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ANTI-INFLAMMATORY EFFECT OF CHLOROFORM EXTRACT OF *FLAVERIA TRINERVIA* (SPRENGEL) C. MOHR -A MEDICINAL HERB.

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ABSTRACT

In the present study of chloroform extract of leaves of *Flaveria trinervia* (Sprengel) C.Mohr. (Asteraceae) obtained by soxhlet extraction method was tested for anti-inflammatory activity by carrageenan induced paw edema in rats. The chloroform extract in dose of 250mg /kg b.w was administered orally.Anti- inflammatory activity effect was compared with standard drug – Indomethacin (10mg/kg b.w) showed 31% and 51% inhibition of paw edema, in extract and standard respectively. These observations help us to conclude that chloroform extract has showed good anti-inflammatory activity against carrageenan induced paw edema.

KEY WORDS: ***Flaveria trinervia*, Anti- inflammatory, Carrageenan, Indomethacin, Plethysmograph.**

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1. INTRODUCTION

Flaveria trinervia (sprengel) C. Mohr. (Asteraceae) is native to Australia and is widely distributed in Chengalpattu, Coimbatore, Dharmapuri, Salem, Tiruchirappalli and Tirunalveli region of Tamilnadu The plant is used to cure jaundice, intispasmodic activity, moderate wound healing property and to reduce fever(Shanthamma et al., 1986).Inflammation is the tissue reaction to infection, irritation or Foreign substance including different types of rheumatic diseases are a major cause of morbidity of the working force throughout the world. It is a dynamic process that is elicited in response to mechanical injuries, burns, microbial infections, and other noxious stimuli that may threaten the well- being of the host. This process involves changes in blood flow, increased vascular permeability, destruction of tissues via the activation and migration of leucocytes with synthesis of local inflammatory mediators, such as prostaglandins, leukorienes(Shah et al ., 2008).There are various components to an inflammatory reaction that can contribute to the associated symptoms and tissue injury. Edema formation, represent such components of inflammation (Mitchell and Cotran, 2000).Inflammation is the complex biological response of vascular tissue to harmful stimuli including pathogens, irritants, or damaged cells. It is a protective attempt by the organism to remove the injurious stimuli as well as initiate the healing process for the tissue (Denko,1992).Anti- inflammatory activities have the potential of this need because their structures are different from those of the more studied plants, while those with more action may likely differ (Fabricant and Fanworth, 2001).Although it a defense mechanism, the complex events and mediators involved in the inflammatory reaction can easily be induced (Sosa et al .,2002).The side effects of the currently available anti-inflammatory drugs pose a major problem during their clinical uses (Mattison et al .,1998). Therefore, the development of newer and more potent anti – inflammatory drugs with lesser side effects is necessary.

2. MATERIALS AND METHODS

2.1 Plant materials and Extraction

The leaves of *F. trinervia* were collected from the Chamaraja Nagar, Karnataka. The specimen was deposited in the herbarium of Department of Botany, Manasagagothri, university of Mysore, Mysore .India. Leaves were allowed to dry under shade for about two weeks. The dried leaves were ground into coarse powder using pestle and mortar. 500g of the powdered leaves were extracted with 5lts of chloroform for three days, using soxhlet apparatus. The extracts were evaporated to dryness and stored at 4^0C in refrigerator until further use.

2.2 Animals

Albino rats (100-150mg. each) of either sex kept under standard environmental conditions (25 +_ 2 0c under 12h light and 12h dark cycle) in polypropylene cages. Standard palliated feed and drinking water were provided adlibitum throughout the experimental period. The animals were acclimated to laboratory conditions one week prior to the initiation of experimental work. The protocol was approved by the Ethics Committee and the CPCSEA under the number-IAEC/ CPCSEA MGZ-209 dated 28-04-2010.

2.3 Anti -Inflammatory Study

Overnight fasted, albino rats weighing between 100 -150g were divided into four groups of five animals each. Group I served as normal and Group II served as Inducer control and received normal saline, Group III received the test substances chloroform extract and Group IV received Indomethacin (10mg/kg b. w.) through oral route. After 30 min of extract, Indomethacin , saline administration, 0.1ml of 1% w/v suspension of carrageenan was injected into the sub - plantar region of the right hind paw of each rat. The paw volume is measured by using digital Plethysomometer, immediately after injection, again at 30,60,120, 180 and 240

min intervals. Percentage inhibition of edema was calculated by using following formula

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

Where Vt = increase in paw volume in rats treated with compound and Vc= increase in paw volume in control group of rats.

2.4 Statistical analysis

The experimental data were expressed as the mean +- SE. The standard error of the mean (SEM) is the standard deviation of the sample mean estimate of a population mean. SEM is estimated by the sample estimate of the population standard deviation (Sample standard deviation) divided by the square root of the sample size. Statistical analysis was carried out using one- way analysis of variance followed by Tukey's Multiple Comparison Test and p values implied significance (b $p<0.01$, and c $p < 0.001$) compared with carrageenan control.

3. RESULT AND DISCUSSION

The carrageenan induced rat paw edema is a biphasic process (Vinegar et al ., 1969).The release of histamine or serotonin, protease, prostaglandin and lysosome (Crunkhorn and Meacock, 1971).The Ethanolic stem extracts of *Rubia cordifolia* L.,treated rats showed 39.13% inhibition where as the Standard indomethacin produced 76.79% (Tailor Chandra Shekar et al .,2010). The extracted Eugenol from *Ocimum sanctum* L. showed 33% inhibition where as the Standard Paracetemol produced 22.8 (Kirti Thakur and K. S. Pitre, 2009).The choloroform extract of the leaves of *Trianthema decandra* L ., (Aizoaceae) showed 58% at thedose of 200mg/ kg after 3h when compared to the effect of aspirin which was 91.37%.(Sampath et al ., 2002).Adminstration of 1% Carrageenan (0.1ml) significantly (b $p < 0.01$ c $p < 0.001$) increased the paw edema volume in the all the time interval as compared to normal control. Oral administration of chloroform extract in the dose of 250mg/kg significantly (b $p <0.001$ c p , 0.0001) inhibited the Carrageenan induced paw edema at 30, 60, 120,180 and 240 min interval as compared to Carrageenan control and it is showed in Table1.The chloroform extract has shown 31% at four hr, where as standard drug showed 51% of inhibition as compared to the control group. The development of edema in the paw of the rat after the injection of Carrageenan is due to release of histamine, serotonin and prostaglandin(Shankhajit et al.,2010). The significant activity of the chloroform extract and the standard drug observed in the present study may be due to the inhibition of mediators of inflammation such as histamine, serotonin and prostaglandin.The chloroform extract showed maximum inhibition of 33% of the dose of 250mg/kg after 3h drug treatment in Carrageenan induced paw edema, where as standard drug showed 39% of inhibition. According to statistical analysis, chloroform extract of *Flaveria trinervia* prevented the formation of edema induced by Carrageenan and thus showed significant anti-inflammatory activity. Further studies involving the purification of the chemical constituents of the plants and the investigations in the biochemical pathway may result in the development of a potent anti –inflammatory agent with low toxicity and better therapeutic index. In spite of tremendous development in the field of synthetic drugs during recent era, they are found to have some or other side effects, where as plants still hold their own unique place. Therefore, a systemic approach should be made to find out the efficacy of plants against inflammation so as to exploit them as herbal anti – inflammatory agents.

Table-1
Effect of chloroform extract in Carrageenan induced paw edema

Treatment (Dose mg/kg. p.o.)	Paw Volume, ml after different time interval (Time in minutes)					
	0	30	60	120	180	240
Normal	1.06 ± 0.03	1.02 ± 0.05[b]	1.06 ± 0.03[c]	1.09 ± 0.03[c]	1.08 ± 0.04[c]	1.06 ± 0.04[c]
Carrageenan (1%, 0.1 ml)	1.37 ± 0.07	1.65 ± 0.07	1.47 ± 0.03	2.02 ± 0.09	2.24 ± 0.11	2.18 ± 0.09
Chloroform Extract (250 mg/kg p.o.)	1.21±0.04	1.21±0.04	1.27±0.04[c]	1.46±0.07[c]	1.50±0.09[c]	1.54±0.09[c]
Indomethacin (10 mg/kg p.o)	0.97 ± 0.03	1.22 ± 0.06	1.33 ± 0.06[b]	1.29 ± 0.06[c]	1.29 ± 0.06[c]	1.31 ± 0.06[c]

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