

HERBAL SOAP: AN OVERVIEW

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ABSTRACT

Herbal soaps are increasingly valued for their powerful benefits and minimal side effects, outshining synthetic alternatives. They not only serve as effective skin care solutions but also address various skin conditions and infections. Infused with one or more potent herbs, herbal soaps offer a higher safety margin compared to commercial soaps, making them a preferred choice for many. As demand for natural skincare rises, these formulations are gaining popularity for their ability to nourish and protect the skin. This review highlights the antibacterial, antifungal, and antimicrobial properties of the diverse herbs used in crafting these beneficial soaps.

KEY WORDS: *Herbal soap, anti-bacterial activity, anti-microbial activity, antifungal activity.*

INTRODUCTION

Plants with medicinal properties have been used as traditional medicine since ancient times ⁽¹⁾. Traditional medicinal system is used in India because it has high safety, high quality, reasonable quality procedures, highly innovative packaging concept and ideas, fully informative drug use literature. Medicinal plant plays an important role in almost all traditional medicine. India has a rich heritage of traditional systems of traditional medicine and healthcare. The WHO estimates that about 80% of the population living in developing countries relies exclusively on traditional medicine for their primary health care needs⁽²⁾.

The traditional system of medicine aims to integrate social and cultural heritage in different countries around the world. The traditional system of medicine is also known as alternative medicine or complementary medicine. The Indian traditional system includes various systems such as Ayurveda, Siddha and Unani⁽³⁾.

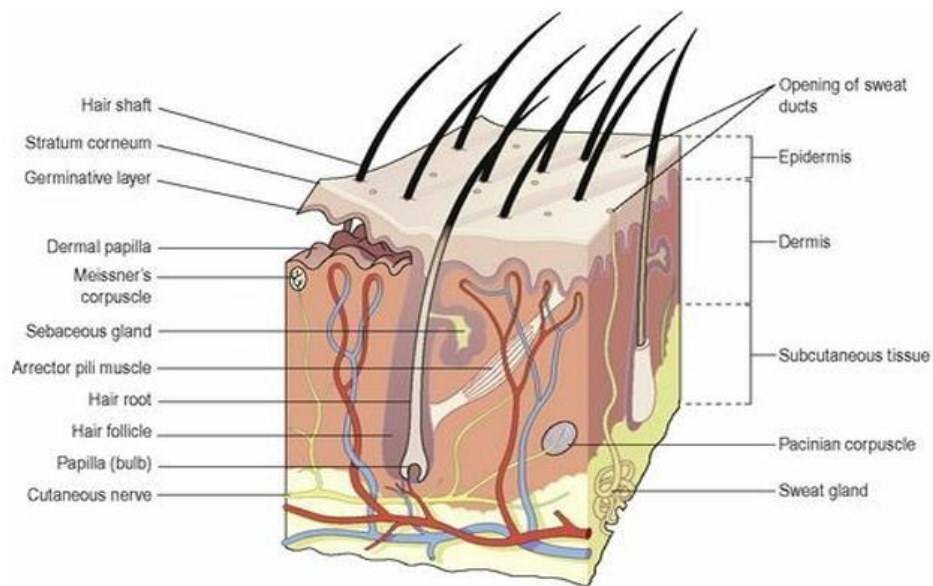
Although the term "drug discovery" mainly refers to the isolation of molecules with activity, so isolation is carried out through the extraction process. Extracting raw medicines from the leaves, stems and roots of plants is used to treat a variety of diseases⁽⁴⁾. Medicinal plants serve as an effective source for both traditional and modern medicine. The preparation of herbal soap is popular for the treatment of various skin infections because it contains natural ingredients with minimal side effect⁽⁵⁾. A person suffering from skin problems such as dandruff, itching, acne, contact dermatitis is advised to use soap according to specific skin care products such as skin type and related problems of the patient⁽⁶⁾. Skin is the first line of defence in the human body, skin makes up upto 15% of the total body weight, because it is the largest organ, and it prevents the body from the environment⁽⁷⁾. Soap is a very traditional medicinal system⁽⁸⁾. Soap is the salt of fatty acids, which is widely used in the types of cleaning and grease products. The basic process of soap making is called saponification⁽⁹⁾. These preparations are becoming more popular in today's world. Soap has been used for almost 6000 years in our daily life and history.

Herbal soaps can be traced back to ancient civilizations, where people utilized natural ingredients for skin care. Pharmaceutical soaps are natural soaps in which natural bioactive ingredients are sorted into an alkaline soap medium to impart a wide variety of biological activities to the final product⁽¹⁰⁾. Natural products, due to their high medicinal value, cost-effectiveness, compatibility, are used to treat almost all diseases and skin problems. Herbal soap ingredients are derived from nature and are free of synthetic additives and artificial Flavors. Herbal ingredients are used in the formulation of herbal soaps, and in addition to their nutritional value, many herbs are found to have antibacterial, antifungal, antihelminth, anti-inflammatory, antihypertensive, anti-bleeding, anti-diabetic, and antidiuretic properties⁽¹¹⁾.

Commonly used ingredients in medicinal soaps are,

- Coconut oil
- Olive oil
- Neem oil
- Turmeric
- Sandalwood
- Venivel
- Jasmine and
- Lemon⁽¹¹⁾.

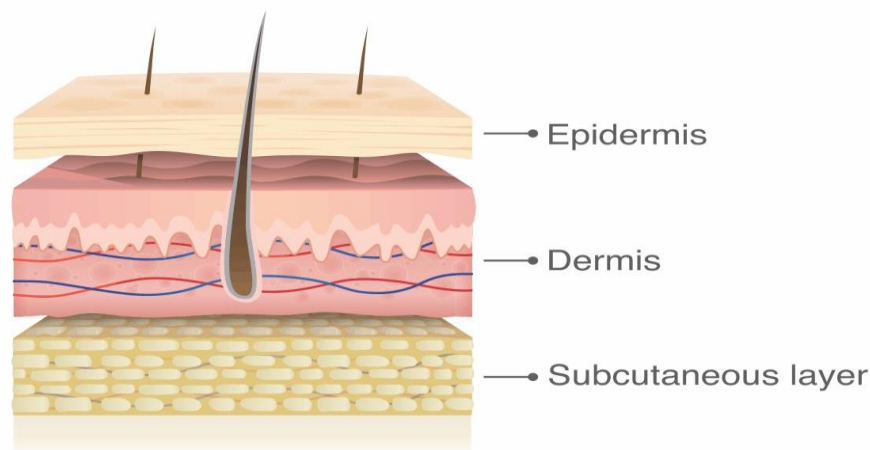
ANATOMY OF SKIN (12)



The skin is the largest organ in our body, protecting the environment in which the body is formed, and it has a surface area of about 1.5 to 2 m². It contains, hair and nails. The layer between the skin and the underlying structure, called the subcutaneous layer.

The skin is made up of three main layers,

- Dermis
- Epidermis
- Hypodermis.



Epidermis

The epidermis is the most superficial layer of the skin and the epidermis is composed of stratified keratinized squamous epithelium. The stratified keratinized squamous epithelium varies in thickness in different body parts, it is thickest on the palms of the hands and soles of the feet. The epidermis does not contain any blood vessels or nerve endings and the deeper layers are bathed in interstitial fluid from the dermis, which provides oxygen and nutrients, and drains away as lymph.

Dermis

The dermis is a tough and elastic layer of skin that is formed from connective tissue and the matrix contains collagen fibres. Collagen fibres bind to water and give the skin tensile strength. Macrophages and mast cells are the main cells in the dermis.




The structure of the dermis contains,

- Blood vessels
- Lymphatic vessels
- Sensory (somatic) nerve endings
- Sweat glands and their ducts
- Hair, erector hair muscles, and sebaceous glands.

Hypodermis

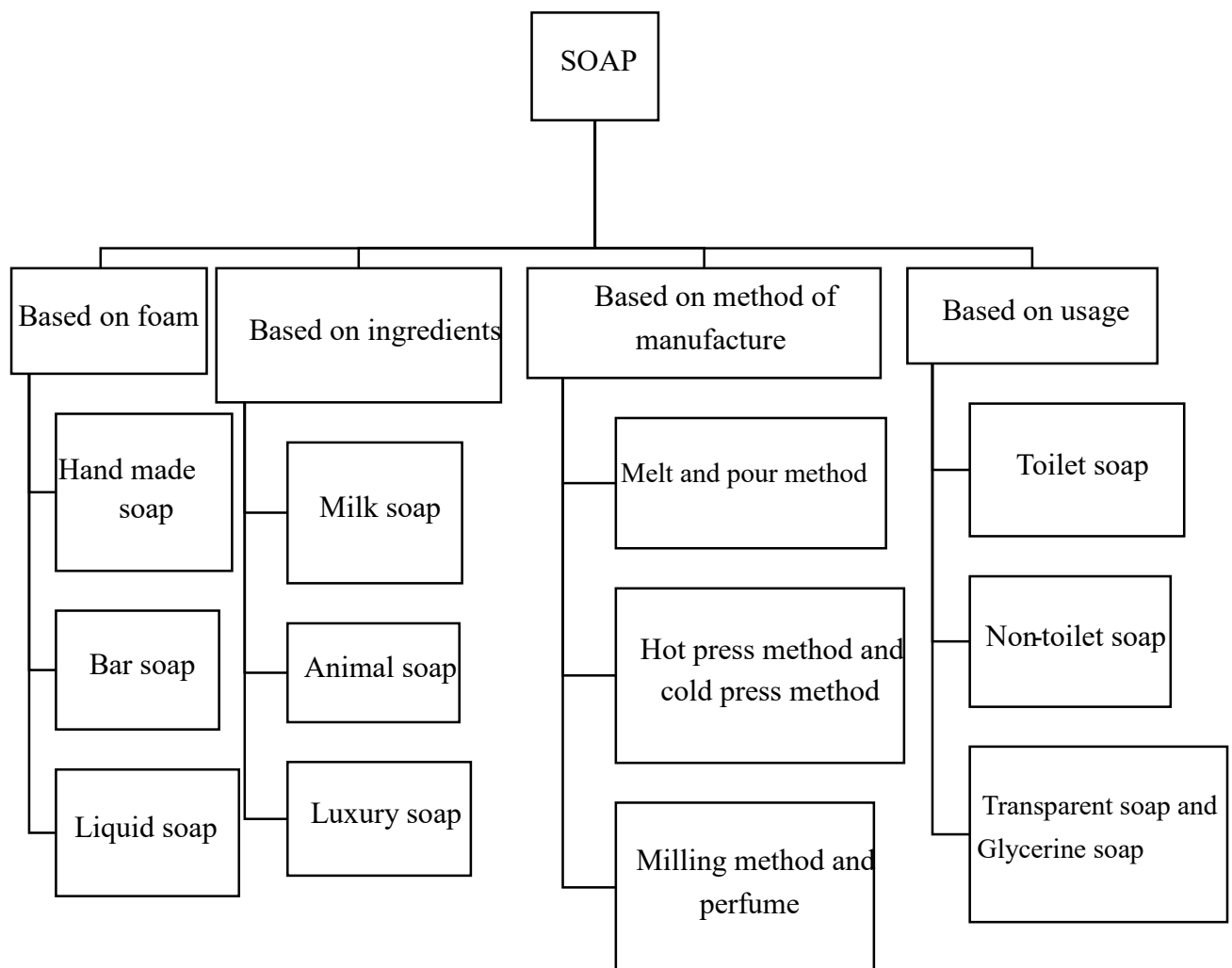
The subcutaneous tissue is the deepest layer of the skin, located below the dermis. It is made up of adipose (adipose) tissue and loose connective tissue that provides insulation, cushioning, and energy storage. Larger blood vessels and nerves are found in the subcutaneous tissue, providing nutrients to the skin and underlying tissues. Subcutaneous tissue plays an important role in temperature regulation and buffering mechanical shocks.

TYPES OF SKIN AND ITS BASIC CARE ⁽¹³⁾

| S.NO | TYPES | IMAGES | CHARATERISTICS | BASIC CARE |
|------|-------------|---|---|---|
| 1 | Normal skin |  | It is well balanced not oily or dry, few imperfections, radiant complexion. | Cleansing Moisturizing Sun protection. |
| 2 | Oily skin |  | It has enlarged pores, shiny appearance, prone to blackheads and acne. | Cleansing Exfoliating Moisturizing Sun protection. |
| 3 | Dry skin |  | It is flaky, rough texture, less elasticity, visible lines and dull. | Cleansing Moisturizing Hydrating Sun protection. |

| | | | | |
|---|------------------|---|--|--|
| 4 | Combination skin |  | It has oily T-zone with dry or normal cheeks | Cleansing Moisturizing Exfoliating Sun protection. |
| 5 | Sensitive skin |  | It is easily irritated, prone to redness, itching and reactions. | Cleansing Moisturizing Avoiding irritants Sun protection. |

CLASSIFICATION OF SOAP⁽¹⁴⁾



PHARMACEUTICAL EXCIPIENTS USED IN SOAP⁽¹⁵⁻¹⁷⁾

Listing of pharmaceutical excipients used in formulation of soap are,

- Emollients
- Moisturizer
- Moisturizer
- Sealant
- Skin cleanser
- Anti-irritation
- Foam accelerator
- Colorants

EMOLLIENTS

An emollient is an agent used to impart and maintain the softness and flexibility of the skin, often used to improve the overall appearance of the skin.

Aliphatic esters, alkoxyated ethers, and alkoxyated alcohols are used as ingredients. Emollients are used in 1-3% compounds and these compounds are stable under normal soap conditions.

HUMECTANTS / MOISTURIZERS

Moisturizers and moisturizers are agents used to condition the skin, which can improve the moisture content and moisturizing ability of the skin. The effectiveness of a moisturizer or moisturizer depends on the humidity in the environment. It has a range of 0.1% to 10% use, and humectants are hygroscopic substances that are usually soluble in water.

Examples: sorbitol, fructose, glucose.

OCCLUSIVE AGENTS

Occlusives are substances or ingredients designed to prevent moisture from being expelled from the skin, thus being used to keep the skin soft and smooth. They are liquid in nature and are added to achieve the desired effect, so-called dry skin products, with an occlusive range of 1-10%. Higher grades may make the soap too soft and sticky, causing squeezing and pressing problems.

Example: beeswax, castor oil, coconut oil.

DERMABRASIVE / EXFOLIATING AGENT

Skin cleansers are used in combination with cleansers to remove the outermost layer of the corneal layer by scrubbing. These dermabrasions make the skin feel smoother.

Examples: cellulose, polylactic acid

ANTI-IRRITANTS

Anti-irritants are agents used in soaps to reduce irritation to the skin. There are several ingredients on the market with anti-irritant properties, such as sucrose esters, α -bisabolol, lactate, and ethoxylated vegetable oils, which are used to reduce the irritation of the product.

FOAM BOOSTER

Foam enhancers, also known as secondary surfactants, are used to improve the performance of the rod, thereby improving skin sensation and reducing irritation caused by primary surfactants, which increase solubility or improve the quality and quantity of foam. Typically, they are added at low levels of less than 5% as adjuvants to the main surfactant.

Examples: Alkyl sulphates - SLS and SLES.

COLORING AGENTS


Colouring agents are substances that are used to give a product an aesthetic appearance. The colorant used in formulation must be approved and certified by the Food and Drug Administration (FDA).






Example: FD and C, D and C dyes and varnishes






USES OF HERBAL SOAP





- Herbal soaps are used to clean pimples, darts and pimples.
- Herbal soaps are used to brighten the skin and effectively fade fright.
- Herbal soaps are used to remove black heads and white heads.
- Herbal soaps are used to reduce skin darkening.
- Herbal soaps are used to treat skin conditions such as eczema and psoriasis.
- Herbal soaps are used to minimize body odour and preserve freshness⁽¹⁸⁾.

HERBS USED IN FORMULATION OF HERBAL SOAPS. (1-19)

| s. no | Herb | Photo | Biological source and family | Part of plant used | Chemical constituents | Uses |
|-------|---------------|---|---|--------------------|---|--|
| 1 | Vitex negundo |  | <i>Vitex negundo</i> plant and Verbenaceae | Leaves | flavonoids, essential oils, flavonoid glycosides, terpenes, lignans, stilbene derivative and iridoid glycosides | Anti-inflammatory, Anti-oxidant, Analgesic, Anti-pyretic, Anti-bacterial, Anti-tumor, Anti-arthritis, Anti-amnesic |

| | | | | | | |
|---|--------------------------|---|--|----------------------------|--|---|
| 2 | Neem |  | <i>Azadirachta indica</i> and Meliaceae | Leaves | Quercetin, Nimbosterol, Nimbin. | Anti-viral, Anti-diabetic, Anti-microbial, Anti-bacterial and Anti-pyretic |
| 3 | Acalypha indica |  | <i>Acalypha indica</i> plant and Euphorbiaceae | Leaves | Alkaloids, catechol's, flavonoids, phenolic compounds, saponins and steroids. | Diuretics, anthelmintic, respiratory problems, rheumatoid arthritis, to cure scabies and other skin infections. |
| 4 | Piper aduncum |  | <i>Piper plant</i> and Piperaceae | Leaves | Monoterpenes, sesquiterpenes and phenylpropanoids | Anti-microbial, Anti-inflammatory Anthelmintic and Analgesic effects |
| 5 | Macroptilium lathyroides |  | <i>Also known as the phasey been</i> and Fabaceae | Leaves Flowers Seeds | crude protein (PB), total lipids (TL), phosphorus (P), potassium (K), calcium (Ca) and magnesium (Mg). | Food source soil conditioner or livestock treating various ailments. |
| 6 | Aloe vera |  | <i>Dried latex of leaves</i> and Liliaceae | Leaves | Aloresin A, lophenol, cycloartenol and emodin. | Anti-hyperglycaemic, Antioxidant, Anti-inflammatory, Anti-hyperlipidemic and Immunomodulator. |

| | | | | | | |
|----|-------------------|---|---|--------|--|---|
| 7 | Reeta |  | <i>Sapindus mukorossi tree</i> And Sapindaceae | Seed | Flavonoids Alkaloids and Tannins | Anti-fungal Anti-bacterial Natural Surfactants Cleansing properties, detergents |
| 8 | Punica granatum |  | <i>Also known as pomegranates</i> and Lythraceae | Leaves | Tannins, Anthocyanins, pelargonidin. | Anti-oxidant, Anti-inflammatory, Anti-cancer and Anti-angiogenesis activities. |
| 9 | Coffee |  | <i>Dried ripe seed</i> And Rubiaceae | Seed | Caffeine Tannin Thiamin Xanthine Spermidine | To treat diabetes, cancer, heart disease, high blood pressure, dementia. |
| 10 | Papaya |  | <i>Carica papaya</i> And Caricaceae. | Fruit | Protein, fat, fibre, carbohydrates, minerals, calcium, phosphorus, iron, vitamin C | Treating various ailments, such as warts, cancers, syphilis, haemorrhoids, intestinal worms |
| 11 | Lerak fruit |  | <i>Sapindus rarak</i> and Sapindaceae | Fruit | Alkaloids, Polyphenols, and Flavonoids | Anti-fungal Anti-bacterial Natural Surfactants Cleansing properties, detergents. |
| 12 | Tridax procumbens | | <i>Tridax daisy,</i> and Asteraceae | Leaves | Triterpenoids, saponins, phenolic compounds | Anti-anaemic, Anti-inflammatory, Anti-diabetic |

| | | | | | | |
|----|--------------------------|---|---|------------------|--|--|
| | |  | | | | and Anaesthetic properties |
| 13 | Terminalia chebula |  | <i>It is known as chebulic myrobalan and combretaceae</i> | Fruits | Chebulinic acid, Tannic acid, Vitamin C, arachidic, Behenic, Linonic, Steric acid. | Anti-bacterial, Anti-fungal, Anti-viral, Anti-diabetic, Anti-mutagenic, Anti-oxidant, Anti-ulcer and Wound healing properties. |
| 14 | Senna macranthera |  | <i>Senna is dried leaflets and Leguminosae</i> | Dried roots | Flavonoids, Tannins, and Coumarin. | Used as an ornamental plant in gardens and as a medicinal plant for treating various ailments. |
| 15 | Salvinia auriculata aubl |  | <i>Eared watermoes and Salviniaceae</i> | Roots and leaves | Stigmasteroe, stigmasterol, diketosteriod | Used as an anti-microbial, anti-oxidant, biosorbent, phytoremediative. |

INVITRO ANTI-BACTERIAL, ANTI-MICROOBIAL AND ANTI-FUNGAL STUDIES OF ABOVE – MENTIONED PLANTS. (1-19)

ANTI-BACTERIAL STUDIES

Usually, antibacterial activity was carried out by the disc diffusion method against *Staphylococcus aureus* bacteria. Inoculating a colony of test organisms in tryptic soy broth (TSB) to produce a new bacterial culture. They were evenly dispersed on bacterial inoculum (0.2 ml) tryptic soy agar (TSA) media. The sterile paper disc was prepared in about 6 mm size and piped different concentrations of hand soap. This paper disk was dried in laminar airflow before being transferred to TSA containing bacterial inoculum.

Dettol liquid soap was used as a positive control and sterile distilled water was used as a negative control. The culture media is incubated at 37 °C for 24 hours and the containment zone is observed and reported.

ANTI-MICROBIAL STUDIES

Antimicrobial action is carried out using good diffusion techniques of microorganisms such as gram-positive bacteria (*Staphylococcus aureus*, *Escherichia coli*) and fungi (*Pseudomonas aeruginosa* and *Candida* spp.). Mueller Hinton agar medium for bacteria and sabouraud glucose agar medium for fungi. Herbal soap extracts of different concentrations are then prepared. The herbal soap extract was placed in the wells of the medium for 24 h, and finally the inhibition area (mm) in diameter was observed and the antimicrobial effect was determined.

ANTI-FUNGAL STUDIES

Antifungal activity was generally assessed using four different microbes such as *Candida albicans*, *Trico phyton rubrum*, *Trico phyton mentagrophytes*, and *Aspergillus fumigatus* according to the agar dilution method on sauropod agar. The extracted soap and primary soap (control) were added to the growth medium in the tubes to give serial double dilution and then absorb the barrier zone during the inhibition period and determine antimicrobial activity.

In addition, antifungal activity was carried out by a well-dispersed method using microbes such as fungi (*Candida albicans* and non-*Albicans Candida* spp.). These fungal pathogens were vaccinated in SDBs, respectively. The fungal inoculum was seeded on SDA plates and the wells were harvested using corn borer then 100 cmL sample was piped into the respective wells and fluconazole was used as a positive control. Plates 30 digs for 48 hours. The zone of inhibition in diameter (mm).

CONCLUSION

The skin is known as the largest organ in our body, and it protects the body's internal organs from the environment. Skin affected by various infections (or) diseases, such as bacterial infections, fungal infections and eczema, psoriasis, acne vulgaris, stress, ulcers, burns, etc., herbal soaps are used to effectively treat these infections. The herbs given above are some examples that are used in soap formulations to maintain healthy skin. Herbal soaps are a formulation with fewer side effects, a high margin of safety, readily available, and more therapeutic activity than synthetic soap preparations. Therefore, in future studies by researchers, the use of herbal soaps has the widest range to maintain skin conditions.

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