

Evaluation and preparation of herbal hair oil with some fresh herbs.

Mr. Saurabh Rajkumar Jadhav. Mr. Nihar nitin katkar Mr. hrishikesh waman sawant Miss.ruchita arun bhoir. Miss.kadambari arun jogale.

Final year B.pharmacy of shreesaraswati institute of pharmacy, tondavali, kankavli, sindhudurg, Maharashtra.

Dr. babasaheb ambedkar technological university, lonere ,raigad, Maharashtra.

_____ Date Of Submission: 01-06-2021

Date Of Acceptance: 14-06-2021

ABSTRACT:-

Hair plays a vital role in the personality of human and for their care we use lots of cosmetic products. Herbal formulations always have activity and comparatively lesser or no side effects with synthetic. This study aimed at reviewing the importance of herbal hair oil for the treatment of common hair problems such as baldness, alopecia, hair fall, grey hair, dryness, and most common dandruff. Herbal hair oils were serving the purpose of hair treatment. Herbal hair oil not only moisturizes scalp but also reverses dry scalp and dry hair conditions. It provides numerous essential nutrients required to maintain normal functions of the sebaceous gland and promote natural hair growth. The present work was aimed to prepare and evaluate a polyherbal hair oil containing herbs. All these herbs have well known traditional potential in the treatment of hair care.

The herbal hair oil provides natural goodness to hair. Herbal hair oil contains vitamins & micro nutrients which acts as nutrition for your hair. Herbal hair oil which made from natural resources reinvigorate hair tissues. No matter, your shampoo & conditioner is made up of how many good ingredients but they can't deeply nourishes your scalp the way hair oil does. Regular use of herbal hair oil cure problem of premature grey hair. Herbal hair oil contains some rare fatty acids which makes them shinny & lustrous.



I. INTRODUCTION

The various herbal ingredients are used in the formulation are Amla, Banyan roots, Onion, Brahmi, Aloevera, Fenugreek seeds, Hibiscus, Curry leaves, Coconut oil. All ingredients provide essential nutrients such as vitamin, antioxidant, protein, terpenoids, and many essential oils to maintain normal function of sebaceous glands. Herbal hair oil not only moisturizers scalp but also converse dry scalp dry scalp and dry hair conditions. The formulated oil was evaluated for its organoleptic properties, acid value, saponification value, viscosity, pH etc. All the parameters were found to be good and within the standards.

It is ancient methodology because its origin was discovered from Holy Vedas& in Unani Scriptures. Hair oils those embraces herbal drugs are called as hair tonics. This herbal formulation always have temped considerable attention because of their good bustle & comparatively lesser or nil side effects with synthetic drug.

Amla is rich in vitamin C, tannins and minerals such as phosphorus, iron and calcium which provides nutrition to hair and also causes darkening of hair. Hibiscus consists of calcium,



phosphorus, iron, vitamin B1, riboflavin, niacin and vitamin C, used to stimulate thicker hair growth and prevents premature graving of hair. Brahmi contains alkaloids which enhance protein kinase activity. Fenugreek seeds (Methi) contains high protein fodder which supply required protein nutrition hair.Banayan to tree roots conataincarbohydrates, flavonoids, amino acids/ proteins, steroids, saponins and Tannins which stops the hair loss & hair breakage problem. Aloe vera is rich in glycosides, amino scids, resins, vitamins & minerals which gives hair look healthier, shinier & softer. Curry leaves contain composition of organic compounds & alkaloids, flavonoids, carbohydrates & sterol which mask hair & gives shinny appearance. Coconut oil is rich in triglycerides of saturated fatty acids which improves hair & scalp health. Mekaa (Mehendi) having 0.2-0.3% of alkaloids gives strengthen hairs. Onion contains quercertin, quercetin-3glycoside, fructose, flavonoids, sulphur, organosulfur compounds which nourishes the hair follicles & reduces breakage & thinning of hairs.



Bacopamonnieri ((brahmi): Synonyms:-

Bacopamonniera Hayata&Matsum. Bramiamonnieri (L.) Pennell



Biological source:-

Brahmiis a non-aromatic herb. The plant leaves are succulent, oblong, and 4–6 mm (0.16–0.24 in) thick. Leaves are arranged oppositely on the stem. The flowers are small, actinomorphic and white, with four to five petals. It can even grow in slightly salty conditions. Propagation is often achieved through cuttings.

Geographical source:-

Brahmi is existing for last long, creeping herb native to the wetlands of southern and Eastern India, Australia, Europe, Africa, Asia, and North and South America.

Toxonomic status:-	
Eukaryota	
Plantae	
Spermatophyte	
Angiospermae	
Dicotyledonae	
Scrophulariales	
Scrophulariaceae	
Bacopa	
Bacopamonnieri	

Toxonomic status:-

Chemical constituents:-

Brahmi is includes chemical compounds like dammarane -type tri-terpenoidsaponins called as bacosides, with jujubogenin pseudo-jujubogenin moieties as their aglycone units. Based on the structural similarity, 12 analogs from the family of Bacosides have been elucidated. In the recent past, bacopasides I-XII, a different class of saponins have been identified as an important constituent of the herbal extractApart from hersaponin, apigenin, D-mannitol, plantainoside В monnierasides I-III. and cucurbitacin; the alkaloids brahmine, herpestine and nicotine have also been classified in the



chemical constituents of Bacopamonniera. Bacoside A is the most studied and potent constituent of Bacopa, which is composed of bacoside A3,bacopasaponin C, bacopaside II and bacopaside X

Uses:-

Brahmi helps in treating temporary baldness by boosting hair growth in areas where hair has thinned out or reduced.

When you apply Brahmi to your hair on a regular basis, it reduces dryness, itchiness and flakiness. Thus, your hair starts to look healthy and nourished at all times.

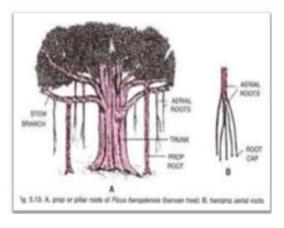
This small herb helps in reducing hair fall to a considerable amount and also boosts hair growth at the same time.

This herb helps in forming a protective layer around the hair fibres. It helps in ensuring the hair remains lustrous and glossy. Using Brahmi on your hair will make your hair look great and feel good Brahmi helps in ensuring the scalp is clean and free of any kind of scalp related issues like acree

of any kind of scalp related issues like acne, dandruff, etc. All of this, as it contains anti-oxidant properties.

Banyan tree root:-

• Synonyms Ficusindica L., Ficuskrishnae C. DC.



Geographical source:-

F. benghalensis is considered native to tropical Asia, from India through Myanmar, Thailand, southern China, and Malaysia. It is also cultivated and naturalized in many tropical regions of the world including western Africa, North America, the West Indies, Australia, the Middle East, and many islands in the Pacific ocean

Taxonomic status:-

Domain	Eukaryote
Kingdom	Plantae
Phylum	Spermatophyte
Subphylum	Angiospermae
Class	Dicotyledonae
Order	Urticales
Family	Moraceae
genus	Ficus
species	ficubenghalensis

Chemical constituents:-

Uses:-

Used to stop hair loss.

It's used with coconut oil gives a new strong hair. To stop the hair breakage problem.

• Hibiscus flowers

• Synonyms:

Hibiscus arnottiiGriff. ex Mast.; Hibiscus boryanus DC.; Hibiscus cooperiauct.; Hibiscus festalisSalisb., Hibiscus liliiflorusGriff. ex Mast., Hibiscus rosiflorus Stokes and Hibiscus storckii Seem.



Geographical source:

The probable origin of the plant was tropical Asia, It was cultivation in China, Japan and the Pacific islands for an equally long time, and it was generally thought that it was originated in South China. The plant with deep-red flowers is believed to have an Asian origin, hence the name rosa-



sinensis meaning 'rose of China. Now it is widely cultivated

Taxonomic status:	
Kingdom	Plantae
Subkingdom	Tracheobionta
Division	Magnoliophyta
Superdivision	Spermatophyta
Class	Magnoliopsida
Subclass	Dilleniidae
Order	Malvales
Family	Malvaceae
Genus	Hibiscus
Species	Hibiscus rosa- sinensis

• Chemical constituents:

Approximately 15%-30% of the plant is made up of plant acids, including citric, malic, tartaric acids and allo-hydroxycitric acid lactone—i.e. hibiscus acid, which is specific to this plant. Other chemical constituents are many, including alkaloids, Lascorbic acid, anthocyanin, Beta-carotene, Betasitosterol, citric acid, polysaccharides arabins and arabinogalactans, quercetin, gossypetin and small amounts of galactose, arabinose, glucose, xylose, mannose and rhamnose.

• Uses:

Stops hair loss Makes your hair look healthy and lustrous Prevents premature graying Thickens hair and add volume Used to treat dandruff Conditions against frizz, dryness, and breakage Prevents split ends

Aloe vera:



• Synonyms

Alovevera, genus Alove, succulent, cape aloe, burn plant, Aloe ferox.

Biological Source

Aloe is the dried juice collected by incision, from the bases of the leaves of various species of Aloe. Aloe perryi Baker, Aloe vera Linn or Aloe barbadensis Mil and Aloe ferox Miller. belonging to family Liliaceae.

Geographical Source

Aloes are indigenous to East and South Africa, but have been introduced into the West Indies and into tropical countries, and will even flourish in the countries bordering on the Mediterranean.

Toxonomic status:-

Kingdom	Plantae
Order	Asparagales
Division	Spermatophyte
Subdivision	Angiospermae
class	Monocotyledoneae
Family	Liliaceae
Genus	Aloe
species	Cape aloe

• Chemical constituents:

• The chief chemical constituent of aloe is aloeemodin ,which occurs in free form .

• It is present as a glycoside in the various species of aloe.

• The amount of emodin present in curacao aloe is two and half times less than the amount present in cape-aloes.

• They also composed of anthrones and anthranols, which may be present in free or combined form as glycoside.

• It also contain isobarbaloin and resins.

• The active resin present in aloes is also known as aloesin.

• Other chemical constituents are volatile oil to some extent which is responsible of its characteristic odour.

- coniceine (piperidine) is also present in some species of aloe.

• It also contain amino acids, enzymes, vitamins and minerals.

• Sugars and hormones and salicylic acid is also present in aloe.

• Steroids are also present in aloe.

Uses:-

Seborrheic dermatitis is the clinical term for the



condition we call dandruff. The symptoms of an itchy scalp and flaking skin under your hair can be treated with aloe vera.

Using aloe vera is a great way to get hair that looks healthier, shinier, and softer.

Deep clean oily hair. Aloevera cleanses the hair shaft efficiently, stripping off extra sebumTrusted Source (oil)

Strengthens and repairs hair strands .Aloe vera contains vitamins A, C, and E. All three of these vitamins contribute to cell turnover, promoting healthy cell growth and shiny hair.

The vitamin content in aloe vera might work to repair hair from sun damage.

• Amla powder



• Synonyms Emblica, Indian goose berry, amla.

• Biological Sources

This consists of dried, as well as fresh fruits of the plant Emblicaofficinalis Gaerth (Phyllanthusemblica Linn.), belonging to family Euphorbiaceae.

Geographical Source

It is a small- or medium-sized tree found in all deciduous forests of India. It is also found in Sri Lanka and Myanmar. The leaves are feathery with small oblong pinnately arranged leaflets. The tree is characteristic greenish-grey and with smooth bark.

Taxonomic status

Kingdom	Plantae
Division	Tracheophytes
Phylum	Angiosperms
Class	Eudicots

subclass	Rosids
Order	Malpighiales
Family	Phyllanthaceae
Genus	Phyllanthus
species	P.emblica

Chemical Constituents

It is highly nutritious and is an important dietary source of vitamin C, minerals, and amino acids. The edible fruit tissue contains protein concentration 3-fold and ascorbic acid concentration 160-fold compared to that of the apple. The fruit also contains considerably higher concentration of most minerals and amino acids than apples. The pulpy portion of fruit, dried and freed from the nuts contains: gallic acid 1.32%, tannin, sugar 36.10%; gum 13.75%; albumin 13.08%; crude cellulose 17.08%; mineral matter 4.12%; and moisture 3.83%. Tannins are the mixture of gallic acid, ellagic acid, and phyllembin. The alkaloidal constituents such as phyllantidine and phyllantine have also been reported in the fruits. An immature fruit contains indolacetic acid and four other auxins—a1, a3, a4, and a5 and two growth inhibitors R1 and R2.

Uses:-

Amla helps in maintaining proper health of hair. It makes them thick and soft.

Amla is a source of Vitamin-C whose deficiency can lead to hair loss and hair breakage.

Antioxidants prevent hair from premature aging and graying.

Amla oil contains essential fatty acids that help in promoting hair growth.

Head massage using amla oil increases blood circulation in the scalp thereby improving hair growth.

It even helps in strengthening hair follicles and acts as a conditioner. Dandruff and dry itchy scalp can be avoided by applying it.

• Curry leaf (Murrayakoenigii)





• Synonym

1. Synonym in Indian Language

Curry Leaf (English), Karepaku (Andhra Pradesh), Narasingha (Assam); Barsanga, Kartaphulli (Bengal); Gorenimb (Gujrat); MithaNeem (Himachal Pradesh); Kathnim, MithaNeem, (Karnataka); KurryPatta (Hindi); Karibeva Kariveppilei (Kerala); Gandhela, Gandla, Gani (Kumaon); Bhursanga (Orissa); Mahanimb (Sanskrit); Karivempu (Tamilnadu).

2. Synonym in other language

Burmese: Pindosine; Danish: Karrry bald; Dutch: Kerriebladeren; English: Curry leaves; French: Feuilles de cury; German: Curryblatter; Indonesian: Daunkari; Italian: Fogli de Cari; Spanish: Hoja.

Biological source

The species name commemorates the botanist Johann König. The genus Murray commemorates Swedish physician and botanist Johann Andreas Murray who died in 1791. Hence the botanical name of the curry leaves is Murrayakoenigii.

Geographical source

Murrayakoenigii originates from east and south part of India, Pakistan, Sri Lanka, China and Hainan but widely cultivated in South-East Asia and some parts of the United States and Australia. It grows throughout India up to the height of 1500 to 1655m from sea level and in the Andaman Islands. It is also available in other part of Asian region like in moist forests of 500-1600m height in Guangdong, Shainan, S Yunnan (Xishuangbanna), Bhutan, Laos, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam. Together with South Indian immigrants, curry leaves reached Malavsia.South Africa and Reunion Island.3.4 Out of the 14 global species that belong to the genus Murraya, only two are known to be found in India,

which is Murrayakoenigii (Spreng) and Murrayapaniculata (Jack). Can grow in full sun or light shade.Murrayakoenigii is distributed from south and East Asia to Australia.

• Taxonomic status

Kingdom	plantae
Sub-kingdom	Tracheobionta
Superdivision	Spermatophyte
Division	Magnoliophyta
Class	Magnoliospida
Subclass	Rosidae
Order	Sapidales
Family	Rutaceae
Genus	Murraya J. Koenig ex L
Species	Murrayakoenigii Spreng

Chemical constituent

Murrayakoenigii is very rich source of organic compounds with different chemical composition such as alkaloids, flavonoids carbohydrates, and sterol is present in the plant extract prepared in solvents such as petroleum ether, ethyl acetate, chloroform, ethanol and water.

Leaves

The fresh leaves of Murrayakoenigii contain 61.77-66.2% of moisture, 2.1-12.5% of protein, 14.6-18.97% of total sugar, 9.7-13.06% of total ash, 1.35-1.82% of acid insoluble ash, 1.35-1.82% of alcohol soluble extractive and water extractive value ranges between 27.33-33.45%.

• Uses

Curry leaves used as hair mask gives you bouncy and shiny hair.

The curry leaves contain antioxidant properties and iron that help strengthens the hair roots and shafts while curbing hair loss.

COCONUT OIL



Synonyms

Coconut oil, coconut butter, copra oil.



• Biological Source

Coconut oil is the oil expressed from the dried solid part of endosperm of coconut, Cocosnucifera L., belonging to family Palmae.

Geographical Source

Coconut is widely distributed throughout the world. It is largely cultivated in African and southeast Asian countries. Coconut also known as copra is a dietary as well as industrial product throughout the world. Large quantity of oil is produced in India, Sri Lanka Malaysia, South Africa, China, Indonesia, and other countries.

Characteristics

In temperate region below 23°C coconut oil is concrete oil. Coconut butter is a white or pearl white unctuous mass, odourless or with peculiar coconut odour and bland taste. Its melting point is 23°C to 26°C. It is soluble in two volumes of alcohol at 60°C but highly soluble in chloroform, ether and carbon disulphide. The oil readily becomes rancid on exposure to air. The coconut oil has the highest saponification value, 250–264 and the lowest iodine value, 7–10 among the vegetable oils in common use.

Chemical Composition

Coconut obtained from the hard, dried endocarp consists of a mixture of triglycerides of saturated fatty acids. The oil contains about 95% of saturated fatty acids with 8 and 10 carbon atoms. It shows the presence of caprylic acid, 2%; capric acid, 50–80%; lauric acid, 3%; and myristic acid about 1%.

- Uses
- Coconut oil is used to improve hair and scalp health.
- It helps to get rid of some types of fungal infections.
- Helps to heal or prevent dandruff and other fungi on the scalp.
- It's a natural saturated fat. The high fat content in it may help calm scalp irritation, flaking, and itching. The fat in coconut oil can also help seal in hair moisture.
- Coconut oil absorbs into hair strands better than mineral oil and other kinds of oils. This might help prevent hair breaking and split ends.
- Another review on the uses of coconut oil in India found that the oil may help reduce

protein loss in hair. This prevents dry, brittle, or breaking hair.

• The researchers note that in India, coconut oil is used both as a hair mask before showering and as a leave-in conditioner after showering.

Methi (Fenugreek seeds)



• Synonym

Trigonellafoenum-graecum, bird's foot, Greek hayseed, trigonella

Biological source

Methi consists of dried ripe seeds of trigonellafoenumgraecum

• Geographical source

The plant grows wild in northern India and is cultivated as a crop throughout India. It is also cultivated in southern and Eastern Europe, Pakistan, France, Morocco and Egypt.

Kingdom	Plantae
Phylum	Tracheophytes
Subphylum	Angiosperms
Class	Eudicots
Subclass	Rosids
Order	Fabales
Family	Fabaceae
Genus	Trigonella
Species	T. foenum-graecum

Toxonomic classification

• Chemical constituents

In a 100 g amount, fenugreek seeds provide 1,350 kilojoules (323 kcal) of food energy and contain 9% water, 58% carbohydrates, 23% protein and 6% fat, with calcium at 40% of the Daily Value (DV, table). Fenugreek seeds (per 100 g) are a rich source of protein (46% DV), dietary fiber, B vitamins, and dietary minerals, particularly manganese (59% DV) and iron (262% DV) (table).



- Uses
- Fenugreek or methi seeds are frequently used as a natural home remedy for thinning hair and other related conditions, such as dandruff or a dry, itchy scalp.
- Beauty publications and other popular media sources claim that they're the secret to growing thick, shiny hair.
- It is also a source of Nicotinic Acid, which encourages hair growth and Lecithin, which energizes hair follicles
- If you're suffering from a dry and itchy scalp an easy fenugreek seed paste combined with an egg yolk is the cure.
- Methi seeds can be used as hair conditioner.
- Onion



• Synonyms

Green onion, spring onion, scallion, Bermuda onion, Spanish onion, veg, Vidalia onion, shallot veggie ,vegetable.

Biological source

The onion (Allium cepa L., from Latin cepa "onion"), also known as the bulb onion or common onion, is a vegetable that is the most widely cultivated species of the genus Allium. The shallot is a botanical variety of the onion. Until 2010, the shallot was classified as a separate species.

• Geographical source

Many archaeologists, botanists, and food historians believe onions originated in central Asia. Other research suggests onions were first grown in Iran and West Pakistan.

•	Taxonomic classification	
	Kingdom	Plantae

Phylum	Tracheophytes
Subphylum	Angiosperms
Class	Monocots
Order	Asparagales
Family	Smaryllidaceae
Subfamily	alliioideae
genus	Allium
species	A.cepa

Chemical constituents

Onion has been found to contain quercetin, fructose, quercetin-3-glucoside, isorhamnetin-4-glucoside, xylose, galactose, glucose, mannose, organosulfur compounds, allylsulfides, flavonoids, flavenols, S-alk(en)yl cysteine sulfoxides, cycloalliin, selenium, thiosulfinates, and sulfur and seleno compounds.

• Uses

High sulphur content in onions help reduce breakage and thinning of hair. Sulphur is essential for regeneration of hair follicles.

Onion pulp can nourish your hair follicles and replenish the nutrients you have lost from your scalp.

The antibacterial and antifungal properties help to prevent and treat scalp infections. A healthier scalp will reduce hair loss.

Natural and powerful antioxidants, onions battle premature graying of hair.

When used regularly, onion paste or juice will not only nourish the hair, it will also create a natural shine for the hair. Over the period of time, this shine can become a permanent feature for your tresses.

Onion juice or pulp, being pungent and able to fight infections also help with lice treatment, and will prevent infestation in future.

Onion juice and oil have shown results of adding volume to hair when used regularly.

For treating dandruff, onion juice or pulp can be used on a weekly basis to clear the scalp.

The onion pulp improves blood circulation in the scalp, promoting hair growth and health.





• Evaluation test:

This prepared hair oil have to be evaluated by some parameters for its quality check up.

1. Sensitivity test :-

This test performed by 3 volunteers by applying on skin and kept it for 30 minutes under the sunlight.

Conclusion:-No irritation was observed.

2. PH :-

Ph was calculated by using ph meter

3. Viscosity:-

The viscosity was determined by Ostwald's viscometer

4. Specific gravity:-

Specific gravity bottle was performed by washing with distilled water dried it and took weight of empty bottle. (Weight -A)

Now same specific gravity bottle was filled with oil sample and took weight of it.(Weight- B)

Calculation- subtracting (weight B – weight A)/ mm.

Materials and methods:-

For formulation of herbal hair oil following all ingredients taken in given amount . precisely all the dried and fresh herbs such as hibiscus, onion, banyan tree root, methi, aloevera,brahmi,curryleaves and coconut oil were weighed and taken. Those all ingredients boiled for 2 hrs of continuous heating. And filtered through dry clean cloth. After collecting that small amount of curry leave water were added as a flavouring agent. and placed into the dry plastic bottle and labelled.

Ingredients	importance	
Coconut oil	Moisturizes dry hair	
Hibiscus	Controls premature graying	
Aloe Vera	Boosting scalp health	
Methi	Hair growth	
Curry leaves	Antidandruff and perfume	
Brahmi	Nourishment	
Onion	Strengthen hair	
Amala powder	Source of vit C	
Banyan tree root	Stop hair loss	

• Role Of herbs in herbal hair oil:-

• Ingredients used in formulation of herbal hair oil:-

Ingredients	Quantity(200ml)
Coconut oil	250ml
Hibiscus	25gn
Aloe Vera	20gn
Methi	10ga
Curry leaves	QS
Brahmi	lSgn
Onion	50gm
Amala powder	lûgn
Banyan tree root	llgn

Evaluation of nervar nan on		
Evaluation	Inference	
parameter		
Sensitivity test	Non sensitive	

Evaluation of herbal bair oil-

Sensitivity test	Non sensitive
Irritation test	Non irritant
pH	
grittiness	smooth
Colour	Brownish yellow
odour	aromatic
viscosity	0.93
Specific gravity	0.912 /25 ℃



	Herbal hair oil (200ml)		
	Ingredients:- Coconut oil;- Hibiscus;- Aloe Vera:- Methi:- Curry leaves:- Brahmi:- Onion:- Amala powder:- Banyan tree root:-	250ml 25gm 20gm 10gm Q.S 15gm 50gm 10gm 10gm	
	Direction:- closely packed and avoid from children's.		
	Uses:-use to strengthen the hairs and moisturize the scalp for continuous use.		
	Storage:- stored in dry and container.	d tightly closed	
•	Label:		



II. RESULT AND CONCLUSION:-

In day to day life women's faced some hair fall problems due to various reasons. it may be some mental stress or may be genetic or may be some hormonal imbalance. During this time hairs started falling and for this hairs needs some nutrients required to maintain normal function of all hair related parts like hair follicle hair root, sebaceous gland etc.

Nourishment of those parts helps to promote the strength to the hairs and it will grow easily. the use of herbal product now a days are very useful and less toxic .herbal cosmetics products are in trend now and because of it herbal pharmaceuticals product now trending in cosmetics. Many pharmaceutical industries are now moving in preparation of such kind of pharmaceuticals products and in future it has scope for longer time. Use of naturally occurring product enhances the productivity and quality of product by provide required amount of nutrients and having null side effects. Which is essential for maintain good and healthy life style. Every human being wanted long , shiny , strong hairs with no side effects and also in minimal price cost. Last but not least that we conclude that, this kind of herbal oil has good nutritional quality.

REFERENCES:-

- [1]. **Exploration of nutraceutical potential of herbal oil formulated from parasitic plant** Fozia Anjum¹, Shazia Anwer Bukhari Afr J Tradit Complement Altern Med 2013 Nov 2;11(1):78-86. eCollection 2014.
- [2]. Development and evaluation of polyherbal formulation for hair growth-promoting activity. Roy RK, Thakur M, Dixit VK.J Cosmet Dermatol. 2007 Jun;6(2):108-12.
- [3]. Kwon S. W., Hong S. S., Kim J. I., Ahn I. H. Antioxidant properties of heat-treated Hibiscus syriacus.Izvestiia Akademii Nauk. Seriia Biologicheskaia. 2003;1:20–21
- [4]. Preclinical and Clinical Studies Demonstrate That the Proprietary Herbal Extract DA-5512 Effectively Stimulates Hair Growth and Promotes Hair Health Jae Young Yu, ¹Biki Gupta, ²Evid Based Complement Alternat Med. 2017; 2017: 4395638. Published online 2017 Apr 30
- [5] Philpott M. P., Sanders D., Westgate G. E., Kealey T. Human hair growth in vitro: a model for the study of hair follicle biology. Journal of Dermatological Science. 1994;7(1):S55–S72. doi: 10.1016/0923-1811(94)90036-1.
- [6]. Effect of topical application of oils of amla, coconut, sarson and samsol on growth of rabbit's hair and sheep wool M S Akhtar, M A Jabbar J Pak Med Assoc 1981 Nov;31(11):246-9.



- [7]. Indian Pharmacopoeia, Government of India, Ministry of Health and Family Welfare, Published by, The Controller of Publication, Edition, Vol. II (1996).
- [8]. N. Sanju, N. Arun and K. K. Roop, Cosmetic Technology, 1st Edition, Birla Publications Pvt. Ltd, Delhi (2006) pp. 379-382.
- [9]. R. Shoba Rani Hiremath Textbook of Industrial Pharmacy, 1st Edition, Orient Longaman Pvt. Ltd., Hyderabad (2007) pp. 99-102