



## FORMULATION AND DEVELOPMENT OF HERBAL HAIROIL

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**Abstract:** In terms of humankind and culture, the idea of beauty and cosmetics is immortal. For their desire to look attractive and youthful, people employ a variety of beauty products that contain herbs. Herbal cosmetics are now-a-days widely used by the common people because of concept of fewer side effects and with a better safety and security profile. The present work was aimed to formulate herbal oil for general purpose (application in hairs) using various herbs. The formulated hair oil contains different herbal plants which are traditionally utilized for hair growth plants used are Triphala, Nirgundi, Liquorice, Aloe Vera, and coconut oil. The formulated herbal oil was evaluated and various parameters such as viscosity, specific gravity, and pH meter.

**Index Terms-** Herbal, Hair Oil, Herbs, Cosmetics, Evaluation.

### I. INTRODUCTION

Recently, the number of men and women who suffered from hair loss and hair thinning is increasing disorder, and the surge for discovering natural products with hair growth promoting potential is continuous. Hair loss is the common patient complaint and a source of significant psychological and physical distress. Many factors such as metabolism, hormones, heredity and side effects of antineoplastic and immunosuppressant drugs, have been negatively affecting on healthy hairs.

Herbal cosmetic has burgeoning demand and in the world market and are an inestimable gift of nature. There are wide spans of herbal product to satisfy beauty regime. The presence of number of phytochemicals and botanicals in the herbal product have dual stuff, one that they are used as cosmetics for body care and another that phytochemicals amend the biological function of human body naturally results in healthy skin hairs. Herbal hair oil not only moisturizes scalp but also converse dry scalp and dry hair condition. It bestows numerous essential nutrients required to maintain normal function of the sebaceous gland and promote natural hair growth.

The present work was aimed to formulate herbal oil for general purpose (application in hair has a several useful function in the animal world). It forms a protective cushion around the head & other delicate parts of the body. Hair oils are those embraces herbal drugs called as hair tonics. Hair oil are formulated to give the hair good shine & gloss. This is achieved by applying a thin continuous film of an oily material on the hair surface without causing stickiness. These are formulations use for cure the disorders such as baldness, greying of hairs, hair falling, and dryness of the hair. Many herbs are used in hair oil such as Kalonji, Aloe Vera, Liquorice, Alma, Ashwagandha, Nirgundi, Nagarmotha Curry leaf, Hibiscus, Shikhakhai, Coriander, Methi etc using various herbs. Various herbs play the different role in hair oil. Coconut oil nourishes the scalp and makes hair shiny. Tulsi is the cogent remedy for hair oil. Herbal hair oils basically extract of the medicinal plants in an oil base.

### II. LITERATURE SURVEY

#### 1. Neha. N. Jagatap (2021)

The aim of present study involves preparation of polyherbal hair oil using plant materials. The prepared polyherbal hair oil evaluated different parameters within the acceptable limits. Such as phytochemical screening, organoleptic characterization, specific gravity, pH, viscosity, acid value, saponification value, refractive index, and also stability study. Antimicrobial assay of the polyherbal hair oil was studied. It provides nutrition's of hair.

#### 2. Mahavir Chhajed, Pritesh Paliwal and Sumeet Dwivedi (2020)

The objective of study was to prepare polyherbal hair oil by using Amla, Bhringraj Jatamansi, Gunja, Bakuchi etc. The six different herbal hair oil formulations were prepared using different oil base either in single combination with different concentration. Further the prepared hair oil was evaluated for the hair growth stimulating activity.

#### 3. Erman Duman (2020)

The aim of this study was to investigate and compare the physicochemical properties and nutritional value of hen egg yolk. Egg yolk oil was extracted using solvents from double yolk.

#### 4. Gaurav Tiwari and Ruchi Tiwari (2021)

The primary goal of this study was to prepare and evaluate herbal hair oil made from fresh components of various plants. It contains a variety of vital nutrients that help the sebaceous gland to operate normally and promote natural hair growth.

#### 5. Harshali Wadekar, Rizwan Thara (2021)

The main aim of project was to formulate & evaluate the herbal hair oil to promote the hair growth and smoothness that is to require for beautifying and attraction of the hair. To supplement the hair with vital nutrients such as vitamin and mineral. To provide alternative source from hazardous chemicals.

#### 6. Amitkumar.K. Jadhav,Ulhas. S. Surwase, Aditya.V. Thengal (2019)

The present work was aimed to formulate herbal oil for applications in hair care using various herbs.

### III. DRUG PROFILE

#### 3.1 Nagarmotha: -



Figure 1

- **Biological name:** -Cyperus scariosus.
- **Synonyms:** -

English: Nut grass

Hindi: Nagarmotha

Marathi: Nagarmotha

Sanskrit: Bhadramusta.

- **Taxonomic classification**

Kingdom: Plantae

Clade: Tracheophytes

Order: Poales

Family: Cyperaceae

Genus: Cyperus

Species: C. scariosus.

- **Geographical source:** Commonly found in the India
- **Microscopical structure:** - Epidermis consists of typical parenchymatous cells with brownish pigments. Hypodermis consists of 2-3 layers of thick-walled cells. Cortex is composed of parenchymatous cells. Outer part is compact and inner part arencymatous with large intercellular spaces. Some cells in cortex region contain brownish oleoresinous matter and other starch grains. Vascular bundles are loosely distributed around the perimeter of a central pith. The xylem vessels possess ligneous secondary wall thickenings. The remainder of the rhizome vascular system. scattered in small bundles throughout the cortex. Pith is composed of parenchymatous cells containing starch grains and few filled with oleoresinous contents.
- **Macroscopic structure:** - Rhizomes are ovoid and tunicate in shape having size about 0.8-2.5cm, colour is brownish black externally and white internally. Surface of rhizome is rough with striations and odour is the fragrant. Taste is starchy.
- **Chemical Constituents:** - Flavonoids, Terpenoids, Cyproten, Gurjunene, Cyperol, Cyperene, Mustskone.
- **Uses:** -Nagarmotha controls the hair fall associated with dandruff. Regular use of nagarmothaimproves hair texture, adds shine and stimulate hair growth. It is effective on split ends. Stimulate the hair growth.

#### 3.2 Kalonji seeds



Figure 2

- **Biological name:** - Nigella sativa
- **Synonyms:** -  
English: black Cumin  
Hindi: Kalonji  
Marathi: Kalonji  
Sanskrit: Kalajaji
- **Taxonomic classification:** -  
Kingdom: Plantae  
Clade: Tracheophytes  
Order: Ranunculales  
Family: Ranunculaceae  
Genus: Nigella

Species: *N. sativa*

- **Geographical Source:** - Native to Eastern Europe and Western Asia, but naturalized over a much wider area, including parts of Europe, Northern Africa and East Myanmar.
- **Macroscopic Structure:** - Seeds are small dicotyledonous, trigonous, angular, rugulose-tubercular, 2-3 mm × 1-2mm, black externally and white inside, odour slightly aromatic and taste bitter.
- **Microscopic structure:** - Transverse section of the seed (plate 3) is preceded by the epidermis which is formed of 3 layers of thick lignified parenchyma cells, covered by cuticle, the external layer is extended into papillae (epidermal out growths). The epidermis is followed by two layers of hypodermis. The endodermis is formed of many layers of parenchyma cells, the outer most layer of which is filled with pigmented materials. In the central region of the section found the embryo which is very small.
- **Chemical Constituents:** - Alkaloids, Fatty acids, Proteins Saponin.
- **Uses:** - It nourishes the hair follicles so that they can grip the hair better which result in less hair fall.

### 3.3 Neem



Figure 3

- **Biological name:** - *Azadirachta indica*
- **Synonyms:**  
English: Neem  
Hindi: Neem  
Marathi: Kadulimba  
Sanskrit: Kakaphala
- **Taxonomic Classification**  
Kingdom: Plantae  
Clade: Tracheophytes  
Order: Sapindales  
Family: Meliaceae  
Genus: *Azadirachta*  
Species: *A. indica*
- **Geographical source:** - It is found in the India, Pakistan, Malaya, Indonesia, Japan, tropical region of the Australia and Africa. In India it is found in the Maharashtra, Tamil Nadu, Rajasthan, and MP.
- **Macroscopic Structure:** - Apex of neem leaves are ovate-lanceolate and base is unequal, colour of leaves is dark green, and texture is smooth. Its odor is typical and taste is bitter. • **Microscopic Structure:** - It have dorsiventral leaf, covering and glandular trichome are present on both the surface. Glandular trichomes are short unicellular stalk and bicellular or unicellular head. Stomata is Anomocytic.
- **Chemical Constituents:** - Nimbin, Nimbaene, Ascorbic acid, Nimbandiol.
- **Uses:** - promote hair growth, conditioned your scalp, temporarily seals hair follicle, minimize grays.

### 3.4 Hibiscus Flowers



Figure 4

- **Biological name:-** *Hibiscus rosa-sinensis*
- **Synonyms:** -  
English: Hibiscus

Hindi: Gudhhal

Marathi: Jaswandi

Sanskrit: Rudrapushpa

- **Taxonomic Classification**

Kingdom: Plantae

Clade: Rosids

Order: Malvales

Family: Malvaceae

Subfamily: Malvoideae

Tribe: Hibisceae

Genus: - *Hibiscus*

Species: - *Hibiscus syriacus* L.

- **Geographical Source:-** Found in India, China, Japan, and Malaysia.
- **Macroscopic structure:** - Hibiscus rosa-sinensis is a bushy, colour is red and taste is slightly sweet and mucilaginous. Calyx of hibiscus rosa-sinensis are polypetalous with 5 lobed and 5 epicalyxes, stamen is Monadelphous.
- **Microscopic structure:** - Pollen grains are spherical, spinuous, yellow in colour. Covering or glandular multicellular trichomes are present. Stone cells and oil globules are absent. Ovals are kidney shape embedded with numerous rosette crystals. Anomocytic stomata are present.
- **Chemical Constituents:** - Tannins, Anthraquinone, Quinine, Phenols, Flavonoids, Alkaloids, Proteins, Alkaloids and Carbohydrates.
- **Uses:-** Nourishes and thickens the hair, Emollient, brain tonic, growth of hair, blackening of hair, lustre of hair, laxative skin diseases.[2]

### 3.5 Onion seeds



Figure 5

- **Biological name:-** Allium cepa
- **Synonym:-**  
English: Onion seeds  
Hindi: Kalonji  
Marathi: Kanda biya  
Sanskrit: Krishnajira
- **Taxonomic Classification**  
Kingdom: plantae  
Clade: Tracheophytes  
Order: Monocots  
Family: - Amaryllidaceae  
Genus: - Allium  
Species: - A. cepa
- **Geographical Source:** - In India major onion producing states are Maharashtra, Madhya Pradesh, Gujarat, Rajasthan, Bihar, Uttar Pradesh, etc.
- **Macroscopic structure:** - Seeds are small dicotyledonous, trigonous, angular, rugulose-tubercular, 2-3 mm × 1-2mm, black externally and white inside, odour slightly aromatic and taste bitter.
- **Microscopic structure:** - The cells that form the peel are rectangular in shape, compactly arranged and without any intercellular spaces. Each cell has a distinct cell wall, a prominent nucleus and vacuole the cells form the outer layer of leaf known as epidermis.
- **Chemical Constituents:** - proteins, vitamins, minerals.
- **Uses:-** Onion seeds make the hair healthy and shiny. It has antifungal properties that keep infections away and also reduces the chance of scalp diseases which causes hair fall. It nourishes the hair and help to grow it.

### 3.6 Curry leaf



Figure 6

- **Biological name:-** Murraya Koenigii
- **Synonym**  
English: Curry Leaf  
Hindi: Karee leaf  
Marathi: Kadi patta  
Sanskrit: Alakavhaya
- **Taxonomic Classification**  
Kingdom: Plantae  
Clade: Tracheophytes  
Order: Sapindales  
Family: Rutaceae  
Genus: Murraya

Species: *M. Koenigii*

- **Geographical Source:** - It grows throughout in India and also in the Pakistan, Sri Lanka, China Hainan but widely cultivated in South East Asia and some parts of the United States and Australia.
- **Macroscopic structure:** -The shape of leaves of *Murraya koenigii* (L.) spreng as obliquely ovate or somewhat rhomboid with acuminate obtuse or acute apex, bipinnately compound with exstipulate in alternate arrangement. The petioles were of 20 to 30 cm in length. The leaf had reticulated venation and dentate margin with asymmetrical base.
- **Microscopic structure:** -The stomata were found distributed on abaxial surface while the adaxial surface was without stomata. The typeOf stomata was noted as anomocytic one. The uniseriate multicellular trichomes were observed on both surfaces, more frequent on upper surface of midrib portion. The wall of trichome was found ridged. The transverse section of leaf exposed a layer of epidermis composed of rectangular cells as outermost covering on both upper and lower layer. The upper epidermis was enveloped with deposition of cuticle.midrib portion; epidermis was followed by 1-4 layers of collenchymatous hypodermis in continuation with 2-5 layers of chlorenchyma cells filled with chlorophyll contents.
- **Chemical Constituents:** - Oxygenated monoterpenes such as theelemene, cadinenes, terpinene and pcymene.
- **Uses:**-Used to prevent hair fall and premature greying of hair.

### 3.7 Nirgundi



Figure. 7

- **Biological name:-** *Vitex negundo* Linn
- **Synonym: -**

English: Chast Tree  
Hindi: Shivari  
Marathi: Nirgudi  
Sanskrit: Nilpushpa

- **Taxonomic Classification: -**

Kingdom: Plantae  
Clade: Traceophytes  
Order: Lamiales  
Family: Verbenaceae  
Genus: *Vitex*  
Species: *V. negundo*.

- **Geographical Source:** -Found in the Afghanistan, Bangladesh, India and China, Cambodia, Indonesia, Malaysia, Myanmar, Nepal,Pakistan.
- **Macroscopic Structure:** -It is a large, aromatic shrub with quadrangular, densely whitish tomentose branchlets up to 4.5 m in height,sometimes a small, slender tree, found throughout the greater partof the India, ascending to an altitude of 1500m. In outer Himalayas barkthin, grey, leaves 3-5foliolate, leaflets lanceolate, entire or rarely crenate, terminal leaflets 5-10 cm x 1.6 x 3.2 cm, lateralleaflets smaller,all nearly glabrous above, white tomentose beneath, flowers bluish purple, small inpeduncled cymes, forming large, terminal, oftencompound pyramidal panicles, drupes globose,black when ripe, 5-6 mm diameter with enlarged calyx.
- **Chemical Constituents:**-flavonoids, alkaloids, terpenoids and vitamins.
- **Uses:** - Applying Nirgundi oil on the scalp helps prevent grey hairs due to its kapha balancing keshya (hair tonic) properties. It maintainsgood quality of hairs.

### 3.8. Methi



Figure 8

- **Biological name:-** *Trigonella foenum – graecum* L.
- **Synonyms: -**

English: Fenugreek  
Hindi: Methee  
Marathi: Methi  
Sanskrit: Methika

- **Taxonomic Classification:**

Kingdom: Plantae  
Clade: Tracheophytes  
Order: Fabales  
Family: Fabaceae  
Genus: Trigonella  
Species: T. foneumgraecum.

- **Geographical Source:**-It is cultivated world-wide as semiarid crop.
- **Macroscopic structure**– Fenugreek is an erect, smooth, herbaceous plant that can grow up to a height of 40-80 cm. The seeds are 6-8m long, oblong or square, green- olive or brownish in colour, with a very strong odour.
- **Chemical Constituents:**-flavonoids, saponins, iron and proteins.
- **Uses:-** useful in hair growth.

### 3.9 Coriander



Figure. 9

- **Biological name:** - Coriandrum sativum
- **Synonyms:**

English: Coriander

Hindi: Dhania.

Marathi: Dhane

Sanskrit: Dhanyaka

- **Taxonomic Classification**

Kingdom: Plantae  
Clade: Tracheophytes  
Order: Apiales  
Family: Apiaceae  
Genus: Coriandrum  
Species: C. sativum.

- **Geographical Source:** -The plant is widely cultivated in the India, Egypt, Eastern Europe, China, Russia and Bangladesh
- **Macroscopic structure:** The fruit/seeds are Cremocarp subspherical in shape, yellowish brown in colour. The size of the fruit is 3 to 4mm in diameter, with aromatic odour, and spicy, aromatic taste.
- **Microscopic structure:** The transverse section of coriander shows the presence of a dorsal surface and a commissural surface. The dorsal surface consists of two vittae and a carpophore. The dorsal surface has five primary ridges and four secondary ridges. The epicarp consists of a single row of small thick-walled cells with calcium oxalate crystals. The mesocarp has an outer loosely arranged tangentially elongated parenchyma cells and the middle layer consisting of sclerenchyma. The middle layer is again divided into; the outer region of sclerenchyma is represented by longitudinally running fibres, whereas the inner region has tangentially running fibres. The vascular bundles are present below the primary ridges. The inner layer has polygonal, irregularly arranged parenchyma cells. The endocarp has the parquetry arrangement. It has single-layered, yellowish cells, and the endosperm is thick, polygonal, colourless parenchyma with fixed oil and aleurone grains.
- **Chemical Constituents:**-Linalool, Terpinene, limonene, pinene.
- **Uses:** -Coriander seeds can help to prevent hair loss by invigorating the roots of the hair follicles. It helps in regrowth of the hairs.

### 3.10 Amla



Figure 10

- **Biological name:** -Phyllanthus embilica
- **Synonyms:**

English: Indian gooseberry

Hindi: Amla

Marathi: Avla

Sanskrit: Amalaka

- **Taxonomic Classification**

Kingdom: Plantae  
Clade: Tracheophytes  
Order: Malpighiales  
Family: Phyllanthaceae  
Genus: Phyllanthus  
Species: P.embilica

- **Geographical Source:** - It is a small or medium size trees found in India. It is also found in the SriLanka, Myanmar.
- **Macroscopic Structure:** The fruit is nearly spherical, light greenish yellow, quite smooth and hard on appearance with six vertical stripes or furrows. The fruit is up to 26mm (1.0) in diameter. Taste of Indian embolic is sour, bitter and astringent.
- **Microscopic structure:** Crushed rind of the fruit showed the masses of parenchymatous cells and thin pieces of epicarp or epidermal cells (surface view appeared rectangular and hexagonal. The cells were thick and the walls were lignified.
- **Chemical Constituents:** -Vitamin C, Tannins, Minerals.
- **Uses:** - Hair conditioner, treat scalp ailments, promote hair growth.

### 3.11 Aloe Vera



Figure 11

- **Biological name:-** Aloe Vera
- **Synonyms:**

English: Aloe Vera  
Hindi: Gwarpatha  
Marathi: Korphad  
Sanskrit: Ghrith Kumari

- **Taxonomical Classification**

Kingdom: Plantae  
Clade: Tracheophytes  
Order: Asparageles  
Family: Asphodelaceae  
Genus: Aloe  
Species: A. vere

- **Geographical Source:** - India, dry areas of Africa, Asia, Europe and America.
- **Macroscopic structure:** - Aloe Vera is a stem less or very short-stemmed plant growing to 60–100centimetres (24–39 inches) tall, spreading by offsets. The leaves are thick and fleshy, green to greygreen, with some varieties showing white flecks on their upper and lower stem surfaces. The margin of the leaf is serrated and has small white teeth. The flowers are produced in summer on a spike up to 90 cm (35 in) tall, each flower being pendulous, with a yellow tubular corolla 2–3 cm (3/4–1+1/4 in) long. Like other Aloe species, Aloe Vera forms arbuscular mycorrhiza, a symbiosis that allows the plant better access to mineral nutrients in soil.
- **Microscopic Structure:** - Each leaf is composed of 3 layers: An inner clear gel is made of glucomannans, amino acids, and lipids. The middle layer of latex which is bitter yellow sap and contains anthraquinones and glycosides. The outer thick layer of 15-20 cells called as rind which has protective function.
- **Chemical Constituents:** - Minerals, fatty acids and is rich in vitamin A, B12, C and E.
- **Uses:-** Strengthens hair, control greasy hair, help itchy scalp, protection from UV damage.

### 3.12 Coat Button



Figure 12

- **Biological name:** -Tridax procumbens
- **Synonyms:**

English: Coat button  
Hindi: Ghamra  
Marathi: Kambarmodi, tantani.  
Sanskrit: Jayanti veda

- **Taxonomic Classification**

Kingdom: Plantae

Clade: Tracheophytes

Order: Asterales

Family:-Asteraceae

Genus: - Tridax

Species: - T. procumbens

- **Geographical Source:** -Found in the India, America, and United States.
- **Macroscopic structure:** -Flowers were of two types, disc flowers, the corolla narrow campanulate, 8 mm long, bright yellow and hairy at the top, with spreading pappus of plumose hairs. Ray flowers 5 or 6, female, with narrow corolla tube and brown ligulate limb, white or pale yellow, flowering and fruiting throughout the year.
- **Microscopic Structure:** -Flower heads are terminal and axillary, 2×1cm, erect patently long peduncled, it has 5 lobes, it has densely whitelong hairy of 1.8-2.3mm.
- **Chemical Constituents:** - alkaloids, carotenoids, flavonoids, fumaric acids, sitosterol, saponins and tannins.
- **Uses:** - It is use as hair tonic and boost hair growth.

### 3.13 Coconut oil



Figure 13

- **Biological name:** - Cocos nucifera
- **Synonyms:** -

English: Coconut

Hindi: Nariyal

Marathi: Narala

Sanskrit: Narikelataila

- **Taxonomic Classification:**

Kingdom: Plantae

Clade: Tracheophytes

Order: Arecales

Family:-Arecaceae

Genus:-Cocos. L

Species:-C. nucifera

- **Geographical Source:** -India, Sri Lanka, Malaysia, South Africa, China and Indonesia.
- **Macroscopic structure:** - The fruit of Cocos nucifera is a drupe in which only the endocarp, the innermost layer of the pericarp, comprises a massive and solid lignified structure. A characteristic for the outer shape of the coconut endocarp is the three longitudinal ridges, which are formed during growth by the fusion of the three carpels. Three pores, the micropyles, are visible at the basal end between the ridges. During sprouting, the seedling grows out through one of these pores, which is in contrast to the other two pores-not lignified.
- **Microscopic structure:** -On mature fruits note that the endocarp consists of stone cells and vascular bundles, in which only the xylem elements are visible due to tissue rupture during growth and the presence of fungal hyphae. Additionally, it identified spiral and pitted tracheae as xylem elements.
- **Chemical Constituents:** -Proteins, Carbohydrate, Vitamins
- **Uses:** - Moisturizing your hair and reducing breakage. Protecting your hair from protein loss and damage when wet. Protecting your hair from environmental damage like wind, sun, and smoke.

### 3.14 Olive oil



Figure 14

- **Biological name:** - Olea europaea. L
- **Synonyms:**

English:olive

Hindi: Jaitoon

Marathi: Olive

Sanskrit:Jaitun

- **Taxonomic Classification**

Kingdom: Plantae



Clade: Tracheophytes

Order: Lamiales

Family: Oleaceae

Genus: Olea

Species: *O. eaeuropea*

- **Geographical Source:** -Found in California, Spain, Italy, France, South Africa, and India.
- **Macroscopic structure:** - The fruit is a small drupe 1–2.5 cm (0.39–0.98 in) long when ripe, thinner-fleshed and smaller in wild plant than in orchard cultivars. Olives are harvested in the green to purple stage. Canned black olives have often been artificially blackened (see below on processing) and may contain the chemical ferrous gluconate to improve the appearance.
- **Microscopic structure:** -The outermost layer of the endosperm (termed aleurone) was observed to be composed by longitudinal shaped cells that laid over the cells of the endosperm with a high content in lipids. At the green fruit stage, this layer was well developed. At the version stage, no significant changes were observed in the aleurone layer, with the exception of minor modifications in the shape. The cells set off slight penetrations in the vicinity of the endosperm cells. At the mature fruit stage, the aleurone layer seemed with a less-structured disposition compared to the previous stages. The lipid-rich cells forming the upper part of the endosperm appeared interweaved with those from the aleurone.
- **Chemical Constituents:** -Oleic acid, Linoleic acid, Palmitic acid.
- **Uses:** - The massage improves the circulation of blood in the scalp and nourishes the hair follicles.

### 3.15 Egg oil



Figure 15

- **Chemical Constituents:** - Fatty acids such as omega 3 fatty acid and omega 6 fatty acids.
- **Uses:** - egg oil can help reduce premature hair loss. EFA affects the blood circulation and cell growth, which help in regenerating the hair follicles.

## IV. RESEARCH METHODOLOGY

### Collection of Plant Material

- The plants herbs were collected from Sitabai Thite College of Pharmacy, Shirur campus.
- Sand particles were removed from sample, washed it thoroughly with Fresh water.
- The plant materials were dried under shadow.
- Then the dried plant materials were crushed, and used for extraction.

### ➤ Material:

The herbal hair oil was formulated by mixing all the herbs i.e. dried flowers of Hibiscus, dried curry leaves, coriander seeds, leaves of Nirgundi, Methi seeds, leaves of coat button, Amla powder, seeds of Kalonji, seeds of onion, stems of Nagarmotha, leaves of Neem, Ginseng powder, Pulp of Aloe Vera.[9]

The oils used for preparation of herbal hair oils were Coconut oil, Olive oil and egg oil extracted from egg yolk.

### □ Preparation of herbal hair oil –

#### □ Method:-

Herbal hair oil was prepared by Maceration processes. The entire prescribed herbs according to the formula were infused in the oil by double boiling method. These processes ensure the absorption of active therapeutic activities of ingredient for better result.

#### □ Procedure

1. All herbs were collected and dried under shadow.
2. Herbs were weighed by using weighing balance whereas, oils were measured through pipette.
3. Herbs were grinded in the mixer.
4. All the herbs were infused in the coconut oil for maceration process for 2-3 days.
5. As further the contents was boiled by using double boiling method, at this process all the active constituents of medicinal plant start to concentrate the oil.
6. Filtration was carried out through the muslin cloth.
7. To the filtrate coconut oil was added to make up the volume.
8. Prepared oil was placed in the amber colour bottle.

#### □ Preparation of Egg oil:-

#### □ Formula: -

1. Eggs – 2/3
2. Olive oil – 10ml

#### □ Procedure:-

1. Take 2-3 egg in the vessel and boiled it for 10 to 15 min in water.
2. Peel away the shells of the hard-boiled eggs.
3. Cut the egg to remove the hardened yolk.
4. Place the egg yolk on the griddle set to high heat and breaks the yolk into pieces with a slotted spatula.
5. Dump 5ml of olive oil over the yolk; continue the breaking of egg yolk pieces and flipping them over for 3-5 minutes.
6. Filter the content with help of muslin cloth.
7. Placed it in amber colour bottle.

### V. Evaluation Parameter

#### Evaluation Parameter for herbal hair oil

Prepared formulation of herbal hair oil was subjected to following evaluation parameter.

1. **Organoleptic Evaluation Parameter:** In organoleptic parameter like colour, odour, texture was carried out. Colour and texture were evaluated by visual and sensation respectively.
2. **Sensitivity test:** The prepared herbal hair oil was applied on 1 cm skin of hand and exposed to sunlight for 4-5 min.



Figure 16

#### 3. 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 M KOH solution was filled in the burette.

- Preparation of sample:

Measure 10 ml oil and dissolved in 50 mL of 1:1 ethanol and ether mixture and shaken vigorously. 1 mL of phenolphthalein solution was then added and titrated with 0.1 molar KOH solution.[9]



Figure 17

#### 4. Saponification value:

To accurately weighed 1mL of oil in a 250mL of conical flask, 10mL of ethanol: ether mixture (2: 1) was added. To this, 25mL of 0.5N alcoholic KOH was added and was kept undisturbed for 30 min. and the flask was cooled. This solution was titrated against 0.5 N HCl using phenolphthalein indicators. Similarly, the blank titration was performed without taking oil (sample). Amount of KOH in mg used was calculated using formula,[8]

Saponification Value =  $56.1(B-S) N/W$

Were,

B= Volume in mL of standard Hydrochloric acid required for the blank.

S= Volume in mL of standard Hydrochloric acid required for the sample.

N= Normality of standard Hydrochloric acid.

W= Weight of the oil taken in grams for the test.

5. **pH:** The pH of herbal hair oil was determined using pH meter.
6. **Viscosity:** The viscosity was determined using Ostwald's viscometer. The viscometer was mounted vertical position on a suitable stand. Water was filled in to the viscometer up to mark A. the time was counted for water to flow from mark A to mark B. Same procedure was repeated for the test liquid



Figure 18

7. **Specific gravity:** Specific gravity bottle was rinsed with distilled water, dried in hot air oven for 15 minutes, cooled, capped, weighed and was noted as (a). Now the same specific gravity bottle was filled with the sample, capped and again weighed (b). Weight of the sample per millilitre was determined by subtracting the weights (b-a).[5]



Figure 19

Table No. 1

Sr.no	Evaluation parameters	Formulated herbal hair oil
1	Colour	Yellowish Brown
2	Odour	Characteristics
3	Sensitivity test	Non sensitive
4	Irritation test	Non irritant
5	Ph	5-6
6	Texture	Smooth
7	Specific gravity	0.90
8	Viscosity	1.07
9	Acid value	3.56
10	Saponification value	187

## VI. Calculation:-

### 1. Specific Gravity:-

Weight of empty bottle (W1) – 14.45

Weight of the density bottle with water (W2) - 45.42

Weight of the density bottle with sample (W3) – 42.48

Mass of liquid sample (oil)= (W3-W1)= 42.48-14.45 =28.03

Mass of Distilled water (W2-W3)=45.42 -14.45 =30.9

Specific gravity = Mass of liquid /Mass of equal volume of water

Specific gravity =28.0

**Specific gravity of herbal hair oil =0.905 g/ml**

### 2. Viscosity

Viscosity of oil =  $q_2 t_2 \eta_1 / q_1 t_1$

$q_1$  = Density of water

$q_2$  = Density of oil

$\eta_1$  = Viscosity of water

$\eta_2$  = Viscosity of oil

$t_1$  = mean time of flow of water from A to B

$t_2$  = mean time of flow of oil from A to B

Viscosity of water = 0.997

Density of oil = 0.90g/ml

Density of water = 0.997g/ml

Mean time for water to flow from A to B = 21.48sec

Mean time for oil to flow from A to B = 25.45sec

Viscosity of oil =  $[0.90 \times 25.45 / 0.997 \times 21.48] \times 0.997$

=  $22.905 \times 0.997 / 21.265$

**Viscosity of oil = 1.07**

### 3. Saponification value=

Saponification Value =  $56.1 (B - S) N/W$

Saponification value =  $56.1 (19.5-11) 0.5/1.2$

**Saponification Value =187**

**VII. RESULTS AND DISCUSSION****Table No. 2**

Sr.no	Ingredient	Quantity of Formulation I	Quantity of Formulation II
1.	Nagarmotha	5%	5%
2.	Hibiscus	5%	5%
3.	Curry leaf	5%	5%
4.	Amla powder	3%	3%
5.	Kalonji seeds	2.5%	2.5%
6.	Onion seeds	2.5%	2.5%
7.	Methi seeds	2.5%	2.5%
8.	Coriander	2.5%	2.5%
9.	Coat button	2%	2%
10.	Neem	1%	1%
11.	Aloe Vera	2.5%	2.5%
12.	Nirgundi	1%	1%
13.	Coconut oil	10%	10%
14.	Olive oil	10%	10%
15.	Egg oil	-	2%

Herbal hair oil was prepared from mentioned ingredient and the various parameters like colour, odour, specific gravity (density), pH, viscosity, saponification value, Acid value and Irritation test of herbal hair oil were evaluated.

Herbal oil provides numerous essential nutrients required to maintain normal function of sebaceous glands and promotes natural hair growth. The utilization of herbal cosmetics enhanced many folds in personal hygiene and healthcare system. Hence, there is a tremendous clamour for the herbal cosmeceutical, individual care or personal health care industry, which is presently focusing and paying extra diligence on the development of herbal-based cosmetics. As nowadays, it is a fast developing segment with a mammoth scope of manifold boost in coming years. Use of bioactive ingredients in cosmetic formulations have valuable effect on body features and provide nutrients, which are essential for maintaining healthy and beautiful hairs. At last, it can be concluded that, this herbal hair oil formulation has significant quality.

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