

## PHARMACOLOGICAL INVESTIGATIONS ON *AGLAIA ROXBURGHIANA* (W. &A) MIQ. VAR. *BEDDOMEI* LEAVES

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**ABSTRACT:** *Aglaia roxburghiana* is a traditional remedy for a variety of diseases. The ethanolic extract of the leaves was screened for related activities were upon it exhibited significant anti-inflammatory activity in rats in acute and chronic models. There was no acute toxicity in mice upto 2g/kg. The extract protected the mast cell deregulation by compound 48/80 and inhibited histamine induced contractions in guinea pig ileum. The data obtained in this study suggest that the extract may act by stabilizing mast cells and blocking histamine receptors.

### INTRODUCTION

*Aglaia roxburghiana* (W. &A) Miq. Var. *beddomei* (Meliaceae) is a source drug for *Priyangu*, used in Ayurveda (1). The plant is considered as a remedy for dysentery, skin diseases, leprosy, inflammation, leucoderma and abdominal pain (2), (3). It is said to be cooling and useful in buring sensation of the body and painful maturation (4).

There is no detailed literature pertaining to biological studies on the leaves of this plant. Hence the ethanolic extract of the leaves, which was found to have alkaloids, steroids and triterpeneoids (5), (6) has been considered for the present stud to evaluate the specific activities, if an, before investigation the isolated compounds.

### MATERIALS AND METHODS

The leaves of *Agalaia roxburghiana* were freshly collected from Tirupathi hills in Andhra Pradesh and authenticated by the botanist, Captain Srinivasa Murti Drug

Research Institute for Ayurveda, where a voucher specimen has been deposited.

Shade dried and coarsely powdered leaves (2 kg) were extracted with 90% alcohol by cold percolation method. The solvent was removed by distillation over water bath and residues under vacuum. This extract, designated as LF (yield 72.7g) was suspended in carboxymethyl cellulose (CMC) and used for animal experiments.

Swiss albino mice (0-25g) Wistar albino rats (150 – 200g), guinea pigs (400-500g) were used for various experiment.

#### Preliminary screening and acute toxicity testing

Mice were tested with different doses of LF extract (500-4000 mg / kg, S.C) and continuously observed for 6h. The changes in various autonomic and behavioral responses were noted. The animals were

kept under observation for a further period of 24h and mortality, if any, was noted, based on the results of preliminary screening (7) three doses (100, 200 & 400 mg/kg, s.c) were selected for further experiments.

### **Analgesic activity**

This was investigated in mice using acetic acid induced writhing (8). Morphine sulphate (0.25 mg/kg, s.c) was used for comparison.

### **Anti-inflammatory activity**

**A) Acute study** (i) Carrageenin induced hind-paw oedema in rats (9). Different groups of rats were tested with three doses of LF extract. 0.1 ml of 1% carrageenin was injected into the right hind paw 30 min after LF extract administration. The paw volume was measured plethysmographically 5h after carrageenin injection.

### **B) Chronic study (10)**

Sterile cotton- Pellets (10mg) were implanted s.c in arm – pits and groins in albino rats. The animals were treated with LF extract for 7 days.

All the animals were sacrificed on 8<sup>th</sup> day and cotton- pellets were removed, dried at 50°C for 24 h and weighed.

In the acute and chronic models of inflammation, the activity of LF extract was compared with Ibuprofen (100mg/kg, s.c)

### **Mast cell degranulation (in vitro study)**

This was carried out by the modified method of Kaley & Weiner (ii). Lf extract was added to the incubates to produce a concentration of 1,10 or 100 µg/ ml. After 10 min the mast degranulator compound 48/80 (10 µg/ ml) was added and incubated for

further 10 min. the percentage degranulation was calculated. The effect of LF extract per se was studied in separate mesenteric bits and percentage degranulation was calculated. Disodium cromoglycate (DSCG) 1µg/ ml was included in the study for comparison.

### **Gastric secretion and ulcer:**

#### **Shay rat ulcer**

Adult male albino rats (130-150g) were selected and ulcers were induced as described by Say et al (12). The animals were treated with LF extract 30 min. prior to pyloric ligation. A separate group of animals received aspirin 100 mg/kg (p.o) 60 min prior to pyloric ligation.

The animals were sacrificed 18h later. Ten the volume, free and total acidity of gastric contents were examined. The gastric ulcers were scored and subjected to histopathological examination.

### **Intestinal smooth muscle (in vitro)**

Healthy adult guinea pig starved overnight was sacrificed, the terminal ileum was cut, washed, mounted. The contractions were recorded with histamine according to the method of Ghosh (13). Following this the LF extract was added and contractions were recorded. The effect of LF extract on the spasmogenic effect of histamine was also investigated.

### **Statistical analysis**

The results were analysed by analysis of variance followed by Dunnett's test.

## **RESULTS**

### **Preliminary screening and acute toxicity**

There was no significant change in the various autonomic and behavioral responses after LF extract administration compared to the control animals. No mortality was recorded in 24h in the animals treated with LF extract upto a dose of 2.0 g/kg.

### **Analgesic activity**

Treatment with LF extract did not alter the number of acetic acid induced writhings in mice compared to vehicle treated animals, But, morphine treatment significantly reduced the number of writhings in mice.

### **Anti-inflammatory activity**

A) **Acute study:** In carrageenin induced paw oedema ibuprofen produced a significant reduction in paw oedema. Similarly a dose dependent reduction was observed with different doses of LF extract (Table-1).

B) **Chronic study:** A dose dependent reduction in the weight of the cotton-pellets was observed after LF extract administration. The reduction was significant in all the doses tested (Table - 2) and comparable with Ibuprofen.

### **Effect on mast cell**

Compound 48/80 per se produced extensive degranulation of mast cells. Pre treatment with LF extract reduced this degranulation significantly at 10 & 100 µg/ml (Table -3).

### **Effect on gastric secretion and ulcer**

Treatment with a potent histamine (H<sub>2</sub>) antagonist, ranitidine significantly reduced the volume of gastric secretion, free acidity, total acidity and also the ulcer score compared to vehicle treatment in pyloric

ligated rats. Treatment with LF extract reduced only the volume but there was not protection of ulcer by the different doses of the extract. Histopathological examination revealed extensive ulceration after LF extract treatment and confirmed the above results.

### **Effect on isolated guinea pig ileum**

LF extract per se did not produce any significant effect on the intestinal smooth muscle. A dose dependent reduction in histamine response was observed after treatment with LF extract.

### **Discussion**

The experiments designed in the present study were based on traditional claims. The results of the study, supports the traditional claims of the use of *Aglaia roxburghiana* in inflammation.

A significant anti-inflammatory effect was observed in acute and chronic modes of inflammation as indicated by reduction in the paw oedema and cotton-pellet granuloma. But the extract did not reveal an analgesic activity.

The leaves contain alkaloids, triterpenes and steroids. The results of the present study supports the traditional claim of the plant in inflammation which suggests that one or a combination of the above said compounds present in the extract may be responsible for the above said activity.

The probable mode of action may be by stabilization of mast cells and blocking the histamine receptor action, However, other mediators involvement needs to be explored in future studies.

**Table 1**  
**Effect of *Aglaia roxburghiana* on acute inflammation**

Treatment (mg/kg)	Vol. of paw oedema (ml)
Vehicle	0.73 ± 0.04
Ibuprofen 100	0.43 ± 0.04*
LF extract	
100	0.37 ± 0.06*
200	0.38 ± 0.06*
400	0.33 ± 0.04*

\*p<0.05 (Dunett's test)

Each value represents the mean ± SEM of 6 observations

**Table 2**  
**Effect of *Aglaia roxburghiana* on Chronic inflammation**

Treatment (mg/kg; s.c)	Wt. of Cotton pellets (mg)
Vehicle	48.73 ± 7.05
Ibuprofen 100	23.25± 1.36*
LF extract	
100	37.40 ± 1.8*
200	32.60 ± 1.0*
400	22.65 ± 0.9*

\*p<0.05 (Dunett's test)

Each value represents the mean ± SEM of 6 observations

**Table 3**  
**Effect of *Aglaia roxburghiana* on compound 48/80- induced degranulation of mast cells**

Pre-treatment (µg/ ml)	Treatment (µg/ ml)	% degranulation
Vehicle	Vehicle	21.8 ± 1.51
Vehicle	48/80 -10	66.0 ± 1.15
LF extract		
1	48/80 -10	66.0 ± 1.7
10	48/80 -10	55.0 ± 2.31*
100	48/80 -10	43.6 ± 1.9*
DSCG1	48/80 -10	20.0 ± 1.9*

\*p<0.05 (Dunett's test, Compared with vehicle + 48/80 treatment))

Each value represents the mean ± SEM of 6 observations

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