

## Antipyretic activity of seeds from Red and White type of lotus (*Nelumbo nucifera*) in Albino rat

P.K. Deepa, P.T.A. Usha, A.M. Chandrasekharan Nair and K.T. Prasannakumari

Department of Pharmacology  
College of Veterinary and Animal Sciences, Mannuthy, Kerala – 680 651, India

### Abstract

*Nelumbo nucifera* (red and white types) at dose rates of 400 mg/kg and 600 mg/kg was administered orally in rats in which pyrexia was induced with brewers yeast. The standard drug used was aspirin (100 mg/kg). The standard drug showed antipyretic effect from first hour of the study onwards. It was found that during the third hour of the study *N. nucifera* red and white types, 600 mg/kg showed significant decrease in body temperature. During the fourth hour of the study, all the treatment groups showed antipyretic effect. A similar decrease in body temperature was observed on fifth hour of the study also. Hence the present study revealed that the *N. nucifera* (red and white types) at the rate of 400 and 600 mg/kg is effective in reducing body temperature in yeast induced pyrexia in rats.

**Keywords:** *Nelumbo nucifera*, Antipyretic, Aspirin, Lotus, Seed, Activity.

### Introduction

*Nelumbo nucifera* Gaertn (nymphaeaceae), the Sacred Indian Lotus Commonly Known as Kamala, Padma or Pundarika is the National Flower of India. Almost all parts of this plant are used in traditional medical practice to treat various diseases. The rhizomes, flowers, stalks and leaves are used in the form of infusion in fever as refrigerant and diuretic (Nadkarni, 1992). Antipyretic property of ethanolic extracts of rhizomes of *Nelumbo nucifera* was reported in rats (Mukherjee *et al.*, 1996). *Nelumbo nucifera* seeds are commonly used in folk medicine in the treatment of tissue inflammation, cancer, emesis and given to children as diuretic and refrigerant in skin diseases.

### Materials and Methods

Forty eight rats were divided into six groups of eight animals each. Body temperature of rats was recorded continuously for seven hours at hourly interval for three days from 8 AM to 3 PM. Blood samples were collected from all animals prior to the experiment and also at the end of the experiment from the retro-orbital plexus using heparinised capillary tubes for biochemical and haematological studies.

Hyperthermia was induced in all the six groups by subcutaneous injection of 20 per cent brewers yeast suspended in normal saline (Turner, 1965). Five per cent gum acacia was used as vehicle for the administration of drugs and extracts in all the groups. The schedule of the experiment was as follows.

Group I-Yeast (20 per cent suspension) 1 ml/100 g body weight subcutaneously.

Group II-Yeast (20 per cent suspension) 1 ml/100 g body weight subcutaneously + Aspirin 100mg/kg body weight orally.

Group III-Yeast (20 per cent suspension) 1 ml/100 g body weight subcutaneously + Alcoholic extract of *Nelumbo nucifera* seeds (red type) @ 400 mg/kg body weight orally.

Group IV-Yeast (20 per cent suspension) 1 ml/100 g body weight subcutaneously + Alcoholic extract of *Nelumbo nucifera* (red type) @ 600 mg/kg body weight orally.

Group V-Yeast (20 per cent suspension) 1 ml/100 g body weight subcutaneously + Alcoholic extract of *Nelumbo nucifera* seed (white type) @ 400 mg/kg body weight orally.

Group VI-Yeast (20 per cent suspension) 1 ml/100 g body weight subcutaneously + Alcoholic extract of *Nelumbo nucifera* (white type) @ 600 mg/kg body weight orally.

The peak pyrexia was observed to be at 19 hrs after yeast administration by conducting trial experiments. The drugs were administered at the time of peak pyrexia. Then the rectal temperature was recorded at an interval of one hour continuously for five hours. Data were analysed using Tukeys multiple comparison test described by Hogalin *et al.* (1991).

### Results and Discussion

The results are presented in table 1. The mean

body temperature at zero hour of the study were  $39.23 \pm 0.09^\circ\text{C}$ ,  $39.10 \pm 0.14^\circ\text{C}$ ,  $39.32 \pm 0.06^\circ\text{C}$ ,  $39.4 \pm 0.06^\circ\text{C}$ ,  $39.42 \pm 0.12^\circ\text{C}$  and  $39.35 \pm 0.05^\circ\text{C}$  for the groups I to VI respectively. During the first hour of the study only aspirin administered group (group II) showed significant decrease ( $P < 0.05$ ) in temperature. The mean body temperature at second hour also indicate that only aspirin administered group showed significant decrease in body temperature. During the third hour of the study group II (aspirin), IV (*Nelumbo nucifera*, red type 600 mg/kg) and VI (*Nelumbo nucifera*, white type, 600 mg/kg) exhibited significant decrease in body temperature. During the fourth hour of the study all the treated groups showed significant decrease in body temperature when compared with control (group I). The decrease in body temperature was sustained in the fifth hour also. The yeast induced pyrexia is called pathogenic fever which is due to production of prostaglandins ( $\text{PGE}_2$ ) which set thermoregulatory centre at a higher temperature (Howard, 1993). The standard drug used aspirin which produced antipyretic effect by inhibition of prostaglandin biosynthesis (Roberts and Morrow, 2001). The study conducted by Mukherjee *et al.* (1996) indicates that *Nelumbo nucifera* rhizomes at dose rates of 200, 300 and 400 mg/kg possessed significant antipyretic effect and the antipyretic effect was comparable to the standard drug paracetamol. The results of the present study is in agreement with the results of the study conducted by Trongsakul *et al.* (2003) in which they observed significant reduction in yeast induced pyrexia by hexane extract of *Diospyros variegata* and the antipyretic effect was similar to that of Aspirin. Panthong *et al.* (2003) observed significant antipyretic activity of *Clerodendron petasites* in yeast induced pyrexia in mice. They suggested that the mechanism of antipyretic action of plant extract was similar to that of other Non Steroidal Anti-inflammatory Drugs. Mutalik *et al.* (2003) suggested that the antipyretic effect of *Solanum melongena* could be attributed to the presence of flavonoids. Hajare *et al.* (2000) also reported antipyretic effect of *Dalbergia* species which may be attributed to the presence of flavonoids. The phytochemical analysis of chloroform and methanolic extract *Vernonia cinerea*

leaves revealed the presence of steroids, alkaloids, saponins, flavonoids and terpenoids which are responsible for the antipyretic effect of the plant (Iwalewa *et al.*, 2003). In the present study also all the above active principles could be detected in *Nelumbo nucifera* on phytochemical analysis which may be responsible for the antipyretic effect. The results of the present study also revealed that the *N. nucifera* plant extract has no significant effect on haematological parameters. The serum enzymes like ALT and AST did not show significant variations after administration of 400 mg/kg and 600 mg/kg of *N. nucifera* (red and white types) in rats.

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Table 1. Effect of Alcoholic Extracts from seeds of *Nelumbo nucifera* (red and white types) on Body Temperature in yeast induced Pyrexia,  $^\circ\text{C}$  Mean  $\pm$  SE, \* $P < 0.05$

Group	0 hour	1 <sup>st</sup> hour	2 <sup>nd</sup> hour	3 <sup>rd</sup> hour	4 <sup>th</sup> hour	5 <sup>th</sup> hour
I	$39.23 \pm 0.09$	$39.23 \pm 0.09$	$39.15 \pm 0.08$	$39.07 \pm 0.05$	$38.93 \pm 0.06$	$38.84 \pm 0.07$
II	$39.10 \pm 0.14$	$38.47 \pm 0.11^*$	$37.46 \pm 0.09^*$	$37.28 \pm 0.14^*$	$37.05 \pm 0.11^*$	$36.93 \pm 0.08^*$
III	$39.32 \pm 0.06$	$39.2 \pm 0.04$	$38.98 \pm 0.18$	$38.52 \pm 0.08$	$38.31 \pm 0.11^*$	$37.95 \pm 0.22^*$
IV	$39.40 \pm 0.06$	$39.2 \pm 0.05$	$38.7 \pm 0.09$	$38.10 \pm 0.17^*$	$37.55 \pm 0.11^*$	$37.31 \pm 0.10^*$
V	$39.42 \pm 0.12$	$39.15 \pm 0.12$	$38.55 \pm 0.15$	$38.33 \pm 0.27$	$37.68 \pm 0.21^*$	$37.38 \pm 0.07^*$
VI	$39.35 \pm 0.05$	$38.73 \pm 0.16$	$38.44 \pm 0.03$	$37.80 \pm 0.08^*$	$37.52 \pm 0.07^*$	$37.33 \pm 0.19^*$