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Studies on antianxiety and anti depressant effect of fruits extract of *ficus racemosa* linn.

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ABSTARCT

Objective

The *Ficus racemosa* fruits of used for folklore medicine to the treatment of Antianxiety and Antidepressant activity of ethanolic fruits extract of *Ficus racemosa* Linn on mice model.

Methods

Evaluation of anxiolytic study (Elevated plus maze, open field test, light and dark model). Evaluation of Depressant study (Tail suspension, forced swim test).

Results EPM

The ethanolic fruits extract of *Ficus racemosais* 200mg/kg, significantly (P<0.001) increase the time spent in open arm and increase the same dose 400mg/kg, (P<0.001) increased the time spent in neutral zone. L&D - decrease the time spent in dark zone and increase time spent in light zone. The both extract of 200mg/kg and 400mg/kg, significantly (P<0.001) OFT- increased the total locomotion. increased total time spent in central compartment while 400mg/kg significantly(P<0.05) increase the total time spent in central compartment. FST - The significantly 400mg/kg significantly reduce the immobility, the dose near to standard drugs. TSM - The significantly 200mg/kg (P<0.05) increase the struggling time to 15%, and the animal treated with 400mg/kg significantly (<0.01) increased the struggling time by increases30%.the result shows the antidepressant activity by tail suspension activity.

Conclusion

Ethanolic fruits extract contain β-sitisterol (steroidal compounds) flavonoids, it may possible the mechanism of anxiolytic and sedative action. we can conclude that ethanolic extract of *Ficus racemosa* possess the Antianxiety and Antidepressant activity for both dose level which comparable with the standard drugs (Benzodiazepine).

Keywords: *Ficus racemosa, Elevated plus maze, Light and dark model, Open field method Tail suspension, Forced Swim test.*

INTRODUCTION

The *Ficus racemos* fruits of used for the folk lore medicine to the treatment of antianxiety and anti-depressant. The present study is carried out to evaluate the Anti-Anxiety and Anti-Depressant activity of ethanolic extract fruits of *Ficus racemosa* Linn on different model in mice.

Anxiety and anxiety disorder

Anxiety disorders are common. Research shows that up to one in four adults has an anxiety disorder sometime in their life, and that one person likely to have had an anxiety disorder in past year. Anxiety disorders are the most common mental health problem in women, and are second only to substance use disorder in men. Anxiety disorders can make it hard people to work or study, to manage daily tasks and to relate well with others, and often results in financial strain and profound personal suffering.

How dose anxiety affect us?

Whenever the fight or flight response is activated by danger either real or imagined, it leads to changes in three "symptom of functioning ": the way thing (cognitive), the body feels and work (physical) and the way you act (behavioral). How much these three system change varies, depending on the person and context?

Cognitive

Attention shifts immediately and automatically to the potential threat. The effect on a person's thinking range from mild worry to extreme terror.

Physical

Effects include palpitation or increased heart rate, shallow breathing, trembling or shaking, sweating, dizziness or light-headedness, "weak in the knees," freezing, muscle tension, shortness of breath and nausea.

Behavioural

People engage in certain behaviours and others as a way to protect themselves from anxiety (e.g., talking self- defence classes or avoiding certain stress after dark).

What are the anxiety disorders?

Panic disorder, Specific phobia, Social phobia, Obsessive compulsive disorder, Acute stress disorder**.** Posttraumatic stress disorder, Generalized anxiety disorder Posttraumatic stress disorder.

DEPRESSION

What is depression? [4]

Major depression and mania are two extremes of affective disorder which refer to a pathological change in mood state. Major depression is a characterized by symptoms like sad mood, loss of interest and pleasure, low energy, worthlessness, guilt, psychomotor retardation or agitation, change in appetite and /or sleep, melancholia, suicidal thoughts, etc. In bipolar disorder cycles of mood swings from mania to depression occur over time. The mood change may have a psychotic basis with delusional thinking or occur in isolation and induce anxiety. On the other hand, pathological anxiety may lead to depression. Bipolar disorder seems to be most closely linked to family history. Stress and conflict can trigger episodes for people with this condition and it's not uncommon for bipolar disorder to be misdiagnosed as depression, alcohol or drug abuse, attention deficit hyperactivity disorder (ADHD) or schizophrenia.

Different types of depression require different types of treatment Emergency and crisis situations, Suicide Self-harm.

MATERIALS AND METHOD

ANIMALS

Swiss albino mice (male: 20-25g) were used in the present study. The animals were produced from disease free animal house, ultra college of pharmacy, Madurai, Tamilnadu, India They were provided normal diet and tap water and *libitum* and were exposed to 12-h light and 12-h dark cycle. The studies were conducted accordance with the ethical committee and all the animals were sacrificed by euthanasia method. The mice were placed in poly propylene cage and were allowed to acclimatize one week prior to treatments.

Plant material

Fruits of *Ficus racemosa* were collected from Alagar kovil hills, Madurai, Tamil nadu, India, and were authenticated by Dr.Stephen. Ph.D. the department of botany, American college, Madurai, Tamilnadu, India.

QUALITATIVE CHEMICAL EVALUATION

Test for alkaloids, Test for amino acids Test for anthraquinones, Test for flavonoids, Test for glycosides, Test for saponins, Test for triterpenoids.

METHODS

Anxiety Models

1. ELEVATED PLUS MAZE
2. LIGHT AND DARK MODEL
3. OPEN FIELD METHOD

Depressant models

1. TAIL SUSPENSION
2. SWIM FORCED TEST

SCREENING OF ANTI-ANXIETY AND ANTI-DEPRESSANT ACTIVITY

Anxiety

Animals: Mice

- Group: Totally 5 group, each group contain 6 animals
- Group I: Control group (vehicle treated groups is common for Anti-anxiety study)
- Group ii: Anxiety control (caffeine hydro chloride p.o)
- Group iii: Anxiety mice receiving low dose-test (200 mg / kg for p.o administration)
- Group IV: Anxiety receiving mice high dose of plant extract (400mg / kg for p.o administration)
- Group v: Anxiety receiving mice standard drug (diazepam 2 Mg/kg ip).

Elevated plus maze

Procedure

The elevated plus maze consist of two open and two enclosed arms of 50 x 10 x 40cm dimensions, with an open roof arranged in such a manner that the two open arms are opposite to each other. The maze is elevated to a height of 50 cm. the mice weighing (20-30 kg) are housed in pairs for 10 days prior to testing. During this period they are handled by the investigator on alternate days in order to acclimatize than reduce stress. Four mice are taken for each test group. The test drug and the standard are administered 30min prior experimentation by i.p. route. The mice are then placed in the centre of the maze facing one of the enclosed arms. During the next 5 minutes the number of entries into and the time spent in the open and enclosed arms and the total number of arm entries is recorded. The procedure should be conducted preferably in a arm sound-proof room. The values of treated groups are expressed as percentage of control groups in terms of motor activity and open arm exploratory time. Benzodiazepines have been shown to de decrease motor activity and increase open arm exploratory time. Though the method is time consuming, it is considered as reliable measure of anxiolytic activity.

LIGHT AND DARK MODEL [24]

Procedure

The testing apparatus consists of a light and dark chamber divided by a photocell equipped zone. A polypropylene animal cage. 44x21x21cm, is darkened with black spray over one third of its surface.

A partition containing a 13’ cm long x 5 cm height opening separate the dark one third from the bright two third of edge .Extract / vehicle and standard drug is administered through per i.p. route. 30 minutes after i.p. administration the mouse are placed individually on the light compartment and observe for a period of 5 min. Number of rearing, number of locomotion, time spent in light and dark zones and number entries in light zone are observed during this observation period.

OPEN FIELD TEST

Procedure

The open field apparatus is made up plywood consist of 56x56 (1xb) cm. the entire apparatus is

painted black and 6 mm thick white lines divided the floor in to 16 square of identical dimension. Open field is lightening by 40 w bulb focusing on to the field from the height of about100cm.The entire room, except the open field is kept dark during the experiment. One hour after the drug treatment, each animal were placed at once corner of the apparatus and the following behavioral aspects were noted in the next 5 min. Latency: time taken by animal to leave square in which it was placed Ambulation: Number of square passed by animal Rearing: Number of times animal stood on its hind legs. [41]

SCREENING OF DEPRESSANT STUDY

Group I: control group mice (vehicle treated Saline iml/kg p.o Administration)
Group iii: Depressant mice receiving plant extract (200 mg / kg p.o Administration)
Group iv: Depressant mice receiving plant extract (400 mg / kg p.o Administration)
Group v: Depressant receiving standard anti - depressant drug (fluoxetine-20mg p.o)

FORCED SWIM TEST [24]

Procedure

Swiss albino mice weighing 20-30g are used. They are brought to the laboratory at least one day before the experiment and are housed separately in cages with free access to food and water. Swiss albino mice are individually forced to swim inside a vertical Plexiglas cylinder(height; 40 cm; diameter; 18 cm, containing 15 cm of water maintained at 25c. Mice placed in cylinder for the first time are initially highly active, vigorously swimming in circles, trying to climb the wall or diving to the bottom. After 2-3 min activity begins to subside and to be interspersed with phases of immobility or floating of increasing length. After 5-6 min immobility reaches a plateau where the mice immobile for approximately 80% of the time. After 15 min the water the mice are removed and allowed to dry in a heated enclosure (32 C) before being returned to their home cages. They are again placed (42) in the cylinder 24 h later and the total duration of immobility is measured during a 5 min test. Floating behaviour during this 5 min period has been found to be reproducible in different t group of mice. An animal is judged to be immobile whenever it remains floating passively in the water in a slightly hunched but up or standard are administered one hour prior testing. Duration of immobility is measured in controls and animals treated with various doses of a test drug or standard, anti-depressant drugs, but also stimulants like caffeine, reduced duration of immobility. The response can be evaluated.

TAIL SUSPENSION TEST IN MICE [24]

Procedure

Swiss albino mice weighing 20-30 g are used preferentially. They are housed in plastic cage for at least 10 days prior to testing in a light cycle with food and water freely available. Animal are transported from housing room to the testing area in their own cages and allowed to adapt to the new environment for 1 hrs. Before testing. All group of animals are treated injection for i.p. route 30 min prior to testing for the test the mice suspended on the edge of a shelf 58 cm above a table top byadhesive tape placed approximately 1 cm from the tip of the tail. The duration of immobility is recorded for a period of 5 min. mice are considered immobile when they hang passively and completely motionless for at least 1 min.

RESULTS

Table 1: Phytochemical Screening of Ficus racemosa linn (Fruits Extract 70% ethanol)

PHYTOCHEMICALS	ETHANOLIC EXTRACT
Amino acid	-
Anthroquinines	-
Alkaloids	-
Carbohydrate	-

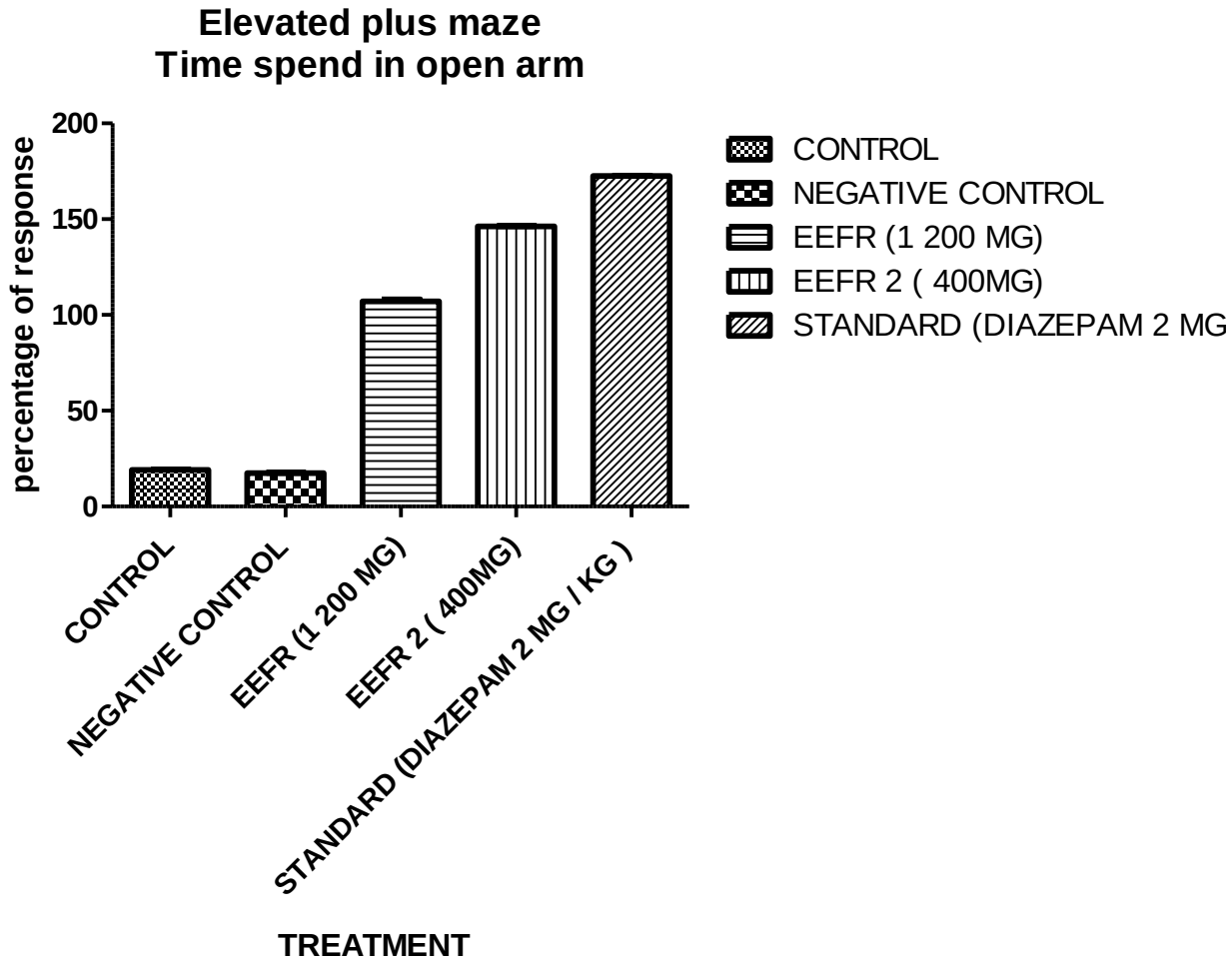
Flavonoids	+
Glycosides	+
Saponins	-
Steroids	+
Tannins	+
Triterpenoids	+
Phenols	+
Fixed oil and fat	+

+= Presence, - = Absence.

ASSESSMENT OF ANXIOLYTIC ACTIVITY

Elevated plus maze (EPM)

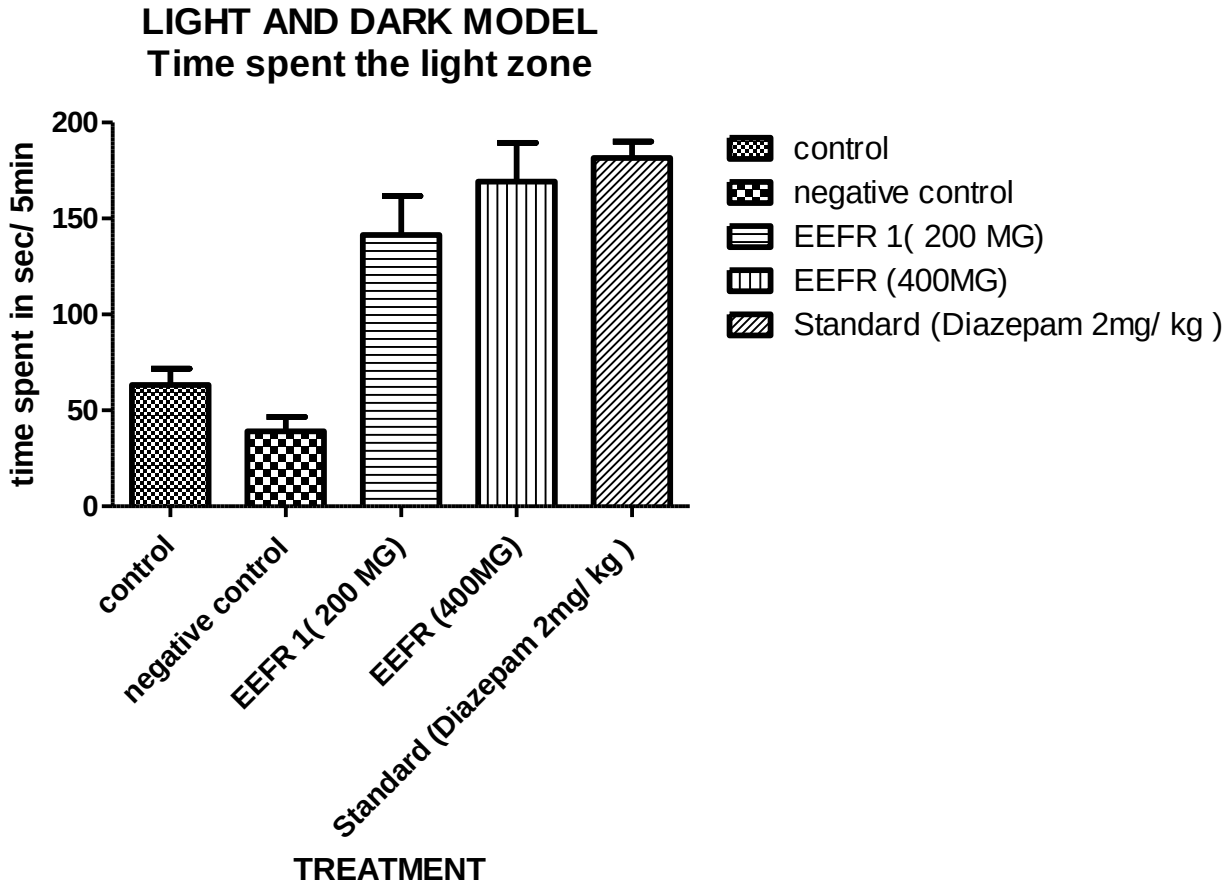
In the EPM, the behavior, which was observed, conformed the anxiolytic of diazepam as reported previously. The ethanolic fruits extract of Ficus racemose is 200mg/kg, significantly (P<0.001) increase the time spent in open arm and increase the same dose 400mg/kg, (P<0.001) increased the time spent in neutral zone. At the dose 400mg/kg decrease time spent in open arm.



Light-dark model

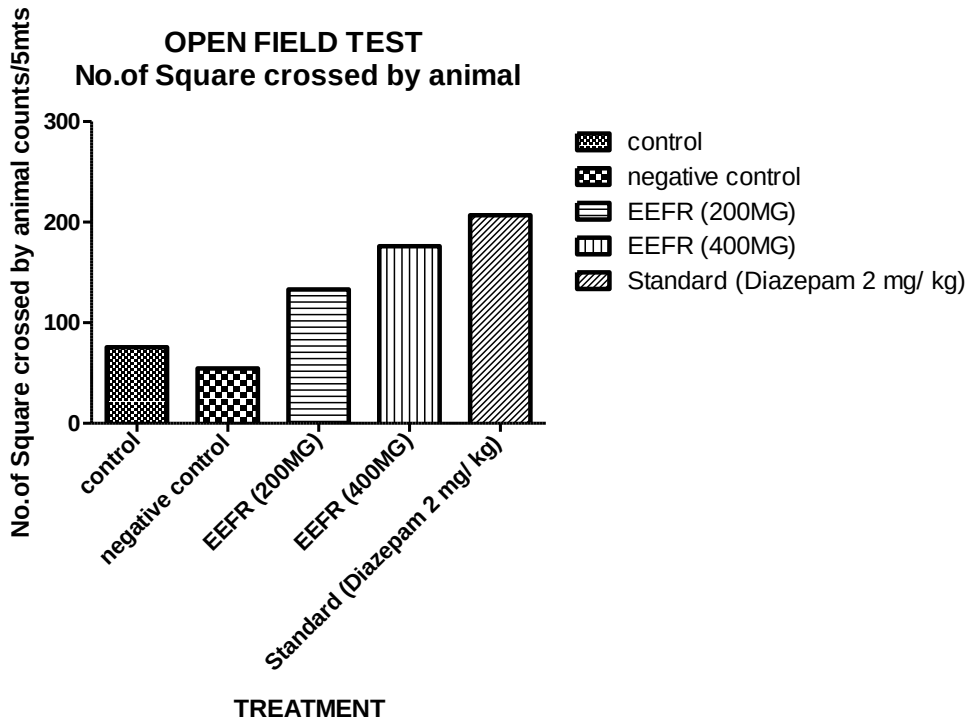
In the light dark model, the diazepam 1mg/kg significantly (P<0.5) shown increase in latency and significantly (P<0.001) increase time spent in light zone and total locomotion at the same dose. The ethanolic extract 200mg/kg (P<0.001) and the decrease the spent in dark zone, increase the spent the light zone. The dose 400 m g/kg, significantly

(P<0.05) decrease the time spent in dark zone and increase time spent in light zone. The both extract of 200mg/kg and 400mg/kg, significantly (P<0.001) increased the total locomotion.



Open field

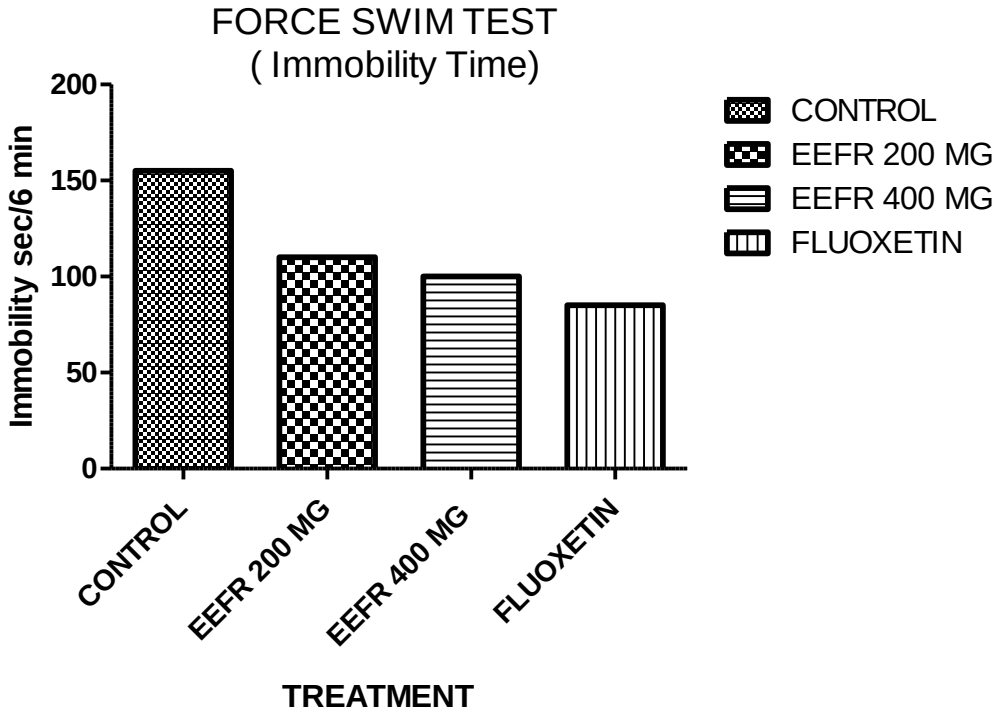
In the open field diazepam (1mg/kg) ethanolic extract is 200mg/kg, significantly (P<0.01) increased total time spent in central compartment while 400mg/kg significantly (P<0.05) increase the total time spent in central compartment, no. of square crossed by animals.



Assessment of antidepressant activity

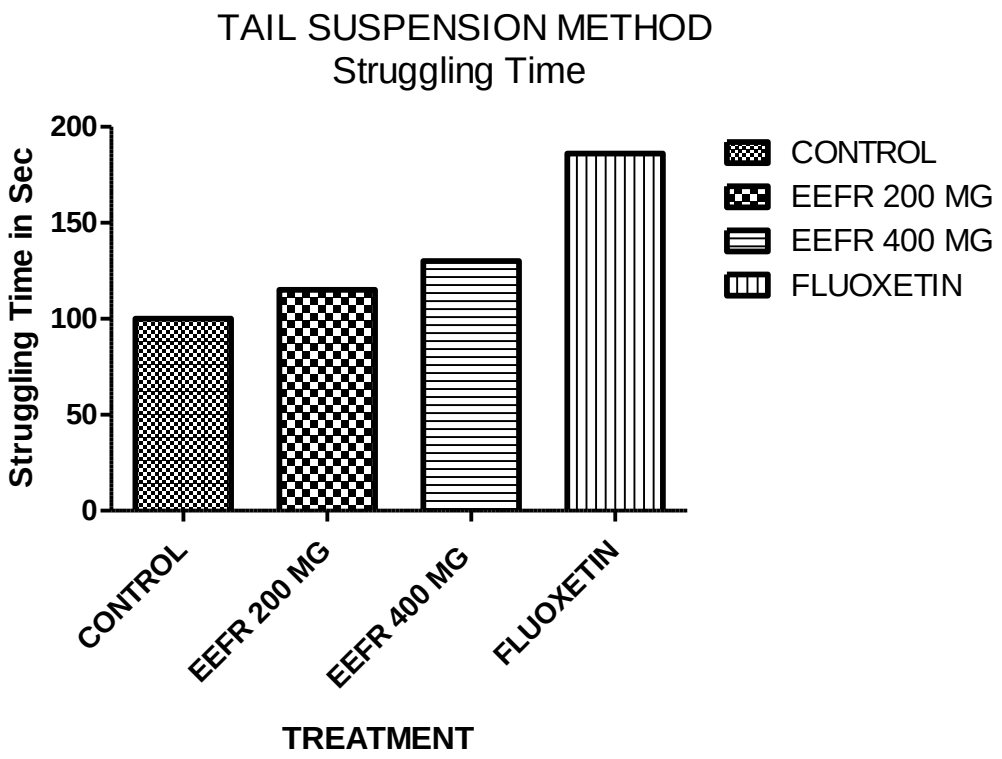
Force swim test

The show the immobility periods the significantly 200mg/kg ($P<0.05$) to reduce the immobility time. The significantly 400mg/kg significantly reduce the immobility, the dose near to standard drugs.



Tail suspension method

The tail suspension test control animal showed a struggling time. The significantly 200mg/kg (P<0.05) increase the struggling time to 15%, and the animal treated with 400mg/kg significantly (<0.01) increased the struggling time by increases 30%.the result shows the antidepressant activity by tail suspension activity by tail suspension method as struggling time has not increased at lower dose and higher dose it produced adequate struggling time as the resulted in



DISCUSSION

The EPM test is based on a premise where the exposure to EPM evoked an approach avoidance conflict that was considerably stronger than that evoked the exposure to an enclosed arm. EPM model is a well-established animal model for testing anxiolytic drugs diazepam, a standard anxiolytic drug is used clinically, is also employed in behavioural pharmacology as a reference compound for including anxiolytic effect. The EPM test is based on premises where the exposure to an EPM evoked approach-avoidance conflict that was considerably stronger than that evoked by exposure to an enclosed arm. The decrease in aversion to the open arm is the result of an anxiolytic effect, expressed by the increase in the spent and entries in to the open arm. The ethanolic fruits extract of *Ficus racemosa*, at 200mg and 400mg/kg, had increased the time spent and percent of entries in to the open arm with percent of entries in to the open arm with percent decrease the in the spent in closed arm. The dose ethanolic extracts of *Ficus racemosa* 200mg and 400mg/kg had increase percent number of entries in to the open arm as compared with control group. In case of rearing there is no much significant difference has been control group with the dose 200mg and 400mg, the time spent the neutral zone is also reduced compared to control groups' .this decrease in number of entry and time spent in dark zone and decrease in the time spent in neutral zone compared to control groups show anxiolytic activity of fruits extract of *Ficus racemosa Linn*

In light –dark model for the screening of anxiolytic activity, four behavioural events were observed, latency to enter into the dark compartment, number of crossing between light and dark compartment, time spent in light zone and number of rearing in light zone. Diazepam 2mg/kg and shown significant effect with all four

parameters. Number of entries in light zone and time spent in light zone increased as compared to control group with 200mg/kg and 400mg/kg dose of both extract. There is increase in number of rearing and in total locomotion as compared to control group. An increase in locomotion and time spent in light zone indicates anxiolytic activity of the ethanolic fruits extract of *Ficus racemosa Linn.*

In the Open Field Model, the conformation with the situation induces anxiety behaviour in mice. In such mice show the thigmotaxic behaviour identified by spontaneous preference to the periphery of the apparatus and reduced ambulation. The anxiolytic treatment decreases this anxiety-induced inhibition of exploratory behaviour. 200mg/kg and 400mg/kg to decrease the time spent in square where it where it was placed and time taken to enter in central compartment as compared to control group. Results obtained from all the doses showed increase the spent in central compartment and increase number of square crossed by the animal which shows decrease in fear of animals, indicates the anxiolytic activity of the ethanolic fruits extract of *Ficus racemosa Linn.*

In the force swim test, the conformation with the situation induced depressant in mice. The ethanolic extract 200mg/kg and 400mg/kg showed the significant antidepressant activity in term of responding to the stress in experimental studies that they exposed in force swim test showed decreased the immobility, to the response indicate the antidepressant activity of the ethanolic extract of fruits of *Ficus racemosa Linn.*

Tail suspension test, the conformation with the situation induced depressant in mice. The ethanolic extract 200mg/kg and 400mg/kg showed the significant antidepressant activity in term responding to the stress in experimental studies they are exposed in tail suspension test showed the animal struggled to escape and the struggling time was increased, to the response indicate the antidepressant activity of ethanolic extract of fruits of *Ficus racemose Linn.*

CONCLUSION

36) From the result our demonstrated that ethanolic extract of *Ficus racemosa* fruits possess a combination of activities like produce Antianxiety and Antidepressant. The ethanolic fruits extract contain β-sitisterol (steroidal compounds) flavonoids, it may possible the mechanism of anxiolytic and sedative action. The extract is bind with highly affinity BZD site GABA –A receptor. From above observation, we can conclude that ethanolic extract of *Ficus racemosa* possess the Antianxiety and Antidepressant activity for both dose level which comparable with the standard drugs (Diazepam & fluoxetine).

BIBLOGRAPHY

[1]. Tripathi KD. Essential of medical pharmacology, JAYPEE brothers, medical publisher (P) Ltd, New Delhi. 6, 439- 452.

[2]. Neil A. Rector PhD. Anxiety Disorders information guide. Library and archives Canada cataloguing in publication. Camh- centre for addiction and mental health centre de toxicomanie et de santé mentale. 3973/02-2011/PM 041.

[3]. 3. Parmar N.S. screening method in pharmacology, Narosa Publishing House PVT. LTD 98-108 and 119-128.

[4]. Beyond blue depression anxiety. Anxiety and depression an information booklet. www.beyond blue.org.av- 1300224636. 9-53.

[5]. Ahamed. F, Urooj. A, Hepatoprotective effects of *Ficus racemosa* stem bark against carbon tetrachloride – induced hepatic damage in albino rats. 210-216.

[6]. Jahan IA, Nahar N, Mosihuzzaman M, Rokeya B, Ali L, Azad Khan AK, Makhmur T, Iqbal Choudhary M. Hypoglycaemic and antioxidant activities of *F.racemosa Linn.* Fruits. 2009, 399-408.

[7]. Ahamed F, Urooj A, anticholinesterase activities of cold and hot aqueous extract of *Ficus racemosa* stem bark. Pubmed- pharmacogn Mag 2010, 142-144.

[8]. Velayutham R, Sankarados N, Ahamed KF. Protective effect of tannins from *Ficus racemosa* in hypercholesterolemia and diabetes induced vascular tissue damage in rats. 2012, 367-373.

[9]. Rao RB, Anupama K, Swaroop KR, Murugesan T, Pal M, Mandal SC. Evaluation of antipyretic of Ficus racemosa bark. 2002, 731-733, 61
[10]. Singh DR, Singh S, Salim KM, Srivastava RC, Estimation of phytochemicals and antioxidant activity of underutilized fruits of Andaman Islands (India). 2012, 446-452.
[11]. Ahmed F, Urooj A, cardio protective activity of standardized extract of *Ficus racemose* stem bark against doxorubicin- induced toxicity. 2012, 468-473.
[12]. Rahuman AA, Venkatesan P, Geetha K, Gopala Krishnan G, Bagavan A, Kamaraj C, Mosquito larvicidal activity of gluanol acetate. a tetracyclic triterpenes derived from *Ficus racemosa Linn.* 2008, 333-339.
[13]. Ahmed F, Siddesha JM, Urooj A, Vishwanath BS. Radical scavenging and angiotensin converting enzyme inhibitory activities of standardized extracts of *Ficus racemosa* stem bark. 2010, 1839-1843.
[14]. Krishna Murti, Upendra Kumar, Enhancement of wound healing with roots of *Ficus racemosa Linn.* In albino rats. Asian Pac J Trop Biomed. 2012, 276-280.
[15]. Sophia D, Manoharan S. Hypolipidemic activities of *Ficus racemosa Linn.* bark in alloxan induced diabetic rats. Afr J Tradit Altern MED 2007, 279-288.
[16]. Mohamed Rageeb Mohammed usman, Patil Rohit, Medicinal uses of *Ficus racemose Linn.* International Journal of pharmaceutical Archive-2(3), 2013, Pp.33-42.
[17]. Baby Joseph, S. Justin Raj, Phytopharmacological properties of *Ficus racemosa Linn*- An overview. International Journal of Pharmaceutical Science Review and Research. 3, 2010, 025.
[18]. Sumit Kumar Tarar, Mandeep Kumar Arora, Ritu Tomar, Umesh Kumar Singh. *Ficus racemosa Linn:* A boon for ailment of human kind. American Journal of Pharmtech Research- 62, 2012, ISSN- 2249- 3387.
[19]. Maxtin, Ficus racemosa, maxtin labs Pvt Ltd, Bangalore, Karnataka, India. www.maxtin.co.in/ficus-racemosa.
[20]. Anita rani shiksharthi, Stuti Mittal, *Ficus racemosa*: Phytochemistry, Traditional uses and pharmacological properties: A review. International Journal of recent advanced in pharmaceutical Research, 4, 2011, 6-15.
[21]. Padmaa M Parrakh, Ficus racemosa Linn- An overview. Natural Product of radiance, 8(1), 2009, 84-90.
[22]. A.Sudhakar, M.Asrar Sheriff, A.K.Sultan Mohideen, shaik Azeem Taj. Phytochemical screening of Ficus glomerata, Roxb. Galled Leaves. International Journal of Pharmaceutical & Biological Archive 3(1), 2012, 105-107.
[23]. A.poongothai, K.P.Sreena, K. Sreejith, M.Uthiralingam, S.Annapoorni. Preliminary Phytochemicals Screening of Ficus racemosa Linn. Bark. International Journal of Pharma and science. 2(2), 2011.
[24]. Text book of Psychotropic and neurotropic. 391-392, 431-432, 434-435,559- 560, 561.
[25]. N.Subrmanain, C.Jothimanivannan, R.Senthil Kumar, S.Kameshwaran, Evaluation of Anti- anxiety Activity of Justicia gendarussa Burm, 4(5), 2013.
[26]. Long Cheng, Guo-feng Pan, Xiao-bo Sun, Yun-xiang Huang, You-shun Peng, Lin –yan Zhou. Evaluation of Anxiolytic- like Effect of Aqueous extract of *Asparagus* stem in mice. Hindawi Publishing Corporation, Evidence- based complementary and alternative Medicine, Article ID 587260, 2013, 10.
[27]. S.Malaviya, K Nandakumar, J Vaghasiya, Y Bhalodiya, N Jivani, N Shet, R Manek, S Chauhan. Anxiolytic activity of root extracts of *Cardiospermum halicacabum* in mice. Internet Scientific Publications, The Internet Journal of Pharmacology. 7(1), 63
[28]. Poonam Mahendra, Sharadha Bisht, Anti-anxiety activity of *Coriandrum sativum* assessed using different experimental anxiety models. An official Publication of the Indian Pharmacological society. Indian Journal Pharmacology, 2011, 547-577.
[29]. Kundan Singh Bora, Aunpam Sharma. Isolation and estimation of anxiolytic principle from *Medicago Sativa Linn.* World Journal of Pharmaceutical Sciences, 3(3), 970-984.
[30]. Kumar S, Sharma A, Anti-anxiety activity studies of various extracts of Turnera aphrodisiac Ward. J Herb Pharmacother. 5(4), 2005, 13-21.
[31]. Saba Shafeen, Srinath Reddy T, Arafath S, Nagarjuna S, Padmanabha Reddy Y. Evaluation of Antianxiety and Antidepressant activity of *Cassia occidentalis* leaves. Asian Journal of Pharmaceutical and Clinical Research, 5(3), 2012, ISSN- 0974-2441.

[32]. F.Josef van der staay, Animal model of behaviour dysfunctions: Basic concept and an evaluation strategy. Brain Research Reviews. Science Direct, 2006, 131-159.

[33]. R.J Rodger, B –J Cao, A. David, A, Holmes. Animal models of anxiety: an ethological Perspective. Brazilian Journal of Medical and Medical and Biological Research 1997, 289-304.

[34]. S.Laura Guzman Gutirerrez,Ricardio Reyes Chilpa, Herlinda Bonalia Jamine. Medicinal plants for the treatment of "nerviou", anxiety, and depression in Mexican Traditional Medicine. ELSEVIER- Revista Brasileria de Farmacognosia, Brazilian Journal of Pharmacognosy, rev Bras farmacogn 2014, 591-608. 64

[35]. Malcom Lader, Malcolm Bruce. States of anxiety and their induction by drugs, Br. J. clin. Pharmac. 22, 1986, 251-261.

[36]. Theresa lbibia Edewor- kuponiyi. Plant –derived with potential sedative and anxiolytic activities. International journal of basic and applied sceience. 02, 2013, 63-78.