

**EVALUATION OF ANTI-INFLAMMATORY AND ANTIPYRETIC  
ACTIVITY OF *OLDENLANDIA UMBELLATA* LINN. ROOTS**

\*Padhy I P, Endale A

School of Pharmacy, College of Medicine and Health Sciences,  
University of Gondar, Gondar, Ethiopia.

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**Abstract**

The ethanolic extract of *Oldenlandia umbellata* (synonym: *Hedyotis umbellata*) root was screened for both anti-inflammatory and antipyretic activity in wistar albino rats. The extract showed significant anti-inflammatory activity in carrageenan induced paw oedema, which is comparable to that of the control and standard drug phenylbutazone. Antipyretic activity screened by brewer's yeast induced pyrexia in albino rats. It is comparable to that of paracetamol. The results indicated that *Oldenlandia umbellata* root is endowed with potential anti-inflammatory and antipyretic activity.

**Keywords:** *Oldenlandia umbellata*, Anti-inflammatory activity, antipyretic activity.

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**Introduction**

*Oldenlandia umbellata* Linn. of family rubiaceae, commonly known as Indian madder and Chay root. It is a small, stiff, highly branched, biennial or perennial herb with tuberous roots, distributed in India (from Assam to Travancore), Ceylon, Burma, Pakistan (Sind) and some parts of Africa, in dry sandy grassy places <sup>[1]</sup>. The leaves are reported to act as febrifuge, expectorant and also used in consumptive, asthmatic affections <sup>[2, 3]</sup>. Information of ethno-botanical survey has revealed the use of root in the treatment of fever, rheumatism and jaundice by the local communities in some parts of Ethiopia.

The literature lacks scientific validation for anti-inflammatory and antipyretic activity of the roots. This project has been undertaken to provide a

scientific basis in standard laboratory models to study these properties of the plant.

**Materials and methods****Plant material**

Fresh plants were collected from the university of Gondar (Ethiopia) campus in July and authenticated after conducting morphological and microscopical analysis. A voucher specimen was stored in the pharmacognosy department of the University for reference. The roots were washed, dried in shade and powdered to 40 mesh size.

**Preparation of the extract**

Powered material was soxhlet extracted with 90% v/v ethanol for 72 hours. It was concentrated under vacuum.

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**Author for Correspondence:**

Padhy I P,  
School of Pharmacy, Department of Pharmacognosy,  
College of Medicine and Health Sciences,  
University of Gondar, Gondar, Ethiopia.  
Email ID: [ipadhy@yahoo.co.in](mailto:ipadhy@yahoo.co.in)

### Preliminary phytochemicals analysis

The extract was subjected to qualitative chemical tests <sup>[4]</sup> and chromatographic (TLC) studies <sup>[5]</sup> to detect the phytoconstituents.

### Animals used

Wistar strain adult albino rats of either sex weighing 150-180 gm were used. They were acclimatized to the laboratory conditions (temperature:  $23 \pm 2^{\circ}$ , relative humidity  $55 \pm 10\%$  and 12 hour light and dark cycle). The animals were fed standard diet pellets and given tap water.

### Acute toxicity studies

Albino rats of either sex were divided into isolated groups of six in each lot. After an overnight fast, suspension of the extract (5% w/v) with acacia mucilage were administered to the isolated groups in graded doses of 0.2 to 04 g/ kg b.w.p.o. under continuous observation for the first two hours to observe any toxic symptoms and later up to 24 hours to record mortality <sup>[6]</sup>.

### Anti-inflammatory activity

The anti-inflammatory activity of test extract was investigated on carrageenin induced oedema <sup>[7]</sup>. Rats were divided into three groups of six each and injected with 0.1ml of 1% carrageenin in normal saline, in the hind paw. The volume of the hind paw was measured before and after three hours of carrageenin injection <sup>[8]</sup>. Control group (group-I) animals were maintained with 10 ml of tween-80 (1% in water)/ kg b. w. p. o. The animals of group-II and group-III were pretreated with test extract (400 mg/ kg, b.w.p.o) and phenylbutazone (100mg/kg. b. w. p. o.) respectively, one hour before carrageenin injection.

### Antipyretic activity

Prior to the experiment, the rats were maintained in separate cages for seven days and the animals with approximately constant rectal temperature were selected for the study. Selected animals were divided into three groups of six each and kept fasting for 24 hours before the experiment. Antipyretic activity was evaluated using Brewer's yeast-induced pyrexia <sup>[9]</sup>. Fever was induced to the animals of all groups by subcutaneous injection (2ml/ kg) of 20 percent aqueous suspension of yeast in normal saline below the

nape of the neck and rectal temperature was recorded by tele-thermometer immediately before and 18 hours after (0 hour) yeast injection. Animals of group-I, were kept as control while animals of group-II, were treated with test extract (400 mg/ kg, b.w.p.o). Paracetamol (150 mg/ kg b. w. p. o.) suspension in 01% Tween-80 was used as standard drug for comparing the antipyretic action of test extracts, which was administered to the animals of group-III.

### Statistical Analysis

The results are expressed as mean  $\pm$ S.E.M. The significance statistical analysis was performed by ANOVA followed by Dunnett's test <sup>[10]</sup>. The value of  $p < 0.001$  was considered statistically significant.

## Results and discussion

### Phytochemical analysis

Reports of preliminary phytochemical analysis indicated the presence of anthraquinone glycosides, flavonoids, phytosterols, saponins, tannins and phenolic compounds.

### Acute toxicity studies

Ethanollic extract of *Oldenlandia umbellata* root was found to be practically non-toxic since no toxic symptoms and mortality was observed even at the dose of 04 g/ kg b.w.p.o. in rats. A dose of 400 mg/ kg, b.w.p.o. was fixed for all the screening experiments.

### Anti-inflammatory activity

The results (Table 1) in this model demonstrated a significant ( $p < 0.001$ ) inhibition of carragennin induced paw oedema. The maximum percentage of inhibition by the extract and phenylbutazone were found to be 56.86 and 60.78 respectively. Carrageenan induced oedema being described as biphasic is mediated by the release of histamine, kinins, 5-HT and a more prolonged second phase is related to the release of prostaglandins like substances <sup>[11]</sup>. The anti-inflammatory activity of the plant extract may be attributed mainly to the constituents such as sterols <sup>[12]</sup>.

**Table No. 01: Anti-inflammatory effect of *Oldenlandia umbellata* root extract in carragennin induced rat hind paw oedema.**

Group	Dose	Mean paw volume (ml) at 03 hours	Inhibition (%)
Group-I	--	0.5 ± .006	
Group-II	400 mg/ kg b.w.p.o.	0.23 ± .005*	56.85
Group-III	100 mg/ kg b.w.p.o.	0.21 ± .009*	60.79

\*Significant at  $p < 0.001$ , p value was calculated by comparing with control by ANOVA followed by Dunnett's test, values are expressed as  $\pm$  SEM; n = 6.

**Antipyretic activity**

The roots on yeast induced pyrexia in rats showed significant ( $P < 0.001$ ) antipyretic effect (Table 2).

An appreciable antipyretic effect noticed at 400 mg/ kg body weight was comparable to the standard drug paracetamol.

**Table No. 02: Antipyretics effect of *Oldenlandia umbellata* root extract in pyrexia induced rats.**

Group	Rectal temperature in °C at time (hours)					
	-18 hours	0 hours	1 hours	2 hours	3 hours	4 hours
Group-I	37.64 ± 0.12	38.62 ± 0.13	39.24 ± 0.20	39.91 ± 0.23	39.87 ± 0.14	39.54 ± 0.15
Group-II	37.6 ± 0.13	38.56 ± 0.15	37.58 ± 0.30*	37.61 ± 0.14*	37.62 ± 0.18*	37.72 ± 0.21*
Group-III	37.68 ± 0.15	38.59 ± 0.15	37.69 ± 0.14*	37.67 ± 0.19*	37.83 ± 0.15*	37.77 ± 0.19*

\*Significant at  $p < 0.001$ , p value was calculated by comparing with control by ANOVA followed by Dunnett's test, values are expressed as  $\pm$  SEM; n = 6.

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