



# Indian Journal of Agriculture and Allied Sciences

A Refereed Research Journal

ISSN 2395-1109

Volume: 1, No.: 3, Year: 2015

Received: 7.08.2015, Accepted: 17.08.2015

## EVALUATION OF THE EFFICACY OF “ROVAAN KESH TAIL” IN THE MANAGEMENT OF HAIR AND SCALP AILMENTS

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### Abstract

**Objectives:** To study the efficacy of Rovaan Kesh Tail in the Management of Hair & Scalp ailments.

**Methods:** A total of 50 patient suffering from Kandu (Itching), Keshchyuti (Hair-falling), Swapa (Abnormalities of touch sensation), Rookshata (Roughness or dryness of the skin), Twak sphutana (breaking or cracking of the skin) were selected. There were 7 dropout & 43 patient's completed the study. All the patient were advised shiro-abhyang with Rovaan Kesh Tail on scalp till it gets absorbed two times daily i.e. Morning & Evening, twice a week for a period of 3 months.

**Results:** Total of 24 patients completed study on Rovaan Kesh Tail in Hair Ailments Groups out of which 8 patients got excellent results and 12 patients got good result. Total number of 19 patients was enrolled in the Rovaan Kesh Tail in Dandruff Group and itching of scalp out of which at the end of three months, 5 patients got excellent result and 9 patients got good result.

**Conclusion:** The study revealed that Rovaan Kesh Tail is effective in treatment of Hair & Scalp ailments.

**Key Message:** Local application of Rovaan Kesh Tail is effective on Hair & Scalp ailments

**Introduction:** Long strong and healthy hair adds beauty to anyone's personality, apart from adding beauty Hair is an Important Component of the body derived from Ectoderm. They provide physical protection. Hair or pile consists of two parts, a shaft and a root. Loss of hair influences social life and social interactions. The most wide spread form of hair loss is baldness affecting both the genders. *Telogen effluvium* is not a permanent form of hair loss, and eventually, the hair follicles can recover. The potential causes of *Telogen effluvium* include malnutrition and crash dieting, pregnancy and childbirth, UV radiation exposure, drugs, endocrine disorders, extreme physical and emotional stress, and severe systemic illness. Topical application of biological response modifiers, and anti-androgens are currently available therapies for the management of *Telogen effluvium* (in women, HRT can also be used); however, the low success rate and associated adverse effects limit their clinical use.<sup>[1]</sup> Dandruff is a common scalp disorder which is Embarrassing and effects a large number of population. In dandruff there is

excessive shedding of dead skin cells from the scalp.

**Review of Literature:** Scalp related disorder are common and dates back in Ancient Era. Ayurvedic literature is flooded with concept of Hair and its treatment. Not only treatment but there is a wide description of Herbs termed as “Keshya” i.e. the herbs which play vital role in maintaining and promoting healthy hair growth. Hair is known as *Kesh* in Ayurveda

**Kesh Vyutpatti:** The word *Kesh* is derived from *Klish Dhatu*.

क्लिश्यते क्लिश बन्धे। क्लिश उपतापे।<sup>[2]</sup>

**Kesh Paryaya:** According to *Amarkoshakara* the synonyms of *Kesh* are *Chikur, Kuntal, Vala, Kachaha, Shiroruha*.

“चिकुरः कुन्तलो वालः कचः केशः शिरोरूहः।”<sup>[2]</sup>

**Keshabhivyakti:** According to *Ashtanga Samgrahakara*, during the development of fetus of embryonic life the manifestation of hair occurs in six month. The hard structures like *Kesh, Smashru* and *Ashti* in *Garbha* are *Pitrujbhava* derieved from father according to all *Samhitakaras*.

भ ठे केश रोमनखास्थिरनाय्वादीन्यभिव्यक्तानि बलवर्णोपचयश्च।<sup>[3]</sup>

**Kesh as Asthi Mala:** In Dhatu Poshan process, the Prasada and the Kitta are the two categories of products that arise out of the Metabolic transformation of the *Dhatu*, so *Kesh* and *Loma* are the *Mala* of the *Ashti Dhatu* during the *Dhatu Poshan* process.

**Kesh Samkhya:** According to Carak some elements in the body can be ascertained from interference only defined as *Tarkya*. Among them the *Kesh*, *Smashru* and *Loma* are 29956 in number. This enumeration pertains to a healthy body. In abnormal states of the body, the number may vary.<sup>[4]</sup>

**Kesh Vikaras:** Acharya Caraka has included the *Kesh Dosh* or *Kesh Vikaras* like discoloration and morbidity in hair of head, small hairs of the body in *Asthi Pradoshaja Vikaras* <sup>[4]</sup>. The other diseases like *Khalitya* (Alopecia), *Palitya* (Graying of hairs) and *Haritloma* (Towney hairs). As per Ashtang Samgrah, Uttarsthana. *Indralupta* has been defined as –

रोमकूपानुगं पित्तं वातेन सह मूर्च्छितम्।

प्रच्यावयति रोमाणि ततः ले मा सशोणितः ॥ 27 / 26

रोमकूपान् रुग्णध्दयस्य तेनान्ये ामसम्भवः।

तद्रिन्द्रलुप्तं रुज्जा च प्राहुश्चाचेति चापरे ॥ 27 / 27

Pitta present at the hair follicles associated with *Vata* causes falling of the hairs, afterwards stigma (*Kapha*) associated with sonita (Blood) blocks the hair follicles, hence no new hair grows in that place. This disease is known as *Indralupta* or *Rujja*. As per Sushruta Samhita, *Nidanasthana*-

रोमकूपानुगं पित्तं वातेन सह मूर्च्छितम्।

प्रच्यावयति रोमाणि ततः ले मा सशोणितः ॥ 13 / 33

रुग्णद्धि रोमकूपांस्तु ततोऽन्ये ामसम्भवः।

तद्रिन्द्रलुप्तं खालित्यं रुज्येति च विभाव्यते ॥ 13 / 34

*Vayu* along with *Pitta* gets vitiated and when reaches the pores of the hair / hair follicles then hair falls out. *Rakta* mixed with *Slesma* blocks the hair follicles so no new hair grows at that place. This disease is known as *Indralupta/ Khalitya/ Rujjya*.

Dandruff is a common disorder of scalp. It affects a large number of population irrespective of Age and sex. Dandruff could be mild to severe in its presentation. Moderate and severe form of Dandruff could be followed by secondary infections which could further lead to Increase in the problem and patient suffering would find it socially, economically, physically & mentally hampering its life.

Dandruff is a condition in which white flakes are seen in hair and clothing.

### Symptoms & Signs of Dandruff

- Scating of skin in the form of flakes
- Itching on head
- Red blisters on the scalp
- Dry scalp
- White flakes on clothes & hairs
- Boils on scalp
- Inflammation
- Seborrheic dermatitis

### Why does Dandruff Occurs

- Due to Fungal Infection
- Unhygienic scalp
- Dry skin
- Mental stress and skin problems
- Stress
- Use of Chemical bases preparations on scalp
- Seasonal Dandruff
- Skin Disorder
- Auto-immune disorder
- Allergy
- Hormonal Imbalance
- Hereditary
- Life style disorder
- Weak Immune system

### Complications of Dandruff

- Secondary Infection
- Seborrheic dermatitis
- Premature Hairfall
- Greying of Hairs
- Eye-bro Dandruff
- Eye disorder etc.

### Darunaka

दारुणकं (क्ली): “दारुणवत् कायतीति। कै+कः

मस्तकजात क्षुद्ररोगं विशेषः।

लोके रूसी इति ख्यातः।<sup>[5]</sup>

*Darunaka* is defined as the disease appearing on head (scalp). It is included under *Ksudraroga*. It is commonly known as *Rusi*<sup>[5]</sup>. *Darayati– Splitting* <sup>[5]</sup> or tearing or difficult to bear or tolerate<sup>[6]</sup>. *Acharyas* have described common etiological factors. A close look in to these factors reveals the importance of dietary habits, climatic changes, personal habits and psychological disturbances etc. ‘*Manasantapa*’ (Mental stress) mentioned by *Caraka* and *Vaghbata* is also a factor causing hair and skin problems. *Darunaka* can be correlated with *Pytiriasis capitoris* dandruff which is a common condition encountered in clinical practice. It effects almost everyone at least some time during adult life. *Kandu* <sup>[7]</sup> is a symptom which has an important role in the pathogenesis of *Darunaka*. it leads to accumulation of *Malas* on the scalp

and excessive secretion of sweat etc. The hair falling in *Darunaka* may occur in lack of Snigdhatva and hair becomes lustreless and rough. Owing to their abnormal dryness, they become friable, short and thin and easily fall out. *Swapa*<sup>[7]</sup> or abnormality of touch sensation means temporary or partial loss of sensation. *Rukshata* (Roughness) is produced by the disease. *Twak sputana*<sup>[7]</sup> is breaking or splitting of scalp is one of the symptoms of *Darunaka*. It occurs owing to scratching and abnormal keratinization of epidermis.

### Materials and Methods

The objective of the Present study is to test the efficacy of Rovaan Kesh Tail for hair & scalp ailments and its results showed that patients get good results with its regular use and there was no side effect noticed in the patients.

**Study Product:** Rovaan Kesh Tail is a polyherbal formulation by Multani Pharmaceuticals Limited which is one of the premier manufacturing company of Ayurvedic, Unani & Veterinary Herbal medicines in India since 1938. With focus on creating value by delivering quality products that are safe, efficacious, affordable and effective under stringent quality norms, manufacturing units in Delhi & Uttarakhand complying with GMP norms, ISO 9001:2008 recommended for the treatment of hair problems which is manufactured on basis of ancient Ayurvedic processes known as '*Tail Pak Vidhi*' and and

'*Kshir Pak Vidhi*'. To utilize the properties of milk along with properties of herbs our ancestors invented the Kshirapaka Kalpana. In any preparation of milk, on gradual increase in temperature the solubility of fat and protein in the media also increases which may enhance the extraction of the medicinally important active constituents and retain them in the media. It would also be supportive in the absorption of the medicament (Table 1).

The present study was planned to evaluate the clinical efficacy of Rovaan Kesh Tail in hair ailments and was conducted between July–November 2014 at Multani Ayurveda Clinic, H-36, Connaught Place, New Delhi by Dr. Kamakshi and Dr. H. S. Tiwari.

**Inclusion Criteria:** A total of 50 patients who were suffering from the following symptoms were included in the study.

- *Kandu* (Itching)
- *Keshachyuti* (Hair fall)
- *Swapa* (abnormalities of touch sensation)
- *Rookshata* (roughness or dryness of the skin)
- *Twak Sphutana* (breaking or cracking of the skin)

Patients suffering from at least one of the following hair or scalp ailments such as dry hair, rough hair, damaged hair, dandruff and itching of scalp and who were willing to give a written informed consent were included in the study.

Table 1: Constituents of Rovaan Kesh Tail

Common Name	Botanical Name	Properties
Bhringraj	Eclipta alba	Keshya <sup>[8]</sup>
Madhuyashtika	Glycyrrhiza glabra	Keshya <sup>[9]</sup>
Bibhitaki	Terminalia bellirica	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 <sup>[10]</sup> .
Amalaki	Embelica officinalis	Strengthens hair follicles <sup>[10]</sup> .
Neem	Azadirachta indica	Hair growth promoting bioactivities: Nimbin, Nimbodin, Gedunin, Quercetin <sup>[10]</sup> .
Brahmi (Saraswati)	Bacopa monnieri	The net result is increased follicular size by large blood supply and reverse miniaturization of hair follicle by DHT <sup>[10]</sup> .
Rosemary	Rosmarinus officinalis	The high terpenoidal content (Linalool, limonene, borneol etc.) have benefiting qualities for hair growth. The oil is circulatory stimulant, restorative, cytophylactic and dandruff preventor of hair roots being antimicrobial and parasiticide <sup>[10]</sup> .
Manjishta	Rubia cordifolia	Wound healing, anti-inflammatory <sup>[11]</sup> .
Indravaruni	Citrullus colocynthis schrad	Hair growth promoting <sup>[12]</sup> .
Padmakha	Prunus pudum	Kshudra roga <sup>[13]</sup>
Japa Pushpa	Hibiscus rosasinensis	Hair growth promoting <sup>[14]</sup> .
Lodhra	Symplocos racemosa	Skin topical agent <sup>[15]</sup> .
Bala	Sida cordifolia	Kshudra roga <sup>[13]</sup>
Prapaundarika	Nelumbo nucifera	Anti-ulcer activity <sup>[16]</sup> .
Methi	Trigonella foenumgraecum	Hair growth promoter <sup>[17]</sup> .
Haridra	Curcuma longa	Accelerated the rate of healing on superficial skin ulcers <sup>[18]</sup> .
Til Tail	Sesamum indicum	Sesamum indicum is emollient, astringent, hair-restorer and useful in baldness, alopecia, to blacken the hair and to promote hair growth <sup>[19]</sup> .
Go Dugdha		Ksheera Paka Kalpana—A unique dosages form for special group of patients <sup>[20]</sup> .

**Exclusion Criteria:** Patients with concomitant severe scalp infection, history of hypersensitivity to shampoos / cosmetics, below 18 years of age,

patients with pre-existing severe systemic disease necessitating long-term medication, patients with genetic and endocrinal disorders, and those

patients who refused to give informed written consent were excluded from the study. Pregnant and lactating women were also excluded from the study. Patient using any other treatment for the indication at same time were also excluded.

**Study Procedure:** Each patients complete medical history including personal data, a description of symptoms and details of past medical history (especially local fungal infection, dandruff, pediculosis, trichotillomania, stress, diet, past illness and drugs), family history of hair problems and history of possible exacerbating factors. All the enrolled patients underwent a thorough clinical examination and scalp skin examination.

All the patients were advised *Shiro Abhyang\** with “Rovaan Kesh Tail” on scalp till it gets absorbed two times daily, *i.e.* morning and evening, twice a week for a period of 3 months. \*(*Shiro Abhyanga* : ‘Abhi’ prefix to ‘Anga’ *Dhatu* makes the word, *Abhyanga* which means to induce specific movements. Thus *Abhyanga* indicates some movement done on the body with the use of *Tail*, *Ghrita*, etc). Recruited Patients were advised *Pathya/ Apathya* as per the Ayurvedic concept as:

**Pathya:** *Sashitillashali, Kshira, Amra, Amalaki, Dadhima, Matulunga, Tail, Takra, Kanjika,*

*Narikelam, Yusha, Haritaki, Puranaghrita, Seka, Lepa, Shirobasti, Musta, Kumari*

**Apathya:** *Viruddha Anna, Divaswapana, Ksharatu*

#### Preventing and Precautions

- Brushing and Combing should be done on regular basis.
- Balanced and Nourishing diet prevents the condition.
- Avoid Stress
- Adequate Sunlight is good
- Avoidance of use of Chemicals
- Regular wash of hairs etc.

**Criteria for Assessment of Results:** The subjective parameters used for assessment were as follows:

1. **Hair and Scalp Examination**
2. **Hair Texture:** Examined by simple method of touching the patient’s hair.
3. **Hair Loss:** Counted after constant combing of patients hair for one minute with the same comb.
4. **Local Scalp Skin Examination:** Dandruff and itching of scalp.

This was done to assess the improvements of hair and scalp ailments with reference to the signs and symptoms presented at the end of each observation counts obtained after the treatment was categorized in to five Tables.

**Table 2: Criteria for Assessment of Results**

Analogous Scale Scores	Description	Improvement (reduction %)
0	No improvement	< 25%
1	Poor	25 to 49
2	Fair	50 to 74
3	Excellent	> 75

#### Observations & Results

A total of 50 randomly allocated patients were enrolled in the patient study out of which 20 were male (mean age 31.5 years) and 30 (mean age 25.5 years) were females. If we segregate patients according to indication, 28 patients enrolled in the study were complaining

about dry, rough hair and hair loss, 22 patients were complaining about dandruff and itching of scalp. At the end of the study there were total 7 drop offs from the study of which 4 patients from hair and 3 patients from scalp ailments (Graph 1 & table 2)

**Table 3: Patient Demographic Data**

Gender	No. of Patients	Mean Age (yrs)
Male	20	31.5
Female	30	25.5

**Table 4: Patient allocation after randomization**

Group	No. of Patients
No. of Patients with hair ailment	28
No. of Patients with scalp ailment	22
Total no. of patients enrolled initially	50
Total no. of patients who completed study	43
No. of drop outs	7

**Table 5: Overall Assessment of Hair condition of Study Subjects as per Investigator**

Condition of Hair	At Enrolment	I <sup>st</sup> follow up	II <sup>nd</sup> follow up	III <sup>rd</sup> follow up
Bad	13	10	5	2
Average	11	6	5	2
Good	-	6	9	12
Excellent	-	2	5	8

Graph 1: Overall Assessment of Hair condition of Study Subjects as per Investigator

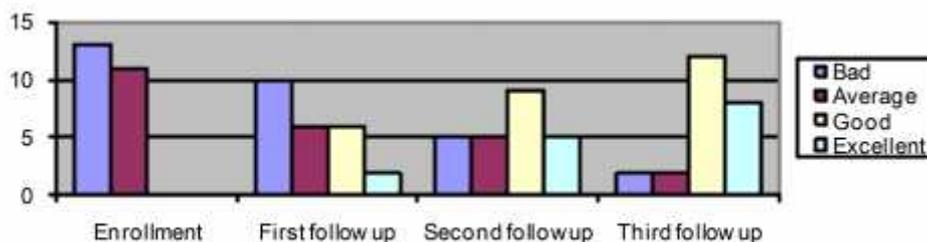
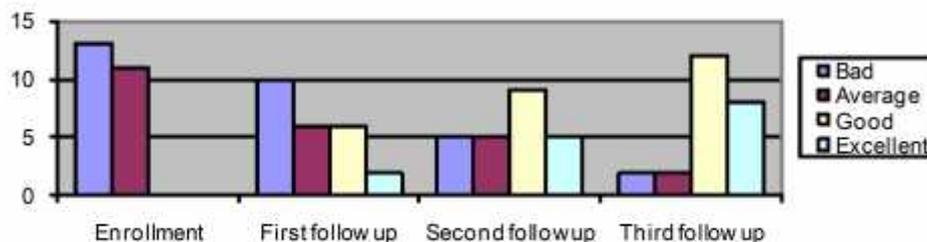


Table 6: Overall assessment of scalp help as per investigator for Rovaan Kesh Tail

Condition of Scalp	At Enrolment	I <sup>st</sup> follow up	II <sup>nd</sup> follow up	III <sup>rd</sup> follow up
Bad	12	9	6	2
Average	7	6	4	3
Good	-	4	6	9
Excellent	-	-	3	5

Graph 2: Overall Assessment of Hair condition of Study Subjects as per Investigator



**Overall Assessment:** Total of 24 patients completed study on Rovaan Kesh Tail in Hair Ailments Groups out of which 8 patients got excellent results and 12 patients got good result. Total number of 19 patients was enrolled in the

Rovaan Kesh Tail in Dandruff Group and itching of scalp out of which at the end of three months, 5 patients got excellent result and 9 patients got good result.

Table 7: Overall assessment of scalp health: KANDU

Grading	Before Treatment	After Treatment
Absent	-	15
Occasionally	4	4
Frequently	7	-
Constantly	8	-

Table 8: Overall assessment of scalp health: KESH BHOOMI RUKSHTA

	Before Treatment	After Treatment
Absent	-	11
Negligible	3	8
With discomfort of Scalp	7	-
With discomfort on Scalp	9	-

Table 9: Overall assessment of scalp health: TVAK SPUTANA

	Before Treatment	After Treatment
Absent	-	15
Visible inside the hair	4	4
Visible over the hair	8	-
Spread over the shoulder	7	-

Table 10: Overall assessment of hair health: KESHCHYUTI

	Before Treatment	After Treatment
Absent	-	13
Occasionally	3	6
Moderate loss	7	-
Maximum loss	9	-

Table 11: Overall assessment of hair health: HAIR TEXTURE

	Before Treatment	After Treatment
No Improvement	-	-
Poor : A little smoother	10	2
Fair : Gently smoother	10	13
Excellent : Smooth & shining	4	9

**Discussion & Conclusion:** The results indicate benefits of ROVAAN KESH TAIL in reducing hair fall & improving hair growth. Rovaan Kesh Tail used for a period of 3 months showed good

results in Scalp problems like Kandu (Itching), Kesh Bhoomi Rukshta, Tvak Sputana (Breaking or cracking of the skin), Keshchyuti (Hair-fall).

Hair and scalp diseases are very common. Normally we shed some of our hairs every day but that does not mean we will go bald. In fact if there is no proper re-growth of the hair after falling could lead to loss of hair. Hair treated with harsh chemicals (for shampoo, colouring, etc.), perming, glow drying, straightening, etc. leaves hair weak, brittle, broken and unmanageable. Changes in life style and many other factors like underlying diseases, excessive exposure to pollution, sun may too lead to distraction of hair. Traction alopecia is a form of occurring due to too much of strain on the hair of once head like wearing tight helmets, tight hair styles, etc. Dandruff taken as Darunaka it describes under Kshura roga. It is taken to occur due to Pitta Kapha and Vata Doshas in Ayurveda.

It has been defined in Ayurveda to have signs & symptoms –

1. Daruna (Cracked scalp)
2. Kandu (Itching of scalp)
3. Ruksha (Dryness of the scalp)

There is excessive shedding from the scalp. Skin cells die and flake off. Hair is an Important Biomaterial composed of protein mainly keratin. The herbal Formulation Rovaan Kesh Tail is composed of various age old known herbs that helps in good quality of hair growth. It is clear that Rovaan Kesh Tail showed very good improvement in different hair and scalp ailments. Rovaan Kesh Tail is made of ancient Ayurvedic process known as ‘Kshir Pak Vidhi’. Milk is a source of fat which entraps the valuable oil and alkaloid present in the herbs, preserve the best of all herbs as it is.

*Emblica officinalis* significantly inhibited the interleukin and gamma-interferon production. *Eclipta alba* has potent anti-inflammatory and analgesic activities. *Eclipta alba* present in Rovaan Kesh Tail is well known herb used in Ayurvedic system of medicine. Action of *Eclipta alba* is found to be acting on follicular enlargement and prolongation of Anagen phase [21]. *Sesamum indicum* is emollient, astringent, hair-restorer and useful in baldness, alopecia, to blacken the hair and to promote hair growth [22]. The principle ingredients of *Rosmarinus officinalis* are caffeic acid, phenolic diterpenes (carnosic acid, carnosol and 12-O-methylcarnosic acid), caffeoyl derivatives (rosmarinic acid), and flavones (isoscuteallarein 7-O-glucoside and genkwanin). The extract of *Rosmarinus officinalis* has been shown to have potent antioxidant activity, in both

aqueous and lipid systems [16]. Neem oil and its various constituents on screening for anti-fungal activity against a number of fungi used different techniques showed promising results [23]. The petroleum ether extract of the leaves and flowers were studied for their potential on hair growth by in vivo & in vitro models. In in-vivo study, topical application of, 1 percent extracts on shaved skin of wistar albino rats for 30 days promoted hair growth [14]. Turmeric paste applied on aseptic superficial skin ulcer in rats and rabbits and septic superficial skin ulcers in rats accelerated the rate of healing by 23.3, 24.2 and 26.6 per cent, respectively (Gujral et al., 1953) [15]. In all the patients there were no complications and adverse effects were neither reported by the patients nor observed by the investigator. Therefore, it can be concluded that Rovaan Kesh Tail is safe and is an effective treatment for the management of diffuse hair loss.

#### References

1. Price, V.H. (1993). Treatment of Hair Loss N. *Engl. J. Med.*, 341:964-973
2. Ramanathan. (1971). *Amarakosha. Amarasimha* Adyar library and research. Vol. I, p 431
3. Murthy, K. R. Srikantha. (*Vagbhata : Astanga Sangraha*. (Ed) (2000). published by, Choukhambha Orientalia Vol.3, p 654
4. Yadavji Trikamji Acharya. (2011). *Agnivesha. Charaka Samhita–Ayurvedadipika* commentary (Ed) Chakrapandita, Varanasi: Chaukhamba surabharathi prakashana, p. 738
5. Raja Radhakantadeva. (2006). *Shabdakalpadruma–3<sup>rd</sup>* (Eds) Varanasi: Naga Publications; Vol. 2,5, p. 937
6. Vaidya Yadhavaji Trikamji, Acharyas. (2002). *Sushruta. Sushruta Samhita* (Ed) Dalhan’s Nibandha Sangraha commentary. 7<sup>th</sup> (Eds) Varanasi : Chaukhamba Orientalia; Vol.1.
7. Shastri, Hari Sadashiva. (2010). *Vagbhata : Astanga Hridaya*. Sarvangasundara commentary of Arunadatta (Ed), Varanasi: Chaukhamba surabharathi prakashana, p. 956
8. Ayurvedic Pharmacopoeia of India, Part I (Vol. II), First Edition
9. Tandon, Neeraj. (2013). *Reviews on Indian Medicinal Plants* (Ed) 2013, Vol. XI. p 1003
10. Akshay, Negi. & Luv, Kush. (2013). Trichophoric Ayurvedicophore. *International Journal of Innovative Research & Development*, 7(2) :129
11. Karodi, R, et al. (2009). Evaluation of the wound healing activity of a crude extract of *Rubia cordifolia* L. in mice. *International Journal of Applied Research in Natural Products* 2(2): 12-18.
12. Dhanotia, R., Chauhan, N. S., Saraf, D. K. and Dixit, V. K. (2009). “Effect of Citrullus

- colocynthis Schrad fruits on testosterone-induced alopecia," *Natural Product Research*, Vol. 16: 1-12.
13. Pandey, Ganga Sahay. (2013). *Bhavprakash Nighantu (Indian Materia Medica)*, (Ed) Commentator, Krishnachand Chunekar (Eds), Chaukhamba Bharti Academy, Varanasi.
  14. Tandon, Neeraj. (2013). *Reviews on Indian Medicinal Plants* (Ed) 2013, Vol. XII p 496.
  15. Vijayabaskaran, M., et al. (2010). Evaluation of In vitro Cytotoxic Activity of Ethanolic Extract of *Symplocos racemosa* Roxb, *International Journal of Pharmaceutical and Clinical Research*, 2(1): 28-30.
  16. Amit, Kumar, Srivastava, et al. (2015). Anti-ulcer and Antioxidant activity of *Nelumbo Nucifera* Gaertn Stalks in Rats, *International Journal of Pharmacy and Pharmaceutical Sciences*, 7(3): 2015.
  17. Gupta, Piyush Kumar, Chauhan, Nagendra Singh, Pathak, Anupam. (2013), Effect of *Trigonella foenum-graecum* Linn. (seeds) and *Butea monosperma* Lam. (flowers) on chemotherapy-induced alopecia, *Spatula DD*. 3(3):121-125.
  18. Sharma, Madhu, Tandon, Neeraj, Gupta, A. K. (2009) *Reviews on Indian Medicinal Plants* (Ed) Vol. VIII pgno.361
  19. Sharma, P.C., Yelne, M.B., Dennis, T.J. and Joshi, A. (2008). *Database on medicinal plants used in Ayurveda*. Published by Central Council for Research in Ayurvedic Science (CCRAS), Jawahar Lal Nehru Bhartiya Chikitsa Avum Homeopathy Anusandhan Bhavan, No.61-65, Institutional Area, Opp. 'D' Block, Janakpuri, New Delhi - 110058 (India) 5:418-20.
  20. Ranjita, Vaghmshi et al. (2009). Pharmaceutical Standardisation of Taila and Ghrita of Guduchi *Indian J of Ancient Med Yoga*. 2(2): Pub Med AYU Vol.30 No.1(Jan-Mar)2009
  21. Kaushik, R., Gupta, D. and Yadav, R. (2011). Alopecia: Herbal Remedies. *Indian J Pharmaceut Sci Res*, 2:1631-7.
  22. Del, Bano, M.J., Lorente, J., Cstillo, J., Benavente-Garcia, O., del Rio, J.A., Ortuno, A., et al. (2003). Phenolic diterpenes, flavones and rosmarinic acid distribution during the development of leaves, flowers, stems, and roots of *Rosmarinus officinalis*: Antioxidant activity. *J. Agric. Food Chem*. 51(15): 4247-4253.
  23. Gupta, A. K. & Tandon, Neeraj. (2004) *Reviews monographs on Indian medicinal plants*. (Ed) Vol. III, Published by Indian Council of Medical Res, New Delhi, India. Page no358.