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Pharmacological Evaluation for Anti inflammatory Activity of Traditionally used Medicinal Plants

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Abstract

Traditional plants such as Amaranthus spinosus Linn and Abutilon indicum Linn have been used in the Indian traditional system of medicine for the treatment of several diseases such as pain, inflammation, piles, toothache etc. The fractions of ethyl acetate, methanol and ethanol were tested for their anti-inflammatory activity. Ethanolic and methanolic fractions of A. indicum and A. spinosus at the doses of 200 and 400 mg/kg produced highly significant activity.

Keywords: *Srimudre gida, tannins, traditional, nervine tonic, kidney problems*

INTRODUCTION

The rural population of our country is more disposed to traditional ways of treatment, because of its easy availability and cheaper cost, inflammation and infections are among those diseases treated with traditional medicine, inflammation is the response of living tissues to injury, acute and chronic inflammations are a complex array of enzyme activations, mediator release, tissue break down and repair [1]. It is known that acute inflammatory response consists of three main vascular effects, namely vasodilatation and consequent increased vascular flow, increased vascular permeability and leucocytes migration. Histamine and 5-HT are usually responsible for eliciting the immediate response of inflammation in rats, whereas kinins and PG (Prostaglandin) mediate the more pronged delayed onset responses [2].

Seen as a logical and fruitful research strategy, in the search of new with anti-inflammatory agents with minimum side effects [3]. *Abutilon indicum* Linn belongs to family Malvaceae. It is commonly known as Atibala in hindi, Srimudre gida in Kannada, it is distributed in tropical regions of India. Traditionally, the whole plant is used as febrifuge, anthelmintic and anti-inflammatory, also used in urinary troubles, leaves extract used as diuretic and demulcent, root nervine tonic and antipyretic, used in piles. Seeds used as laxative and demulcent [4].

Flowers were used as anti-bacterial and anti-inflammatory, the chemical constituents of this plant contain

mucilage, tannins, asparagines, gallic acid and sesquiterpenoids [5]. *Amaranthus spinosus* Linn is an erect glabrous herb with hard stem belongs to the family Amaranthaceae, this herb reddish with many grooved branches with spines, found in tropical and subtropical region of India [6].

The traditional report on *A. spinosus* claim the use of drug in inflammatory conditions, stomach problems and abscess [7]. Decoction of the plant used in kidney problems, it improves digestion, and also leaves decoction used to prevent miscarriage [8]. Literature survey of these plants reveals that no scientific claim has been made on anti-inflammatory activity on fractions of leaves, hence, it was thought worthwhile to validate these claims by scientific means.

MATERIALS AND METHODOLOGY

Preparation of Extracts

The powdered leaves of *A. indicum* and *A. spinosus* material was subjected to continuous hot extraction with ethyl acetate, ethanol and methanol in soxhlet extractor, after each extraction the solvent was recovered, and the extracts were concentrated at room temperature. Obtained extracts were used for the evaluation of anti-inflammatory activity in albino rats.

Acute Toxicity Studies

The acute oral toxicity studies were performed according to the OECD guidelines. The toxicity studies were done by up and down process. The LD₅₀ were found at 2000 and 1000 mg/kg b.w, so the dose was fixed at 400 and 100 mg/kg b.w, as it was 1/5th and 1/10th of the LD₅₀ dose.

Anti-inflammatory Activity by Carrageenan Induced Paw Oedema

The anti-inflammatory activity was evaluated using 0.1 ml of carrageenan (1% w/v solution) the ethical clearance was obtained by the IAEC before the experiment. Albino rats of Wistar strains of either sex between 150–200 gm was selected for the studies. The animals were kept on diet and allowed food and water *Ad libitum*. They were housed in polypropylene cages maintained under laboratory conditions.

The rats were divided into six groups of six rats each, the control group received tween 80(0.5%) 0.1 ml the test group received diclofenac sodium 10 mg/kg by oral route. The test Groups III, IV, V and VI received 400 and 100 mg/kg of ethyl acetate, ethanol and methanol fractions of *A. indicum* and *A. spinosus* respectively by oral route, all the test samples were administered orally 30min before injection of carrageenan in normal saline into the sub-plantar region of right hind limb of each rats, contra lateral paw was injected with an equal volume of saline through I.P. the rat pedal volume up to the ankle joint was measured using plethysmometer at 1/2 , 1,2, and 3rd hours after the injection of carrageen and percent inhibition of inflammation was calculated [9, 10].

Statistical Analysis

The statistical analysis formed using one-way ANOVA, as primary test, followed by Dennett's test and p value <0.01 was taken as significant.

RESULTS AND DISCUSSION

In the carrageenan induced inflammation model, ethanolic and methanolic fractions of *A. spinosus* at the doses of 100 and 200 mg/kg produced highly significant action and *A. indicum* at the dose of 400 mg/kg showed significant inhibition of paw oedema, whereas 100 mg/kg showed less significant activity, they are comparable to control and that of standard drug. Results are shown in Table 1.

Carrageenan induced oedema is a biphasic response, the first phase was mediated through the release of histamine, serotonin and kinins, whereas the second phase is related to the release of prostaglandin and slow reacting sub which peak at three hours [11]. Preliminary phytochemical analysis of the fractions revealed the presence of flavonoids is known to target PG which is involved in the late phase of acute inflammation and perception [12]. Hence, the presence of flavonoids in the fractions may be contributory to its anti-inflammatory activity.

CONCLUSION

On the basis of above results, it can be concluded that the leaves fraction of *Amaranthus spinosus* and *Abutilon indicum* produced significant anti-inflammatory effect may due the presence of flavonoids as evident by phytochemical investigation. However, the further studies are necessary to identify and isolate the active constituent represents for its exact mechanism of action.

Table 1: Anti-inflammatory Activity of *Amaranthus spinosus* (L) and *Abutilon indicum* (L) Leaves Extracts.

Groups	Drugs	Dose mg/kg	Mean Volume of Paw Oedema (ml) at					% Inhibition
			0 min	30 min	60 min	120 min	180 min	
I	Control	--	0.70±0.04	0.74±0.51	0.97±0.07	1.03±0.12	1.01±0.08	--
II	Standard	10	0.51±0.08	0.56±0.07	0.49±0.05***	0.50±0.06***	0.48±0.05***	53.47
III	ASEAF	100	0.85±0.01	0.87±0.08	0.83±0.07**	0.81±0.1***	0.71±0.06***	30.7
IV	ASEF	200	0.63±0.09	0.67±0.02	0.61±0.06***	0.62±0.01***	0.59±0.06***	42.58
V	AIEAF	100	0.83±0.1	0.92±0.03	0.93±0.05 ^{ns}	0.91±0.06**	0.89±0.093*	12.85
VI	AIMF	400	0.89±0.03	0.96±0.04	0.94±0.01 ^{ns}	0.83±0.01**	0.78±0.02**	23.80

Values are mean±S.E.M (n=6); ***p<0.001, **p<0.01, *p<0.05, ns=not significant.

Student's 't' test

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