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FORMULATION AND EVALUATION OF HERBAL ANTI HAIR FALL SHAMPOO

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ABSTRACT
The objective of the research work was to formulate and evaluate Herbal Anti Hair fall shampoo using herbal ingredients such as *Emblica officinalis* (Amla), *Sapindusmukorossi (*Reetha), *Trigonella foenumgraceum(* fenugreek*), Aloe Barbadensis Miller (*Aloevera*), Linum usitatissimum (*Flaxseed*), Acacia concinna (Shikakai), Lawsonia Inermis (*Henna*), Hibiscus Rosa sinensis.L(*Hibiscus*), Murrayakoenigii (*curryleaves*), Azarditcha Indica (*Neem*)*. Rationale for selection of plants in the present study was on the basis of their medical importance. All the selected herbs were collected, dried and powdered. Decoction of these ingredients was prepared by maceration and heating. Herbal shampoo was prepared by mixing method and evaluated for its organoleptic and physico-chemical characteristics. Results of the work reveals that the Herbal shampoo is potential for imparting cleansing of the hair also conditioning, smoothing of the hair surface, reduces the hair fall, good health of hair, hair free of dandruff and safety benefits are expected. The advantage of herbal cosmetics is their non-toxic nature, reduce the allergic reactions and time tested usefulness of many ingredients. Thus in present work, we found good properties for the herbal shampoo and further optimization of study benefits herbal shampoo on human use as cosmetic product.

Keywords: Cosmetic, flax seeds, herbal shampoo, anti hair fall

INTRODUCTION
In our day to day life everyone wants to look smart and beautiful. Beauty has become a part and parcel of our regular life which includes external appearance, attire and physical expressive moments. Among those external appearance plays a major role and which can be modified based on desire.[1] In the process of looking good people have become so conscious of the products they use in their daily life.“**Cosmetic is defined as, any article intended to be rubbed, poured, sprinkled or sprayed on, or introduced into, or otherwise applied to, the human body or any part thereof for cleansing, beautifying, promoting attractiveness or altering the appearance, and includes any article intended for use as a component of cosmetic.” The cosmetic products are classified according to their physical states in three main categories as solids, semi solids and liquids. [2]**
Now a day’s peoples are conscious about hairs due to increase in pollution hairs get damaged. **Common hair problems occur are** Dandruff, Oily Scalp, Dry Scalp, Hair Loss, Frizzy Hair, Split ends, Hair dye damage, Hair fall due to hormonal imbalance, Heat damaged hair and Androgenetic alopecia. [2,3] Pollutants badly affects on hair resulted into spilt ends, roughness, retarded growth of hairs, loss of shine of hair and hair falls. These all problems of hair are covered by shampoo but in case of synthetic shampoos they are made from chemical constituents shows side effects on hairs. In case of poly herbal shampoos natural ingredients are involved in it, which having natural tendency as a cleanser. [3] As India is greatly blessed with biodiversity so, most Indians use natural ingredients for daily purpose including hair cleaning by removing dirt, scalp and sebum. For an example, Shikakai is used from ancient time for cleansing of hairs Herbs are used since from since beginning of civilization to maintain health and treat disease. Selection of herbal ingredients is important for maintaining growth and health

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of hairs. Selection of herbal ingredients is based on ability of ingredient to remove the dirt and scalp also on nourishing activity of ingredients for health of hairs. [4]
Natural cosmetics are popular one all over the world as they convey the impression of having better purity, safety and efficacy. So our study aims at formulating the herbal shampoo to impart protection and reducing the hair fall and promotes the hair growth to all the types using the common ingredients which are proven effective through different studies. [5]

MATERIALS AND METHODS

Materials used in the study

All the ingredients used in the study were collected from the medicinal garden of A. M. Reddy Memorial College of Pharmacy and local market. Ingredients used were *Emblica officinalis* (Amla), *Sapindusmukorossi (*Reetha), *Trigonella foenumgraceum(* fenugreek*), Aloe Barbadensis Miller (*Aloevera*), Linum usitatissimum (*Flaxseed*), Acacia concinna (Shikakai), Lawsonia Inermis (*Henna*), Hibiscus Rosa sinensis.L(*Hibiscus*), Murrayakoenigii (*curryleaves*), Azarditcha Indica (*Neem*).*Parts of the selected plant used in the formulation of herbal shampoo are listed in table1.

Table 1: List of the herbs used in the study

S. No	Name of Plant	Source
1.	Flax seeds	Purchase from Local Market
2.	Reetha	Purchase from Local Market
3.	Shikakai	Purchase from Local Market
4.	Fenugreek	Purchase from Local Market
5.	Neem Leaves	Medicinal garden A. M. Reddy College
6.	Aloe vera	Medicinal garden A. M. Reddy College
7.	Amla	Medicinal garden A. M. Reddy College
8.	Henna	Medicinal garden A. M. Reddy College
9.	Hibiscus	Medicinal garden A. M. Reddy College
10.	Curry Leaves	Medicinal garden A. M. Reddy College
11.	Guar gum	Purchase from the local market

Collection and Extraction of plants parts

Required parts of all the selected plants from medicinal garden were collected. Fruit of *Emblicaofficinalis* were washed neatlt and then chopped into pieces and dried. Leaves *of Azarditcha indica a, Lawsonia Inermis, Hibiscus Rosa sinensis L. , MurayyaKoenigii* plants were washed neatly and dried, Fresh *Aloe Barbadensis miller* was taken from the medicinal garden and under running tap water. Fruit of *SapindusMukorossi* and *Acacia concinna* are collected and dried. Seeds of *Tigonella foenum graceum* are collected and then dried under shade. Dried plants were screened to the presence of other plant parts and then powdered finely using mortar and pestle. Powdered herbs are packed

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separately in air tight containers for further use. All the plant dried powders are extracted separately with distilled water with required heating and occasional stirring and then filtered. The extracts are used for formulation and remaining extract was refrigerated for further use.

Formulation of shampoo

Herbal shampoo was prepared by mixing method. All the ingredients were accurately measured as per the formulation and mixed carefully to get uniform dispersion of all extracts without lumps. The prepared shampoo was stored in containers till it is evaluated. The formulations are given in table 2

Table 2: Formulation of herbal shampoo

S.No	Ingredients	Activity	F_1	F_2	F_3	F_4	F_5	F_6
1.	Flax seeds	Promotes hair growth	5 ml	5 ml	5 ml	5 ml	5 ml	5 ml
2.	Aloevera	Soothing agent	2 ml	_	2 ml	_	2 ml	_
3.	Amla	Promotes hair growth	5 m	5 ml	5 ml	2 ml		2 ml
4.	Henna	Prevents Dandruff	2 ml	2 ml	2 ml		5 ml	2 ml
5.	Reetha	Strengthens Hair	5 ml	5 ml	_	5 ml	5 ml	10 ml
6.	Shikakai	Reduces Hairfall	5 ml	5 ml	5 ml	5 ml	10 ml	10 ml
7.	Neem Leaves	Strengthens Hair	2 ml		_	2 ml	_	2 ml
8.	Hibiscus	Prevents Hairfall	_	2 ml	_	2 ml	2 ml	_
9.	Curry Leaves	Promotes Hair growth	_	2 ml	_	2 ml	_	_
10.	Fenugreek	Prevents Hairfall			5 ml	5 ml	2 ml	2 ml
11.	Guar gum	Thickening Agent	0.1 g	0.1 g	0.1 g	0.1 g	0.1 g	0.1 g

EVALUATION OF HERBAL SHAMPOOS

To assure the quality of the prepared formulations, visual assessment, pH, density, sensitivity, foam producing ability, fluidity, total solid content and detergency tests were carried out. The formulations prepared were visually inspected by a panel of human volunteers for physical properties such as their color, fragrance, clarity and smoothness. [6]

Determination of pH and percent of solids contents:

The pH of 10% shampoo solution in distilled water was determined at room temperature 25°C using pH meter. For determining percentage of solid content a clean dry evaporating dish was weighed and added 4 grams of shampoo to the evaporating dish. The dish and shampoo was weighed. The evaporating dish with shampoo was placed on the hot plate until the liquid portion was evaporated. The weight of the shampoo only (solids) after drying was calculated. [7]

Rheological evaluations:

The viscosity of the shampoos was determined by using Brookfield viscometer. 10ml of shampoo is taken in a beaker and spindle is dipped in it for about 5min. and then reading is taken. [8]

Cleansing action:

5 grams of wool yarn were placed in grease, after that it was placed in 200 ml. of water containing 1 gram of shampoo in a flask. Temperature of water was maintained at 350C. The flask was shaked for 4 minutes at the rate of 50 times a minute. The solution was removed and sample was taken out, dried and weighed. [9]

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Foaming ability and foam stability
Cylinder shake method was most widely used for determining foaming ability. 50 ml of the 1% shampoo solution was put into a 250 ml graduated cylinder and covered the cylinder with hand and shaken for 10 times. The total volumes of the foam contents after 1min shaking were recorded. The foam volume was calculated only. Immediately after shaking the volume of foam at 1 minute intervals for 4 minutes were recorded. [10]

Skin sensitization:
Required quantity of prepare herbal shampoo was taken and applied to the skin of volunteers. The sensitivity of the skin is checked after 10 minutes. [11]

Stability studies:
Stability testing of prepared formulations was carried out by placing formulations in container and placing them at room temperature for a period of 3 months. Formulations were evaluated for their physical characters like colour, odour, pH, consistency and texture after storage period. [12]

RESULTS AND DISCUSSIONS
Herbal shampoo was prepared by using various selected plants namely Amla, Reetha, fenugreek, Aloevera, Flaxseed, Shikakai, Henna, Hibiscus, curry leaves, Neem as hair fall preventive agents. The results of various tests were discussed below.

Physical characterization
All the formulations have good flowability in liquid state indicating good consistency of a liquid formulation. No lumps were observed in the formulations and it resulted in smooth texture of shampoo when touched with fingers. Shampoo has good spreadability when poured and rubbed between palms. All the formulations have a good fragrance because of herbs even though mild. Various physical parameters obtained for the formulations were listed in the table 3

Table 3: Physical characterization of formulation

S.No	Formulation	Physical Appearance	Texture	Colour	Odour
1.	F_1	Liquid	Smooth	Brown	Characteristic
2.	F_2	Liquid	Smooth	Brown	Characteristic
3.	F_3	Liquid	Smooth	Light Brown	Characteristic
4.	F_4	Liquid	Smooth	Brown	Characteristic
5.	F_5	Liquid	Smooth	Brown	Characteristic
6.	F_6	Liquid	Smooth	Dark Brown	Characteristic

pH, Percent of Solid content, Foam Height, Foam Stability and Cleaning Action
pH is an important characteristic for the protection of scalp and to prevent further side effects like itching and dandruff on usage of shampoo. All the formulations are in the pH range of 5.5 to 8 indicating very slight acidic to basic range and nearer to scalp pH. Lesser the percent of solid content in the formulations more the uniformity of ingredients. Although foam generation has little to do with the cleansing ability of shampoos, it is of paramount importance to the consumer and is therefore an important criterion in evaluating shampoos.Foam is the indication of dirt removal in general, more the production of stable foam for a longer time represents more cleansing property. Though formulations exhibit good foaming capability F6 has highest foaming ability and stable for a long time.pH,Percentage

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of solid content, Height of the foam and stability of the foam are obtained for the formulations were listed in the table 4.

Table 4: Characterization of the formulation

S.No	Formulation	pH	Percent of solid content	Foam Height (cm)	Foam Stability(min)
1.	F_1	7	50%	5 cm	29 min
2.	F_2	8	40%	4cm	28 min
3.	F_3	7.3	45%	8cm	30 min
4.	F_4	6	35%	10cm	32 min
5.	F_5	6.5	30%	15cm	36 min
6.	F_6	5.5	28%	20cm	40 min

Cleaning action and Rheological Evaluation

Cleaning action of the formulation primarily involves the use of surfactants, which are compounds that lower the surface tension between two substances, such as solid and liquid. Formulation F6 has the better cleaning action of 91%. Viscosity of the formulations was majorly due to the vehicle concentration in the formulation. In the preliminary studies shampoo base was prepared using various concentration of guar gum and final concentration was adjusted based on the viscosity and flowability of shampoo. With the adjusted concentration of guar gum formulations were prepared and studied for their viscosities. Formulations exhibited good flowability with a medium viscosity range.

Table 5: Cleaning action and Viscosity of the formulation

S.No	Formulation	Cleaning Action (%)	Viscosity
1.	F_1	40.8%	1.16
2.	F_2	38%	1.18
3.	F_3	44%	1.19
4.	F_4	58%	1.20
5.	F_5	70%	1.21
6.	F_6	91%	1.25

Skin Sensitization Test

Redness and skin damage has severe unwanted effect on scalp if the formulation is not properly designed. For further optimization shampoo must be good and should not cause any sensitivity reactions on scalp. When tested on human volunteers hand over a specified area no signs of irritation, redness or swelling were observed. It indicates that all shampoo formulations have skin friendly nature and can be comfortably applied. Results of skin sensitization test were shown in figure1a, 1b & 1c.

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Figure 1a : Application of Shampoo [F_1] After Application

Figure 1b : Application of Shampoo [F_2] After Application

Figure 1c : Application of Shampoo [F_3] After Application

Stability Studies

Stability throughout shelf life is most important for a formulation to be used for a long time. Retention of same characteristics indicates stability of the product. All the six formulations remain more or less stable without major changes in their physical properties. There is no change in the odour of the six

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formulations indication no chemical degradation occurred in formulations and the texture of the formulation is remained smooth and fine. Increasing in the viscous nature was observed with the formulations except that of F6.

Table 6: Stability studies of the formulation

S.No	Formulation	Colour	Odour	pH
1.	F_1	Brown	Characteristic	7
2.	F_2	Brown	Characteristic	8
3.	F_3	Light Brown	Characteristic	7.3
4.	F_4	Brown	Characteristic	6
5.	F_5	Brown	Characteristic	6.5
6.	F_6	Dark Brown	Characteristic	5.5

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CONCLUSION
The present study was designed to develop a poly herbal shampoo in order to overcome disadvantages of synthetic products. As natural ingredient s are safe and produce long term beneficial effects with negligible side effects, ingredients with good medicinal values were selected and shampoo was prepared with satisfactory results. Out of all the formulations F6 has better good cleansing and foaming ability and was considered as best formulation. Further studies are needed for development of the formulation into a marketed product.

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