



Formulation and evaluation of herbal hair oil

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Abstract:

The onion peel hair oil are hair care components implemented to the hair for the treatment of alopecia. The present study is about the formulation and evaluation of hair oil using various plant material. This hair oil was prepared for the hair growth. The formulated oil contains different herbal plant which are traditionally utilized for hair growth plants used are onion peel, coconut oil, curry leaves, neem, hibiscus, amla, fenugreek seed. The prepared onion peel hair oil evaluated different parameters such as pH, density, viscosity, organoleptic properties, acid value, saponification value, phytochemical screening. The primary irritation test is carried out. Henceforth the onion peel hair oil considered to treat alopecia and increasing hair growth, reduce hair loss and reduce the dandruff. The global shift toward natural and sustainable personal care products has increased interest in herbal formulations for hair management. This study aimed to formulate and evaluate a polyherbal hair oil incorporating plant-based ingredients with established pharmacological benefits. Key botanicals, including *Embllica officinalis*, *Eclipta Alba*, *Azadirachta indica*, and *Hibiscus rosa-sinensis*, were selected due to their reported properties such as hair growth promotion, antimicrobial activity, and scalp nourishment. The formulation was prepared using a suitable oil base, followed by standardized extraction and blending techniques.

Keywords: Alopecia, onion peel, Hair growth, Dandruff, Herbal plant, Neem, Phytochemical screening, pH, Viscosity.

Introduction:

Hair is an epidermal derivative which is one of the vital parts increasing the overall elegance of the body. Hair fall, dandruff, lice, split ends, grey hair are few problems involved with hair faced by human. To overcome these problems, human takes many precautionary measures by applying many cosmetics. In which Hair oil is one among them, used to solve almost all of these problems. Herbal cosmetics are in high demand due to the increasing interest of mankind towards them, because they are more effective with nil or less side effects, easily available ingredients etc. Herbal hair oil is more preferred and is used in many ailments of hair. They promote hair growth, improve elegance of hair and prevent hair fall. Hair oil not only promotes hair growth they also provide necessary moisture to the scalp rendering in beautiful hair. The Onion Peel Hair Oil Formulation are showing anti-hair fall property with some of other beneficial activities like Anti-dandruff Activity. It also improves blood circulation to the scalp and roots, reduce hair pigmentation, Anti-fungal activity, Anti-hairfall property, Hair growth activity, and treat alopecia.

2. Material:

A proper method has to be carried out while formulating the onion peel oil. Selection of active ingredients.

B. Collection of active ingredients.

C. Extraction method of Onion peel.

D. Formulation of onion peel oil.

E. Evaluation of onion peel oil.

F. Result.

1) Onion Peel:

Kingdom: Plantae

Order: Asparagale

Family: Amaryllidaceae

Genus: Allium

Species: Allium cepa

Botanical Name: Allium cepa

Biological source: The dry outer peel of the onion (Allium cepa)

Geographical Source: Onion are cultivated worldwide, particularly in temperate regions. Major producing countries including China, India and the United States

Chemical Constituents:

- ✓ Flavonoids (such as quercetin)
- ✓ Phenolic compounds (such as kaempferol)
- ✓ Saponins
- ✓ Alkaloids (e.g., alliin, which is a precursor of allicin)
- ✓ Essential oils
- ✓ Tannins
- ✓ Vitamins (vitamin C, vitamin B6) ✓ Minerals (such as potassium and sulfur)

Benefits for hair:

It prevents breakage and thinning of hair, regrowth of hair follicle, it prevents the premature greying of hair. It has antioxidant capacity which could be beneficial in treating problems.



Fig No.1 Onion Peel

2) Hibiscus:

Kingdom: plantae

Order: Malvales

Family: Malvaceae **Genus:** Hibiscus

Species: Hibiscus rosa-sinensis (Commonly Known as the Chinese hibiscus, through many sprcies of Hibiscus exist)

Botanical Name: Hibiscus rosa-sinersis (For the most commonly referenced species)

Biological Source: The flowers leaves and stems of the hibiscus plant are commonly used **Geographical**

Source: Hibiscus is native to tropical and subtropical regions of the world, particularly in Asia, Africa: and the Pacific Island

Chemical constituents: Hibiscus contains several bioactive compounds, including:

- ✓ Anthocyanins (which give the flower its color)
- ✓ Flavonoids
- ✓ Organic acids (such as citric acids)
- ✓ Polysaccharides
- ✓ Tannis
- ✓ Amino acids
- ✓ Vitamin

Benefits for hair:

- ✓ Hibiscus for hair is highly beneficial in treating oily scalp issues such as dandruff and itchiness due to its astringent properties.
- ✓ Hibiscus for hair has been traditionally used as a natural colour to mask grey hair.
- ✓ Hibiscus tea for hair growth.
- ✓ Hibiscus stop hair fall.



Fig No.2 Hibiscus

3) Fenugreek seed :

- **Kingdom:** Plantae
 - **Order:** Fabales
 - **Family:** Fabaceae
 - **Genus:** Trigonella
 - **Species:** Trigonella frenum-graecum
 - **Botanical Name:** Trigonalla frenum-graecum
 - **Biological Source:** The biological source of fenugreek is the dried seeds of the plant Trigonella foenum-graceum
- Chemical constituents:**

Fenugreek contains a variety of bioactive compounds, including

- ✓ Alkaloids (e.g., Trigonelline)
- ✓ Saponins (e.g., Diosgenin)
- ✓ Flavonoids (e.g., Quercetin)
- ✓ Coumarins
- ✓ Tannins
- ✓ Glycosides
- ✓ Essential oils (e.g., 4-hydroxyisoleucine)
- ✓ Proteins (e.g., Amino, lectins)
- ✓ acids (e.g., Lysine, Methionine)
- ✓ Fats (e.g., fatty acids like linoleic acids)

Benefits for hair:

Moisturizes hair and replenishes hair growth.



Fig No.03 Fenugreek Seeds

4) Neem:

- **Kingdom:** Plantae
- **Order:** Sapindales
- **Family:** Meliaceae
- **Genus:** Azadirachta
- **Species:** A.indica
- **Biological Source:** Neem consists of the fresh or dried leaves and seed oil of Azadirachta indica

J.Juss (Melia Indica or M. Azadirachta Linn.)

Chemical constituents:

The most important active constituents is azadirachtin and the others are

- ✓ nimbolinin
- ✓ nimbin
- ✓ nimbidin
- ✓ nimbidol
- ✓ sodium nimbinate
- ✓ gedunin, salnnin
- ✓ quercetin

Benefits for hair:

They possess Anti-fungal and Antibacterial properties, used for a dandruff-free Demane, cure scalp infection and dandruff, work wonders for itchy and flaky scalps.



Fig.No.4 Neem

5) Amla:

Kingdom: Plantae

Order: Geraniales

Family: Euphobicaceae

Genus: Emblica

Species: officinalis gearth

Geographical source: It is found in Maharastra, Karnataka, etc

Biological source: Emblica, Indian goose berry, amla. This consists of dried, as well as fresh fruits of the plant *Emblica officinalis* Gaerth (*Phyllanthus emblica* Linn.), belonging to

Chemical constituents:

- ✓ Gallic acids
- ✓ Ellagic acids
- ✓ Vitamin C
- ✓ Tannis
- ✓ Flavanoids
- ✓ Phenolic acids

Benefit for Hair:

- ✓ it reduce hair falls and prevent hair loss.
- ✓ It helps in treating hair problems.
- ✓ It helps in treating dandruff

**Fig.No.5 Alma****6) Curry Leaves****Kingdom:** planta**Order:** Sapindales**Family:** Rutaceous**Genus:** murraya. J. Koenig**Species:** M. koenigii.L**Synonym:** bergera loenigii**Botanical Name:** murraya koeniggi**Biological Source:** Leaves**Geographical source:** Native to indi, srilanka and Southeast Asia**Chemical constituents:**

- ✓ Alkaloids (e.g., murrayanine, koenimbine)
- ✓ Essential oils (e.g., terpinene, linalool, pinene)
- ✓ Triterpenoids
- ✓ Carbohydrates and proten

Benefits for hair:

- ✓ It is used to promote hair health.
- ✓ It potentially reducing hair fall.
- ✓ Improving scalp health.
- ✓ Due to antioxidant and Nutrients-rich property



Fig.No.6 Curry leaves

7) Oil Coconut:

- **Kingdom:** plantae
- **Order:** Arecales
- **Family:** Arecaceae / palmae
- **Genus:** Cocos
- **Species:** c. Nucifera
- **Biological Source:** Coconut oil derived from dried fruits of Cocos nucifera.
- **Geographical source:** It found in South India, west India.

Chemical Constituents: it contains

- ✓ Capric acid
- ✓ Lauric acids
- ✓ Caprylic acid
- ✓ Fatty acids
- ✓ Palmitic aids
- ✓ Stearic acids
- ✓ Oleic acids
- ✓ Linoleic

Benefits:

- ✓ Coconut oil acts as moisturizing the air and reducing breakage.
- ✓ Help to grow your hair.
- ✓ It protects the hair from environmental damage like sun, wind.
- ✓ Hair loss prevention.



Fig.No.7 Coconut Oil

8) Moringa Leaves

- **Order:** Brassicales
- **Family:** Moringaceae
- **Genus:** *Moringa oleifera*
- **Species:** *Moringa oleifera* Lam.
- **Biological Source:** Leaves
- **Geographical Source:** Native to India; widely cultivated in Asia and Africa

Chemical Constituents

- ✓ Vitamins (A, C, E)
 - ✓ Minerals (iron, calcium, potassium)
 - ✓ Flavonoids
 - ✓ Phenolic compounds
 - ✓ Amino acids
- ### Benefits for Hair
- ✓ Strengthens hair follicles
 - ✓ Promotes hair growth
 - ✓ Reduces hair fall
 - ✓ Nourishes scalp due to rich vitamin content



Fig.No.8 Moringa Leaves

9) Black Cumin (Black Jeera / Kalonji)

- **Kingdom:** Plantae
- **Order:** Ranunculales
- **Family:** Ranunculaceae
- **Genus:** *Nigella sativa*
- **Species:** *Nigella sativa* L.
- **Biological Source:** Seeds
- **Geographical Source:** Native to South and Southwest Asia

Chemical Constituents

- ✓ Thymoquinone
- ✓ Alkaloids
- ✓ Saponins
- ✓ Essential oils ✓ Fatty acids

Benefits for Hair

- ✓ helps reduce hair fall
- ✓ Promotes hair regrowth
- ✓ Prevents premature greying
- ✓ Improves scalp health



Fig.No.9 Black Cumin

10) Watermelon Seeds

- **Kingdom:** Plantae
- **Order:** Cucurbitales
- **Family:** Cucurbitaceae
- **Genus:** *Citrullus lanatus*
- **Species:** *Citrullus lanatus*
- **Biological Source:** Seeds
- **Geographical Source:** Cultivated worldwide, especially in tropical and subtropical regions

Chemical Constituents

- ✓ Protein
- ✓ Fatty acids (linoleic acid, oleic acid)
- ✓ Magnesium
- ✓ Zinc
- ✓ Vitamins (B-complex)

Benefits for Hair

- ✓ Strengthens hair roots
- ✓ Supports hair growth
- ✓ Adds shine to hair
- ✓ Helps maintain scalp health

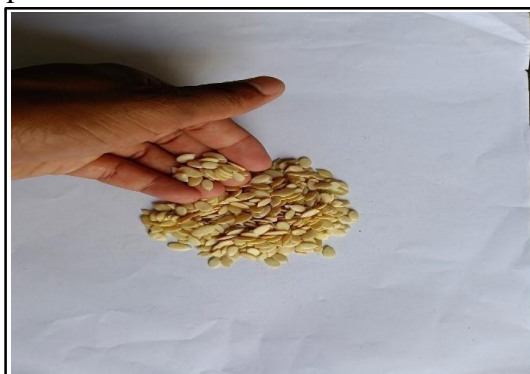


Fig.No.10 Watermelon Seeds

11) Pumpkin Seeds

- **Kingdom:** Plantae
- **Order:** Cucurbitales
- **Family:** Cucurbitaceae
- **Genus:** Cucurbita pepo
- **Species:** *Cucurbita pepo*
- **Biological Source:** Seeds
- **Geographical Source:** Widely cultivated across the world

Chemical Constituents

- ✓ Zinc
- ✓ Magnesium
- ✓ Fatty acids
- ✓ Phytosterols

Proteins

Benefits for

- ✓ Hair
- ✓ Promotes hair growth
- ✓ Helps reduce hair thinning
- ✓ Strengthens hair follicles
- ✓ Improves scalp circulation



Fig.No.11 Pumpkin Seeds

12) Vitamin E Capsule

Category: Fat-soluble vitamin supplement

Chemical Name: Tocopherol

Common Name: Vitamin E

Biological Source: Derived from vegetable oils such as sunflower oil, soybean oil, and wheat germ oil

Geographical Source: Widely available worldwide

Chemical Constituents

- ✓ Alpha-tocopherol (major active component)
- ✓ Beta-, gamma-, and delta-tocopherols
- ✓ Antioxidant compounds

Benefits for Hair

- ✓ Acts as a powerful antioxidant, reducing oxidative stress on scalp
- ✓ Promotes healthy hair growth
- ✓ Helps repair damaged hair follicles
- ✓ Improves blood circulation in the scalp
- ✓ Adds shine and softness to hair



Fig.No.12 Vitamin E Capsule

EXTRACTION METHOD:

Take dried 10 gm onion peel powder fill the filter paper pouch in the Soxhlet apparatus assembly and in the round bottom flask take 200 ml of ethanol they continue heating to the heating mantle to complete the cycle. After the complete cycle the extract is collected in flask. Remove round bottom flask and filter the extract using Whatman filter paper. After fi the pure extract of onion peel.



Fig No.13 SOXHLET APPARATU

Extraction of onion peel using hot water (Aqueous method):

Collected dried onion peel and wash them to removing impurities from the peels. Then dry the peels completely and after the drying take half liter of water in the beaker add the dried onion peels into the water. Then boil the water for 30 to 40 min. then the extract is filter out using filter paper then we get the pure extract of onion peel.



Fig No.14 Extraction

Table No.01 Formulation Table of Onion Peel Oil:-

	Ingredients	Formulation 1	Formulation 2
1	Onion peel (extract)	17 ml	17 ml
2	Coconut oil	90 ml	90 ml
3	Hibiscus	4 gm	4 gm
4	Curry leaves	4 gm	4 gm
5	Neem	4 gm	4 gm
6	Amla	4 gm	4 gm
7	Fenugreek seeds	4 gm	4 gm
8	Moringa Leaves	2.5gm	2.5gm
9	Black Cumin	2 gm	2 gm
10	Watermelon Seeds	4 gm	4 gm
11	Pumpkin seeds	2.5gm	2.5gm
12	Vitamin E capsule	1 Capsule	1 Capsule

Ingredient:

Fig.No.15 Ingredient

Preparation of onion peel Hair oil:-

The onion peel hair oil was prepared by collecting various plant material such as coconut oil, curry leaves, neem, fenugreek seeds, amla, hibiscus and onion peel extract. Where procured from natural sources. Accurately weigh all the dried and fresh herbs and are grind into fine form. Then directly boiled in the coconut oil for 40 to 50 min. Then oil is filtered through a muslin cloth. Make up the volume with coconut oil. The oil prepared using simple traditional method **Second procedure for oil:**

- 1) Accurately weigh the coconut oil and onion peel extract.
- 2) Add other ingredients curry leaves, neem, fenugreek seed, amla, hibiscus as it is (do not grind into fine form.)
- 3) Boil for the 40 to 50 min.
- 4) Filter the oil using muslin cloth.
- 5) Make up the volume with coconut oil.

Evaluation of onion peel hair oil:

The formulated hair oil was evaluated for parameters like organoleptic properties, pH, viscosity, acid value, saponification value, phytochemical screening. Calculation can show be:

1) 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 4.61n/w.

Where, n Number of ml of 0.1M KOH. W-Weight of oil.

Acid value- $\frac{4.061 \times 8.83 \times 0.1}{10}$

10 gm

= 4.4610

10

0.358 For 10 gm **2) Saponification value:**

2g of oil was accurately weighed and transferred into a 250ml iodine flask. 25ml of 0.5M alcoholic potassium hydroxide was added and boiled under reflux on a water bath for 30mins. Phenolphthalein was added as indicator and titrated against 0.5M HCl ('an' ml). Similarly blank was performed ('b' ml) without the sample.

Saponification Value: $\frac{26.05(b-a)}{w}$ Were, Blank Titration:

3) PH: pH

PH of herbal oil was detected using pH meter.

4) Viscosity:

Viscosity was determined using Ostwald's viscometer. Specific gravity of the prepared oil was

Determined using pycnometer or specific gravity bottle.

5) Density:

The oil density is defined as the mass per unit volume at a specified pressure and temperature. Density mass/volume **6) Stability:**

The stability hair oil was determined in various temperature condition like 25°C, 35°C, and 45°C for 15 to 30 days.

7) Organoleptic Parameters:

The organoleptic properties of formulated onion peel oil judged using color, odour, physical state, sedimentary and polarity.

Table No.2 Phytochemical Screening Image to Be Added

Alkaloids

Sr.no	Test	Observation	Inference
1	1ml oil + 5 drop of mayers reagent	Yellowish colour formed	Alkaloid present

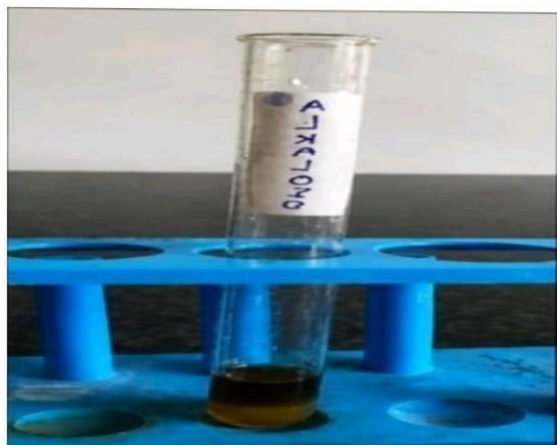


Fig No.16 test for alkaloids

Flavonoids

Sr.no	Test	Observation	Inference
1	2ml of oil + add 2-3 drops of NaOH	Deep yellowish color	Flavonoids present
2	Oil is mixed with few ml ethanol And conc. HCL	Pink color formed	Flavonoids present

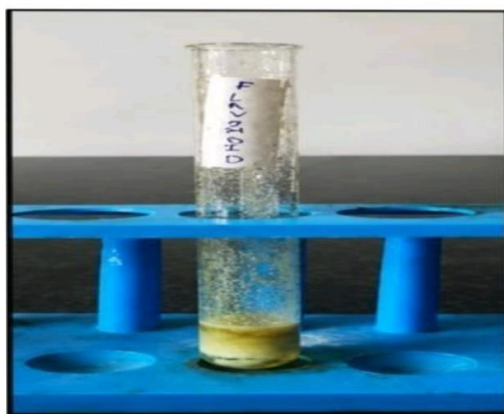


Fig.No17 test flavonoids

Glycosides

Sr.No.	Test	observation	Inference
1	Oil sample is mixed with few ml of H ₂ SO ₄	Red colour is developed	Glycosides present
2	2drops of oil sample is mixed with Mercury acetate	Separate the drug acetate and mercury	Indicates glycosides present

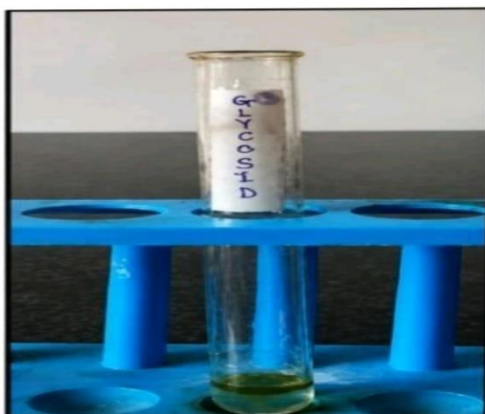


Fig.No.18 test for glycosides

Terpenoids

Sr no.	Test	Observation	Inference
1	2ml of oil is mixed with Chloroform and conc.H ₂ SO ₄	A reddish-brown colour layer was formed	Indicates presence of terpenoids

Saponins:

Sr no	Test	Observation	Inference
1	the oil sample is mixed with few ml of water	White colour foam is formed	Indicates presence of saponins

Table No.03-Organoleptic Properties

SR NO.	PARAMETER	OBSERVATION
1	colour	Greenish yellow
2	odour	characteristics
3	Physical state	Liquid with greasy in nature
4	sedimentation	No sedimentation
5	polarity	Non polar

Table No.4 Phytochemical Evaluation Parameter

NAME OF THE TEST	RESULT
Alkaloids	+ve
Flavonoids	+ve
Glycosides	+ve
Terpenoids	+ve
Saponins	-ve

Table No. 5 Evaluation Parameter

SR NO	PARAMETER	OBSERVATION
1	Colour	Greenish yellow
2	odour	Characteristic
3	Irritancy	Non -irritant
4	PH	5.5
5	Viscosity	0.25
6	Density	0.90gm/ml
7	Stability	Stable
8	Acid value	0.446
9	Saponification	114.20

Conclusion

The onion peel hair oil is one of the most well recognized for alopecia treatment. All the parameters showed that they are within the limits and as per the standards. Since all the ingredients added have many advantages, this oil will help in maintaining good growth of hair by promoting hair growth, turning greyhair to black, hair fall, protects from dandruff, provide Shining, results in good looking hair, Treating dry scalp, Increasing scalp blood circulation Herbal oil provides numerous essential nutrients required to maintain normal function of sebaceous glands and promotes natural hair growth. All these drugs not only show remarkable activity but are also devoid of potential side effects as compared to synthetic drugs. So, this polyherbal hair oil has cooling effect and thus relieves headaches and stress due to heavy workloads. It gets absorbed into the scalp with in a shorter period of time and thus acts as nourishment to hairs. It acts as natural hair nourisher, helping in hair growth by the reduction of hair fall. Coconut oil moisturizes hair. Amla and Eclipta Alba help in thickening and blackening of hair. Hibiscus helps in hair softening resulting in healthy growth. This hair oil also effectively used in treating headaches because of cooling effects and thus relieves from stress and strain conditions. It has shown good hair growth results without any allergic or side effects as it is completely constituted with naturally occurring crude drugs. At last it can be concluded that, this herbal hair oil formulation has significant quality.

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