



Formulation and Evaluation *Eclita alba* as a Natural Hair Dye

Ch. Pragna* and C. Srinivas Reddy.

Department of Pharmacognosy and Phytochemistry, Vaagdevi College of Pharmacy, Warangal, Telangana, India - 506002.

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*Corresponding Author Email: chpragna99@gmail.com

Abstract

Eclipta alba (L.) Hassk commonly known as bhringraj. It is mainly found spreading easily in moist grounds and is widely used for its nutritional values all over the world. The plant is used to treat different diseases in human in traditional medicine. The important pharmacological activities are hepatoprotection, antibacterial, analgesic, antidiabetic hair growth, etc. This paper explains the evidence- based information regarding the Phytochemical and evaluation study as a natural hair dye.

Keywords

Eclipta alba, bhringraj, photochemistry and pharmacological activity.

INTRODUCTION

Hair is an appendage of the skin. Hair offers protection to body beside attractive. The scientific study of hair is called trichology.

Hair has a very practical purpose. In nose and ears, it keeps away foreign from invading the body. Under the arms and in the public area, it protects body from friction. The hair on head cushions from blows and keeps head warm in winter and cool in summer. Eyebrows keep sweat from running into your eyes and eyelashes shade the eyes and help to keep dust out.¹⁻²

Hair is composed mainly of a hard chemical substances called keratin. This is a protein, in nails and in the claws, features, hooves, and wool in animals. Hair contains varying amounts of carbon, hydrogen, oxygen, nitrogen, and sulfur. Light hair has more oxygen and sulfur, whereas dark hair has more carbon and hydrogen.⁴

MATERIALS AND METHODOLOGY

HAIR DYE EVALUATION STUDIES IN RATS:

The hair dye activity of plant extracts i.e., *Eclipta alba* were evaluated In vivo by different groups of rats by following methods.

Hair Dye (*In vivo*):

Hair Dye Lotion Preparation Procedure:

Preformulation studies:

Identification of Drug:

Synonym: Ricinus oil.

Biological Source: Castor oil is the fixed oil obtained by the cold expression of the seeds of *Ricinus communis* Family:Euphorbiaceae.

Name: Castor oil.

Category: Lubricant and Laxative.

Boiling Point: 290°C (595°F).

Solubility determination: Soluble in alcohol, miscible in chloroform, solvent ether, glacial acetic acid and petroleum ether. It is insoluble in mineral oil.

Organoleptic Properties:

Colour: Pale yellow or Colourless liquid.

Taste: Bland but afterwards slightly acrid, and nauseating.

Odour: Slight and Characteristic smell.

Standards: Viscosity: 6-8 poises.

Density: 961kg/m³.

Acid value: not more than 2.

Iodine value: between 82 to 90.

Saponification value: between 176 and 187.

Storage: Should be stored in well closed container.

Identification of Drug:

Synonym: Cera flave, cera alba, yellow wax.

Biological Source: Bees wax is purified wax and obtained by melting and purifying the honeycomb of bees *Apis mellifera* and other of apis.

Name: Bees wax.

Category: Emollient.

Melting point: 60 to 64°C (144 to 147° F).

Solubility Determination:

Insoluble in water, soluble in hot alcohol ether, chloroform, carbon tetrachloride, fixed and volatile oils.

Standards: Acid value: 5-10%.

Iodine value: 8-13.

Ester value: 80-95.

Organoleptic Properties:

Colour: Yellowish-brown or yellowish –white.

Odour: Agreeable and honey like.

Taste: Faint characteristic.

Storage: Should be stored in well closed container in a cool, dry room avoiding exposure to light, strong odour.

Kept in a well-ventilated area.

Identification of Drug:

Name: Stearic acid.

Molecular formula: C₁₈H₃₆O₂.

Category: Lubricants, Softening agents.

Melting Point: 69.3°C (156.7 °F; 342.4K).

Solubility Determination:

Solubility: Soluble in alkyl acetates, alcohols, HCOOCH₃, Phenyls, CS₂, CCL₄.

Solubility in dichloromethane: 3.58g/100g (25°C).

8.85g/100g (30°C).

18.3g/100g (35°C).

Solubility in acetone: 4.56g/100g.

Solubility in chloroform: 18.4g/100g.

Solubility in toluene: 15.75g/100g.

Organoleptic Properties:

Colour: White powder.

Odour: Characteristic smell.

Taste: acidic.

Storage: Stored in well closed container at room temperature.

Identification of Drug:

Name: Sodium hydroxide (NaOH).

Category: Strong base.

Melting Point: 280-285.

Solubility Determination:

Solubility in water: 359g/L.

Solubility in ammonia: 21.5g/L.

Solubility in methanol: 14.9g/ml.

Organoleptic Properties:

Colour: Colourless crystals.

Odour: Odourless.

Taste: Basic.

Storage:

It is stored in closed container.

***Eclipta alba* hair dye lotion formulation studies:**

Viscosity, Skin irritation test, Stability studies.

Evaluation of hair dye:

Microscopic studies, Test for PH, Effect of Sunlight on colored rat hair, Effect of Natural detergent on colored rat hair, Patch test.

RESULTS AND DISCUSSIONS

Extraction results:

1. Percentage yield and Physical appearance of petroleum ether extracts of *Eclipta alba*

S.NO.	Extract	% Dry wt(w/w)	Colour	Consistency
1.	<i>Eclipta alba</i>	1.72	Dark brown	Resinous

The results shown in the above table indicates the powdered extracts of *Eclipta alba* by Soxhlation.

Qualitative Phytochemical Screening:

Phytochemical Screening of Petroleum ether extract of *Eclipta alba*

TLC profile of phytoconstituents

Detection of various phytoconstituents by TLC in the petroleum ether extract of *Eclipta alba* by Soxhlation.

Detection of various phytoconstituents by TLC in the Petroleum ether of *Eclipta alba*.

TLC PROFILE OF FLAVONOIDS: TLC PROFILE OF ALKALOIDS:



Toluene:Acetone:Formic acid (11:6:1)



Ethyl acetate:Methanol:Water (100:13.5:10)

Table:

PRE-FORMULATION:

S.NO	Name	M.pt As per I.P.
1.	Stearic acid	69 °C 69.3°C
2.	Bees wax	60°C 62-64°C.
3.	NaOH	280-285°C 801°C

Castor oil – B.pt -290.as per I.P.313°C

Solubility Determination:

Sodium hydroxide:

Solubility in water: 359g/L.

Solubility in ammonia: 21.5g/L.

Solubility in methanol: 14.9/L.

Stearic acid:

Solubility: Soluble in alkyl acetates, alcohols, HCOOCH₃, Phenyls, CS₂, CCl₄.

Bees wax:

Solubility: Insoluble in water, Soluble in hot alcohol ether, chloroform, carbon tetrachloride, fixed and volatile oils.

Castor oil:

Solubility: Soluble in alcohol, miscible in chloroform, solvent ether, glacial acetic acid and petroleum ether. It is insoluble in mineral oil.

***Eclipta alba* lotion Evaluation studies:**

Test for Thermal Stability, Determination of pH, Determination of Total Fatty Matter.

Calculation:

Total Fatty Matter % = $100 \times M_1 / M_2$

Where, M₁= mass in gram of residue.

M₂= mass in gram of material taken for test

Total Fatty Matter% = $100 \times 0.25 / 2 = 11.5\%$

Determination of Water content:

Calculation:

Water % by mass = $V \times D \times 100 / M$.

Where, V = volume of water in ml at room temperature collecting in receiving tube.

D = density of water at room temperature.

M = Mass in gm of the material taken for the test.

Water% by mass = $7 \times 1 \times 100 / 10 = 70\%$.

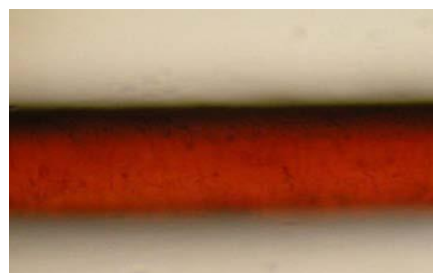
EVALUATION OF LOTION: GENERAL EVALUATION OF LOTION.

HAIR DYE EVALUATION STUDIES IN RATS:

The hair dye effect of Petroleum ether extract of *Eclipta alba* were evaluated by *in vivo* method.

Effect of *Eclipta alba* extract, *Eclipta alba* lotion, Minoxidil. on hair dye.

Microscopic Study, pH, Effect of Sunlight on colored rat hair, Effect of Natural detergent on colored rat hair, Patch test

MICROSCOPICAL IMAGES OF RAT HAIR:**Day-7****Day-12****Day-9****Day-15****EFFECT OF SUNLIGHT ON COLORED RAT HAIR:****Day-7****Day-9****Day-12****Day-15**

EFFECT OF DETERGENT ON COLORED RAT HAIR:



Day-7



Day-9



Day-12



Day -15

COMPARITIVE EFFECT OF ECLIPTA ALBA EXTRACT, ECLIPTA ALBA

LOTION AND MINOXIDIL ON HAIR DYE:



Figure: Control



Figure: *Eclipta alba*

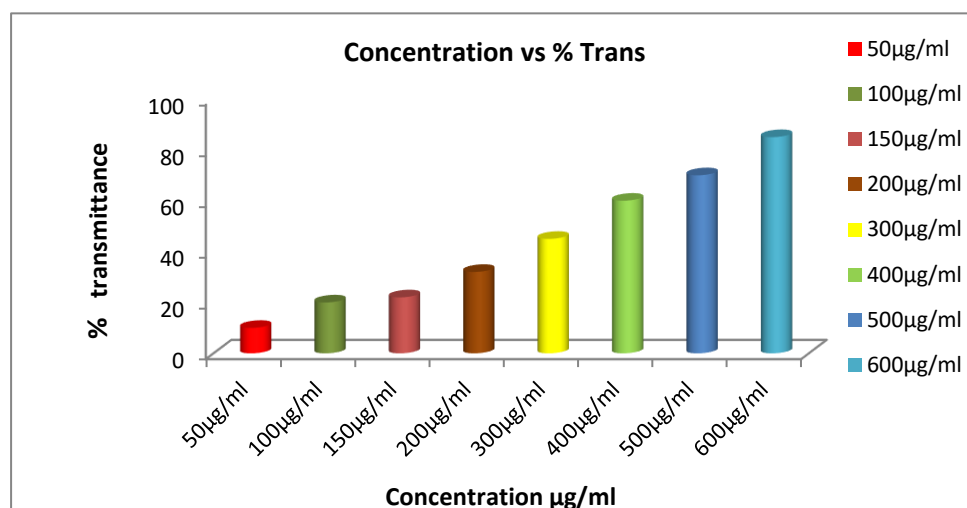


Figure: Minoxidil

Standard Graph of *Eclipta alba* of Concentration and % Transmittance.

Concentration	%Transmittance
0	
50µg/ml	10
100µg/ml	20
150µg/ml	22
200µg/ml	32
300µg/ml	45
400µg/ml	60
500µg/ml	70
600µg/ml	85

Graphical Representation of *Eclipta alba* concentration vs % Transmittance



By the above graph representation concentration increases the transmittance increases

***Eclipta alba* lotion Formulation studies results:** Viscosity, Skin irritation test, Stability studies.
Stability studies *Eclipta alba* lotion formulation

CONCLUSION

In conclusion, Petroleum ether extract of *Eclipta alba* definitely promote hair colour. Animals treated with *Eclipta alba* plant extract and minoxidil. *Eclipta alba* showed better efficacy as compared to minoxidil.

The Minoxidil hair dye damages the cortex of hair. *Eclipta alba* hair dye does not damage the cortex of hair. Similarly, in our study, we have observed that the minoxidil hair dye which has skin irritation and cause proliferation of epithelial cells near the base of the hair follicle and may induce the vasodilation of scalp blood vessels. Minoxidil has hair growth activity and promotes hair colour.

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