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Preparation and evaluation of poly herbal hair oil

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ABSTRACT

In Ayurvedic medicine, herbs are used as an integral part of health care system. Besides healthcare, herbs are also used for beautification of the body and for preparation of various cosmetics and colours. The aim of present study involves preparation of poly herbal hair oil using fresh leaves of various plants. The prepared herbal oils were subjected to phytochemical screening, General characterization, Physical and Biological evaluation.The aim of present study involves preparation of poly herbal hair oil using fresh leaves of *Sphaeranthus indicus, Wrightia tinctoria, Eclipta alba, Hibiscus Rosa sinensis.* The oil was prepared according to Ayurvedic pharmacopeia. The evaluation of prepared poly herbal hair oil was carried out by various parameters such as organoleptic, phytochemical, specific gravity, pH, viscosity, acid value, saponification value, refractive index and stability studies. Antimicrobial activity of the poly herbal hair oil was studied by the zone of inhibition method. The Antioxidant activity of the oil was studied by DPPH radical scavenging test. The prepared formulations are assessed for primary skin irritation test on our forearm. Above parameters were found to be good and within the standards and among three concentrations of prepared poly herbal hair oil, third concentration showed better results than other two concentrations. All the values in the evaluation of finished product showed that they are within the acceptable limits. Hence, it is concluded that the oil is beneficial in maintaining good growth of hairs, turning grey hairs to black, providing protection from dandruff, and results in lustrous looking hairs.

Keywords: Hair, Herbal formulations, Hair oil, Stability studies.

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INTRODUCTION

Ayurveda literally means "science of life", and is considered to be the traditional medicine of India. In Ayurvedic medicine, herbs are used as an integral part of health care system. The synthetic chemical compounds have replaced many Ayurvedic plant products, the safety and efficacy of the natural products could not find suitable match. Herbal drugs obtained from plants are believed to be much safer in the treatment of various diseases[1].

Hair is a protein filament that grows from follicles found in the dermis. Hair is one of the most important of our body that improves the overall appearance of a person[2]. The hair fall, Dandruffs, split ends, grey hair are the major problem associated with hair. To overcome these problems, we use lots of cosmetics[3]. Among these, hair loss (alopecia) is a universal problem having affected both sexes of all races to different extents for as long as mankind has existed[4]. The hair care industry has become aware of this and delivering active products directed towards meeting this consumer demand. In traditional Indian system of medicine many plants and herbal formulations are reported for hair growth promotion as well as improvement of quality of hair[5]. Hair oils are the hair care formulations applied for treatment of hair disorders such as baldness, aggression of hair, discoloring of hair, hair falling, dryness of hair. Herbal hair oils are formulated with herbal extracts in an oil base[6]. In our study, we have formulated herbal hair oils from *Sphaeranthus indicus*, *Wrightia tinctoria*, *Eclipta alba*, *Hibiscus rosa sinensis* extractions with different ratios and concentrations. The formulated hair oils are evaluated individually for their anti dandruff, hair growth initiation, protection activities.

Based on the thorough literature survey, *Sphaeranthus indicus*, *Wrightia tinctoria*, *Eclipta alba*, *Hibiscus rosa sinensis* were selected for the preparation of poly-herbal hair oil because there was no hair oil prepared with this herbs.

Sphaeranthus indicus

This plant is also known as Bodasaramu, bodataramu in telugu, belongs to the family Asteraceae. Used as anthelmintic, antibacterial, antifungal, alterative, aphrodisiac, bitter, demulcents, diuretic, acrid, digestive, externally emollient, hypoglycaemic, pectoral, stomachic[7], cervical lymphadenitis, chronic, sinusitis, migraine, epilepsy, lipid disorders, diseases of spleen, anaemia, dysuria[8] (fig.1).

Wrightia Tinctoria

Wrightia tinctoria is also known as Amukudu, Chit-ankalu, jeddapala, kalinga in telugu, belongs to Apocyanaceae[7]. Used as antidysenteric, for piles, skin diseases, astringent,[8] wound healing, anti inflammatory, anti ulcer, anti cancer, anti bacterial and antifungal[9] (fig. 2).

Figure 2: *Wrightia tinctoria*

Figure 1: *Sphaeranthus indicus*

Eclipta Alba

Eclipta alba belongs to the family Asteraceae, it is known as Guntakalagara, Guntagalagara in Telugu.

Figure 3: *Eclipta alba*

Used as anti-inflammatory, anthelmintic, anodyne, anticephalagic, Hair tonic, ophthalmic, antiodontalgic, diuretic, trichogenous, promotes hair growth, shampoos,[7] deobstruant, antihepatotoxic, anticatarrhal, febrifuge, hepatitis, spleen enlargements, chronic skin diseases [8] (fig.3).

Hibiscus Rosa Sinensis

Hibiscus rosa sinensis of family Malvaceae and this plant is known as Dasarratau, Javapushpama, mandara in Telugu. Used as Aphrodisiac, aperient, antiscorbutic, diuretic, depuritive, emollient, brain tonic, anodyne, menorrhagia[7] and also used in the treatment of bronchial catarrh, Emmenagogue, laxative, skin diseases, growth of hair, blackening of hair, luster of hair[8] (fig.4).

Figure 4*: Hibiscus rosa sinensis*

MATERIALS AND METHODS

Collection and authentication of plant materials:

The poly herbal hair oil was prepared by collecting and using various plant materials. These are i. *Sphaeranthus indicus* leaves were collected from Agricultural fields, Mangalam, Tirupati. ii. *Wrightia tinctoria* leaves were collected from University of Sri Padmavati Mahila Visvavidyalayam, Tirupati. iii. *Hibiscus rosa sinensis* leaves were collected from Sri lakshmi venkateswara oil rotary stone house pet, Nellore. Collected plants were identified by Dr. Madhava chetty, Botanist, Dept. of Botany, Sri Venkateswara University, Tirupati.

Culture:

Clinical isolates of Candida albicans was procured from S.V.Medical College, Tirupati, Andhra Pradesh for the in-vitro studies. All the isolates obtained were maintained in Sabouraud's agar medium at 37□ until use.

Drugs and chemicals:

All the chemicals and solvents used were analytical grade. Ascorbic acid, 2, 2 -di phenyl -1-picrilhydrazyl (DPPH), Polyoxyethylene sorbitan monolaurate (Tween20) were obtained from store of Institute of Pharmaceutical Technology, Sri Padmavati Mahila Visvavidyalayam, Tirupati.

Formulation of poly herbal hair oil: (Table 1)

Herb: Oil: Water = 1:4:8

Table 1: ingredients of herbal hair oil formulation

Formulation	Sphaeranthus	Wrightia	Hibiscus	Eclipta	Sesame oil	Water
PHO- I	15 gms	15 gms	15 gms	15 gms	300 ml	600 ml
PHO- II	17.5 gms	17.5 gms	17.5 gms	17.5 gms	300 ml	600 ml
PHO- III	20 gms	20 gms	20 gms	20 gms	300 ml	600 ml

Procedure followed for the Preparation of Poly herbal hair oil:

Tailas are preparations in which taila is boiled with prescribed herb according to the formula. This process ensures adsorption of the active therapeutic properties of the ingredients used.

Methods of preparation:

Leaves are one part by weight, sneha should be four parts and the water should be eight parts. The leaves and the sneha are mixed together, drava is then added boiled on mild fire and stirred well continuously so that the leaves is not allowed to adhere to the vessel. When all the moisture has evaporated, the moisture in the leaves will also being to evaporated, at this stage it has to be stirred more often and carefully to ensure that the leaves does not stick to the bottom of the vessel. The leaves are taken out of the ladle and tested from time to know condition and stage of the sneha. Leaves are harder and when put in fire burns without any cracking noise. A further degree of heating leads to evaporation of sneha. When the taila attained the correct stage froth comes out. The fairly warm taila is filtered. At the beginning the boiling should be on mild fire and at the end also it should be only on mild fire [10]. Similarly other two concentrations (PHO II, PHO III) were also prepared.

Evaluation of Poly herbal hair oil preparations:

The prepared herbal hair oils were subjected to phytochemical screening, general characterization, physical and biological evaluation.

Phytochemical screening of Poly herbal hair oil preparations:

The prepared herbal oils were subjected to qualitative chemical analysis for identification of various plant constituents like alkaloids, glycosides, flavonoids, tannins, phenols, steroids and saponins by using different methods [11].

General characterization:

The general characters like colour and odour were evaluated manually.

Physical evaluation:

The physical evaluation parameters were determined are specific gravity[2], pH, viscosity[6], refractive index, acid value and saponification value[12].

Anti-microbial evaluation (antidandruff activity) Cup plate method:

Diffusion dependent antimicrobial activity of the poly herbal hair oil was studied by the zone of inhibition method. The plate was incubated at 37 °C for 2 days. The zone of inhibition was measured[13].

Antioxidant activity:

DPPH radical scavenging test:

One ml of oil solutions (20, 30, 40, 50 and 60 µg/ml. in acetone) was added to one ml of DPPH solution (0.2mM in acetone). After a 30 min of reaction at room temperature, the absorbance of the solution was measured at 517nm. The Antioxidant activity of the oil is measured against ascorbic acid as standard[14].

Primary skin irritation test:

The prepared formulations are assessed for primary skin irritation test on our forearm, little amount of PHO-I, PHO-II, PHO-III, were applied on the test site. The test site was observed for erythema and edema for 3 to 4 hrs[4].

Stability studies:

Prepared Poly herbal hair oil is observed for stability condition. The poly herbal hair oil was kept aside and observed for 1, 2, 4 and 6 months intervals.

RESULTS AND DISCUSSION

Herbal hair oil is one of the most well recognized hair treatments. Herbal hair oil not only moisturizes scalp but also reverses dry scalp and dry hair condition. It provides numerous essential nutrients required to maintain normal function of sebaceous glands and promotes natural hair growth. The herbal hair oil was prepared from the above mentioned ingredients (Table 1) and it is subjected to the qualitative chemical analysis for identification of various plant constituents (Table 2). The various parameters like Colour, Odour, Specific gravity (density), pH, Viscosity, Saponification value, Acid value, Refractive index and irritation test, of three concentrations of poly herbal hair oils were evaluated (Table 3).

Anti dandruff activity was carried out by measuring the zone of inhibition of different concentrations of poly herbal hair oil. All Poly herbal hair oil showed good and more activity as standard where as PHO - III showed more activity against fluconazole it might be due to presence of more concentration of active principles. (Table 4).

Table 2: phytochemical evaluation of herbal hair oil

Name of the Test	Results
Alkaloids	- ve
Flavonoids	+ ve
Tannins	+ ve
Steroids and Terpenoids	+ ve
Saponins	- ve
Glycosides	+ ve
Phenols	+ ve

+ ve = present, -ve = absent

Table 3: physical evaluation of herbal hair oil

Parameters	Results		
	PHO I	PHO II	PHO III
Colour	Dark green	Dark green	Dark green
Odour	Characteristic	Characteristic	Characteristic
Specific gravity	0.94	0.89	0.82
pH	5.94	5.75	5.52
Viscosity	0.0504	0.0522	0.0547
Acid value	9.424	11.399	13.80
Saponification value	19.635	26.367	23.842
Refractive index	1.5046	1.5735	1.6346
Skin irritation	No irritation	No irritation	No irritation

Table 4: zone of inhibition of poly herbal hair oil

Microorganism (*Candida albicans*)	**Zone of inhibition in cms**				
	PHO I	**PHO II**	**PHO III**	**Standard (Fluconazole)**	**Control (Sesame oil)**
TRIAL I(cm)	1.2	1.2	1.4	1 cm	0.8 cm
TRIAL II(cm)	1.1	1.1	1.5		
TRIAL III(cm)	1	1.2	1.4		
AVG.(cm)	1.1	1.16	1.43		

Antioxidant activity was carried out in DPPH radical scavenging assay. Based on the IC 50 value of the hair oil, poly herbal hair oil concentrations three showed more scavenging activity as compared to other concentration. (Table 5, 6, 7). Poly herbal hair oil three has capability of inhibiting the oxidation of other molecules.

Hence, from the present investigation it was found that the formulated herbal hair oils has optimum standards and further standardization and biological screening establishes the efficacy of formulated herbal hair oil.

Antimicrobial activity of three different concentrations of poly herbal hair oil were carried out by cup plate method using *Candida albicans* organism, results are showed in Table 4.

Anti oxidant activity of poly herbal hair oil was studied by DPPH method and results are showed in Table 5, 6, 7 and fig 5, 6, 7 respectively.

Table 5: absorbance and % radical scavenging activity values of different concentrations OF PHO- I

Drug With Acetone Concentrations(µl/ml)	**Absorbance**	**% Radical Scavenging Activity**	**IC_{50}**
20	0.230	32.25%	44 µl/ml
30	0.340	45.68%	
40	0.360	59.49%	
50	0.412	57.78%	
60	0.446	62.55%	
Standard (Ascorbic acid)	0.07	89.76%	

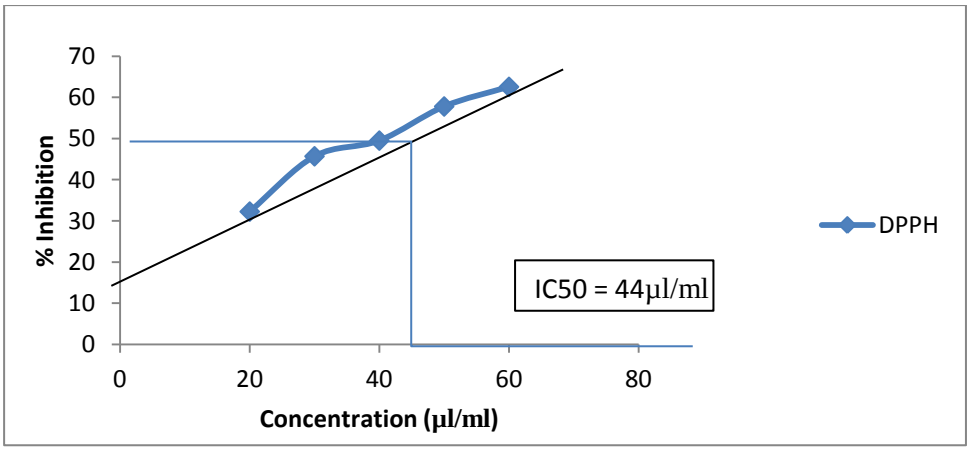

Figure 5: Effect of Poly Herbal Hair Oil - I on DPPH Scavenging Activity

Table 6: absorbance and % radical scavenging activity values of different concentrations of PHO- II

Drug With Acetone Concentrations(µl/ml)	Absorbance	%Radical Scavenging Activity	IC_{50}
20	0.270	37.86%	
30	0.367	51.47%	
40	0.384	53.85%	38.5l µl/ml
50	0.420	58.90%	
60	0.465	65.21%	
Standard(Ascorbic acid)	0.07	89.76%	

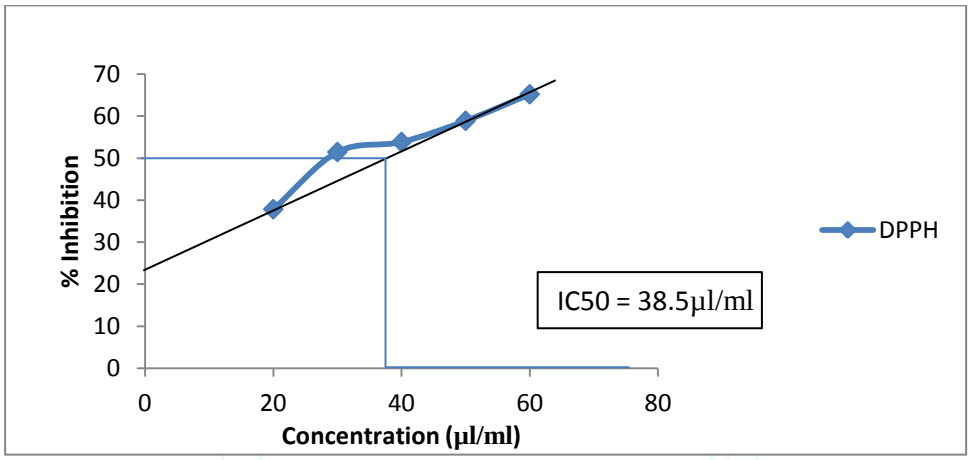

Figure 6: Effect of Poly Herbal Hair Oil - II on DPPH Scavenging Activity

Table 7: absorbance and % radical scavenging activity values of different concentrations of PHO III

Drug with acetone Concentrations (µl/ml)	Absorbance	% Radical Scavenging Activity	IC_{50}
20	0.324	45.44%	
30	0.395	55.39%	
40	0.411	57.64%	29µl/ml
50	0.435	61.00%	
60	0.480	67.32%	
Standard (Ascorbic acid)	0.07	89.76%	

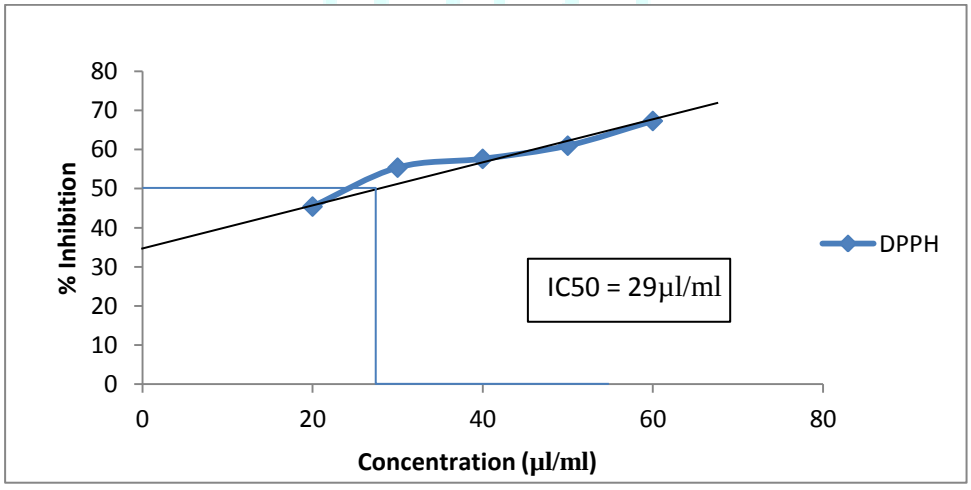

Figure 7: Effect of Poly Herbal Hair Oil - III on DPPH Scavenging Activity

CONCLUSION

In general, the herbal formulation provides good blend of vitamins, antioxidants, terpenoids, and essential oils. All the values in the evaluation of finished product showed that they are within the acceptable limits. Hence, it is concluded that the oil is beneficial in maintaining good growth of hairs, turning grey hairs to black, providing protection from dandruff and results in lustrous looking hairs.

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