

## ON THE ANTIPIRETTIC, ANTI-INFLAMMATORY, ANALGESIC AND MOLLUSCIDAL PROPERTIES OF POLYSCIAS FRUTICOSA (L) HARMS

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**ABSTRACT:** *The n-butanol extract of the leaves Polyscias fruticosa (L) Harms (Araliaceae) was tested for its anti-inflammatory activity plethismometrically in egg white induced paw oedema in rats, antipyretic activity and analgesic activity by writhing method phenyl butazone, paracetamol and aspirin were used as positive controls for anti-inflammatory, antipyretic and analgesic activity screening studies receptivity. It as observed that the n-butanol fraction mainly contains terpenoid type of saponins and designated as NBES fraction- (n –butanol extract containing saponins). Molluscicidal screening studies proved the effectiveness of NBES to control certain kind of snails which are considered as the primary host of fluke worms.*

### INTRODUCTION

As a part of our continued efforts in finding a suitable plant with potential bioactivities we observed tat n-butanol extract of the leaves *Polyscias fruticosa* (*Nothopanax furticosa* or *Panax furticosa*) possesses valuable pharmacological properties as claimed in indigenous system of medicine<sup>1</sup>. A survey of the literature sowed the absence of any systematic phyto-pharmacological screening studies for this plant. The present work throws light on the anti-inflammatory, antipyretic and analgesic properties of the n-putanol extract (NBES) of the leaves of *Polyscias fruticosa* as well as the molluscicidal activities of the same extract.

### MATERIALS AND METHODS

**Plant Material:** Fresh leaves of polyscias fruticosa were collected and authenticated at the Horticulture department of the agricultural University, Coimbatore, Tamil Nadu. Voucher specimens were deposited

in the herbarium of the pharmacognosy laboratory college of pharmacy, SRIPMS.

### Preparation of the leaf extract

Soxhlet extraction of the finely powdered fresh leaves (1 kg) was carried out using 70% ethanol for a period of 12 hours, the extract obtained was concentrated under reduced pressure-below 60°C. (yield 28%) this ethanolic extract was diluted with water (100ml) and further extracted with chloroform to remove any lipid materials, the water extract left behind was again extracted with ethylacetate and then with n-butanol<sup>2,3</sup>. the n-butanol layer was separated and evaporated to dryness; yield 60 gms of the crude saponin extract; which is designated a NBES. Different qualitative and quantitative chemical and physical examinations showed the presence of triterpenoid saponins in this extract<sup>4,5,6,7</sup>. NBES fraction when examined by TLC over

silicagel was found to contain 6 spots; using solvent system-n-butanol: AcOH:H<sup>2</sup> O (40:10:10); 5% phosphomolybdic acid in ethanol; heated to 110°C.

### Acute Toxicity

Acute toxicity study was carried out using Swiss albino mice<sup>8</sup>. The extract was administered orally in doses of 0.1, 0.25, 0.5, 1.00, 1.5, 2.0, 2.5 gms/kg. Animals were observed at regular intervals of 1hr for a period of 24 hours. No toxic symptoms were observed thus proving the safety of the drug up to a dose of 2.5 gms/ kg body weight.

### Anti-inflammatory action

The anti-inflammatory studies were conducted with Wister albino rats of either sex (100-150gms)<sup>9,10</sup>. The animals were used after an acclimatization period of at least 10 days to the laboratory environment.

### Egg White – Induced paw oedema

Egg white was injected (0.1ml of a freshly collected sample) into the plantar-aponeurosis of the right hind paw of rats which received either the drug or the positive control or the vehicle alone; orally one hour prior to the egg white injection. The paw volume was measured before and three hours after egg white administration by volume displacement method<sup>11</sup>. NBES at doses of 250 mg/kg and 500 mg/kg were administered orally into two groups of rats. One group received the positive control drug phenyl butazone at a dose of 100 mg/kg orally into two groups of rats received 0.5% CMC (Vehicle) alone. Paw volumes were measured three hours after the injection of egg white. The difference in the left and right paw volumes indicated the volume of inflammation.

**Table No 1.**  
**Effect of NBES on Egg White induced Paw Oedema**

Drug Group	Dose Oral Route	Mean Paw Volume	Inhibition of Oedema (%)
Control	0.5% CMC	0.41 ± 0.03	....
NBES	250 mg/kg	0.318 ± 0.0045	21.95
NBES	500 mg/kg	0.188 ± 0.0044	54.14
Phenyl Butazone	100 mg/kg	0.115 ± 0.0031	71.95**

N=5 Vehicle 0.5% CMC P Value <0.01\*\* Student t- test

### Analgesic Activity

The analgesic activity of NBES was studied by acetic acid induced writhing syndrome<sup>12</sup> in Swiss albino mice (35-40 gms), writhing syndrome was induced by injecting 6% v/v glacial acetic acid

intraperitoneally. The experiment was carried out in four groups of Swiss albino mice (n=6) NBES in 0.6% CMC at dose levels of 100 mg/kg and 200 mg/kg. The drugs were administered orally. Aspirin

(100mg/kg) served as the reference drug; administered orally to one group of mice. Another group – receiving 0.5% CMC alone served as the solvent control. 0.6% glacial acetic acid was administered to all the groups one hour after the drug

administration. The number of writhing produced by ice were counted and recorded for a period of 20 minutes. The percentage protection of the drug was calculated using the formula:

#### Percentage Protection

= 100- (T/C) x 100 where,  
T= Drug-treated group and  
C= Control group

**Table No .2**  
**Effect of NBES on Acetic acid – induced writhing reflex**

Drug Group	Dose mg/kg	Average writhes in 20 mts	% Protection
NBES	100mg/kg	12.2 ± 0.447	39.5
NBES	200mg/kg	9.0 ± 0.707	55.0*
NBES	500mg/kg	5.8 ± 0.447	71.0***
Aspirin	100mg/kg	4.8 ± 0.447	75
Solvent vehicle 0.5% CMC	1ml/100gms	20.2 ± 0.447	---

N= 6 \*P Value < 0.05 \*\*\*P Value < 0.001 Student's t-test Reference drug – Aspirin

#### Antipyretic Activity

Wistar albino rats of either sex weighing between 80-120 gms were arranged in four groups of five each. The normal rectal temperature and its hourly variation were recorded at the beginning of the experiment using a digital tele thermometer<sup>13, 14</sup>. Animals were fasted for 24 ours before giving the drugs, but water freely permitted, pyrexia was induced by the administration of TAB vaccine supplied by the public health laboratory, Coimbatore. The vaccine was given intra peritonally in a dilution of 1/15 in normal saline to all animals. After two hours of the administration of TAB

vaccine, the rectal- temperature of each rat was taken and found to be fairly stabilized. The first group of rats were given the vehicle (5% gms acacia). The second group was given the NBS orally at a dose of 250 mg/kg body weight, the third group was given the NBES orally at a dos of 500 mg/kg body weight. The fourth group was administered with paracetamol (100mg/kg body weight orally) which was used as the reference standard drug. The rectal temperature of rats were taken using an electronic digital tele thermometer<sup>15, 16</sup>. The results were evaluated by student's 't' test.

**Table No.3**  
**Antipyretic activity of NBES**

Groups	Dose	Temperature					
		Normal temp	2hrs after TAB Vaccine	1 <sup>st</sup> hr C Temp.°C	2 <sup>nd</sup> hr Temp.°C	3 <sup>rd</sup> hr Temp.°C	4 <sup>th</sup> hr Temp.°C
Control 5% gm acacia	1ml/100gms	34 ± 0.25	37.625 ± 0.273	36.7 ± 0.273	36.5 ± 0.054	36.12 ± 0.164	36.1 ± 0.164
N.B.E.S 250 mg/kg	200 mg/kg	34 ± 0.25	37.98 ± 0.2049	37.5 ± 0.409	37.2 ± 0.279	37.0 ± 0.277	36.72 ± 0.258
N.B.E.S 500 mg/kg	500 mg/kg	34 ± 0.25	37.84 ± 0.2302	35.9 ± 0.624	35.4 ± 0.37	34.82 ± 0.148	33.98* ± 0.277
Parace- tamol (P.L)	100kg	34 ± 0.25	38.12 ± 0.3039	35.14 ± 0.532	34.12 ± 0.408	33.78 ± 0.164	33.38 ± 0.268

Pyrexia inducing TAB Vaccine (1/15 dilution)  
Route of administration: oral P<0.05\*  
N=6 Student's –'t' test

### **Molluscicidal activity**

In this study, ten average sized adult snails were used in each group and the snails were identified as *biomphalaria Pfeiffer* and *Indoplanorbis exustus* 17, 18. Normal activities of the snails were recorded. There different concentrations; 125 ppm; 250 ppm 500 ppm were made of NBES in distilled water and 100 ml of each of these drug concentrations were poured in respective labeled glass beakers for studying the activity for the selected varieties of snails.

The snails of each species were released into all these glass beakers along with a piece of vegetable to feed and the snails were observed for their activities for the next 24 hours. The snails were then transferred to normal water for a period of 24 hours and the percentage of mortality was observed. Bleeding and inactivity confirmed the death of snails. The results are tabulated in Table -4.

**Table No 4**  
**Effect of NBES on two varieties of snails**

Drug	Concentration	Snail species	% Mortality
Control Distilled water			NIL
NBES	125	<i>B.pfeiffer</i>	36.66
NBES	250	<i>B.pfeiffer</i>	60.00
NBES	500	<i>B.pfeiffer</i>	83.3
NBES	125	<i>l. exustus</i>	40.5
NBES	250	<i>l. exustus</i>	68.3
NBES	500	<i>l. exustus</i>	85.5

## RESULTS AND DISCUSSION

There were no behavioral or autonomic changes in the animals treated with different doses of NBES. No mortality was observed in mice thus proving the safety of the drug upto 2.5ms / kg body weight.

The anti-inflammatory screening revealed tat NBES at a concentration of 500 mg/kg possessed significant inhibitory activity on egg white-induced oedema in albino rats. (Table 1). NBES again showed analgesic activity in higher concentration on acetic acid induced writhing. (Table 2).

The antipyretic revealed that NBES at a dose of 500 mg/kg showed effective antipyretic activity as compared to the

standard reference drug paracetamol 100 mg/kg body weight Table 3)

NBES at 500 ppm concentration showed marked lethal effect against both varieties of fresh water snails studied. It can be summarized that NBES may be used as an effective plant molluscicidal, as this extract is mainly constituted of saponins. The molluscicidal activity of the saponins of *Polyscias fructicosa* is interesting because schistosomiasis is a dreadful disease among humans and animals around the world<sup>17</sup> and the fesh water snails act as intermediate host to schistosomes, the causative agents of schistosomiasis.

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