



Research Article

PREPARATION AND EVALUATION OF MATRUJ SBA HAIR OIL CONTAINING POLYHERBS FOR ARRESTING HAIR PROBLEMS

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ABSTRACT

Herbs are an essential component of the healthcare system in Ayurvedic medicine. In addition to being used in medicine, herbs are also utilized to make a variety of cosmetics and colours as well as to enhance one's appearance. The purpose of this research is to prepare polyherbal hair oil using plant-based ingredients which are fresh leaves of various plants. Polyherbal hair oil prepared by using multiple herbal components some of containing leaves, roots or whole plant. Firstly all raw materials are characterized by different parameters such as ash values, water and alcohol soluble extractives, TLCs, and phytochemical analysis, etc. Then prepared herbal oils were subjected to General characterization like sensitivity, Grittiness, sedimentation and Physical evaluation such as pH, acid value, viscosity, saponification value, specific gravity, density and stability study. The above parameters were found to be good and within standards. The characterization of all raw materials shows the different parameters and phytochemical analysis of phytoconstituents which are required for healing different hair problems. This is FDA approved herbal hair oil and it s already in use for a patients and it shows very good effect against all hair problems. Conclusively, combination of effective herbs could be used to improve hair growth, nourishes the scalp and prevents dandruff.

INTRODUCTION

Hair is a crucial aspect of our physical appearance and often a reflection of our overall health and well-being. Hair is a complex and unique structure composed mainly of a protein called keratin, which forms the structural foundation of the hair shaft. It is a protein filament that develops from dermal follicles. Each hair consists of several layers, including the cuticle, cortex, and medulla, each with distinct properties contributing to the overall strength, elasticity, and appearance of the hair. The main issues with hair include hair loss, dandruff, split ends, and gray hair [1]. A rising number of men and women are dealing with the painful issue of hair loss. Alopecia, or hair loss, is a common patient issue or complaint. Many products, such as hair oils, hair shampoos, hair conditioners, hair serums, hair gels, hair masks, and hair dyes, are available on the market to help with

these issues [2]. Along with Polyherbal hair oils, derived from a combination of various medicinal plants and herbs, have been an integral part of traditional and Ayurvedic medicine for centuries. These oils are specifically formulated to promote hair health, stimulate hair growth, and address common hair-related issues such as hair fall, dandruff, premature greying, and scalp infections. The synergistic effects of multiple herbs in a polyherbal formulation often enhance the therapeutic properties, making these oils highly sought after in the realm of natural hair care [3].

This SBA hair oil is a FDA approved herbal oil product for hair care treatment under cosmetic category. SBA hair oil is user friendly, safe, efficient hair oil with satisfied patient base since 5 years. This SBA hair oil manufacturing method is ancient and Ayurvedic. SBA hair oil contains rich potent choice of herbs indulged in making of SBA hair oil. It is most preferred choice in OPD with ample loyal customers for continuous orders. In our study, we have formulated herbal hair oil using *Neem, Mothivelchi, Dagadphool, Talispatra, Jatamasai, Chandan, Musta, Tager, Gulab, Karpurkachri, Mehandi, Maka, Brahmi, Amalakiswarasa*, sesame oil,

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coconut oil, *Bhimsenikapur* for arresting different hair problems.

Benefit of Herbal Hair Oil [4]

- Promote the hair growth thickness of hair
- For longer and stronger hair
- Maintaining the health of your hair
- Maintaining the colour of your hair
- It stimulates hair growth
- Improves hair growth
- Prevents dandruff
- Stress relief
- Nourishes the scalp
- Strengthens hair follicles
- Improves hair texture and shine
- Aroma therapeutic benefits
- Natural and chemical-free

Drugs with their Information

Neem [5,6]

Scientific name- *Azadirachta indica*

Family- Meliaceae

Parts used- Maximum leaves

Active constituents- Nimbolinin, nimbin, nimbidin, nimbidol, sodium nimbinat, gedunin, salannin, and quercetin.

Uses- Antifungal, relieve the itchiness of scalp, inflammation, and irritation associated with dandruff and dryness.

Mothi Velchi (Black cardamom) [7]

Scientific name- *Amomum subulatum*

Family- Zingiberaceae

Parts used- Fruit

Active constituents- Terpinyl acetate, terpineol, borneol, terpinene, limonene.

Uses- Nourishes the hair from the roots.

Dagadphool (Stone Flower) [8]

Scientific name- *Parmelia perlata*

Family- Parmeliaceae

Parts used- Leaves

Active constituents- Flavonoids and alkaloids, amino acid and cymene.

Uses- Hair Care, health supplement, antioxidant, anthelmintic property.

Talisa patra [9]

Scientific name- *Abies Webbiana*

Family- Pinaceae

Parts used- leaves

Active constituents- Flavonoids steroids, terpenes, sugars, phenols, flavonoids, tannins, saponins, and quinines.

Uses- Treatment of coughs, colds and fevers

Jatamamsi [10, 11]

Scientific name- *Nardostachys jatamansi*

Family- Caprifoliaceae

Parts used- Leaves and roots

Active constituents- Sesquiterpenes and coumarins

Uses- Premature greying of hairs, boost hair growth.

Chandan [12]

Scientific name- *Santalum album*

Family- Santalaceae

Parts used- Trunk

Active constituents- Santenone, essential oil and its components (α -santalol and β -santalol), phenolic compounds and fatty acids.

Uses- Treating hair problems like dandruff and prevents hair fall, Cooling, calming effect just like aroma therapy, reduces stress and anxiety, reduce burning sensation of eyes and all these benefits contribute to better healthy scalp and hair growth.

Musta [13]

Scientific name- *Cyperus rotundus*

Family- Cyperaceae

Parts used- roots

Active constituents- Sesquiterpenoids such as patchoulone, isopatchoulone, sugeonyl acetate, sugetriol triacetate and sugebiol, as well as flavonoids such as kaempferol, luteolin and quercetin

Uses- Topical *Cyperus rotundus* oil is an effective and safe method to decrease hair growth. The oil's flavonoids have anti-androgenic activity on androgenic hair [14].

Tagar [15]

Scientific name- *Valeriana officinalis*

Family- Valerianaceae

Parts used- roots

Active constituents- pyridine alkaloids, some organic acids and terpenes, especially the so called valepotriates, esterified iridoid-monoterpenes

Uses- It strengthens the hair follicles and roots. It controls dandruff and enhances hair growth. It promotes smoothness and silkiness of hair.

Gulab [16]

Scientific name- *Rosa centifolia*

Family- Rosaceae

Parts used- Petals

Active constituents- Citronella, geraniol, nerol, stearopten, farnesol, phenyl ethanol, fatty oil, tannins and organic acids.

Uses- Antioxidant and antimicrobial agents, these cleanse and nourish your scalp and fortifying your follicles to grow thick, sturdy hair strands. Rose petals also serve as a potent natural conditioner and

moisturizing your tresses and preventing potential outbreaks of dandruff.

Kapoor kachari [17]

Scientific name- *Hedychium spicatum*

Family- Zingiberaceae

Parts used- leaves, roots, bark, fruit, flowers

Active constituents- Rhizome has been reported to contain sitosterol and its glucosides, furanoid diterpene-hedychenone and 7-hydroxyhedychenone, and essential oils like cineole, terpinene, limonene, phellandrene, p-cymene, linalool and terpineol as major constituents.

Uses- Treating hair loss

Mehandi [18]

Scientific name- *Lawsonia inermis*

Family- Lythraceae

Parts used- Leaves

Active constituents- Carbohydrates, phenolic, flavonoids, saponins, proteins, alkaloids, terpenoids, quinones, coumarins, xanthenes, fat, resin and tannins. It also contained 2-hydroxy-1,4-naphthoquinone (lawsone).

Uses- The natural pigments from the *Lawsonia inermis* leaf coat each strand. Using a natural hair dye means building a protective layer around the hair cuticles and every strand, safeguarding your hair against potential damage. Hair dyes with henna lock in moisture boosting luster and strength.

Bhringaraja (Maka) [19]

Scientific name- *Eclipta alba*

Family- Asteraceae

Parts used- Leaves, roots, bark, fruit, flowers

Active constituents- Coumestan derivatives like wedololactone [1.6%], demethylwedololactone, desmethyl-wedololactone-7glucoside and other constituents are ecliptal, β -amyrin, luteolin-7-O-glucoside, hentriacontanol, heptacosanol, stigmaterol

Uses- It nourishes the scalp and hair follicles that make it favorable for the hair follicles to regenerate more hair strands. It also hydrates the hair strands and makes them shiny and healthy.

Brahmi [20]

Scientific name- *Centella asiatica*

Family- Apiaceae

Parts used- Leaves, roots

Active constituents- Saponins (also called triterpenoids), which include asiaticoside.

Uses- *Brahmi* helps control sebum (oil) production that keeps infection at bay and repairs your scalp to give your stronger and healthier hair and also acts as brain tonic enhancing healthy neurofunctioning along with healthy hair.

Amalaki swarasa (Amala) [21]

Scientific name- *Emblica officinalis*

Family- Euphorbiaceae/Phyllanthaceae

Parts used- Fruit

Active constituents- Gallic acid, ascorbic acid, ellagic acid, rutin, quercetin, and catechol.

Uses- It helps in balancing the sebum content of your scalp. The vitamin C-rich fruit helps in the regeneration of new hair from the follicles that mean it helps in treating baldness. The nutrient content in the fruit helps in the promotion of hair growth

Til Tailam [22]

Scientific name- *Sesamum indicum*

Family- Pedaliaceae

Parts used- Oil

Active constituents- Sesamin, sesamolin, sesamol, sesaminol, sesamolin phenol, and other lignan-like active ingredients.

Uses- Lubricate the hair shaft, increases flexibility and also treat dandruff. It stimulates blood circulation on the scalp promoting hair growth. In addition, it's rich in omega-3 and omega-6. Research shows that a deficiency in these fatty acids impacts hair loss. If hiding thinning hair or hair loss is a concern. Sesame oil for hair encourages good scalp health and in turn boosts your hair growth. It controls premature graying of hair and baldness.

Coconut oil [23]

Scientific name- *Cocos nucifera*

Family- Arecaceae

Parts used- Oil

Active constituents- Phenols, tannins, leucoanthocyanidins, flavonoids, triterpenes, steroids, alkaloids and saponins.

Uses- It helps reduce protein loss and keep each hair strand looking healthy.

Bhimseni Kapoor [24]

Scientific name- *Cinnamomum Camphora*

Family- Lauraceae

Parts used- Oil

Active constituents- It contains essential oil were - camphor, linalool, cineole, and 3, 7, 11-trimethyl-3-hydroxy-6,10-dodecadien-1-yl acetate.

Uses- It soothes scalp irritations, prevent dryness and keep various infections and hair problems at bay. It is also known to improve blood circulation ensuring healthy hair growth with frequent usage.

MATERIALS AND METHODS

Collection of Plant Part

The polyherbal hair oil was prepared by collecting various plant materials like *Amla* fruits, neem leaves, *Henna* leaves, *Bringraj*, *Gulab* petals, *Jatamamsi* from herbal garden and *Mothi Velchi*,

Dagadphool, Talisapatra, Til oil and coconut oil, castor oil, *Bhimseni Kapoor, Chandan* were procured from local market.

Procedure for Preparation Hair Oil

The table below lists the many components that are involved in formulating herbal hair oil. Accurately weigh all the dried and fresh herbs such as *Amla, Brahmi, Mothi velchi, Dagadphool, Talisa patra, Jatamamsi, Musta, Bringraj, Tagar, Karpurkarchi, Bhimseni Kapoor* etc.

Step 1- Preparation of kadha no. 1: Boil raw brahmi with water for 2-3 h the filter properly with muslin cloth.

Step 2- Preparation of Kadha no. 2: whole *Amla* fruit were cut into small pieces and make a paste out of it and filter properly with muslin cloth then take that *aamla filtrate* for further process.

Step 3- Mix *Kadha* no. 1 and *Kadha* no. 2 properly then add accurate amount sesame oil, coconut oil and stir well this mixture.

Step 4- Add all remaining ingredients in above mixture except *Bhimseni Kapoor* and mix well then allow to boil for 48 h then cool to room temperature filter with muslin cloth. At end the polyherbal hair oil will form.

Table 1: Ingredients of polyherbal hair oil formulation

S.No.	Ingredients	Quantity
1	<i>Neem</i>	5 g
2	<i>Mothi velchi</i> (Black Cadimom)	0.2 g
3	<i>Dagadphool</i>	0.2 g
4	<i>Talisapatra</i>	0.2 g
5	<i>Jatamamsi</i>	0.2 g
6	<i>Chandan</i>	0.2 g
7	<i>Musta</i>	0.2 g
8	<i>Tagar</i>	0.2 g
9	<i>Gulab</i>	0.2 g
10	<i>Karpurkarchi</i>	0.2 g
11	<i>Mehandi</i>	0.2 g
12	<i>Bringraj (Maka)</i>	0.2 g
13	<i>Brahmi</i>	4 g
14	<i>Amalaki swarasa</i>	q.s.
15	<i>Til tailam</i>	2 part
16	Coconut oil	2 part
17	<i>Bhimseni Kapoor</i>	0.2 g

Characterization and Identification of Raw Material

Individual raw material were subjected to Proximate analysis including colour, odour, surface miscopy, foreign matter %, moisture %, total ash %, acid insoluble ash %, sulphated ash%. Along with this characterization heavy metal detection done and water soluble as well as alcohol soluble extractives evaluated of all raw material. The extracts obtained from successive solvent extractions were then subjected to qualitative chemical analysis for identification of various plants constituents using different methods. Thin layer chromatographies with different mixtures of solvent systems were performed to confirm the presence of constituents detected in qualitative chemical test.

Evaluation of Polyherbal Hair Oil

Raw materials which are used for the preparation of polyherbal hair oil are characterized under different parameters such as organoleptic properties, physicochemical analysis, qualitative analysis of phytoconstituents which are present in raw material.

General Characterization [25, 26]

The general characters like colour and odour were evaluated manually.

Sensitivity

Applied to the skin and exposed to the sunlight for 5 minutes to check for any irritation over skin.

Grittiness

Rubbed to the skin and observed.

Sedimentation

Keep the whole preparation λ aside for overnight and check for sedimentation.

Physical evaluation [27-29]**pH**

pH of the herbal oil was detected using pH meter. The pH meter was calibrated with buffer solutions of pH 4 and pH 7. The electrode was bathed in hair oil for a few minutes until the pH returned to normal.

Acid Value

10ml of oil was added with 25ml of ethanol and 25ml of ether. Phenolphthalein was added as indicator and titrated with 0.1M potassium hydroxide solution,

Acid value = $5.61n/w$ Where,
 n = Number of ml of 0.1M KOH
 w = Weight of oil

Viscosity

The viscosity of prepared herbal hair oil was estimated by Ostwald's Viscometer at a room temperature. The viscosity of prepared herbal hair oil was calculated by using the equation.

$$\eta_L = \frac{\eta_w \times \rho_L t_L}{\rho_w \times t_w}$$

η_w = Absorbance viscosity of water

t_w = Time of flow of water

ρ_w = Density of water

η_L = Absolute viscosity of liquid

ρ_L = Density of water

Saponification Value

In a 250ml conical flask, 1ml of oil was accurately weighed, and 10ml of ethanol:ether combination (2:1) was added. 25ml of 0.5N alcoholic KOH was added to this flask. The flask was kept for 30 minutes and then cooled. Using phenolphthalein indicator, the cooled solution was titrated against 0.5N HCl. The blank titration was carried out in the same way but without using any oil (sample). The amount of KOH used in mg was computed

Specific Gravity

Specific gravity bottle was taken, rinsed with distilled water, dried in the oven for 15 minutes, cooled, and then weighed (a). Herbal hair oil was filled in the same specific gravity bottle, closed, and weighed again (b). Subtracted the weight (b-a) from the weight of the sample per millilitre.

Density

Density of material is defined as its mass per unit volume. It is determined by following formula
 Density = mass of oil/volume of oil in Specific gravity bottle.

Stability Study

Prepared Poly herbal hair oil is examined for consistency. At intervals of 1, 2, 4, and 6, the poly herbal hair oil was set aside and observed.

RESULT AND DISCUSSION**Characterization and Identification of Raw Material**

Raw materials which are used in the preparation of polyherbal hair oil are characterized by organoleptic properties such as colour, odour, surface microscopy, and foreign matter. The obtained results for all raw materials mentioned in below table. The % moisture value indicates the moisture content is present in raw material which should around 10 %. The most important parameter for the quality of drugs (raw material) is ash value. The ash value is useful in determining authenticity and purity of drug and also these values are important in qualitative standards. A high ash value is indicative of contamination, substitution, adulteration, or carelessness in preparing the drug. The acid insoluble ash value is a measure of mineral content of a food product that is not soluble in acid. Sulphated ash value gives the amount of residual substances not volatilized from a sample when the sample is ignited in the presence of sulphuric acid [30]. Heavy metals detection test is one of the important measures to check for irregular levels of toxic or potentially harmful metals. Heavy metals such as lead, arsenic, cadmium, iron, cyanide, nickel, cobalt, silver, molybdenum are detected for test and they found negative in all included raw materials. Alcohol and water soluble extractive values where determine by using these raw material with solvent. These values are primarily useful for the determination of exhausted or adulterated drug. The less extractive value indicates addition of exhausted material, adulteration or incorrect processing during drying or storage or formulating [31]. pH values of all ingredients found in the range of 4 to 7 indicating suitability for human use. Brix value gives idea about dissolved solids in a liquid [32].

Qualitative preliminary phytoconstituents screening of the various extracts of ingredient showed the presence of various phytochemical. Alcoholic extract has been used for the detection of phytoconstituents. Alkaloids are important secondary metabolites in plants. They are known to possess therapeutic properties. Alkaloids can be used in the production of tonics, creams, lotions, face and hair masks, compresses for skin problems with numerous inflammations, and discoloration and anti aging products, as well as for reducing the formation of cellulitis. Alkaloids are present in all ingredients which used for herbal hair oil preparation except *Mothilvelchi*, *Dagadphool*, *Talisa patra* and *Karpur kachari* [32]. Flavonoids are broad-spectrum secondary metabolites

with cosmetics, pharmaceutical, nutraceutical, and medicinal applications. Flavonoids are considered as a major group of plant polyphenols having potential for cosmeceuticals and biomedical applications. They are present in food materials and plants. They are responsible for protection against pathogens, herbivores, and also ultraviolet radiation. The flavonoids have excellent hair growth and hair growth effects because they accelerate the growth of hair by shortening the period of transition from the resting phase to the growth phase of the hair cycle and we found in our investigation that all herbal ingredients of herbal hair oil containing flavonoids [33]. Saponins found in neem, *Dagadphool*, *Talisa patra*, *Karpur kachari*, *Mehandi*, *Brahmi* and *Aamla*. Saponins exhibit hair follicle strengthening, hair growth promotion, and

hair dyeing activities [34]. Carbohydrates are imperative for optimum hair health. They are used to provide energy to convert protein into the cells that form your hair [34]. Carbohydrate found in most of the raw materials of herbal hair oil. Proteins are found only in *Jatamamsi*, *Gulab*, *Mehandi*, *Brahmi* and *Maka (Bhringaraja)*. Proteins are used in protein treatments are used to coat your hair strands with keratin, adding strength to the bonds between your hair molecules [35]. Almost all raw materials in hair oil contain tannins and phenols except *Dagadphool*, *Tager* and *Karpurkachri*. All natural polyphenols, including tannins, present high antioxidant activity and could be used to reduce fading of natural hair color [36]. Half of raw materials contain steroids as a phytoconstituents. Steroids are useful for stimulating hair growth.

Table 2 (a): Characterization Parameters and Phytoconstituents Evaluation of all Ingredients^[42]

Sr.No.	Test	Ingredients				
		<i>Neem</i>	<i>Mothi velchi</i>	<i>Dagadphool</i>	<i>Talisapatra</i>	
1	Colour	Brown Coloured Powder	Dark brown colour	Slightly Black Colour	Brown Colour	
2	Odour	Bitter	Characteristic Odour	Characteristic odour	Pleasant odour	
3	Surface Microscopy	Smooth	Smooth	Smooth	Smooth	
4	Foreign Matter %	Nil.	Nil	Nil	Nil	
5	Moisture %	7.425%	6.65 %	5 %	9.075 %	
6	Total Ash %	6.1 %	3.8 %	1.8 %	2.7 %	
7	Acid insoluble Ash	0.043 %	0.11 %	0.004 %	0.113 %	
8	Sulphated Ash	0.043 %	0.016 %	0.002 %	0.001 %	
9	Heavy metal detection	Negative	Negative	Negative	Negative	
10	Alcohol soluble Extractive	27 %	23.5 %	19 %	20 %	
11	Water soluble Extractive	28.3 %	22.28 %	18 %	39.5 %	
12	Thin Layer Chromatography, RF value	Alcoholic Extract, Mobile Phase Chloroform: methanol: Water (10:10:3) <u>RF value = 0.37</u>	Alcoholic Extract Mobile Phase Chloroform : Ethyl acetate : Methanol: Formic Acid (46.1: 30.8: 15.4:7.7) <u>RF Value = 0.94, 0.80, 0.16</u>	Alcoholic Extract Mobile Phase Toluene: Methanol: Glacial Acetic Acid (7:4:3:1) <u>RF value = 0.11,0.28, 0.40</u>	Alcoholic Extract Mobile Phase Chloroform: Methanol (95:5) <u>RF value = 0.6, 0.7</u>	
13	Brix	0.7 %	0.6 %	4 %	5 %	
14	pH	5	6	5	4	
15	Qualitative Analysis					
	Constituents	Tests				
	Alkaloid	Dragendroff Test	Positive	Negative	Negative	Negative
		Meyers Test	Positive	Negative	Negative	Negative

Flavanoids	Alkaline reagent Test	Positive	Positive	Positive	Positive
Saponins	-	Positive	Negative	Positive	Positive
Carbohydrates	Fehlings Test	Negative	Positive	Positive	Negative
	Benedict's Test	Negative	Positive	Positive	Negative
Proeins	Biuret Test	Negative	Negative	Negative	Negative
	Ninhydrin Test	Negative	Negative	Negative	Negative
Tannins and Phenols	Ferric Chloride Test	Positive	Positive	Negative	Positive
	Lead Acetate Test	Positive	Positive	Negative	Positive
Steroids	Salkowski Test	Positive	Positive	Positive	Positive

Table 2 (b): Characterization parameters and phytoconstituents evaluation of all ingredients^[42]

S. No.	Test	Ingredients			
		<i>Jatamamsi</i>	<i>Chandan</i>	<i>Musta</i>	<i>Tagar</i>
1	Colour	Dark Brown	Light pale yellow colour	Slightly Brown in Colour	Brown black colour
2	Odour	Very strong aromatic	Odourless	Characteristic Odour	Characteristic odour
3	Surface Microscopy	Fibrous	Smooth	Reticulated and simple pitted vessels, Fiber like, Closely packed cells	Smooth
4	Foreign Matter %	Nil	Nil	Nil	Nil
5	Moisture %	2.4 %	3.075 %	8.65 %	7.6 %
6	Total Ash %	5.4 %	5.9 %	6 %	9.67 %
7	Acid insoluble Ash	0.18 %	0.005 %	0.005 %	0.009 %
8	Sulphated Ash	0.177 %	0.049 %	0.002 %	0.012 %
9	Heavy metal detection	Negative	Negative	Negative	Negative
10	Alcohol soluble Extractive	9.56 %	13.1 %	13.16 %	16.72 %
11	Water soluble Extractive	20 %	31.3 %	23.7 %	37.7 %
12	Thin Layer Chromatography, RF value	<u>Petroleum Ether Extract-</u> Mobile Phase – Toluene:Ethyl Acetate (73:7) Chloroform Extract Petroleum Ether: Diethyl ether (1:1) Methanol Extract Benzene: Ethyl Acetate (95:5) <u>RF Value</u> = 0.2, 3.66, 0.4, 0.55, 0.66, 0.75,	Methanol and Hexane Extraction Extract – Toluene: Ethyl acetate (93:7) <u>RF value</u> = 0.81	Alcoholic Extract, <u>Mobile Phase</u> Toluene: Ethyl acetate (9:1) <u>RF value</u> = 0.88, 0.44, 0.55, 0.73	Alcoholic Extract Ethyl Acetate : Methanol and Water (10:1.7:1.3) <u>RF value</u> = 0.34, 0.99

		0.833				
13	Brix	3 %	0.5 %	0.4 %	4 %	
14	pH	6	6	6	6	
15	Qualitative Analysis					
	Constituents	Tests				
	Alkaloid	Dragendroff Test	Positive	Positive	Positive	Positive
		Meyers Test	Positive	Positive	Positive	Positive
	Flavanoids	Alkaline reagent Test	Positive	Positive	Positive	Positive
	Saponins	-	Negative	Negative	Negative	Negative
	Carbohydrates	Fehlings Test	Positive	Positive	Positive	Negative
		Benedict's Test	Positive	Positive	Positive	Negative
	Proeins	Biuret Test	Positive	Negative	Negative	Negative
		Ninhydrin Test	Positive	Negative	Negative	Negative
	Tannins and Phenols	Ferric Chloride Test	Positive	Positive	Positive	Negative
Lead Acetate Test		Positive	Positive	Positive	Negative	
Steroids	Salkowski Test	Negative	Negative	Negative	Negative	

Table 2 (c): Characterization parameters and phytoconstituents evaluation of all ingredients^[42]

Sr. No.	Test	Ingredients			
		<i>Maka</i>	<i>Brahmi</i>	<i>Amla</i>	<i>Bhimsemi Kapoor</i>
1	Colour	Dark Green	Blackish colour	Slight brown colour	Colourless
2	Odour	Slightly aromatic	Pleasant odour	Astringent	Characteristic
3	Surface Microscopy	Smooth	Smooth	Smooth with six prominent lines, greenish when tender changes to yellow colour	Crystal
4	Foreign Matter %	Nil.	Nil	Nil	Nil
5	Moisture %	8.63 %	1.987 %	0.8 %	NA
6	Total Ash %	6.38 %	3.4 %	1.4 %	NA
7	Acid insoluble Ash	0.041 %	0.027 %	0.008 %	NA
8	Sulphated Ash	6 %	0.097 %	0.001 %	NA
9	Heavy metal detection	Negative	Negative	Negative	Negative
10	Alcohol soluble Extractive	34.1 %	12 %	41.04 %	1 %
11	Water soluble Extractive	13.1 %	31.2 %	52.6 %	0.8 %
12	Thin Layer Chromatography,	Alcoholic	Alcoholic Extract	Hydroalcoholi	Alcoholic

	RF value	Extract, <u>Mobile Phase</u> Toluene: Acetone: Formic Acid (11:6:1) RF value = 0.15, 0.338, 0.415, 0.461, 0.523, 0.538, 0.553, 0.569	<u>Mobile Phase</u> Chloroform : Methanol (18:2) RF Value = 0.6,0.7, 0.9 Toulene: Ethyl Acetate: Methanol: Formic acid (3:3:5:2.5:1) RF value 0.15, 0.338, 0.415, 0.4615, 0.523, 0.538, 0.553, 0.569	c Extract <u>Mobile Phase</u> Toluene: Ethyl Acetate: Formic Acid: Methanol (6:6:1.8:0.25) RF value = 0.64, 0.3, 0.5	Extract <u>Mobile Phase</u> Chloroform: Ethyl acetate (95:5) or (9:1) RF value = 0.4, 0.6	
13	Brix	4 %	3 %	30 %	0.1 %	
14	pH	7	7	3	4	
15	Qualitative Analysis					
	Constituents	Tests				
	Alkaloid	Dragendroff Test	Positive	Positive	Positive	NA
		Meyers Test	Positive	Positive	Positive	NA
	Flavanoids	Alkaline reagent Test	Positive	Positive	Positive	NA
	Saponins	-	Positive	Positive	Positive	NA
	Carbohydrates	Fehlings Test	Positive	Positive	Positive	NA
		Benedict's Test	Positive	Positive	Positive	NA
	Proeins	Biuret Test	Positive	Positive	Negative	NA
		Ninhydrin Test	Positive	Positive	Negative	NA
	Tannins and Phenols	Ferric Chloride Test	Positive	Positive	Positive	NA
		Lead Acetate Test	Positive	Positive	Positive	NA
Steroids	Salkowski Test	Positive	Positive	Negative	NA	

Table 2 (d): Characterization parameters and phytoconstituents evaluation of all ingredients^[42]

S.No.	Test	Ingredients		
		<i>Gulab</i>	<i>Karpurkachri</i>	<i>Mehandi</i>
1	Colour	Magenta on base and light near apex	Cream colour	Green colour
2	Odour	Aromatic	Pleasant odour	Pleasant odour
3	Surface Microscopy	Smooth	Smooth	Smooth
4	Foreign Matter %	Nil	Nil	Nil
5	Moisture %	4 %	3 %	4.075 %
6	Total Ash %	8.34 %	1.2 %	5.6 %
7	Acid insoluble Ash	2.213 %	0.007 %	0.02 %
8	Sulphated Ash	2.99 %	0.017 %	0.018 %
9	Heavy metal detection	Negative	Negative	Negative
10	Alcohol soluble Extractive	12.64 %	12.96 %	23 %

11	Water soluble Extractive	21.68 %	24.3 %	30 %	
12	Thin Layer Chromatography, RF value	Alcoholic Extract <u>Mobile Phase</u> Ethyl Acetate: Ethyl methyl Ketone: Formic Acid (5:3:1:1) RF not there 0.61, 0.26, 0.91	Aqueous and ethanolic extract <u>Mobile Phase</u> Hexane: Ethyl acetate (4:1) <u>RF value</u> : 0.12, 0.97	Alcoholic Extract, <u>Mobile Phase</u> Chloroform: Ethyl Acetate: Formic Acid (3:6:1) <u>RF value</u> = 0.28, 0.4, 0.52, 0.64, 0.81.	
13	Brix	4 %	4 %	4 %	
14	pH	5	5	6	
15	Qualitative Analysis				
	Constituents	Constituents			
	Alkaloid	Dragendroff Test	Positive	Positive	Positive
		Meyers Test	Positive	Positive	Positive
	Flavanoids	Alkaline reagent Test	Positive	Positive	Positive
	Saponins	-	Negative	Positive	Positive
	Carbohydrates	Fehlings Test	Positive	Positive	Negative
		Benedict's Test	Positive	Positive	Negative
	Proeins	Biuret Test	Positive	Negative	Positive
		Ninhydrin Test	Positive	Negative	Positive
	Tannins and Phenols	Ferric Chloride Test	Positive	Negative	Positive
		Lead Acetate Test	Positive	Negative	Positive
Steroids	Salkowski Test	Positive	Negative	Positive	

Table 2 (e): Characterization parameters and phytoconstituents evaluation of all ingredients^[42]

S. No.	Test	Ingredients	
		Til tail (Sesame oil)	Coconut oil
1	Colour	Slightly brown colour	Colourless
2	Odour	Odourless	Distinct aroma
3	Foreign Matter %	Nil	Nil
4	Adultration method of oil	No colour change in acidic layer	No colour change in acidic layer
4	Acid Value	12.2 %	2.24 %
5	Specific Gravity	0.941	0.798
7	Saponification Value	134.64	159.585

Evaluation of Polyherbal Hair Oil

Developed herbal hair oil was reddish brown to black in colour with a transparent appearance, and when applied, it was smooth and don't have any irritation. It does not get sediment as it is not containing any caking. The pH of the whole herbal hair oil was 5.6, which was suitable for hair, implying that the herbal hair oil was compatible with hair^[37]. Acid value represents the freshness and storage quality of oil. It is the measure of susceptibility and it's extending of decomposition. The acid value of the polyherbal hair

oil show 3.92; which shows that it is good for the oil stability (Table 3)^[38]. The viscosity of a fluid represents its resistance to deformation at a certain pace. Fluids have viscosity, which is equivalent to the colloquial term meaning "thickness." The frictional force between fluid layers that are contiguous is measured by a fluid's viscosity. When driven into a tube, a viscous fluid flows more quickly near its axis than it does near its walls. Stress (such as a pressure difference between the tube's two ends) can keep the flow going. Because of

this, there is friction between the fluid layers that are flowing in relation to one another. The compensatory force when a tube flows at a constant rate relies on the fluid's viscosity [39]. The smaller the mean molecular weight of triglycerides is, the shorter the average length of fatty acids and, inversely, the higher the

saponification value. In actual, the saponification value of polyherbal hair oil was found to be 106.59 (Table 3)^[40]. The saponification number indicates the type of fatty acid that is present in the fat. High saponification value shows fats produce soaps that are very soluble^[41].

Table 3: Evaluation test for Polyherbal hair oil

Parameters	Results
General Characterization	
Colour	Brown to black colour
Odour	Pleasant
Sensitivity	No irritation
Grittiness	Smooth
Sedimentation	No sedimentation
Physical Evaluation	
pH	5.6
Acid value	3.92
Viscosity	0.0146
Saponification Value	106.59
Specific gravity	0.99007
Density	1.0072

CONCLUSION

This Matruj SBA hair oil containing polyherbs hair oil is one of the most well recognized hair treatments. This is a FDA approved herbal product for hair treatments. This herbal hair oil not only hydrates the scalp, but they help repair dry scalp and hair. It offers a variety of vital nutrients needed to support the sebaceous glands' regular operation and encourages the growth of healthy hair. In addition to provide antidandruff activity, the product is packed with numerous essential nutrients. The usage of various herbal ingredients, each of which has unique benefits, in well-balanced combinations will have a positive impact on hair. The herbal extracts and ingredients selected for the creation of hair oil were said to have capabilities that, when combined, produced a synergistic effect that encouraged the growth of healthy, glossy hair. These properties included hair growth, relaxation, anti-dandruff, hair thickening, and hair fall control. It has been demonstrated that the mixture is safe to use on people. This polyherbal hair oil is made using several herbs (Table 1), which have been discussed above as ingredients. The various parameters like sensitivity test, viscosity, pH, irritation test, grittiness test, saponification value and acid value of herbal hair oil was evaluated (Table 3) and found that the finished product is within the limits with having minimal or no side effects.

REFERENCES

1. Begum SG, KAR Dr MS, Kota R, Reddy SK. Design and Evaluation of herbal hair oil formulations by using ethanolic extract of Ziziphus jujuba mill. leaves. *International Journal of Pharma and Bio Sciences*. 2017; 8(3). doi:10.22376/ijpbs.2017.8.3.p322-327
2. Mohamed Dawoud, Abdou R. Comparative study on clinical efficacy and safety of formulated and marketed myrrh extract in capsules. *Asian Journal of Pharmaceutical and Clinical Research*. 2019; 154-9. doi:10.22159/ajpcr.2020.v13i1.36277
3. Gerard G. Dumancas, Lakshmi C. Kasi Viswanath, Arnie R. de Leon, Sindhura Ramasahayam, Randall Maples, Rangika Hikkaduwa Koralege, Undugodage Don Nuwan Perera, Joel Langford, Aamina Shakir, Samuel Castles. *Health Benefits of Virgin Coconut Oil*. 2016 Nova Science Publishers, Inc. 1-25
4. Madnani N, Khan K. Hair cosmetics. *Indian Journal of Dermatology, Venereology, and Leprology*. 2013; 79(5): 654. doi:10.4103/0378-6323.116734
5. Neem. 1992; <https://nap.nationalacademies.org/catalog/1924/neem-a-tree-for-solving-global-problemsdoi:10.17226/1924>
6. Alzohairy MA. Therapeutics role of azadirachta indica (neem) and their active constituents in diseases prevention and treatment. *Evidence-Based Complementary and Alternative Medicine*. 2016; 2016: 1-11. doi:10.1155/2016/7382506
7. Satyal P, Dosoky NS, Kincer BL, Setzer WN. Chemical compositions and biological activities of amomum

- subulatum essential oils from Nepal. Natural Product Communications. 2012; 7(9). doi:10.1177/1934578x1200700935
8. Maqbul MS, Alhasel HM, Majid DH, Momen TN, Alhazmi HA, Jeddani FM, et al. Chemical Analysis (GC-FID-MS) and antimicrobial activity of *Parmotrema perlatum* essential oil against clinical specimens. *Oriental Journal of Chemistry*. 2019; 35(6): 1695–701. doi:10.13005/ojc/350610
9. Timothy CN, Nandhini JS, Varghese SS, Rajeshkumar S. *Abies webbiana* ethanolic extract based mouthwash and its antimicrobial and cytotoxic effect. *Journal of Pharmaceutical Research International*. 2021; 371–85. doi:10.9734/jpri/2021/v33i62b35625
10. Jha SV, Bhagwat AM, Pandita NS. Pharmacognostic and phytochemical studies on the rhizome of *Nardostachys jatamansi* DC. using different extracts. *Pharmacognosy Journal*. 2012;4(33):16–22. doi:10.5530/pj.2012.33.3
11. Ethnopharmacology of *Nardostachys jatamansi* DC. Herbalism, Phytochemistry and Ethnopharmacology. 2011;362–7. doi:10.1201/b10878-22
12. Sharifi-Rad J, Quispe C, Turgumbayeva A, Mertdinç Z, Tütüncü S, Aydar EF, et al. *santalum* genus: Phytochemical constituents, biological activities and health promoting-effects. *Zeitschrift für Naturforschung C*. 2022; 78(1–2): 9–25. doi:10.1515/znc-2022-0076
13. Ju Y, Xiao B. Chemical constituents of *Cyperus rotundus* L. and their inhibitory effects on uterine fibroids. *African Health Sciences*. 2017;16(4):1000. doi:10.4314/ahs.v16i4.16
14. Mohammed GF. Topical *Cyperus rotundus* oil. *Aesthetic Surgery Journal*. 2014; 34(2): 298–305. doi:10.1177/1090820x13518801
15. Patočka J, Jakl J. Biomedically relevant chemical constituents of *Valeriana officinalis*. *Journal of Applied Biomedicine*. 2010;8(1):11–8. doi:10.2478/v10136-009-0002-z
16. Wang Y, Zhao Y, Liu X, Li J, Zhang J, Liu D. Chemical constituents and pharmacological activities of medicinal plants from *Rosa* genus. *Chinese Herbal Medicines*. 2022; 14(2): 187–209. doi:10.1016/j.chmed.2022.01.005
17. Goel R, Joshi V, Gautam M, Ghildiyal S. Pharmacological evaluation of extracts of *Hedychium Spicatum* (ham-ex-smith) rhizome. *Ancient Science of Life*. 2012; 31(3): 117. doi:10.4103/0257-7941.103189
18. AL-SNAFI AE. A review on *Lawsonia inermis*: A potential medicinal plant. *International Journal of Current Pharmaceutical Research*. 2019; 1–13. doi:10.22159/ijcpr.2019v11i5.35695
19. Timalisina D, Devkota HP. *Eclipta prostrata* (L.) L. (Asteraceae): Ethnomedicinal uses, chemical constituents, and biological activities. *Biomolecules*. 2021; 11(11): 1738. doi:10.3390/biom11111738
20. Gray NE, Alcazar Magana A, Lak P, Wright KM, Quinn J, Stevens JF, et al. *Centella asiatica*: Phytochemistry and mechanisms of neuroprotection and cognitive enhancement. *Phytochemistry Reviews*. 2017; 17(1): 161–94. doi:10.1007/s11101-017-9528-y
21. Chahal AK, Chandan G, Kumar R, Chhillar AK, Saini AK, Saini RV. Bioactive constituents of *emblica officinalis* overcome oxidative stress in mammalian cells by inhibiting hyperoxidation of peroxiredoxins. *Journal of Food Biochemistry*. 2019; 44(2). doi:10.1111/jfbc.13115
22. Wei P, Zhao F, Wang Z, Wang Q, Chai X, Hou G, et al. *Sesame* (*sesamum indicum* L.): A comprehensive review of nutritional value, phytochemical composition, health benefits, development of food, and Industrial Applications. *Nutrients*. 2022; 14(19): 4079. doi:10.3390/nu14194079
23. Lima EBC, Sousa CNS, Meneses LN, Ximenes NC, Santos Júnior MA, Vasconcelos GS, et al. *Cocos nucifera* (L.) (Arecaceae): A phytochemical and pharmacological review. *Brazilian Journal of Medical and Biological Research*. 2015; 48(11): 953–64. doi:10.1590/1414-431x20154773
24. Chen HP, Yang K, You CX, Lei N, Sun RQ, Geng ZF, et al. Chemical constituents and insecticidal activities of the essential oil of *cinnamomum camphora* leaves against *lasioderma serricorne*. *Journal of Chemistry*. 2014; 2014: 1–5. doi:10.1155/2014/963729
25. Kuber BR, Lavanya Ch, Haritha ChN, Preethi S, Rosa G. Preparation and evaluation of Poly Herbal Hair Oil. *Journal of Drug Delivery and Therapeutics*. 2019; 9(1): 68–73. doi:10.22270/jddt.v9i1.2161
26. Safaeian L, Shatalebi M-A, Baradaran A, Alamdarian M. Preparation and evaluation of a hair wax containing propolis and *Eruca sativa* seed oil for hair growth. *Advanced Biomedical Research*. 2016; 5(1): 182. doi:10.4103/2277-9175.190985
27. JK P, MK S, PS S, BG C. In-vivo studies to determine hair growth potential of poly herbal medicated hair oil in female Swiss albino mice. *Research Journal of Pharmacy and Technology*. 2023; 1409–14. doi:10.52711/0974-360x.2023.00232
28. Srivastava AK. Acetaminophen-induced hepato- and nephrotoxicity and amelioration by Hydroalcoholic polyherbal formulation in experimental rodents. *International Journal of Green Pharmacy*. 2018; 12(04). doi:10.22377/ijgp.v12i04.2258
29. Kuber BR, Lavanya Ch, Haritha ChN, Preethi S, Rosa G. Preparation and evaluation of Poly Herbal Hair Oil. *Journal of Drug Delivery and Therapeutics*. 2019; 9(1):68–73. doi:10.22270/jddt.v9i1.2161
30. Chandel H, Pathak A, Tailang M. Standardization of some herbal antidiabetic drugs in polyherbal formulation. *Pharmacognosy Research*. 2011; 3(1): 49. doi:10.4103/0974-8490.79116
31. Singh K. Pharmacognostical aspects and phytochemical screening of powdered *rosa centifolia* petal. *Journal of Drug Delivery and Therapeutics*.

- 2022; 12(2-S): 155-63. doi:10.22270/jddt.v12i2-s.5298
32. Saraf S, Ajazuddin. Evaluation of physicochemical and phytochemical properties of Safoof-E-Sana, a Unani polyherbal formulation. *Pharmacognosy Research*. 2010; 2(5): 318. doi:10.4103/0976-4836.72332
33. Bassino E, Gasparri F, Munaron L. Protective role of nutritional plants containing flavonoids in hair follicle disruption: A Review. *International Journal of Molecular Sciences*. 2020; 21(2): 523. doi:10.3390/ijms21020523
34. Narayana Saibaba K. Next generation biosurfactants and their practical application in the Food Sector. *Applications of Next Generation Biosurfactants in the Food Sector*. 2023; 349-60. doi:10.1016/b978-0-12-824283-4.00011-3
35. Choi HI, Choi GI, Kim EK, Choi YJ, Sohn KC, Lee Y, et al. Hair greying is associated with active hair growth. *British Journal of Dermatology*. 2011; 165(6): 1183-9. doi:10.1111/j.1365-2133.2011.10625.x
36. Tiwari G, Tiwari R. Assessment of nutraceutical potential of herbs for promoting hair growth: Formulation considerations of herbal hair oil. *The Open Dermatology Journal*. 2021; 15(1): 78-83. doi:10.2174/1874372202115010078
37. K Shyam Sundar Rao. A study on the formulation and evaluation of herbal hair oils. *Journal of Pharmaceutical Negative Results*. 2023; 1972-8. doi:10.47750/pnr.2023.14.s02.236
38. Parthasarathy U, Nandakishore OP. Morphological characterisation of some important Indian garcinia species. *Dataset Papers in Science*. 2014; 2014: 1-4. doi:10.1155/2014/823705
39. K Shyam Sundar Rao. A study on the formulation and evaluation of herbal hair oils. *Journal of Pharmaceutical Negative Results*. 2023; 1972-8. doi:10.47750/pnr.2023.14.s02.236
40. Parthasarathy U, Nandakishore OP. Morphological characterisation of some important Indian garcinia species. *Dataset Papers in Science*. 2014; 2014: 1-4. doi:10.1155/2014/823705
41. T R. Formulation and evaluation of herbal hair gel for hair growth potential. *Journal of pharmacology & amp; clinical research*. 2017; 2(2). doi:10.19080/jpcr.2017.02.555581
42. *Ayurvedic Pharmacopoeia of India, Volume-I, Volume-II, Volume-III, Volume-IV Vaidyayoga rathnavali*; 2014

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