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PHARMACEUTICAL DEVELOPMENT OF HERBAL HAIR GEL WITH TWO DIFFERENT METHODS W.S.R.TO BHAVPRAKASHOKTA KESHYA DRAVYA

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ABSTRACT

We often see our hair as a reflection of our identity as it is considered as one of the biggest beauty asset of a human. Any Person would love to possess thick healthy hair. But due to their hectic lifestyle these days' people suffer from hair loss, dandruff problems and premature graying of hair due to which their self-esteem is seriously affected. So there is a need to develop the standard procedure of preparation of herbal topical applications as they have faster and accurate results than oral administration of drug. The present era is the "Era of Technology and Information" so by using modern instrumental advances in manufacturing procedures we have tried to made herbal hair gel by *Bhavprakashokta keshya dravyas*. *Ayurveda* have many number of effective formulations and drugs for treating various diseases but problems of less shelf life is a major challenge. To use these formulations in this present era they require effective modifications into new dosage forms with more shelf life without compromising the underlying basic principles. Standardization describes all measures taken during manufacturing process and quality control leads to reproducible quality of particular product. *Acharya Bhavamishra* mentions various drugs as having *keshya* property, among those we have selected *japa pushpa* (*Hibiscus rosasinensis* Linn.), *gunja beej* (*Abrus precatorius* Linn.), *nirgundi* (*Vitex negun-do* Linn), *bhringaraj* (*Eclipta alba* Hassk) and *saireyak* (*Barleria prionitis* Linn) for preparing the herbal hair gel. We have documented two methods of extractions and standard manufacturing procedure of herbal hair gel.

KEYWORDS: Hair, herbal hair gel, bhavprakashokta keshya dravya.

INTRODUCTION

Today, people worldwide are looking for herbal personal care products that supply multiple benefits with minimal efforts. Not only women but there is increasing number of males are using such products that are created for the purpose of cleansing, beautifying or altering appearance and enhancing attractive features.[3]

Hair are considered one of the biggest beauty asset of the human being. Any Person would love to possess thick, long, shiney, healthy hair. But now days due to strenuous lifestyle people suffer from hair loss, dandruff problems and premature graying of hair.

In the today's fast moving era, everyone wants quick and easy results of everything andsame with the disease and application of medicines and their results. Therefore, the current study is aimed to develop a safe, potent, effective and convenient to use on daily basis with the longer shelf life and cost effective remedy of Ayurveda for hair in the form of herbal hair gel.[3]

For the treatment of the hairfall, dandruff, premature graying of hair etc. so many drugs are mentioned in Ayurvedic classics, out of them we have selected 5 *Bhavprakashokta keshya dravyas. Japa pushpa* (*Hibiscus rosasinensis* Linn.), *gunja beej* (*Abrus precatorius* Linn.), *nirgundi* (*Vitex negun-do* Linn), *bhringaraj* (*Eclipta alba* Hassk) and *saireyak* (*Barleria prionitis* Linn) for preparing the herbal hair gel.[2] These all well known medicinal drugs, which are easily available and having greater potency. The reasons behind selecting these drugs are their bioavailability in abundance as fresh or dry herb, having *keshya* property and cost effectiveness.

AIM AND OBJECTIVES

Aim: Pharmaceutical development and standardization of herbal hair gel by using *Bhavprakashokta keshya dravyas.*

OBJECTIVES

Development of the standard manufacturing process of herbal hair gel with selected ingredients. Analysis of the study drug physico-chemically to develop its standard.

MATERIALS AND METHODS

Pharmaceutical study

Material

The drugs are taken from different *vargas* of *Bhava Prakash Nighantu* (Indian Materia Medica) of *Shree Bhava Mishra* (C.1500-1600 A.D.) commentary by Prof. Krishna Chandra Chunekar, published by Chaukhambha Bharati Academy, Varanasi, Reprint: year 2013. In this study we have selected 5 drugs from *Bhavprakasha* which are having *Keshya karma.* These drugs were collected from the herbal garden of the Y.M.T. Ayurvedic Medical College, Kharghar, Navi Mumbai and local flower market of Dadar, Mumbai and authenticated from the Dravyaguna department of Y.M.T. Ayurvedic Medical College.

Table 1: The drugs identified are tabulated as in following table.

Name of drugs (part used)	Botanical name and Family	Rasa	Guna	Virya	Vipaka	Karma	Ref (varga shlok no., pg. no.)
Japa (pushpa)	*Hibiscus rosasinensis* Linn.- *Malvaceae*	Ksh, T	Laghu, Ruksha	S	Katu	*KV shamak-Keshya*	*Puspa, 58, 493*
Gunja (seed)	*Abrus precatorius* Linn – *Fabaceae*	T, Ksh	Laghu , Ruksha	U	Katu	*VP shamak-Keshya, In-dralupta*	*Guduchyadi,125,339*
Nirgundi (patra)	*Vitex negun-do* Linn.- *Verbenaceae*	T, Ksh, K	Laghu	U	Katu	*KV shamak-Keshya*	*Guduchyadi,113,329*
Bhringraj (panchang)	*Eclipta alba* Hassk. – *Compositae*	K	Tikshna , Ruksha	U	Katu	*KV shamak-Keshya*	*Guduchyadi, 239, 414*
Saireyak (patra)	*Barleria prionitis* Linn – *Acanthaceae*	T, M,A	Atisnigdha	U	Katu	*VRK shamak-Kesha ranjana*	*Puspa, 49, 489*

M- Madhura , A- Amla, L- Lavana, K- Katu , Ksh- Kashaya, T- Tikta , S-Sheeta, U-Ushna

Table 2: Ingredients for Kwatha.

Sr. No.	Ingredients	Latin name	Part used	Quantity
1	*Japa*	*Hibiscus rosasinensis* Linn	*Pushpa* (wet and fresh)	1 part
2	*Gunja*	*Abrus precatorius* Linn	Beej (coarse powder)	1 part
3	*Nirgundi*	*Vitex negun-do* Linn	*Patra* (wet and fresh)	1 part
4	*Bhringraj*	*Eclipta alba* Hassk	*Panchanga* (wet and fresh)	1 part
5	*Saireyak*	*Barleria prionitis* Linn	*Patra* (wet and fresh)	1 part
6	Water			8 parts reduced upto 1/4th part

Table 3: Extraction by Soxhlet Apparatus.

Sr. No.	Ingredients	Latin name	Part used	Quantity
1	*Japa*	*Hibiscus rosasinensis* Linn	*Pushpa* (wet and fresh)	5 gm
2	*Gunja*	*Abrus precatorius* Linn	Beej (coarse powder)	5 gm
3	*Nirgundi*	*Vitex negun-do* Linn	*Patra* (wet and fresh)	5 gm
4	*Bhringraj*	*Eclipta alba* Hassk	*Panchanga* (wet and fresh)	5 gm
5	*Saireyak*	*Barleria prionitis* Linn	*Patra* (wet and fresh)	5 gm
6	Water			8 parts = 200 ml

Table 4: Ingredients for Herbal hair gel.

Sr. No.	Ingredients	Action	Proportion	Quantity
1	*Kwatha of* selected *Bhavprakashokta keshya dravya*		1 part	100 ml
2	EDTA	Chelating agent	0.01%	0.1 ml
3	Carbopol	Gelling agent	2%	2 gm
4	Methyl paraben	Preservative	0.065%	650 mg
5	Propyl paraben	Preservative	0.035%	350 mg
6	Triethanalomine	pH stabilizer	1.5%	1.5 ml
7	Essential oils	Fragrance	2%	2 ml

Instruments and Equipment

Table 5: Instruments for Kwatha and Soxhlet Extraction.

Khalva yantra	Weighing machine	Stainless steel vessel	Measuring cylinder
Stirrer	Gas with stove	Cotton cloth	Glass bottle for storage
Soxhlet apparatus	Glass beads	Petroleum jelly	Glass beakers

Table 6: Instruments and equipments for Herbal Hair Gel.

Planetary mixer	Weighing machine	Spatula	Measuring cylinder
Stirrer	Conical flasks	Dropper	Container for filling of gel
Tissue paper	Filter paper		

Pharmaceutical method

Schematic presentation of *kwatha* (by Sharngdhar samhita)

Japa pushpa + Gunja beej + Nirgundi patra + Bhringraj Panchanga + Saireyak patra

Ingredients were taken

⇩

Slightly pounded with *Khalva yantra*

⇩

Then 8s times of ingredients water was taken in a vessel

⇩

Started heating to the decoction

⇩

After remaining of 1/4th of water gas was switched off

⇩

Kwatha was filtered with help of cotton cloth, Kwatha was ready.

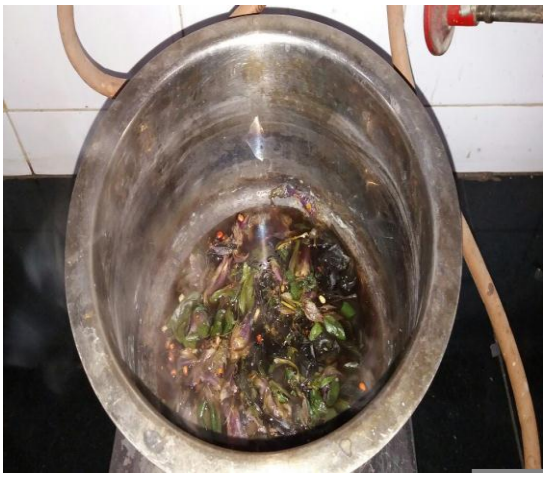


Figure 1.

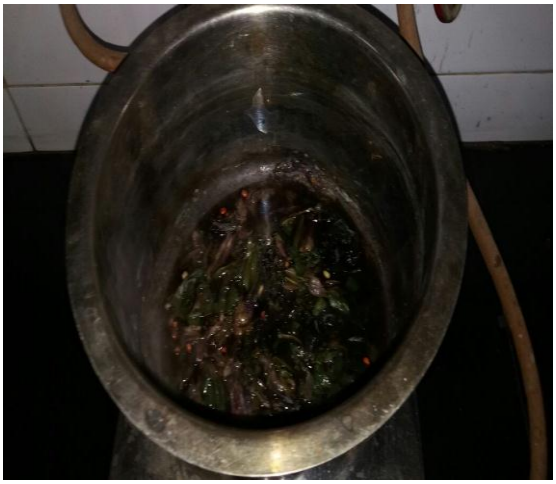


Figure 2.

Soxhlet extraction

Japa pushpa + *Gunja beej* + *Nirgundi patra* + *Bhringraj Panchanga* + *Saireyak patra* (each 5 gm) ingredients were taken in a cotton cloth and tied it in a pottali.

⇩

Extraction was done by continous hot extraction (Soxhlet) method using 200 ml distilled water.

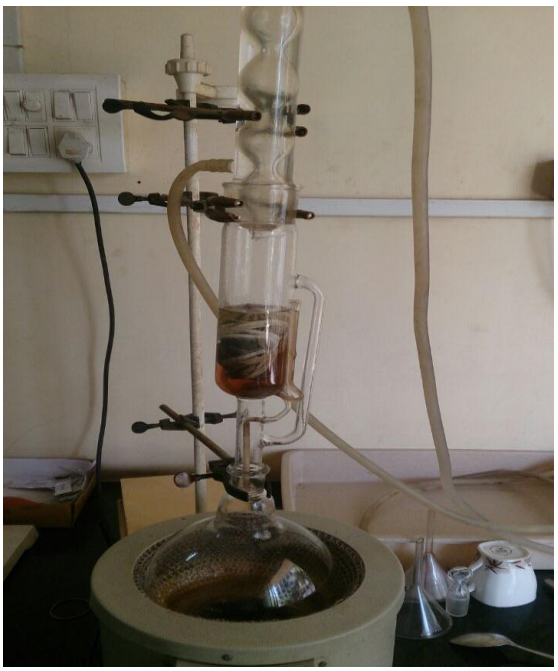


Figure 3.

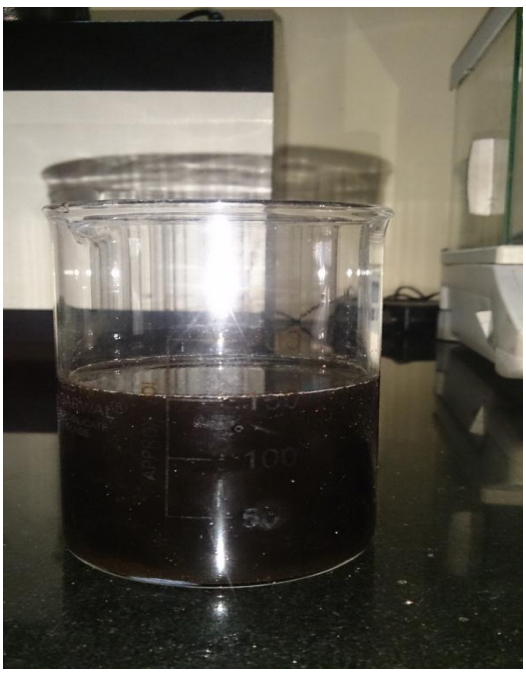


Figure 4.

Schematic presentation of Herbal Hair Gel

100 ml of *kwatha/Soxhlet extraction* was taken into the planetary mixer

⇩

0.1 ml of EDTA is added and mixture was stirred for 2 mins.

⇩

Then 2 gm carbopol was added and stirred the mixture at 300 rpm for initial 15 mins.

⇩

Gradually increased the rmp of the mixer every 5 mins and continue till 30mins.

⇩

Then added Tri-ethanolamine (1.5 ml) & stirred the mixture at 3000 rmp for 5 min.

⇩

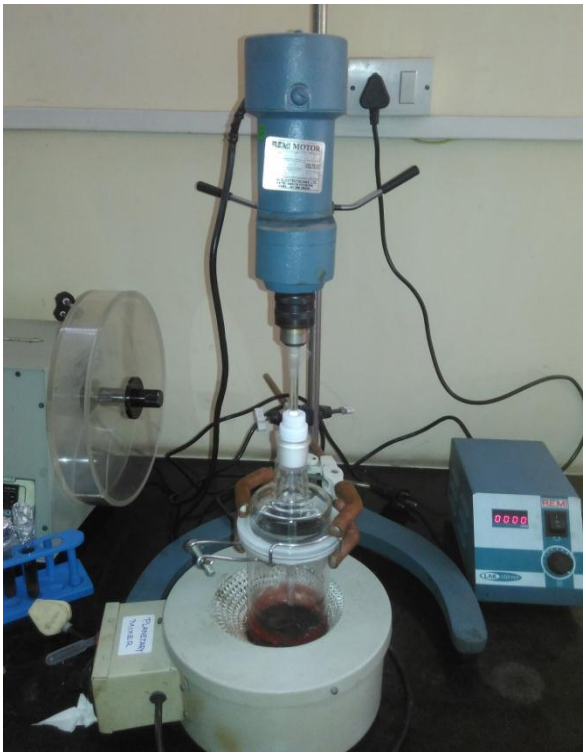
Methyl paraben(650 mg) & Propyl paraben (350 mg) was added & stirred the mixture at 3000 rmp for 5 mins.

⇩

Essential oils (2 ml) were added & stirred the mixture at 3000 rmp for 5 mins.

⇩

After sufficient stirring a homogenous mixture of gel was prepared, stored the gel in appropriate containers and labeled.



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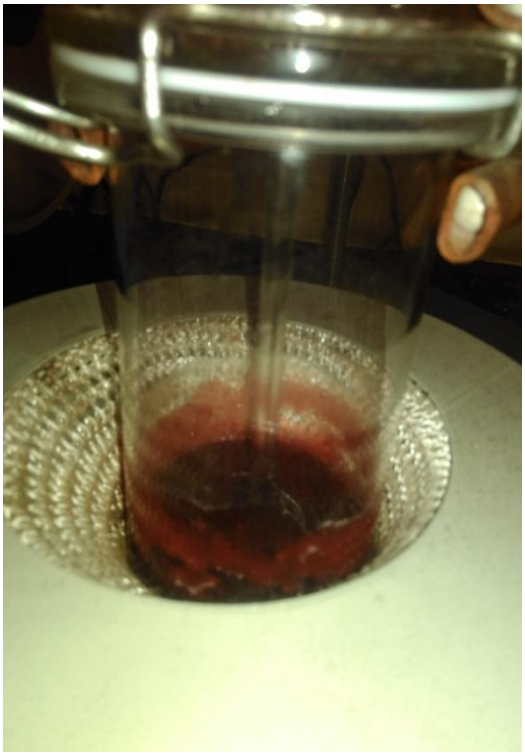

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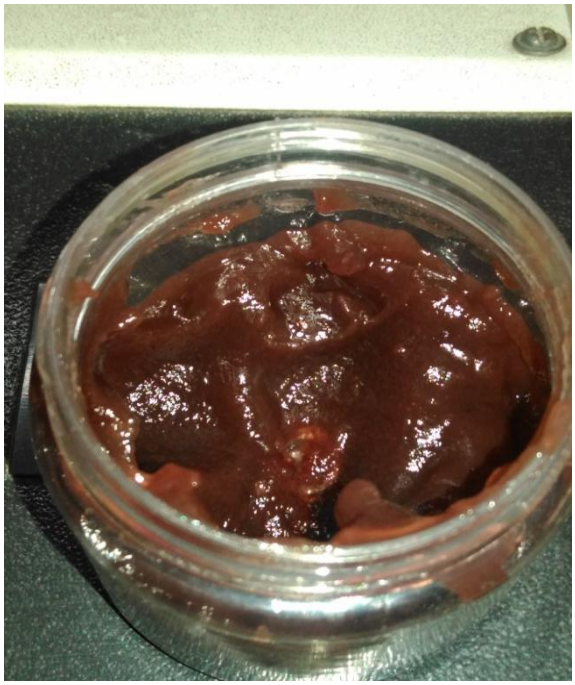

Figure 7.

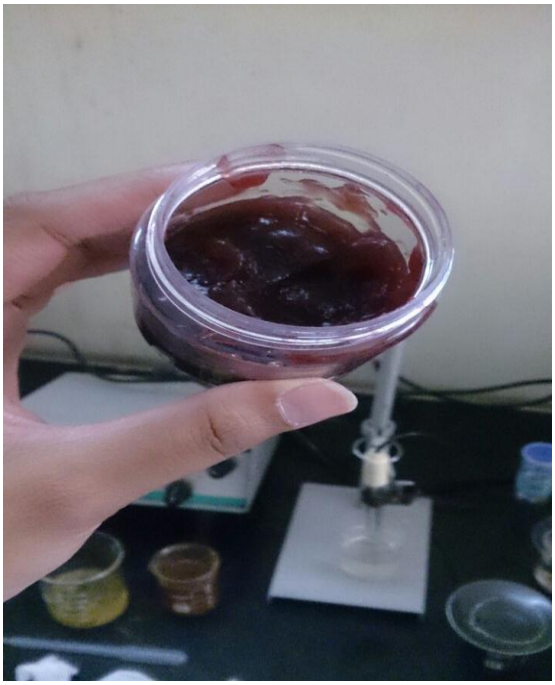

Figure 8.

OBSERVATION

Testing parameters for Herbal Hair Gel

a. *Panchabhautika Parikshana (Shabda, Sparsha, Roop, Rasa, Gandha)*

b. Modern Parameters

- Appearance
- pH value
- Spreadability
- Homogeneity
- Skin irritation test
- Viscosity

Table 7: *Panchabhautika Parikshana.*

Parikshana	**Gel prepared by *Kwatha kalpana***	**Gel prepared by Soxhlet extraction**
Shabda	No specific sound	No specific sound
Sparsha	Slakshna	Slakshna
Roopa	Magenta-red coloured homogenous mixture of gel	Dark brown coloured homogenous mixture of gel
Rasa	Not applicable	Not applicable
Gandha	characteristic smell	characteristic smell

➢ **Modern parameters**

- Physical appearance - The gel formulation was evaluated in terms of physical character like change in colour, odour and rheological parameters.
- pH - The pH of the gel formulation was determined by using digital pH meter i.e. electrode method and pH strip method. 500 mg of gel was taken and dissolved in 50 mL distilled water and measurement of pH was done in triplicate and average value was calculated.
- Viscosity - Brookfield viscometer was used for the measurement of viscosity of the prepared gel. The Brookfield viscometer was rotated at 100 rpm, spindle no.6. Each reading was taken after equilibrium was attained by the sample at the end of two minutes.
- Spreadability - It was determined by wooden block and glass slide apparatus.

Weights of about 20 g was added to the pan and the time was noted for upper slide (movable) to separate completely from the fixed slides. Spreadability was then calculated by using the formula,

S=M.L/T

Where, S=Spreadability, M=Weight tide to upper slide, L=Length of glass slide, T=Time taken to separate the slide completely from each other. The therapeutic efficacy of a formulation also depends upon its value.

- Homogeneity - Developed gel was tested for homogeneity by visual inspection after the gel was set in the container. It was tested for appearance and presence of any aggregates.
- Skin irritation test - Test for irritation was performed on human volunteers with their consent. Five volunteers were selected and 1.0 g of formulated gel was applied on an area of 2 square inch to the back of hand. The volunteers were observed for lesions or irritation.[5]

Table 8: The study was repeated three times and average value is given in following table.

Sr. No.	Parameters	Results	
		Herbal hair gel by *Kwatha*	Herbal hair gel by Soxhlet extraction
1	pH	5.65 (by strip-5)	4.73 (by strip-5)
2	Physical appearance	Magenta-red colour and characteristic odour was found	Dark brown colour and characteristic odour was found
3	Viscosity	4639	4558
4	Homogeneity	Homogeneous, smooth and consistent gel. No aggregates	Homogeneous, smooth and consistent gel. No aggregates found.

		found.	
5	Spreadability	11.10 (g-cm/sec)	10.18 (g-cm/sec)
6	Skin irritation test	Skin compatible. No irritation found	Skin compatible. No irritation found

RESULTS AND DISCUSSION

Reports of pH, viscosity, spreadability, physical appearance, homogeneity and skin irritation test are given in above table. It can be found from literature survey that pHmean value of female hair 6.784 ± 0.16, and that of male hair 5.604 ± 0.93.[6] The pH of the formulated gel was found to be 5.65 (gel by *kwatha*) and 4.73 (gel by Soxhlet extraction) which is close to the aforesaid values as well as skin pH. A good viscosity is required to have an acceptable formulation, too viscous gel may cause pourability problem whereas too low viscosity may cause settling of dispersed contents while storage. The gel was moderate viscous in appearance with 4639 cps (gel by *kwatha*) and 4558 cps (gel by Soxhlet extraction) viscosity. Application of a gel is comfortable if the base spreads easily, exhibiting maximum slip and drag. The prepared gel produces good spreadability 11.10 (g- cm/sec)- gel by *kwatha* and 10.18 (g-cm/sec) – gel by Soxhlet extraction. In general, the gels that possess a high consistency index are less spreadable.

The gel prepared by *kwatha* was magenta- red colour and gel prepared by Soxhlet extraction was dark brown colour with characteristic odour was found in both formulations. Both the gels was found to be homogeneous, smooth, and consistent with no aggregates or sediments with skin compatible and no irritation found on application.

CONCLUSION

In the present study, the gel was formulated successfully. The topical application of this gel may have minimum side effects as compared to allopathic drugs which is needed to be established. From the above study it is observed that most of the *keshya* drugs described in *Bhava Prakasha Nighantu* are having *Tikta*, *Kashaya* and *Madhur rasa*, *Ruksha guna*, *Usna Virya*, *Katu vipaka*, and VK *shamaka* property.[1] Vitiated *Vata* and *Pitta* are responsible for hair fall and vitiated *Rakta* and *Kapha* are responsible for permanent hair fall. Similarly vitiated *Pitta* is responsible for discoloration of hair. As *Tikta, Kashaya* and *Madhur rasas* are *Pitta shamaka*, *Ruksha guna* and *Usna Virya* are *vata shamaka* and *Katu vipaka* is *Kapha shamaka*. As *gunja* seeds are having anti-fungal properties so it can be used as an anti-dandruff treatment and *saireyak* is having *kesha ranjan* activity and other drugs i.e. *japa pushpa, nirgundi patra* and *bhringraj* are having *keshya* activity, hence these drugs are

helpful in treating hair fall and discoloration of hair i.e., on *khalitya, palitya, indralupta* etc.[1] So these drugs with *keshya* properties are converted into new dosage form i.e. gel form for better application providing more stability and shelf life. However an elaborate protocol for the pre-clinical and clinical trials is needed to be designed and implemented to check the anti-dandruff, anti-greying and anti-hair fall activity on human volunteers and in-vitro study.

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