AYUSHDHARA
ISSN: 2393-9583 (P)/ 2393-9591 (O)
An International Journal of Research in AYUSH and Allied Systems
Research Article

# EVALUATION OF ANTI-PYRETIC ACTION OF *NELAMUCHCHALA* (*GYMNOSTACHYAM FEBRIFUGUM* BENTH.)-AN EXPERIMENTAL STUDY

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**KEYWORDS:** *Nelamuchchala* (*Gymnostachyam febrifugum* Benth), Brewer's Yeast, Pyrexia, Decoction, Anti-pyretic.

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**ABSTRACT**

Folklore medicine is an integral part of Ayurveda. *Nelamuchchala* (*Gymnostachyam febrifugum* Benth.) is one such drug which is traditionally used for fever, ulcers, cough, metrorrhagia and puerperal fever. The objective of the study is evaluation of the anti-pyretic actions in albino rats. The healthy albino rats are selected and grouped into 5. The control, standard, trial into three in different dosage forms i.e., normal dose (1ml), half dose (0.5ml). double dose (2ml) The decoction of Trial drug prepared and given in the different dosage forms. Pyrexia or Fever is induced by using Brewer's Yeast solution injected subcutaneously at thigh region and temperature rise after 1hr. Then hourly temperature recorded upto 14 hours. Result obtained from the study was statistically analysed that standard, trail group in normal ($p<0.001$) and double dose($p<0.001$) are highly significant and no significant change was observed in control group ($p>0.05$) effect in albino rats. The present study has revealed that the decoction of *Nelamuchchala (Gymnostachyam febrifugum* Benth) efficacious to reduce pyrexia in albino rats. The observations could be considered to be the reference standards in future studies.

## INTRODUCTION

The local available herb called *Nelamuchchala* widely used in the ethnomedical practices. It belongs to Acanthaceae Family[1]. The root of this herb is still used by folklore practitioners of South Canara district of Karnataka State in India for fever, indigestion, headache, cough, ulcers, metrorrhagia and puerperal fever. The reference of this herb are not available in Samhitha and Nighantu. No Sanskrit name for his drug in Ayurveda. The information available in modern books like Indian Medicinal Plants[2], Indian Materia Medica[3] and Wealth of India [4] The roots are anti-pyretic and action[5, 6]. This drug contains phenols, tannins, flavonoids and also having antimicrobial action[7]. This study is undertaken for the evaluation of the anti-pyretic action of *Nelamuchchala* (*Gymnostactyum febrifugum* Benth.) in albino rats.

Fever is also known as Pyrexia. Body temperature is maintained by thermoregulatory center present at hypothalamus. It controls body temperature by nervous feedback mechanism by integrating impulse obtained from the nerve endings; due to infection prostaglandins inhibit the thermoregulatory function [8].

Concept of fever has been critically dealt by the Acharya Charaka that mainly due to vitiation of *Pitta dosha*. When the *Tapa* (heat) attains abnormal state in the body called fever [9, 10]

## AIMS AND OBJECTIVES

To access the efficacy of *Nelamuchchala* (*Gymnostachyum febrifugum* Benth.) in fever on Albino rats.

## MATERIALS AND METHODS

### Collection of the Trial Drug

Botanically identified authentic sample of roots of *Nelamuchchala* (*Gymnostachyum febrifugum* Benth.) was collected from sullia Taluk, South Canara District of Karnataka. The roots were cleaned, dried and prepared coarse powder.

### Preparation of Decoction

Decoction of the drug was prepared according to the procedure mentioned in Sharangadhara Samhitha[11].

### Dose Fixation of the Trial Drug

Dose of trial drug was calculated by extrapolating the human dose to animal dose based on the body surface area ratio using the table of paget and Barnes (1964). After calculation rat dose is fixed as 1 ml. The decoction of trail drug administered orally with the help of oral rat feeding cannula. Recommended human dose of decoction converted into Rat dose by using formula.

Rat dose = Human dose x 0.018/100 grams per body weight[12].

The Rat dose is fixed as 1ml.

**Method**

In this procedure Brewer's Yeast solution is prepared in normal saline and injected subcutaneously at the thigh region to the experimental albino rats. Rectal temperature recorded after 1 hr. of inducement of fever. Hourly monitoring for 24 hours.

**Procedure**

Healthy albino rats were selected. Albino rats are kept 18 hrs fasting before experiment. Normal body temperature of all rats were recorded. 20% of Brewer's yeast was injected at thigh region. Rectal temperature recorded after 1 hr inducing the fever by digital thermometer. After 1 hr corresponding medicine was to be administered for all the groups and hourly temperature was recorded upto 14 hrs.

**Groups**

Selected healthy Albino rats were grouped into control, standard and trial groups. Trial groups were administered with different dosage quantity like half, normal and double dose.

| Groups | drug | doses |
|---|---|---|
| CONTROL (A) | Distilled water | 1ml/100gms of body wt. |
| STANDARD (B) | Suspension of Paracetamol | 0.75ml |
| Trial (C1) | Root Decoction | 0.5ml (half dose) |
| Trial (C2) | Root Decoction | 1ml (Normal) |
| Trial (C3) | Root Decoction | 2ml (Double) |

**OBSERVATION AND RESULTS**

The comparison of control group (A)P>0.05 value and Trial group (C1) P>0.05 with half dose shows insignificant result. The Standard group (B) P<0.001 and Trial group (C2) P<0.001 with normal dose shows anti-pyretic effect at the end of the 6th hour. But Trial group (C3) P<0.001 with double dose produces the effect at the end of the 3rd hour and hypothermia takes place. Then after 6th hour attained normal temperature level which was maintained till 14th hours. Group (C1)not showed the antipyretic effect, but better than control group.

**OBSERVATIONS AND RESULTS**

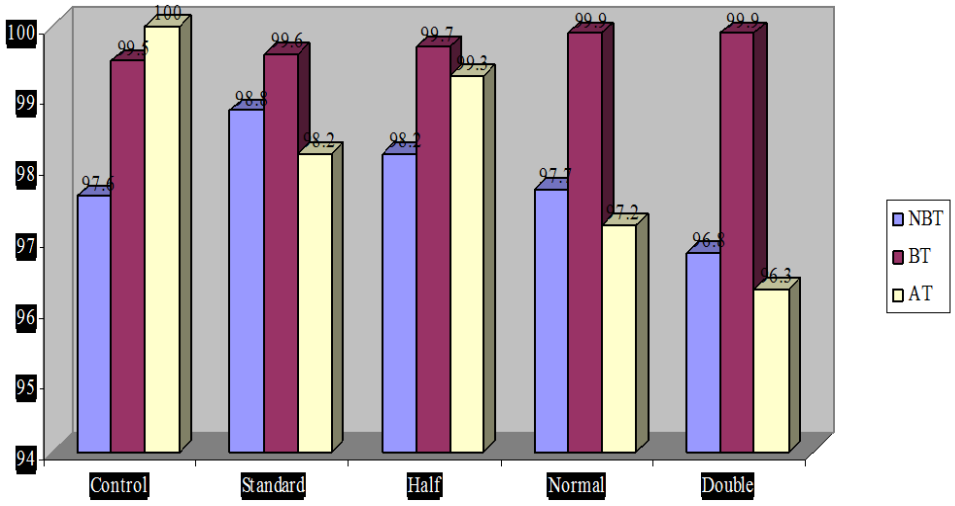
Hourly mean temperature of albino rats of all the 5 groups.

| Groups | NBT | IT | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 98.3 | 99.5 | 99.9 | 99.8 | 100.4 | 100.8 | 100.6 | 101.3 | 101.2 | 100.5 | 100.1 | 100.3 | 100.3 | 100 | 99.9 | 99.9 |
| B | 98.8 | 99.6 | 99.9 | 100 | 100.4 | 101.5 | 101.2 | 100 | 99.8 | 99.8 | 99.7 | 99.4 | 98.9 | 98.8 | 98.5 | 98.2 |
| C1 | 98.2 | 99.7 | 99.8 | 100.2 | 100.3 | 100.2 | 100.3 | 101.1 | 100.8 | 100.7 | 100.3 | 99.9 | 99.8 | 99.4 | 99.3 | 99.3 |
| C2 | 97.7 | 99.8 | 100 | 100.2 | 100.6 | 101.4 | 101.2 | 100.4 | 100.1 | 99.8 | 99.6 | 99.9 | 98.8 | 98.8 | 98.8 | 97.7 |
| C3 | 96.8 | 99.7 | 97.7 | 96.5 | 96.5 | 96.2 | 96.4 | 96.6 | 96.8 | 97.2 | 96.9 | 96.6 | 96.5 | 96.5 | 96.3 | 96.3 |

NBT- Normal body temperature IT-Initial temperature

**Statistical Data of 5 Groups**

| | BT | | AT | | | |
|---|---|---|---|---|---|---|
| Groups | Mean | SD | Mean | S.D. | T' value | P' value |
| A | 99.5 | 0.223 | 100 | 0.904 | 2.01 | p>0.05 |
| B | 99.6 | 0.228 | 98.2 | 0.281 | 8.91 | P<0.001 |
| $C_1$ | 99.7 | 0.133 | 99.3 | 0.685 | 1.65 | p>0.05 |
| $C_2$ | 99.8 | 0.308 | 97.7 | 0.776 | 6.71 | P<0.001 |
| $C_3$ | 99.7 | 0.299 | 96.3 | 0.506 | 21.4 | P<0.001 |



| Sl. NO | Groups | 'T' Value | 'P' Value | Result |
|---|---|---|---|---|
| 1 | A & B | 0.7282 | P>0.05 | B≥A |
| 2 | A & $C_1$ | 0.0617 | P>0.05 | $C_1$≥A |
| 3 | A & $C_2$ | 2.493 | P<0.01 | A<$C_2$ |
| 4 | A & $C_3$ | 4.876 | P<0.001 | A<$C_3$ |
| 5 | B & $C_1$ | 1.980 | P>0.05 | B≥$C_1$ |
| 6 | B & $C_2$ | 2.732 | P<0.01 | $C_2$>B |
| 7 | B & $C_3$ | 9.107 | P<0.001 | B<$C_3$ |
| 8 | $C_1$ & $C_2$ | 2.726 | P<0.01 | $C_1$<$C_2$ |
| 9 | $C_1$ & $C_2$ | 3.976 | P<0.01 | $C_1$ <$C_3$ |
| 10 | $C_2$ & $C_3$ | 8.173 | P<0.001 | $C_2$<$C_3$ |

## DISCUSSION

Pyrexia caused due to pyrogens above the normal body temperature i.e., $36^0$C - $37^0$C (96.68 F - 99.00F)[8] and it differs in every individual. The increase in the temperature above the normal level is called as the Pyrexia. Pathologically fever is induced by the pyrogens due to infection. The pyrogens stimulates to produce prostaglandins. These pyrogens increase the production of prostaglandins in hypothalamus. These prostaglandins inhibit the thermoregulatory function and set the thermoregulatory set point high resulting in the condition fever. In this study, Yeast (fungus) was used as the pyrogen for inducing the Fever. This drug having flavonoids and phenols can be act as antimicrobial and antioxidant. So the test drug efficacy to reduce temperature in rats. In Charaka Samhita 6 types of *Jwara* are mentioned among which this can be considered under *Agantuja Jwara*.

This drug having bitter taste which acts as *Deepana, Pachana, Vishahara, Jwaragna, Krimighna* and *Vata-pitta Doshahara*[13]. Trial drugs having *Krimigna* and *Vishahara* action due to *Tikta Rasa*. Because of this property it acts against pyrogen and reduce the infection. In this way test drug efficacy to decrease the body temperature.

## CONCLUSION

The trial drug *Nelamuchchala* (*Gymnostachyum febrifugum* Benth.) which is selected from folklore medicine can be proved that it is having significant role in reducing the fever - induced pyrexia in experimental animals. On the basis of experimental study it can be concluded that the *Nelamuchchala* (*Gymnostachyum febrifugum* Benth.) has potential to cure the Fever.

## AKNOWLEDGEMENT

The author is thankful to Dr.Vishwanathan former Professor and HOD, PG studies in Dravyaguna Vijnana, Alva's Ayurvedic medical college, Moodabidri for their ever encouraging constant guidance, critical suggestions and overall supervision to complete the work.

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**Cite this article as:**
Vijayalakshmi P B, Haridasan. Evaluation of Anti-Pyretic Action of Nelamuchchala (*Gymnostachyam Febrifugum* Benth.)-An Experimental Study. AYUSHDHARA, 2016;3(5):877-879.
***Source of support: Nil, Conflict of interest: None Declared***