

# Effect of Nethra Eye Drops (Siddha Formulation) on Rabbits Eye

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**Abstract:** To evaluate the effect of Nethra eye drops applied to the ocular surface of rabbits eye. **Methods:** The rabbits in the experimental group were given the test substance daily for 28 days while the control group was kept in the same conditions without any treatment. Irritation of the eye, body weight, and mortality rate were observed on Day 7, 14, 21 and 28 after the commencement of the experiment. **Result:** There was no evidence of irritation or any pathology in both the experimental and control animals. Nethra eyedrops appears to reduce the irritating effect. **Conclusion:** The herbal constituents of Nethra eye drops in combination did not result in irritation.

**Keywords:** Cornea, Ocular surface, Nethra, Irritation

## 1. Introduction

The use of medicinal plants is based on the experience of many generations of physicians and traditional systems of medicine from different ethnic societies. The use of medicinal plants in modern medicine suffers from the fact that although hundreds of plants are used in the world to prevent or to cure diseases, scientific evidence in terms of modern medicine is lacking in most cases. However, today it is necessary to provide scientific proof as to whether or not it is justified to use a plant or its active principles.<sup>1</sup>

Ophthalmic problems afflict a substantial portion of the population. Some of these can be managed with antibiotics and steroids. However, the prolonged use of these drugs has its own drawbacks.

The emergence of cataract is related to strong UV radiation and growing pollution which can be effectively reduced by natural antioxidant biomolecules which may be applied externally or as topical application as eye drops; or taken internally as food supplements or through nanobiotechnology based formulations<sup>2</sup>

These side effects are believed to be less with herbal preparations<sup>3</sup> though there are very few systematic studies conducted to evaluate this. The present study intended (i) to evaluate the protective effect of a specific preparation of Nethra eye drops in reducing irritation and (ii) to assess whether the Nethra eye drops themselves would cause irritation or not, as some of the constituents are considered therapeutically useful, yet possibly irritating to the eye. So tests were carried out on albino rabbits

### Ingredients

Rock salt

Piper longum (Fruit)

Argemone Mexicana (Exudate)

Tabernaemontana coronaria (Flower)

Blepharisboerhavifolia (Leaf)

Gingili oil (base)

Each ingredient of the formulation is known to have different types of activities such as anti-inflammatory, antioxidant, antimicrobial and soothing. As it is desired that the final formulation should have all the above activities, each ingredient was screened for all these activities and then combined in various proportions

## 2. Material and Methods

### Animals and their living conditions

Healthy rabbits without any eye disorder were selected for the study. All rabbits used in this study (n = 24) were New Zealand, white albino rabbits weighing 2.0 – 3.5 kg. They were housed individually in metal cages fitted with perforated floors. The room was environmentally controlled with a 12 - h light/12 - h dark cycle, at 30–70% humidity range and 22–24°C temperature range. They were allowed to drink tap water and had access to normal feed *ad libitum*. Standard ethical considerations for handling laboratory animals were observed.

### Study Design

The rabbits were allocated to experimental and control groups. The experimental group had 4 sub - groups (n = 6, 3 males and 3 females in each subgroup) and the control group had 6 rabbits (3males and 3 females). Each cage was tagged with details such as the study number, study name, dose, group name, and animal number, date of initiation and date of termination of the study. The experimental group was given the test substance for 28 days daily. The control group was kept in the same environmental conditions without any treatment. They were housed in an air - conditioned room under a 12 h - light/12 h - dark cycle. No rabbit had either a corneal or conjunctival disorder.

### Experimental Procedure

Each 15 ml of the Siddha preparation consisted of (i) Rock salt solution 5%, (ii) Juice of Piper Longum fruit 5%, (iii) Exudate of Argemone mexicana 15% (iv) Juice of Tabernaemontana coronaria flowers 15% (v) Juice of Blepharisboerhavifolia leaf 60% v/v Gingili oil as base. The

pH of the eye drop was found to be 5.10. The test substance was instilled in the conjunctival sac of the left eye of each animal in the experimental group after pulling the lower lid away from the eyeball. The lids were then gently held together for one second to prevent loss of test material. The experimental groups were divided into three subgroups according to dose of the test substance. The subgroups were (i) the low dose group, consisting of those rabbits which were given 0.1 ml per day for 28 days; (ii) intermediate dose group, which consisted of those rabbits which were given 0.1 ml twice a day for 28 days; and (iii) those rabbits which were given 0.1 thrice a day for 28 days, who were tagged as the high dose group.

#### Assessments:

All assessments were blind scored. Irritation of the eye was assessed on day 7, 14, 21 and 28 using an ocular lesion scale which consist of three parts, part 1 measured opacity (degree of density), part 2 was to check the reaction of the iris (pupil) to light and part 3 was to measure the redness of the palpebral and bulbar conjunctiva, cornea and iris, and to measure pupil size. During the experiment the body weight, signs and symptoms of eye irritation and mortality rate were observed on the day 7, 14, 21 and 28 after the commencement of the experiment.

#### Data analysis:

The data of the experimental group were compared with the data of the control group using Student's t - test on Graph pad version 9.1

### 3. Results

#### Eye irritation:

There was no evidence of irritation according to the ocular lesion scale

**Body weight:** There was no significant change in the Body weight of experimental rabbits when compared to its control counterparts.

**Pupil diameter:** Pupil diameter measured by using the pupil gauge results expressed in millimeter unit.<sup>4</sup>

#### Pupillary response to light:

In a dark room, swinging flashlight was used to detect an afferent pupillary defect. The response presented as either it was present or absent.<sup>5</sup>

#### Corneal sensation:

A wisp of cotton wool applied and moved from side to side to examine corneal sensation. The results expressed as either it was intact or absent.<sup>5</sup>

#### Conjunctival redness:

Conjunctiva of both eyes checked in order to detect if the redness present or not.<sup>5</sup>

#### Average of 28 days study on rabbits eye using Nethra eye drops

Group	B. weight	Pupil size	L. reflex	C. Redness	C. Sensation
I	2.25±2.43	5.4mm	Present	Absent	Present
II	2.36±4.12	5.2mm	Present	Absent	Present
III	2.46±3.22	5.6mm	Present	Absent	Present
IV	2.32±2.64	5.4mm	Present	Absent	Present

### 4. Discussion

The results suggest that applying the test substance (Nethra eye drops) for 28 days in graded doses does not cause eye irritation in rabbits, non significant increase in weight and pupil size is noted.

Nethra eye drops shows absence of eye redness and presence of light reflex, corneal sensation. Each ingredient of this formulation is known to have different types of activity. So it is desirable that their combination will have antimicrobial, anti - inflammatory and antioxidant properties. Outcome for various ocular conditions were variable showing that Nethra eye drops may have more beneficial effect for one condition or another

### 5. Conclusion

The findings of the present study suggest that Nethra eye drops can be safely prescribed in different infective and inflammatory ophthalmic diseases. However, its efficacy remains to be evaluated in a drug controlled clinical trial.

### 6. Conflict of Interest

The authors declare that there is no any conflict of interest in the publication of this paper

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