

Development and Evaluation of Herbal Eyeointment from *Heliotropiumindicum* Linn Leaf Extract for Conjunctivitis

A. Geethalakshmi

Department of Pharmaceutics,
R R College of Pharmacy, Bangalore, Karnataka, India

Himavarshini J.

Department of Pharmaceutics,
R R College of Pharmacy,
Bangalore, Karnataka, India

Kavitha Yadav

Department of Pharmaceutics,
R R College of Pharmacy,
Bangalore, Karnataka, India

ABSTRACT

Even in areas where modern medicine is available, the interest on herbal medicines and their utilization have been increasing rapidly in recent years. Plants have played a significant role in maintaining human health and improving the quality of human life for thousands of years. The present work was designed with the aim to formulate and evaluate the ocular ointment containing HeliotropiumindicumLinn leaf extract. Cold infusion of the leaves used to remove cataract in the eye. The ocular ointment was prepared from aqueous extract in varied concentration and was evaluated. The ointment base was prepared and formulation of ointment was done by incorporating the extract in the base by levigation method. After completion of formulation it was evaluated for its physicochemical parameters like colour, odour, pH ,spreadability, extrudability, consistency, diffusion study, solubility, washability. Also the formulation was evaluated for its stability at various temperature conditions which shows no change in the irritancy, spreadability, diffusion study and anti- microbial studies. Thus it could become a media to use the medicinal properties of leaf extract of Heliotropiumindicum Linn effectively and easily as a simple dosage form.

Keywords: HeliotropiumindicumLinn, Ocular herbal ointment, Bacterial conjunctivitis and Anti-microbial.

INTRODUCTION:

In improving the quality of human life plants have played a significant role. Herbal medicine is based on the principle that plants contain constituents that can promote health and alleviate illness. All over the world the plants research has increased and the collected evidences showed the immense potential of medicinal plants used in various traditional system. There are many medicinal plants generally used in ocular diseases which are easily available and possess biological activity. The efficacy of many traditional medicines in curing ocular disorders is recognized by modern science also. In pink eyes there is an inflammation of conjunctiva which is also known as Conjunctivitis which is the most common disorder encountered in ophthalmology. It causes redness, burning sensation, sensitivity to light, dryness, grittiness sensation, itchy and scratchy feeling, watering of eyes, and swelling of eyelid. The conjunctivitis caused due to bacteria known as bacterial conjunctivitis.

Heliotropiumindicum(HI) Linn (Family Boraginaceae) is a medicinal plant. It has various medicinal uses in the treatment of disease conditions such as abdominal pains, amenorrhoea, aysmenorrhoea, skin rashes, wounds, hypertension, ocular infections, convulsion and dizziness. Cold infusion of the leaves used as an enema stops abdominal pains; this preparation also removes cataract in the eye; the juice from the leaves is squeezed into the eye to stop dizziness; decoction of the whole plant is used to treat convulsion in children. Other medicinal uses of HI comprises the use of juice of the leaves as an antiseptic and anti- inflammatory agent when applied to

wounds, sores, boils, gum boils and pimples on the face. Boiled with castor oil, it is applied to sores from scorpion bites and also locally used in treating Ophthalmia. HI leaves are used for the treatment of ophthalmic disorders, erysipelas and pharyngodynia^{1,2}. Our aim of the project is to prepare and evaluate the eye ointment from HI leaf extract to treat bacterial conjunctivitis.

MATERIAL AND METHODS:

Collection and preparation of plant powder:

The leaves of *H. indicum* were collected in the month of December from Nagercoil, TN and dried in shade. The plant was authenticated by Dr.D.Stephen, Madurai medical college, TamilNadu. The shade dried leaves were powdered to get a coarse powder. The powder was passed through sieve No. 40 and stored in an airtight container for further use.

Preparation of extracts:

The leaf of the plant were dried in shade for about 3 weeks and ground by using a mixer to a coarse powder. Powders of leaf were first extracted with the petroleum ether for defatting and then successively re-extracted with ethyl acetate and 70% acetone for 48 hrs. Obtained acetone extract was filtered and dried by using rotary flash evaporator.

The 20gm of coarse powder of leaf was boiled in 400 ml of distilled water and were further heated at 60–70°C to a concentrated solution (~50 ml). Extracts were subsequently filtered through 0.22µm filters and concentrated to dry mass by using vacuum distillation. The percentage yield was calculated. The aqueous extracts were used for further study.

Table 1: Formulation of Ointment base

S. No.	Ingredient	Quantity
1.	Wool fat	0.5gm
2.	Cetostearyl alcohol	0.5gm
3.	Hard paraffin	0.5gm
4.	Yellow soft paraffin	8.5g

Table 2: Formulation of Herbal Ointment

S. No.	Ingredient	Quantity
1.	Prepared <i>H. indicum</i> extract	0.12gm
2.	Ointment base q.s.	10gm

Procedure for preparation of herbal ointment:

a) Initially ointment base was prepared by weighing accurately grated hard paraffin which was placed in evaporating dish on water bath. After melting of hard paraffin remaining ingredients were added and stirred gently to aid melting and mixing homogeneously followed by cooling of ointment base.

b) Herbal ointment was prepared by mixing accurately weighed *H. indicum* extract to the ointment base by levigation method to prepare a smooth paste with 2 or 3 times its weight of base, gradually incorporating more base until to form homogeneous ointment, finally transferred in a suitable container.

EVALUATION OF OCULAR HERBAL OINTMENT FORMULATIONS:

Physical Evaluation:

Visual Appearance and Clarity:

Clarity and transparency are the most important characteristic features of ophthalmic preparations. The formulations were examined for visual appearance, clarity and transparency by visual observation.

Consistency:

Smooth and no greediness is observed.

Measurement of pH:

The preparation should be non-irritating as it is to be administered to the eye. To ensure that the preparation has same pH as that of lacrimal fluid, the pH of the formulation after addition of all the ingredients was measured using digital pH meter.

Spreadability:

Spreadability was determined by the apparatus which consists of a wooden block, which was provided by a pulley at one end. By this method spreadability was measured on the basis of slip and drag characteristics of ointment. About 2 g of ointment under study was placed on this ground slide. The ointment was then sandwiched between this slide and another glass slide having the dimension of fixed ground slide and provided with the hook. A 1 kg weighted was placed on the top of the two slides for 5 minutes to expel air and to provide a uniform film of the ointment between the slides. Excess of the ointment was scrapped off from the edges. The top plate was then subjected to pull of 80 g. With the help of string attached to the hook and the time (in seconds) required by the top slide to cover a distance of 7.5 cm be noted. A shorter interval indicates better spreadability. (Table: 3)

Spreadability was calculated using the following formula: $S = M \times L / T$

Where, S = Spreadability,

M = Weight in the pan (tied to the upper slide),

L = Length moved by the glass slide and

T = Time (in sec.) taken to separate the slide completely each other (Table: 13, 14)

Homogeneity:

All developed gels were tested for homogeneity by visual inspection after the gels have been set in the container. They were tested for their appearance and presence of any aggregates.

Extrudability The formulation was filled in collapsible tube container. The extrudability was determined in terms of weight of ointment required to extrude 0.5cm of ribbon of ointment in 10 seconds. **Diffusion study** The diffusion study was carried out by preparing agar nutrient medium. A hole board at the center of medium and ointment was by placed in it. The time taken by ointment to get diffused through was noted. (after 60 minutes) **LOD** LOD was determined by placing the formulation in petri-dish on water bath and dried for the temperature 105°C. **Solubility** Soluble in boiling water, miscible with alcohol, ether, chloroform. **Washability** Formulation was applied on the skin and then ease extend of washing with water was checked.

Antibacterial activity by agar well diffusion method:

In this method a previously liquefied medium was inoculated with 0.2 ml of *Staphylococcus aureus* suspension having a uniform turbidity at temperature of 40° C. 20 ml of culture medium was poured into the sterile petri dish having a internal diameter of 8.5 cm. Care was taken for the uniform thickness of the layer of medium in different plates. After complete solidification of liquefied inoculated medium, the wells were made aseptically with cork borer having 6mm diameter. In each of these plates ointment was placed carefully. Plates were kept for pre diffusion for 30 minutes. After it normalized to room temperature, the plates were incubated at 37° C for 24 hours in case of bacteria. After incubation period was over, the zone of inhibition was measured with help of Hi-media. The inhibitory effect of ointment formulation was compared with marketed ointment for bacteria.

Stability study Physical stability test of the herbal ointment was carried out for four weeks at various temperature conditions like 2°C, 25°C and 37°C. The herbal ointment was found to be physically stable at different temperature i.e. 2°C, 25°C, 37°C within four weeks.

RESULT AND DISCUSSION:

The present study was done to prepare and evaluate the herbal ointment. For this the herbal extracts were prepared by using simple maceration process to obtain a good yield of extract and there was no any harm to the chemical constituents and their activity.

The levigation method was used to prepare ointment so that uniform mixing of the herbal extract with the ointment base was occurred which was stable during the storage.

The physicochemical properties were studied which shows satisfactory results for spreadability, extrudability, washability, solubility, loss on drying and others.

Also, the formulation was placed for a stability study at different temperature conditions like 2°C, 25°C, 37°C within four weeks. There were no changes observed in spreading ability, diffusion study as well as anti-bacterial study irritant effect.

Physicochemical evaluation of formulated ointment

Physicochemical parameters	Observation
Colour	Slight brownish
Odour	Characteristic
Consistency	Smooth
P H	7.3
Spreadability(seconds)	7
Extrudability	0.4 gm
Diffusion study (after 60 min)	0.7 cm
Loss on drying	30%
Solubility	Soluble in water, miscible with alcohol, ether, chloroform
Washability	Good
Non irritancy	Non-irritant
Stability study (2°C, 25°C, 37°C)	Stable

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. It is a very good attempt has made to establish the herbal ointment containing aqueous leaf extract of *Heliotropium indicum* Linn. The antibacterial studies revealed that the developed herbal formulation consisting aqueous leaf extract of *Heliotropium indicum* Linn comparatively better to treat bacterial conjunctivitis. The ointment also shows the good antimicrobial activity against the microbes used. So, the developed herbal formulation is a viable alternative to conventional synthetic eye ointment.

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