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A Systematic Review on Herbal Soap Derived from Plant Extracts

Ajay Sharma[1], Ritu Verma[2]

B. Pharmacy, Mahatma Gandhi College of Pharmaceutical Sciences, Jaipur, India
Email: *ajaysharmaas8112[at]gmail.com*

Abstract: ***Plant derivatives are most popularly considered as a natural ingredient that provides us with an alternative to the prevalent chemical based soaps. This study considers the evaluation of such alternative to strengthen skin care aid, avoiding hazardous synthetic chemical based soaps and replacing them with much safer Herbal soaps. In this study, formulated soap was evaluated for distinct physicochemical attributes, pH, Color, Foam forming ability, Saponification and more. The composition of the herbal soap is augmented with botanical extracts, essential oils, and other plant-based ingredients known for their therapeutic properties. These Herbal soaps are generally absent harsh chemicals and synthetic aroma, making them suitable for those with sensitive skin. Herbal soaps are rich in vitamins, antioxidants, and minerals that can help replenish the skin, curtail inflammation, and promote healing. The preparation was evaluated for number of parameters to ensure its safety and efficacy.***

Keywords: Herbal Soap, saponification, botanical extracts, synthetic, skin care

1. Introduction

Persons having skin issues like dryness, itching, acne, contact dermatitis are referred by Dermatologist and advised to use specific skin care products including specific type of soap according to skin type and related issues of patient.[1] The word cosmetic comes from the Greek word "Kosmetikos" which means having strength, set skill decorative [2]. Chemically soaps are the combination of fats, oils (of animal or vegetable origin) and Salt. Soaps are generally salts of free fatty acid made via saponification, where alkaline substances react with fatty acids in fats or oils [3].

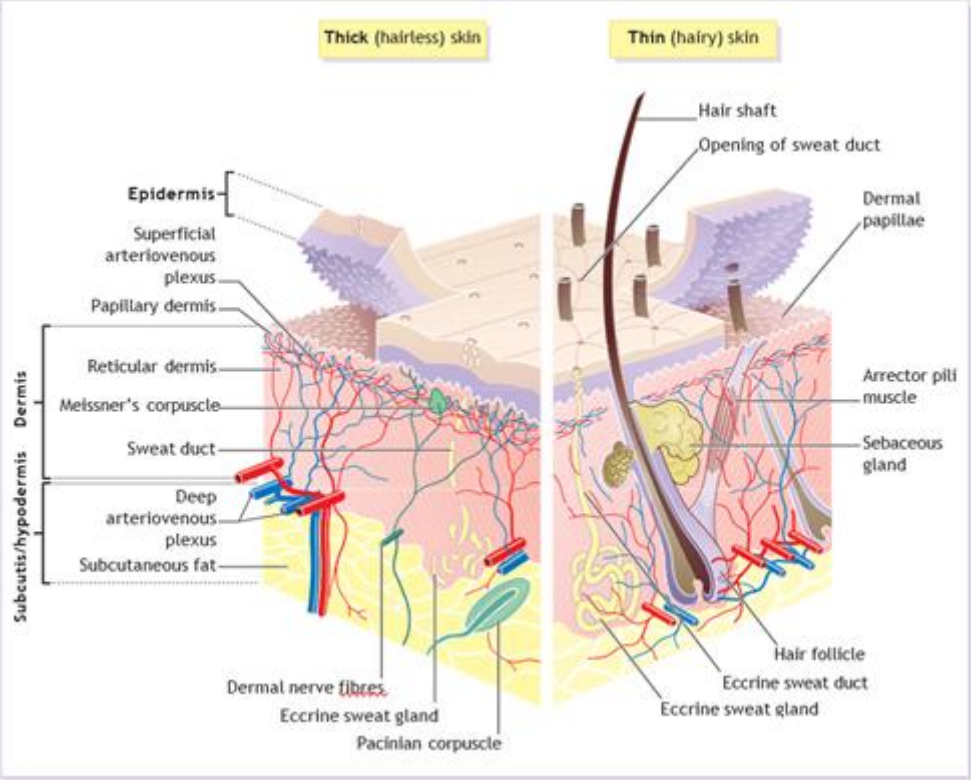
Natural products with high medicinal values could be employed in the treatment of various skin related issues. Herbal products have proven to be cost effective and adaptability to all types of formulations. The active components are employed for skin diseases as creams, ointments and soaps.

Herbal soap preparation is a medicine or drug. It contains Antibacterial and antifungal agents which mainly uses part of plants such as leaves, stem, roots and fruits to treat an injury or disease or to achieve good health[4]. This preparation possess antimicrobial property are administered topically and available to apply in various forms like creams, lotion gel, soap, solvent extract or ointment. The variety of creams and soap properties have been used to treat various skin disorders [5].

Herbal soaps are usually handmade and have 100% organic ingredients which impart only goodness to skin and are safe to environment too. Some herbs work well to naturally color your products. Some herbs are wonderful for relaxing and stress relief. Other herb additives will provide benefits to the skin, such as reducing acne or soothing irritation. Plus, there are herbs that contain a variety of healthy minerals and vitamins that are very beneficial. Herbal soaps are made of organic natural substances; they result in smoothening and rejuvenating the skin. Even the fragrance of herbal soap relaxes the mind without affecting environment. They will be devoid of artificial color and aroma. Moreover, chemical soaps have animal fat and lack the essential oils from plant extract which give a natural and pleasing aroma [6-9]

Skin:
Skin is pretty essential for all health care professionals to achieve maximum information about the function and structure of human skin. Skin is also referred to as cutaneous membrane. In adults, the skin has a surface area rangingfrom1.2 to2.2m^2.

Three Primary Layer of Skin:
a) Epidermis
b) Dermis
c) Hypodermis



Different skin types are normal, dry, oily, combination, or sensitive types.

Skin Related Issues:[1]
High alkaline soap means there are lots of un-saponified lye left in soap, it can irritate skin. This is especially so for anyone with sensitive skin, including young children. Irritants in traditional soaps can cause dryness, contact dermatitis, inflammatory acne and throw off the delicate pH balance your skin maintains for both face and body.

- **Contact Dermatitis**

Soap bars containing a potent antiseptic, tetrachlorosalicylanilide (TCSA), can leave with some fairly serious side effects. The parts of body exposed to an irritant, like TCSA or even strong fragrances in harsh soap and cosmetics, can break out into a red, often itchy rash accompanied by dry, cracking skin, oozing blisters, swelling and burning.

- **pH Damage**

The acid mantle, a thin, protective layer, is primarily composed of sebum; the skin‘s naturally produced oil. Its integrity is susceptible to irregularities caused by internal and external factors, like diet, pollutants and harsh soaps. In a study on the effects of soap and detergents on skin surface pH in infants, the greatest increase occurred after washing with alkaline soap.

- **Dryness**

Harsh cleansers can strip the skin‘s natural oils, leading to dryness and irritation. Surfactants in cleansers can damage proteins and lipids in skin, leading to tightness, itching, dryness and barrier damage after washing, according to a study published in Dermatologic Therapy.

- **Inflammatory Acne**

Cleansing agents such as harsh soap with a higher pH may damage the acid mantle‘s natural antimicrobial defences and lead to acne vulgaris, among other conditions, according to a study published in Skin Pharmacology and Physiology.

2. Literature Survey

Saponification: Technically, Soaps are very long hydrocarbon chains of carboxylate salts. Soap can be made from the base hydrolysis of a fat or an oil. This hydrolysis is called saponification. Traditionally, soaps were made from animal fat and lye (NaOH).

History of cleansing

Way before the soap was originated, ancient India’s main source for cleansing were soap nuts , also known as Soap berries , extracted from Sapindus Saponaria plant. Here, Sap means “Soap” and Indus means “India” (Soap from India).

Similarly, this nut was used in ancient China, Middle East spanning to Europe. Ancient Indian Skincare practice was not just confined to soap nuts, but was improved with the usage of a variety of herbs like neem, tulsi, turmeric, sandalwood and many more.

The Chemistry of Soap

Saponification, as mentioned above, is the process for making soaps using hydrolysis. The prevailing method is to heat animal fat or vegetable oil in sodium hydroxide and hydrolyzing it into carboxylate salts and glycerol.

Herbal Soap: Basic Ingredients and Various Herbs [1]

- **Lye / Sodium hydroxide**

Soap making is essentially the chemical reaction between oils and lye, which in cold process soap making is sodium hydroxide. Together and through the wonder of chemistry, they will form a completely new compound — soap.

- **Distilled water**

Distilled water in soap making to activate the lye and disperse it through the oils. Most of this water evaporates out of bars during the curing process.

- **Oils & Fats**

Different oils give different properties to soap including hardness, lather, creaminess, and conditioning. Most soap recipes are also super-fatted. Common oils, fats, and butters used in soap making are Castor oil, Coconut oil, Cocoa butter, Grapeseed Oil, Neem oil, Olive Oil, Palm oil, Sunflower oil, Almond oil etc.

- **Antioxidants**

Soaps may oxidize and go rancid depending on the oil .To combat rancidity, and help soap have a longer shelf-life, soap makers use two main antioxidants : grapefruit Seed Extract(GSE) and Rosemary Oleoresin Extract(ROE)

- **Soap Fragrance**

The most common way to scent soap is with either essential oils or cosmetic grade fragrance oils. Essential oils are concentrated plant and flower extracts and come in a fairly extensive range.

- **Fragrance oils**

Fragrance oils are commercially produced perfumes for the toiletry and home industry. They're relatively inexpensive, have a scent that lasts ages, and have a much more varied range to choose from. All fragrance oils are not skin-safe.

- **Soap Colours**

In natural soap making have several options for colouring the soap which will include powders which can be purchased from specialty suppliers and even flowers and plants that could be growing in garden right now. Other options could include clays, plant extracts, or ingredients that will caramelize and give a warm colour to the finished product.

a) Some of your base oils, such as olive oil, will impart a more yellow or creamy colour. White and/or light-coloured oils will create white soap.
b) Cosmetic clays can add beautiful natural colour to your soap and come in a range of shades including blue, brown, yellow, green, and pink.
c) Sugars: milk, sugar, and honey will caramelize if you add them to your batch before trace. They'll do the same thing if your soaping temperature is warm enough — over 105F in my experience.
d) Herbs, Flowers, & Roots: Nature creates all types of wonderful colours useful in soap making. Use calendula petals for golden orange, alkane root for purples, and madder root for pink.

- **Botanicals**

The word botanicals simply mean natural fruit, flower, leaf, and root additives that impart either colour, visual interest, or exfoliation to your soap. There is some conjecture as to how much of the original properties found in these ingredients survive the soap making process. However, many are useful in adding colour, texture, and decoration.

Problem Definition

- Describe Soap making process.
- Explain with the use of a table , different types of herbal soaps available.
- Devise evaluation parameters to test herbal soaps.

3. Methodology/ Approach [10]

Turmeric is arhizomatous herb aceous perennial plant of the ginger family Zingibereace. It is native to the Indian subcontinent and South East Asia. The major phytochemical constituents present in the turmeric extract are curcumin. It is found to have very good antioxidant, anti-inflammatory action. Turmeric plants are rich in a wide variety of secondary metabolites such as tannins, terpenoids, alkaloids, anthraquinones, and flavonoids (Table1).Generally, fewer side effects have been observed in herbal soap as compared to other chemical preparations. The present study focuses on a novel soap formulation with the turmeric extract, Aloevera, and holy basil (tulsi) having medicinal properties which can also be used as regular bath soap.

Table 1: List of Herbs with its Functional Properties use to Formulate Herbal Soap [11–18]

Aloe Vera Leaf Powder (Aloebarbadensis) Asphodelaceae		• Helps skin with irritation, sun burn, or inflammation. • This herb is soothing and contains antioxidants, vitamin C, and other minerals (which allow the skinto heal faster than it normally would).
Beet Root Powder (Betavulgaris) Amaranthaceae		• Imparts shades of pinks and light reds. • It has nutrients, such as beta-carotene, vitamin B5, vitamin B1, vitamin C, glycine, magnesium, phosphorous, potassium, selenium, tryptophan, tyrosine, and zinc.

Orange Peel Powder (Citrussinensis) Rutaceae		• It has lovely citrus scent • It has anti- microbial and anti-bacterial properties.
Pomegranate Fruit Powder Herbs (Punicagranatum) Lythraceae		• It has high level of antioxidants and vitamins, which leads to promoting healthy cell growth by nourishing the skin. • It has anti-inflammatory and anti-aging properties.
Green Tea PowderHerbs (Camelliasinensis)Theaceae		This herb has both antioxidant properties and gentle exfoliation abilities that make it nice for softening skin.
Cocoa Powder Herbs(Theobroma cacao) Malvaceae		• It is rich in smell and many vitamins and minerals, • Cacao beans are rich in vitamins A, B1, B2, B3, C, E and pantothenic acid. Plus, they are rich inmagnesium, calcium, iron, zinc, copper, manganeseand potassium. • It contains caffeine, which is actually beneficial to the skin.
Chamomile (Matricariachamomilla) Asteraceae		• It helps to relieve acne, wounds, cuts, burns, rashes, and even insect bites. • It also treats restlessness, trauma, anxiety.
TeaTree Oil (Melaleucaalternifolia) Myrtaceae		• It helps to penetrate the skin from its crucial condition and excessive exposure from chemical ingredients. • This penetration capability is the main reason to allow these natural herbs to function remarkably well.
Peppermint (Menthapiperita) Lamiaceae		• Peppermint can be the best and alternative option treatment for the skin to relieve illness and health skin problems. • It is helpful for vomiting, lymph nodes, nausea, sinusitis and respiratory infections.
Neem oil (Azadirachatindica) Meliaceae		It cures the burning and soreness while lessening the redness of the erratic lesions.

Sandalwood (Santalumalbum) Santalaceae		• It is having an essential oil that helps to dampen and hydrate the dry and aging skin. • It also relieving the irritation and itching for some greasy skin conditions.
Tumeric (Curcumalonga) Zingiberaceae		It is used outwardly for skin injuries and minor sores, ring worm wounds, and especially athletes' foot.
Basil (Ocimumbasilicum) Lamiaceae		• It is helpful for skin irritation, stings, snake and insect bite, and skin acne. • It is also considered as a key ingredient for rubbing aromatic body that relaxes the skin.

Evaluation Parameters:

1) Herbal Soap pH: The soap prepared must be tested for its pH. The pH of the herbal formation is expected to be between 6.5 to 7, which is optimum for its utilization on the skin. Higher as well as lower pH refers to the harmful effects on the skin.
2) Colour: The prepared soap must be visualized to determine its colour.
3) Foam forming ability: The herbal soap is also tested for its foam forming ability .
4) Foam retention time: it refers to the time interval between the foam forming and foam disappearance.
5) Saponification value determination: The amount of Potassium Hydroxide in milligramswhich is required for the complete saponification of fat or oil of 1 gm. In either word it isdefined as the mean of molecular weight of fatty acid which is present in oil or fat. [1]
6) Determination of Total Fatty Matter: The procedure for the analysis of total fatty matter present in the soap sample is carried out by the reaction of the soap with an acid in association of hot water.

4. Conclusion

Herbal cosmetic in India is gaining its place in the market. Natural products are the main source for these polyherbal soaps that have next to zero side effects. The soaps prepared from various herbs and their extracts are tested for various evaluation parameters and are expected to exceed the expectations. Moreover, a standard for the herbal soaps was created based on the evaluating parameters and physicochemincal properties like pH, colour, foam .

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