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## Trichophoric Ayurvedicophore

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### **Abstract:**

*The Ayurvedic Formulations Are Hair Growth Promoters. They Have Emerged As The Popular Life-Style Medications And Achieved Phenomenal Pharmacoeconomical Success. They Improve Looks, Self-Image, Life Style And Quality Of Life. Theoretically, Their Formulation Chemistry And Bioactions Were Elucidated For Designing The Hair Growth Promoting Ayurvedicophore.*

### **1.Introduction**

The natural remedies<sup>1-4</sup> for the hair growth promotion benefitted the management of life style drugs through advertising expertises. The botanical treatments have revolutionized the hair cosmetology. The prime objectives of the ayurvedic hair oil formulations are to stimulate blood flow to scalp and promote hair growth<sup>5-7</sup> because the loss of hair growth is due to:

- Poor blood circulation to scalp = hair loss
- Poor blood flow to hair follicles+ malnutrition = weak hair roots
- Weakness of hair roots and follicies = susceptible to DHT attack
- Hair follicle + DHT(Dihydrotestosterone) = shorten the anagen (growth cycle)= (Thin /Fragile hairs)
- Continous poor blood circulation to scalp =hair follicle dies

Enhancement of blood circulation makes sure that the hair follicle remains healthy, strong and stimulate hair follicles to enter into hair growth phase (anagen). All the ayurvedic hair formulations have almost common herbal constituents with minor variations , as listed below:

- |                |                       |
|----------------|-----------------------|
| • Amla         | Emblica officinalis   |
| • Bahera       | Terminalia Belerica   |
| • Bhringraj    | Eclipta alba          |
| • Harar /Harad | Terminalia chebula    |
| • Indrayan     | Citrullus celocynthis |
| • Mandukpurni  | Bacopa monniera       |
| • Mehndi       | Lawsonia inermis      |
| • Neem         | Azadirachta indica    |
| • Nagarmotha   | Cyperus rotundus      |
| • Nariyal tel  | Cocos nucifera        |
| • Pudina       | Mint                  |

The basic composition of ayurvedic hair oil has two components:

- Base Oils = coconut , olive and til oils are generally used. The coconut oil is most widely used because of the following suitable properties.
  - Long shelf life lasting upto two years due to its resilience to high temperature.
  - It stored in solid form at temperature lower than 24.5 C in order to extend shelf life. It is the most stable oil, slow to oxidize and resistant to rancidity.

- Hypolipidemic effect may be useful in preventing the hair loss due to arterial blockade and poor circulation to scalp.
- Special herbs acts as biovitalizers for promoting hair growth.

The formulation composition of three ayurvedic hair oils Navaratna, Keshvardan and Vatika hair oils was studied in order to derive an ayurvedic trichophore for hair growth agonism. The hair growth promoting biomedicinal roles are based on their herbal constituents.( Table 1)

Ayurvedic Hair Oils	Herbal Constituents	Claimed Bioactions
NAVRATAN HAIR OIL	Amla, Bhringraj, Hriber, Japapushpa, Kshirkokali, Kunch, Latakasturi, Mint Oil, Mandukparni, Pudina, Nagarmotha, Sailaja	Keeps the head cool,, antifatigue, enhance memory, prevent premature hair follicle, prevents hair shedding, muscle strengthening effect.
KESHVARDAN	Amla, Neem extract, bhringraj, Brahmi, Harad, Indrayaan Java Kusum, Katsavaiya, Kanver, Maal Kangni, Mehndi extract, Nariyal Oil	Hair revitalizer, prevents hair loss, enhance hair's strength by increasing thickness, promote optimal growth
VATIKA HAIR OIL	Amla, Bahera, Neem leaves, Brahmi, harar, Rosemary oil, lemon oil, Green almonds.	Unique natural formulation ensures deeper oil penetration, provides hair and scalp full nourishment, promote healthy hair

Table 1: Ayurvedic Hair Oils

Recently Emu oil<sup>8-9</sup> has strategically marketed as novel and promising hair care product because it, stimulates melanogenesis, blocks DHT, promotes hair regrowth, nourishes the scalp and hair and reverses the effects of ageing. This oil has three superior qualities restores a natural healthy shine, superb moisturizing properties and effective fortifying agent for limp dry hair to eliminate split ends. Bioactivity originates from food group status of Emu oil. It behaves as the structural and functional food. The essential lipids found in Emu oil prevent the formation of defective cell wall structures. Emu oil provides non-rigid polyunsaturated lipids, reducing the blood flow resistance in scalp arteries and capillaries.

The chief herbal chemicals of ayurvedic hair oils are listed in Table 2. They have ayurvedichophoric bioactions for hair growth

Botanical Sources	Herbal Chemicals
Bahera (Terminalia bellirica)	Anolignan-B, 9-Epichebulic acid, Ellagic acid, Gallic acid
Amla (Emblica officinalis)	Emblicanin-A, Emblicanin-B, Ellagic acid, Gallic acid, Quercetin, Lithium ortho-sillicate, vitamin C
Bhringraaj (Eclipta alba)	Desmethylwedeloactone
Harara (Terminalia chebula)	Ellagic acid, Gallic acid, Chebulagic acid
Indrayaan (Citrullus colocynthis)	Omega 3 – fatty acids
Neem (Azadirachta indica)	Nimibidin, Gedunin, Quercetin, Kaempferol, Nimbolide, Nimbil

Table 2: Herbal Chemicals

The trichophoric bioactions of natural herbs are enumerated further.

#### 1.1. Aloe Vera

Nourishes and moisturizes hair and keeps the scalp healthy due to its antibiotic like properties. It is useful for preventing hair loss and growth retardation by inflammatory and immunological disorders. Topical application improves blood circulation to hair follicles and promotes hair growth by virtue of having many hair friendly vitamins

### 1.2.Amla

It is an ayurvedic wonder and potent antioxidant. It has great reputation as the promoter of hair growth because it strengthens the hair roots and helps to maintain the natural health and thickness of hairs. It has anti-ageing and restorative efficacy due to Emblicanin A and B. Their concentrations have free radical scavenging enzymes (superoxides dismutase, catalase etc) which decrease lipid per-oxidation. The therapeutic antioxidant compounds are pyrogallol, Gallic and ellagic acids and quercetin. It has lithium ortho-silicate which is important for hair growth. Since hair is made of proteins, and connective tissues having a nutrient like silica which strengthens hair follicles. It is also a crucial element for growing adequate hairs.

### 1.3.Bahera

The antibacterial and antifungal activities protect hair roots from infectious degeneration. The antioxidative and rejuvenatory properties safeguard hair cells and follicles against free radical damage.

### 1.4.Bhringraj

It is highly beneficial to hairs. It imparts black coloration and shine / lusture to hairs. Ursolic and Oleanolic acids contribute such bioactions.

### 1.5.Brahmi / Mandukparni

They are known as brain tonics and responsible for hair growth by:

- Strengthen connective tissue and cells in the walls of blood vessels. It improves the circulation for good nutrients supply.
- Rejuvenatory, resuscitative and strength promoting activities.
- Strong anti-inflammatory.
- Alleviate erratic hormone levels.
- The net result is increased follicular size by large blood supply and reverse miniaturization of hair follicle by DHT.

### 1.6.Ginkgo Biloba

It has many bioactions for the treatment of hair loss. They are:

- DHT and Insulin resistance cause vascular insufficiency that results in progressive miniaturization of hair follicle. The systemic ingestion of ginkgo biloba increases and maintains microcapillary circulation, thus improving the hair growth.
- Bioflavonoids (e.g. Ginkgetin) are potent anti-inflammatory thus prevent hair loss due to inflammation of hair roots.
- Its anti-oxidant ability, reducing blood viscosity for increasing vascular dilation contribute to hair growth.

### 1.7.Green Almonds

Provide nourishment to the hair.

### 1.8.Henna

Coats the hairs and protects them from oxidation so that their natural color is maintained.

### 1.9.Lemon

Control sebum flow and helps in the prevention of dandruff. It makes hairs tangle free, thus promotes the manageability of hairs.

### 1.10.Nagarmotha

It contains sesquiterpenoids, Oleanolic acid derivatives and aliphatic alcohol-5-dodecen-1-yl acetate which have anti-microbial properties, for protecting weakness of hair roots caused by microbes.

### 1.11.Neem

Leaves of Neem have structurally diverse natural products, terpenoids, sterols, flavonoids, glycerides of saturated and unsaturated fatty acids. Their chemical constituents contribute the following hair growth promoting bioactivities.

- Nimbin - anti-inflammatory, anti-fungal
- Nimbidin - anti-bacterial, anti-fungal
- Gedunin - vasodilator, anti-fungal
- Quercetin - anti-oxidant, anti-inflammatory, anti-bacterial

### 1.12.Rosemary Oil

The high terpenoidal content (Linalool, limonene, borneol etc.) have benefitting qualities for hair growth. The oil is circulatory stimulant, restorative, cytophylactic and dandruff preventor of hair roots being antimicrobial and parasiticide.

### 1.13.Shikakai

It is natural cleaner for keeping hairs free from various microbial invasions.

Recently plants extracts have initiated novel formulation design<sup>34-36</sup> for preventing hair falling and keeping safety over a long period. The formulation is composed of three components:

- Plant extract
- Cytotonic agent (blood circulation promoter)
- Bioactive promoters (blood circulation accelator, anti-microbial, anti-inflammatory, anti-serorrheic, humectants, hair follicle growth activator).
- The plant extracts used are Laminaria angustata, Nettle roots, German, Palmetto, dried roots of Sophora flavescens, roots of Astragalus huantchy and Geranium nepalense. The cytotonic agents frequently employed are pantothenic acid, ginseng extracts and its derivatives, biotin and mononitroguaiolon. The extract of Swertia japonica, vitamin E, capsicum tincture (benzylnicotinate) and garlic extract are applied as blood circulation accelator or promoter. Cepharanthine, phthalides, benzalkonium chloride or salicylic acid act as anti-microbial, anti-inflammatory or keratolytic agents. The mode of action of such products involves potent inhibitory action of type-II-5-alpha reductase isoenzyme and enhance the levels of growth factors in dermal papilla.e.g.KGF,IGF-1

## 2. Discussion And Result

The formulation of ayurvedic hair oils has growth promoting activities. The majority of hair oils have terpenoids, fatty acids, anti-oxidants, immunostimulants, anti-inflammatory and hair friendly vitamin B complex types of natural products. The hair growth promoting activity is the synergistic action of total chemical constituents of the oil. It is combined effect of both, their active and inactive compounds. The active lipotropic compounds have bioactivities and inactive compounds may modify physicochemical properties. Lipotropic chemical structures of oils are absorbed, interact with lipid parts of cell membrane and modify the activities of K<sup>+</sup>, Ca<sup>++</sup> ion channels. They also affect chemical messages and impulses of neurotransmitters leading to relaxation, analgesic and anesthetic types of bioactions.

Ayurvedic product is a herbal mixture, therefore specific mode of actions cannot be assigned to particular chemical structures. It is suggested that basis of an ayurvedic trichophore should have bioactivities rather than specific chemical structures. Hair growth promoting effect of the combined bioactivities, rendered by various herbal chemicals are the basis of ayurvedic design. It is not a pharmacophore in which specific chemicals moieties are essential for the receptor binding or activations, therefore only trichophoric bioactivities are desirable for ayurvedic agonism, free from the antagonism of the stipulated therapeutic objectives. It is the focal point of the ayurvedic designing. Hair growth requires the stimulatory bioactions during anagen phase. We applied this concept to trichophoric ayurvedicophore, which has following characteristics:

- Biological synergism of diverse trichophoric activities
- Lacks pathogenic inductions
- Chemical specificity of bioaction is irrelevant.
- Biological effectiveness and therapeutic specificity are most relevant.

The proposed hair growth promoting potential of ayurvedicophore should be comprised of five bio-vitalizing or revitalizing actions:

- Enhance mitosis in follicular and dermal papilla cells
- Enhance nutrients supply by enhancing the blood circulation to scalp, so hair follicles remain healthy and not susceptible to DHT attack.
- Potentiate hormonal tropism for hair follicles and roots.
- Prevent microbial and viral inflammations of hair follicles and roots.
- Has antioxidant efficacy to dilute the age related balding.

The consumers desire to feel better and look good, therefore radiance for gorgeous look requires superior quality of natural hair care products. This encourages to innovate a strategy for hair growth promoters of better potency and tissue selectivity by synergizing hair-growth mechanisms.

## 3. Conclusion

The ayurvedic therapeutics has gained respectful status in recent years. The natural hair cosmetics have great psychosocial esteem for modern life style drugs. The most desirable formulation for hair growth promotion is combinatorial medication of hair growth agonists, biovitalizers with rejuvenating efficacy and antioxidant, anti-inflammatory immunostimulatory activities. This study pioneered the concept of ayurvedicophore which is the mixture of diverse chemical structures with trichophoric agonism of bioactions.

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