibacterial herbal soap formulations (HSFs). A soap base with the right physicochemical properties (emolliency, foaming potential, and pH) was found via a series of experimental formulations created from basic soap ingredients. HSFs with 5, 9, or 11% leaf preparation concentrations were made by adding either the Methanolic fresh leaf extract (FLE), Methanolic dry leaf extract (DLE), or pulverized dry leaf sample (DLP) of *S. alata* and *E. uniflora.* The HSFs' physicochemical properties and antibacterial efficacy against *Staphylococcus aureus, Bacillus subtilis,* and *Candida albicans* were evaluated using a hole-in-plate agar diffusion assay. The selected soap base was exceptional in terms of emolliency, froth production consistency, and pH. The HSFs had similar physicochemical properties. Antibacterial activity against *S. aureus* and *C. albicans* in HSFs comprised of combinations of the DLEs at 9 and 11% concentrations was equal to ($p>0.05$) that of

a commercial antiseptic soap containing 0.30% triclosan. *Bacillus subtilis* was much less responsive to HSFs (p0.05). Individually, DLEs, FLEs, and DLPs were less effective in soap formulations than their combined effects (p0.05). Physicochemically and antibacterially, the HSFs comprised of S. alata and E. uniflora DLEs (1:1 w/w) at 9 and 11% concentrations were on par with the commercial antiseptic soap used as a comparison.[53]

Noni (*Morinda citrifolia* L.) fruit, yam (*Pachyrizus erosus*) root, rose (*Rosa damascena*) petal, and betel leaf extract were all added to clear soap and tested for their antibacterial effects. Hot processing was used to create these clear herbal soaps. We checked the levels of chloride, free fatty acids, total fatty matter, and moisture. Herbal clear soaps' antibacterial activity was examined using agar well diffusion testing. When the moisture content was over 17% but below 21%, clarity was maintained. The pH ranged from 9.22 to 9.47, and the free fatty acid concentration was between 0.12% and 2.15%. The fatty component of clear soap made from yam root is 45.12%. Total fatty matter was found to be 23.20 percent lowest in clear soap made from betel leaves. The amounts of chloride in bars of soap made from Noni fruit, yam root, rose petals, and betel leaves ranged from 14.38% to 21.81%, 14.17% to 16.52%, and 14.17% to 16.52%, respectively. Clear soaps made from noni fruit, yam root, betel leaf, and rose petals all inhibited bacteria growth more effectively than the control soap. Clear soap made from herbs was efficient against four common bacteria: *Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa*, and *Candida albicans*, at both 10% and 20% concentrations.[54]

The purpose of the research was to develop a therapeutic biotechnology product using a fermented kombucha solution and pineapple honey in three different strengths (15, 25, and 35 percent). Four distinct soap-based preparations were tested in a controlled laboratory study; they included soap made from white sand with sugar concentrations of 15%, 25%, and 35%; a solution of fermented Kombucha Pineapple honey from Subang; and biore for market bath soap. The method of disc diffusion is implemented. One-way analysis of variance (ANOVA) and subsequent tests with post hoc analysis were used to evaluate the data. The most effective treatment for both gram-positive and gram-negative bacteria was found to be a bath soap containing 35% of the active component, kombucha fermented pineapple honey vinegar solution. Recent developments in preventing the spread of gram-positive and gram-negative bacteria are examined in this study.[55]

In order to produce organic antiseptic soaps with reduced skin sensitivity, toxicity, and biodegradability, green chemistry was used in their production. The fatty acids profile of underutilized *M. charantia* seed and its potential for antimicrobial soaps were examined. Due to the synergistic action of oil components and natural additions, the oil may prevent skin disorders, microbial infection, inflammation, ageing, and beautify human skin. Due to its great output, the seed may be used to make natural antibacterial soaps commercially. Since it's too acidic for eating, it's useful for soap making. The oil's GC-MS fatty acids profile suggests it may be a source of natural essential fatty acids. This study also showed that wood ash, which many Nigerian bakeries and eateries throw away, may be used to make high-quality natural antibacterial soaps using Green Chemistry. The soap is devoid of alkalinity, preservatives, colorants, antibiotics, and stabilizers.[56]

Fungal Infection

This research developed antifungal herbal antibacterial soap using Luliconazole and oils and extracts of *Azadirachta indica, Ocimum tenuiflorum, Aloe barbadensis* miller, and *Santalum album* for cutaneous infection. This study developed and evaluated a novel drug delivery system in the form of Antifungal Herbal Antibacterial soap, which produced good foam on affected parts, delivered the drug faster, was economical, convenient, and effectively treated topical fungal infections. All patients may utilize the formulation. The preceding assessment and testing show that the formulating process for Antifungal Herbal Antibacterial Soap was effective and legitimate.[57]

Herbal cosmetics have a lot of weight as a result of their effective performance and lack of negative effects. Kuppaimeni, or *Acalypha indica* is an antifungal herb that helps get rid of bacteria like staphylococcus aureus and streptococcus species that cause skin infections. Also, diseases like psoriasis and eczema may be cured. Polishing, replenishing, rejuvenating, whitening, softening, smoothing, and fighting acne and pimples are just some of the benefits. The selection of herbs follows a purely random process. This research was conducted to formulate and test an antifungal herbal soap including *Acalypha indica*. Antifungal herbal soap is formulated using the melt-and-pour technique. The quality of the final product was measured in many ways.[58]

Garlic oil-based antifungal soap was developed to treat fungal infections. Fungal infections are the most prevalent health issue individuals face. So, scientists looked into treating fungal infections using antifungal soap. A strong antifungal impact could be seen in the finished herbal soap composition. After testing the produced mixture, promising results were found across a range of physicochemical metrics. Plants are readily available, and their efficacy helps producers save costs and reduce or eliminate adverse effects. The antifungal properties of garlic oil in this soap help to cure fungal infections. It has potential as a treatment for psoriasis and eczema, two skin disorders that are not caused by fungi.[59]

A unique herbal soap using methanol-extracted *V. negundo* leaf extract was developed by researchers. According to initial *Phytochemical* studies the herbal bath soap containing 0.38 g of herbal extract per 75 g bar is best. To show the extract's efficacy at lower concentrations, low-concentration soaps (0.25 g of *V. negundo* extract for 75 g soap) and high-concentration soaps (0.5 g) were created. The herbal bath soap had a Saponification value of 395.52 mg/ml, a total fatty matter of 70%, a moisture content of 6.23%, and a pH of 9.67. Since testing showed no colour change, grade 2 soap was issued. Methanolic leaf extract was efficient against *S. aureus*, but not *E. coli* or *P. aeruginosa.* Candida sp., a non-filamentous fungus, was utilised to assess extract and soap anti-fungal activity. The developed soaps kill germs and fungus better than normal soaps. Fungus cultures benefited from the extract at the same concentration as soap formulations, unlike bacteria. Thus, the made soap is more anti-fungal than commercial soaps and may be used as a biopharmaceutical product to treat fungal skin diseases in addition to its usage as herbal bath soap.[60]

Researchers was formulated a herbal soap from *Azadirachta indica* bark and *Ziziphus mauritiana* seed and conduct physicochemical and antifungal tests. The herbal soaps were tested for pH level, causticity, insoluble matter in alcohol, and moisture, as well as their colour, foam retention (Fr), foam height (Fh), and colour. Antifungal activity against *Aspergillus fumigatus* and *Microsporum gypseum* was studied. Foam stability in distilled water was best for soap base C, whereas emoluency was highest for soap base A. There were no negative physicochemical indicators. Anti-fungal formulas including two or more extracts have been shown to be more effective than those containing only one. The results of the research provide an alternative to antibacterial soap for use in the cosmetics sector.[61]

An herbal soap was developed by scientists using an extract of *C. zedoaria* rhizome and the seed coat of *B. flabellifer.* Soap was made by mixing equal parts of each aqueous extract with soap base, and then analyzing it for its appearance, smell, feel, total fatty matter, foaming ability, moisture percentage, alkalinity, and pH. Herbal soap's IC50 value was modest, yet plants have antioxidant action. The effectiveness of the soap against S. aureus and E. coli was shown by agar well diffusion. The formulated soap's physicochemical properties matched the control. 400mg of herbal soap had the maximum zone of inhibition (20mm) for *S.aureus,* demonstrating its antibacterial action. 400mg herbal soap inhibited *E.coli* best (25mm). Antimicrobial soap. GC MS showed the herbal extract contained antimicrobial and antifungal compounds.[62]

It was important to make herbal medicinal soap that came from plants, broke down naturally, and didn't need any preserving agents. Tropical seeds of *Daniellia oliveri, Elaeis guineensis*, and *Vitellaria paradoxa* (Shea butter) that weren't used much provided oil or fat for making soap, and *Moringa oleifera* seed oil and leaf extract provided chemicals that killed bacteria. *Ocimum basilicum* had antibacterial properties and a pleasant smell. By mixing oils in different amounts, different soaps were made. The color, acid value, free fatty acid value, saponification value, hardness, pH, color, and bubbling power of the oil and soap were found to be important. Trans esterified fatty acid methyl esters were analyzed using GC–MS to find out how many fatty acids were in the oils. It has 57% linolelaidic acid, while Shea butter and palm kernel oil only have 46% oleic acid and 44% lauric acid. Soaps made from Daniellia oliveri oil and Shea butter stopped *Streptococcus aureus, Klebsiella granulomatis,* and *Aspergillus niger* from growing on agar. When it comes to killing *Klebsiella granulomatis* (42 mm) and *Aspergillus niger,* shea butter soap works the best. Making soap was cheap compared to buying soap from stores. Using these natural materials to make eco-friendly plant soaps would cut down on the daily use of many dangerous manmade chemicals, give non-traditional seed oils a use, and help the local economy.[63]

Morinda morindoides (Baker) (Rubiaceae) leaf hexane extract was used to make soap and evaluated its antifungal properties against human fungus strains. *Morinda morindoides'* hexane extract was added to soap (SMM) as an antifungal and tested against four dermatophytes *(spergillus fumigatus, Candida albicans, Trichophyton mentagrophytes*, and *Trichophyton rubrumA)* using basic soap (BS) as a control. MIC and IC50 were measured by agar dilution from 125 mg/ml to 3.9 mg/ml for these isolates. *Morinda morindoides* extract soap (SMM) inhibited all fungal strains at 31.25 mg/ml. But basic soap (control) inhibited *Candida albicans* at 125 mg/ml and 62.50 mg/ml for the other 3 strains. The antifungal activity of SMM was higher than basic soap. Soap with *Morinda morindoides* leaf hexane extract inhibited the fungal strains. Thus, this soap may treat dermatomycosis.[64]

Piper betel leaf and garlic oil was used to develop herbal antifungal soap. The optimized batch was utilised to create herbal soap after studying soap base impact. The formulation shown excellent competence. F3 batch has superior assessment characteristics compared to F1 and F2. F3 optimized batch formulation performed well. *Proteus vulgaris, bacillus, klebsiella pneumoniae, Staphylococcus aureus,* and *pseudomonas aeruginosa* were swabbed uniformly across a culture plate to test the efficacy of an antimicrobial agent against fungi/bacteria grown in culture. Agar was then covered with 5X5 mm soap. After 24 hours in the incubator, the plates were read. Extracts of betel leaves (*Piper betle* L.) and garlic oil were discovered to have antifungal properties. It may be used as herbal

soap for different fungal infections in women with less negative effects.[65]

Herbal Soap for Skin Diseases

The objective was to develop and evaluate a transparent soap containing Secang wood extract (*Caesalpinia sappan* L) in combating the *P. acnes* bacterium. Overactive oil glands are at the root of acne vulgaris, which manifests as clogged pores. Acne is caused by bacteria, such as Propionibacterium acnes, which may lead to inflammation. Acne-causing Propionibacterium may be inhibited by using an extract of Secang wood (*Caesalpinia sappan* L), which contains Brazilin flavonoids. Soap may be used to treat acne. The potential exists for Secang wood to have economic value as a medical cosmetic. Based on the results, clear soap has a pH of 9.3 to 9.7, a firm texture, a VCO smell, and a colour range from light purple to dark purple red. Free fatty acids/free bases are 0.04-0.4%, and bitter fats are 0.29-0.34%; total fat is 15.96%-30.98%; and the water content is 18%-30.6%; Although the inhibitory diameter of F4 = 24.50 mm in clear solid soap was bigger than F0 = 21.67 mm, this difference was not statistically significant.[66]

Aqueous extracts of Guava leaves, Aloe Vera, Turmeric, Rose petals, and Soap nuts were utilised to make an acne-fighting herbal soap. Saponins, tannins, phenols, glycosides, quinones and terpenoids, were found in the aqueous extract of these plants. Acne vulgaris is caused by the overproduction of sebum and the presence of bacteria in the follicular canal *(Propionibacterium acnes, S. aureus,* and *Staphylococcus epidermidis)*. Acne is inflamed by *Staphylococcus aureus. Staphylococcus aureus* and *E. coli* were tested for in vitro antibacterial activity using agar well diffusion. Guava leaves inhibited *Staphylococcus aureus* 17 mm, whereas turmeric inhibited 11mm. Turmeric and Aloe Vera extracts exhibited no zones; however Guava leaves showed a 9mm zone containing *E. coli*. Aloe Vera is recognized for its antibacterial properties; however our investigation found no antibacterial activity. This research indicated that Guava leaf aqueous extracts killed *Staphylococcus aureus* and *E. coli. E. coli* was unaffected by turmeric extracts, whereas *Staphylococcus aureus* was. Aloe Vera, recognized for its antibacterial properties, inhibited neither bacterium.[67]

Table 1.Table Showing the Plants Name, Plants Part, Plants Extract Type, Experiment Model and Expected Out-Comes of Different Medicinal Plants

Plant Name	Plant Part	Plant Extract type	Experiment Model	Expected Outcomes	References
Azadirachta indica, Curcuma longa, Ocimum tenuiflo-rum	Leaves, Rhizome	Oils	*Pseudomonas aeruginosa, Staph-ylococcus aureus, Candida albicans*	Anti- Bacterial, Anti- microbial, Anti-fungal, Anti -oxidant	(23)
Azadirachta indica, Ocimum tenuiflo-rum, Sapindus mukorossi , Acacia concinna	leaf and bark	Aqueous, Etha-nolic, And Ethyl Acetate Extracts of Neem Leaf	*E.coli*	Antibacterial Activity	(26)
Jatropha podagri-ca, Solanum lycop-ersicum, Pandanus amaryllifolius	Roots, Skin, Leaves	Ethanolic Extracts of Roots, Skin, Leaves	*Pseudomonas aeruginosa, Candi-da albicans*	Microbial Activity	(27)
Ocimum gratis-simum, Moringa oleifera, C. sinensis.	Leaves, Seed	Leaves Extract, Seed Oil	*Bacillus subtilis, Escherichia coli*	Antimicrobial Ac-tivity, Antioxidant Potential	(29)
T. diversifolia, Azadirachta indica, Aloe secundaflora	Leaves, dried gel, seeds	Dry powdered leaves were ex-tracted with water	*E.coli*	Antibacterial Prop-erties	(30)
Salvinia auriculata Aubl	Roots, leaves	roots was extracted using n-hexane	*Staphylococcus aureus*	Antibacterial activity, Antiseptic Properties	(31)

Plectranthus ornatus Codd	Leaves	extract was prepared using dichloromethane	*Staphylococcus aureus*	Antibacterial activity, Antiseptic Properties	(32)
Neem oil, Nalpamaradhi oil	Seeds	Pressing and crushing of seed kernel	*Staphylococcus aureus, Pseudomonas aeruginosa, Aspergillus niger, Candida albicans.*	Antibacterial, Antifungal Properties	(34)
Terminalia catappa, Curcuma longa, Garcinia indica	Leaves, Fruits, Rinds	Methanolic extract	*Bacillus subtilis, Escherichia coli*	Antiseptic, Antibacterial Properties	(35)
A. indica, C. fistula, and N. nucifera	Leaves, Roots	Ethanolic extract	*S.aureus, P.aeruginosa, C.albicans.*	Antibacterial properties	(36)
Cyperus rotundus L.	Nut grass tuber	Methanolic extract	*Staphylococcus Epidermidis, Propionibacterium acnes*	Antioxidant, Antibacterial, Anti-inflammatory Properties	(37)
Schinus terebinthifolius, Piper nigrum	Fruits	Hydro distillation of fruits	*Staphylococcus aureus, Escherichia coli*	Antibacterial Properties	(39)
Curcuma longa, Origanum vulgare	Rhizomes	Ethanolic extract	*Staphylococcus aureus, Escherichia coli, Aspergillus niger,*	Antimicrobial properties	(40)
Leucas aspera	leaves	Ethanolic extract	*Escherichia coli*	Antibacterial properties	(42)
Ixora coccinea	Roots	Ethanolic extract	*Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli,*	Antimicrobial activity	(44)
Mimusops elengi L., Senna auriculata, Ocimum Basilicum Oil.	Leaves, Roots	Methanolic extract	*Staphylococcus aureus and Escherichia coli*	Antibacterial and Antioxidant activity	(45)

Tridax procumbens	leaves	Methanolic extract	*Microsporum fulvum, M. gypseum, Trichophyton mentagrophytes, T. rubrum, Trichosporon beigelii, Staphylococcus aureus, Salmonella typhi*	Antimicrobial activity	(46)
Aegle marmelos	Leaves	Aqueous extract	*Staphylococcus aureus, Escherichia coli, Proteus vulgaris*	Antimicrobial Activity	(50)
Carica pubescens Lenne , K. Koch	Fruit	Aqueous extract	*Staphylococcus epidermidis*	Antibacterial activity	(52)
Senna alata, Eugenia uniflora	Leaves	Methanolic extract	*Staphylococcus aureus, Bacillus subtilis, Candida albicans*	Antibacterial activity	(53)
Morinda citrifolia L., Pachyrizus erosus, Rosa damascena	Leaves, Fruit	extract by pureed and squeezed fruit, and steam distillation process	*Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, Candida albicans*	antimicrobial activity	(54)
Momordica charantia	Seeds	Extraction by using n-hexane	*Escherichia coli, Streptococcus aureus, Bacillus subtilis, Salmonella typhi, Pseudomonas aeruginosa, Candida albicans, Klebsiella Pneumonia, Penicillium notatum, Aspergillus niger and Rhizopus stolonifer*	Antiseptic properties	(56)

Acalypha indica	Leaves	Methanolic extract	*staphylococcus aureus*	Antifungal properties	(58)
Vitex negundo	Leaves	Methanolic extract	*staphylococcus aureus*	Antifungal activity	(60)
Borassus flabellifer, Curcuma zedoaria	Seed coat, Rhizome	Aqueous extract	*S. aureus and E. coli*	Antioxidant action, Antibacterial action	(62)
Morinda morindoides	Leaves	Hexane extract	*Trichophyton rubrum, Candida albicans, Aspergillus fumigatus Trichophyton mentagrophytes,*	Antifungal activity	(64)
Piper betle L.	Leaves	Hexane extract	*Proteus vulgaris, bacillus, klebsiella pneumoniae, Staphylococcus aureus, pseudomonas aeruginosa*	Antifungal activity	(65)
Caesalpinia sappan L	Wood	Ethanolic extract	*Propionibacterium*	Anti-acne properties	(66)
Guava, Turmeric, Aloe Vera, Rose	Leaves, Petals	Aqueous extracts	*Propionibacterium acnes, Staphylococcus epidermidis, S. aureus*	Anti-acne properties	(67)

Conclusion

Extracts of medicinal plant parts like leaves, roots, barks, wood, and fruits were extracted using solvents like water, methanol, ethanol, and ethyl acetate, and then evaluated using a number of tests designed to measure their antimicrobial activity. When put through their paces, the created formulas performed well in a variety of tests. Using these soaps on a small number of models allowed us to conclude that they did not cause any irritation to the skin. There was also an effort to standardize the finished soaps.

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