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Likitha Rao and Neelima
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Original Article

Evaluation of Anxiolytic, Antidepressant and Anti-Inflammatory Activities of Ethanolic Extract of *Urena lobata* Leaf

S P Likitha Rao [1, *], KSSN Neelima [2]

[1] Azad College of pharmacy, Hyderabad, Telangana State, India.

[2] Vikas institute of pharmaceutical sciences, Rajahmundry, Andhra Pradesh, India.

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ABSTRACT

Depression is one of the major mental disorders. It affects up to 25% of women and 12% of men and is a highly chronic disorder. Antidepressant drugs used in the treatment of major depressive disorders are believed to act on the central monoaminergic systems mainly 5-HT and nor-adrenergic synaptic neurotransmissions. Selective serotonin reuptake inhibitors and noradrenaline reuptake inhibitors are effective in treating most depressive episodes, but about one third of these patients show only partial or no response to the treatment. Therefore, research for new antidepressants with greater effectiveness is still desirable. The presence of phenols gives the leaves of *urena lobata* the potent antiseptic bactericidal properties and this supports the use of the leaves extract in rheumatism, gonorrhea treatment and in preventingthe formation of infections. The leaves have high saponin contents. Saponins have the tendency to fight microbes. They are well known for their homeostatic activities because of their characteristic soapy nature. Overall results of the present investigation demonstrated that *Urena lobata* leaf extract could be the better alternative for maintaining the anxiety, depression and inflammatory conditions. These Studies lead to the conclusion that the herbal extract of *Urena lobata* leaf extract could be used for the treatment of anxiety, depression and inflammatory, as they are found to be potent and safe.

Keywords: *Urena lobata*, chronic disorder, monoaminergic systems.

1. INTRODUCTION

Stress has been observed to play a key role in the etiology of neurodegenerative diseases and mental disorders. Restraint stress for 120 min has been reported to enhance depression-like behaviour in mice[1]. Acute exposure to 2 h of restraint stress exhibited a decrease in the concentration of 5-HT and its metabolite – 5-hydroxyindoleacetic acid, in the hippocampus, leading to stress-induced behavioural depression[2]. NO is a short lived, lipophilic molecule generated from L-arginine by nitric oxide synthase[3].

Corresponding author *
S P Likitha Rao
Azad College of pharmacy, Hyderabad, Telangana State, India
Email: psrao_19@yahoo.co.in

2. MATERIALS AND METHODS

Animals

Male Sprague Dawley Rats (200 – 250 gm), Male swissAlbino mice (22 – 25 gm) were employed in study. The rats will have free access to standard pellet feed and water ad libitum and are to be housed under controlled temperature 25°C ± 2°and relative humidity 44-56%. A light dark cycle of 12:12h respectively used [6, 7].

Animal models

Elevated plus maze test[8]

The animals were divided in to four groups, with each group consisting of 5 male mice. First group receives normal saline, second group received diazepam (1mg/kg), third consists of std drug piracetam, fourth groups and fifth one receives plant extract 250 mg/kg and 500 mg/kg respectively. The plus – maze consists of two open arms and two closed arms (50 x 10 x 40 cm each) elevated to a height of 50 cm. Thirty minutes post treatment, each mouse will be placed in turn in the centre of the maze facing one of the closed arm. The cumulative times spent by each mouse in the open and closed arms of the maze will be recorded for 5 to 7 min.

Forced swim test[9]

The rats of 160-180gm will be used. They will be individually forced to swim in an open cylindrical container (diameter 10 cm, height 25 cm), containing 19 cm of water at 25 ± 1º C. All the rats were divided into different groups. The first group (depressed animals) assigned as control received only vehicle (0.9% Normal saline- 10ml/kg, i.p or 20% Tween80, p.o). The second group received standard drug Imipramine (10mg/kg, p.o), the other three groups received acute dose of test drugs. The total duration of immobility will be recorded during the last 6 min of the 10-min period. Each Rat was judged to be immobile when it ceased struggling and remained floating motionless in the water, making only those movements necessary to keep its head above water. A decrease in the duration of immobility is indicative off an antidepressant effect.

Evaluation

Duration of immobility will be measured in controls and animals treated with various doses of a test drug or standard. Dose-responses can be evaluated.

Carrageenan induced paw oedema method [10]

Sprague Dawley rats (weight 180-200gms and age 2-3 months) of either sex were divided into 5 groups. Acute inflammation were produced by sub plantar injection of 0.1mL of 1% suspension of carrageenan with 2% gum acacia in normal saline, in the left hind paw of rats, one hour after oral administration of extract doses each and Indomethacin 10mg/kg body wt. will be administered by oral route. The paw volume will be measured plethysmometrically (Digital volume meter) at 0, 0.5, 1, 2, and 3hr after the carrageenan injection. The difference between '0' readings and readings after 30, 60, 120 and 180 min respectively will be taken as the volume of edema. Percentage inhibition of edema will be calculated.

3. RESULTS AND DISCUSSION

Table 1: Anti Inflammatory Activity by Carageenan Induced Paw Edema Method

		Mean Paw Edema (paw volume) (cm)				
Treatment	Dose	0 hr	1hr	2hr	3hr	6 hr
Control	10ml/kg	0.36±0.04	0.98±0.05	1.50±0.05	2.75±0.08	3.50±0.12
T1(U.L. 250 mg/kg)	250mg/kg	0.33±0.04	0.52±0.04	0.58±0.04	0.71±0.05	0.85±0.04
T2(U.L. 500 mg/kg)	500mg/kg	0.38±0.02	0.50±0.02	0.61±0.01	0.68±0.03	0.76±0.04
Diclofenac sodium(standard	10mg/kg	0.25±0.03	0.41±0.04	0.48±0.03	0.60±0.03	0.73±0.02

Table 2: Effect Of U.L. By Elevated Plus Maze Model

		No. of entries / 5min		Time spent (Sec)/5min	
Group	Treatment	Open arm	Close arm	Open arm	Close arm
Group I	Control (Vehicle, p.o)	4.50±0.3	7.6±0.8	26.66±0.18	22.01±0.27
Group II	U.L.(250mg/kg)	5.37±0.7	7.45±0.45	28.16±0.37***	10.94±0.36***
Group III	U.L. (500mg/kg	7.2±0.5	5.60±0.7	30.07±0.25***	13.04±0.21***
Group IV	(Diazepam; 10mg/kg	7.66±0.2	4.45±0.6	35.15±0.23***	15.69±0.31***

Table 3: Effect of U.L. Extract On Forced Swim Test

Group	Dose (i.p; mg/kg)	Time of immobility in seconds
Control	5ml/kg	149 ± 2.469
Imipramine	30mg/kg	117 ± 2.875**
U.L.	250mg/kg	134 ± 3.276*
U.L.	500mg/kg	125 ± 3.055**

The rats were forced to swim in a restricted space from which they cannot escape, and are induced to a characteristic behavior of immobility. This behaviour reflects a state of despair which can be reduced by several agents which are therapeutically effective in human depression. The forced-swimming test, the most-widely used tool for assessing antidepressant activity preclinically, is sensitive to the effects of all of the major classes of antidepressant drugs [82]. Immobility time is reduced by clinically-relevant doses of tricyclic and atypical antidepressants, 5-HT uptake inhibitors and monoamine oxidase inhibitors in mice and rats[11]. The present study revealed that *Urena Lobata* Leaf extarct treatment, given orally, was effective in forced-swimming test. Both *Urena Lobata* Leaf Extract and imipramine significantly reduced immobility behavior which indicates depression[12]. Administration of diazepam significantly increased the percentage of time spent and of arm entries in open arms as compare to control group. The *Urena Lobata* Leaf extarct at dose (500 mg/kg) resulted in a significant increase in the percentage of time and entries into open arm , compared to control groups. The URENA LOBATA LEAF

extarct at dose (250 mg/kg) resulted in a significant increase in the open arm time but not entry.The EPM stands as of the most popular in vivo animal test currently in use. The test was further validated as an animal model of anxiety on pharmacological, physiological and behavioural grounds. Diazepam increased the percentage of open arm entries and the time spent in the open arms confirming the anxiolytic effect. Inflammation is the response of living tissue to injury. Which involve activation of arious enzyme, mediators release, cell migration, tissue breakdown and repair. Carrageenan induced paw edema is suitable experimental animal model for evaluation anti- edematous effect of natural product. And this involves three phases, in first phase (1 hr after Carrageenan induce) involves the release of serotonin and histamine from mast cells, in second phase (2hr) is provided by kinins and the third phase (3hr) is mediated by prostaglandins, the cycloxygenase product and lipoxygenase products. From the result *urena lobata* leaf extarct at a dose of 500 mg/kg significantly inhibited carrageenan induced edema ($P<0.05$) after 60 min. *urena lobata* leaf extarct showed a dose dependent activity but was less than that produced by indomethacin[13].

4. CONCLUSION

It is concluded that, *Urena lobata* leaf extract reported to possess antianxiolitic, antidepressant and anti-inflammatory property; Phytochemical analysis of *Urena lobata* leaf extract has shown the presence of potent phytochemicals like alkaloids, flavonoids, glycosides, phytosteroids, fixed oils and fats, tannins and phenols. Several authors reported that flavonoids, steroids, terpenoids, phenolic acids are known to be bioactive principles. Ethanolic extracts of the extract was subjected to toxicological studies (acute toxicity studies) in mice. No toxicity symptoms and mortality were observed even with high doses of the extracts and mixture.

urena lobata leaf extract may be an effective and acceptable alternative for the treatment of anxiety, depression and inflammatory conditions. Overall results of the present investigation demonstrated that urena lobata leaf extract could be the better alternative for maintaining the anxiety, depression and inflammatory conditions. These Studies lead to the conclusion that the herbal extract of *urena lobata* leaf extract could be used for the treatment of anxiety, depression and inflammatory, as they are found to be potent and safe.

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