



Research Article

FORMULATION AND EVALUATION OF COFFEE SOAP WITH ANTIOXIDANT, ANTICARCINOPREVENTIVE, ANTICELLULITES PROPERTIES

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ABSTRACT

The most common type of skin infection is bacterial skin infection which demands immediate care as well as continuous care to maintain healthy skin. The aim of this study is to formulate a poly herbal soap with the extracts of Coffee Powder and coconut oil. The studies and research indicated above show that coffee soap possesses anti-aging, anti-cancer, and anti-cellulite characteristics. Glycerine, coconut oil, clear soap base, steric acid, and sodium hydroxide are some of the substances employed in medications to treat various skin conditions. The developed formulation's physical properties are advantageous. Using assessment studies, ascertain the quality of high temperature, foaming retention, and foam heights. The recipe provides excellent pH. The melt-and-pour approach can be used to successfully make coffee soap, the study's findings show. Amazing antioxidant and cellulite-reducing abilities.

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INTRODUCTION

Coffee is both the name of the beverage made from the Coffee plant and the plant itself. The coffee plant is a bush or tree, with a maximum height of ten metres (about 32 feet), however it is typically pruned to a smaller size. Originally from Ethiopia, coffee plants are currently grown in Southeast Asia, South America, and Central America. C. arabica and C. robusta are the two varieties of coffee beans that are grown most frequently. The Coffee plant is what gives coffee both its common and scientific names. The coffee plant can grow as a bush or tree up to ten metres (32 feet) in height, but it is usually cut to a smaller size. Coffee plants are now grown in South-east Asia, South America, and Central Asia. They were originally native to Ethiopia, America. The two most often produced coffee bean kinds are C Arabica and C Robusta. Due to their multiple intrinsic benefits, using soaps manufactured from natural components, like coffee soap, not only thoroughly cleans your body without the use of any unidentified hazardous ingredients, but also eliminates the need for numerous post-bath care products, such as cellulite, anti-aging, and moisturising creams. Despite the benefits it might give your body, coffee's majority of skin advantages are topically applied due to its antioxidant content, making coffee-infused soaps an easy and convenient way to reap their benefits, easy method to profit from them. The antioxidants in coffee help to protect your skin from damage and ageing. Due to free radicals. According to studies, coffee oil can increase collagen and elastin, making the skin seem and feel tighter.

This is akin to the advantages hyaluronic acid, an ingredient in anti-aging cosmetics, has on the skin sun spots, redness, or other signs. The primary alkaloid present in coffee fruits is caffeine, which is also responsible for the bitter flavour of coffee. Coffee's antioxidant qualities are associated with its chlorogenic, ferulic, caffeic, and n-coumaric acids. Melanoidins are powerful dark pigments that are created when coffee is roasted. Antioxidants Trigonelline and caffeine are categorised as antioxidants by certain sources as well. Considering its ability to in several organs, including the oesophagus, breast, liver, and kidney, they restrict cell proliferation and cause apoptosis. Caffeine may have potential as an anticancer medication through a number of carcinogenic pathways in the body and brain. Caffeine is an active ingredient because it prevents excessive fat accumulation in cells, which has an aesthetic benefit. Component in cellulite-reduction products. This alkaloid works by reducing phosphodiesterase activity.

Why is coffee soap so beneficial to skin?

Using soaps made from natural ingredients, like coffee soap, not only cleans your body without any hidden dangerous ingredients but also satisfies your need for numerous post-bath care products, such as cellulite, anti-aging, and moisturising creams, due to its extensive inherent benefits. While drinking coffee can provide your body antioxidants, the majority of coffee's skin benefits are received topically, making coffee-infused soaps a quick and simple way to benefit from them.

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Antioxidants included in coffee assist to shield your skin from ageing and damage from free radicals. Coffee oil can enhance collagen and elastin, making the skin look and feel tighter, according to some research. This is comparable to the benefits of hyaluronic acid, an anti-aging beauty care component, has on the skin. The appearance of sun spots, redness, and fine lines is reduced by using coffee soap. Coffee's chlorogenic and melanoidin compounds may both be responsible for the anti-inflammatory effects of coffee soap. The reduction of hyperpigmentation, which could be related to inflammation, is also linked to this acid. Drinking coffee regularly has been linked to a reduction in the effects of photoaging, according to a recent study. Niacin, often known as vitamin B3, is produced by the breakdown of a crucial substance called trigonelline and is a significant component of coffee. Niacin may prevent non-melanoma skin cancers and perhaps prevent other skin growths, according to a reliable source. Coffee soap is a soothing post-sun care product that your sunburned skin will appreciate because it has the same anti-aging benefits. By lowering transepidermal water loss, coffee soap can also aid in maintaining skin hydration. It has also demonstrated antibacterial and antifungal properties, making it a potent anti-acne remedy.

Out of the 90% of women who have cellulite, the majority have substantial cosmetic concerns. Fortunately, coffee soap can help with cellulite appearance reduction due to its caffeine content. In a 2014 study, researchers discovered that applying a skin cream containing caffeine on cellulite reduced the number of cellulite fat cells by 81% against 32% for the placebo. Caffeine is an active ingredient in many anti-cellulite lotions that have been created to minimise the appearance of cellulite, another study suggests that caffeine, which is present in coffee, enhances blood vessels under the skin and increases general blood flow, which helps to reduce cellulite. To give your skin a smooth and even appearance, coffee soap exfoliates the skin while also assisting in the appearance of cellulite reduction. Coffee soap was created using coffee powder and a clear soap base, and it was then assessed using a variety of criteria, including organoleptic features, pH, foam height retention, and skin irritation and resistance to hot temperatures. We enumerated types of soap, various soap making techniques, coffee soap production and advantages. Since ancient times, people have used soap, and it is still commonly used today as a cleaning agent, a mild antiseptic, and sometimes even an ingestible antidote. Poisonous methods. A soap maker can create soap. A quick procedure called saponification that requires occurs when an alcohol interacts with a fatty acid alkali. When fatty acid-containing fats or oils are mixed with a powerful alkali, the alkali coming first divides the fatty acids and glycerine from the fats or oils. Then, the potassium or sodium component of the alkali combines with the fatty acid component of fats or oils. The potassium or soap is the name given to this mixture. The fatty acid's sodium salt. Thus, soap is a cleaning agent. Agent produced by the blending of fats.

Caffeine's Antioxidant properties

It is well known that UV rays speed up photo aging of the skin, decrease the production of pre-collagen, affect collagen fibre, decrease skin elasticity, cause blood vessels in the skin to expand and crack, promote the formation of wrinkles, spots, and discoloration, and in severe cases, can cause skin cancer, such as melanoma. The generation of free radicals is also

increased by UV light, which damages cells as a result. Incorporating caffeine into sunscreen products improves their ability to block UV rays, lowers the production of free radicals in skin cells, and may even help prevent skin cancer from UV exposure. Caffeine is an effective scavenger of hydroxyl radicals (OH) and alkoxy radicals (OCH₃), a poor scavenger of free radicals.

Caffeine's Possible Anticarcinopreventive

An increasing body of research suggests that coffee may guard against both melanoma and non-melanoma skin cancers. Despite the fact that there are additional substances that could fight cancer, caffeine is one of the most widely studied substances. Had substances in the chemopreventive capacity of coffee. Due to its anti-proliferative and a reduction in the risk of cancer through controlling cell proliferation, growth and apoptosis. Caffeine lowers sunburn lesions in the epidermis, blocks UV rays, and has sunscreen effects, according to research by inhibiting (UV)-induced carcinogenesis the synthesis of thymine dimers. Caffeine boosts pre-cancerous cells that have been damaged and tumour apoptosis. Through p53-dependent and p53-independent biological pathways, caffeine alters the cell cycle and promotes UV-induced apoptosis. Recent research data have shown a caffeine's ability to prevent the spread of cell lines from melanoma and non-melanoma tumours.

Caffeine's effect on carcinogenesis has been extensively researched and was first tested in rats. When taken orally, caffeine reduced the risk of UVB-induced cancer. Mice, and when the caffeine was removed, these effects disappeared. Tea, either green or black. Caffeine inhibited two important carcinogenic pathways and caused apoptosis in UVB-damaged keratinocytes when administered to human cells. In the development of skin tumours following UVB exposure. These early encouraging results prompted not only extensive research to assess potential links between caffeine consumption and the risk of developing melanoma and non-melanoma skin cancers. Investigations to pinpoint the genetic causes of cancer as well as parameters affecting the interaction between caffeine and UV-induced carcinogenesis. NEIL3, a particular DNA repair gene was discovered in the DNA repair pathway for base excision a significant factor in caffeine-mediated skin tumour inhibition, furthermore elucidating caffeine's function in preventing skin cancer.

Caffeine's Anticellulites Properties

Cellulite is a common issue for women. It is also known as gynoid lip dystrophy or the orange peel effect (because the dimpling on an orange looks similar to the dimpling on the skin). The thighs and buttocks are where it mostly shows up. The presence of extra subcutaneous fat that pushes into the dermis causes cellulite, a complex condition involving the lymphatic and microcirculatory systems that results in the dimpling appearance. This fat is broken down through a process called lipolysis, which is complicated and controlled by a number of hormones and neurotransmitters. By accelerating lipolysis and preventing the build-up of extra fat, caffeine has an impact on this intracellular pathway. The removal of stored fat, toxins, and superfluous materials produced by the lipolysis process, which collectively may impair the microcirculation in blood vessels and promote the development of cellulite, occurs through the stimulation of the draining lymph systems in fatty tissue by caffeine.

Soap

Typically, a mixture of sodium salts of different natural fatty acids makes up soap.

Types of soap preparations

Melt and Pour Soap:- According to the definition, all handcrafted soap is “glycerin soap.” The extra glycerin is collected out of a lot of commercial soap. Thus, glycerin is a key component of all handcrafted soap. To create a really nourishing, moisturising bar, additional glycerin is typically added to clear soap. One who “humects” is glycerin. The notion is that if you wash with it, it will provide skin moisture. As a result of using glycerin soap, your skin will retain a thin coating of glycerin, which will attract moisture. You can acquire clear soap base from Moulds will be filled with huge blocks that have been melted, coloured, and scented. Owing to Melt and Pour’s simplicity of use Growing in popularity is the art of manufacturing soap. Every aspect of creating cold-process soap is involved in this procedure, but it goes a step beyond.

Cold Process of Soap: - Fatty acids can be found in nearly any oil, and sodium hydroxide (lye) is utilised to create cold process soap. When creating cold process soap, water and sodium hydroxide combine to create a chemical reaction known as it is a difficult, enduring quality technique.

Hot Process of Soap: - The cold process technique is flexible. Take all of the ingredients for hot process soap and combine them in a pot. Place the pot over a heat source, such as a stove, and stir often as the soap goes through several stages. During this process, the surplus water is drained off.

Rebatching Soaps: - Rebatching is a type of cold process soap production that is also known as French milled or triple milled soap. When making cold process soap from scratch, grate the ingredients, put them in a kettle with some liquid, position it over a heat source, and stir until the mixture melts into a mushy mess. At this point, you can add fragrance and colorant. It is common practise to employ this technique to maintain the aroma or some essential oils’ medicinal qualities.

Experimental Work

Coffee Powder

Synonyms:- Arabica coffee, Brazilian coffee, Ethiopian coffee, and Arabian coffee are all types of coffee.

Biological Source:- It is the dried ripe seeds of Coffee Arabica Linn, belonging to family Rubiaceae.

Geographical Source:- It is indigenous to Ethiopia, Brazil, India, Vietnam, Mexico, Guatemala, Indonesia and Sri Lanka.

Chemical Constituents:- Coffee’s primary ingredients are caffeine, tannin, fixed oil, and proteins. It has 3-5% sugar, 2-3% caffeine. Proteins at 13%, tannins, and 10-15% fixed oils. In Caffeine is found in the seeds as a salt of Acid chlorogenic. It also has wax and oil in it.

Use:- Dead skin cells are gently removed by the coffee grounds, revealing softer, smoother skin. For a glowing and you might try a coffee to get a beautiful complexion. Mask. Half a cup of coffee should be combined with A few milk spoons to achieve a thick consistency. Use this combination as a face mask for ten to fifteen minutes. And remove it with

warm water. This mug Mask will assist in removing dead skin cells, leaving a skin that is radiant.

Benefits of coffee on face

1. It has a lot of antioxidants.
2. It shields the skin from damaging UV radiation.
3. It gives skin a smooth, healthy glow.
4. It improves circulation.
5. Skin Lightener.

Sr. No	Ingredients	Quantity	Role
1	Transparent Soap base	50g	Soft and Smooth Skin
2	Coffee Powder	5g	Antioxidant
3	Coconut Oil	7.6 ml	Cleaning properties
4	Steric acid	3g	Harden product
5	Sodium hydroxide	1.71g	Foaming agent
6	Distilled water	q.s to 100	Saponification
7	Glycerine	6.5 ml	Humectant
8	Denatured alcohol	8.87 ml	Popping bobbles



Fig 1 Coffee Powder

Transparent Soap base: - Transparent soaps have an opaque and shiny texture that is very soft and smooth on the skin. The look and appearance of the transparent soap make it look luxurious and rich, unlike other ordinary soaps. Transparent glycerin soaps are versatile and easily customizable as you can use different fragrances, coloured pigments, essential oil.

Transparent soap is simply hot process soap that uses solvents to dissolve the soap crystals that form allowing light to pass, therefore creating transparency. When creating a transparent soap recipe, choose at least 50% hard oils (coconut oil 50ml)

Transparent Soap ingredients

Sodium hydroxide- 10gm



Glycerine:- 5ml, Coconut oil:- 50ml

Fig 2 Transparent soap base

Coconut oil

Biological name:- Cocos nucifera

Kingdom:- plantae

Family:- Arecaceae

Genus:- Cocos.L

Species:- Nucifera

Uses:- On the skin, coconut oil forms a moisturising barrier that is protective. Coconut oil is rich in antioxidants and contains beneficial saturated fats, vitamins like vitamin E, amino acids, lauric acid, and caprylic acid, as well as healthy saturated fats. To create a wholesome lather, add coconut oil to cold-process soap.

Benefits of Coconut Oil in Soap

1. Moisturizing
2. Rich lather
3. Eczema and Acne
4. Reducing and Inflammation
5. Skin Healing, antibacterial, antifungal, antiviral.



Fig 3 Coconut oil

Stearic acid

Appearance: White solid

Odour:- pungent, oily

Density: 0.9408 g/cm³ (20 °C), 0.847 g/cm³

Melting point: 69.3 °C (156.7 °F; 342.4 K

Boiling point: 361 °C

Solubility:- Soluble in alkyl acetates,

Uses

Stearic acid, a vegetable-derived waxy ingredient that is typically used to thicken lotion, is also employed as a hardening agent in soaps (at a usage rate of 5% of your oils). Stearic acid is additionally used as a hardening agent in paraffin- or vegetable-based candles. Preservative and Water Soluble.



Fig 4 Stearic Acid

Sodium hydroxide

The Iupac name : sodium oxadinoide

Other names: caustic soda

Chemical formula : NaOH

Appearance: White crystal

Odour:- Odourless

Melting point: 318°C

Solubility:- Water, Ethanol, Methanol

Uses

Additionally known as lye, sodium hydroxide. Oils and fats react chemically when combined with lye solution. The term "saponification" refers to this process. A lovely handmade soap is the consequence of this.



Fig 5 Sodium hydroxide

Methods for coffee soap

The term "Melt and Pour Soap" refers to soap bases that have already gone through the typical soap-making process, in which certain oils are to produce a mixed with an alkaline solution. The saponification process. Pour and Melt Simply melt the foundation before using the soap. Pour the mixture into a mould, then let it set. In addition melt and Pour soap, in other terms, is pre-saponified soap. That is usable with or without additional chemical Modifying or processing.

Step1:-Melt the oils and glycerin after weighing them into your crock pot.

Step2:-Fill two other containers with equal amounts of lye and distilled water. To make a solution, mix the lye into the water while doing so.

Step3:-Add the lye solution to the melted glycerin and oils.

Step4:-Melt the stearic acid using a double boiler on the stove after weighing it out.

Step5:-Blend Because of the stearic acid, it will become rather thick.

Step6:-Add denatured alcohol once it has been weighed to the mixture. Break up the soap by stirring quickly.

Step7:- Cook the soap for 10 minutes.

Step8:-For clarity, check your soap. After five more minutes of cooking, I retested.

Step9:- By combining sugar and water in a pot and boiling it, you can make your sugar solution.

Step10:-To the crock pot, whisk in the sugar solution. If you would like, double-check the clarity.

Step11:-It's time to smell, colour, and mould once you've declared it finished.

Step12:-Place into moulds. To lessen bubbles on the surface, spray with alcohol. Furthermore, add some coffee powder.



Fig 7 Formulation of Coffee Soap

Evaluation parameters of coffee Soap

The coffee soap formulated was evaluated for the following.

Organoleptic evaluation

- Colour:-brown.
- Odour:-light caramelized and almost nutty.
- Appearance:-Good

Physical Evaluation:- The coffee soap formulated was evaluated for the following properties.

1. pH:-Utilising pH paper, the pH was determined. The pH was found to be naturally basic.
2. Foam retention:- 25 ml of the 1% soap solution was added to a 100 ml graduate measuring cylinder, which was then sealed. 10 times with handshakes. The amount of Foam was applied every minute for four minutes, then Logged on. It turned out to be 5 minutes.
3. foam heights:-10 cm
4. Irritation and Skin effect:- no irritation to skin.
5. High temperature stability:-At temperatures exceeding 50 C, the soap was allowed to stand.



Fig 8 Evaluation of coffee soap

CONCLUSION

Coffee is a beverage made from the roasted and ground seeds of African-derived tropical evergreen coffee bushes. Along

with water and tea, coffee is one of the three most consumed beverages worldwide and one of the most lucrative international commodities, coffee soap beneficial for skin because coffee soap is loaded with antioxidants, it stimulates blood flow to the skin's surface and aids in the reduction of body fat. Even the appearance of cellulite might be helped. The skin can be cleared of dry, dead skin cells and given a more radiant and smooth appearance by adding finely ground coffee beans to a soap bar or body scrub. Coffee increases circulation, which enhances the look of the skin by promoting blood flow.

Caffeine is the main alkaloid component in coffee fruits and the source for bitter taste of coffee. The chlorogenic, ferulic, caffeic, and n-coumaric acids found in coffee are linked to its antioxidant properties Melanoidins, which are produced when coffee is roasted and are brown pigments, are potent antioxidants Some sources also classify caffeine and trigonelline as antioxidants. Due to its capacity to inhibit cell proliferation and trigger apoptosis in numerous organs, including the oesophagus, breast, liver, and brain, via a number of carcinogenic routes, caffeine may have potential as an anticancer drug. Caffeine has a cosmetic role by preventing excessive fat build-up in cells, which is why it is an active ingredient in anti-cellulite products. By inhibiting the activity of phosphodiesterase, this alkaloid promotes the breakdown of fats during lipolysis. According to the research and study mentioned above, coffee soap has anti-aging, anti-carcinogenic, and anti-cellulite characteristics varied skin appearances to cure several components used in pharmaceuticals, including glycerin, coconut oil, clear soap base, steric acid, and sodium hydroxide. The developed formulation exhibits favourable physical properties. The formulation offers outstanding pH, foaming retention, foam heights, and high temperature quality based on evaluation experiments based on the study's findings, it can be said that coffee soap can be successfully created using the melt-and-pour method, which has outstanding anti-oxidant and Anticellulites qualities.

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