



## Development Of Antiseptic Soap By Using *Calendula Officinalis* And *Althaea Officinalis*

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### Abstract

Ayurvedic cosmetics are also known as the herbal cosmetics the natural content in the herbs does not have any side effect on the human body most herbal supplement are based on several botanical ingredients with long histories of traditional or folk medicine usage. Among the numerous botanical ingredients available in the market today. Numerous chemical toxins microorganism present in the atmosphere may cause chemical infection and damage to skin cosmetics alone are not sufficient to take care of skin and body parts. *Calendula officinalis* and *Althaea Officinalis* has attracted worldwide prominence owing to its wide range of medicinal properties, *Calendula officinalis* and *Althaea Officinalis* and its constituents have been demonstrated to exhibit anti-inflammatory, antihyperglycemic, antiulcer, antimalarial, antifungal, antibacterial, antimutagenic and anticarcinogenic properties. This study was conducted to evaluate the effect of aqueous, ethanolic and ethyl acetate extract from *Calendula officinalis* Petals and *Althaea Officinalis* Roots.

**Keywords:** Vaccume Distillation, Hydro Distillation, Soap.

### INTRODUCTION

Other mammalian species, particularly pig skin, and human skin have similar anatomical, physiological, biochemical, and immunological characteristics. Human skin and pig skin both have ratios of epidermal and dermal thickness. Pig and human skin have comparable blood vessel and hair follicle patterns, dermal collagen and elastin contents, and physical responses to various growth factors. Pig and human skin also have similar dermal collagen and elastin contents. [1,2] Skin has mesodermal cells, which absorb some of the potentially harmful ultraviolet radiation (UV) from sunlight. Pigmentation, such as melanin, is provided by melanocytes. Additionally, it contains DNA repair enzymes that aid in undoing UV damage; consequently, skin cancer rates are higher in people who lack the genes for these enzymes. Malignant melanoma is one type of cancer that is primarily caused by UV light. It is particularly invasive, spreads quickly, and is frequently fatal. Human skin pigmentation varies dramatically between populations. As a result, people are now categorised according to their skin tone. [3] The inside of the small intestine is 15 to 20 times larger than the skin's surface area, making the skin the second largest organ in the human body. The skin's surface area for the typical adult human is between 1.5 and 2.0 square metres (16 to 22 square feet). Skin thickness varies greatly between men and women, the young and the old, and across the entire body. A good example is the forearm's skin, which measures 1.26 mm for women and 1.3 mm for men on average. [4] The average square inch (6.5 cm<sup>2</sup>) of skin contains more than 1,000 nerve endings, 650 sweat glands, 20 blood vessels, and 60,000 melanocytes.[3-5] (Better source is required) There are variations, but the typical human skin cell has a diameter of about 30 micrometres (m). A skin cell typically has a surface area of 25 to 40 m<sup>2</sup>, depending on a number of variables. The epidermis, dermis, and hypodermis are the three main layers of skin.

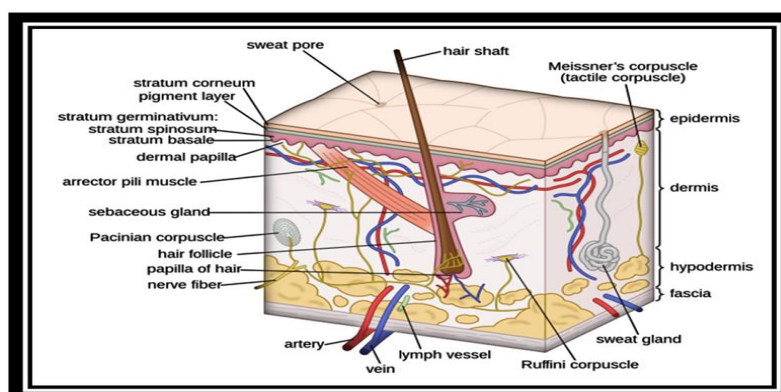


Fig. 1: Human Skin Structure

## **Epidermis**

The outermost layer of skin is called the epidermis; the Greek prefix "epi" means "over" or "upon". It is made up of stratified squamous epithelium with an underlying basal lamina and acts as the body's waterproof, protective wrap that also acts as a barrier to infection. The epidermis lacks blood vessels, and the deepest layers' cells are almost entirely supplied with diffused oxygen from the environment. [6] and to a much lesser extent by blood capillaries that reach the dermis' outermost layers. The Merkel cells, keratinocytes, melanocytes, and Langerhans cells are the primary cell types that make up the epidermis. Starting with the outermost layer, the epidermis can be further divided into the following strata: corneum, lucidum (only on the palms of hands and soles of feet), granulosum, spinosum, and basale. At the basal layer, mitosis produces new cells. When the daughter cells (see cell division) are separated from their blood source, they die and move up the strata, changing their composition and shape. The keratin protein is inserted after the cytoplasm has been released. They eventually slough off (desquamation) when they reach the corneum. "Keratinization" is the term for this action. Skin serves as a natural barrier to infection because of its keratinized layer, which also keeps harmful chemicals and pathogens out and water in. [6,7]

The epidermis receives nutrition from the dermis through diffusion and lacks blood vessels. Keratinocytes, melanocytes, Langerhans cells, and Merkel cells make up the majority of the epidermis' cells. The skin uses the epidermis to control body temperature.

## **Layers**

The skin protects the underlying muscles, bones, ligaments, and internal organs with up to seven layers of ectodermal tissue. [8] The epidermis is made up of several layers, the innermost layers of which are where cells undergo mitosis to form. As they differ and fill with keratin, they move up the strata, changing shape and composition. They eventually become "sloughed off," or desquamated, after reaching the stratum corneum, the top layer. Within weeks, a process known as keratinization occurs.

A fibrillar lattice of dead keratin was thought to make up the stratum corneum, which was previously thought to be "a simple, biologically inactive, outer epidermal layer." [9] The stratum corneum should be regarded as a live tissue, contrary to what is now known to be false. [10] Although terminally differentiated keratinocytes known as corneocytes, which are anucleated, make up the majority of the stratum corneum, these cells are still alive and metabolically active until they are desquamated.

## **Sublayers**

The epidermis is divided into the following 5 sublayers or strata:

- Stratum corneum
- Stratum lucidum
- Stratum granulosum
- Stratum spinosum
- Stratum basale

Under the epidermis, there are blood capillaries that are connected to venules and arterioles. It's possible for arterial shunt vessels to avoid the network in the fingertips, nose, and ears.

## **Dermis**

The connective tissue-filled layer of skin below the epidermis is called the dermis, which protects the body from strain and stress by acting as a cushion. A basement membrane forms a strong bond between the dermis and the epidermis. It also contains a large number of nerve endings responsible for the senses of touch and heat. It has blood vessels, lymphatic vessels, sweat glands, sebaceous glands, apocrine glands, and hair follicles. The stratum basale of the epidermis and the dermis' own cells are both nourished and waste is removed by the dermis' blood vessels.

The dermis is structurally divided into two regions: the reticular region, which is deep and thick, and the papillary region, which is nearby the epidermis.

## **Papillary region**

The connective tissue that makes up the papillary region is labile and areolar. Its finger-like projections, known as papillae, that extend towards the epidermis gave rise to its name. The dermis receives a "bumpy" surface from the papillae that interdigitates with the epidermis, strengthening the bond between the two skin layers. The papillae's influence on the epidermis, which projects into the palms, fingers, soles, and toes, shapes the surface of the skin. It is possible to identify people using their fingerprints or footprints because these epidermal ridges form patterns (see: fingerprint) that are genetically and epigenetically determined and distinctive to each individual.

## **Reticular region**

Deep within the papillary region, the reticular region is typically much thicker. Its name comes from the dense concentration of collagenous, elastic, and reticular fibres that weave throughout its dense, irregular connective tissue. Strength, extensibility, and elasticity are characteristics of the dermis that are provided by these protein fibres. The roots of the hair, sebaceous glands, sweat glands, receptors, nails, and blood vessels are also found in the reticular region. The

dermis is where tattoo ink is kept. The dermis is also home to stretch marks, which are frequently caused by pregnancy and obesity.

### **Subcutaneous tissue**

The subcutaneous tissue, also known as the hypodermis and subcutis, is located beneath the cutis' dermis and is not a component of the skin. Its function is to supply the skin with blood vessels and nerves as well as connect it to the underlying bone and muscle. It is made up of elastin, adipose tissue, and loose connective tissue. Fibroblasts, macrophages, and adipocytes are the main cell types (subcutaneous tissue contains 50% of body fat).

The body uses fat as padding and insulation.

### **Anti-Septic Soap**

Numerous people on the planet share the desire to maintain beautiful skin and hair, so using safe cosmetic products is unavoidable. Natural cosmetics with bioactive phytochemical ingredients have greater pharmacological and aesthetic effects while being less toxic to consumers and the environment as a whole. The creation of herbal antiseptic soaps that are plant-based, biodegradable, and free of artificial colorings and preservatives was done using the green chemistry principle. Physico-chemical characteristics such as colour, acid value, free carboxylic acid value, soapification value, hardness, pH, colour, and ability to foam in the oil and soaps were found to be pertinent.

### **Antibacterial soap**

Antibacterial soap is a type of soap that includes chemical ingredients that are supposed to help kill bacteria. Although other chemical additives are frequently used, triclosan is a common ingredient in antibacterial soaps. Both the U.S. Food and Drug Administration (FDA) and some academics have questioned the efficacy of goods marketed as antibacterial.

### **Ingredients**

The most popular antibacterials found in soaps are triclosan and triclocarban. However, benzethonium chloride, chloroxylenol, and benzalkonium chloride are other typical antibacterial components found in soaps.

### **Effectiveness**

It is well known that triclosan can prevent the growth of a variety of bacteria and some fungi, which gives rise to claims that antibacterial soap is effective. Recent studies, however, contend that antibacterial soaps are no more effective than regular soaps at warding off disease or reducing bacteria on users' hands. Due to a lack of data on the long-term health effects of their use as well as evidence of their efficacy, the U.S. Food and Drug Administration banned the use of 17 additional ingredients, including the common antibacterial ingredients triclosan and triclocarban, as well as the common antibacterial ingredients triclosan and triclocarban, in "antibacterial" soaps and washes in September 2016. There is no evidence that over-the-counter antibacterial soaps are more effective at preventing illness than washing with regular soap and water, according to the FDA. The organisation claimed that the FDA did not receive enough information from manufacturers regarding the long-term health effects of these chemicals, despite requests for such information. Hand sanitizer is exempt from this prohibition. This is because alcohol, not triclosan or other similar ingredients, is typically used in hand sanitizers to kill microbes. Anti-bacterial soaps and gels are ineffective and potentially harmful, according to a 2017 statement by 200 scientists and physicians published in the academic journal *Environmental Health Perspectives*. Antimicrobial agents should not be used in paints, textiles, or other products that come into contact with food, according to the statement. In 2017, the British company Unilever announced it would phase out triclosan and triclocarban from its products by the end of the year, adding that they would be replaced by "a range of alternatives, including natural and nature-inspired antibacterial ingredients". In the media, it has been asserted that antibacterial soap prevents the SARS-CoV-2 virus better than regular soap. There is no proof that antibacterial soaps are any better, and there is only weak evidence that they might be long-term worse, according to the CDC and the Food and Drug Administration.

### **What is natural soap?**

Natural ingredients are the foundation of natural soaps. Natural organic ingredients are used in organic soaps. Most organic soaps are made of a mixture of butter and oils from various plants. There are many vitamins, nutrients, and antioxidants in this substance. These substances are necessary for human skin, hair, and other body parts to develop, survive, and/or maintain health. Other healthy ingredients like clays, salts, essential oils, and botanical extracts are frequently added to natural soaps. Although they cost more because they take longer to make and typically contain higher-quality ingredients, handmade soaps are often gentler on sensitive skin. To find the natural soap that is best for your skin type and preferences, it is important to experiment with a variety of them.

### **Benefits of Using Natural Soap**

Real Soap Rather Than "Fake Soap:" Many products marketed or displayed as "cleanser," "body bar," "body wash," "beauty bar," "skincare bar," and even "deodorant soap" are actually detergent-based products and not soaps at all.

### **Natural Soap is Highly Moisturising**

Glycerine is a by-product of the production process and is one advantage of using real soap. Due to its ability to draw moisture to itself inside and outside of the skin, glycerine is a fantastic skin moisturiser. Traditional soaps hydrate the skin while bathing because they contain glycerine, unlike many commercial soaps that can dry out the skin. Why? Because commercial soaps purchased at stores frequently go through a process intended only to remove the glycerine.

### **Better Ingredients Used**

When a business produces hundreds of thousands or even millions of soap bars at once, a portion of the profit margin is gained from mass production and a portion is gained from using the cheapest products available, which are frequently synthetic copies of the real thing.

In addition to potentially harming your skin, many people think that these synthetic products can occasionally be harmful to your endocrine, reproductive, respiratory, and immune systems.(12) It is well known that commercial soaps frequently contain Parabens, Sulphates, and Triclosan, chemicals that are thought to cause allergies, alter hormone levels, and possibly raise the risk of certain cancers. Shea butter, grass-fed tallow, olive and coconut oils, among others, are typically found in natural soaps. These are thought to be very nourishing and healthy for the skin. We offer soap bars with flavours like Patchouli and Cedarwood, to name a couple.

### **Cruelty-Free and Animal-Friendly**

You can be sure that no animals were harmed during the production or testing processes when using natural, organic soaps. Animal fat is only occasionally used in soaps as an ingredient, and most ingredients are organic and don't need to be produced in large-scale factories or other facilities that harm the environment significantly. In contrast, organic producers frequently have smaller facilities and rely on botanical extracts and herbs to create their finished goods. The base of the ingredients are coconut and palm oils, to which are added essential oils from various plants, flowers, spices, and fruits. Natural soaps occasionally contain tallow or lard, which are both animal products, but they will always be labelled as such. Importantly, because these products don't contain pesticides or contain chemicals derived from synthetic sources, no animal testing is required for them. [11-14]

**Wider Choice:** As was already mentioned, a local manufacturer typically produces organic soaps in small batches. Small batches result in more variety of products as well as simpler control. Without needing to retool expensive factory machinery, it is simple to change the scent or style of each batch. Because of this, these soaps can also be easily customised. To give the consumer the most options possible, features like colour, shape, size, texture-whether it's grainy or smooth-scent, batch size, and others are frequently modified. Even organic soaps with coffee, cinnamon, peppermint, or fruit scents are available for purchase.

**Unique, Handmade Product:** Commercial soaps that are mass produced are made with many, many identical units in order to maximise production efficiency. Profit is prioritised, frequently at the cost of the wellbeing of the customers who pay for them. Organic bars are unique in that they do differ slightly from bar to bar, just as natural ingredients differ slightly depending on the climate and other environmental factors during a given year. The absence of harmful ingredients and the abundance of healthy ones in each bar, however, are the only aspects of them that are the same. [15]

**Better for the Environment:** Organic soaps don't release any poisons or toxins that are bad for the environment. After use, the soap degrades more quickly and doesn't harm the water cycle or the wildlife that lives in our rivers, lakes, and oceans. Even if everything else were equal, this eco-friendliness would be a compelling case for using organic soap. They are a clear winner when you factor in the soaps' excellent quality and effectiveness as well as the enjoyment you get from a more interesting product.[16]

**Rich in Antioxidants:** Organic soaps can actually help to repair the skin by reducing inflammation, keeping skin hydrated, and helping the user to have younger-looking, healthier skin because many of the ingredients used in them are natural antioxidants, and because the process doesn't extract these substances for other purposes. Organic soaps typically have a pH level between 9 and 10, which is kinder to the skin and helps you feel and look clean and fresh right away. [17, 18]

## **MATERIALS AND METHODS**

**Materials:** Glycerine, Stearic acid Coconut oil, Sodium EDTA, Castor oil, Sodium chloride of Analytical grade was procured from Sigma Aldrich for the study.

## Formulation of Base

**Table 1: Formulation of Base**

Sr. No.	Ingredients	Quantity for 100%
1.	Stearic acid	27
2.	Coconut oil	7
3.	Castor oil	5
4.	Alcohol	10
5.	Sodium chloride	6.20
6.	Glycerin	9
7.	EDTA	0.25

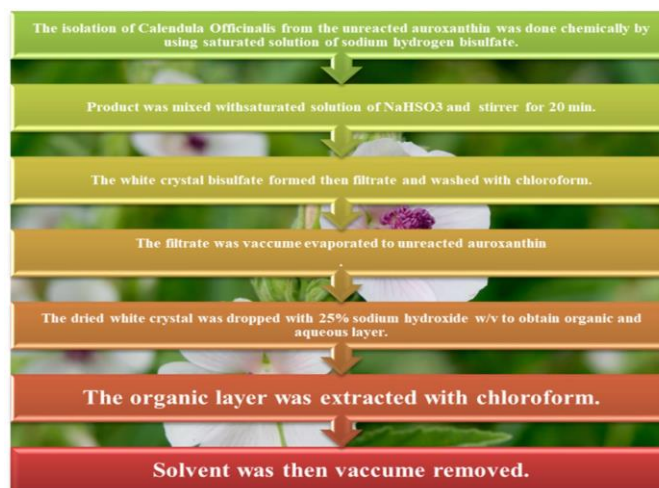
## EXPERIMENTAL WORK

### Extraction of Calendula Officinalis Petals using Vaccume Distillation

**Vacuum Distillation:** Vacuum distillation is the process of distilling under low pressure, which enables the purification of compounds that are difficult to distil at ambient pressures or is done merely to save time and energy. This method divides compounds according to variations in their boiling points. When the desired compound's boiling point is challenging to reach or will result in the compound decomposing, this technique is used. Compounds have lower boiling points at lower pressures. The temperature-pressure relationship can be used to calculate the decrease in boiling point. Vacuum distillation on an industrial scale [19] has a number of benefits. To separate the essential components in close boiling mixtures, several equilibrium stages may be necessary. Vacuum distillation is one method for lowering the number of steps required. With diameters up to about 14 metres (46 feet), heights up to about 50 metres (164 feet), and feed rates up to about 25,400 cubic metres per day (160,000 barrels per day), vacuum distillation is typically used in oil refineries. By preventing product degradation or polymer formation due to reduced pressure and cooler tower bottom temperatures, vacuum distillation can enhance a separation. reduction in mean residence time, particularly in columns using packing rather than trays, which results in less product degradation or polymer formation. Increasing output, purity, and capacity. Vacuum distillation has another benefit in that its capital costs are lower, though operating costs are a little higher.



**Fig. 2: Vacuum Distillation Apparatus**



**Fig 3: Extraction of Calendula Officinalis Petals by Vacuum Distillation**

**Preliminary phytochemical screening:** Standard methods were used & tests were performed for Flavonoids, Glycosides, Alkaloids, Phenols, Tannins, Lipids: [20-25]

#### EVALUATION PARAMETERS

**Table 2: Evaluation Parameter of Antiseptic Soap**

Sr. No.	Parameters	Observation
1	Colour	Light Blue
2	Odor	Aromatic
3	Appearance	Good
4	Size	8.4cm x2.6 cm
5	Shape	Round
6	Foam Height (cm)	2.5
7.	Foam Retention (Min)	3.0
8.	pH	7.3
9.	Alcohol insoluble matter (%)	18
10.	Hightemperature stability	Soap melts above 45°C

#### RESULTS

**Table 3: Patch Test of Soap**

Sr. No.	Parameter	M1	M2
1	Immediately after removal of product	N.R.	N.R.
2	After 24 hrs	N.R.	N.R.
3	After 48 hrs	N.R.	N.R.

N.R = No Reaction

**Table 4: Weight of Oil With Respect To Time**

Weight (g)	Time (mins)
0.40	250
0.45	500
0.50	750
0.60	1000
0.65	1200

The Extract produced by Vacuum Distillation Method is 2.6g weight of oil per 100g of dry Petals sample thereby producing 2.6% Extract yield at 780°C.

**Table 5: Result of Essential Oil Extraction**

Method of extraction	% yield
Soxhletion Method	3.7
Vaccume Distillation	2.6

#### Calculation of Percentage Yield of Extract

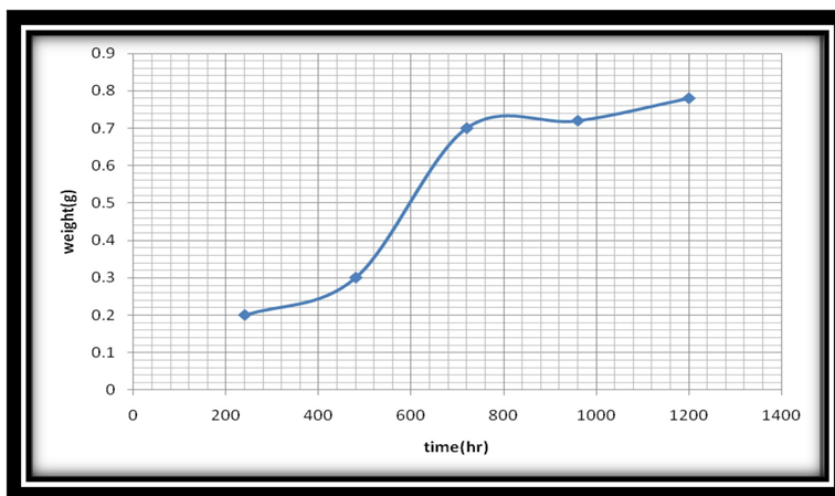
##### Material Balance for Soxhletion Method

- Weight of Althaea Officinalis = 100g
- Quantity of hexane used= 600ml, Quantity of Ethanol used= 200ml
- Weight of beaker= 105.26g
- Weight ethanol and essential oil= 202.7g
- The weight of Extract obtained= 3.7g
- %yield = ME/MN x 100
- Where, ME = Mass of essential oil MC = Mass

Extract sample

- ME = 3.7g MA = 100g
- By substituting values

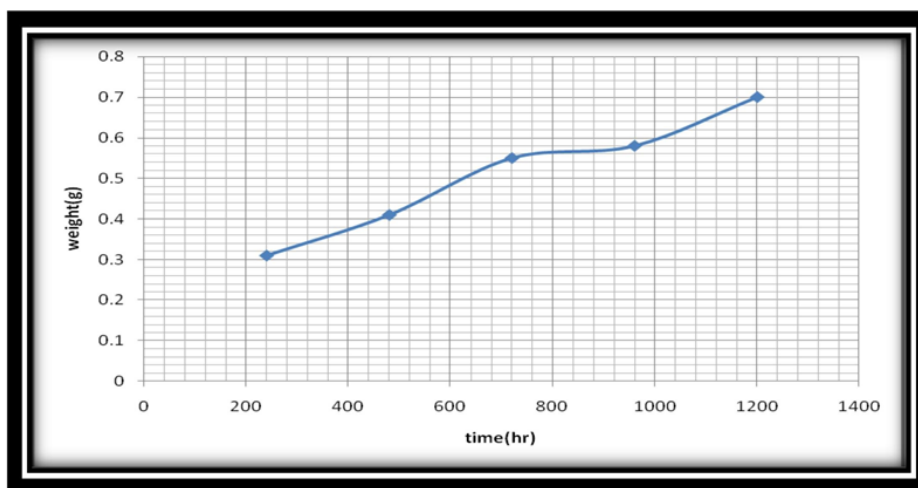
- %yield =  $3.7/100 \times 100 = 3.7\%$
- Therefore % yield= 3.7%



**Fig 4: Graph Below Shows the Plot of the Weight of Extract With Respect To Time for Soxhletion Method**

**Material Balance for Vaccume Distillation Method**

- Weight of Calendula Officinalis Root= 120g
- Quantity of Olive oil used= 600ml, Quantity of Ethanol used= 140ml
- Weight of beaker= 97.86g
- Weight ethanol and Extract= 100.41g
- The total weight= 2.6g
- %yield =  $ME/MR \times 100$
- Where, ME = Mass of essential oil MC = Mass of Calendula Officinalis Sample
- ME = 2.6g
- MC = 120g
- By substituting values
- %yield =  $2.6/120 \times 100 = 2.16\%$
- Therefore % yield= 2.16%



**Fig 5: Graph of the Weight (C) Of Calendula Officinalis Extract to The Time (Mins) For Vaccume Distillation Method**

**CONCLUSION**

The term "herbal cosmetics" also applies to ayurvedic cosmetics. The majority of herbal supplements are based on a number of botanical ingredients that have a long history of use in traditional or folk medicine and do not have any negative effects on the human body. among the many botanical ingredients that are currently offered on the market. Cosmetics by themselves are insufficient to take care of skin and other body parts due to the numerous chemical toxins and microorganisms that can damage and infect skin. Due to a wide range of medicinal properties, Calendula officinalis

and *Althaea Officinalis* have gained prominence around the world. These properties include anti-inflammatory, anti-hyperglycemic, anti-ulcer, anti-malarial, antifungal, antibacterial, antimutagenic, and anticarcinogenic effects. Aqueous, ethanolic, and ethyl acetate extracts of *Althaea Officinalis* Roots and *Calendula officinalis* Petals were tested in this study to determine their effects.

Herbal antiseptic soaps were created in the current work, and they had good foam-producing properties as well as the right size, shape, thickness, and weight. *Calendula officinalis* and *Althaea Officinalis* herbal soaps were created for their anti-bacterial properties to treat acne, pimples, and scars. Cold pressing was used to create two different formulations, M1 and M2, which were then evaluated for their clarity, colour, and odour, as well as their size, shape, thickness, weight, and pH. The results of these tests were satisfactory. The pink colour of the herbal soap, along with its pleasant aroma and antiseptic qualities, gave it a good appearance. According to the study, it can be said that using the cold process technique, herbal products can be successfully created in the form of medicated herbal soaps with excellent antiseptic and anti-bacterial properties.

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#### CONFLICTS OF INTEREST

Authors have no conflicts of interest to declare.

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