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Extraction and Evaluation of Herbal Shampoo

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Abstract: ***Shampoo is probably the largest unit sale among the hair care products since shampoo are one of the cosmetic products used in daily life. A shampoo may be a cleaning aid for the hair and is counted among the foremost beauty products. Currently shampoo is not only used to cleanse dirt on the hair and scalp but also to hair growth and prevent hair loss. The main objective of this study was to eliminate harmful synthetic ingredient from anti-dandruff shampoo formulation and substitute them with a secure natural ingredients. Herbal shampoo was prepared with fenugreek, curd, lemon, shikakai, flax seed, vetiver, soapnut were extracted and formulated. Several herbs are reported to be effective in controlling the bacterial and fungal. The formulated shampoo were evaluated by using several tests such as pH, solid content, wetting time test, physical appearance, phytochemical analysis.***

Keywords: Antibacterial activity, Antifungal activity, dirt, fragrance, fenugreek, Herbal shampoo, , curd

I. INTRODUCTION

Shampoos are probably the foremost widely used cosmetic products. Shampooing is that the most commonest form of hair treatment to get rid of dirt, grease and debris from the hair, scalp and other parts of body without damaging the natural gloss of hair and to keep the hair fragrant, lustrous, soft and manageable. Sarovar Reddy *et al*. 2016. A shampoo is essentially an answer of a detergent containing suitable additives for other benefits like hair-conditioning enhancement, lubrication, medication etc. Khaloud Al Badi, *et al*. 2014. Shampoos are various types, such as

Powder shampoo,
Liquid shampoo,
Lotion shampoo,
Solid gel shampoo,
Jelly shampoo,
Aerosol shampoo,
Medicated shampoo,
Liquid herbal shampoo, and
Herbal shampoo powder etc.

A. Categories of Shampoo

Specialized shampoo,
Conditioning shampoo,
Anti-dandruff shampoo,
Baby shampoo,
Two layer shampoo surupsing.

B. Composition of Shampoo

Surfactant,
Antidandruff agent,
Conditioning agent,
Pearlescent agent,
Sequestrates,
Thickening agent,
Colours, perfumes and preservative. Vlavi *et al*. 2017.

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C. Ideal Characteristics of Shampoo

1) Should effectively wash hair
2) Should effectively and completely remove the dust,excessive sebum
3) Should produce a good amount of foam
4) The shampoo should be easily removed by rinsing with water
5) Should leave the hair non dry, soft, lustrous with good, manageability
6) Should impart a pleasant fragrances to the hair
7) Should not make the hand rough and chapped
8) Should not have any side effect or cause irritations to skin or eye. Akash D.patil *et al.* 2017.

As far because the herbal shampoos are concerned in stability criteria, depending upon the character of the ingredients, they'll be simple or plain shampoo, antiseptic or antidandruff shampoo and nutritional shampoo containing vitamin, amino acids, proteins hydrolysate. Sharma *et al.* 1998. There are several medicinal plants that are reported to possess beneficial effects on hair.

The primary advantage of using natural shampoo is to take care of healthy hair without fear the side effects of chemicals contained in synthetic shampoo. Daisy Raybould *et al.* 2011. Synthetic shampoo contains synthetic surfactants are primarily added for foaming ability and cleansing action but their regular use results in the dryness of hairs, hair loss, irritation to scalp and eyes.

During the last few decades, there has been a dramatic increase in the use of natural ingredients in the cosmetic products. Nowadays many herbal shampoos which are available in the market which contains plant crude extract and essential oil.

A good shampoo should almost immediately form abundant foam to the type of water used or the nature of soil or fat to be removed from the hair. Though foam formation is not released to the cleansing effect, but people phychologically always prefer a high foam product. Some shampoos have found to be a side effects like drying of hair. Sarovar Reddy *et al.* 2016. Several ingredients that are used in herbal shampoo are fenugreek, flax seed, shikakai, soapnut, vetiver, lemon, curd.

Table 1: Lists of samples

S. No	**Samples**	**Images**
1	fenugreek	
2	flax seed	
3	shikakai	
4	soapnut	

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5	vetiver	
6	lemon	
7	curd	
8	Guar gum powder	

II. METHODOLOGY

Table No 2: List of ingredients and their category

S. No	Common name	Botanical name	Parts used	Category
1	Fenugreek	Trigonella foenum-graecum	Seeds	Conditioning agent
2	Flax seed	Linum usitatissimum	Seeds	Sequestering agent
3	Shikakai	Acacia concinna	Powder	Detergent
4	Soapnut	Sapindus mukorossi	Fruit	Detergent
5	Vetiver	Chrysopogon zizanioides	Root	Coolant, antibacterial agent
6	Lemon	Citrus limon	Fruit	Anti dandruff, pH modifier
7	Guar gum	Cyamopsis tetragonolobus	Powder	Thickening agent

A. Collection of Samples

All the plant materials were collected from the local market. Fenugreek *(Trigonella foenum-graecum),* Shikakai *(Acacia concinna),* Soapnut *(Sapindus mukorossi),* Vetiver *(Chrysopogon zizanioides)* plant materials were dried and powdered. It was stored in a container for further use.

B. Preparation of plant Extracts

All the powdered materials were extracted separately by using distilled water and it was boiled for 4 hours. The extract of the each plant material was separated and evaporated. It was stored in a refrigerator for further use. Phytochemical analysis was done in all the plant extracts.

C. Formulation of Herbal Shampoo

The plant extracts were mixed in different proportions to obtain a herbal shampoo. Herbal extracts were added to the 10% gelatin solution and were mixed by shaking for 20 minutes. To the mixture of flax seed gel and guar gum was added with stirring. Lemon juice was also added with stirring. Finally the pH of the solution was adjusted. Few drops of lavender oil were also added to impart aroma to the prepared shampoo and the final volume was made upto 100ml with gelatin solution. To this solution 0.5% sodium benzoate was added as a preservative.

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D. Evaluation of Herbal Shampoo

The prepared formulations was evaluated for product performance which includes organoleptic characters, pH, physiochemical characterization and for solid content. To guarantee the nature of the items, particular tests were performed for surface tension, foam volume, foam stability and wetting time test.

E. Physical Appearance

The prepared formulation was visually assessed for colour, clarity, odor and froth content.

F. Determination of pH

Developed formulations was diluted using distilled water with 10% concentration. The prepared formulation was evaluated by using digital pH meter at a room temperature.

G. Determination of % Solid Contents

A clean dry petridish was weighed and added with 4 grams of shampoo. The dish with shampoo was weighed. The exact weight of the shampoo was calculated. The petridish with shampoo was placed on the hot plate until the liquid portion was evaporated. After drying the weight of the dish was calculated.

H. Dirt Dispersion Test

Two drops of shampoo were added to the 10ml distilled water taken in a large test tube. To this solution, one drop of India ink was added and the test was stoppered and shaken ten times. The amount of ink within the foam was indicated by the rubric like None, Light, Moderate, Moderate or Heavy.

I. Foaming Ability and Foam Stability

The stability of the foam is determined by using cylinder shake method. About 50ml of the formulated shampoo (1%) solution was taken in a graduated cylinder of 250ml, it was covered with one hand and shaken 10 times. Foam stability was evaluated by recording the froth foam volume of shake test after 1min and 4 mins, respectively. The total foam volume was measured after 1 min of shaking.

J. Wetting Time Test

Wetting time was calculated by noting the time required by the canvas paper to sink completely. A canvas paper weighing 0.44g was cut into a disc of diameter measuring 1-inch. Over the shampoo surface, the canvas paper disc of diameter measuring 1-inch. Over the shampoo surface, the canvas paper disc was kept and the time taken for the paper to sink was measured using the stopwatch.

K. Surface Tension Measurement

Dilute the shampoo using distilled water to fix 10% concentration. Measurements were carried out using stalagmometer. Dip the flattened end of the stalagmometer in to beaker containing sample of developed shampoo and suck it until the level reaches the mark. Fix that within the stand and permit the sample to run slowly from the mark. Count the amount of drops formed when level of liquid reaches from A to B. Repeat the experiment with distilled water. The data was calculated using following equation.

$$R_2 = \frac{(W_2 - W_1)}{(W_2 - W_1)} \times 100$$

W_1 = Weight of empty paper
W_2 = Weight of beaker with distilled water
W_3 = Weight of beaker with shampoo solution
N_1 = No. of drops of distilled water
N_2 = No. of drops of shampoo solution
R_1 = Surface tension of distilled water at room temperature
R_2 = Surface tension of shampoo solution

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L. Antibacterial Activity Of Formulated Herbal Shampoo

The prepared herbal shampoo were subjected to antimicrobial activity by cup plate method using Muller Hinton Agar (MHA) medium. It was poured into a petri dish. A suspension of microorganisms *(staphylococcus aureus)* was uniformly swabbed on agar plates using sterile cotton swabs. Using different formulations of prepared shampoo 50, 75, 100 and 125µl concentration were added to the agar wells. The petri plates were sealed using para film and incubated at 37° C for 24 hours.

M. Antifungal Activity Of Formulated Herbal Shampoo

The prepared shampoo were subjected to antifungal activity by using potato dextrose agar (PDA) medium. It was poured onto a petridish. A suspension of microorganisms *(Candida albicans)* was uniformly swabbed on agar plates using sterile cotton swabs. Using different formulations of prepared shampoo 50, 75, 100 and 125µl concentrations were added to the agar wells. The petriplates were sealed using para film and incubated at 37°C for 24 hours.

III.EXPERIMENTAL RESULTS

A. Phytochemical Analysis

The phytochemical analysis of different plant samples were carried out and it shows the presence of bioactive compounds. The bioactive compounds are classified into two types of primary metabolites and secondary metabolites. Primary constituents are chlorophyll, protein, sugar and amino acids. Secondary constituents are glycosides, steroids, tannins, terpenoids and alkaloids. The presence and absence of different bioactive compounds are shown in table 2. The presence of bioactive compounds are used in various industrial process.

Table No 3: Phytochemical Test

Phytochemical test	fenugreek	Soapnut	Shikakai	Lemon	Vetiver
Alkaloids	-	-	+	+	+
Flavanoids	-	-	-	-	+
Saponins	+	+	+	+	-
Phenols	+	-	+	+	+
Glycosides	-	-	-	-	+
Proteins	+	+	-	-	+
Reducing sugar	-	-	-	-	+
Anthocyanin	-	-	+	-	-
Coumarins	+	+	+	+	+
Terpenoids	-	-	+	-	+
Steroids	-	-	+	-	+
Tannins	-	-	+	+	-

B. Herbal Shampoo Formulation

The shampoo was formulated by mixing the different volumes of the aqueous extracts of all the ingredients . The above plant extracts contains the phytochemical activity. The phyto constituents of saponins which is a natural surfactants having detergent property and foaming property. The 10% gelatine solution behaves as a pseudoplastic forming clear solution. Lemon juice (1 ml) added to the shampoo serves as anti dandruff agent and maintains the acidic pH in the formulation. Vijayalakshmi A *et al .2018*



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IV.EVALUATION OF FORMULATED SHAMPOO

A. Physical Appearance

The prepared shampoo showed good characteristics in terms of foaming effect and appearance on the visual inspection of the formulation.

B. pH

The pH of the prepared solution of shampoo using distilled water (10%) was evaluated at room room temperature. The pH of the shampoo was resulted at 6.8.

C. Solid Content

Shampoo with high solid content are going to be very difficult to rinse the hair. The prepared shampoo contains of solid contents. Thus they considered easy to wash out when having less solid contents during preparation of shampoo.

D. Foaming Ability And Foam Stability

From the consumer point of view , from stability is one of the important needs of a shampoo. The foam volume produced by the formulated shampoo is 50 ml. By using cylinder shake method , the foam volume was measured as 1 minute and 4 minute interval. The foam was generated by the shampoo has good stability and the prepared shampoo exhibits a higher foam property which may be due to the presence of shikakai and soapnut.

E. Antibacterial Activity Against Staphylococus Aureus

The prepared shampoo were subjected to antimicrobial activity by using cup plate method. The prepared shampoo were added to different concentration (50,75,100 and 125 µl) in agar wells. The zone of inhibition were successfully observed after 24 hours of incubation period.



F. Antifungal Activity Against Candida Abbicans

The prepared shampoo were subjected to antifungal activity by using cup plate method. The prepared shampoo were added to different concentration (50,75,100 µl) in agar wells. The zone of inhibition were successfully observed after 48 hours of incubation period.



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V. CONCLUSION

The present study was carried administered with the aim of preparing the herbal shampoo that reduces hair loss during combining, safer than the chemical conditioning agents also on strengthen hair growth. Herbal shampoo was formulated with the aqueous extract of medicinal plants that are commonly used for cleansing hair traditionally. Use of the synthetic agents reduces the protein or hair loss. The most purpose behind this investigation was to develop a stable and functionally effective shampoo by excluding all types of synthetic addictives, which are normally incorporated in such formulation. The results of the evaluation study was to perform many tests.

All the ingredients which are are want to organize the herbal shampoo are safe and thus the physiochemical evaluation of shampoo showed good performance. Formulated herbal shampoo shows physiochemical properties. The local plant extract have great potential to the developed to supply good quality shampoo. Sastrawidana *et al*.2019.

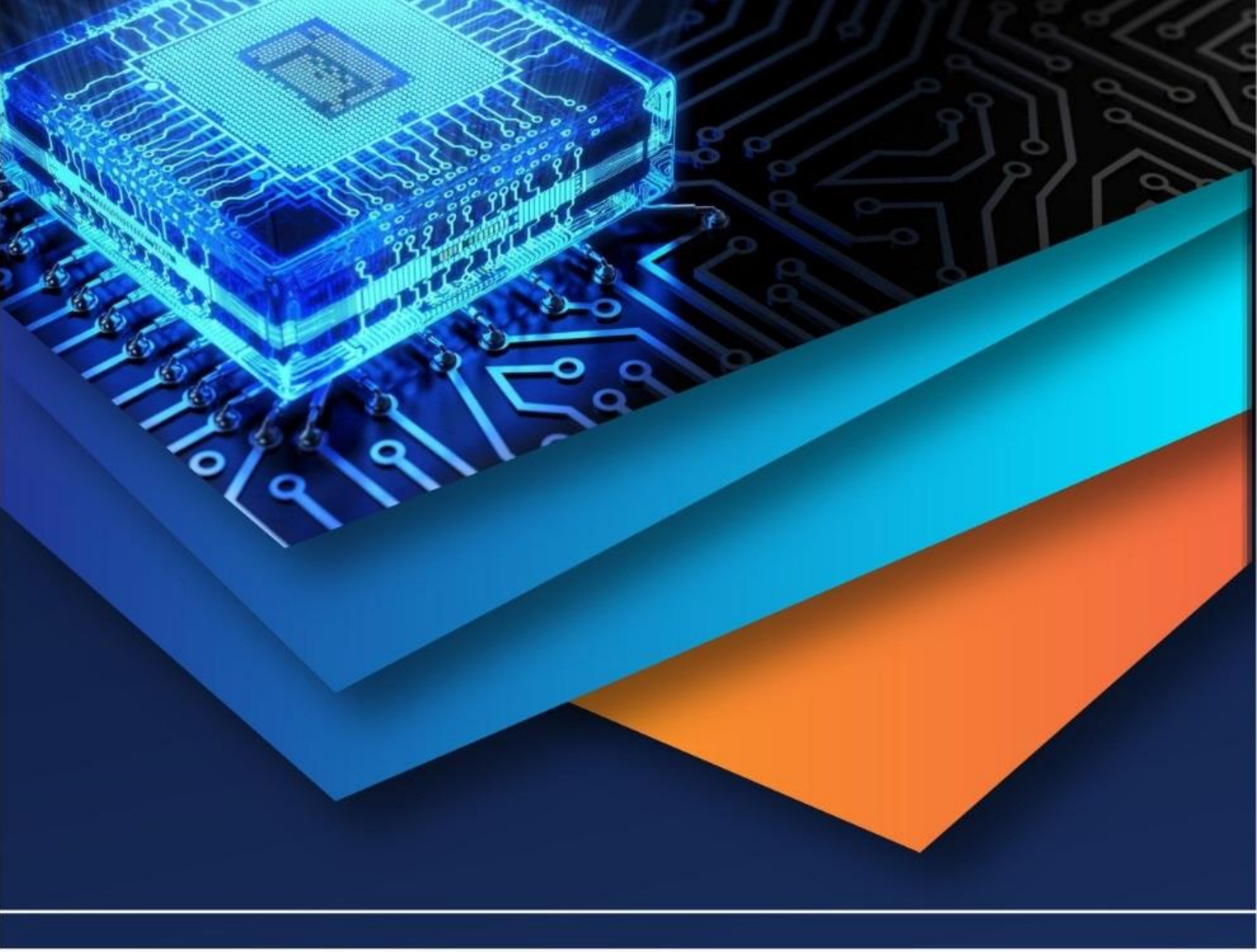
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