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Formulation Development and Standardisation of Herbal Hair Tonic.

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ABSTRACT: Herbal cosmetics are immeasurable gift of nature have expanding demand in world market. There remain wide spans of seasoning cosmetic product to satisfy beauty regime. The presence of number of phytochemicals and botanicals within the seasoning product have twin stuff, one that they're used as cosmetics for body care and another that phytochemicals amend the biological functions of build naturally results in healthy skin and hairs. Seasoning hairdressing not solely moisturizes scalp however additionally converse dry scalp and dry hair conditions. It bestows various essential nutrients needed to take care of traditional functions of the sebaceous secretor and promote natural hair growth. Cosmetics so play a significant role in human life. Now days, seasoning cosmetic are wide used thanks to the belief that they need fewer facet effects and higher safety. Hair is one among the first elements of the body which acts as a protecting appendage. Current research work focused on to develop hairdressing for defending problems allied with hairs by victimization numerous natural oils. The optimised hair oil formulation evaluated for its organoleptic properties as well as chemical properties. In result optimised combination of natural oils proves their significant stability for nourishing hair growth.

KEYWORDS: Hair oils, nourishment, hair cosmetics, phytochemicals.

I. INTRODUCTION

Hair is the first thing that people notice about you. A great hairstyle can give you the personality boost you require in doing well in both personal and professional fronts. Hair loss, is a common biological problem all over the world. The importance of hair in enhancing the overall personality of a human being cannot be overestimated. Hair loss, on the other hand, can prove to be a real disadvantage for many people. Some young people's facing problem of hair loss due to their genetical variation, some environmental and systemic factors as well as personal habits etc.

Hair is a epidermal derivative which consists of two distinct parts as follicle and hair shaft. The follicle is the essential unit for the generation of hair. The hair shaft consists of a cortex and cuticle cells and a medulla in some types. Hair shaft pigmentation showed due to predominance of eumelanin. Hair contain proteins keratin involved in hair growth. A hair follicle anchors each hair into the skin. The hair bulb forms the base of the hair follicle. In the hair bulb, living cells divide and grow to build the hair shaft[1].

Taking care of hair is crucial to having long-lasting hair. However, to understand the importance of hair we need to understand the anatomy of hair so as to demystify the process of hair loss and hair fall. To begin with, hair is not considered living cells. In fact, they are mostly composed of protein cells called Keratin. The hair has two components - the long shaft and the thicker root that forms part of the hair follicle.

Hair is a protein filament that grows from follicles found in the dermis. Hair is one of the most important part of our body which improves the overall appearance of a personal beauty. The hair fall, Dandruffs, split ends, grey hair are the major problem associated with hair. To overcome these problems, we use lots of cosmetics. 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. 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[2].

Aside from the scalp, the human hair is observed in all different parts of the frame

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except lips, the palm of the hand and sole of the toes. Human hair goes through various stages of development. First, the fetal hair (also known as lanugo hair) forms on the baby's head inside the womb. It falls off after a few months. This hair is replaced by downy hair, which is again replaced by mature or terminal hair, when a boy or a girl reaches puberty. This mature hair stays with human beings for the rest of their lives. This is the type of hair that is prone to damage and disease[3].

Hair is an epidermal derivative which is one of the vital parts increasing the overall elegance of the body. Hair fall is problem involved with hair faced by human. To overcome this, human takes many measures by applying many cosmetics for each. Hair oil is one among them used to solve almost all of these problems.

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 recognised compared with synthetic ones.

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

1.1. Hair fall:-

Hair loss or hair thinning is a hair problem characterized by loss of more than 100-150 stands a day. The amount of hair fall can range to mild, moderate or severe [5].

1.2. Symptoms

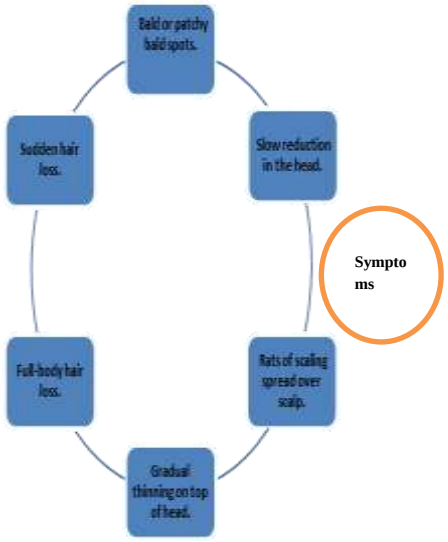

Figure No. 1: Symptoms of Hair loos.

These are the most common types of hair loss that affect life as they grow[6].

The foundation of beauty and cosmetics is as old as humanity and civilization. It is an ancient method because its origins are found in the sacred Vedas and in the Unani texts. As the expert said chemical drugs do not always work like magic bullets[7].

Table no 1: Representing different oils with figures used in the preparation of hair oil.

Sr. No.	Oils	Figures
1.	Castor oil Biological source: Castor oil is a fixed oil obtained by cold expression of the seeds of Ricinus communis. Family : Euphorbiaceae Use: strengthening strands, promoting hair growth, and nourishing dry scalp[9].	 Figure No.: 04
2.	Almond oil Biological source: Almond oil is a fixed oil by expression from the seeds of Prunus amygdalus. Family : Rosaceae Use: strengthening strands, promoting hair growth, and nourishing dry scalp[10].	

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3.	Coconut oil Biological source: Oil derived from fruits of Cocus nucifera. Family : Arecaceae Use: nourishes the scalp, vehicle, stimulates hair growth by unclogging pores[5].	

1.3. Benefits of herbal hair oils.

1. It keeps the hair shiny
2. It allows the hair follicles,
3. It rejuvenates the hair follicles,
4. Helps to improve light and strength and your hair,
5. Helps to improve blood circulation to the skin,
6. No toxins and no side effects[10].

1.4. Role of natural oils

Castor oil: -

Castor oil is rich in ricinoleic acid - a type of fatty acid known to fight inflammation. When applied to the skin, it is thought to promote healthy hair growth and prevent hair loss[11].

Almond oil: -

Almond oil contains Biotin, and stroking your hair with almond oil is an effective way to give your hair a healthy dose of Biotin to promote hair growth and reduce hair loss. Almond oil is also rich in vitamin E[12].

Coconut oil: -

Coconut oil contains lauric acid which helps to bind proteins to the hair, protects roots and strands, and prevents them from cracking. The antioxidants found in coconut oil help to grow healthy hair. Coconut oil is known to penetrate the hair follicles and protect them from environmental pollution and extreme heat[13].

How to oil your hair:

Massaging the oil into the scalp increases blood circulation, which may improve hair growth. Applying oil to the scalp may also prevent dandruff.

Follow these steps to give hair oiling a try:

- Apply oil on your scalp and massage with fingertips using a circular motion.
- Apply the oil left on your palms to your hair.
- Cover with a towel or shower cap and leave on overnight.
- The next day, shampoo hair while dry. Rinse thoroughly.
- Condition as normal. You can also use coconut oil as a conditioner[22].

Table no 2: Role of oils in herbal hair oil[7].

Ingredients	Importance
Castor oil	Lubricant
Almond oil	Emollient
Coconut oil	Moisturizer

II. METHODS AND MATERIALS

2.1. The procedure of herbal hair oil: -

- The various ingredients used in the preparation of herbal oils are shown in Table 1.
- Measure accurately all natural oil samples as per formula defined.
- Mix well to reach uniformity and transfer in airtight container. [14]

Table no 3: Ingredients used in formulation of herbal hair oil[2].

Ingredients	Formulation 1 (Quantity in Percent)	Formulation 2 (Quantity in Percent)	Formulation 3 (Quantity in Percent)
Castor Oil	50%	50%	45%
Almond Oil	20%	40%	18%

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Coconut Oil	30%	10%	37%

Table no 4: Chemical test for oils[15].

Sr. No.	Chemical /Solubility test
1	Solubility in polar solvents a. 5ml oil + 5ml water, observe solubility b. 5ml oil + 5ml alcohol, observe solubility
2	Solubility in non-polar solvents, a. 5ml oil + 5ml chloroform, Observe Solubility. b. 5ml oil + 5ml petroleum, Observe Solubility.
3	Sample oil stained on filter paper

2.2. Chemical testing of phytochemicals (terpenoids):

- Qualitative test of terpenoids (Salkowski test): - Take oil sample (5ml) and immersed in 5 mL of ethanol. The extract is mixed in 2 mL of chloroform. It warmed up a bit and then cooled. 3 ml of concentrated H_2SO_4 was gradually added to the sides of the test tubes. The brown rain forms in the area indicating the presence of terpenoids.
- Quantitative test of terpenoids: - Take oil sample 10ml and immersed in 9mL of ethanol for 24 hours. Extracted after filtration, extracted with 10mL of petroleum ether using a separating panel. The ether extract was separated into pre-measured glass containers and waited for its complete drying (wf). Ether evaporates and yield (%) of total terpenoid content is measured by formula (wi-wf / wi × 100)[16].

2.3. Thin Layer Chromatography Analysis: -

- Following steps involved in performing TLC for oil sample and formulation evaluation,
- Preparation of TLC plate: Prepared the slurry of adsorbent media (silica gel-G) in distilled water and poured the slurry on the TLC glass plates to obtain a thin layer.
- Activation of TLC plate: TLC plate was activated by heating in oven for 30min at $105^{O}C$.
- Sample application: Dipping the capillary into the solution to be examined and applied the sample by capillary touched to the thin layer plate at a point about 2cm from the bottom. Air-dried the spot.
- Chamber saturation: The glass chamber for TLC should be saturated with mobile phase. Mobile phase was poured into the chamber and capped with lid. Allowed saturating about 30 min.
- Chromatogram development: After the saturation of chamber and spotting of samples on plate, it was kept in chamber. The solvent level in the bottom of the chamber must not be above the spot that was applied to the plate, as the spotted material will dissolve in the pool of solvent instead of undergoing chromatography. Allowed the solvent to run around 10-15cm on the silica plate
- Visualization: Plates were removed and were examined visually, under UV after that Rf value calculated [17, 18, 19].

III. EVALUATION HERBAL HAIR OIL: -

Herbal oils formulated are tested for parameters such as pH, sensitivity test, acid value, amount of saponification, specific gravity, refractive index, viscosity and organoleptic parameters.

3.1) Organoleptic Equipment:

Colour, smell, irritation of the skin was determined directly. The oil is rubbed on the hand and exposed to the sun for 5 minutes to check for any irritation of the skin[4].

3.2) Sensitivity testing:

Prepared herbal hair oil is applied to the skin of 1 cm hand and placed in the sun for 4-5 minutes[4].

3.3) Viscosity:

The viscosity of the herbal hair oil was determined using a Brookfield viscometer.

Prepare the gel using gel-forming materials (gelling agents) like Carbopol or any other suitable polymer. Keep the gel for at least 24 hours for uniform dispersion and homogenisation. After 24 hours when gel is completely formed, place sufficient quantity in the beaker or sample holder provided with the instrument. Set-up the base level of instrument using level indicator on the top of instrument and plug in for constant electric supply. Clean the spindle and attach to the

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instrument. Rotate the spindle in the gel till you get a constant dial reading on the display of the viscometer. Repeat the determination at least three times for reproducible results. Maintain a constant temperature using thermostat throughout the determination[20].

3.4) PH:

The pH of the herbal hair oil was determined using a pH meter[4].

3.5) Specific gravity:

A bottle of gravity is rinsed with distilled water, dried in a hot oven for 15 minutes, cooled, covered, measured and marked (a). Now the same magnetic field bottle was filled with a sample, capped, and weighed (b). The sample weight per milliliter is determined by subtraction (b-a) [20].

3.6) Acid Value:

Measure about 10g of the test item, in iodine flask. Prepare a 50ml mixture of equal volume of ethanol (95%) with ether, add 0.5ml phenolphthalein solution and dissolve it against 0.1N aqueous potassium hydroxide solution to reduce it. Dissolve the limited amount of material in the top neutral solution, if the sample does not melt in the cold solvent, connect the flashlight with the reflux condenser and heat it slightly, with constant stirring, until the sample melts. Add 1ml of phenolphthalein solution and titrate to 0.1N aqueous potassium hydroxide solution, until the solution remains pink in an instant after shaking for 30 seconds. Calculate the amount of acid from the following calculation.

Acid value = 5.61 × n/w

Where, n = ml of potassium hydroxide solution 0.1N, w = object weight, in gm[21].

3.7) Saponification Value:

2g of fat was accurately measured and transferred to 250ml of iodine flask. 25ml of 0.5Ml of hydroxide alcohol is else and stewed underneath reflux in a very water tub for half-hour. Phenolphthlein was else as a reference and was measured at zero.5M HCl (‘an’ ml). Equally empty voids (‘b’ ml) were excluded from the sample.

Saponification value: -28.05 (b-a)/w

Where, w = weight in grams of answer[21].

3.8) Refractive index:

Determined employing a measuring system. Clean the tool and wipe the prisms with alcohol and wipe with solvent and dry. Keep the tools getting ready to the acceptable light so bigger lightweight shines within the prisms. Apply water to the prisms with the assistance of tubing and change the tool to induce a crosswire border within the viewing space. Change the attention piece and open the knot to seek out the border of the cross strings within the middle. Browse non-standard speech readings as indicated by water ratio. Clean up the prisms and wipe with solvent or alcohol employing a cotton swab. For every sample, to get relevant results[20].

IV. RESULTS AND DISCUSSION:

4.1 Observation for solubility profile of oil:

Table no 5: Result for chemical / solubility test.

Sr. No.	Chemical /Solubility test	Observation	Inference
1	Solubility in polar solvents a. 5ml oil + 5ml water, b. 5ml oil + 5ml alcohol	 Completely insoluble Completely insoluble	 Oil present Oil present
2	Solubility in non-polar solvents, a. 5ml oil + 5ml chloroform, b. 5ml oil + 5ml petroleum,	 Completely miscible Completely miscible	 Oil present Oil present
3	Sample oil stained on filter paper	Permanent-stain observed	Fixed oil is present

All oil sample and formulation I, II, III comply with above results.

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4.2. Observation for phytochemical test:

Qualitative test of terpenoids (Salkowski test):

Table no 5: Result for chemical test

Salkowski test	Observation and Inference
Oil (5ml) was taken and immersed in 5 mL of ethanol. The extract is mixed in 2 mL of chloroform. It warmed up a bit and then cooled. 3 ml of concentrated H_2SO_4 was gradually added to the sides of the test tubes. The brown rain forms in the area indicating the presence of terpenoids.	Castor oil, almond oil, coconut oil, formulation 1, formulation 2, formulation 3 all shows the radish-coloured precipitation and the interface indicating the presence of terpenoids.

The qualitative analysis of oils and formulations revels that major component terpenoids present which showed phytochemical nature. Quantitative test of terpenoids: Test not observed significant result.

4.3. Thin layer chromatography:

Table no 6: Result for TLC Analysis.

Sr. no	Mobile Phase Used	Observation (Rf value)					
		Castor	Almond oil	Coconut	Formulation 1	Formulat	Formulation
1	Benzene-Chloroform [1:1]	0.75	0.5	0.65	0.71	0.87	0.83
2	Benzene-Ethyl acetate [19:1]	0.58	0.68	0.82	0.7	0.88	0.76
3	Acetone-Methanol-Water [3:15:2]	0.72	—	—	0.56	0.73	0.61

The TLC analysis of oil samples and formulations observed Rf value, it revels that the selected mobile phase for respective phytocompound showed presence of like terpenoids, terpenoids derivatives and comply with standard Rf value. Experimental formulation 3 expressed more significant results as compared with other formulations.

4.4. Formulation evaluation:

Table no 7: Results for evaluation of all formulation

Sr. no	Evaluation Parameter	Castor oil	Almond oil	Coconut oil	Formulation 1	Formulation 2	Formulation 3
1	Colour	Very-pale yellow	Pale yellow	Colour-less	Pale yellow	Pale yellow	Pale yellow
2	Odour	Characteristic	Sweet	Pleasant	Pleasant	Pleasant	Pleasant
3	Irritation test	Non irritant	Non irritant	Non irritant	Non irritant	Non irritant	Non irritant
4	Sensitivity	Non sensitivity	Non sensitivi	Non sensitivity	Non sensitivity	Non sensitivity	Non sensitivity
5	Viscosity	537 cp	47.80 cp	55.3 cp	202 cp	230 cp	210 cp
6	PH	5.5	4.8	5.2	3.5	6.2	5

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7	Specific gravity	0.943	0.911	0.922	0.832	1.000	0.925
8	Acid value	1.45	1.10	3.03	1.024	0.1890	0.2805
9	Saponification-tion value	182	190.74	258.06	49.756	57.694	51.892
10	Refractive index	1.3331	1.333	1.3332	1.3331	1.3333	1.3332

The oil sample and all formulation selected for present study are evaluated by all above parameters, results mentioned in table no. 7. The selected parameters for formulation evaluation help to define stability and quality. The formulation 3 expressed more significant results as compared with other formulations. It may be due to phytochemicals present in oil samples, composition and quantity selected for formulation. The result obtained formulation 3 which may be show more efficiency for hair nourishment.

V. CONCLUSION

All the evaluation parameters observed results for hair oil formulation showed better result may be due to selected natural oils, their phytochemical composition and quantity selected for formulation. Based on the results, we conclude that the formulation no. 3 among others formulations, shows more stability and comply with all standard limits which will show significant effect in maintaining good hair nourishment and results in lustrous looking hair.

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