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Formulation and Evaluation of A Polyherbal Hair Oil

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ABSTRACT

Mankind uses various products to enhance beauty and elegance to look young and charming. Cosmetics thus play a vital role in human life. Now a days, herbal cosmetic are widely used because of the belief that they have fewer side effects and better safety. Hair is one of the primary parts of the body which acts as a protective appendage. The objective of the present work is to develop a hair oil for general purpose (daily use) using various herbs. The formulated oil was evaluated for its organoleptic properties, acid value, saponification value, refractive index, pH etc. All the parameters were found to be good and within the standards.

Keywords: Hair oil, herbs, cosmetics, formulation, evaluation.

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INTRODUCTION

Hair is an epidermal derivative which is one of the vital parts increasing the overall elegance of the body. Hair fall, dandruff, lice, spilt ends, grey hair are few problems involved with hair faced by human[1]. To overcome these, human takes many measures by applying many cosmetics for each. Hair oil is one among them used to solve almost all of these problems[2].

Herbal cosmetics are in high demand due to the increasing interest of mankind towards them because they are more effective with nil or less side effects, easily available ingredients etc. Hair care cosmetics are now added with herbs and they are well recognized compared with synthetic ones[3].

Herbal hair oil is more preferred and is used in many ailments of hair[4]. They promote hair growth, improve elegance of hair and prevent hair fall[5]. Hair oil not only promotes hair growth they also provide necessary moisture to the scalp rendering in beautiful hair[6].

The present work was aimed to prepare and evaluate a polyherbal hair oil containing herbs like Neem, Shikakai, Amla, Shankpushpi, Brahmi, Bhringaraj, Jatamansi, Nirgundi, Shatavari, Gammbhari and Pudina in til and coconut oil. All these herbs have well known traditional potential in the treatment of hair care.

MATERIALS AND METHOD

Collection of plant part

For the preparation of herbal hair oil various plant materials were collected viz., Neem, Amla, Shankpushpi, Brahmi, Bhringaraj, Jatamansi, Nirgundi, Shatavari, Gammbhari and Pudina from various places of Goa, India and was properly authenticated in the Goa University.

Formulation of herbal hair oil[3]

The various ingredients used in the formulation of herbal oil are presented in Table 1. Accurately weigh all the dried and fresh herbs such as Amla, Nirgundi, Bringaraj, Jatamansi, Neem, Shikakai, Gammbhari, Aprajita, Shankpusphi, Brahmi, Kapur and Pudina and were grinded in the mixture and was mixed in 63% of til oil. The above content was boiled for 15 min. and was filtered through muslin cloth. To the filtrate coconut oil was added to make up the volume (100 mL). Finally small amount of color and flavoring agent was added to the oil and it was placed in amber colored bottle.

Table 1: Ingredients used in formulation of herbal hair oil

Ingredients	Quantity (%)
Amla	85
Neem	2.5

Shikakai	2
Nirgundi	2
Jatamansi	3
Shatavri	3.5
Brahmi	7
Aprajita	2
Gammbhari	3
Shankpushpi	3.5
Bringhraj	10
Kapur	1
Pudina	1
Coconut oil	63
Til oil	37
Flavouring agent	2

Evaluation of herbal hair oil[6]

The formulated herbal hair oil was subjected to physical and biological evaluation.

Physical Parameters[13,14]

Physical Appearance/Visual Inspection:

The formulations prepared were evaluated in terms of their colour, odour and clarity.

Viscosity:

The viscosity was determined using Ostwald's viscometer.

Refractive index:

It was determined using refractometer.

Sensitivity test

The prepared herbal hair oil was applied on 1 cm skin of hand and exposed to sunlight for 4-5 min.

pH:

The pH of herbal hair oil was determined using pH meter.

Specific gravity:

Take the specific gravity bottle, rinsed it with distilled water, dry it in oven for 15 minutes, cool, closed it with cap and weigh it (a). Now fill the same specific gravity bottle with the sample and closed it with cap and again weigh it (b). Determine the weight of sample per milliliter by subtracting the weight (b-a).

Determination of boiling point

Boiling point was determined by simple capillary method.

Detection of Mineral Oil (Holde's Test):

Take 22ml of the Alcoholic KOH solution in a conical flask and add 1ml of the sample of oil to be tested. Boil in a water bath using an air or water cooled condenser till the solution becomes clear and no oily drops are found on the sides of the flask. Take out the flask from the water bath, transfer the contents to a wide mouthed warm test tube and carefully add 25ml of boiling distilled water along the side of the test tube. Continue shaking the tube lightly from side to side during the addition. The turbidity indicates presence of mineral oil, the depth of turbidity depends on the percentage of mineral oil present.

Chemical evaluation [14,15]

Acid value

Preparation of 0.1 molar solution: Weighed 0.56 g KOH pellets and dissolved in 100 mL of distilled water and stirred continuously. The prepared 0.1 molar KOH solution was filled in the burette. Preparation of sample: Measured 10 mL oil and dissolved in 25 mL of ethanol and 25 mL of ether mixture and shacked. Added 1 mL of phenolphthalein solution and titrated with 0.1 molar KOH solution.

Peroxide value

5 gm of substance was taken in a 250ml flask with stopper, and 30 ml of mixture of 3 volume of glacial acetic acid and 2 volume of chloroform was added and the flask was shaken until substance get dissolved, then 0.5ml of saturated solution of KI was added, then allow to stand for 1 min. With shaking 30 ml of water was added and gradually titrated against 0.01M sodium thiosulphate solution.

Saponification value

Accurately weighed 1 mL of oil into a 250 mL of conical flask and 10 mL of ethanol : ether mixture (2 : 1) was added. To this flask 25 mL of 0.5 N alcoholic KOH was. Kept the flask for 30 min. and the flask was cooled. The cooled solution was titrated against 0.5 N HCl using phenolphthalein indicator. Similarily the blank titration was performed without taking oil (sample). Amount of KOH in mg used was calculated.

Iodine Value:

The material was treated in carbon tetrachloride medium with a known excess of iodine monochloride solution in glacial acetic acid (Wij's solution). The excess of iodine monochloride was treated with KI and the liberated iodine estimated by titration with sodium thiosulphate.

Ester value:

The Ester value is the no. of milligrams of KOH required saponifying the ester present in 1g of the substance.

Hydroxyl Value

The hydroxyl value is found by the number of milligrams of potassium hydroxide required to neutralise the acid combined by acylation in 1 g of the substance.

Antimicrobial Evaluation:

Evaluation of antifungal activity

1) Fungus *Aspergillus niger* and *Candida albicans* were used in the present study determine the antifungal activity of the herbal oil by agar diffusion method (cup plate method) and standard used is Griseofulvin (100 µg/ml).

2) In the agar diffusion method, nutrient agar for antifungal activity was used as culture media and cavity were aseptically made over the culture plates using borer (9 mm internal diameter).

3) The cavities were filled with formulation, standards and control. The plates were incubated at 37°C for 24 hrs.

4) The activities were determined by measuring the diameter of the zone in mm.

5) The experiment was replicated two times to confirm the reproducible results.

Evaluation of antibacterial activity

1) Bacteria *Escherichia coli* were used in the present study to determine antibacterial activity of the herbal oil by agar diffusion method (cup plate method). And the standard used is Penicillin (100 µg/ml).

2) In the agar diffusion method, nutrient agars for antibacterial activity were used as culture media and cavity were aseptically made over the culture plates using borer (9 mm internal diameter).

3) The cavities were filled with formulation standards and control. The plates were incubated at 37°C for 24 hrs.

4) The activities were determined by measuring the diameter of the zone in mm.

5) The experiment was replicated two times to confirm the reproducible results.

RESULTS AND CONCLUSION

Throughout the development process the formulations were subjected to microbiological evaluations. Final formulations were evaluated for parameters like consistency, texture, spreadability, washability and skin irritation. All these preliminary parameters were satisfactory. The herbal oil prepared was found to be a safe product with its pH near to the pH range of skin, being in normal range. The formulation was found to be clear with light greenish colour. The viscosity found was 0.9111 with a good refractive index of 1.441. Acid value was also found to

be satisfactory. The viscosity and density was also found to be satisfactory for use. The peroxide value was found to be 1.38 with saponification value as 118.06, Iodine value as 79.7, Ester value as 182.66 and Hydroxyl value as 30.45. (Table 2). The formulated product was devoid of any potentially irritant synthetic substances like parabens as it consisted entirely of natural substances. Thus the formulation was superior to the marketed brands due to its non-irritancy, safety and due to the complete absence of any artificial ingredients. Antifungal and antibacterial activity of formulation shows significant activity when compared with standard which increases its potential to combat seborrhea and acne. Zone of inhibition for *Aspergillus niger* was 1.02 and 1.08 for concentration 0.1 and 0.2 µg/ml respectively, for *Candida albicans*, it was 0.87 for 0.1µg/ml concentration and the same for E.Coli, it was 0.10 for 0.1µg/ml concentration (Table 3). Plant based products have been effectively proven for their utilization as source for antimicrobial and antifungal compounds.

Table 2: Evaluation of herbal hair oil

	Parameters	Inference
Physical	Odour	Characteristic
	Colour	Light greenish
	Clarity	Clear
	Viscosity	0.9111
	Refractive index	1.441
	Sensitivity test	No irritation
	pH	6.7
	Specific gravity	0.9344
	B.P	215℃
Chemical	Mineral oil	57%
	Acid value	2.4
	Peroxide value	1.38
	Saponication value	118.06
	Iodine value	79.7
	Ester value	182.66
	Hydroxyl value	30.45

Table 3: Zone of inhibition values at different concentrations of herbal Hair oil

Name of the organism	Concentration (ml)	Zone of inhibition (cm) Formulation	Standard (100 µg/ml)
Aspergillusniger	0.1	1.02	1.21
	0.2	1.08	1.32
Candida albicans	0.1	0.87	1.78
Escherichia coli	0.1	0.10	2.52

Figure 1: Antifungal activity of formulation Antifungal activity of standard (Aspergillus niger)

Figure 2: Antifungal activity of formulation Antifungal activity of standard (Candida albicans)

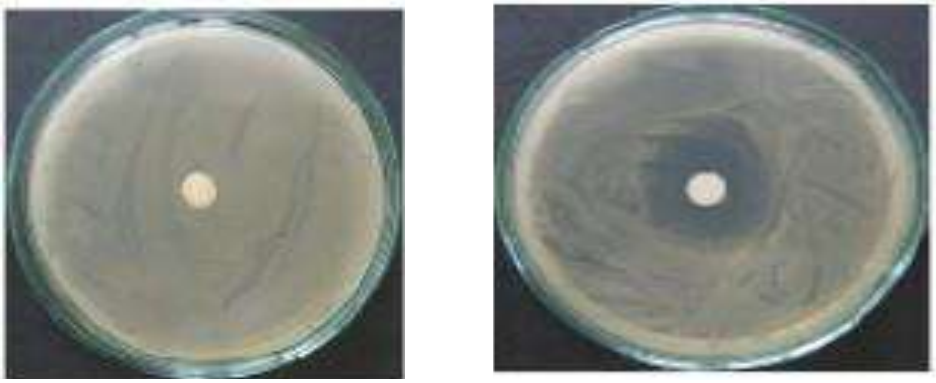

Figure 3:Antibacterial activity of formulation Antibacterial activity of standard. (E. coli)

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