



CODEN (USA): IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.816195>Available online at: <http://www.iajps.com>**Research Article****PREPARATION AND EVALUATION OF HERBAL HAIR OIL****T. Usha Kiran Reddy\*, G. Sindhu , S. Rajesh, B. Aruna, K. S. Sandhya Rani**

S V U College of Pharmaceutical Sciences, S V University,

Tirupati – 517502, A.P, India.

**Abstract:**

*Antioxidants play a major role in increasing the blood circulation and thus help in hair growth as well as in the treatment of a lot of diseases. Now - a - days there is a wide use of herbal cosmetics due to the belief that they have fewer side effects and better safety. The objective of the present study is to prepare and evaluate herbal hair oil using coconut oil, hibiscus, amla, neem & eclipta alba. The preparation was also subjected to various tests for analysis including moisture content, total ash, acid insoluble ash, water soluble ash, water insoluble ash & sulphated ash. Apart from that the formulation is subjected to viscosity, surface tension, pH, acid value etc.*

**Keywords:** *Antioxidant, herbal hair oil, physical parameters.***Corresponding Author:****T. Usha Kiran Reddy**

S V U College of Pharmaceutical Sciences,

S V University,

Tirupati – 517502, A.P, India

E-Mail: [usha.t2789@gmail.com](mailto:usha.t2789@gmail.com)

QR code



Please cite this article in press as T. Usha Kiran Reddy *et al*, **Preparation and Evaluation of Herbal Hair Oil**, *Indo Am. J. P. Sci*, 2017; 4(06).

**INTRODUCTION:**

Hair oils are the hair care preparations used for the prevention and treatment of baldness and other ailments. They also promote the luxurious growth of hairs. Hair oil containing herbal drugs are used as hair tonic. Hair care products are categorized into two main category, hair tonics and hair grooming aids. These are basically the extracts of medicinal plants in an oil base.

Alopecia is a universal problem, having affected both sexes of all races to different extents for as long as mankind has existed. It has been suggested that alopecia could have an adverse effect on physiological life and self esteem between both the genders. Alopecia affects approximately 50% of men over 40 years of age and may also affect just as many as women. The majority of men and women (90%) more or less want to reduce hair loss. Alopecia is a synonym of baldness, involves absence or loss of hair, especially of the head. Androgens are well known to cause regression and balding on the scalp in genetically disposed individuals. Alopecia has also been observed as major side effect of anticancer drugs, immunosuppressant and many other drug treatments. To prevent alopecia and hair loss during diseased conditions and during drug treatments synthetic drug, minoxidil may be used. It is a potent vasodilator appears to be safe for short-term treatment of hair growth. Long-term treatment of minoxidil may lead to side effects and gradual decrease in regrowth. So instead of synthetic drugs, natural drugs are advisable for treating hair care problems. A plethora of herbal drugs have been employed for hair treatments. A few of these herbs are amla, henna, neem, methi, lemon, Tulasi, brahmi, shikakai, reetha, liquorice root, musk root, mahabhringraj, jatamansi, marigold, hibiscus, nutmeg, parsley, rosemary, thyme. Amla is rich in vitamin C, tannins and minerals such as phosphorus, iron and calcium which provides nutrition to hair and also causes darkening of hair. Hibiscus consists of calcium, phosphorus, iron, vitamin B, riboflavin, niacin and vitamin C, used to stimulate thicker hair growth and prevents premature graying of hair. Other drugs also have their respective advantages in improving healthy hair growth.

Besides healthcare, herbs are also used for beautification of the body and for preparation of various cosmetics. In traditional system of medicine, many plants and herbal formulations are reported for hair growth promotion but lack of sound scientific backing and information limits their use. On the basis of market survey carried out on crude drugs used presently for herbal hair oils gives us clue for selection of drugs for hair oil.

**EXPERIMENTAL SECTION:****Plant Material:**

The crude herbal drugs are collected from the surroundings of Tirumala hills of Tirupati, A.P. and were authenticated by K. Madhavachetty, Asst. Professor, Dept. of Botany, S V University, Tirupati.

**Reparation of Polyherbal Hair Tonic****Introduction**

In India preparation of hair oils blended with various hair growth promoting drugs is an age old process. In many old literatures hair tonic preparations are included to treat various dandruff and hair fall process. The hair oil preparations are mainly intended to cool the scalp and for luxurious growth of hair in women. Various types of oils like coconut oil, mustard oil, castor oil, olive oil are applied to scalp in admixture with suitable herbal drugs. Of all these coconut oil is the best suitable oil base due to its effective activity and also economical compared to other oils. Hence coconut oil enriched with herbal drugs is best mentioned method for thick hair growth. For this process of obtaining polyherbal hair tonics, coconut oil is extracted initially and simultaneously the required crude drugs are collected and dried.

**Coconut oil extraction processes**

Coconut oil is extracted from the kernel or meat of matured coconut harvested from the coconut palm. In the wet process, coconut milk is made first and then the oil is extracted from the milk. Coconut kernel is shredded, mixed with a little water, and then squeezed or pressed to extract the oil. The resulting oil or water mixture produces coconut cream or coconut milk depending on the percentage of oil. The coconut milk is then allowed to separate naturally. Since oil is lighter than water, the oil rises to the surface. This takes 12 to 24 hours. The oil can then be skimmed off. This is the traditional method of making coconut oil from coconut milk commonly used by many people for making the oil at home. Other methods incorporate heating, fermentation, refrigeration, or centrifugal force to separate the oil from the water. Some minor heating is generally done afterwards (often in a low temperature vacuum chamber) to drive off excess moisture and produce a more purified product and to extend shelf life.

In the dry process the oil is extracted directly from the kernel. The coconut kernel is first shredded and dried in an oven to about 10 to 12% moisture. The dried, shredded coconut is then placed into a press and the virgin oil is expelled.

**Methods used for preparation of herbal hair tonic**

If the coconut oil is blended with various drugs which has medicinal activity then it is termed as hair tonic. It is prepared by the following mentioned processes.

- Cloth method
- Paste method
- Direct boiling method

**i) Cloth method:**

The dried drug was weighed and tied in a muslin cloth. This cloth was then hanged in coconut oil base, with continuous boiling, stirring and finally the oil was filtered.

**ii) Paste Method:**

Paste method was used where fresh fruit or pulp or the desired part of the plants were converted into paste with very little amount of water and kept overnight. After this the wetted drug was mixed in coconut oil base and boiled with continuous stirring at a constant temperature, until the water droplets in oil stop knocking and the drug has completely extracted in the oil. The Oil was then filtered through a muslin cloth.

**iii) Direct Boiling Method:**

The crude drugs were powdered, weighed and directly boiled in coconut oil with continuous stirring and heating until the drug had completely extracted in the oil base.

**Procedure followed for the preparation of polyherbal hair tonic**

For the preparation of polyherbal hair tonic the following steps are involved.

- I) Preparation oil coconut oil base
- II) Boiling of crude drug powders in coconut oil base to form enriched hair tonic.

Coconut oil is extracted from kernel by dry process and complete procedure of extraction of coconut oil from dry kernels is mentioned above. It is used as oil based and preserved.

Crude drugs are processed by following methods.

**i) Collection of crude drugs:**

Crude drugs of Neem, Hibiscus, Eclipta, Amla were collected.

**ii) Drying of crude drugs:**

Crude drugs were dried under shade and proper aeration is provided in order to hasten the drying process. Drying under shade will retain the active constituents. Hence shade drying is preferred over artificial drying.

**iii) Mixing and blending of dried crude drugs:**

The dried crude drugs were made into coarse powder by using mixer. Later on all these coarsely powdered drugs are passed through mesh number 80. Thus obtained powders are blended individually to get a uniform mixture.

**iv) Formulating herbal hair tonic:**

Pure coconut oil extracted from *Cocos nucifera* is used. Initially the oil is heated under low flame. To this hot oil, crude drugs in required quantities were added by taking them in a muslin cloth. The crude drug mixture present in muslin cloth is dipped in hot oil. The process is continued by taking the cloth in and out of hot coconut oil under low flame. Thus the active ingredients of the crude drugs will get absorbed into the hot coconut oil. Later the hot oil is cooled and any traces of crude drug powders are removed by filtration process. Initially the oil is brown in colour. On standing of crude oil under cool place for a week turns the colour of the oil to pale green.

**v) Packing of polyherbal hair tonic:**

The oil has pleasant smell with rejuvenating activity for hair growth. The prepared hair oil is completely obtained from natural drugs so it has no side effects and has promising results. It is packed in amber coloured bottles and sealed tightly. Then the bottles are sealed in air tight bottles.

**vi) Storage of polyherbal hair tonic:**

The sealed bottles are stored under cool conditions. This keeps the oil stable for longer period of time without undergoing rancidity or saponification.

**Table1: list of ingredients used for hair tonic preparation**

S.No.	Ingredients	Quantity		
		2.5%	5%	7.5%
1.	Coconut oil	25ml	25ml	25ml
2.	Hibiscus	2.5 gms	5 gms	7.5 gms
3.	Amla	2.5 gms	5 gms	7.5 gms
4.	Neem	2.5 gms	5 gms	7.5 gms
5.	Eclipta	2.5gms	5gms	7.5gms

### Evaluation of Herbal Hair Oil

The prepared oils were then subjected to physical and biological evaluation.

#### Physical evaluation

In physical evaluation, parameters like specific gravity,  $P^H$ , acid value Saponification value are conducted.

#### Specific gravity:

Initially empty specific gravity bottle was weighed. Then the same specific gravity bottle was filled with water and again weighed. Later specific gravity bottle was replaced with hair tonic and weighed again. Weights are noted and thus specific gravity of hair tonic was calculated.

Weight of empty specific gravity bottle =  $w_1$ gms.

Weight of specific gravity bottle with water =  $w_2$ gms.

Weight of specific gravity bottle with hair tonic =  $w_3$ gms.

Specific gravity bottle of water =  $0.9961 \text{ g/cm}^3$ .

Specific gravity of hair tonic was calculated as  $\rho = \frac{w_3 - w_1}{w_2 - w_1} \times \rho$

#### $P^H$ :

The  $P^H$  was determined by using digital  $P^H$  meter. 20ml of herbal hair tonic was taken in a beaker and the bulb of  $P^H$  meter was dipped in hair tonic. The obtained  $P^H$  values are noted down.

#### Chemical Evaluation:

##### Acid value:

One gram of substance was dissolved accurately in 5ml of mixture of equal volume of ethanol and ether previously neutralized with 0.1M KOH. If the sample was not dissolved properly then reflux condenser was connected and the sample was warmed slowly with

frequent stirring until the sample was dissolved. Then 1ml of Phenolphthalein solution was added and titrated with 0.1M KOH until the solution remained as faintly pink after shaking for 30 minutes. Acid value was calculated from the following equation.

$$\text{Acid value} = 5.61 \times n/w$$

$n$  = No. of ml of 0.1M KOH

$w$  = Weight of substance

##### Saponification value:

2ml of herbal hair oil was weighed and transferred into a 25ml of conical flask. To this 25ml alcoholic KOH solution was added. It was heated on a water bath for 30 minutes by frequently mixing the content of the flask phenolphthalein was added to cooled liquid and titrated against 0.5M HCL. Blank solution was performed and Saponification values were calculated.

$$\text{Saponification value} = (b-a) \times 28.05 / \text{weight of substance}$$

$b$  = blank value

$a$  = assay value

Saponification values were determined and the formulations were subjected to biological evaluation.

#### Biological evaluation

##### Primary skin irritation test

The prepared formulations were assessed for primary skin irritation test. Healthy human volunteers were selected for the study. The hair of each volunteer of  $1 \text{ cm}^2$  was shaved which could accommodate three test sites. It was cleaned with surgical spirit. The quantities of formulations were applied over the respective test sites were observed for erythema and edema for 48hrs after application.

**RESULTS:****Evaluation of physical parameters:**

The herbal hair tonic was prepared and following results were obtained.

**Physical state:** greasy liquid.

**Colour:** pale green in colour.

**Odour:** pleasant.

**Polarity:** non-polar compound.

**Solubility:** soluble in non polar solvents.

**P<sup>H</sup> :** slightly acidic to neutral.

**Specific gravity:**

Specific gravity for polyherbal hair tonic was done and following results were obtained.

The results of specific gravity of hair tonic are tabulated below:

**Table 2: specific gravity of hair tonic at various concentrations**

S.NO	CONCENTRATION (%)	SPECIFIC GRAVITY
1	2.5	0.937
2	5.0	0.947
3	7.5	0.942

**P<sup>H</sup>.**

The P<sup>H</sup> of hair tonic at different concentrations was noted down.

P<sup>H</sup> values of herbal hair tonic at different concentrations are tabulated below.

**Table 3: P<sup>H</sup> of hair tonic at different concentrations:**

S.NO	CONCENTRATION (%)	P <sup>H</sup>
1	25	9.0
2	50	8.3
3	75	7.4

**Acid values:**

The acid values of hair tonic at different concentrations were obtained as given below.

**Table 4: Acid values of hair tonic at different concentrations:**

S.NO	CONCENTRATION (%)	Acid values
1	25	2.47
2	50	2.17
3	75	1.557

**Table 5 : Saponification values of hair tonic at different concentrations**

S.NO	CONCENTRATION(%)	SAPONIFICATION VALUES
1	25	193
2	50	182
3	75	255

**Saponification values:**

Saponification of hair tonic at different concentration was calculated and the values are formulated in tabular form as given above table.

**Biological Evaluation:**

Primary skin irritation test was conducted to evaluate the any irritation produced by the prepared formulations on intact skin of human volunteers. All of the prepared formulations did not show any erythema or edema. This indicates that the prepared formulation was nonirritant on skin of human volunteers.

**DISCUSSION:**

The results obtained for the evaluation tests are under the specified limits. Colour is pale green and the oil has pleasant odour. The results obtained for physical parameters like specific gravity, P<sup>H</sup>, acid value, Saponification value are according to the standard values. In biological evaluation, it is tested on human skin and it did not produce any inflammation, allergy or erythemic reactions.

**SUMMARY:**

The herbal hair tonic was formulated using the herbs *Phyllanthus emblica*, *Hibiscus rosa sinensis*, *Azadirachta indica*, *Eclipta alba* dissolved in pure hot coconut oil. It was evaluated for physical and biological evaluation parameters and the values obtained were under required limits.

**CONCLUSION:**

The various constituents of the herbal extracts such as minerals and amino acids may be the cause for the significant hair growth activity. All these drugs not only show remarkable activity but are also devoid of potential side effects as compared to synthetic drugs. So this polyherbal hair tonic has cooling effect and thus relieves headaches and stress due to heavy workloads. It gets absorbed into the scalp with in a shorter period of time and thus acts as nourishment to hairs. It acts as natural hair nourisher, helping in hair growth by the reduction of hair fall. Due to the addition of Neem it also acts as antidandruff hair tonic. Amla and *Eclipta alba* helps in thickening and blackening of hair. *Hibiscus* helps in hair softening resulting in healthy growth. All these dried and powdered drugs mixed with coconut oil in sufficient quantities will give a permanent solution for hair fall and proper hair growth. This hair tonic also effectively used in treating headaches because of cooling effects and thus relieves from stress and strain conditions. It has shown good hair growth results without any allergic or side effects as it is completely constituted with naturally occurring crude drugs.

**ACKNOWLEDGEMENT**

We would like to acknowledge my honest gratitude to all the well-wishers for their valuable support and convey my sincere thanks to Prof. K. Thyagaraju garu, Principal, S V U College of Pharmaceutical Sciences, S V University, Tirupati for his encouragement and support in carrying out the work.

**REFERENCES:**

1. Bhatia Sc. Perfumes, soaps, detergents and cosmetics. 2<sup>nd</sup> ed. New Delhi. CBS publishers and distributions; 2001; 639, 641.
2. Mithal BM, Shah RN. A hand book of cosmetics. 1st ed. New Delhi. Vallabh Prakashan; 2000; 141, 142.
3. Auboyer, Jeannine (2002) [1961]. Daily life in ancient India: from 200 BC to 700 AD. London: Phoenix
4. Harper Collins Publishers, Menlopark, California, 1996; 129. Robbins CR. Chemical and Physical Behavior of Human Hair. 3rd ed. New York: Springer-Verlag, 1994:343
5. Jachowicz J. Hair damage and attempts to its repair. J Soc Cosmet Chem 1987; 38:263-286
6. Negri AP, Cornell HJ, Rivett DE. A model for the surface of keratin fibers. Text Res J 1993; 63:109-115.
7. Olsen E A, Weinerr M S and Amara I A, J. Am. Acad. Dermatol. 1990; 22, 643.
8. Robbins CR. Chemical and Physical Behavior of Human Hair. 3rd ed. New York:
9. Tortora G L Grabowski S R, Principles of Anatomy and Physiology, 8th Ed.,
10. Uno H. Quantitative models for the study of hair growth in vivo. In: Baden HP, editors. Molecular and structural biology of hair; 1991; 107-124.
11. Wilson C, Walkden V and Powell S, Brit. J. Acad. Dermatol. 1991; 24,661.
12. Wolfram LJ, Lindemann MKO. Some observations on the hair cuticle. J Sac Cosmet Chem 1971; 22:839-850.
13. Hutchings, A., Haxton Scott, A., Lewis G., Cunningham A. 1996. *Zulu medicinal plants- an inventory*. University of Natal Press, Pietermaritzburg.
14. Joffe, P. 2001. *Creative gardening with indigenous plants*. Briza Publications, Pretoria
15. Parkes Riley, H. 1963. *Families of flowering plants of Southern Africa*. University of Kentucky Press, USA.
16. Pooley, E. 1993. *The complete field guide to trees of Natal, Zululand and Transkei*. Natal Flora Publications Trust, Durban.
17. Pooley, E. 1998. *A field guide to wildflowers of KwaZulu-Natal and the eastern region*. Natal Flora Publications Trust, Durban.

18. Agero AL, Verallo-Rowell VM (September 2004). "A randomized double-blind controlled trial comparing extra virgin coconut oil with mineral oil as a moisturizer for mild to moderate xerosis". *Dermatitis* 15(3): 109-16.
19. Effects of dietary coconut oil on the biochemical and anthropometric profiles of women presenting abdominal obesity. *Lipids* 44 (7): 593-601.
20. Elkins, L. Hair's the thing. *Household & Personal Products Industry* 2006; 43(12):74(6)
21. Shah C S, Qudry J S, A Text book of Pharmacognosy, 11th Ed., B.S. Shah Prakashan, Ahmedabad. 1996; 119
22. The Aurvedic Formulary of India, Government of India, Ministry of Health and family planning, Department of health, Delhi, 1st ed .1978; part 1, 99.
23. Wagner H, Blatt S, Zgainski FM. *Plant drug analysis* Verlas, Berlin. 1994; 291-304.
24. Walker, J. 1996. *Wild Flowers of Kwazulu-Natal*. Walker Family Trust, Pinetown.
25. Leistner, O.A. (ed.). 2000. Seed plants of southern Africa: families and genera. *Strclitzia* 10. National Botanical Institute, Pretoria
26. Manning, J. 2009. *Field guide to wildflowers of South Africa*. Struik Publishers, Cape Town
27. Parkes Riley, H. 1963. *Families of flowering plants of Southern Africa*. University of Kentucky Press, USA.
28. Ramaswamy, minor forest products, mysore 1945-55 damodaran and nair, *biochem j*
29. *Sunset Western Garden Book*, 1995:606-607
30. Lawton, Barbara Perry (2004). *Hibiscus: Hardy and Tropical Plants for the Garden* Timber Press. p. 36. .
31. Lee, David Webster (2007). *Nature's Palette: the Science of Plant Color*. University of Chicago Press. p. 183.
32. Steam, W.T. 1972. *Steam's dictionary of plant names for gardeners*. Timber press, Oregon.
33. The Aurvedic Formulary of India, Government of India, Ministry of Health and family planning, Department of health, Delhi, 1st ed .1978; part 1, 99.
34. McGuffin M, Hobbs C, Upton R, et al. (eds.) *American Herbal Products Association's Botanical Safety Handbook*. Boca Raton, FL: CRC Press, 1997, p. 44.
35. Saxena AK, Singh B, Anand KK. Hepatoprotective effects of *Eclipta alba* on subcellular levels in rats. *J Ethnopharmacol* 1993 Dec;40(3):155-61.
36. Wagner H, et al. Coumestans as the main active principles of the liver drugs *Eclipta alba* and *wedelia calendulacea*. *Planta Med* Oct 1986;(5):370-4.
37. Xu ZL. *Pocket Handbook of Chinese Herbal Medicine*. Miami: Waclicon International, 2000, p. 106.
38. Pooja S. Banergee, Megha Sharma, Rajesh Kumar Nema, Preparation, evaluation and hair growth stimulating activity of herbal hair oil, *Journal of Chemical and Pharmaceutical Research*, 2009, 1 (1):261-267.
39. Lipi Purwal, Surya Prakash B.N Gupta and Milind. S. Pande, Development and Evaluation of Herbal Formulations for Hair Growth, *E-Journal of chemistry* Vol. 5 No.1 pp, 34-38, January 2008.
40. Adhirajan N., T. Ravi Kumar, Shanmugasundaram N. and Mary Babu, J. *Ethnopharmacology*, 2003; 88, 235-239.
41. Adhiranjan N, Dixit VK, Chandrakasan G. Development and evaluation of herbal formulation for hair growth. *Indian Drugs*, 2001; 38:559-563

1.