

In Vivo Studies Of Hair Growth Promotant Activity On Female Albino Wistar Rats By Using Clitoria Ternatea Flower Extraction

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ABSTRACT: The present study deals with the assessment of hair growth of plant, Clitoria ternatea. The plant was extracted by using ethanol. Herbal formulations was prepared with the extract. The formulations were subjected to characterization of pH, texture, odour and toxicity studies. Hair growth activity of the formulations was studied in comparison with 2% minoxidil solution (standard) in albino wistar rats for 30 days. It was concluded that Clitoria ternatea showed the best hair growth activity. Formulation containing Clitoria ternatea of ethanol extract showed the minimum time to initiate (7 days) as well as to complete the hair growth (15 days) at denuded surfaces. This formulation showed the best hair lengthening properties as compared to others. The consider concluded that indeed the short-term treatment with these home grown details is successful in critical hair growth advancement.

Key words: Herbal, Alopecia, Hair growth, Hair loss, Minoxidil, Clitoria ternatea,

I. INTRODUCTION:

Hair has sociological importance throughout the world. Alopecia (baldness) or hair loss, a dermatological disorder is a common problem in cosmetics as well as primary health practice[1].

Drugs which claim to treat their Hair loss target a steadily growing, multi-billion dollar market worldwide[8]. Over the past several years about 3,00,000 products claimed to help their regrowth But minoxidil and finasteride, none of them was found to be viable in hair development promotion[4]. Minoxidil, a engineered (cardiovascular) sedate was experimentally demonstrated to assist the treatment of alopecia. The hair development action of minoxidil is really the side impact of this cardiovascular drug. Herbal drugs have been broadly utilized for hair development advancement since antiquated times in Ayurvedha and Unani framework of pharmaceutical. In Ayurvedha, Indrayan (Citrullus colocynthis), Bhringraj (Eclipta alba), Brahmi/mandukparni (Bacopa monnieri) and Nagarmotha (Cypercus rotundus) have been reported to be effective in the treatment of Indralupta that is bladeness[9]. Natural products are very popular and well accepted in the cosmetic and hair care industries and about 1000 plant extracts have been examined for hair care usage. In this study Clitoria ternatea flower was taken. The flower was in blue colour contain Anthocyanin chemical constituents that can be used as hair growth[11].



Clitoria ternatea flower

The present research deals with the assessment of hair growth potential of *Clitoria ternatea* flower. In the sub tropical region, these herbs have long been utilised as folk medicines for hair maintenance.

II. MATERIALS AND METHODS:

Collection and identification of plant:

The flowers of *Clitoria ternatea* were collected from the road side and near house in the month of November (2021). The flowers of *Clitoria ternatea* were identified by comparing with standard herbarium specimens available in Department of Botany (ethanobotanical science) was authenticated by Professor Dr.K. Gowrishankar (Botanist). The whole study was conducted from september 2021 to February 2022 in the Department of Pharmacology, Department of Pharmacognosy and Department of Pharmaceutics.

Preparation of herbal extracts:

The flowers were dried under shade and made to a coarse powder. One hundred gram flower powder was extracted in the soxhelt extraction apparatus with 500ml of ethanol (40 to 60°C). The extract was filtered and evaporated under reduced pressure and dried in vaccum. The dried extract was employed in the development of hair-growth formulas.

Preparation of formulations:

Clitoria ternatea flower was prepared as a base for all preparations. *Clitoria ternatea* flower were collected from sub-tropical region washed with fresh distilled water and dried a t suitable bactericide. *Clitoria ternatea* flower was extracted by using ethanol. The extraction consists of majorly Anthocyanins, steroids & flavanoids by using hair growth formulation of herbal cream. The foreign particles are removed from the formulation manually. To improve the stability of cream heated at 40°C. The stabilizing agent consist of Ascorbic acid (0.5% w/w), preserving agent sodium benzoate (0.5% w/w) was added and mixed in the formulations . the cream was stored in normal room temperature. In this method, *Clitoria ternatea* flower containing blue colour pigment (Anthocyanin constituents) was used for hair growth promotant activity.

Physical evaluation:

The prepared formulation were evaluated for surface pH, texture, odour, and skin irritation properties. The pH of all formulations were determined by pH meter. Texture determination was done by naked eyes odour of the formulations was also observed.

For primary skin irritation test, the healthy female rats were divided into 3 groups of 2 rats each. A 4 cm² area of dorsal portion of all rats were shaved and wiped with surgical spirit. A constant measures

quantity of the formulations was applied over the respective sites were observed any toxic side effects,

erythema and edema on skin surface for 48h after application.

In vivo hair growth activity in albino wistar rats:



Female Albino Wistar Rat

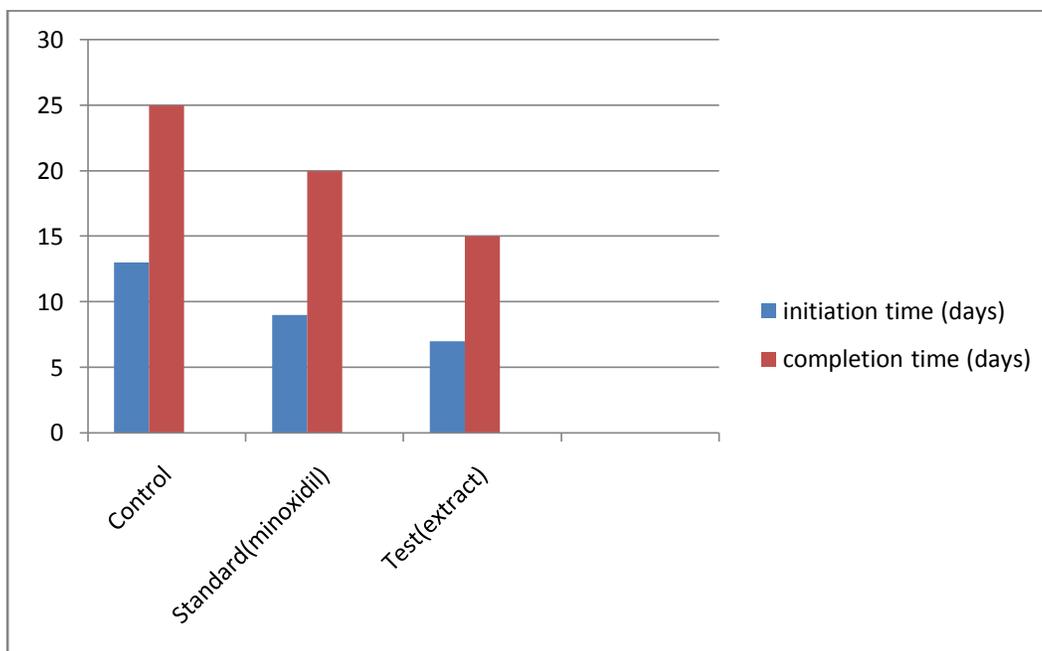
Female Albino Wistar Rats, weighing 210-250 g were used for hair growth studies. The Institutional Ethical Committee authorised the study. Animals were maintained in cages and exposed to regular environmental circumstances. They were fed ad libitum with a standard food and had free access to drinking water. Hair growth experiments were conducted on the produced formulations.

In this the screening of hair growth potential was evaluated in albino wistar rats. The healthy female rats was divided into three groups of 2 rats each. The hairs of dorsal portion 4 cm² area of the rats clipped with scissor and the traces of the hairs were removed by the application of marketed hair removal cream (Anne French, India). Finally, surgical spirit was used to remove the denuded skin. Equal quantity of prepared formulations and 2% standard minoxidil solution (Mintop, Dr.Reddy's

Lab. India) were applied to the denuded area of female albino wistar rats once a day for 30 days. Control group received only the prepared formulations. The hair development pattern was qualitatively evaluated and recorded during the duration.

Qualitative studies on hair growth:

Qualitative hair growth analysis was undertaken by visual observation of two parameters: Hair growth initiation time (i.e., minimum time to initiate hair growth on denuded skin region) and Time for hair growth to be completed (i.e., minimum time taken to complete cover the denuded skin region with new hair). Therefore, the hair growth initiation time and hair growth completion time were recorded for each group of animals with respect to standard and control, during the treatment.



Qualitative hair growth studies of herbal formulation

Hair length studies:

Hair length studies was considered to be an important factor of growth. After 15 and 30 days, hair was randomly removed from the shaved area of selected rats.

With the help of a magnification lens, manual measuring of plucked hair was done with tweezers holding the fine hair against a ruler. Random samples of 100 strands of (from each group) hair were measured and the average length (nm) was computed.

III. RESULT AND DISCUSSION:

The pH of all the prepared formulations ranged from 6.4 to 6.7. The formulations showed characteristic odour and different textures. Primary skin irritation test was carried out to evaluate the skin irritation by the prepared formulations on intact skin of rats. The prepared formulations did not show any erythema or edema; this indicates the prepared formulation were non irritant and non toxic on skin of rats.

Thus, the prepared extract were considered save for topical administration. This formulation were applied to the denuded area of albino rats once a day for 30 days. The hair development pattern was monitored and recorded qualitatively throughout the duration.

Hair growth initiation time and completion time was considerably reduced as compared to other test animals upon treatment with formulation (ethanol extract of *Clitoria ternatea*) respectively.

The ethanol extract of *Clitoria ternatea* showed the least initiation time (7 days) and least completion time (15 days). In control group animals, hair growth was initiated in the denuded area in the second week (13 days), whereas it was noted in the first week for extract and minoxidil-treated groups (9days). The formulations of *Clitoria ternatea* showed better hair growth activity even over the standard (minoxidil).

Time Taken For Initiation & Completion Of Hair Growth:

Treatment	Initiation time (days)	Completion time (days)
CONTROL (A)	13	25
MINOXIDIL (B)	9***	20***
EXTRACT (C)	7***	15***

***p<0.001, significance Vs control
 The hair lengthening properties was found to be in the order of **Extract > Minoxidil > Control.**

Therefore it can be concluded that formulation of ethanol extract showed best hair lengthening properties as compared to others.



Hair growth range

The ethanol extract of *Clitoria ternatea* flower showed hair growth promotant activity. In comparison to the control and minoxidil-treated groups, the extract-treated animals generated longer,

denser anagenic hair and it took less time for hair to cover the denuded epidermis of female rats.

Herbal medications work by increasing blood flow to the scalp, which promotes hair growth. Herbal drugs generally exert their hair growth

promotion effects by improving blood flow to scalp. The antioxidant effect of *Clitoria ternatea* might have contributory effect in hair growth.

From the results of hair growth activity experiment in rat model, it was concluded that *Clitoria ternatea* showed the best hair growth activity with no skin irritation. It took the shortest amount of time to initiate and complete hair growth on denuded surfaces. As compared to others, it was also found to improve the hair length.

The overall result of preliminary study shows that the short-term treatment with this herbal hair growth formulation is effective in significantly reducing hair loss and may stimulate new hair growth in a portion.

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IV. CONCLUSION:

The ethanol extract of *Clitoria ternatea* flower is more effective than Minoxidil in promoting hair growth in female albino wistar rats. If fully developed, it has the potential of surpassing Minoxidil which currently is widely used for hair growth promotion and is categorized as a life style drug. The herbal extract would be preferred, not only because of its natural origin but also minoxidil possess several side effects.

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