JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Formulation and Standardization of Hair Oil by Polyherb

[1]Viraj Mahajan*, [2]Prajwal Mudhale, [3] Dr. Nilesh Chougule

[1] Assistant Professor, [2]Student, [3]Principal

Department of Pharmacognosy, Ashokrao Mane Institute of Pharmacy, Ambap-416112, India

Abstract:

Herbal formulations always have attracted considerable attention because of its lesser and nil side effect compared with synthetic drugs. The concept of beauty and cosmetics are an ancient as mankind and civilization. Various herbal beauty products are widely used and continuously increasing in their demand by the common people because of lesser side effects and with better safety and security profile. Key herbs like Amla (Emblica officinalis), Banyan aerial roots (Ficus Benghalensis), Aloe vera, Bhringraj (Eclipta alba-L.) and Hibiscus (Hibiscus rosa-sinensis). Hair care products are used for cleansing, modifying the texture of hair, changing of the color, giving life to the stressed hair, providing nourishment to the hair and giving the healthy appearance to the hair.The study's primary objective was to treat hair issues such as dandruff, improve scalp blood circulation, and promote natural hair growth by maintaining the normal function of the sebaceous gland. Herbal oil is also used to prevent dandruff and split ends.The formulated herbal oil was evaluated by using various parameters such as Organoleptic properties, specific gravity, stability, viscosity, Acid value, pH etc. and the value obtained from it are found to be similar to that of the standard values like there is no sedimentation, no grittiness and shows satisfying organoleptic properties and the results were determined and are reported in this work.

Keywords: Herbal Formulation, Polyherbal Hair Oil, Standardization technique, Evaluation Test, Chemical Constituents.

Introduction:

Ayurveda is an ancient system of medicine that originated in India over 3,000 years ago. It is based on the belief that health and wellness depend on a delicate balance between the mind, body, and spirit. The primary goal of Ayurveda is to promote good health, rather than fight disease, although treatments may be geared toward specific health problems. Ayurveda, the traditional Indian medicinal system remains the most ancient yet living traditions with sound philosophical and experimental basis. It is a science of life with a holistic approach to health and personalized medicine. It is known to be a complete medical system that comprised physical, psychological, philosophical, ethical, and spiritual health.[1]

Key Concepts in Ayurveda:

Doshas: Ayurveda identifies three primary life forces or energies called doshas: Vata, Pitta, and Kapha. Each person has a unique combination of these doshas, which determines their physical and mental characteristics.

Vata: Associated with air and space. It governs movement, breathing, and circulation.

Pitta: Associated with fire and water. It governs digestion, metabolism, and energy production.

Kapha: Associated with earth and water. It governs growth, immunity, and fluid balance.

Prakriti: This refers to a person's unique constitution, determined by the balance of the doshas at the time of conception. It affects their tendencies towards certain health conditions and their overall physical and mental traits.

Agni: This refers to the digestive fire, crucial for digestion, absorption, and assimilation of food. Balanced agni leads to good health, while imbalanced agni can lead to disease.

Dhatus: These are the seven tissues of the body: plasma, blood, muscle, fat, bone, marrow, and reproductive tissue. They are nourished in a sequence from the food we eat.

Malas: These are the waste products of the body such as urine, feces, and sweat, which must be properly eliminated for health.

In Ayurveda, each cell is considered to be inherently an essential expression of pure intelligence hence called self-healing science.[2] In addition, to the self-healing concept, the use of herbal treatment is equally important in this Indian traditional system of medicine.

According to the World Health Organization, about 70–80% of the world populations rely on nonconventional medicines mainly of herbal sources in their healthcare.[3] Public interest for the treatment with complementary and alternative medicine is mainly due to increased side effects in synthetic drugs, lack of curative treatment for several chronic diseases, high cost of new drugs, microbial resistance, and emerging diseases, etc.[4]

Hair is one of the essential sections of the body and considered to be supporting structure of the integument along with sebaceous glands, sweat glands and nails. Hairs gain ground the overall appearance of the person and protect the scalp from ultraviolet light, cushion round the head and insulate the skull. There are 1,00,000 - 2,00,000 hairs are on head. Growth rate of scalp hair is between 0.27- 0.40mm per day.[5]Hair growth occurs in cycles consisting of three phases.

Anagen (growth phase): Most hair is growing at any given time. Each hair spends several years in this phase.
Catagen (transitional phase): Over a few weeks, hair growth slows and the hair follicle shrinks.
Telogen (resting phase): Over months, hair growth stops and the old hair detaches from the hair follicle. A new hair begins the growth phase, pushing the old hair out.

he cosmetics in general are external preparations and are meant to be applied to external parts of the body. Cosmetics may be applied to skin, hair and nails for the purpose of covering, colouring, softening, cleansing, nourishing, waving, setting, modification, preservation, removal and protection. Hair care products are used for cleansing, modifying the texture of hair, changing of the color, giving life to the stressed hair, providing nourishment to the hair and giving the healthy appearance to the hair. Herbal hair oils are used for curring disorders of hairs such as baldness, aggression of hair, discoloring of hair, hair falling, and dryness of hair etc.[6]

Herb used in hair oil:

1. Amla (Emblica Officinalis) :

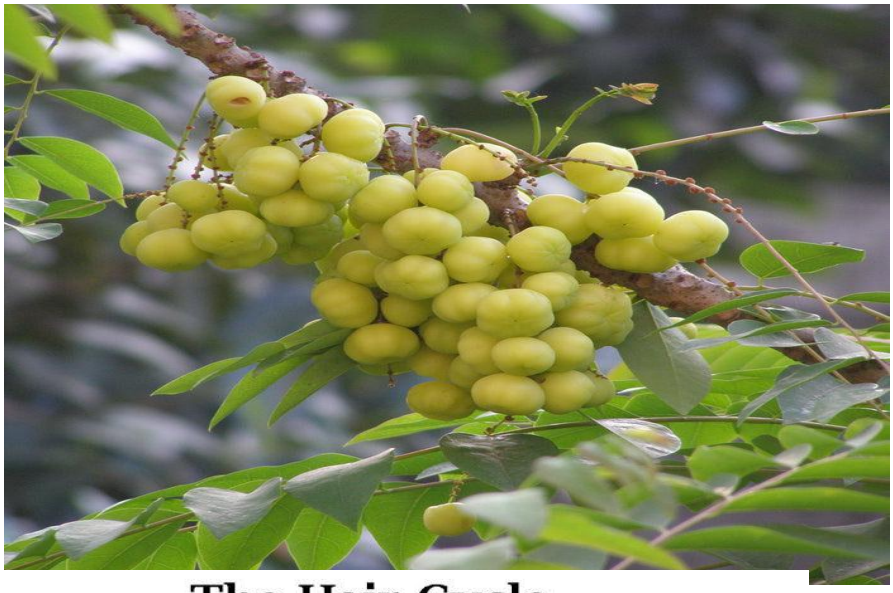

Fig. 1: Amla

Synonyme: Emblica, Indian goose berry, amlaki,

Biological Source: It consist of dried as well as fresh fruits of plant Emblica officinalis gaerth.

Family: "Euphorbiaceae"

Taxonomy:

Kingdome	Plantae
Division	Angiospermae
Class	Dicotyledonae
Order	Geraniales
Family	Euphorbiaceae
Genus	Emblica
Species	Officinalis geartn

Chemical Constituent: It also mainly contains vitamin-c. also present tannins. It contains Pectin & 75% Moisture, fat & phyllemblin. Also present phosphorus, iron & calcium.

Uses:

Amla helps enriching hair growth and hair pigmentation.

2. Banya areial roots(Ficus Benghalensis):

Fig. 2: Banyan areial roots

Synonyme: Bargad, Bor, Ber, Ala and Pedda mari

Biological Source: It consist of all arial parts of plant Ficus Benghalensis

Family: Moraceae

Taxonomy:

Kingdome	Plantae
Division	Tracheophyta
Class	Dicotyledons
Order	Rosales
Family	Moraceae
Genus	Ficus
Species	Ficus benghalensis

Chemical Constituent: Some of the active chemical constituents found in the plant include phytosterolin, ketones, flavonoids, flavonols, sterols, It contains oentacylic triterpenes, triterpenoids, furocoumarin, tiglic acid ester and other esters Active chemical composition, there are various medicinal uses of the banyan tree.

Uses:

a) Extract of the roots and the leaves are useful for curing various skin related problems.

b) For healthy hair, crushed prop roots paste is applied to hair.

3. Hibiscus flower

Fig. 3: Hibiscus flower

synonyms: China rose, Chinese hibiscus, Rose of China

Biological source: It is obtained from the fresh petals of Hibiscus Rosa Sinensis.
Family: Malvaceae.

Taxonomy:

Kingdome	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Malvales
Family	Malvaceae
Genus	Hibiscus
Species	rosasinensis

Chemical constituents:

It contains a variety of chemical constituents like Flavonoids, Anthocyanins, Mucilage, Citric acid, Malic acid, Phenolic Acid, Vitamin C (Ascorbic acid), Vitamin E (Tocopherol)
Uses: It helps to strengthen your hair roots, rich in flavonoids and amino acids, nourishes and thickens your hair.

4. Aloevera

Fig. 4: Aloevera

Synonyme: Aloe, Musabbar

Biological source: It is obtained from the dried or fresh latex of leaves of Aloevera.
Family: Liliaceae.

Taxonomy:

Kingdome	Plantae
Division	Magnoliophyta
Class	Liopsida
Order	Liliales
Family	Liliaceae
Genus	Aloe
Species	Aloe vera

Chemical constituents:

Enzymes, minerals, sugars, lignin, saponins, salicylic acids and amino acids, vitamins A (beta-carotene), C and E, and It also contains vitamin B12, folic acid, and choline

Uses: Aloe Vera pulp subsumes proteolytic enzymes which repairs dead skin cells on the scalp, good conditioner, imparts smooth, shiny, bolsters hair growth, reduces dandruff and itches on the scalp.

5. Maka (Bhringraj)

Fig. 5: Bhringraj

Synonyms: Eclipta alba, False Daisy, Karisilankanni, Kehraj.

Biological Source: Whole plant of Eclipta prostrata (L.) L.

Family: Asteraceae

Taxonomy:

Kingdome	Plantae
Division	Tracheophyta
Class	Magnoliopsida
Order	Asterales
Family	Asteraceae

Genus	Eclipta L.
Species	Eclipta alba (L.)

Chemical Constituents: Alkaloids (ecliptine, nicotine), flavonoids (luteolin, apigenin, wedelolactone), coumestans (wedelolactone, demethylwedelolactone), triterpenoids (eclalbasaponins, ursolic acid), and others.

Uses:

has anti-inflammatory and antifungal properties that help to reduce dandruff and It also acts on the dry scalp to reduce itching

EXPERIMENTAL METHODOLOGY:

Collection of Amla, Banyan areial root, Hibiscus, Aloevera and Maka powdersThe dried powder forms of Hibiscus, Aloevera, Banyan areial root, Amla, and Maka can be bought locally.

Extraction and Formulation Process:

Oil Infusions using Dried Plants

1. The dried herb was grinded to as fine a powder as possible.
2. The powdered herb was placed in a jar that could be capped tightly, and a fixed oil of your choice (Olive, Sesame, Almond, etc.) was added. Enough oil was used to completely wet the herb.
3. The mixture was stirred well.
4. The herb was allowed to settle, and then enough oil was added to cover the wet herb an additional ¼ inch. Some lighter herbs floated at first, so there was an additional ¼ inch below instead.
5. Many dried herbs absorbed this extra ¼ inch of oil. The mixture was checked 24 hours later, and since absorption had occurred, enough oil was added to re-establish the extra measure of oil.
6. The jar was capped tightly.
7. It was placed in a thick paper bag or box to keep light out, and it was placed in the sun for 7 to 10 days (a warm to hot infusion, depending on the weather).
8. The mixture was shaken or stirred every couple of hours each day or at least several times a day.
9. When the infusion was completed, the oil was strained from the herb and the remaining pulp was pressed.
10. The infusion was allowed to sit still indoors for several days, then it was decanted and the sediment was filtered out.

11. The mixture was bottled in glass containers, tightly capped, labeled, and stored in a cool dark place. [7].

Ingredient and their property or uses:

Sr. No.	Name of ingredients	Uses
1.	Amla	Antioxidant, antimicrobial, soothing
2.	Banyan Areial roots	Antioxidant, anti-inflammatory, antimicrobial
3.	Hibiscus	Promoting healthy, strong, and shiny hair
4.	Aloevera	Providing hydration, nourishment, and protection to the hair and scalp
5.	Mhaka	Strengthening hair roots, reducing dandruff, preventing hair fall, and promoting overall hair health
6.	Coconut oil	Base or carrier oil

Hair Oil Composition:

Sr. No.	Ingredients	Quantity
1.	Amla	5gm
2.	Banyan areial root	5gm
3.	Hibiscus	5gm
4.	Aloevera	5gm
5.	Maka	5gm
6.	Coconut oil	200 ml

Evalution Tests:

1. Identification of Organoleptic properties on different marketed herbal hair oil.
Colour: Brown

Odour: Characteristic

2. Viscosity
Viscosity is a measure of the resistance of a fluid to deformation under stress or tensional stress. The viscometer was thoroughly cleaned. The viscometer was mounted in a vertical position on a suitable stand. The dry viscometer was filled up to the g mark. The time required in seconds for the hair oil sample to flow from mark A to B was counted. This process was repeated three times. The densities of the liquids were determined. The viscosity was determined using Ostwald's viscometer.

$$\eta = K.t$$

$$= 0.008 \times 666$$

$$= 5.328 \text{ cP}$$

where:

η is the viscosity of the fluid,

K is a constant known as the viscometer constant,

t is the time taken for the fluid to flow through the viscometer.

3. Density

The density of a material is defined as its mass per unit volume, and it is determined by the following formula**.**

Density = mass of oil / volume of oil in Specific gravity bottle.

= 8.67 / 10

= 0.867 gm/ml

4. Specific gravity

To determine the weight of the sample per milliliter, a specific gravity bottle was used in the experiment. First, the bottle was thoroughly rinsed with distilled water to ensure no residual substances affected the measurements. It was then dried in an oven for 15 minutes and allowed to cool to room temperature before being capped. The bottle's weight was recorded as (a). Next, the same specific gravity bottle was filled with the sample and capped again. The bottle with the sample was weighed and recorded as (b). The weight of the sample per milliliter was determined by subtracting the initial weight (a) from the final weight (b), providing an accurate measure of the sample's density relative to its volume [8].

weight of sample in mililiter = b - a

= 26.10 -17. 43

= 8.67 gm

5. pH

The pH of various commercially marketed herbal hair oils was determined using a pH meter

Chemical Evaluation of Herbal Hair Oil

6. Acid value

Preparation of 0.1 molar solution involved weighing 0.56 g of KOH pellets and dissolving them in 100 mL of distilled water while stirring continuously. The resulting 0.1 molar KOH solution was then filled into the burette. For the preparation of the sample, 10 mL of oil was measured and dissolved in a mixture of 25 mL of ethanol and 25 mL of ether, which was shaken to ensure thorough mixing. To this mixture, 1 mL of phenolphthalein solution was added, and it was titrated with the 0.1 molar KOH solution. This process

likely aimed to determine the acidity or alkalinity of the sample based on the volume of KOH required to neutralize it, as indicated by the phenolphthalein indicator.

$$\text{Acid Value} = [56.1 \times V \times N]/w$$

$$= [56.1 \times 6 \times 0.1]/8.67$$

$$= [33.66]/8.67$$

$$= 3.88 \text{ mg KOH/g}$$

Where,

56.1 = molecular weight of KOH.

V = Volume of KOH used in titration in mL.

N = Normality.

w = Weight of hair oil sample in gram.

7. Saponification value

Accurately measured 1 mL of oil was placed into a 250 mL conical flask, followed by adding 10 mL of an ethanol:ether mixture in a ratio of 2:1. To this mixture, 25 mL of 0.5 N alcoholic KOH solution was added. The flask was left to stand for 30 minutes and then cooled. The cooled solution was titrated against 0.5 N HCl using phenolphthalein as an indicator. Similarly, a blank titration was performed without adding the oil sample. The amount of KOH used in milligrams was calculated based on the difference in volume of HCl required to neutralize the sample and the blank. This process helps in determining the amount of acidic or basic substances present in the oil sample. [9].

$$\text{Saponification value} = [N \times V \times 56.1]/w$$

$$= [0.5 \times 6 \times 56.1]/0.867$$

$$= 168.3/0.867$$

$$= 194.12 \text{ mg KOH/gm}$$

Where,

56.1 = molecular weight of KOH.

V = Volume of KOH used in titration in mL.

N = Normality.

w = Weight of hair oil sample in gram.

RESULT AND DISCUSSION:

In present study physicochemical evaluation was carried out of Polyherb oil. The various standard tests were performed and the test shows following results as below in Table,

Sr. No.	Parameters	Polyherb hair oil
1.	Colour	Brown
2.	Odour	Characteristic
3.	Viscosity	5.328 cP
4.	Density	0.867 gm/ml
5.	pH	5.1
6.	Specific gravity	8.67 gm
7.	Acid value	3.88 mg KOH/g
8.	Saponification value	194.12 mg KOH/gm

CONCLUSION:

This research successfully formulated and standardized a polyherbal hair oil using hibiscus, amla, banyan aerial root, aloe vera, and bhringraj, capitalizing on their traditional medicinal properties for hair care. Each herb was carefully selected and processed to optimize the retention of bioactive compounds such as flavonoids, vitamins, and minerals known to promote hair health. Phytochemical analysis confirmed the presence of these beneficial compounds, validating the therapeutic potential of the formulated hair oil.

Stability testing demonstrated the oil's robust performance under various storage conditions, indicating its suitability for commercial production and consumer use. Comparative evaluations with commercial hair oils revealed competitive advantages in terms of natural ingredient efficacy and overall hair care benefits. This study underscores the efficacy of polyherbal formulations in providing effective and sustainable solutions for hair care needs. It highlights the importance of integrating traditional herbal knowledge with modern scientific approaches to develop natural cosmetic products that meet consumer demands for safe and efficacious hair care solutions. Future research could focus on further optimizing extraction methods, exploring additional herbal combinations, and conducting clinical trials to validate these formulations' efficacy across diverse populations.

References:

1. Semwal DK, Mishra SP, Chauhan A, Semwal RB. Adverse health effects of tobacco and role of Ayurveda in their reduction. J Med Sci. 2015;15:139–46.

2. Lad V. Ayurveda, the Science of Self-Healing: A Practical Guide. 2nd ed. New Delhi: Lotus Press; 1987.

3. Jacqui W. Herbal products are often contaminated, study finds. BMJ. 2013;347:f6138.

4. Humber JM. The role of complementary and alternative medicine: Accommodating pluralism. J Am Med Assoc. 2002;288:1655–6.

5. Gupta P.K, Gupta S. K. Pharmaceutics and Technology: second edition., 2011; 121-27.

6. Sharma P. P. Cosmetics formulations, manufacturing and quality control: second edition.,2001; 311- 418.

7. James Green, "The Herbal Medicine Maker's Handbook", in 2000; 323-324.

8. Mohanta G.P, Manna P.K. Practical text book of Physical Pharmacy: second edition., 2009; 15-63.

9. Shah B.N, Nayak B. S. Experimental pharmacognosy: first edition., 2015; 214 – 215.