

Pharmacological Evaluation of Analgesic and Anti Inflammatory Activities of *Securinega Leucopyrus*

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Abstract: The study was undertaken to evaluate the analgesic and anti-inflammatory activity of *Securinega leucopyrus* R. Smith leaf extracts using eddy's hot plate method, undiluted fresh egg albumin induced rat paw oedema method respectively. The study comprised of four treatment groups (control, standard and test – Aqueous leaf extracts of various doses) all with six animals in each group. At the end of the study aqueous leaf extract showed significant analgesic activity when compared with standard and control treatment groups.

Keywords: *Securinega leucopyrus*, Eddys hot plate, paw edema, analgesia, anti-inflammatory.

INTRODUCTION

Medicinal plants are an important source to our traditional health care systems. It is estimated that 70-80% of the rural population in developing Asian nations depends on traditional medicine for primary healthcare today. As per the World Health Organization (WHO), more than 80% of the World's population relies on traditional herbal medicine for their primary health care needs. These valuable herbal traditions found in developing countries have always been considered an important component of the cultural heritage of the world and traditional use and management of medicinal plants [1]. *Securinega leucopyrus*, (Willd) Muell. (Family: Euphorbiaceae) known as *Katupila* (in Sri Lanka), *Thumri* (Sanskrit name), *Humari* (in Hindi), *Shinavi* (in Gujarat) and also called as "Spinous fluggea" in English [2]. It has been described by the medico-ethno-botanist as a wonderful drug for the treatment of wound healing.

It is also useful in vitiated conditions of Pitta, burning sensation, strangury, seminal weakness and general debility and is used as a wonderful medicine in menstrual disorders [3].

It consists of quasitrin, albumin, resins and coloring agents. *Katupila* possesses *kashaya* and *Tikta rasas*; *Lagu*, *Ruksha*, *Tikshna gunas*; *Ushna veerya* and *Katu vipaka*. *Katupila* leaves act as an antiseptic and its paste is used in folklore to extract any extraneous materials from body tissues without surgery [4]. Pharmacognostical study of *S. leucopyrus* powder shows the presence of calcium oxalate crystals, large amount of tannin and oil helpful in the treatment of cuts and wounds [5].

Pain is a symptom of many diseases requiring treatment with analgesics. Severe pain due to cancer metastases needs the use of strong analgesics that means opioid drugs. The addiction liability of opioids led to intensive research for compounds without this side effect. Many approaches have been used to

differentiate the various actions of strong analgesics by developing animal models not only for analgesic activity but also for addiction liability. Several types of opioid receptors have been identified in the brain allowing *in vitro* binding tests. However, the *in vitro* tests can only partially substitute for animal experiments involving pain [6].

Inflammation is defined as the local response of living mammalian tissues to injury due any agent. It is a body defense reaction in order to eliminate or limit the spread of injurious agent, followed by removal of the necrosed cells and tissues. The present article highlights the methods of performing different activities of analgesic and anti-inflammatory for the evaluation [7].

MATERIALS AND METHODS

Plant Material Collection and Extraction

The leaves of *Securinega leucopyrus* was collected, shade dried and powdered mechanically. About 100 gm of powder will be extracted with 200 ml

of water (aqueous extract) allow for 24hr. Filter twice by watmans filter paper at room temperature for 4 h using a mechanical shaker. The extract will be dried at 40°C under vacuum under reduced pressure. Thus, the prepared extract is used for further pharmacological evaluation.

Acute toxicity studies

The oral acute toxicity study was carried out as per the guidelines set by Organization for Economic co-operation and development received from the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA). One tenth of the median lethal dose (LD₅₀) was taken as an effective dose. Acute toxicity study was done as per OECD, 2006 guidelines [8]. Acute oral toxicity tests found the LD₅₀ of the plant was >2000mg/kg. The animals were observed for the signs of toxicity such as grooming, hypertension, hyperactivity, sedation and hyperthermia continuously for 2 hours and for mortality upto 24 hours after the administration of doses.

Evaluation of analgesic activity

Screening for analgesic activity – Eddy’s Hot Plate Method

Wistar rats (200-300g) of either sex were divided into four groups containing six animals in each. A control group received 0.9% normal saline 2ml/kg orally, while second group received standard drug (Pentazocine) and other groups the standardized aqueous extract (100 & 200mg/kg) extract of *Securinega Leucopyrus* at doses 10 mg /kg-1 p.o,

respectively. The temperature of hot plate was maintained at 55±0.5°C⁹. The rats were placed individually on hot plate and time between placement and licking of paws, shaking or jumping off the surface was recorded by using Eddy’s hot plate apparatus. As response latency, rat with baseline latencies of less than 5 sec or more than 15 sec were eliminated from the study and cut off latency time was set at 15 sec to avoid tissue damage. After determination of base line response latencies, hot plate latencies were re determined at 15, 30, 60, 120 and 180 min after drug administration.

Evaluation of Anti Inflammatory activity

Screening for anti-inflammatory activity – Paw edema method

Wistar rats (200-300g) of either sex were divided into four groups containing six animals in each. A control group received 0.9% normal saline 5ml/kg i.p, while second group received standard drug (Indomethacin) [10] and other groups the aqueous extract at doses 100&200 mg /kg-i.p, respectively. Acute inflammation was produced by the sub-planter administration of 0.1ml fresh egg albumin into the right hind paw of each rat 1hour after administration of respective extracts. The paw volume was measured at 0min and 180mins, taking the readings at 30mins intervals, after the egg- albumin administration by displacement technique using plethysmometer.

RESULTS

Analgesic activity

Table-1: The analgesic activity of aqueous leaf extracts of *Securinega Leucopyrus* using the Eddy’s hot plate method

S.No	Treatment Dose	Dose (Mg/kg) I.p.	Total time(s)	Time period(Min)					Mean ± SEM
				15	30	60	120	180	
1	Control	10ml	15	9	9	8	8	7	8.2
2	Aceclofenac	25	15	8	6	4	2	2	4.4
3	Aq extract	100	15	9	7	6	5	4	6.2
4	Aq extract	200	15	8	6	4	4	3	5

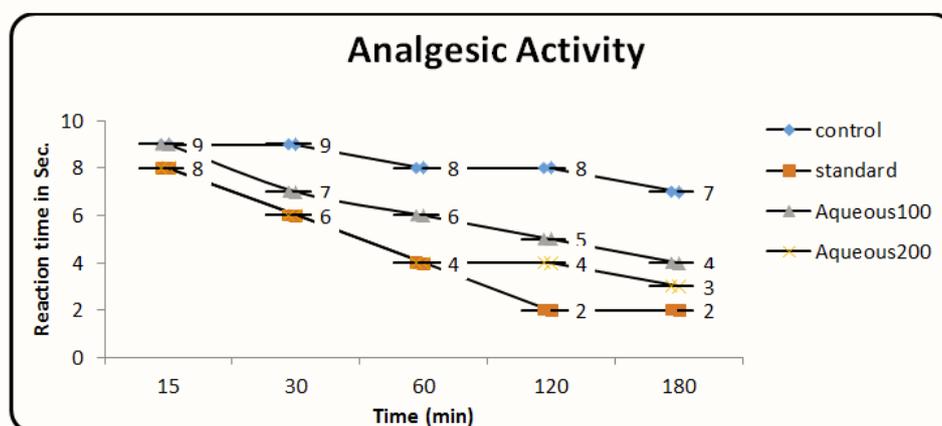


Fig-1

Table-2: Anti-inflammatory activity

S.No	Treatment Dose	Dose (Mg/kg) I.p.	Paw volume at various intervals (Min)				
			30	60	120	180	240
1	Control	10ml	0.20±0.03	0.45±0.03	0.68±0.04	0.74±0.06	0.68±0.05
2	Aceclofenac	25	0.14±0.02	0.26±0.03	0.35±0.08	0.36±0.04	0.39±0.02
3	Aq extract	100	0.19±0.06	0.24±0.04	0.40±0.03	0.38±0.08	0.36±0.03
4	Aq extract	200	0.16±0.04	0.36±0.07	0.49±0.05	0.65±0.04	0.58±0.06

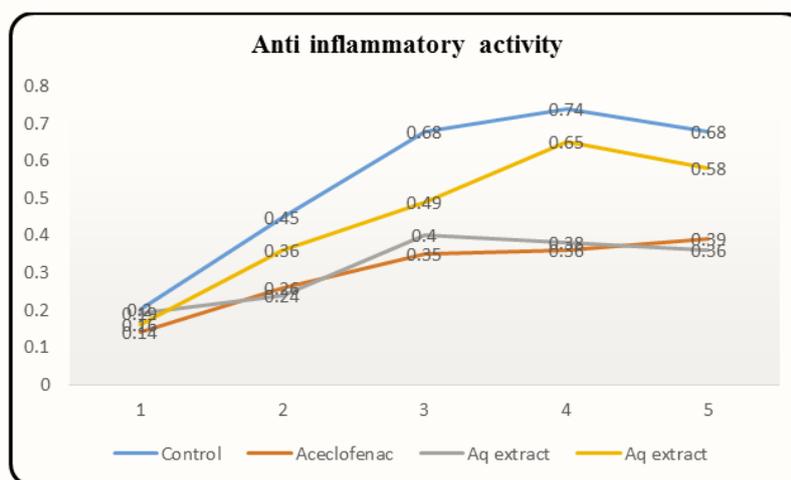


Fig-2

DISCUSSION

When the parameters for the analgesic activity were evaluated, we can observe more number of jumping responses in control and found to be gradually decreased in case of aceclofenac treated standard group. Similarly the test extracts with different concentrations also followed the same way of standard but not as much as effective when compared with standard. In Case of anti-inflammatory also, the severity of avoidance was increased by test extracts. Even though the test extracts doesn't showed a greater effect than standard, it showed a good potency.

CONCLUSION

Both the aqueous extracts has shown significant central analgesic activity done by using hot plate method in rats, when compared with other treatment groups. Similarly they has shown profound anti-inflammatory activity performed by using plethysmometer by egg-albumin induced paw edema method, when compared with other treatment groups.

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