



## Evaluation Of Hair Growth Activity Of *Camara Lantana Linn.* On Wistar Albino Rat

<sup>1</sup>Ashutosh Shukla, <sup>2</sup>Manoj Jaiswal, <sup>3</sup>D.S Bele

<sup>1</sup>M.Pharm Student, <sup>2</sup>Associate Professor, <sup>3</sup>Principal

<sup>1</sup>Department of Pharmacology,

<sup>1</sup>Charak Institute of Pharmacy, Mandleshwar, India

**Abstract:** Hair is an essential appendage of the skin composed primarily of keratin, a fibrous structural protein. It originates from hair follicles located in the dermal layer. Hair not only enhances physical appearance but also provides protection against ultraviolet (uv) radiation, dust, and environmental pollutants.

The hair growth cycle consists of three distinct phases: anagen (growth phase), catagen (transitional phase), and telogen (resting phase). Disruption in this cycle may lead to alopecia, a common dermatological condition characterized by hair loss. Approximately 50% of the male population experiences some degree of alopecia during their lifetime, making it a significant medical and cosmetic concern.

*Lantana camara linn.* (family: verbenaceae) is a widely cultivated ornamental plant bearing clusters of yellow, pink, orange, or red flowers. The term *lantana* is derived from the latin word "lento," meaning "to bend." Traditionally, its leaves have been used for their antispasmodic, antibacterial, and antifungal properties, while the stem has been used for maintaining oral hygiene. Due to the presence of various phytoconstituents, the plant may possess potential hair growth-promoting activity.

**Keywords:-** *Camara lantana linn*, ANOVA, Alopecia, Soxhlet Apparatus, Maceration.

### I. INTRODUCTION

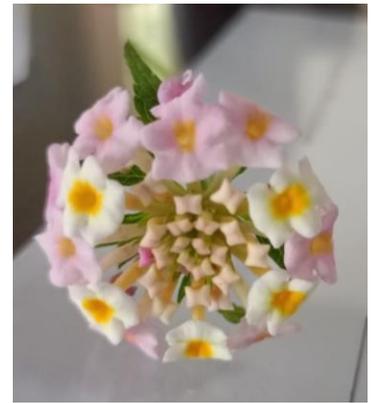
Hairs are often defined as -"Improved Epithelial structure formed as a result of keratinization of germinative cells," hairs are the outgrowths from the follicles present on the skin. Hair consists of keratin with chemical constituents such as Carbon (C), Nitrogen (N), Sulfur(S), & Oxygen (O). Hair growth varies from person to person but on the average hair grows about 15-30 mm/month. Hair is that the one of the vital parts of the body derived from ectoderm of the skin, and is protective appendages on the body. <sup>(1)</sup>

Medicinal plants represent an important source of medically important compounds. Since ancient time, medicinal plants are used to cure several types of health problems. Systemic analysis of these plants provides a variety of bioactive molecules for the development of newer pharmaceutical products. <sup>(2)</sup>

*Lantana camara Linn* is a flowering ornamental plant. It is used in several traditional medicinal preparations and is well known to cure several diseases. It is a major source of various classes of bioactive natural metabolites. From ancient times, Flowers are used as pectoral for children, leaves and fruits of that plant can be used externally in various skin diseases, cuts, and wounds. Stems and roots are used for gargles and toothaches as a toothbrush. The present article is reviewed that the phytochemical, analytical, pharmacological activities, and toxicology of *camara Lantana Linn.* <sup>(3)</sup>

**PLANT PROFILE**

01	Hindi Name	raimuniya
02	English name	spanish flag, Wild flag
03	Family	Verbenaceae
04	Kingdom	Plantae
05	Sub kingdom	Tracheobionta
06	Super divison	Spermatophyta
07	Division	Magnoliophyta
08	Class	Magnoliopsida
09	Sub class	Asteridae
10	Order	Lamiales
11	Genus	Lantana
12	Species	Lantana Camara

**GEOGRAPHICAL DISTRIBUTION**

The Wild sage is found in many states in India such as Jammu-Kashmir, South India, and Tamil Nadu, in different parts of Maharashtra, and also in Himachal Pradesh and Uttar-Pradesh. It is found in the Caribbean and Central and northern South America also now dispersed in about 60 tropical and subtropical countries and also temperature parts of the world.<sup>(4-5)</sup>

**PART OF PLANT**

Flowers of *Lantana camara* Linn are small habitually yellow or orange altering to red or scarlet, in dense axillary heads. The calyx is small, corolla tube slender, the limb spreading 6–7 mm wide and divided into unequal lobes. Stamen is four in two pairs, which included ovary two ovules, two-celled. Flowering arises between August and March, or all-around year if suitable moisture and light are available and small flowers are held in clusters. Color is usually orange, sometimes varying from white to red in various shades and the flowers usually change colors as they age. In the axillary head, flowers are having a yellow throat almost throughout the year.<sup>(6)</sup>

**MEDICINAL USE**

*Lantana camara* Linn. is commonly used as a herbal medicine and, in some regions, as firewood. The leaf oil is used as an antiseptic for scars or wounds; the roots are used for treating a toothache and the flowers for chest pain issues in children. *Lantana camara* Linn leaves extract exhibited antiproliferative, antimicrobial, fungicidal, insecticidal and nematocidal activities, as antispasmodic, tonic, and antiemetic, to treat respiratory infections. Most previous reports have described the antifungal and antimicrobial activities of *Lantana camara* Linn showed germicidal activity. The present review aims to document the phytochemistry and pharmacological evaluation of *Lantana camara* Linn and the prospects for further scientific investigation of the therapeutic compounds.<sup>(7)</sup>

**II. MATERIAL & METHOD**

Material which used in hair growth activity chemicals, Instruments & Glassware.

## EXPERIMENTAL ANIMALS

Wister Albino rat (200-225gm) all rats were purchased from Institute of animal Health & Veterinary. Sync Bio Research Pvt. Ltd. 8- Maruti Nandan Estate, Tajpur Road, Changodar, Ahemdabad-382213, Gujrat, India Reg. No. 2101/PO/RcBiBt/S/20/CPCSEA. They were housed in a group of six under standard laboratory conditions of temperature ( $25 \pm 2^\circ\text{C}$ ) Animals were Provided a standard laboratory diet (Mazie 60%, Soya flex 20%, Wheat 18.5%, common salt 1% mineral Mixture) And free access to drinking water. The experimental rat was maintained under 12hrs light and dark cycle. Animals were acclimatized to the new experimental environment for 5 days. (Quarantine Period) Before initiating the study. Laboratory animal handling and experimental Procedures were performed according to CPCSEA Guidelines and the registration Number of 1575/PO/Re/S/11/CPCSEA in Charak Institute of Pharmacy.

## METHOD

Fresh Flowers of *Camara Lantana Linn.* were collected from Road side of Local nimar Region in Barwani M.P.

Extract was Prepared using Soxhlet Apparatus with 95% Ethanol.

Preliminary Phytochemicals Screening was carried out by following Methods

- Identification of terpenoid Molisch test<sup>(8)</sup>
  - Identification of saponin
  - Identification of Flavanoids by sodium Hydroxide
  - Identification of Carbohydrates by 525olisch Reagent<sup>(9)</sup>
  - Identification of Alkaloids by mayer's Reagent<sup>(10)</sup>
  - Identification of protein by Millions Reagent<sup>(11)</sup>
- Hair Growth Activity done by Animal Model-Skin Irritation test, Hair Growth Measurement & Hair length Measurement.
  - Comparison of Standard & test were Performed.
  - Statistical Analysis done by, one way ANOVA and followed by Tukey's multiple comparison test using Graph-pad PRISM 10 software.

## III. EXPERIMENTAL WORK

Fresh Twig Containing Flowers of *Camara Lantana Linn.* in the month of January from Road side area of Barwani M.P. The plant was authenticated by Dr. Bupendra Bhargav, Assistant professor of Botany, S.B.N Govt. PG college, Barwani, M.P. After taxonomic and ethanomedical identification & Authentication of collected plant *Camara Lantana Linn.* fresh flowers were collected. Flowers collected were dry under the shed. Once they dried up completely flowers were Coarsely powdered by hands & mixer grinder and stored in air tight container.



Figure no: 1 collection of flowers

## EXTRACTION PROCESS

### ETHANOLIC EXTRACTION

Powdered flowers material 100 g was placed in a porous thimble in the upper chamber. In the lower boiling flask, the extracting solvent 200 ml was added. The flask was heated by the thermostat controlled heating mantle. The temperature was adjusted based on the boiling point of the solvents. The solvent was heated to reflux and extracted<sup>(12)</sup>. Ethanol was used for 18 hours at 60°C after charging the powder of *Camara Lantana Linn.* flowers into the thimble of a Soxhlet apparatus.<sup>(13)</sup> Exhaustive extraction was considered complete when a colorless solvent appeared in the siphon tube.<sup>(14)</sup> The concentrated extract was boiling at 55°C at water bath to achieve a semi – solid dark reddish – brown color mass.<sup>(15)</sup> extracts was weighed and preserved in brown air tight bottle at 5 °C until further use.<sup>(16)</sup>

### MECERATION EXTRACTION

Preparation of plant extract Cold maceration technique was used for the extraction of plant material and a total of 100 g of the coarse powder was used. During the process, 100 g of the coarse powder was soaked in an Erlenmeyer flask with 1 L of distilled water and then placed on a shaker adjusting at 170 revolutions per minute for 90 minute room temperature.<sup>(17)</sup>



figure no: 2 weighing



figure no: 3 soxhlet method



figure no: 4 maceration method

**PRELIMINARY PHYTOCHEMICALS SCREENING OF PLANT EXTRACT**

- **Test for protein**

Introduce 5-6 drops of Millon's reagent to both extracts. The formation of a white precipitate that turns red upon heating signifies the presence of proteins within the extract.

- **Test for Flavonoids**

Mix 1 mL of each extract separately with 2 mL of 2N sodium hydroxide. The presence of a yellow color indicates the existence of flavonoids.

- **Test for Saponin (Foam Test):**

To 0.5 gm of the extract was added to 5 ml of distilled water in a test tube. The solution was shaken vigorously and observed for a stable, persistent froth.

- **Test for Terpinoids**

**Salkowski Test:-**The extract 5ml is mixed with 2ml chloroform and this 3ml con.H<sub>2</sub>SO<sub>4</sub> is added. A reddish brown colour show presence of Terpinoids.

- **Test for carbohydrates**

Add 1 mL each of the Molisch reagent to both the extracts taken in test tubes and slowly introduce concentrated sulfuric acid with a gentle addition along the inner walls of the test tubes. Detection of a violet ring forming at the junction between the two liquids signifies the existence of carbohydrates within the extracts.

- **Test for Alkaloids**

3-5 Drops of Mayers Reagent were added to Extract. The Formation of cream colored Precipitate indicate Positive result.

### **DETERMINATION OF HAIR GROWTH ACTIVITY**

The rats divided into four group each contain 6 in each group

- Normal Control
- Standard (Minoxidil)
- Test Group I- (Ethanolic Extract of *Camara Lantana L.*)
- Test Group II – (Aqueous Extract of *Camara Lantana L.*)

### **HAIR GROWTH MEASUREMENT**

The Rats were divided into four groups 6 rats in each group) group I-control, Group II-Aqueous Extract, Group III- Ethanolic Extract & Group IV – Standard. 3cm<sup>2</sup> area was Shaved of individual rat in each group then cleaning the skin of Animal using Spirit to avoid Infection, then application of extract (II, III) & standard solution on Shaved Skin as according to group. About 2ml of solution were applied on shaved area. Observation was continue till 30 days for Quantitative & Qualitative parameters of Hair growth.

### **QUALITATIVE HAIR GROWTH STUDY**

Qualitative hair growth was evaluated by visual observation of two parameters: (a) hair growth initiation time, that is minimum time to initiate perceptible hair growth, and (b) hair growth completion time, that is, minimum time taken to cover the denuded skin region with new hair completely. Hair growth initiation and completion time was recorded for each group of animals.<sup>(18)</sup>

### **SKIN IRRITATION TEST**

Shaven dorsal area of the Rat with depilatory cream (Veet ® cream) and cleaned using surgical spirit and there after alcoholic and aqueous extracts (3%) were applied on skin over 4 cm<sup>2</sup> and the rat were observed for 48h.<sup>(19)</sup>All test animals were observed for the presence of erythema and edema.

## HAIR LENGTH MEASUREMENT

The test solution (II, III) was administered topically on the rat shaved skin, once a day (morning) with a volume of 2 ml, for 30 days. On days 7, 14, 21, and 30 from each treated area was taken randomly 6 hairs and the length of each hair was measured. Hair is taken by cutting, then straightened and placed on a dark base as well as tape and measured using a scale/caliper. The value is expressed as mean  $\pm$  SD. <sup>(20)</sup>

## IV. RESULTS

### EXTRACTION PROCESS

The total yield obtained from extraction was found in the ethanol 18% W//W and water 7%W/W.

table no: 1 phytochemical screening

S.No.	Phytochemicals	Aqueous Solution	Ethanollic Solution
1.	Protein	-	+
2.	Flavanoids	+	+
3.	Saponin	+	+
4.	Terpinoids	-	+
5.	Carbohydrates	+	+
6.	Alkaloid	-	-



figure no: 5 phytochemical screening

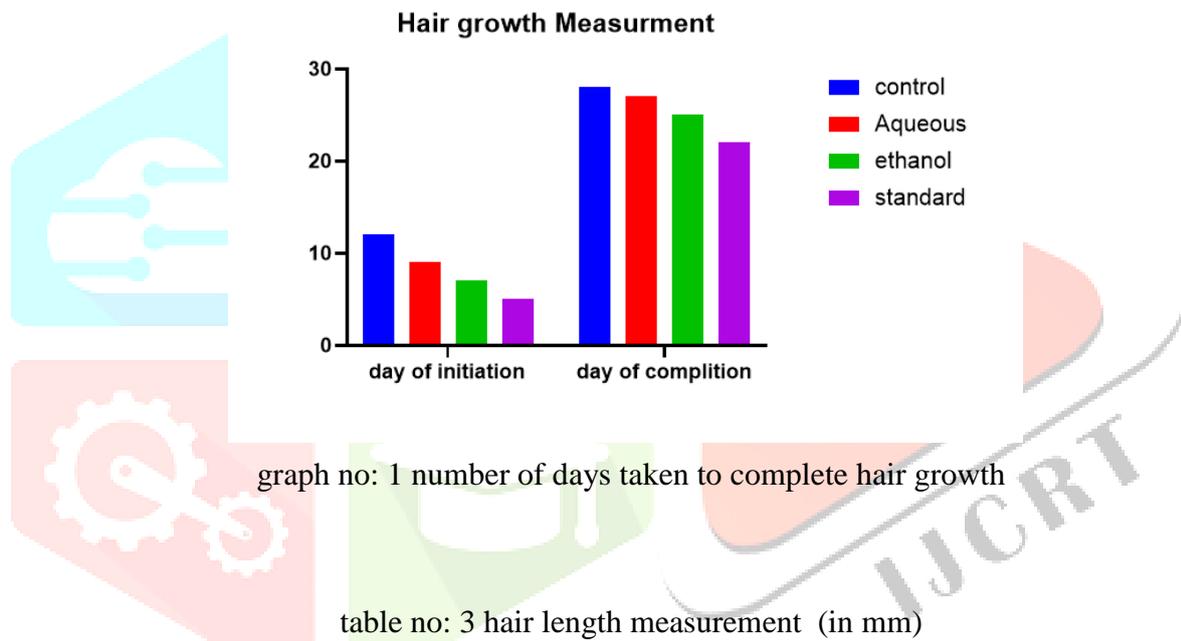
### SKIN IRRITATION ANALYSIS

Ethanollic and Aqueous Extract of *Camara Lantana Linn.* did not show any sign of Irritation i.e. no erythema or edema and no loss of hairs was observed at the site of application till 24-48 Hours.

## QUALITATIVE OBSERVATION OF EXTRACT OF *CAMARA LANTANA LINN.* HAIR GROWTH

table no: 2 observation of hair growth

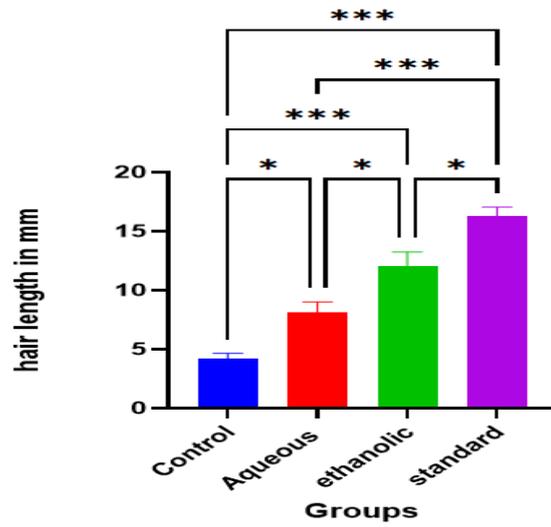
Group	Treatment	Number of days taken to initiate hair growth	Number of days taken to complete hair growth
Control(I)	No treatment	12	28
Test(II)	Aqueous extract	9	27
Test(III)	Ethanollic extract	7	25
Standard(IV)	Minoxidil	5	22



Group	Treatment	Length of Hair mean(mm) $\pm$ SD			
		Day 7	Day 14	Day 21	Day 30
Control	No treatment	2.90 $\pm$ 0.23	3.98 $\pm$ 0.26	4.69 $\pm$ 0.30	5.10 $\pm$ 0.18
Test	Aqueous extract	6.51 $\pm$ 0.19*	7.29 $\pm$ 0.17*	8.12 $\pm$ 0.20*	10.59 $\pm$ 0.25*
Test	Ethanollic extract	9.56 $\pm$ 0.69***	10.72 $\pm$ 1.10***	12.50 $\pm$ 0.49***	15.25 $\pm$ 0.71***
Standard	Minoxidil	14.30 $\pm$ 0.59***	15.86 $\pm$ 0.63***	16.98 $\pm$ 0.65***	17.62 $\pm$ 0.64***

Data are expressed as mean  $\pm$  (n=6) \*P<0.05 and \*\*\*P< 0.001 as compared to Control Group using On-way ANOVA followed by (post Hoc) Tukey's Multiple comparison test.

Col: One-way ANOVA



graph no: 2 hair length measurement

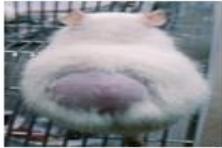
Group	Start of Experiment	Initiation of Hair Growth	Completion of Hair Growth
<b>CONTROL</b>	 Day 0	 Day 12	 Day 28
<b>STANDARD</b>	 Day 0	 Day 5	 Day 22
<b>AQUEOUS</b>	 Day 0	 Day 9	 Day 27
<b>ETHANOLIC</b>	 Day 0	 Day 7	 Day 25

Figure no: 6 visual observation hair growth

## V. CONCLUSION

In the present study, the ethanolic and Aqueous extract of flowers of *Camara Lantana Linn* were selected to explore the scientific information on Phytochemical and Pharmacological aspects. The parameter which is reported under botanical description and evaluate the phytochemical studies of plant *Camara Lantana Linn* Showed the presence of active constituent in the ethanolic or Aqueous extract are as follows Carbohydrates, tannins, Protein, and terpenoids from the experiments. The effect of this drug in various type of disease. *Camara Lantana Linn* so the need of the present study was to identify the novel hair growth promoter with no side effect. The active constituent of *Camara Lantana Linn* flowers (terpenoid, flavanoids,) to increase the hair growth.

This preclinical study introduce an initial concept for the hair growth potential of *Camara Lantana Linn* flowers. Further studies investigating the anti-androgenic mechanism of this plant as well as human studies will be complementary to this study.

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