



“FORMULATION AND EVALUATION OF HERBAL SHAMPOO CONTAINING ANTIDANDRUFF ACTIVITY OF NYCTANTHES ARBOR TRISTIS LINN”.

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Abstract:

Shampoos are products that remove excess oil, dust on the skin and scalp. Many of the ingredients in shampoos are chemical and that is why they have been severely attacked due to the potential risk of side effects with their use. The main objective of this study was to eliminate the harmful synthetic ingredient in dandruff anti-dandruff and to replace it with safe natural ingredients. An effort has been made to integrate modern formulation technology into a formula based on natural ingredients. Night jasmine flowers, Ritha fruit, Amala fruits, hibiscus flowers, Fresh Tulsi leaf Soap nut, Neem leaf, Aloe- vera pulp, Guar -gum, Rose merry oil, Almond oil, Brahmi leaves, collected in an Ayurvedic store and remained as Banana roots, pomegranate seeds, leaves Hibiscus, Marigold flowers, and lemon fruit and all the ingredients are extracted and create a unique texture and stability tested with Dove shampoo on the market. Formulation 4 was found to be the best method based on the criteria for testing and stability studies. In a review of research data, the development of four anti-dandruff products containing all the positive properties of a suitable shampoo and was found to be safe, effective and economical compared to synthetic Dove anti dandruff shampoo, proved to be a stable improvement., an effective herbal anti- dandruff shampoo that may be commercially available instead of an existing synthetic shampoo is possible.

1. Introduction: -

Nyctanthes arbor-trisis linn. is popularly known as ‘Night Jasmine’ or ‘Harsinghar’ due to the fact that its flower emits a very strong and pleasant fragrance during the whole night ^[1,2]. The the flower start falling after midnight and by the day break, the plant appears dull. The generic name ‘nyctanthes’ has been coined from two Greek word ‘Nykhta’ (Night) and ‘anthos’ (flower) ^[3,4]. The specific name ‘arbor-tristis’ meaning ‘the sad tree’ is supposedly derived from dull looks of the tree during daytime ^[5]. It is a traditional ethno-medicinal plant found not only in India but also in Asia ^[6].

Night jasmine is the official flower of the state of **West Bengal, India**, and for **Kanchanaburi province, Thailand**. The plant lives for 5-20 years. The leaves, flowers, bark, fruits and seeds of the plant all have diverse

pharmacological qualities and are employed in alternative systems of medicine like ayurved, siddha and and unani. [7.8]

Night jasmine (*Nyctanthes arbor-tristis*) is known as Parijat and is known in many names in local languages. The various parts of the plant are useful in many diseases. The plant is widely distributed/ cultivated in various regions of tropics and subtropics. The plant has an average life span of 10 years and grows as a shrub.

Nyctanthes arbor-tristis Linn “a night time flowering sad tree” of own family Oleaceae (*Nyctaginaceae*) is well known in India and its neighbouring international locations as one of the maximum flexible medicinal plant lives having a wide spectrum of biological sports and is widely cultivated in tropical and subtropical areas all over the international. The flowers have a smell like jasmine which blooms in the night. It is a terrestrial woody perennial having life span of five - twenty years.

It is mostly a shrub or a small tree having brilliant, incredibly fragrant plant life, which bloom at night and fall off earlier than sunrise, giving the floor below a pleasant combination of white and crimson. Thus, at some point of the day the plant loses all its brightness and hence is known as "Tree of sadness" (*arbor-tristis*).

It is likewise referred to as Harsinghar, Coral Jasmine, Parijat, queen of the night and night time flowering jasmine. It is also generally known as a Night jasmine. The use of the medicinal flowers and plant parts for curing illnesses or diseases has been documented in history of all civilizations. The interest in medicinal and fragrant flowers has been shown all over the world because of their safe and effective energetic principles. [9]

1.1. Taxonomical Classification:

- Kingdom: Plantae
- Division: Magnoliophyta
- Order: Lamiales
- Family: Oleaceae
- Genus: *Nyctanthes*
- Species: *Arbor Tristis*
- Binomial Name: *Nyctanthes arbor*
- Common Name: Night blooming Jasmine [10]

1.2. Plant profile:

- **Nature:** - it is cool & dry in nature, but some night jasmine is hot in nature
- **Synonym:** - Night blooming cestrum, Night jasmine, Lady of the night, Queen of the night, Harsingar, Sad Tree
- **Biological Name:** - *Nyctanthes arbor tristis* linn, *Cestrum nocturnum*
- **Geographical Source:** -
 - Night jasmine is native to tropical regions of central & south america.
 - It has been introduced and cultivated in various other tropical & subtropical regions around the world due to its ornamental & aromatic qualities.
 - It is commonly found in countries with warm climets, & in some places, it has become naturalized [11]

Table-1: Some restorative Medicinal uses of Night jasmine as referenced in Ayurveda.

Sr. No.	Plant Part	Medicinal uses
1	Flower	Colic, dyspepsia, fart, turning grey of hair and sparseness, astringent, stomachic, and carminative in nature, ophthalmic, gout treatment, cure of faintness and dizziness, start feminine cycle
2	Seeds	Piles, sparseness, scurvy and hair tonic
3	Leaf	Sciatica, joint inflammation, fevers, stiffness and assorted excruciating circumstances, ringworm (skin disorder), bronchitis, bronchial asthma, hack, dyspepsia (issue with processing related with hurt, fart, indigestion and queasiness), stoppage and counteractant for reptile toxin, cholecystagogue.
4	Stem	Relieves cerebral pain
5	Bark	Relieves expanding of lungs
6	Oil	Oil comprised of its bark carries help to agony of eyes, oil produced using fragrant greenery is utilized as aroma
7	Leaf, Flower, seed,	In the treatment of contagious skin contamination, dry hack, and bronchitis.
8	Bark and Roots	Used as an antitoxin for snakebites, expectorant, febrifuge and a gentle laxative

Table-2:

Active
Chemical
constituents
found in
one-of-a-
kind parts
of Night
jasmine and
their
biological
activities.

Part of Plants	Chemical Constituents	Biological activity
Seeds	Arbortristoside A&B, Glycerides of linoleic oleic, lignoceric, stearic, palmitic and myristic acids, nyctanthic acid, 3-4 secotriterpene acid.	Antibacterial, Antileishmanial, Antifungal, Immunomodulatory
Flowers	Essential oil, nyctanthin, d-mannitol, tannin and glucose, carotenoid, β -monogentiobioside- β Dmonoglucoside ester of α -crocetin, glycosides viz β -monogentiobioside ester of α -crocetin (orocrocin-3), β -digitiglobioside ester of α -crocetin	Diuretic, Antioxidant, Anti-inflammatory, Anti-bilious, Sedative, Antifilarial, Antidandruff.
Leaves	D-mannitol, β -sitosterole, Flavanol glycosides-Astragaline, Nicotiflorin, Oleanolic acid, Nyctanthic acid, tannic acid, ascorbic acid, methyl salicylate, carotene, friedeline, lupeol, mannitol, Glucose and fructose, iridoid glycosides, benzoic acid.	Antibacterial, Anthelmintic, Anti-inflammatory, Hepatoprotective, Immuno potential, Anti-pyretic, Antioxidant, Antifungal



Night jasmine plant**Flower****Fig. no.1 Night jasmine plant****Fig. no.2 Flower of Night jasmine****1.3. What is Antidandruff activity: -****1.3.1. Dandruff:**

Dandruff is a chronic scalp condition, which involves excessive shedding of dead skin cells from the scalp. It is caused by a fungus called *Malassezia restricta* and *Malassezia globosa*. *Malassezia* formerly called *Pityrosporum* dandruff is caused is a yeast causing infection of skin and scalp.

Dandruff is caused due to excessive shedding of dead skin cells from the scalp.

It affects 5% of the population and mostly occurs after puberty, between 20 and 30 years, and dandruff affects males more than female.

The skin renews itself about once a month. Usually, scalp sheds dead cells in a nearly invisible way, but sometimes cell turnover becomes unusually rapid and dead cells are shed as visible flakes called dandruff. Warm and humid atmosphere, overcrowding, and poor personal hygiene promote the growth of *Malassezia*.^[12]

**Fig.No.3. Scalp of hair****1.3.2. Causes of dandruff:**

One explanation for dandruff is that the fungus *pityrosporum* oval, which is naturally present on the scalp and other parts of the skin. Typically, this fungus causes no damage. However, with the weather change, hormonal, and stress, the scalp will produce more oil, causing the fungus *p. oval* to proliferate. With the proliferation of the fungus, itchiness of the scalp skin cells and the loss of hair follicles and so-called dandruff will come.

The exact mechanism of dandruff formation is now believed to be the result of the formation of enzymes called lipases. The *Malassezia* fungus breaks down sebum to oleic by using these enzymes. The oleic acid then penetrates the top layer of skin and causes increased skin cell turnover in susceptible people. This, in turn, causes dandruff flakes and sometimes itching and redness.^[13]

1.3.4. Classification of dandruff: -

Depending upon the symptom's dandruff are categorized as:

- 1) Dry dandruff
- 2) Oily dandruff

- 1) Dry dandruff
 - a) it is also called pityriasis steroids.
 - b) Information on the minutes scale which accumulates on the scale area.
- 2) Oily dandruff
 - a) It is also called pityriasis steroids.
 - b) It arrives on the scale with sebum production.

1.3.5. Different disease associated with scalp hair:

- ❖ Mycotic conditions
- ❖ Dandruff
- ❖ Seborrheic dermatitis
- ❖ Tinea capitis
- ❖ Pediculosis capitis
- ❖ Inflammatory condition
- ❖ Psoriasis

1.4. Symptoms of dandruff mainly include the following: -

- presence of fragments (scaling)
- itching of the scalp
- redness around the scalp

1.5. What is the Problem related to hair: -

1. Dandruff
2. Dry hair
3. Spilt end
4. Oily hair
5. Frizzy hair
6. Hair loss
7. Heat damage
8. Colour damage
9. Grey hair

1.6. Herbal anti-dandruff shampoos: -

Herbal anti-dandruff shampoos are the cosmetic formulation which contain herbal ingredients such as plant extra and essential oil. These herbal shampoo are generally used to remove the dandruff, to add natural colour to the hair, to remove the extra oil hair, for the healthy growth of the hair, to remove the dust, dirt, and scales of the scalp, to prevent hair falling, to imparts softness and smoothness to the hair shaft, etc. it is assumed that they can penetrate to the root shafts, stimulate the sebaceous glands, enhance the blood circulation and impart greater strength to the hair root and the shaft. They are also used against alopecia, thinning, clubbing, and greying of hair and hair shaft roughness and breaking. There are large numbers of plants which have beneficial effects on hair and are commonly used in shampoo. ^[14,15]

Herbal shampoo is most probably utilized herbal cosmetic which commonly used for cleaning hair and scalp in daily routine life. Now a days, Herbal plants and formulation are widely used for cosmetic. Prepared herbal shampoo is applied on wet scalp surface, massaging into hair, and cleansed by rinsing with water. Dandruff is also most commonly caused for hair fall. It is necessary to remove from scalp.

Main purpose of herbal shampoo is to remove dandruff from hair fall. Herbal formulation is most commonly used in development as well as developing countries as health care aid. The herbal shampoo is type of cosmetic

preparation that uses herbs that is natural ingredients from the plants. Any hair cleansing solution, made from the extract of ayurvedic herbs and flowers, can be termed as a 'herbal shampoo'.

It can also be defined as a hair care product in form of viscous liquid used to remove dirt, oil from the hair and make them clean. The shampoo has abundant abilities like lubrication, conditioning, hair growth, reduction of hair loss, maintaining hair colour, medication. It also has vital roles like anti-dandruff property, cleansing action, also acts as a keratolytic agent. The main aim of shampoo preparation is to clean dirt and dandruff, also used to make hairs soft and silky.

The purpose of the present investigation is to avoid the use of synthetic or chemical preparation that are available in the market. Several herbal ingredients with antidandruff properties were used, which make hair soft and lustrous, promote hair growth. Importantly these preparations are cost effective, not much expensive.

1.7. Benefits of herbal shampoo: -

1. Herbal shampoos for hair growth are formulated to strengthen the hair follicles by delivering essential oils and nourishment all through the roots and follicles.
2. Herbal shampoos can cleanse the scalp and remove excess oil. They can also protect the scalp from UV rays.
3. Herbal shampoos can nourish and strengthen hair, stimulate hair growth, and reduce hair loss. They can also help with dandruff, scalp irritation, and frizz.
4. Herbal shampoos are made with plant-based ingredients and are free of harsh chemicals. They can contain natural ingredients like soapnut, amla, shikakai, methi, and mehndi that are traditionally used in Indian hair care.

1.8. Function of shampoo: -

1. Keep healthy natural oils.
2. It should effectively and completely remove dirt or soil.
3. It should effectively wash the hair.
4. It should produce a good amount of foam to satisfy the user.
5. It should be readily removed by rinsing with water.
6. It should impart a pleasant fragrance to the hair.
7. It should not have any side effect or causes irritation to the skin and eye.
8. Conditioning.

Aim: “FORMULATION AND EVALUATION OF HERBAL SHAMPOO CONTAINING ANTIDANDRUFF ACTIVITY OF NYCTANTHES ARBOR TRISTIS LINN”.

Objective:

1. To reduce the formation of dandruff flakes and relieve symptoms.
2. To check effect of individual component of shampoo the on growth of dandruff causing microorganisms.
3. Sub-culturing and a maintenance of cultures of dandruff causing microorganisms.
4. To select herbs which are effective against dandruff.
5. To standardize extraction procedure for active ingredients of herbs.
6. Preparation of shampoo using effective herbs.
7. Determining shampoo’s inhibitory effects causing microorganisms.
8. Sample distribution and analysing of feedback obtained data analysing and report writing.

2.Materials and methods:

Table 3: Material used for antidandruff shampoo preparation:

Sr. no.	Ingredients	Quantity
1.	Amla	10g
2.	Hibiscus	10g
3.	Shika-kai	30g
4.	Soap-nut	20g
5.	Tulasi	10g
6.	Neem	10g
7.	Aloe vera	5g
8.	Guar gum	1g
9.	Vitamin E capsule	1 capsule
10,	Lemon juice	10ml
11.	Almond oil	5ml
12.	Rosemerry oil	4ml

1) Amla: -

Amla, known as Indian gooseberry, is an ample source of vitamin C. it is full of many health benefits Amla is used as a essential hair tonics, required to enhance hair growth and improve hair pigmentation. It gives power to the roots, take care of the colour, and improve luster.



Fig.No.4. Amla

1. Strengthen the scalp and hair.
 2. Reduce premature pigment loss from hair, or greying.
 3. Stimulate hair growth.
 4. Reduce hair loss.
 5. Prevent or treat dandruff and dry scalp.
 6. Prevent or treat fungal and bacterial hair and scalp infection.
 7. Improve overall appearance of hairs.
- 2) **Hibiscus:** Hibiscus or ‘gudhal’ is the most beneficial ingredient for hair. It is used for the growth of hair, its regrowth, and hair loss. Hibiscus carries amino acids, Vitamin A, c and alpha hydroxyl acid along with other nutrient that are highly beneficial for hair and scalp.
1. They keep scalp healthy and minimize the chances of dandruff from hair.
 2. Condition hairs.
 3. Prevents baldness.
 4. Treat dandruff and itchy scalp.
 5. Prevents premature greying.



Fig.No.5. Hibiscus

- 3) **Shika-kai: -**
1. Cleanses hair Add more shine to the hairs.
 2. Prevents Gray's.
 3. Curbs hair loss.
 4. Prevents lice, psoriasis, eczema and scabies.
 5. Provide nourishment to the hair and promote healthy and rapid hair growth.
 6. Prevent split ends.



Fig.No.6. Shika -kai

4 Soap-nut: -

Reetha shows cooling effects and acts as an excellent cleanser on the skin. Soap-nuts prevent the scalp from drying and retain the softness of the skin. The mixture of soap nuts chickpea when applied on the skin gives gentler effect on the skin. It makes skin soft and tender. It also used in removing flakes of cells on the scalp.

1. Stops hair fall
2. Prevents fall
3. Prevents dandruff
4. Fight against scalp infection



Fig.No.7. Soap-nut

8)Tulasi: -

Tulasi help maintain moisture in your scalp and improve blood circulation, reduce itchiness and dryness, strengthens the hair.

1. Treat dandruff
2. Prevent premature greying of hair
3. Keep scalp healthy
4. Help in promoting blood circulation
5. Reduce grease of hair
6. Prevent scalp from getting itchy
7. Antimicrobial
8. Anti-lice property.



Fig.No.8. Tulsi

9)Neem: -

Neem helps to clean the scalp. It clears the clogged pores and improve hair growth. The regenerative properties are extremely essential for the treatment of dandruff. It is endowed with antiseptic and healing properties and it can be used for a variety of hair problem. Dandruff of can be removed by using neem leaves as a rinse. The most common neem uses are in our hair care rituals. As per Ayurveda, Amla, Reetha, neem, Shika-kai are herbs needed for healthy locks, enhanced hair growth, decreased hair fall and make the hair voluminous.



Fig.No.9. Neem

10)Aloe-vera: -

1. Calms an itchy scalp
2. Deep clean oily hairs
3. Strengthen
4. Aloe vera contain proteolytic enzyme which repairs dead skin cells on scalp.
5. Promote hair growth
6. Smooth natural curls
7. Reduce fizziness
8. Detangle hair



Fig.No.10. Alo-vera

11)Guar gum: -

Guar gum powder is a natural-ingredients that is used in the creation of gels, shampoo, and lotion because it has a smooth texture and is easy to apply. It removes liquid surface tension as a surfactant. The powder is frequently used in formulation in this capacity.

**Fig.No.11. Guar-Gum****12)Vitamin-E capsule:**

Vitamin E may help support a healthy scalp and natural hair as it has natural antioxidant effect that could assist with maintaining hair growth. There is some limited evidence to support the claim that vitamin E can help prevent hair loss. Vitamin E can help replenish shine that the hair loses as a result of damage the hair.

**Fig.No.12. Vitamin -E capsules****13) Lemon juice: -**

1. Add more shine
2. Get rid of dandruff
3. Split ends
4. Reduced hair fall
5. Gives natural colour to hairs
6. Detox the scalp
7. Promote the growth of hair
8. Great hair mask for dry and damage hair.



Fig.No.13. Lemon

14) Almond oil: -

1. Almond oil is an emollient.
2. It has the essential fatty acids that can help in moisturising the scalp and strands, leading to healthy smooth hair that has a soft texture.
3. Almond oil, when used regularly, penetrates to a cellular level to help soften the hair at the roots and calm the frizzy texture.



Fig.No.14. Almond- oil

15) Rosemerry oil: -

1. Promote hair growth
2. Makes hair stronger
3. Boosts blood circulation
4. Helps control hair loss
5. Relieves scalp irritation
6. Gets rid of dandruff



Fig.No.15. Rosemarry oil

3.Preparation of Night jasmine extract and antidandruff shampoo: -

3.1. Collection of plant material and preparation of extractaction: -

The fresh flower of night jasmine was collected from the surrounding of some local areas of Nagpur city. The plant authenticated by prof. Dr. N. M. Dongarwar, Head of Department of Botany. Rashtrasant Tukdoji Maharaj Nagpur University (RTMNU). The fresh flower of night jasmine is collected and soaked in methanol overnight. The night jasmine flower extract by decoction method.



Fig.No.17. Night Jasmin Plant material extraction

3.2. Preparation of antidandruff shampoo: -

All the plant material were collected from ayurveda store as well as local market. All the ingredient were accurately weight and soaked in organic solvent such as ethanol, methanol suitable for which are used in different plant material. Soak them at overnight individually. Then all the ingredients were extracted ideally and boiled 121°C for 45 to 60 minutes by using distilled water as a solvents system... Later the mixture was cooled, filtered and collected. Then thickening agents were added and the solution were

gently stirred. Later Rosemerry oil, almond oil and lemon juice added to mixture and stirred. Finally, shampoo was prepared and stored in a container.



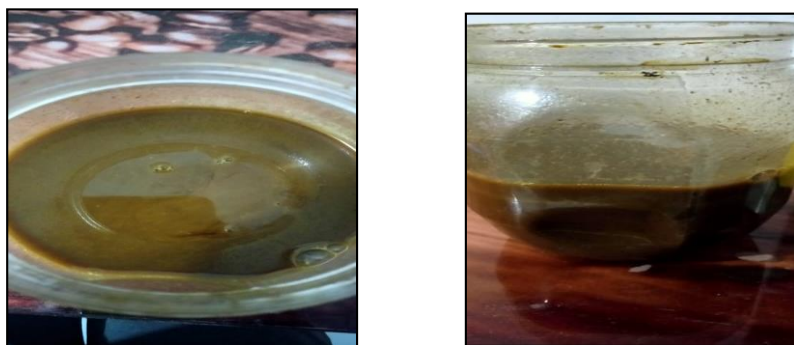


Fig.No.18. Formulation of anti -dandruff shampoo

4.Evaluation Parameter of Anti-Dandruff Shampoo: -

4.1. Evaluation of herbal shampoo: -

1. Physical parameters-

- a. Prepared shampoo was evaluated for product performance which includes physiological parameters.

2. Determination of pH-

- a. 1ml of prepared shampoo were diluted water and the pH of shampoo were estimated using pH paper at room temperature.

3. Solubility check-

- a. 2ml of shampoo were added to 100ml of water and the solution formed were shook and were heated to enhance the solubility. After 10mins, the solution was cooled and then the quantity of residue was measured.

4. Cleansing action-

- a. 5gms of wool yarn were added in grease and it were placed in flask containing a mix of 200ml of water along with 1ml of shampoo. Temperature of content in flask were maintained at room temperature. Then the flask was shaken for 4min at rate of 50 shakes per min. The solution was removed, and weighed. The amount of grease removed, and sample were taken out, dried and weighed. The amount of grease removed were calculated by using the following equation,
- b. $DP = 100(1 - T/C)$
- c. Where DP = percentage of detergency power,
- d. C=weight of sebum in the control sample
- e. T=weight of sebum in the test sample

5. Determination of percentage solid content: -

- a. a clean dry China dish was weighed and 4ml of shampoo were added to it. The weight of dish and shampoo were noted. The exact weight of shampoo was calculated. Place the China dish with shampoo on hot plate until the liquid portion were evaporated. The weight of shampoo after drying were calculated.

6. Viscosity measurement: -

- a. the viscosity of prepared shampoo was estimated by Ostwald's viscometer at room temperature. The viscosity of prepared shampoo was calculated by using the equation,
- b. $n_2 = \frac{n_1 \times t_2}{t_1}$
- c. $p_1 \times t_1$
- d. n_1 =absolute viscosity of water
- e. t_1 = time of flow of 3water
- f. p_1 =density of water
- g. n_2 =absolute viscosity of liquid
- h. t_2 =time of flow of liquid
- i. p_2 =density of liquid

7. Foam detergency: -

- a. Cylinder shake method were used for foam determination 50ml of 5% shampoo solution was put into a 250ml measuring cylinder and covered with hand and shaken for 12times. After that the cylinder were kept aside for 60sec.

8. Dirt Detergency: -

- a. 2 drops of shampoo were added in a largest test tube that contained 10ml of distilled water. To it 1 drop of India ink were added then the test tube was stoppered and shook it for 10 time. The amount of ink on the foam were estimated as none, light, moderate or Heavy.

9. Surface tension measurement: -

- a. Dilute the shampoo using distilled water to fix 10% as concentration. Measurement was carried out using stalagmometer. Dip the flattened end of stalagmometer into beaker containing sample of developed shampoo and suck it until the level reaches the mark. Fix that in the stand and allow the sample to run slowly from the mark. Count the number of drops formed when the level of liquid reaches from A to B. repeat the experiment with distilled water. The data were calculated by using the following equation,
- b. $R2 = \frac{(W3 - W1) N1 \times R1}{(W2 - W1) N2}$
 - i. (W2-W1) N2
- c. Where, W1 is weight of empty beaker.
- d. W2 is weight of beaker with distilled water
- e. W3 is weight of beaker with shampoo solution
- f. N1 is the no. of drop of distilled water
- g. N2 is no. of drops of shampoo solution
- h. R1 is surface tension of distilled water at room temperature
- i. R2 is surface tension of shampoo solution

10. Stability studies: -

- a. It was performed by keeping the prepared shampoo in a closed container at cool and dry place for 3 days. The changes like color, texture of shampoo was observed at particular time period.

5.Result and Discussion: -**5.1. Evaluation of anti-dandruff herbal shampoo:****1. Physical appearance / Visual Inspection:**

The result of inspection of series of formulation are listed below

Table 4: The table showing in formation and visual inspection

Sr. No.	Formulation	Visual inspection
1.	Sample 1	Grey brown, pleasant smell
2.	Sample 2	Grey brown, pleasant smell
3.	Sample 3	Grey brown, pleasant smell

2. Solubility check: -

The shampoo was in water. So, the shampoo was easy for applying in hair.



Fig.No.20. Solubility check

3. Determination of pH: -

The pH of herbal shampoo has been shown to be important and enhancing the qualities of hair, minimizing irritation to the eyes, and stabilizing the ecological balance of the scalp. The current trend to promote herbal shampoo followers. pH is one of the ways to minimize damage to the hair. Mild acidity prevent swelling promote tightening of the scale, there by including shine. As seen for below table all the shampoo were acid balanced were ranged 6.4 which were near to the scalp pH.

4. Cleansing Action: -

The result of detergency ability, when compared with the marketed formulation and it was found between 30-33%.

Normally it is considered that forming ability of natural shampoo is not comparable with its synthetic counterpart. But the study proves that combination of natural surfactants such as retha in optimized concentration can generate sufficient foam for the shampoo. This data may prove the ability of natural surfactants like retha in optimized concentration as the best replacement for the harsh synthetic detergents. The anti-dandruff activity of developed formulation showed positive results.



Fig.No.21. Cleansing action

5. Determination percentage solid content:

A clean dry China dish was weighed, and 4 gram of shampoo was added to it. The weight of dish and shampoo was noted. The exact weight of shampoo was calculated. Place the China dish with herbal shampoo on hot plate until the liquid portion was evaporated. The weight of shampoo after drying was calculated.

Table 5: solid content:

Sr. No.	Formulation	Solid content
1	Sample 1	21.11
2	Sample 2	22.58
3	Sample 3	26.57



Fig.No. 22: Determination percentage solid content:

6. Viscosity Evaluation: -

The viscosity was in range 1.10-1.30 poise which gives great fluidity, which makes formulation easy to apply on and easy to spread on hair. Formulated shampoos did not show any skin irritation on application as the shampoo is fully prepared by natural herbs and was found between 1.10-1.40 pa s.

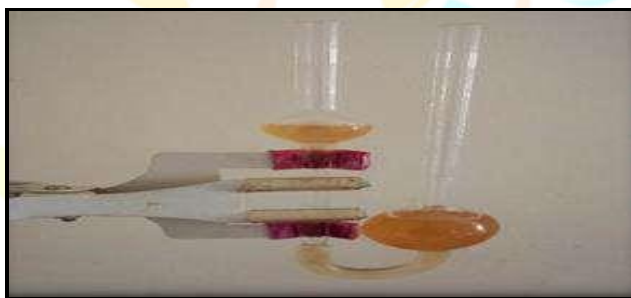


Fig. No. 23 Determination of viscosity

7. Stability study:

stability and acceptability of organoleptic properties of formulation during the storage period indicated that they are chemically and physically stable. The shampoo was observed for physicochemical changes were observed. The shampoo was found to be stable.

8. Nature of hair after washing:

The hair was found to be soft, shiny and silky.

9. Foam determination:

foam production has little to do with cleansing activity of shampoo, it is key importance to the consumer and is therefore an important criterion in evaluating shampoo. The shampoo showed good foaming properties.

Table 6: Foam determination:

Sr. No.	Number of tests containing ml of solution	Height of foam in cm
1	1ml	0.5
2	2ml	0.7
3	3ml	1.2
4	4ml	1.5
5	5ml	2

**Fig.No.24:** Foam determination

10. Dirt detergency: - It was performed as the evaluation producer. The dirt detergency activity of shampoo was found to be as moderate.

**Fig.No. 26:** Dirt detergency

11. Surface tension measurement: - A proper shampoo should be able to decrease the surface tension of pure water to about 40 dynes/cm. it is one of the main mechanisms of detergency. The reduction in surface tension of water from 72.8 dynes/cm to 34 dynes/cm by the herbal shampoo is an indication of their good detergent action.

6. Conclusion:

The present study was carried out with the aim of preparing the herbal shampoo that reduces dandruff, hair loss, strengthen the hair growth. Herbal shampoo was formulated with the aqueous extract of medicinal plant that are commonly used for cleansing hair traditionally. At this time, hair fall is the major problem so in this case we try to add some type of herbal drug in the formulation to prevent hair fall, make smooth, as well as give anti-dandruff action. The formulation of herbal anti-dandruff shampoo are given positive effect and reduce dandruff and other

type of fungal infection from hair like eczema and scabies and Provide nourishment to the hair and promote healthy and rapid hair growth, Prevent split ends. This type of formulation we use night jasmine plant which contain anti-dandruff property. There is no any type of side effect, so they are useful for all of them. The formulation of anti-dandruff hair shampoo provides a method for treating a scalp dandruff of seborrheic dermatitis.

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