

FORMULATION AND EVALUATION OF HAIR GEL

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ABSTRACT

Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. Herbal formulations have growing demand in the world market. Herbal gel containing Trigonellafoenum- gracum and MurrayaKoenigii extract was found to be stable. The Trigonellafoenum-gracum and Murrayakoeniggi extract herbal gel was pale yellowish in color, translucent in appearance, and smooth in application. pH also maintained constant throughout the study which was found to be 4.5-5.5. Murrayakoenigii revealed the fact that it is a common remedy among the various ethnic groups, ayurvedic practitioners for treatment of diversity of ailments. However, very little efforts have been put by the scientific community to discover the beneficial potential of this plant. It is thought-provoking to know that crude organic extracts of leaves of Murrayakoenigii have been evaluated for hair growth. The values of spreadability indicate that the gel is easily spreadable by small amount of shear. pH also maintained throughout the study which was found 4.5-5.5. The herbal hair gel using methi and curryleaves were prepared by using carbopol as gelling agent. The result obtained was satisfactory with all formulations.

KEYWORDS: Trigonella foenum-gracum, Murraya Koenigii, Hair, Hair growth initiation, Hair follicle, Herbalhair gel.

INTRODUCTION

Herbal formulations gains an important role in all over the world as it is completely made up of natural sources derived from the plants. Pre-mature hair loss is one of the common types of dermatological condition. The etiology of hair loss is still not completely understood and also its complete medical treatment is not satisfactorily developed. One of the major causes of hair loss is the deficiency of iron (anemia).^[1]

As there is many more hair loss treatment available but no one of them is 100% effective. For the treatment of hair loss commonly plethora of herbs are used such as hibiscus, neem, amla, methi, tulsi, brahmi, lemon, shikakai, liquorice, nutmeg, henna, reetha, liquorice root, musk root, mahabhringraj, jantamasi, chitraka, marigold, parsley, rosemary, thyme. From the amongst plant amla is the major source of vitamin C and also contain phosphorus, calcium and iron which provides nutrition to normal hair growth and also use for the darkening of hair.^[2] Hibiscus contains calcium, iron, vitamin B1, phosphorus, riboflavin, niacin and vitamin C, which prevents premature graying of hairs and also provide thicker hair. Brahmi consists of alkaloids that enhance activity of protein kinase. Methi having high protein fodder that works as protein supplement to supply nutrition for hair.

Leaves and seeds of T.foenum-graecum have been used extensively to prepare extracts and powders for medicinal uses. T. foenum-graecum is reported to have antidiabetic, anti-fertility,

anticancer, antimicrobial, anti- parasitic and hypocholesterolaemic effects. The seeds of the T. foenum-graecum herb possess toxic oils, volatile oils and alkaloids have been shown to be toxic to bacteria, parasites and fungi. The potential uses of in vitro propagated plants as sources for new drugs are still largely unexplored.^[3]

Murraya koenigii (Curryleaf tree) which exhibits diverse biological activities. *Murraya koenigii* has been used for centuries in the Ayurvedic system of medicine. *Murraya koenigii* commonly known as curry plant belongs to the family Rutaceae.^[4] The plant is a medicinal plant and native to India, Sri Lanka and other South Asian countries. It is usually found in tropical and sub-tropical region and cultivated in China, Australia, and Nigeria etc. The plant is highly valued for its leaves which are used for flavouring and spicing of food. The curry leaf is believed to have several medicinal properties such as anti-diabetic, antioxidant, antimicrobial, anti- inflammatory, anticarcinogenic and hepato-protective properties. Curry leaves have the richest source of carbazole alkaloids such as koenigine, mahanimbine and extracted from the leaves which have been found to demonstrate anti-cancer and anti-oxidant properties. The medicinal values of *Murraya koenigii* are numerous and beneficial to humans.^[5]

The essential oil is also utilized by soap and cosmetic aromatherapy industry. Curry leaves are boiled with coconut oil till they are reduced to blanked residue which is then used as an excellent hair tonic for retaining natural hair tone and stimulating hair growth. It is traditionally used as a whole or in parts as antiemetics, antidiarrheal, febrifuge, blood purifier, antifungal, depressant, anti-inflammatory, body aches, for kidney pain and vomiting.^[6]

MATERIALS AND METHODS

Fenugreek seed extract

The finely grinded seed powder was taken. From the total extract 10gm of seed powder was taken and 50ml of ethyl alcohol was added to that extract stirred it constantly for 30 min and the solution was kept in room temperature for 24 hrs and then filtered. The filtered solution was stored at 4°C for further use.



Fig. 1: Fenugreek seed extract

Curry leaves extract.^[7]

200g of washed and fresh leaves of *Murraya koenigii* was mixed together with 1000ml of distilled water in a round bottom flask. The operating temperature was 100°C as the boiling

point of water. The extraction was done between 3 to 9 hours in the interval of 3, 4, 5, 6, 7, 8 and 9 hours. The essential oil was then separated from its hydrosol by using diethyl ether as a solvent.



Fig. 2: Curry Leaves

Preparation of formulation^[8]

Twelve different herbal hair gel formulations were prepared by simple gel formulation preparation method with carbopol gel base. The gel formula contains methyl paraben , glycerine, triethanolamine, silicon, vitamin E. carbopol 934 two grams and measured quantity of extracts was dispersed in 80 ml of distilled water and mixed by stirring continuously in a magnetic stirrer. The measured quantity of glycerin triethanolamine, silicon, vitamin E was added to the mixture under continuous stirring. Mixing was continued until a transparent gel was formed.



Fig No : 03 Soxhelt Apparatus

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Fig No : 04 Herbal Gel

Table 1: Twelve different herbal hair gel formulations.

| Formulation | Methi Extract(ml) | Curryleaf Extract (ml) | Carbopol (gm) | Methyl Paraben (mg) | Glycerin (ml) | Silicon (mg) | TEA (ml) |
|-------------|-------------------|------------------------|---------------|---------------------|---------------|--------------|----------|
| F1 | 2 | 2 | 2 | 50 | 2 | 50 | 2 |
| F2 | 2 | 2 | 1.5 | 50 | 1.5 | 50 | 1.5 |
| F3 | 2 | 2 | 1 | 50 | 1 | 50 | 1 |
| F4 | 2 | 2 | 0.5 | 50 | 0.5 | 50 | 0.5 |
| F5 | 2 | - | 2 | 50 | 2 | 50 | 2 |
| F6 | 2 | - | 1.5 | 50 | 1.5 | 50 | 1.5 |
| F7 | 2 | - | 1 | 50 | 1 | 50 | 1 |
| F8 | 2 | - | 0.5 | 50 | 0.5 | 50 | 0.5 |
| F9 | | 2 | 2 | 50 | 2 | 50 | 2 |
| F10 | | 2 | 1.5 | 50 | 1.5 | 50 | 1.5 |
| F11 | | 2 | 1 | 50 | 1 | 50 | 1 |
| F12 | | 2 | 0.5 | 50 | 0.5 | 50 | 0.5 |

Evaluation of herbal hair gel^[9]

Physico-chemical evaluation

Physical parameters of Trigonella foenum-gracum and Murraya koeniggi extract herbal gel such as color and appearance were checked.

Spreadability Analysis

1 g of Trigonella foenum-gracum and Murraya koeniggi extract herbal gel was placed on the ground slide. Another glass slide having the dimension of fixed groundslide was placed above it. A 20 g weighted was placed on the top of the two slides for 5 minutes to expel air and to provide a uniform film of the gel between the slides. Excess of the gel was scrapped off from the edges. The top plate was then removed and the time required by the top slide to detached

from another slide was noted. Spreadability was calculated by using the following formula:

$$S = m \times l/t$$

where, S= spreadability, m-weight tied to upper slides(20 g), l- length of the glass slide (7.5 cm), t- time taken in sec.

pH measurement

pH measurement of the gel was carried out using a digital pH meter by dipping the glass electrode completely into the gel system to cover the electrode. The measurement was carried out in triplicate and the average of the three readings was recorded.^[10]

Washability

All herbal gel formulations are checked for its washability with water.

pH measurement

The pH of hair gel was found to be around 3.6-6.0 for all the formulations.

The formulation F4 has 5.1 pH, which is an acceptable range for hair gel preparations.

Table 2: pH of the formulations.

| Formulations | pH |
|--------------|------|
| F1 | 5.3 |
| F2 | 3.93 |
| F3 | 5.1 |
| F4 | 5.33 |
| F5 | 5.82 |
| F6 | 5.40 |
| F7 | 4.02 |
| F8 | 3.61 |
| F9 | 4.85 |
| F10 | 4.52 |
| F11 | 5.77 |
| F12 | 6.05 |

Spreadability Analysis

The spreadability of hair gel was found to be around 2-12 seconds for all formulations.

Table 3: Spreadability of the formulations

| FORMULATION | SPREADABILITY (g cm/sec) |
|-------------|-----------------------------|
| F1 | 15 |
| F2 | 12.5 |
| F3 | 21.4 |
| F4 | 25 |

| | |
|-----|------|
| F5 | 21.4 |
| F6 | 25 |
| F7 | 25 |
| F8 | 15 |
| F9 | 25 |
| F10 | 30 |
| F11 | 50 |
| F12 | 75 |

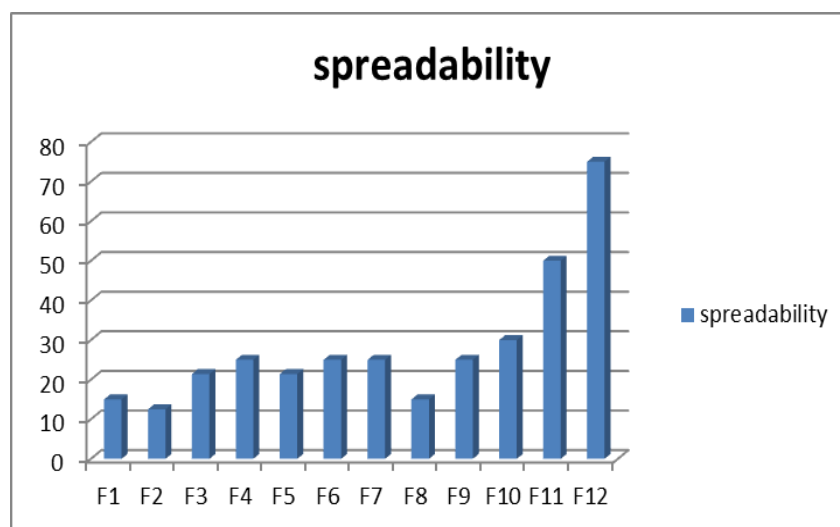


Fig No : 05 Spreadability.

CONCLUSION

Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. Herbal formulations have growing demand in the world market. Herbal gel containing *Trigonella foenum- gracum* and *Murraya Koenigii* extract was found to be stable. The *Trigonella foenum-gracum* and *Murraya koeniggi* extract herbal gel was pale yellowish in color, translucent in appearance, and smooth in application. pH also maintained constant throughout the study which was found to be 4.5-5.5 . *Murraya koenigii* revealed the fact that it is a common remedy among the various ethnic groups, ayurvedic practitioners for treatment of diversity of ailments. However, very little efforts have been put by the scientific community to discover the beneficial potential of this plant. It is thought-provoking to know that crude organic extracts of leaves of *Murraya koenigii* have been evaluated for hair growth. The values of spreadability indicate that the gel is easily spreadable by small amount of shear. pH also maintained throughout the study which was found 4.5-5.5.

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REFERENCES

1. Sulaiman Mad-Ali, Soottawat Benjakul, Thummanoon Prodpran, and Sajid Maqsood:

- Characteristics and Gel Properties of Gelatin from Goat Skin as Influenced by Alkaline-pretreatment Conditions, *Asian Australas. J. Anim. Sci.*, 29.
2. Hemendrasinh J Rathod and Dhruvi P Mehta, A Review on Pharmaceutical Gel, *Acta Scientifica International Journal of Pharmaceutical Science*, 1(1).
 3. Dr. Renu Mishra, Shikha Mandloi , Nishi Yadav and Jyoti Choithani phytochemical analysis of trigonella foenum graecum and its antibacterial activity against staphylococcus aureus, *world journal of pharmacy and pharmaceutical sciences sjif Impact Factor*, 6.041 5(6): 1408-1423 Research Article ISSN 2278 – 4357
 4. Poonam Ankush Jadhav and Sunil Ankush Jadhav, review on: murraya koenigii – a beneficial herb, *world journal of pharmacy and pharmaceutical sciences sjif impact Factor*, 6.647 6(9): 425-432 Review Article ISSN 2278 – 4357. S.P. Dhamane, N.V. Tayade, V.V. Potnis, A.S. Kulkarni and A.S. Gadekar, formulation and evaluation of antidandruff hair gel for treatment of seborrhoeic dermatitis, *World Journal of Pharmaceutical Research SJIF Impact Factor* 5.990 4(5): 1260-1271. Research Article ISSN 2277– 7105.
 5. Swarnlata Saraf, Manjusha Jharaniya , Anshita Gupta, Vishal Jain, Shailendra Saraf, herbal hair cosmetics: advancements and recent findings, *World Journal of Pharmaceutical Research*, 3(2): 3278- 3294. Review Article ISSN 2277 – 7105.
 6. Prasan R. Bhandari, Curry leaf (*Murraya koenigii*) or Cure leaf: Review of its curative properties, *Journal of Medical Nutrition and Nutraceuticals*, 1(2).
 7. CE Igara, DA Omoboyowa, AA Ahuchaogu, NU Orji and MK Ndukwe, Phytochemical and nutritional profile of *Murraya Koenigii* (Linn) Spreng leaf, *Journal of Pharmacognosy and Phytochemistry*, 2016.
 8. Rajasekaran Aiyalu, Arulkumaran Govindarjan, Arivukkarasu Ramasamy, Formulation and evaluation of topical herbal gel for the treatment of arthritis in animal model, *Brazilian Journal of Pharmaceutical Sciences*, 2016; 52(3).
 9. Milla Gabriela Belarmino Dantas, Silvio Alan Gonçalves Bomfim Reis, Camila Mahara Dias Damasceno Larissa Araújo Rolim, Pedro José Rolim- Neto, Ferdinando Oliveira Carvalho, Lucindo José Quintans-Junior, and Jackson Roberto Guedes da Silva Almeida, Development and Evaluation of Stability of a Gel Formulation Containing the Monoterpene Borneol, *Hindawi Publishing Corporation e Scientific World Journal*, 2016. Article ID 7394685.
 10. Praveen S. Patil, Vinod M. Reddy, Karnakumar V. Biradar, Chandrashekhar B. Patil and K. Sreenivasa rao, development and evaluation of anti-dandruff hair gel, *international journal of research in pharmacy and chemistry*.
 11. Jamil R., Nor Natasha Nasir, Hafizah Ramli, Isha R. and Nur Aminatulmimi Ismail, extraction of essential oil from murraya koenigii leaves: potential study for application as natural-based insect repellent, *arpn Journal of Engineering and Applied Sciences*.
 12. egupathi, K Chitra, K Ruckmani, KG Lalitha and Mohan Kumar, Formulation and Evaluation of Herbal Hair Gel for Hair Growth
 13. Potential, *J of Pharmacol & Clin Res* Copyright © All rights are reserved by T Regupathi. Sardana S. Herbal drug development from natural sources. *JAPTR*, 2012; 2(3): 3-82.
 14. Laila O., Murtaza I. Fenugreek: a treasure of bioactive compounds with promising antidiabetic potential, *IJFNS*, 2015; 1(4): 149-157.
 15. Ganesan P., Phaiphon A., Murugan Y. Comparative study of bioactive compounds in curry and coriander leaves: An update. *JCPR*, 2013; 5(11): 590-594.