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## EFFECTS OF ANTI-INFLAMMATORY ACTIVITY OF SAPINDUS MUKOROSI

Venkateshwarlu Goli<sup>1\*</sup>, N.L Gowrishankar<sup>2</sup>, Sravan Prasad Macharla<sup>3</sup>, Tadakapalli.Ramchander<sup>4</sup>,  
Jimmidi.Bhaskar<sup>5</sup>, Kanakam.Vijay Bhaskar<sup>5</sup>

<sup>1</sup>Department of Pharmacognosy, Venkateshwara Institute of Pharmaceutical Sciences, Charlapally ,  
Nalgonda, Andhra Pradesh, India – 508001.

<sup>2</sup>Department of Pharmacognosy, Swami Viveka nanda institute of pharmaceutical sciences, Bhuvanagiri,  
Nalgonda Andhra Pradesh, India – 508001.

<sup>3</sup>GBN Institute of Pharmacy, Ghatkesar, RR District, Andhra Pradesh, India.

<sup>4</sup>Department of Pharmacognosy ,Mother Theresa college of pharmacy,Ghatkesar,R.R district

<sup>5</sup>Department of Pharmacognosy, Venkateshwara Institute of Pharmaceutical Sciences, Charlapally,  
Nalgonda, Andhra Pradesh, India – 508001.

[Email:venkatvenki505@yahoo.in](mailto:venkatvenki505@yahoo.in)

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### Abstract:

The present study was carried out to investigate the anti-inflammatory property of petroleum ether, alcoholic and aqueous extracts of *spindus mukorossi* leaves using experimental animal models. The antiinflammatory activity of the various extracts was studied based on their effects on carrageenan-induced paw oedema and cotton pellet granuloma in rats,.The extracts in dose levels of 50,100 and 200 mg/kg orally were used for anti-inflammatory studies. The ethanol and aqueous extracts of leaves of *spindus mukorossi* significant ( $P<0.05$ ) anti-inflammatory activities in a dose-dependent manner to that of standard drug indomethacin,while petroleum ether extract exhibit minimum inhibitory effect in carageenan induced hind paw oedema and cotton pellet granuloma in rats. all the doses used when compared to the control group. The results obtained indicate that the crude leaf extracts of *spindus mukorossi* possess potent anti-inflammatory by supporting the folkloric usage of the plant to treat various inflammatory conditions.

**Key words:** *sapindus mukorossi*, Anti-inflammatory activity, Rat paw oedema, carrageenan induced inflammation

## **Introduction**

The plant *Sapindus mukorossi* available in all regions of India and which is used as a folklore medicine for tribal people. This plant is most use ful in shampoos preparations and detergent and it also called soapnut tree. Soap nuts have historically been used in folk remedies as a mucolytic agent, salivation, epilepsy<sup>[1]</sup>, emetic<sup>[2]</sup>, contraceptive<sup>[3]</sup>, and for to treat chlorosis<sup>1</sup> While they do exhibit anti-inflammatory and anti-microbial properties, the effectiveness of some of these folk-remedy treatments have not been subject to extensive scientific scrutiny. However, modern scientific medical research has investigated the use of soapnuts in treating migraines<sup>[4,5]</sup> Investigation of the contraceptive capability of plant saponins have shown some spermicidal capacity for certain extracts.<sup>[6]</sup> While the *Sapindus* saponins have not been proven to be as effective as more commonly used spermicides it has been shown that they are less irritating than chemical alternatives.<sup>[7]</sup> Soapnuts, such as those of *Sapindus mukorossi*, are among the list of herbs and minerals in Ayurveda. They are a popular ingredient in Ayurvedic shampoos and cleansers. They are used in Ayurvedic medicine as a treatment for eczema, psoriasis, and for removing freckles. Soapnuts have gentle insecticidal properties and are traditionally used for removing lice from the scalp.

## **Materials and Methods**

### **Plant materials**

The leaves of the plant *Sapindus mukorossi*, were freshly collected in Cherlapally adjacent regions, Nalgonda, AP, India during Jan-Feb, 2011. It was identified and authenticated by an expert from the Dept. of Botany, Kakatiya University, Warangal.

### **Preparation of Extract**

The plant materials were washed thoroughly to remove the dirt and shade dried at room temperature. The dried leaves were coarsely powdered (1kg) and extracted successively with petroleum ether (PEE), ethanol (EE) and water (AE) using Soxhlet apparatus and concentrated under vacuum to obtain a petroleum ether extract (5.46 %), an ethanol extract (16.45 %) and the aqueous extract (10.24 %). Dilution of the extracts were made in saline for pharmacological studies.

## Animals

Male albino rats, weighing 150-200g were procured from C.C.M.B, Hyderabad, India. The animals were housed in polypropylene cages with sterile, inert husk materials as bedding. The experimental animals were maintained under controlled environment conditions (12 h light and dark cycle, temperature  $22 \pm 10^{\circ}\text{C}$  and relative humidity 40-70 %). The animals were fed with a balanced commercial diet (Hindustan Lever Ltd., Mumbai, India) and water *ad libitum*. All procedures described were reviewed and approved by the institutional ethical committee.

## Carrageenan - induced rat paw oedema

The extracts of *Sapindus mukorossi* were evaluated for anti-inflammatory activity by carrageenan induced rat paw oedema method [8]. Following an overnight fast, 50, 100 and 200 mg/kg of the petroleum ether, ethanol and aqueous extracts of *Sapindus mukorossi* were orally administered to animals in different groups, using an oral cannula. At the same time, animals in the reference group received 10 mg/kg indomethacin orally, while animals in the control group received saline, at a dose of 2 ml/kg. The paw volume was measured just before and 1, 2, 3 and 4 hr after the carrageenan injections using plethysmometer. The animals were pretreated with all the drugs 1hr before the administration of carrageenan. Acute inflammation was produced by the subplantar administration of 0.1 ml of 1% carrageenan in normal saline in the right paw of the rats. The left paw served as a reference to non-inflamed paw for comparison. Mean increase in paw volume was measured and percentage of inhibition was calculated.

$$\text{Percentage inhibition of edema} = 1 - \frac{V_t}{V_c} \times 100$$

## Statistical analysis

Data are presented as mean  $\pm$  S.D and the statistical significance of observed difference between the value in the different groups were determined by student's t-test and results were considered statistically significant when  $P < 0.05$

## Results and discussion

*Sapindus mukorossi* extracts (EE and AE) were observed to significantly reduce the edema induced by carrageenan better than PEE in a dose dependent manner. This is an indication of anti-inflammatory effect of the extracts.. Inflammatory processes are the physiological response of the organism to different stimuli such as trauma, infections or immunological mechanisms[9] The presence of edema is one of the prime signs of inflammation[10]. The method was chosen for this study since edema induced by carrageenan is the most prominent acute experimental model in search for new anti-inflammatory drugs[11]. It is known that carrageenan-induced paw edema involves many mediators which induce inflammatory reaction in two different phases[12]. The initial phase is attributed to the release of mediators such as histamine, serotonin and bradykinin[13]. The second phase of oedema is due to the release of prostaglandins, protease and lysosome in tissues[14]. There was significant differences observed throughout the experiment between control and indomethacin treated groups. The inflammatory granuloma is a typical feature of established chronic inflammatory reaction[15]. The dry weight of the pellet correlates with the amount of granulomatous tissue. The EE and AE extracts (200mg/kg) were effectively and significantly reduced. These data showed the ability of the extracts in reducing the number of fibroblasts, and synthesis of collagen and mucopolysaccharides, which are natural proliferative events of granulation tissue formation. Thus, the results of this study confirmed the traditional uses, claiming that *Sapindus mukorossi* leaves has potent anti-inflammatory activity.

However, to know the exact mechanism of action of *sapindus mukorossi* leaf extracts, further study with purified fractions is warranted.

**Table-1: Effects of various extracts of *Anisomeles malabarica* on carrageenan - induced rat paw oedema.**

Group	Dose	Time(hr)	1hr	2hr	3hr	4hr	% of inhibition
Control	2ml	39.02±1.02	64.29±3.21	86.68±5.12	96.43±7.37	112.07±81.	
indomethacin	10	32.40±1.56	36.32±2.16	48.28±2.10	46.92±1.43	44.43±1.52	49.45
PEE	50	37.96±2.78	59.54±4.32	78.07±5.62	69.92±6.74	65.89±5.94	20.44
	100	34.88±1.97	52.27±3.62	77.27±5.72	64.04±4.79	65.55±4.13	25.42
	200	32.96±1.56	47.54±3.16	62.07±3.02	57.92±2.54	56.89±3.61	36.84

EE	50	37.96±2.76	58.54±4.26	76.07±5.32	66.92±4.74	62.89±5.91	23.18
	100	34.96±1.66	49.54±3.26	64.07±4.32	62.92±3.74	60.89±4.81	32.28
	200	31.76±1.56	41.32±1.16	54.45±1.10	52.86±1.43	50.72±1.52	44.81
AE	50	34.91±2.73	56.52±4.16	72.09±5.16	68.86±4.82	64.88±4.91	24.32
	100	33.96±1.76	49.54±3.26	72.09±5.16	62.92±2.74	60.89±4.81	32.61
	200	31.52±1.56	40.32±1.03	50.32±1.12	51.52±1.08	50.31±1.14	45.69

Values are expressed as mean ± S.D. (n=6). P<0.05, significantly compared to the control

PEE→petroleum ether extract

EE→Ethanolic extract

AE→aqueous extract

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**Corresponding author:**

**Goli. Venkateshwarlu\***

**Email:**[venkatvenki505@yahoo.in](mailto:venkatvenki505@yahoo.in)