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Research Article

Formulation And Evaluation of Anti-Dandruff Herbal Shampoo

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ABSTRACT

Shampoos are the cosmetics preparations meant for cleansing the hair and scalp by removal of the dirt. The study was aimed at formulating and evaluating a poly herbal shampoo containing extract of plant materials such as reetha, neem, henna and curry leaves. The evaluation parameters such as colour, pH, clarity, viscosity, foam ability, dirt dispersion and antimicrobial studies were performed. The formulated shampoo was compared with commercially available marketed formulation. From the studies. Found that the formulation (F3) gives good results as compared to marketed formulation.

INTRODUCTION

In the ancient era, people used natural products for hair care and cosmetic purposes. Herbal cosmetics are products which are formulated using various excipients and one or more herbs in the form of extract or in whole form1. Nowadays, consumer demand for natural ingredients has been increasing. Herbal cosmetics like herbal conditioner, herbal shampoo, herbal soap, herbal face wash are available in the market. The best thing is that these are prepared from shrubs and herbs. The merits of these products are that these do not have any side effects nor cause any reaction on the human body, safe and free to use as compared to synthetic ingredients 2,3.

Hair And Its Anatomy

Hair is an integral part of the human body. It is otherwise called pili or pilus4. It is a protein filament that grows from the follicles on the skin or dermis. Hair is made up of 95%keratin a fibrous, helicoidal protein that forms part of the skin and all its attachments [body hair, nail etc].Hair is made up of two separate structure5

- **The Hair Follicle:** which exists below the skin.
- **The Hair Shaft:** which is the hair that we see.

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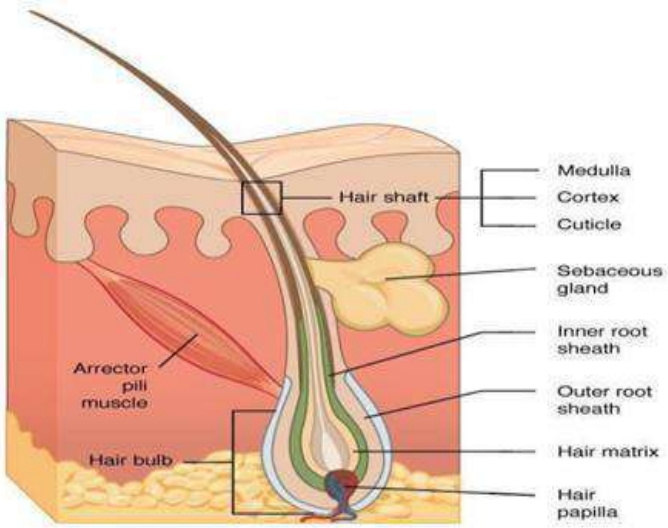

Fig: -Hair Anatomy

Problems Related to Hair

Dandruffs. Dry hair. Split ends. Hair loss. Psoriasis.

DANDRUFF

Dandruff is a major cosmetic problem and is of concern in developed and developing countries . It is a chronic scalp condition manifested by scaling , redness and itching of the scalp.6 The word dandruff is a combination of the words -'tan' meaning tetter and 'drof' meaning dirty. It occurs due to excessive shedding of dead skin cells(epidermal cells) in large clumps from the scalp .It is the condition caused by a fungus called Malassezia (Pityrosporum)-M. restricta and M.globosa. It affects 5% of the population and mostly between 20-30 years and found in males more than females7.

Dandruff can be of 2 types 8: -

- Oily dandruff
- Dry dandruff

Oily dandruff (Pityriasis Steatoides)-waxy greasy yellowish thick scales crusts are present, scalp become red and hair may be dull characterized by itching. Patients with oily dandruff develop thin hair and lead to loss of hair

Dry dandruff (Pityriasis sicca)-fine, thin, furfuraceous, dry, slightly greasy scales are present, hair becomes dry and lusterless and characterized by mild to moderate itching and the scaliness of the scalp is exaggerated.

Causes Of Dandruff 9

- Dry skin
- Scrubbing
- Abnormal keratinisation of epidermal tissue
- Excessive sebum secretion from the skin
- Eczema
- Hair psoriasis

Signs And Symptoms 10

- Itching of scalp
- Scalp redness
- Presence of fragments
- Flaking off of dead skin
- Patches of skin scaling and turning red

Herbs Used in Formulation of Polyherbal Anti Dandruff Shampoo

- Neem: - Azadirachta indica is a popular natural remedy for dandruff due to its antifungal and antibacterial properties. Neem is effective in treating dandruff as it helps to reduce inflammation and itching of the scalp. The active compounds in neem oil inhibit the growth of dandruff-causing fungus and bacteria, promoting a healthy scalp. Applying neem oil to the scalp or using shampoos containing neem extract can help combat dandruff and improve scalp health. Additionally, neem also has moisturizing properties that can prevent dryness and flakiness of the scalp.

- Reetha: Reetha, also known as soapnut, is a natural and effective anti-dandruff agent. It contains saponins that have cleansing properties and help remove dirt and oil buildup on the scalp. Reetha also has antimicrobial properties that can help fight against the fungi that causes dandruff. Additionally, it is gentle on the scalp and doesn't strip the natural oils, making it a safe and natural alternative to harsh chemical-based anti-dandruff shampoos. Reetha is available in various forms such as powder, liquid or shampoo and can be easily incorporated into a hair care regimen.

- Curry leaves: Murraya Koenigii are an effective anti-dandruff agent. They contain antifungal and antibacterial properties that help reduce dandruff and prevent its recurrence. The leaves are rich in beta-carotene and proteins that nourish the scalp, reduce scalp irritation, and improve hair growth. Curry leaves are commonly used in hair oils and hair masks to keep dandruff at bay. To use curry leaves as an anti-dandruff agent, crush a handful of leaves and mix them with coconut oil.

- Henna: Lawsonia inermis -Lythraceae/Henna is a natural plant based dye which has medicinal property and may help combat dandruff. The antimicrobial and antifungal properties of henna have been known to fight against the fungus, which is often the cause of dandruff. It also helps to maintain the natural pH balance of scalp.

Formulation Of Anti-Dandruff Polyherbal Shampoo

Collection And Extraction of Plant Materials

Collection Of Plant Material

For the present studies, various herb such as Reetha (Sapindus mukorossi), Neem (Azadirachta indica), Henna (Lawsonia inermis), Curry leaves (Murraya koenigii) were selected.The plant parts like leaves (neem, curry leaves and henna)and fruit(reetha)were collected. The collected plant materials were dried under shade for a period of 5-7 days. Once the herb has been dried, it is finely ground with hand driven mixers individually to get fine powder of herbal materials.The finely powdered drug was sieved and stored in airtight containers .

(Reetha powder)

(curry leaves powder)

(neem powder)

(henna powder)

Extraction of Plant Materials

The extraction was done by using a decoction method. The ingredients were weighed and transferred into a 500ml beaker . Added 100 ml of water to the dried powder taken in the beaker. The mixture was kept for boiling until the water was reduced to one quarter. After boiling, the extract was cooled and filtered using muslin cloth . The filtrate was collected in a conical flask and covered with a cotton plug and was stored in a refrigerator12.

Name Of the Herb	Weight Taken
Azadirachta indica	10gram
Sapindus mukorossi	10gram
Lawsonia inermis	10gram
Murraya koenigii	10gram

Method of preparation of herbal shampoo formulations

In a 250 ml beaker take 25 ml of water and add 4 ml of oleic acid. Dissolve it completely by using a magnetic stirrer. Add 3g of sodium lauryl sulphate,heat gently to 60°C by continuous stirring .When ingredients get completely dissolved ,reduce the stirring speed. To this ,add 3 ml of triethanolamine and stir for 5 minutes. After that, EDTA and sodium benzoate together were added and stirring continued till it became clear liquid. 30 ml of water , tween 80 was taken in a beaker, stirred for 10 minutes and a required quantity of plant extracts were added. This liquid was added to the above one and stirred for 20 minutes.Take 25 ml of water and add 5g of HPMC and dissolved it by continuous stirring .Then to this solution add above prepared shampoo.Ph is adjusted by using Nacl and lavender oil is added as perfume. 13,14,15.

Formulation Design of Poly Herbal Shampoo

INGREDIENTS	F1	F2	F3	F4
NEEM EXTRACT	2ml	2.5ml	3ml	3.5ml
HENNA EXTRACT	2ml	2.5ml	3ml	3.5ml
CURRY LEAF EXTRACT	2ml	2.5ml	3ml	3.5ml

Evaluation 16

1. **Visual Appearance: The** formulations were visually inspected and the colour of each formulation was noted and recorded.

2. **Clarity**: The formulations were visually checked whether it is clear or not and recorded.

3. **pH:** The pH of prepared formulations was determined by digital pH metre at room temperature.

4.**Dirt Dispersion Test**

In a test tube takes 10 ml of distilled water and adds 2 drops of shampoo and one drop of Indian ink dye. The test tube is closed with your thumb and shaken for 10 minutes. The level of appearance of the ink dye test tube was observed and based on that, level was graded as none, slight, moderate and heavy.

5.**Foamability Test**

It was determined by the cylindrical shake method. In a 100 ml graduated cylinder take 50 ml of shampoo and shake vigorously for 10 times. The volume of foam was measured after 1 min of shaking and recorded.

6.Determination Of Viscosity

The viscosity of the shampoo was determined by using Brookfield viscometer by setting spindle S64 and rotating speed of 6 and 12 rpm.

7. Antidandruff Activity

Disc diffusion method was used for determining the anti dandruff activity of shampoo. It was carried out by employing the culture of fungi Candida albicans in sabouraud dextrose agar medium. The medium containing Candida albicans was poured into a petri plate which was sterilised in an autoclave. At room temperature, the Petri plate is allowed to solidify. Place the appropriate drug implemented discs on the surface of inoculated agar plate. The plates were incubated at 30-55 °C. After incubation, plates were observed for the zone of inhibition. The diameter of the zone of inhibition was measured using a ruler and compared with standard and recorded in mm.

RESULT AND DISCUSSION

Evaluations such as visual appearance,clarity,pH determination ,dirt dispersion ,foam test viscosity and anti dandruff study were performed for the four formulation

Physicochemical Parameters

The formulations F1and F2 were observed as pale brown colour and F3 were found to be brown colour and F4 were found to be dark brown in colour.All the prepared shampoos were found to be clear .The ph of all the prepared shampoos was in the range of 5.7-6.7 which was within range of hair ph .The below table shows the result of visual appearance and clarity and ph,

Formulation Code	Visual Appearance	Clarity	Ph
F1	Pale brown	Clear	6.73
F2	Pale brown	Clear	6.27
F3	Brown	Clear	6.29
F4	Dark brown	Clear	5.73
STD	Green	Clear	6.35

Foamability And Dirt Dispersion Test

The foam test for all the formulations were performed and found to be between 75mm to 191mm.The normal range of foamability is between 176mm to 179mm.Formulation F3 showed foaming value of 175mm which lies within the normal range.

Formulation	Foamability	Dirt Dispersion
F1	75mm	Light
F2	93mm	Light
F3	175mm	Moderate
F4	191mm	Moderate
STD	176mm	Moderate

Viscosity

The viscosity of all prepared formulations was found to 2000-3900 cps at 6rpm and 2100-2950 cps at 12 rpm. There was decrease in viscosity with increase in rpm .It indicates pseudo plastic flow nature of Non Newtonian liquid . All the formulation showed viscosity with in the accepted range(normal range of viscosity 2000 to 9000 cps).The viscosity of formulated shampoos is shown in table :-

Formulation	Viscosity (CPS)	
	6rpm	12rpm
F1	2150cps	F1
F2	2399cps	F2
F3	2700cps	F3
F4	3899cps	F4
STD	2900cps	STD

Anti-Dandruff Activity

The anti-dandruff activity of the formulated shampoo was determined by disc diffusion method and the respective zone of inhibition was obtained. The zone of inhibition in the first petri dish for F2 and F3 was 19 and 27 mm respectively and that observed in second petri dish for F1,F4 and standard was 19,15 and 29 mm respectively. The test results for zone of inhibition of all the poly herbal shampoos and the standard is shown in Table .

Formulation	Zone Of Inhibition (MM)
F1	19mm
F2	24mm
F3	27mm
F4	26mm
STD	29mm

CONCLUSION:

The study was undertaken to formulate poly herbal shampoos containing herbal anti dandruff agents.The anti dandruff activity of the shampoo is primarily due to the natural ingredients such as neem, reetha, henna, and curry leaves.Various evaluation parameters were checked and it was concluded that the formulated shampoos were clear and pleasing in appearance.The pH , viscosity, foam stability, and dirt dispersion studies were carried out for the prepared formulations and the standard .The results were with that of the standard and was found out that F3

showed better results. Also, the formulations were subjected to antimicrobial study and was concluded that F3 showed greater zone of inhibition when compared with the other formulations; which was near to the zone of inhibition of standard. From the obtained results it can be concluded that the prepared shampoos were user- friendly ,safe and are better alternatives to the commercially available shampoos.

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