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Anti-Inflammatory Activity of *Smilax wightii fruit, Endemic* A.DC. (*Smilacaceaea*) -An Endangered Medicinal Plant from the Nilgiris

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Abstract

Smilax wightii A.DC. is an endangered medicinal plant available in the Nilgiri Biosphere Reserve an it is said to be used in curing several diseases like dysentery, amoebiasis, veneraldiseases, urinary complaints, fever, spermatorrhoea, antifertility, anaemia, rheumatic-arthritis, veterinaryamoebiasis and gastric complaints which are found in the Indian and Chinese system of medicine. In the present study, the ethanol extract of *S. wightii* exhibited the significant anti-inflammatory activity at the dose of 100 mg/kg and 200 mg/kg, body weight. The per cent inhibition of paw oedema of *s. wightii* is 59.77 and 77.58 at various doses .The result confirmed that *S.wightii* has potent anti-inflammatory activity.

Keywords: S*milax wightii*, ethanolic extract, anti-inflammatory activity.

1. Introduction

Inflammatory diseases and rheumatic diseases are major causes of morbility of a working force throughout the world. It is said to be called as 'King of human Miseries'. In any type of injuires on human body could be elicited as serious of chemical changes in that area is called inflammation. The steroidal and even non-steroidal anti-inflammatory drugs some time evoked several side effects. Therefore it is necessary to search for new anti-inflammatory drugs from the natural botanical resources with minimal drawbacks. Now a days there is a growing interest in the scientific evaluation of plants found in the Indian traditional systems of medicine, like Ayurveda,

siddha and Unani. The genus *Smilax* consist of ca. 300 species, belongs to the families Smilacaceae (Fnaec,2000) and distributed in temperature, tropic and subtropical zones. The roots of *Smilax wightii* have been reported to cure dysentery, amoebiasis, veneraldiseases, urinary complaints, fever, spermatorrhoea, antifertility, anaemia, rheumatic-arthritis, veterinary amoebiasis and gastric complaints (Adhikari *et al*., 2010). The genus of *Smilax* has reported to contain several phytoconstituents such as dioscin, steroids smilagenin and sarsapogenin Coimbatore BSI, 1989. Several species of *Smilax* are used in Chinese traditional system of medicines as anticancer, anti-inflammatory and analgesic agents (Ozoy *et al*., 2008). Therefore, the present study was undertaken to evaluate the anti-inflammatory activity using fruits *of Smilax wightii*, a rare endemic medicinal plant of Smilacaceae.

2. Materials and Methods

Fresh fruits of *S.wightii* was collected from kodanadu, the Nilgiri Hills, Western Ghats Tamilnadu and authenticated by a plant taxonomist, M.Murugesan, Scientist, SACON and Coimbatore.

Extraction

Air dried and coarsely powdered *S.wightii* fruits are extracted initially with petroleum ether followed by ethanol. The extract was then concentrated to dryness under reduced pressure and controlled temperature. Final traces of methanol were removed and they were preserved in a refrigerator till further use (Khandelwal, 2002).

Experimental

Male swiss albino rats weighing about 20-25g were procured from Kerala agricultural University, Animal house, Trissur. All the animals were kept in standard polypropylene cages and maintained under standard conditions: temperature (24±1°C), relative humidity (45-55%) and 12:12 light: dark cycle. All these rats were acclimatized to laboratory conditions 48 hrs before the experimental period. Each groups has 5 rats which are used in all sets of experiments. The rats were provided with standard rodent pellet diet and the food was withdrawn 18-24 hrs before the experiment and only water was allowed *ad libitum*. All the experiments were performed according to ethical guidelines for the investigation of experimental pain in conscious animals (659/02/a/CPCSEA).

***In vivo* Anti-Inflammatory Activity**

Carrageenan-induced paw oedema in albino rats

In this experiment, all the rats were divided into 5 groups each consisting of five rats in each group. In all groups acute inflammation was produced by sub plantar injection of 0.1ml freshly prepared 1% suspension of carrageenan in normal saline in the right hind paw of the mice and paw volume was measured plethysommetrically at 0 to 180mins after carrageenan injection. All the rats were premedicated with indomethacin (10mg/kg b.wt.) orally two hour before infection. Mean increase in paw volume was measured and percentage was calculated for all the extracts.The extracts were subjected for acute toxicity studies and 1/10th of the LD50 dose was selected for pharmacological activity (Winter and Poster, 1957). Percentage inhibition of paw volume was calculated by the following formula.

$$\% \text{ Inhibition} = \frac{Vc - Vt}{Vc} \times 100$$

Where

Vt- means increase in paw volume in mice treated with test compounds.

Vc- means increase in paw volume in control group of rats.

3. Results and Discussion

The present study demonstrated the potent anti-inflammatory activity of the ethanolic extract of *smilax wightii* fruits ethanol extract in carrageenan induced rat paw oedema model. The mean increase in paw oedema volume was about 139.63±1 in control rats for 180 mins. *smilax wightii fruits* ethanol extract at the dose of 100 mg/kg and 200 mg/kg, body weight significantly ($p < 0.01$) reduced the mean paw edema volume after 3 hrs carrageenan injection. *smilax wightii fruits* ethanol extract treated groups have exhibited improved anti-inflammatory activity with the per cent inhibition of paw odema of 59.77 and 77.58 respectively, as compared with the control group. However, the standard drug, Indomethacin has also exhibited (10 mg/kg b.wt.) significant ($p < 0.01$) anti-inflammatory activity and per cent inhibition was 82.01 as shown in table 1. *In vivo* anti-inflammatory activity (Carrageenan-induced oedema test), is highly sensitive to non-steroidal anti-inflammatory drugs, and has long accepted as a useful phlogistic tool for investigation of new anti-inflammatory drugs (Just *et al* 1998). The extract has inhibited the release of pro-inflammatory mediators of acute inflammation such as histamine and prostaglandin. Interestingly, the extracts caused gastrointestinal irritation in rats typical of anti-inflammatory inhibitors such as the non-steroidal anti-inflammatory drugs NSAIDs (Rang and Dale 1988). Thus, these extracts may exert anti-inflammatory effect. The similar results were also reported in cardiopermum helicacabum (Venkadesh Babu and Krishakumari, 2006).

The anti-inflammatory activity of aerial parts and tuber part of methanolic extracts of *S.wightii* were evaluated by carrageenan induced mice paw oedema method. (Udegbunam *et al.*, 2012).

From this study it may be concluded that the fruits of *S.wightii* were found to exhibit anti-inflammatory activity, this activity is due to the presence of some flavonoids, alkaloids, terpenoids and phenols in the fruits. Hence it could be used as an alternative drug from the plant origin for the treatment of anti-inflammatory related diseases.

Table 1: *In vivo* anti-inflammatory activity of ethanolic extract of *Smilax wightii* fruit on Carrageenan induced hind paw oedema in rats.

Treatment	**Oedema volume (ml)**					**% Inhibition after 180 min**
	Dose mg/kg	**0 min**	**60 min**	**120 min**	**180 min**	
Group I	Normal saline	24.13±1.83	59.54±1.32	94.23±1.89	139.63±1.	_
Group II	100µg/kg	25.85±1.96	98.49±1.88	62.13±1.32*	56.24±1.82*	**59.77**
Group III	200µg/kg	28.48±1.64	87.21±1.27**	43.44±1.83**	31.30±1.66***	**77.58**
Group IV	400µg/kg	26.78±1.93	51.84±1.07**	34.22±1.28**	24.78±1.27***	**82.25**
Group V	10mg/kg	29.13±1.62	36.13±1.05**	32.27±1.22**	25.11±1.37***	**82.01**

Each Value is SEM ± 5 individual observations *P < 0.05,
** P<0.01, * ** P<0.001 Compared paw oedema induced control vs drug treated rats

Group I : Control rats given normal saline orally by using an Intra Gastric Catheter tube (IGC).
Group II : Rats given ethanol EW extract at the dose of 100 mg/ Kg b.wt. by IGC.
Group III : Rats given Ethanol EW extract at the dose of 200 mg/ Kg b.wt. by IGC.
Group IV : Rats given Ethanol EW extract at the dose of 400 mg/ Kg b.wt. by IGC.
Group V : Rats given Indomethacin at the dose of 10 mg/ Kg b.wt. by IGC.

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