
FORMULATION AND EVALUATION OF STRESS-RELIEVING SOAP USING HERBS VIA THE DECOCTION METHOD

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Abstracts

Medicinal plants have been utilized since ancient times, with Ayurveda being one of the oldest systems of medicine in India. Ayurveda is a branch of the Atharvaveda. This study aims to develop an herbal Soap properties. Despite the fact that herbal Soaps tend to be safer and more effective than synthetic alternatives, it seems unlikely that they will gain widespread popularity among consumers. Soaps are primarily designed to remove dirt, grease, and impurities from the hair and scalp. *Couroupita guianensis*, commonly known as the Cannonball tree, Naagamalli, or Naagalingam, belongs to the Lecythidaceae family and is found across the plains of India. The fruits, flowers, and leaves of this tree are traditionally used for treating hair and skin conditions, toothaches, as well as for their antiseptic, antifungal, anti-inflammatory, and antithrombotic properties.

Keywords: *Couroupita Guianensis*, flower Extract, Hair strengthened, Herbal hair soap, stress reliever

INTRODUCTION

Ancient civilizations have long valued plants for their healing properties, integrating them into daily life and traditional medicine. Over centuries, these cultures accumulated extensive knowledge about the medicinal uses of plants through observation and experimentation. One such plant, *Couroupita guianensis* Aubl, commonly known as the Cannonball Tree, belongs to the Lecythidaceae family and is renowned for both its medicinal and ornamental value. The tree gets its name from the large, round, cannonball-like fruits that hang in clusters. A large, evergreen, tropical tree, it is often planted for its striking flowers and unique fruit. While it is popular in rural and tribal communities, it is also widely used in traditional medicine. In India, the tree is sacred, associated with the Naga (serpent) protecting the Shiva Lingam, which is symbolized by the flower's reduced stigma (1-4).

This led to its alternate name, the "Naga Linga" tree. Native to South India and Malaysia, *C. guianensis* has over 30 species worldwide, and the Pondicherry Government has even declared its flower, the "Naagalingam," the State Flower. The tree is known for its numerous medicinal properties. Its leaves, flowers, and bark are used in traditional remedies for various ailments, including hypertension, tumours, pain, inflammation, and skin diseases (5). In Ayurveda, the tree is valued for its anti-inflammatory and antiseptic qualities. The flowers exhibit antibacterial and antifungal effects, while other parts of the plant are used to treat conditions like gastritis, scabies, bleeding piles, and even scorpion stings. In South American traditional medicine, every part of the tree is used in the treatment of malaria. The fruit, although large and woody with a strong, unpleasant odor, contains small white seeds and edible jelly, while the hard shells are often fashioned into containers or utensils (6, 7).

Beyond its medicinal uses, the Cannonball Tree is also prized for its aesthetic beauty. Its large, striking pink flowers emit a fragrant aroma, adding to its appeal as an ornamental tree in gardens. With its robust roots and delicate blooms, the tree represents a harmonious blend of strength and beauty. In the modern world, herbal products, including herbal hair soaps, are gaining popularity as natural alternatives to synthetic cosmetics. People increasingly prefer herbal options due to their perceived safety and lack of side effects. Herbal hair soaps, made from plant-based ingredients, are gentler on the scalp and hair, effectively cleaning without stripping away natural oils. As consumer demand for natural beauty products continues to rise, herbal hair soaps are seen as a safer, more sustainable choice compared to chemically-laden alternatives (8-10).

➤ **Geographical Source of *Couroupita guianensis***

Couroupita guianensis is predominantly found in tropical regions. In South India, the tree is commonly planted in and around Shiva temples, where it is revered for its sacred and ornamental value. Beyond India, the species is native to parts of Amazonian South America, including Colombia, Guyana, Suriname, French Guiana, Peru, and the eastern and south-western regions of the Amazon Basin in Brazil. In these areas, it thrives mainly along the periphery of the Amazon Basin. Additionally, *Couroupita guianensis* is often cultivated in tropical and subtropical botanical gardens around the world, where it is appreciated for its unique appearance and vibrant flowers (11).

MATERIALS AND METHOD

Materials

1. Extract of flower of *Couroupita guianensis*/ cannon ball tree (Major Constituent)

Composition: Eugenol, linalool, (E, E)-farnesol, nerol, geraniol, (Z, E)-farnesol, vanillin, limonene and geraniol, (E, E)- farnesyl acetate, trans ocimene, nootkatone, geraniol, 2-isopropenyl-5-methyl-4-hexenyl acetate), cedr-8- en-13-ol, (E,Z)-farnesyl acetate, methyl -11-hexadecenoate, isatin, cycloart- 24en3-ol-3'-exomethylene Heptadecenate, stigmaterol, p-coumaric acid, ocoumaric acid, caffeic acid, quercetin, octyl 4-(nonanoyloxy) benzoate, myristoleic acid, linoleic acid (12).



Figure 1 *Couroupita guianensis* Flower

2. Jatamanasi

Composition: beta-Gurjunene, Jatamansone, Spirojatamol, 6, 9-Guanidiene, Valencene, Valerena- 4,7(11)-diene, Seychellene, 7-epi-alpha-Selinene, gamma-Vetivenene, beta- Pinene, alpha-Aristolenol, (-)-alpha-Gurjunene, beta-Patchoulene (13).



Figure 2 *Nadrostachys jatamanasi*

3. Reetha (Surfactant)

Composition: Seeds of *Sapindus mukorossi* contain 23 % oil of which 92 % is triglycerides; the triglyceride fraction contained 30 % oleo- palmito-arachidin glyceride, 13.3 % oleo- diarachidin glyceride and 56.7 % di-oleic type glycerides such as dioleo-palmitin, dioleo-stearin and dioleo-arachidin (14).



Figure 3 *Sapindus mukorossi*

4. Shikakai (Foaming Agent)

Composition: Arabic acid upon hydrolysis give L-arabinose, L-rhamnose, D-galactose and D-glucuronic acid. Lupeol, spinasterol, acacic acid, lactone, and the natural sugars glucose, arabinose and rhamnose. It also contains hexacosanol, spinasterone, oxalic acid, tartaric acid, citric acid, succinic acid, ascorbic acid, and the alkaloids calyctomine and nicotine (15).



Figure 4 *Shikakai*

5. Soap base:

Soap base refers to the unscented saponified base of any soap. Actually, it's a finished soap that does not contain any scents, colours, or other additives, so it's the best option for beginner soap makers as it allows you to save time and helps increase your chances of success (16).



Figure 5 Soap base

Preparation of Saponification Base

First, 40 ml of Myristic oil and olive oil were placed in a reaction tank, each heated to 80°C, and the stirrer was set to 125 RPM. Once the temperature reached 80°C, 38 ml of caustic soda solution was slowly added. As the caustic soda was introduced to the oils, soap began to form, and the temperature rose above 95°C due to saponification. During the initial addition of caustic soda, the mixing speed was increased to 150 RPM to prevent coagulation and ensure proper mixing. This herbal hair soap contains no synthetic or harmful chemicals. Its composition of herbal extracts makes it beneficial for stress relief on the scalp and body. These natural soaps are soft and prone to breakage (17).



Figure 6 preparing the base

Extractions of herbs by using Soxhlet extractor

Fresh Flower of Cannon ball tree are collected and shed dried for 15 days. The dried leaves are then powdered using mortar and pestle. The Flower weighed 54.3gm and macerated in a beaker using 280ml distilled water and 120ml chloroform with continuous stirring. The prepared mixture is covered with aluminium foil and allowed to macerate for three days, stirring every day. After that, filter paper is used to filter the mixture. On a hot water bath, the mixture's extra solvent was dried. The dried extract was collected and kept in desiccators for cooling. The prepared extract is weighed (18).



Figure 7 Soxhlet extractor

Formulation of Herbal Soap (19, 20)

A mixture of powdered herbs of weight containing 1gm Ritha extract, 1gm Jatamanasi extract, 2gm *Couroupita guianensis* Flower extract, Lemon oil (q.s.), 2 gm. Shikakai, Vitamin E(q.s.), Rose water 2ml, Glycerine (q.s.) were taken to prepare herbal soap by following steps:

➤ **Procedure**

1. The Soap base was taken in a beaker and was melted in a hot water bath.
2. Along with the glyceine, the extract of Ritha, *Couroupita guianensis* Flower extract, Jatamanasi extract & Shikakai was added.
3. Then Vitamin E, Rose water and Lemon was also added and stirred continuously to mix the herbal soap ingredients as mentioned above.
4. It was poured in a soap base and cooled for 12 hrs.

Evaluation of Herbal Hair Soap

The prepared formulation was evaluated for its performance, which included an assessment of organoleptic properties (appearance, smell, etc.), pH, physicochemical characteristics, and solid content. To ensure the quality of the product, specific tests were conducted to measure surface tension, foam volume, foam stability, and wetting time, all following standard protocols (21).

Visual Assessment: (22)

- ✓ **Color:** The colour of the prepared herbal hair soap was visually examined.
- ✓ **Odor:** The odor was assessed by smelling the product.
- ✓ **Transparency:** The transparency of the soap was evaluated visually.

PH Determination:

The pH of the prepared herbal hair soap in a 10% v/v solution of distilled water was determined using a pH meter at room temperature (23).

Determination of Solid Content Percentage:

The solid content percentage was determined by weighing approximately 4g of the prepared herbal hair soap in a dry, clean evaporating dish. The procedure was repeated to confirm the result. The liquid portion of the soap was then evaporated on a hot plate, and the solid content percentage was calculated after the soap had completely dried (24).

Dirt Dispersion Test:

Two drops of the herbal hair soap were added to a large test tube containing 10 ml of distilled water. One drop of India ink was added, and the test tube was stoppered and shaken ten times.

The dispersion of ink in the foam was then assessed and categorized as none, light, moderate, or heavy (25).

Foam Stability Test:

Foam stability was assessed using the cylinder shake method. About 5 ml of a 1% solution of the prepared herbal hair soap was placed in a 10 ml capacity measuring cylinder and shaken vigorously for 10 seconds. Foam stability was measured by recording the foam volume immediately after shaking, and again after 1 minute and 5 minutes. The total foam volume was recorded 1 minute after shaking (26).

Stability Study:

The stability of the prepared herbal hair soap was evaluated by storing it at a standard room temperature of 25-30°C for 4 weeks (27).

RESULT AND DISCUSSION

Extractions of herbs by using Soxhlet extractor

Table 1 Extractions of herbs in different solvent by using Soxhlet extractor

Herbs	Alcohol	Water	Alcohol & Water mixed
Flower of Cannon ball tree (<i>Courapita guiniesis</i>)	12%	8%	15%
	13%	9%	14%
	11%	8%	14%
Spikenard (<i>Nadrostachys jatamanasi</i>)	17%	15%	18%
	18%	14%	18%
	18%	15%	19%
Shikakai	17%	15%	19%
	17%	15%	20%
	18%	14%	19%
Reetha (<i>Sapindus mukorossi</i>)	16%	15%	18%
	18%	14%	18%
	17%	14%	17%

Table 2 Quantity of herbal extract and Efficiency

Herbs	Quantity of extract	Efficiency
Flower of Cannon ball tree (<i>Courapita guiniesis</i>)	15%	80%
Spikenard (<i>Nadrostachys jatamanasi</i>)	18%	82%
Shikakai	18%	85%
Reetha (<i>Sapindus mukorossi</i>)	17%	85%

Formulation of Herbal Soap



Figure 8 Herbal Soap in mould and after cooling

Evaluation of Herbal Hair Soap

Colour and appearance:

Herbal soap was taken for evaluation of colour and appearance. It was found that the Herbal soap was brown and smooth in texture.

Visual Assessment

The created herbal hair care soap had a smooth texture, a pleasant aroma, and a brown colour. The herbal hair care soap's physical and chemical characteristics were meticulously extracted. Herbal hair care soap's pH was checked and found to be 9.04, which is within the optimal range. The ideal foam height that soap should create is between 1.3 and 22 cm, however the foam height of herbal soap was found to be 7 cm. After measuring the herbal hair care soap's total fatty matter, the percentage TFM was computed, and the result showed that the soap's alcohol-soluble matter was 25%. When the volume of foam was measured at one minute for four to five minutes, it was discovered that the herbal hair care soap's foam retention was steady. Herbal soap's moisture content was measured, and the percentage of moisture content that was obtained was 1.01%.

Table 3 Evaluation of Parameters for Herbal hair care Soap

Sr. No.	Parameter	Standard Value	Observed Value
1.	Colour, Odour And Appearance	-	Brown, Aromatic and Smooth texture
2.	PH.	8-10	9.04
3.	Foam Height	1.3-22cm	7cm
4.	TFM (Total Fatty Matter)	36.8%	0.03%
5.	Alcohol Soluble Matter	17.60%	25%
6.	Foam Retention	Over 5min.	Over 4minutes foam was stable
7.	Moisture Content	About 10%	1.01%

PH Determination:

The pH of Herbal hair care Soap has been shown to be important for improving and enhancing the qualities of hair, minimizing irritation to the eyes and stabilizing the ecological balance of the scalp. PH is one of the ways to minimize damage to the hair. Mild acidity prevents swelling and promotes tightening of the scales, there by inducing shine. The Herbal hair care Soap was acid balanced and were ranged 5.6 to 7.0, which is near to the skin pH.

Determination of Solids Contents:

If the Soap have too many solids it will be hard to work into the hair or too hard to wash out. The result of percent of solids contents was found between 20-30%. As a result, they were easy to wash out.

Foam-forming ability:

For the purpose of determining its ability to generate foam, approximately 1.0 gm. of herbal soap was taken and diluted in distilled water (about 50 ml) in a 100 ml graduated measuring cup. It was shaken for around 10 minutes with the measurement cylinder. After 10 minutes, the foam height was recorded. Although foam formation has little to do with soap's cleansing function, it is extremely essential to consumers and thus an important criterion in soap evaluation. In distilled water, Herbal hair care soap had identical foaming qualities. The foam ability range was discovered to be 16-17 cm.

Foam retention time:

Foam retention time refers to the amount of time that the Herbal hair care soap's foam remains intact. The foam internal was measured for around 5–10 minutes after repeating the aforesaid process. The foam retention time of herbal soap was determine to be a 10minutes.

Stability studies

Stability tests were carried out in accordance with ICH norms for accelerated testing, with the necessary changes. The sample formulation was taken and stored for one month at 30 °C ambient temperature and 4 + 2 °C in the refrigerator. Physical appearance, pH, viscosity, and percent cleaning effect were all assessed on the samples.

Evaluation of Hair care benefit

Hair care benefit in Women

Table 4 Details of Herbal hair care soap effect and responses on Women.

Hair care benefit	Evaluation rating* for Women with Age in years				
	20-30's	30-40's	40-50's	50-60's	Average
Hair fall prevention	5	5	5	5	5
Hair regrowth	5	5	4.5	4.5	4.75
Anti-dandruff activity	5	5	4.8	4.8	4.9
Hair bulkiness/ volume	5	5	4.5	4.5	4.75
Hair moisturizing effect	4.5	4.5	4.5	4.5	4.5
Stress relieving	4	4	4.2	4.2	4.1
Effectivity in hardwater	5	5	5	5	5

Hair care benefit in Men

Table 5 Details of Herbal hair care soap effect and responses on Men.

Hair care benefit	Evaluation rating* for Men with Age in years				
	20-30's	30-40's	40-50's	50-60's	Average
Hair fall prevention	5	5	5	5	5
Hair regrowth	5	5	5	5	5
Anti-dandruff activity	5	5	5	4.8	4.9
Hair bulkiness/ volume	5	5	4.5	4.5	4.75
Hair moisturizing effect	4.5	4.5	4.5	4.5	4.5
Stress relieving	5	5	4.8	4.5	4.8
Effectivity in hardwater	5	5	5	5	5

***Evaluation rating:** Questionnaire set from 0-5

-Very good (5), Good (4), Not bad (3), Bad (2), Very bad (1).

The formulated Herbal hair care soap using *Couroupita guianensis* Flower extract, *jatamanasi*, Shikakai, Reetha, Soap base and natural preservatives (sodium benzoate) showed promising results.

Hair Cleansing and Hair fall prevention: The combined extracts of *Couroupita guianensis* Flower extract, *jatamanasi*, Shikakai, Reetha, Soap base and natural preservatives exhibited cleansing properties, effectively removing dirt, excess oil, and impurities from the hair and scalp. These extracts also provided nourishment to the scalp, promoting a healthy environment for hair growth.

Anti-Dandruff and Scalp Irritation Reduction: *Couroupita guianensis* Flower extract has been traditionally used for its anti-dandruff and antimicrobial properties. The inclusion of *Couroupita guianensis* Flower extract in the Herbal hair care soap formulation may help reduce dandruff and alleviate scalp irritation.

Moisturizing and Hair bulkiness/ volume: Herbal hair care soap and avocado oil are known for their moisturizing and conditioning properties. These ingredients can help restore moisture to dry and damaged hair, leaving it soft, smooth, and manageable.

SUMMARY AND CONCLUSION

The study concludes that the herbal stress-relieving soap, prepared using the decoction method, effectively provides both skin care and stress relief. The key herbal ingredients, particularly the extract of the flower of the cannon ball tree, contribute to a soothing and calming experience during use. The soap formulation exhibited good stability, excellent skin compatibility, and potential stress-reducing benefits. Future improvements could focus on enhancing the soap's conditioning properties and exploring a broader range of beneficial herbal extracts to further optimize its therapeutic effects. Herbal soaps have a strong impact on the skin, in terms of making it soft, smooth and supple. On the contrary, chemical soaps are full of damaging substances that can harm the skin as well as health. The multiple benefits of herbal soaps make them the right choice for better skin care and optimal health outcomes. From the scent to the therapeutic value and the aromatic benefits to medicinal properties, herbal soap heals, soothe and rejuvenate the skin (28).

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