FORMULATION AND EVALUATION OF HERBAL SHAMPOO OF *GMELINA ASIATICA FRUITS*

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ABSTRACT:

Gmelina Asiatica fruit from the family of Lamiaceae posses blood purification, anti-syphilis, anti-gonorrhoea and treatment of Vata and Pita disease and also used in hairfall and dandruff problems. To taken the benefits of Gmelina Asiatica fruit extract is the major aim of this study and to prepare the shampoo and evaluate the nature of this herbal shampoo. This herbal shampoo contains Hibiscus leaf extract, aqueous extract of Gmelina Asiatica fruits, sodium lauryl sulphate, methyl paraben, lemon grass oil and distilled water. The formulation was prepared and evaluated for physiochemical parameters and the results showed the production of the herbal shampoos. The pH (6.32 ± 0.01 to 5.62 ± 0.03), percentage of solids (22.31 ± 0.02 to 24.31 ± 0.03), dirt dispersion, surface tension (36.44 ± 0.22 to 37.12 ± 0.13), viscosity (6.7 ± 0.2 to 5.1 ± 0.2), skin irritation test(no irritation) & visual stability. The formulation was clear, had good foam formation, good foam quality & retention with proper rheological properties & skin compaliances. Formulation with 10%extract showed best results of evaluation parameters. The formulation efficacy were in the range 10% extract containing F2 > 5% extract containing F1>20% extract containing F3>30%extract containing F4.

Keywords: *Gmelina Asiatic fruits, Anti-dandraff herbal shampoo,*

INTRODUCTION:

On older days, many of our ancestors were used the herbal plants and their explants for it's medicinal uses. In that way, some plants are used to prevent dandruff problems. People are fitted to live their lives in natural habits by using herbal plant and their parts such as fruits, leaves, flowers to maintain their health of hairfall, dandruff and hair colour. Till now, in some villages, people are using this type of herbal plants for better lives.

Gmelina asiatica is a type of deciduous plant species, was discovered by Linnacaeus who is known as the father of Botanical science. It is comes from the family of *Lamiaceae.* The explants of this plant contains many medicinal uses. Such as it's root is used in the blood purification,also used in the treatment of rheumatism and in gonorrheae and syphilis. The leaf of this plant is used in the urogenital infection. Their fruit is applied in the general tonic in weakness. Also used in treatment of Vata and Pitta diseases. In such a way, this plant is also used in many cases for it's therapeutic action, like treating hairfall and dandruff problems.

Gmelina asiatica Linn is a large scrambling shrub or small tree with many branches. It is fully grown about 2 to 8 meters height. It is a main tropical flowering plant which is notable for it's head. Synonyms for this plant in many languages such as, in Tamil, it is called as 'Mulkumizh' or 'Nilakumil'. In Sanskrit, it is 'Vikarini' and in Hindi it is known as 'Badhara'. In Telugu it is 'Challa gummudu'. The leaves of this plant are evergreen and small which is grown about 0.5 to 3 cm long and slender. The leaf blades is oval or triangular in outline which contains 3 to 5 lobes when young.

The stem seems as hard yellowish or brownish white and grey wood. The plant has no edible uses. It's flower are large with 2.5 to 5 cm long, covered with fine hair and yellowish or sulphur yellow bisexual flower. It's cultivation status is ornamental, wild in sandy clay or poor soil by seed propogation method. It is axillary or terminal racimes which the flower is flowering season from March to May. The fruit of this plant is appeared as pear shaped drup that is yellow in colour after ripening. It can grow in open habitats, gaps, margin. And also found from sea level upto 500 meter altitude. This plant is widely found in East Asia-India, Sri lanka, Bangladeesh, Thailand, Cambodia, Vietnam. Shampoo is the cleansing preparation of the hair and scalp. Though there are different types of skin cleansers, but the hair cleansing preparations can be grouped into only one category and are called as shampoo. They are basically water based products containing mainly surfactants.2it's Primary function is of cleansing the hair of accumulated sebum, scalp, debris and residues of hair grooming preparations. The herbal shampoo although better in performance and safer than the synthetic ones will be popular with consumers.

MATERIAL AND METHODS

The juice of *Gmelina asiatica* were collected from the village of sangiyam forest, near Kallakurichi. It is authentified by Government arts and secince college, tiruvannamalai. The fresh juice is used for the preparation of shampoo. Coconut oil, lime oil, potassium hydroxide, ethyl alcohol,methyl paraben, glycerin, castor oil, olive oil was used from the laboratory of Smt. Gandhimathi college of pharmacy.

EXPRESSION OF *GMELINA ASIATICA*

30-40 ml of juice of *Gmelina asiatica* were obtained by the process of hydraulic press .To filtrate the active constituent, the juice is filtrated by using muslin cloth. Then, the filtrate is kept in centrifuge at 2000 rpm. The supernatant was mixed with the shampoo base formula.

FORMULATIONS OF SHAMPOO

Firstly, the saponification of olive oil, castor oil and coconut oil with the addition of potassium hydroxide by using the reflex condenser. After that, glycerin was added with gradual stirring. Methyl paraben, ethyl acohol and lime oil were used as additives to the shampoo formulation where the ethyl acohol and methyl paraben are used as preservatives and to mask the pungent smell of the extract, lime oil is used. As taking 5%, 10%, 20% and 30% of the extract of *Gmelina asiatica*, the formulations of F1, F2, F3 and F4 were prepared as shown in the table given below,

Table 1: Composition of shampoo formulation

S.NO.	COMPOSITION	F1	F2	F3	F4
01	*Gmelina asiatica fruit juice*	5	10	15	20
02	Hibiscus leaf extract	3	3	3	3
03	Sodium lauryl sulphate	2	2.5	2	2.5
04	Methyl paraben	1	1	1	1
05	Lemon grass oil	0.5	0.5	0.5	0.5
06	Distilled water	100	100	100	100

Evaluation of formulated shampoo

To evaluate the prepared formulation, the following tests were conducted. The tests including physical appearance/visual inspection, determination of Ph, determine presence of solid content, rheological/viscosity evaluation, dirt dispersion, cleaning action, detergency ability, foaming ability and surface tension. To ensure the quality of product, the following tests were conducted. The test such as determination of dry residue, moisture content, stability testing, surface tension and detergency test. The results were compared with marketed formulations.

1.Physical appearance/visual inspection

The prepared formulation were evaluated by its physical appearance such as foam producing ability, clarity and fluidity.

2.Determination of pH

1gm of product is dissolved with 9ml of water and determine the pH using pH meter at 27^{o} C.

3.Determine percent of solids content

The clean dry evaporating dish was weighed and taken 4gm of shampoo in the evaporating dish. The shampoo and the dish both were weighed. The optimize weight of shampoo was calculated only and put the evaporating dish with shampoo was placed on the hot plate until the liquid portion gets evaporated. The weight of shampoo (solid) after drying was calculated.

4. Rheological or Viscosity evaluation

The Brookfield viscometer is used to determine the viscosity of shampoo. Take 10ml of shampoo in a beaker and spindle is dipped in it for about 5 minutes and then reading is taken.

5. Dirt dispersion

2dropsof formulated shampoo was added in the large test tube contains 10ml of distilled water. One drops of India ink added the test tube was stopered & shakes for 10times. The amount of ink in the foam were estimated as none, light, moderate or heavy.

6. **Cleaning action**

Take 5 gm of wool yarn were placed in grease, after that it was placed in 200 ml of water containing 1gm of shampoo in a flask. The water's temperature was maintained at 350^{o}C. Then the flask was shaken for 4 mins at the rate of 50 times a minute. From the solution the sample was taken out and it allowed to dried then weighed. By using the following equation the amount of removed sample was calculated: DP=100(1-T\C). In which, DP is the percentage of detergency powder, C is the weight of sebum in the control sample and T is the weight of the sebum in the sample.

7. Detergency ability

The detergency ability of the samples was evaluated by using the Thompson method. Firstly, a crumple of hair was washed with a 5% sodium lauryl sulfate (SLS) solution, then dried and divided into 3g weight groups. The sample were suspended in a hexane solution containing

10% artificial sebum. The mixture was shaken for 15 minutes at room temperature. After that sample were removed and the sebum content was determined by evaporating the solvent at room temperature. Then each sample was divided into 2 equal parts. One part is washed with 0.1ml of 10% test shampoo and the other part is considered as negative control. After drying the residue sebum on sample was extracted with 20ml n-hexane and re-weighed. Finally the % of detergency ability was calculated by using the following equation. DP=100(1-T\C). In which, DP is the percentage of detergency powder, C is the weight of the sebum in the control sample and T is the weight of sebum in the test sample 3,4.

8. Foaming ability and foam stability

The foaming ability of the sample was determined by using the Cylinder shake method. Take 50ml of the 1% shampoo solution in a 250ml graduated cylinder. The cylinder was covered by the hands and shaken for 10 times. After one minute of shaking, the total volume of foam content was recorded and only the foam volume was calculated. Immediately after shaking, the volume of foam was recorded for each minute interval within four minutes.

9. Stability studies

The physical stability was estimated for a period of 3 month at the interval of one month in a glass tube. The heat stability of the product was studied by placing it in a glass tubes, which were placed in a humidity chamber at 45^{o} C and 75% relative humidity.

10. Nature of hair after washed

By collecting the responses from the volunteers, the nature of the hair after wash can be estimated.

11. Skin sensitization test

This is the test, which is used to check the irritation occurred by the product on the skin. It is done by the human volunteers.

12. Surface tension test

The proper shampoo must be able to decrease the surface tension of pure water about 40 dynes\12cm. The reduction in surface tension is one of the mechanisms implicated in detergency. The reduction of surface tension in water from 72.8dynes/cm to 34.70dynes/cm by the herbal shampoo is an indication of their good detergent action.

RESULT AND DISCUSSION;

The result of visual inspection of the formulations are listed in the tabular column. It can be seen that all formulations have good characteristic smell. Formulation 1 and 3 have less foaming character with compared to formulations 2 and 4. The colour of the formulations varying depending on the concentration of the sample taken.

TESTS	F1	F2	F3	F4
Physical appearance	Clear, no characteristic smell	Clear, no characteristic smell	Clear, no characteristic smell	Clear, no characteristic smell
pH	6.32 ± 0.01	5.62 ± 0.03	5.43± 0.04	5.21± 0.02
Solid content	21.17± 0.02	23.32± 0.01	24.13± 0.02	24.21± 0.04
Viscosity	6.7±0.2	6.3±0.4	5.4±0.1	5.1±0.2
Dirt dispersion	Heavy	Moderate	Light	None
Cleaning action	Low	Low	High	Very high
Detergency ability	High	Very high	High	Very high
Foaming ability	High	Very high	High	Very high
Colour	Light coffee colour	Very slight brown	Brown in colour	Slight brown
Skin sensitization	Suites for sensitive skin and irritation free	Irritation free	Irritation free	Irritation free
Hair after wash	Smooth	Smooth and clear	Silky smooth	Smooth and dandruff free
Surface tension	36.44 ± 0.22	35.21 ± 0.45	37.12 ± 0.13	36.97 ± 0.15

CONCLUSION

From this result come to the conclusion that, it is possible to formulate a natural herbal shampoo by using Gmelina Asiatica fruit juice which posses anti-dandruff activity with compared to some of the shampoos having synthetic chemicals. From the above study it was concluded that all this preliminary physiochemical and stability studies suggested for utility of herbal shampoo with economy and consumer compliance.

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